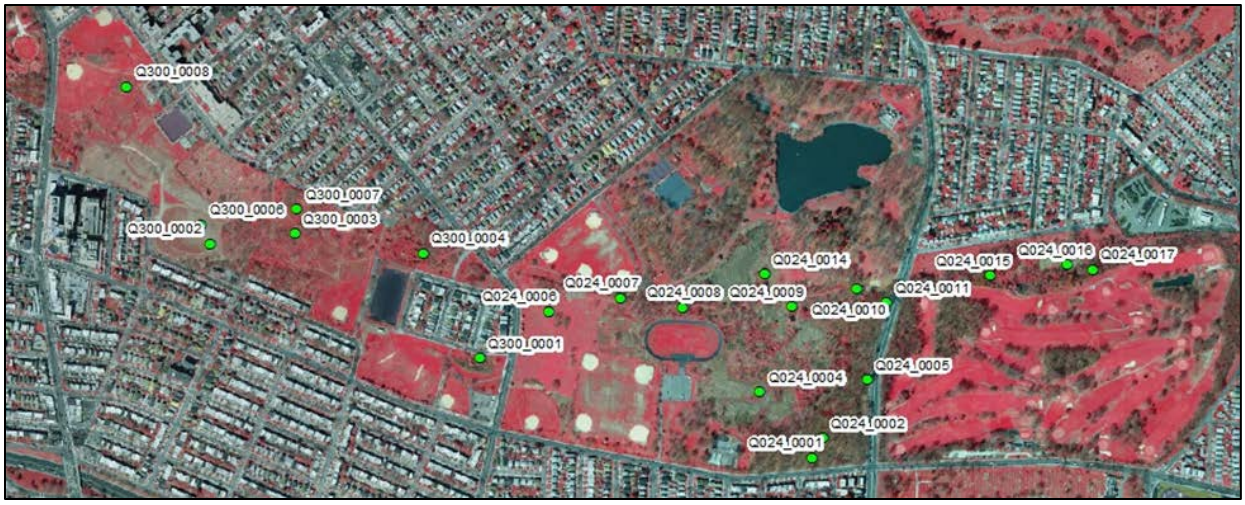
Classification of Natural Areas Conservancy's Ecological Assessment Plots



New York
Natural Heritage
Program

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Established in 1985, the New York Natural Heritage Program (NYNHP) is a program of the State University of New York College of Environmental Science and Forestry (SUNY ESF). Our mission is to facilitate conservation of rare animals, rare plants, and significant ecosystems. We accomplish this mission by combining thorough field inventories, scientific analyses, expert interpretation, and the most comprehensive database on New York's distinctive biodiversity to deliver the highest quality information for natural resource planning, protection, and management. The Program is funded by grants and contracts from government agencies whose missions involve natural resource management, private organizations involved in land protection and stewardship, and both government and private organizations interested in advancing the conservation of biodiversity.

NY Natural Heritage is housed within NYS DEC's Division of Fish, Wildlife & Marine Resources. The program is staffed by more than 25 scientists and specialists with expertise in ecology, zoology, botany, information management, and geographic information systems.

NY Natural Heritage maintains New York's most comprehensive database on the status and location of rare species and natural communities. We presently monitor 181 natural community types, 803 rare plant species, and 474 rare animal species across New York, keeping track of more than 13,500 locations where these species and communities have been recorded. The database also includes detailed information on the relative rareness of each species and community, the quality of their occurrences, and descriptions of sites. The information is used by public agencies, the environmental conservation community, developers, and others to aid in land-use decisions. Our data are essential for prioritizing those species and communities in need of protection and for guiding land-use and land-management decisions where these species and communities exist.

In addition to tracking recorded locations, NY Natural Heritage has developed models of the areas around these locations important for conserving biodiversity, and models of the distribution of suitable habitat for rare species across New York State.

NY Natural Heritage also houses *i*MapInvasives, an online tool for invasive species reporting and data management.

NY Natural Heritage has developed two notable online resources: Conservation Guides include the biology, identification, habitat, and management of many of New York's rare species and natural community types; and NY Nature Explorer lists species and communities in a specified area of interest.

The program is an active participant in the NatureServe Network – an international network of biodiversity data centers overseen by a Washington D.C. based non-profit organization. There are currently Natural Heritage Programs or Conservation Data Centers in all 50 states and several interstate regions. There are also 10 programs in Canada, and many participating organizations across 12 Latin and South American Countries. Our collaboration with NatureServe and other states helps us put our information into a broader context. With NatureServe, we track the rarity of species and natural communities at global and state scales, allowing us to distinguish conservation priorities for species with just a few populations in the world to other species with a few populations in New York but many populations elsewhere. We can also pool our data to look across state and international lines. For example, New York data on rare species and natural communities along Lake Ontario have been combined with similar data from Canada to facilitate analyses of potential consequences of lake-level changes. New York information has also been combined with data from neighboring states to help us understand the significance of our best biodiversity sites relative to similar systems in southeastern Canada, New England, the Mid-Atlantic states, and other Great Lakes states.

Learn more at www.nynhp.org.

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New York Natural Heritage Program

Gregory J. Edinger
Timothy G. Howard
Matthew D. Schlesinger

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Cover photos:
Top left: Plot X092_0184, Van Cortlandt Park, Oak-tulip tree forest (southern), CEGL006075.
Top right: Plot R031_0037, Wolfe's Pond Park, Red maple-sweetgum swamp, CEGL006110.
Center: Kissena Park in Queens with points representing NAC's Ecological Assessment plots.
Bottom left: Plot Q001_0058, Alley Pond Park, Coastal oak-beech forest, CEGL006377.
Bottom right: Plot X092_0284, Van Cortlandt Park, Successional black cherry forest, CEGL009012.

Table of Contents

Table of Figures

Table of Tables

Executive Summary

In the fall of 2015, with support from the Natural Areas Conservancy (NAC), the NY Natural Heritage Program (NYNHP) initiated a study to classify 1183 vegetation plots sampled in 2013 and 2014 as part of the NAC's citywide assessment of natural area parkland in NYC. The objectives for this project were to produce a digital collection of the plots used for this classification effort, in database format, annotated with the vegetation USNVC Association assigned, create a list and describe each vegetation Association documented to be in Parks natural areas based on the plot data, develop a dichotomous field key to the vegetation Associations documented to be in Parks natural areas, and produce a report describing the process used to assess, analyze, and categorize each plot.

Our goal for building a database based on the Excel workbooks was to make a tool that would allow rapid viewing and assessment of the plot data and well as the data restructured by USNVC Association. Thus, once plots were assigned to an Association, information about all plots within one association would be summarized on one visualization form. In order to display plot data succinctly, we summarized much of the information, such as summing DBH values by species in the overstory, averaging percent cover by species across subplots in the understory, and counting vines by species in the overstory and midstory. The final result is a Microsoft Access form with 1183 records (the number of plots) that displays all pertinent plot data in two succinct views. Similarly, the form displaying information by Association contains 70 records (the number of Associations identified) that succinctly summarizes species present in the plots classified to each Association.

We primarily used five existing USNVC keys to classify the 1183 vegetation plots to Association. These included keys to the North Atlantic Coast and Lower New England Ecoregions, and keys to nearby National Park Service units, including the Appalachian National Scenic Trail, Gateway National Recreation Area, and Sagamore Hill National Historic Site. The primary key used for each plot was recorded in the database (KEY USED) as well as the path used to reach the assigned Association (KEY PATH). Plots that did not key out cleanly were assigned up to two additional, alternate Association types (in the CEGL_2 and CEGL_3 fields).

In summarizing the classified plots, of the 44 Terrestrial Associations, 33 were forested. Of the 23 of these that were successional forests, 14 were mostly dominated by native tree species and 9 were strongly dominated by non-native or invasive species (Table 4). About 43% of the plots (504 plots) were classified as one of the following four upland forest types: coastal oak-hickory forest CEGL006336 (164 plots), oak-tulip tree forest CEGL006125 (140 plots), successional southern hardwoods (*Liquidambar styraciflua*) CEGL007216 (111 plots), and successional southern hardwoods (*Robinia pseudoacacia*) CEGL007279 (89 plots). About 17% (201 plots) of the 1183 plots were classified as wetland of which two types were determined to be in the Estuarine system. Of the 197 freshwater wetland plots, about 64% (127 plots) fall into one of the following three red maple swamp Associations: red maple-sweetgum swamp CEGL006110 (72 plots), red maple-blackgum swamp CEGL006156 (29 plots), and red maple-hardwood swamp CEGL006406 (26 plots). There were 6 floodplain forest Associations with a total of 42 plots (4%) identified in this classification.

We developed a dichotomous key to the Associations by first creating leads to grouping plots by three broad Systems: Terrestrial, Palustrine, and Estuarine. Within each system we described subcategories that included important groupings discovered through the rapid classification effort. For example, in the Terrestrial system we divided plots into forested and open uplands and within the forested group we recognized deciduous and evergreen/mixed

forests. Within deciduous forests, separating oak forests from all other forest types was an important first step. Once it was determined the plot was an oak forest, then it was relatively easy to classify the type based on the associated trees in the overstory and/or midstory.

Other conventions that were adopted for use in the key for identifying Palustrine (wetland) plots include the following: 1) plot includes obligate wetland species, 2) plot is within or adjacent to a DEC and/or NWI wetland polygon; 3) plot is within or adjacent to an identifiable unmapped wetland signature on air photo (e.g., area appears flooded on leaf-off CIR air photos).

The key uses the U.S. National Vegetation Classification (USNVC) Association as the basic unit of classification. USNVC CEGL codes are included in the key with the scientific name and common name for each Association. CEGL codes in the 9000 series (e.g., CEGL009001 – CEGL009012) were created for potentially new USNVC Associations that currently are not described by NatureServe. For successional forests and forests dominated by non-native trees, the native, natural type may be able to be classified by excluding the dominant tree species and re-keying the plot on the remaining trees and indicator species if present.

There were several challenges to this classification exercise. The random placement of the plots resulted in many of them being placed at community boundaries and thus reflecting vegetation characteristics of more than one vegetation type. Similarly, some plots ended up in non-target Systems (e.g., forest plots sampling wetlands or open areas). Another classification challenge occurred when vegetation was not identified down to the species level, or simply identified incorrectly. Finally, because invasive species are more likely to grow well in many different vegetation types, plots with many invasive species may mask the native nature of the plot. All of these challenges have the potential to make a plot more variable (or less characteristic) in its vegetation assemblage, in turn making it more difficult to classify cleanly into an Association type.

These forest and wetland plot data are a tremendous resource for strategic planning and management of New York City's natural resources. Having them classified to a consistent, robust, internationally recognized vegetation classification system greatly increases their utility. Additional analyses that could build on this work include a Floristic Quality Assessment (FQA) of the plots, a remote assessment of stressors (Landscape Condition Assessment) on each plot, and a more thorough comparison to the Ecological Covertype Map (ECM).

Introduction

In the fall of 2015, with support from the Natural Areas Conservancy (NAC), the NY Natural Heritage Program (NYNHP) initiated a study to classify 1183 vegetation plots sampled in 2013 and 2014 as part of the NAC's citywide assessment of natural area parkland in NYC. NAC's field assessments were conducted across three main ecological systems: salt marshes, freshwater wetlands, and uplands with data collection protocols unique to each system. In this project we classified plot data from the upland and freshwater wetland assessments. In addition to the field assessment data, we also referenced NAC's remotely-sensed Ecological Covertype Map (ECM) (O'Neil-Dunne et al. 2014).

The four objectives for this project were as follows:

- Produce a digital collection of the plots used for this classification effort, in database format, annotated with the vegetation USNVC Association assigned.
- Create a list and describe each vegetation Association documented to be in Parks natural areas based on the plot data.
- Develop a dichotomous field key to the vegetation Associations documented to be in Parks natural areas.
- Write a report describing the process used to assess, analyze, and categorize each plot. The report will also include the method used for developing the final key for all types documented.

Vegetation sampling plots serve as the ground-truthed "specimen" of an ecological community or vegetation association. Plots record the structure and composition of the vegetation and can be statistically analyzed and grouped based on characteristics that recur in the landscape. A plot dataset can be classified using an existing published classification appropriate to the study area, or by developing a unique, new classification based on the plots alone. For this study we started by using existing published classifications that cover NYC, which we describe in the next section. Consistently classified plots using a standardized classification system have many useful purposes, such as producing accurate vegetation cover maps, documenting locations of invasive species, and identifying areas of high quality versus areas in need of management/restoration. Vegetation classifications, much like the vegetation itself, are dynamic and change over time. As new plots are sampled and old plots resampled, new types may be described and old ones may disappear. More detail on the usefulness of classifications based on plots is presented in the next section.

Vegetation and Community Classification

Since its founding in 1985, the New York Natural Heritage Program has over three decades of experience classifying ecological communities starting with the publishing of Carol Reschke's Ecological Communities of NYS in 1990 (Reschke 1990) and leading up to its latest revision posted online in 2014 (Edinger et al. 2014a). Over this time we have produced classifications for various government agencies and non-profit organizations, such as the Kohler Environmental Center in Wallingford, CT (Edinger 2014) and The Nature Conservancy (Edinger 2003, Bried and Edinger 2009). However, it has been our involvement in the National Park Service (NPS) Vegetation Mapping Program that is most responsible for elevating our classification capabilities to our current high standards. Since 2002 we have produced classifications using the U.S.

National Vegetation Classification (USNVC) for six NPS sites and two National Wildlife Refuges in New York (Klopfer et al. 2002, Edinger et al. 2008a, 2008b, 2014b, 2014b, Perles et al. 2008, Sechler et al. 2008a, 2008b, 2014). It is this culmination of experience that NYNHP brings to the NAC plot classification project.

Classifications have proven to be a useful conservation and natural resource management tool, whether developed at the ecological community level (e.g., Edinger et al. 2014a) or at the vegetation Association level (e.g., USNVC). Classifications provide natural resource managers with a standard set of terms and concepts to describe wildlife habitats. They also provide mapping units to use in plans for managing public and private natural areas such as wildlife management areas, parks, and nature preserves. Classifications can be used to identify ecological communities for environmental impact statements and other forms of environmental review. In combination with NY Natural Heritage and NatureServe's ranking system, these classifications can be used to establish priorities for land acquisition by public agencies and private conservation organizations. Programs for long-term monitoring of environmental change can use the classification to guide the selection of monitoring sites and prioritize land management and restoration activities.

For this project we used the U.S. National Vegetation Classification (USNVC) Association as the basic unit of classification of the NAC plots and cross-referenced them to NY ecological communities (Edinger et al. 2014a). Both classification systems are briefly described below.

U.S. National Vegetation Classification

The U.S. National Vegetation Classification (USNVC, http://usnvc.org/) is maintained through a partnership sponsored by the U.S. Federal Geographic Data Committee (https://www.fgdc.gov/), which brings together Federal agencies, NatureServe (http://www.natureserve.org/), and the Ecological Society of America (http://www.esa.org/esa/). Begun in the 1990s, through the work of The Nature Conservancy, the classification continues to grow as more and more community types are found and analyzed.

The basic unit of vegetation classification in the USNVC is the Association, a plant community type that is relatively homogeneous in composition and structure, and occurs in a uniform habitat. Each Association is assigned a unique Community Element Global code (CEGL) by NatureServe. For example, the Northeastern Dry Oak-Hickory Forest (CEGL006336) is a widespread Association occurs from Maine to Maryland and, based on plot data from these data sets, is a relatively common Association in New York City. Associations recognized by the USNVC are sometimes directly equivalent to communities in state-specific vegetation classifications such as Ecological Communities of New York State (Edinger et al. 2014a) and can usually be cross-referenced to the state classification. In this example, the Northeastern Dry Oak-Hickory Forest (CEGL006336) is equivalent to the coastal oak-hickory forest in the NY classification (Edinger et al. 2014a).

Ecological Communities of New York State

In 1990, NY Natural Heritage published Ecological Communities of New York State, an all-inclusive classification of natural and human-influenced communities. To date we have described 256 ecological communities in the state (181 natural and 75 cultural). From 40,000-acre beech-maple mesic forests to 40-acre maritime beech forests, salt marshes to open alpine communities, our classification has become the primary source for natural community classification in New York and a fundamental reference for natural community classifications in the northeastern United States and southeastern Canada. This classification, which has been

continually updated as we gather new field data, has also been incorporated into the National Vegetation Classification System described above. The most recent version of Ecological Communities of New York State (Edinger et al. 2014a) is available online (http://www.dec.ny.gov/docs/wildlife_pdf/ecocomm2014.pdf).

Methods and Results

Acquisition of Plot Data

NAC provided plot data collected through their Ecological Assessment program for upland and freshwater wetland plots. These data were provided in Excel spreadsheet format. After some discussion about data formats, an initial full set of data was provided on September 4, 2015. This included an Excel workbook for upland data and a second excel workbook for freshwater wetland data. Data for a total of 1183 plots were provided (Table 1). On September 9, 2015, NAC generously provided the upland/forest protocol manual to help us better understand the data in the upland plot dataset and also provided location data for both sets of plots so that they could be viewed in GIS.

Table 1. The number of plots provided and incorporated into the database

Data set	Number of plots
Upland	1124
Freshwater Wetland	59
Total	1183

The Excel workbooks contained sheets (tabs) for each of the types of data collected with eight sheets (plus one lookup table) in the Upland workbook and six sheets in the Freshwater Wetland workbook. Each sheet is described briefly in Appendix A.

Construction of NAC Plots Classification Database

Our goal for building a database based on the Excel workbooks was to make a tool that would allow rapid viewing and assessment of the data provided so that plots may be quickly assigned to different USNVC Associations and NYNHP Natural Communities. Mid-way through development, we realized there needed to be two primary visualization tools: a tool that displays information by plot and secondly, a tool that displays information by USNVC Association (CEGL code). We built both of these tools in a Microsoft Access (v. 2007) database (named "NAC_EA_data_UPL_and_FWW_v5_clean.accdb").

The development of the plot viewer followed the steps outlined in Figure 1.

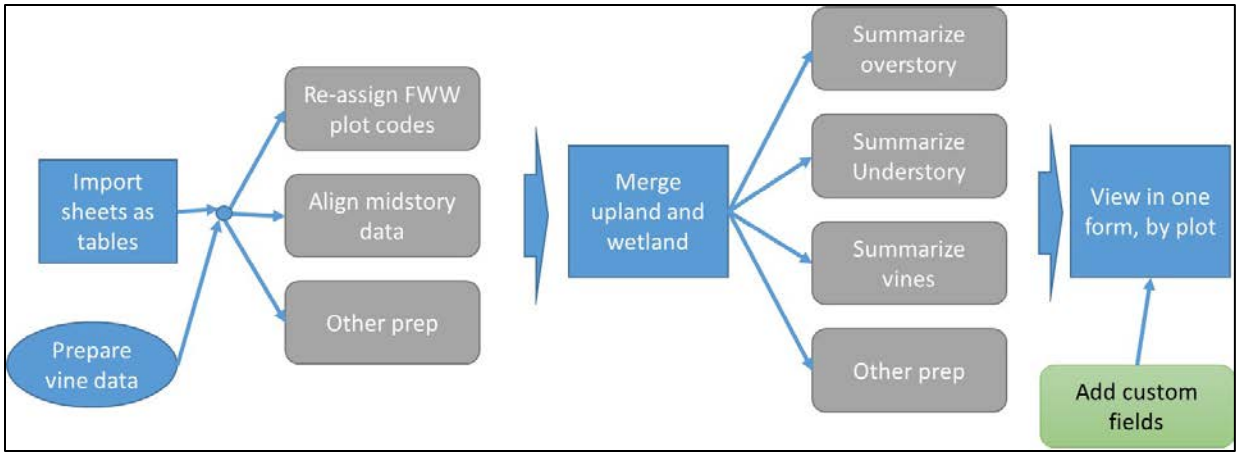

Figure 1. Overview of steps used to create plot viewer tool (form) in the database.

The most important steps included

- Preparing vine data: Vine data were collected in the overstory and midstory tables and we wanted to be able to display a single list of vines found in the plot. To extract the relevant information, we combined and normalized all the vine data in the R statistical program before importing it into the database.
- Re-assigning FWW plot codes. In order to increase our efficiency, we sought to combine the upland and wetland datasets. Before doing so, we needed to modify every usage of the plot code for wetlands with a prefix of "w_".
- Formatting midstory data equivalently in order to combine them.
- Merging upland and wetland. Upland and wetland data were merged within all data collection types (overstory, midstory, understory, ground cover, additional species, woody seedlings).
- Summarizing overstory: To provide two estimates of cover for overstory trees, we summed DBH (diameter at breast height) values by species as well as calculated the total area covered by stems. This is a similar metric to basal area and was calculated using the formula: Area = $pi*r^2$ for each tree and then the total area was the sum of these areas.
- Summarizing understory: We averaged percent cover of species across the four subplots so we could get a representation of percent cover for each species at the plot level. When there were only data for three subplots, we assumed there were no species in the fourth subplot.
- Summarizing vines: Using the pre-processed vine data, we counted the number of vine records for each species, by plot, within both the overstory and midstory layers.
- Displaying each of the primary data sets in sub-forms linked to a primary form by the Plot ID.
- Adding a select set of custom fields to this custom form to annotate the plot data. The purpose of the custom fields was to describe the process used to identify the USNVC Associations and then record the different Associations and NYNHP Natural Communities assigned to each plot. We added a total of 10 fields, as described in Table 2.

Table 2. New fields added to the database for use in the Plot Viewer tool. These fields were used to track the classification decisions made for each plot.

Field	Purpose
Key used	Primary publication/key used to classify plot to USNVC Association (CEGL code).
NVC Classification OK	Checkbox to indicate whether the plot keyed out well using the key in the "key used" field.
Key Path	Documents the series of couplet choices made in the key.
Classification problems	Checkbox to indicate if there were problems with classifying this plot.
Comments	Any comments about classifying this plot
NY Community 1	NYNHP Natural Community assigned to this plot, first choice.
NY Comm 2	Secondary NYNHP Natural Community assigned to this plot, if classification was not clean.
CEGL_1	USNVC Vegetation Association CEGL code assigned to this plot, primary choice.
CEGL_2	Secondary USNVC Vegetation Association CEGL code assigned if the fit to CEGL_1 is not clean.
CEGL_3	Tertiary choice for Vegetation Association.

The final view of a single plot thus has a list unique species found in the overstory, another list for the midstory, and another for the understory (Figure 2). A list of vines observed in either the overstory or understory is also included, as is a list of any additional species observed in the plot. To better understand the density of trees in the plot we include a count of the total number of trees in the plot, irrespective of species. The custom fields described in

Table 2 are also included on this form on this first tab. On a second tab of the form (Raw Data) we display DBH and Vigor data for each tree, each understory species record (subplot and percent cover), as well as the ground cover information collected for each subplot.

Once each plot was classified to an Association (CEGL), we could then summarize plot information by each type. That is the purpose of the second primary form, named "frm_CEGL 1 Summaries" (Figure 3). For each stratum, each species is listed along with the number of plots of this type in which it occurs. We also used this form to summarize species lists into sentence form so there are text fields to allow this prose format. Other tabs list the plots assigned to this type (for each of the CEGL_1, 2, and 3 levels), and the final descriptive paragraph of prose.

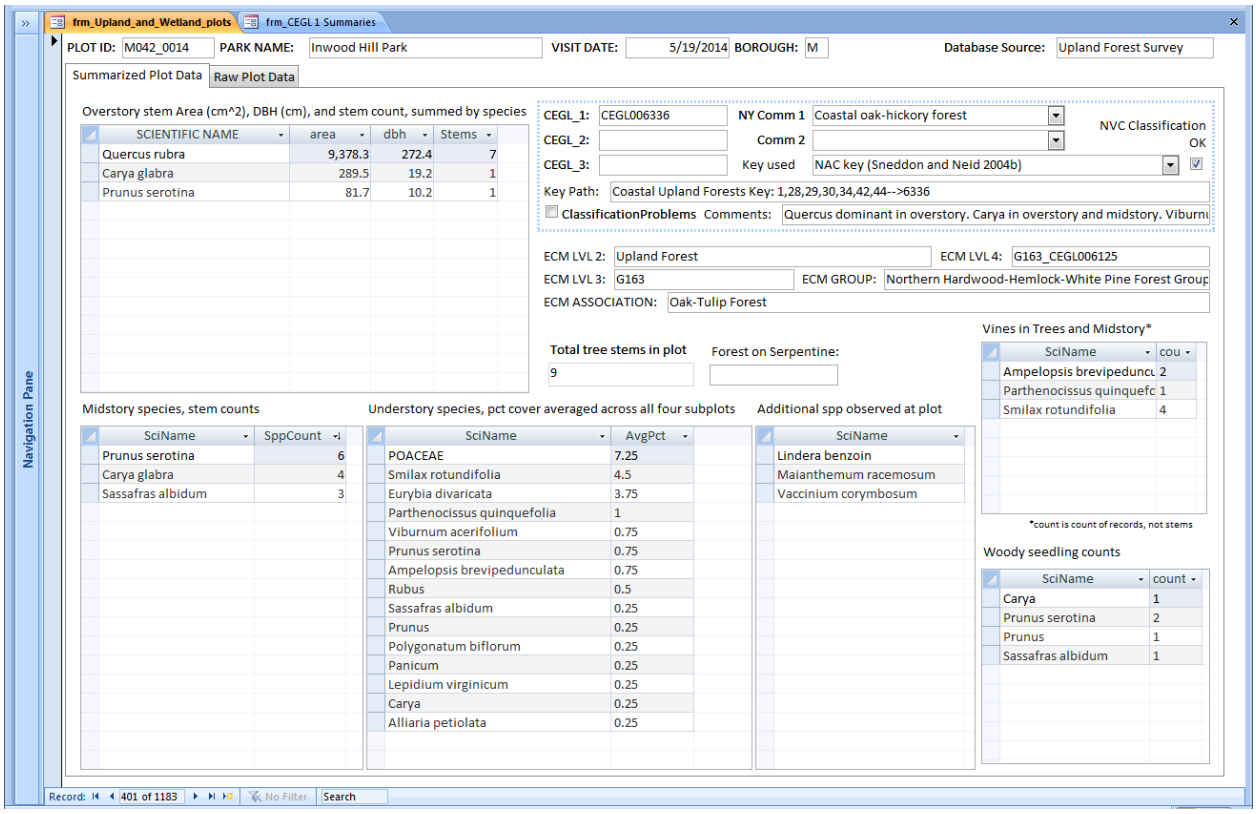

Figure 2. Screen shot of the Form describing data within each plot.

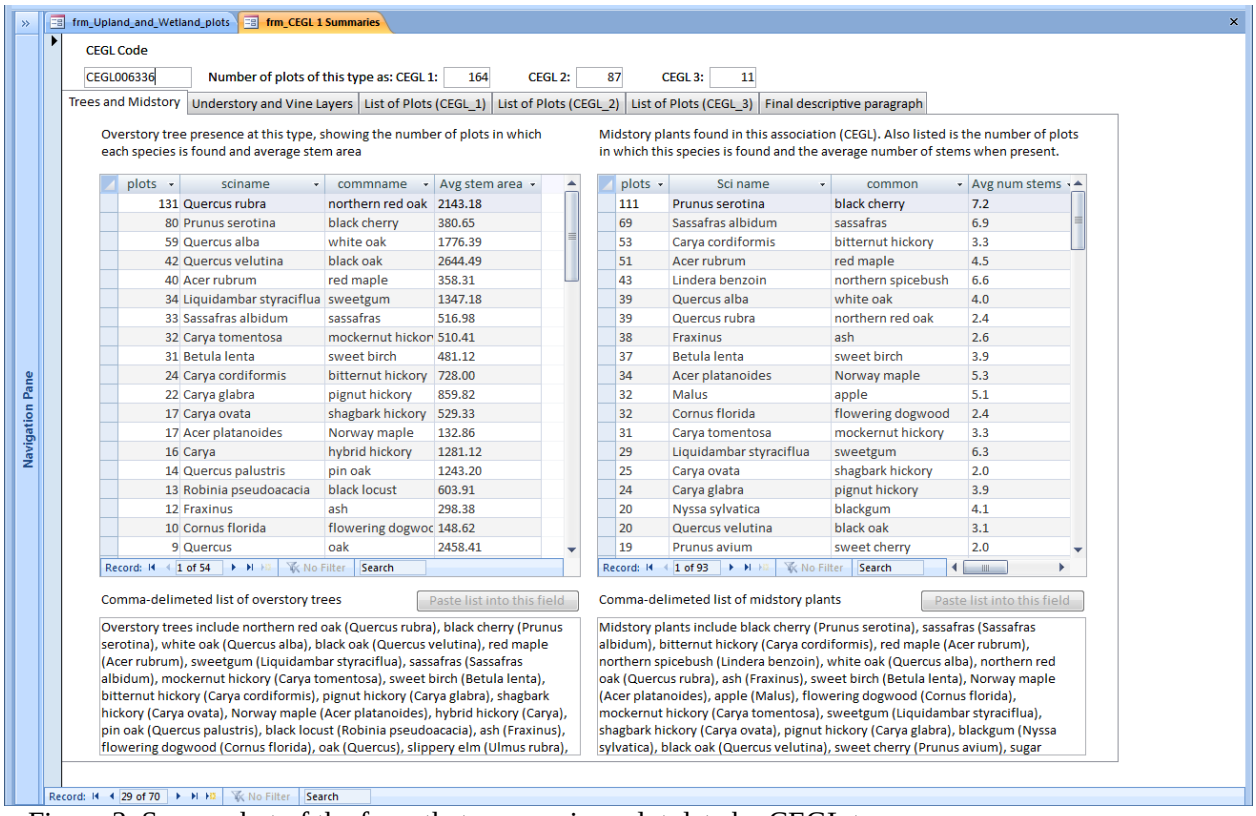

Figure 3. Screen shot of the form that summarizes plot data by CEGL type.

These two forms have many tables, queries, subforms, and even Visual Basic code servicing them. These objects can be viewed via normal routes within Microsoft Access. Additional screenshots are presented in Appendix B.

Rapid Classification of NAC Plots to USNVC Association

We used the following USNVC keys to classify the 1183 vegetation plots (in order of preference):

1. National Vegetation Classification, Vegetation of the North Atlantic Coast (NAC Ecoregion): A key to the types (Sneddon and Neid 2004a).
2. National Vegetation Classification, Vegetation of the Lower New England (LNE Ecoregion)/Northern Piedmont Ecoregion: A key to the types (Sneddon and Neid 2004b).
3. Draft Key to the Vegetation of the Lower New England Section of the Appalachian National Scenic Trail June 2011(NatureServe 2011).
4. Vegetation Classification and Mapping at Gateway National Recreation Area (Edinger et al. 2008a).
5. Vegetation Classification and Mapping at Sagamore Hill National Historic Site (Edinger et al. 2008b).

We used the following USNVC information sources to classify plots that were missing from the keys listed above:

1. International Ecological Classification Standard: Terrestrial Ecological Classifications. Associations of Maine, Massachusetts, New Hampshire, New York, and Vermont (NatureServe 2013).
2. NatureServe Explorer: An online encyclopedia of life (NatureServe 2016a).

Using the Access database described earlier, we sorted the plots alphabetically by PLOT ID (e.g., B018_0002 to X268_0003). This sorting conveniently grouped plots together by PARK NAME (e.g., Canarsie Park to Givans Creek Woods), so we could spatially review clusters of plots in GIS. Using a top-down approach, we looked at the dominant and co-dominant species in the overstory, midstory, understory, and additional species tables in the database to classify the plot. We started with the North Atlantic Coast Ecoregion key (Sneddon and Neid 2004a) and if we successfully keyed out the plot to a good fitting USNVC Association, then we entered the citation for the primary key used in the KEY USED field. Next we recorded the Key Path (e.g., Coastal Upland Forests Key: 1, 28, 29, 30, 34, 42, 44 → 6336) as way to document decisions made while keying the type. We entered the best USNVC CEGL code into the CEGL_1 field and entered the NYNHP ecological community name into the NY_Community_1 field. If the plot keyed out cleanly to one Association or closely fit the description in one of the USNVC information sources, then we checked the NVC_Classification _OK box.

If the plot did not cleanly key out to one Association or if it keyed to two or more types in the keys, then we entered the best USNVC CEGL code into the CEGL_1 field and the second best was entered into the CEGL_2 field. In a minority of cases (91 plots) a third type was entered into the CEGL_3 field. If two or more CEGL codes were entered for a plot, then we would check the Classification Problems box and entered notes in the Comments field.

If we were unable to key the plot to an appropriate Association using the NAC Ecoregion key, then we would try the next key on the list (e.g., LNE Ecoregion key) until a satisfactory type was identified. We worked our way down through the list of keys in this manner for each plot.

We consulted other USNVC publications and resources if the above list of keys did not work. After keying about 200 plots we were able to recognize patterns. Most coastal and maritime types were found in the NAC Ecoregion key while inland types, such as oak-tulip tree forest, were in the LNE Ecoregion key. NYC has characteristics of both ecoregions given that some areas of the city have the topography and geology of LNE Ecoregion while other areas have the vegetation and proximity to the ocean typical of the NAC Ecoregion. Most of Manhattan and the Bronx lie within the LNE Ecoregion (Figure 4). However, coastal influences to the forests likely extend inland beyond the ecoregion boundary given that these lines were drawn at a regional scale (i.e., covering northeast U.S.). Van Cortlandt Park, for example, is relatively close to tidal waters (~1.5 mi. W to the Hudson River, ~6 mi. E to Long Island Sound, and ~6 mi. S to the East River) and may include coastal and non-coastal Associations despite not being on the Coastal Plain. Adding to the confusion, one particular forest Association is found in both the LNE and NAC Ecoregions (CEGL006336). The NVC applies this Association to NYNHP's Appalachian oak-hickory forest in LNE Ecoregion and Coastal oak-hickory forest in NAC Ecoregion. All plots that were classified as CEGL006336 using the NAC Ecoregion key (Sneddon and Neid 2004a) were labelled as Coastal Oak-Hickory Forest for this study.

The more recent publications listed above (e.g., NatureServe 2013) often included Associations that were not described when the ecoregion keys were written (Sneddon and Neid 2004a, 2004b). We entered classification notes into the Comments field that pointed out dominant or abundant species in the various layers (e.g., "Quercus - Carya in overstory").

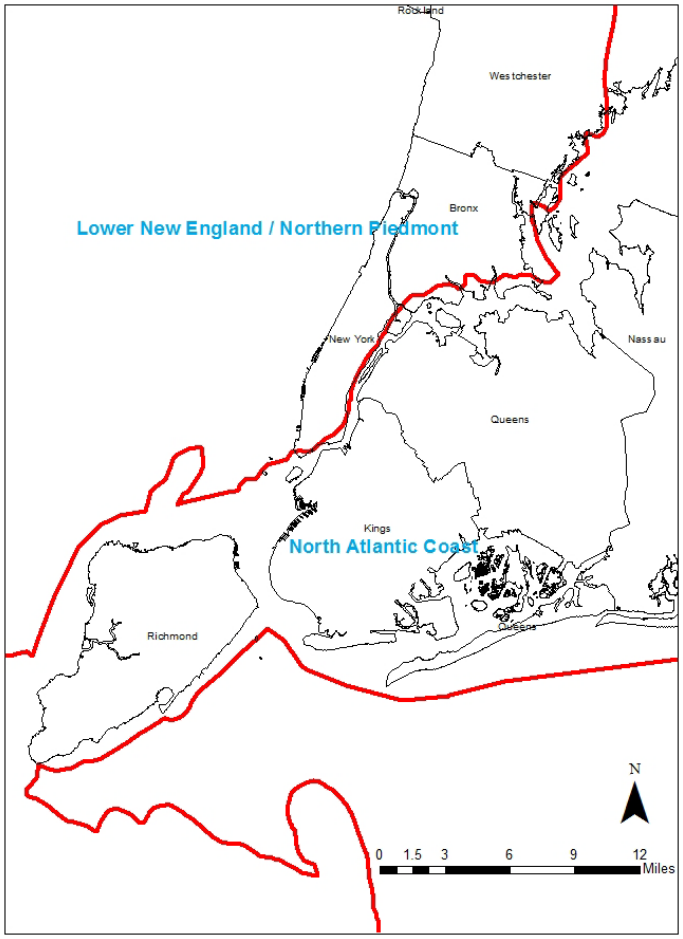

Figure 4. Ecoregions of New York City.

The first go-through was completed by mid-November 2015 and presented to NAC via Webex conference on Nov. 19. Afterwards, problematic plots were keyed using the floodplain forest sections of keys that were not considered on the first round. The Appalachian Trail key (NatureServe 2011) was especially useful in this exercise.

About a dozen types were considered potentially new USNVC Associations that currently are not described by NatureServe and we created CEGL codes in the 9000 series (e.g., CEGL009001 – CEGL009012) for these types.

We classified the 1183 NAC vegetation plots into 62 vegetation cover types as the primary Association (Table 3) of which 48 are existing USNVC Associations, 12 are proposed new Associations, and two are cultural types (e.g., mowed lawn and pine plantation). A detailed classification of these types is

provided in Appendix C (NatureServe 2016b). This classification is a subset of the USNVC and includes descriptions, lists of similar Associations, global rarity ranks, and distribution information for each type found in the study area. The classification includes a summarized description of the vegetation structure and composition derived from NAC plot data for each type.

Table 3. The USNVC Associations plots were classified to as the primary type (CEGL_1). For each Association the number of plots classified to the Association is listed, as well as the NYNHP Natural Community these plots classify to. Each community is also annotated as wetland (w), non-forested (o), or with non-native species characterizing the type (x).

	USNVC Code	Number of plots	NYNHP Community Name
1	CEGL002186	2	Shrub swamp - w - o
2	CEGL004019	1	"Common reed upland" - x - o
3	CEGL004096	27	“Successional Sassafras Forest”
4	CEGL004097	1	Maritime dunes (backdune) – o
5	CEGL004141	10	Palustrine common reed marsh - x - w - o
6	CEGL004187	3	Estuarine common reed marsh - x - w - o
7	CEGL004400	1	Maritime beach - o
8	CEGL006001	2	Floodplain forest (*Acer* - *Ulmus*) - w
9	CEGL006006	1	High salt marsh - w - o
10	CEGL006069	3	Shrub swamp - w - o
11	CEGL006075	7	Oak-tulip tree forest (southern variant)
12	CEGL006088	1	Hemlock-northern hardwood forest
13	CEGL006107	8	Successional old field - o
14	CEGL006110	72	Red maple-sweetgum swamp - w
15	CEGL006114	2	Floodplain forest (terrace) - w
16	CEGL006125	140	Oak-tulip tree forest
17	CEGL006134	1	Chestnut oak forest
18	CEGL006145	41	Successional maritime forest
19	CEGL006156	29	Red maple-blackgum swamp - w
20	CEGL006161	1	Maritime dunes (backdune) - o
21	CEGL006185	11	Floodplain forest (*Quercus palustris*) - w
22	CEGL006217	6	Floodplain forest (*Acer negundo*) - w
23	CEGL006303	20	Successional northern hardwoods (*Populus* - *Betula*)
24	CEGL006336	164	Coastal oak-hickory forest
25	CEGL006373	3	Maritime post oak forest
26	CEGL006375	16	Coastal oak-heath forest
27	CEGL006377	55	Coastal oak-beech forest
28	CEGL006379	22	Maritime shrubland (tall) - o
29	CEGL006380	1	Hemlock-northern hardwood forest
30	CEGL006406	26	Red maple-hardwood swamp - w
31	CEGL006407	27	Successional northern hardwoods (*Acer platanoides*) - x
32	CEGL006438	24	Serpentine Forest

	USNVC Code	Number of plots	NYNHP Community Name
33	CEGL006445	11	Floodplain forest (*Carya cordiformis*) - w
34	CEGL006446	5	Shallow emergent marsh - w - o
35	CEGL006451	11	Successional shrubland - o
36	CEGL006457	4	Maritime dunes (backdune) - o
37	CEGL006506	16	Successional northern hardwoods (*Quercus - Acer rubrum - Betula*)
38	CEGL006575	2	Floodplain forest (*Fraxinus pennsylvanica*) - w
39	CEGL006576	3	Shrub swamp - w - o
40	CEGL006635	7	Beech-maple mesic forest (variant)
41	CEGL007191	25	Successional southern hardwoods (*Ailanthus altissima*) - x
42	CEGL007216	111	Successional southern hardwoods (*Liquidambar styraciflua*)
43	CEGL007221	12	Successional southern hardwoods (*Liriodendron tulipifera*)
44	CEGL007279	89	Successional southern hardwoods (*Robinia pseudoacacia*) - x
45	CEGL007879	10	Floodplain forest (*Juglans - Celtis*) - w
46	CEGL007944	9	Successional southern hardwoods (*Pinus strobus*)
47	CEGL008472	3	"Japanese knotweed marsh" - x - w - o
48	CEGL008503	6	Successional northern hardwoods (*Betula lenta*)
49	CEGL009001	11	Successional southern hardwoods (*Acer pseudoplatanus*) - x
50	CEGL009002	14	Successional southern hardwoods (*Morus alba*) - x
51	CEGL009003	4	Successional southern hardwoods (*Alnus glutinosa*) - x
52	CEGL009004	15	Successional southern hardwoods (*Populus deltoides*)
53	CEGL009005	19	Successional old field (*Artemisia vulgaris*) - x - o
54	CEGL009006	1	Successional southern hardwoods (*Phellodendron*) - x
55	CEGL009007	8	Successional southern hardwoods (*Ulmus*)
56	CEGL009008	3	Successional southern hardwoods (*Fraxinus*)
57	CEGL009009	13	Successional southern hardwoods (*Quercus palustris*)
58	CEGL009010	2	Successional southern hardwoods (*Aralia elata*) - x
59	CEGL009011	4	Successional southern hardwoods (*Malus*) - x
60	CEGL009012	31	“Successional Black Cherry Forest”
61	CEGL00XXXX	5	Mowed lawn with trees - x - o
62	CST007178	1	Pine plantation
	Total	1183	

x = Association dominated by non-native species
w = wetland (Palustrine or Estuarine)
o = non-forested.

Table 4. The number of Associations and plots at higher levels in the classification.

	Number of Associations (% of 62 total)	Number of plots (% of 1183 total)
Terrestrial	44 (71%)	982 (83%)
Terrestrial Forested Uplands	33 (16%)	908 (77%)
Terrestrial Forests (more mature, mostly native)	11 (18%)	416 (35%)
Terrestrial Successional Forests (younger)	22 (37%)	492 (42%)
Terrestrial Successional Native Forests	13 (23%)	315 (27%)
Terrestrial Successional Non-native Forests	9 (15%)	177 (15%)
Terrestrial Open Uplands	10 (16%)	73 (6%)
Terrestrial Native Open Uplands	7 (11%)	48 (4%)
Terrestrial Non-native Open Uplands	3 (5%)	25 (2%)
Terrestrial Cultural Plantations	1 (2%)	1 (<0.1%)
Palustrine	16 (26%)	197 (17%)
Palustrine Forested Wetlands	10 (16%)	171 (15%)
Palustrine Open Native Wetlands	4 (7%)	13 (1%)
Palustrine Open Non-native wetlands	2 (3%)	13 (1%)
Estuarine	2 (3%)	4 (<1%)
Estuarine Native	1 (2%)	1 (<0.1%)
Estuarine Non-native	1 (2%)	3 (<1%)

The majority of Associations were Terrestrial (44 or 71%) as were the majority of plots (982 or 83%) (Table 4). Just over one quarter of the Associations were Palustrine (16 or 26%), but only 17% of the plots (197) were classified as such. Estuarine Associations were not a target type and thus only account for 3% of the Associations in the classification and <1% of the plots sampled.

Plot classification summaries

Upland Forests

Of the 44 Terrestrial Associations, 33 were forested (11 were more mature, mostly native forests and 22 were younger, successional forests). Of the 22 successional forests, 13 were mostly dominated by native tree species and 9 were strongly dominated by non-native or invasive species (Table 4). About 43% of the plots (504 plots) were classified as one of the following four upland forest types: coastal oak-hickory forest CEGL006336 (164 plots), oak-tulip tree forest CEGL006125 (140 plots), successional southern hardwoods (*Liquidambar styraciflua*) CEGL007216 (111 plots), and successional southern hardwoods (*Robinia pseudoacacia*) CEGL007279 (89 plots) (Table 3).

Wetlands

About 17% (201 plots) of the 1183 plots were classified as wetland (indicated by 'w' in Table 3) of which two types were determined to be in the Estuarine system (high salt marsh CEGL006006 - 1 plot and Estuarine common reed marsh CEGL004187 - 3 plots). Of the 197 freshwater wetland plots, about 64% (127 plots) fall into one of the following three red maple swamp Associations: red maple-sweetgum swamp CEGL006110 – 72 plots, red maple-blackgum swamp CEGL006156 – 29 plots, and red maple-hardwood swamp CEGL006406 – 26 plots (Table 3). There were 6 floodplain forest Associations with a total of 42 plots (4%) identified in this classification. Although floodplain forests are classified as Palustrine Associations it is very likely that many plots tagged to these types are no longer wetlands following state and federal

definitions given historic alterations to the landscape that reduced or eliminated the natural flood regime. (If a former floodplain is filled, ditched, drained, or blocked by a hardened shore to the point it no longer floods, then the floodplain trees might persist for a long while, but the community would likely transition to an upland forest type. In plots we examined, the understory tended to lack characteristic native floodplain forest herbs, such as sensitive fern, ostrich fern, and genera such as *Laportea*, *Boehmeria*, *Urtica*, and *Pilea*.) Palustrine common reed marsh (CEGL004141) had the most plots (10) in the open wetland group followed by shallow emergent marsh (CEGL006446) with 5 plots.

Non-native Associations

Of the 62 Associations in the classification 15 (24%) are dominated by non-native species (indicated by 'x' in Table 3) and 18% (218 plots) of the 1183 plots were classified as one of these 15 types.

The non-native Association with the most plots was the successional southern hardwoods dominated by black locust (*Robinia pseudoacacia*) (CEGL007279) with 89 plots. Black locust is not considered native to NY (Werier et al. 2016), but reported as native throughout the lower 48 states by USDA Plants (http://plants.usda.gov/core/profile?symbol=ROPS; USDA, NRCS 2015). Its abundance in NYC may be explained by being introduced at an earlier time given its native proximity and the widespread use of locust logs as fence posts. Further analysis of the plot data is needed to quantify the presence and distribution of non-native and invasive species in the city and to assess which species are prevalent in which Association.

Multivariate Analysis

We used non-metric multidimensional scaling (NMDS) to try to get a better idea of how plots grouped together in ordination space. Ordination has the ability to compare the abundance of all species documented in a plot and then bring together plots that are most similar in species membership and abundance. Plots with many similar species (and their abundance) will appear close together in a graph, while plots with many different species will be further apart in the same graph. To conduct these analyses, we used the R statistical software (R Core Team 2015), with the "RODBC" (Ripley and Lapsley 2015), "vegan" (Oksanen et al. 2015), and "labdsv" (Roberts 2015) packages.

We extracted overstory, midstory, and understory species data, by plot from the database. We kept each stratum separate in the analyses, using DBH as the measure for abundance in the overstory, stem count in the midstory, and percent cover in the understory. Each of these measures was summed by species within each plot.

The entire dataset of all 1183 plots turned out to be a difficult group to work with primarily because of the many plots with intermediate characters or vegetation that characterizes more than one type. This is particularly an issue concerning plots with many invasive species: invasives are often indiscriminate in the habitat they invade, resulting in Associations that would normally be very different in composition having some of the same species (the invasives).

In our final assessment, we extracted only the plots that were tagged as "NVC Classification OK" in the database, totaling 298 plots with 25 Associations. Using "Wisconsin-square root" transformed data and the Bray distance measure we allowed the metaMDS function to find the best solution after 50 random starts. A plot of the final NMDS shows plots (points) scattered with no exceptionally clear clustering but with some separation between groups (Figure 5).

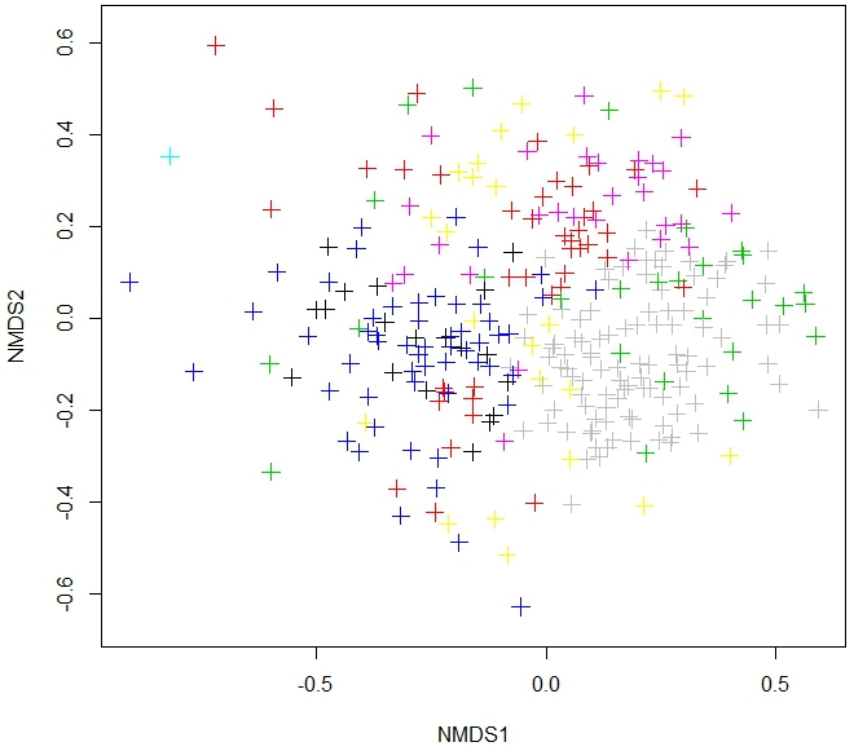

Figure 5. Non-metric multidimensional scaling plot for 298 plots, with points colored by USNVC association type.

To get a better picture of how the plots separated out in the ordination, we plotted smaller groups of Associations in Figure 6. This series of plots shows how the shrub dominated Associations fell out on the left side of the ordination (Figure 5a), the wetland and floodplain Associations were mostly on the upper portion of the ordination (Figure 5c), and the upland forest Associations plotted at the bottom right (Figure 5d). The successional and ruderal forest types, however, grabbed the center of the plot with a wide spread that overlapped in ordination space with nearly all of the other Associations (Figure 5b).

We expect there are ways to filter the data set so that plots might be grouped more cleanly in an ordination. Using only canopy and sub-canopy data, for example, may benefit the forest groups, but likely not the shrubby or herbaceous dominated sites. Similarly, one could perhaps remove some of the most ubiquitous invasive species from the data set to explore how the native Associations grouped without that excess noise. Limited time disallowed any further exploration along these potential routes.

Another analysis that might be of interest, post-hoc, would be to evaluate how much each plot diverges from the ‘true’ representation of its classified vegetation type. As there are so many potential factors that fall into defining the criteria for a plant association, using an ordination such as the NMDS presented here offers a possible approach for doing this. The first, and possibly most difficult step would be to define, in ordination space, the ‘true’ representation of each vegetation type. Ideally there would be one or more existing plots that can be treated as

reference plots for each type. The distance, in ordination space, to the reference plot could then be considered measure for how different a plot is to the ideal representation.

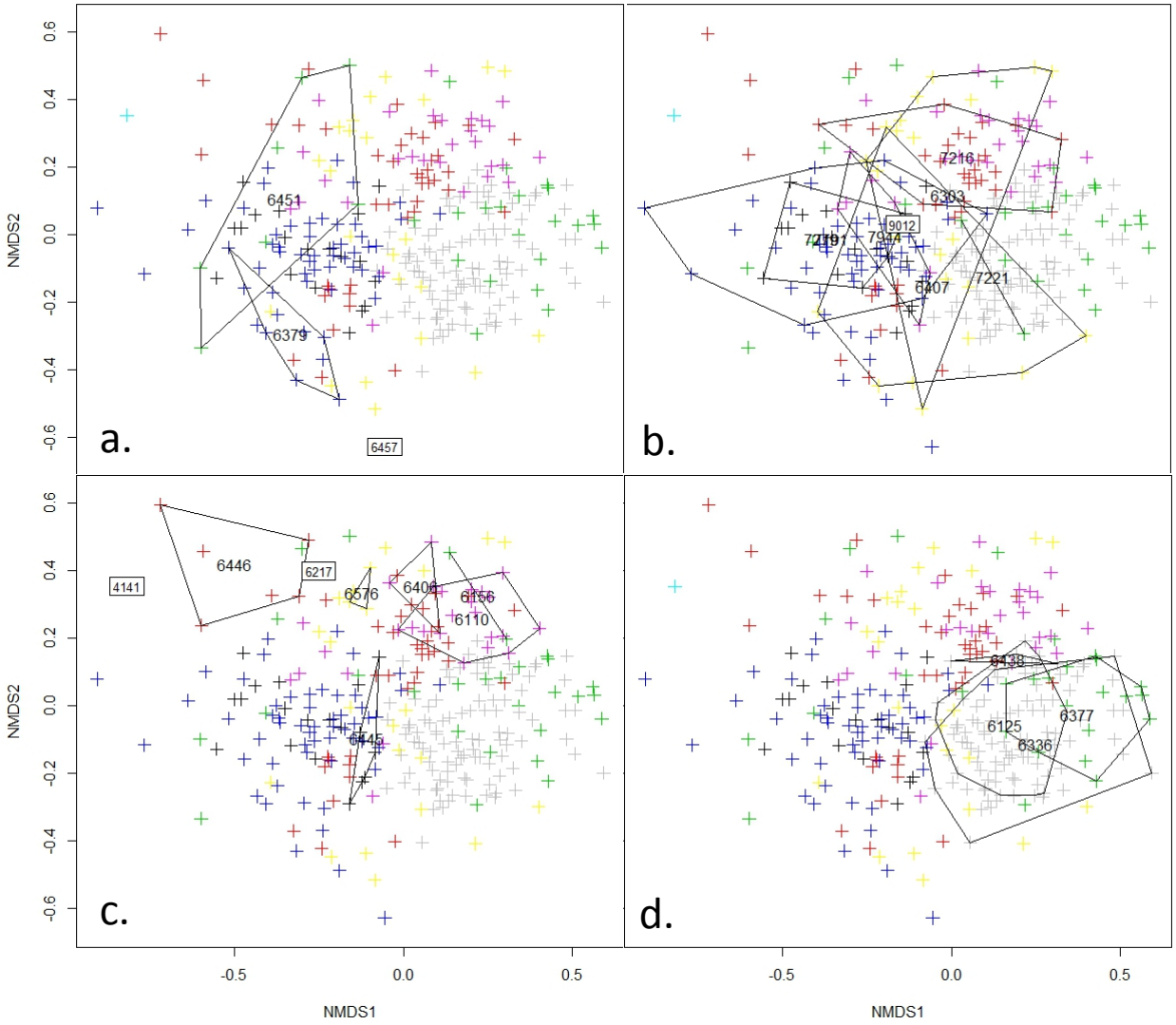

Figure 6. The same ordination as Figure 5, but with different Associations highlighted to show pattern in separation. Each four digit number refers to the final four digits of the Association (CEGL) code. All points for each code fall within the polygon circumscribing each number. Rectangles indicate a single plot represents that association (and is at that location). The panels show the following: (a.) The three shrubby associations (CEGL006451, CEGL006379, CEGL006457); (b.) Ruderal forests (CEGL006303, CEGL006407, CEGL007191, CEGL007216, CEGL007221, CEGL007279, CEGL007944, CEGL009012); (c.) swamps, marshes, and floodplains (CEGL004141, CEGL006446, CEGL006110, CEGL006156, CEGL006406, CEGL006576, CEGL006217, CEGL006445); and (d.) upland forests (CEGL006336, CEGL006377, CEGL006438, CEGL006125).

Development of Plot Classification Key

We developed the key by documenting the approach used in the rapid classification effort described earlier. The first draft took the form of an outline. USNVC Associations were first

grouped by the following three broad Cowardin Systems: Terrestrial, Palustrine, and Estuarine (Cowardin et al. 1979). Within each system we described subcategories that included important groupings discovered through the rapid classification effort. These groupings tended to follow the NYNHP classification of system and subsystems (Edinger et al. 2014a). For example, in the Terrestrial system we divided plots into forested and open uplands and within the forested group we recognized deciduous and evergreen/mixed forests. Within deciduous forests, separating oak forests from all other forest types was an important first step. Once it was determined the plot was an oak forest, then it was relatively easy to classify the type based on the associated trees in the overstory and/or midstory.

We used NAC plot data to identify thresholds between groups. For example, we compared the number of tree stems in the NAC plot overstory and midstory to the number canopy and subcanopy trees in similar-sized forest plots collected by NYNHP in the same community (e.g., oak-tulip tree forest) and determined that about 12 or more stems were needed to classify a plot as forested. We also recognized that about 30 cm DBH was a good cut-off for identifying successional vs. mature forests regardless of species dominance. Mature forests tended to classify easier than successional or modified forests. We recognized that there were hundreds of forest plots dominated by younger trees and theses trees could be native or non-native.

Other conventions that were adopted for use in the key for identifying Palustrine (wetland) plots include the following: 1) plot includes obligate wetland species, such as skunk cabbage (*Symplocarpus foetidus*), lizard's tail (*Sauruus cernuus*), buttonbush (*Cephalanthus occidentalis*), water willow (*Decodon verticillatus*), duckweed (*Lemna* sp.), royal fern (*Osmunda regalis*), rice cutgrass (*Leersia oryzoides*), marsh seedbox (*Ludwigia palustris*), fringed sedge (*Carex crinita*), swamp rosemallow (*Hibiscus moscheutos*), Virginia bugleweed (*Lycopus virginicus*), marshpepper smartweed (*Polygonum hydropiper*), etc.; 2) plot is within or adjacent to a DEC and/or NWI wetland polygon; 3) plot is within or adjacent to an identifiable unmapped wetland signature on air photo (e.g., area appears flooded on leaf-off CIR air photos).

The key uses the U.S. National Vegetation Classification (USNVC) Association as the basic unit of classification. USNVC CEGL codes are included in the key with the scientific name and common name for each Association. CEGL codes in the 9000 series (e.g., CEGL009001 – CEGL009012) were created for potentially new USNVC Associations that currently are not described by NatureServe. For successional forests and forests dominated by non-native trees, the native, natural type may be able to be classified by excluding the dominant tree species and re-keying the plot on the remaining trees and indicator species if present.

We sent the first draft of the key to NAC for review on December 31, 2015. In early 2016 and in response to NAC comments we did the following: 1) we modified the key to make it fully dichotomous, 2) added a few overlooked Associations to the classification, and 3) split successional maritime forest into three distinct types. These three modification steps are described below.

Creation of Dichotomous Key

The original key we developed (above) had some spots where we allowed more than two leads for the user to choose among before choosing the final Association. This approach has both advantages and disadvantages; if the choices are just to discern among many different dominant species, then multiple leads may allow the key to be shorter and more concise. A fully dichotomous key, however, is more likely to ensure that users do not miss any leads and that each couplet is compared equally.

We converted the original key to a fully dichotomous key (Appendix D) by, as much as possible, looking for large differences in environmental setting or for characters that would divide Associations relatively evenly by each split. We tried to avoid situations that simply called for presence of one species in lead (a.) and the absence of that species in lead (b.). At one point that goal resulted in a set of leads based on the seed characteristics of the dominant tree species (such as: are seeds wind dispersed or are the seeds in a berry?). We recognize that those characters may not be available in the field and thus the key may be behaving as an educational tool as a little knowledge in natural history would be beneficial for the user. As this is only used to discriminate among seven Associations, any user could easily jump further into the key if these characters are unknown.

We also changed the format and added some navigation support with this dichotomous version. Each indent level, up to the ninth indent, is set as a new heading style in the Microsoft Word document. Users can turn on the navigation pane (click View tab, then check Navigation Pane) and then click HEADINGS in the navigation pane and a full outline of the key is shown. Each pair of leads can be shown together by hiding all parts of the key that occurs between them. Leads can also be jumped to by clicking on them in the navigation pane.

Although the key was specifically designed to work with NAC's Ecological Assessment plots, it appears suitable as a useful first draft field key to the NYC forest types. The key was used with moderate success on May 10, 2016 where a small group of workshop participants identified three forest types in northern Central Park (Figure 7).

Figure 7. NY Natural Heritage Program Chief Ecologist Greg Edinger leads workshop participants in a forest keying session in northern Central Park. Photograph by Helen Forgione.

Additional Associations

We discovered the following three Associations in the NYC Ecological Covertype Map (ECM, O'Neil-Dunne et al. 2014) that were not included in the keys used to do the rapid classifications step: Oak-tulip tree forest (southern variant) (CEGL006075), serpentine forest (CEGL006438), and maritime post oak forest (CEGL006373). We reviewed the database for plots that may be classified as these Associations and the steps are described below.

Oak-tulip Tree Forest

On the first go through, plots with oak and tulip tree in the overstory and/or midstory were classified as oak-tulip tree forest (CEGL006125). The Ecological Covertype Map (ECM) used this and another Association (CEGL006075) for oak-tulip tree forests. By identifying characteristic species that tended to be unique to each (i.e., possible indicator species) we reviewed plots that were classified as oak-tulip tree forest (CEGL006125) and coastal oak-beech forests (CEGL006377) that had some tulip tree in the overstory and /or midstory for candidates to reclassify as CEGL006075.

Oak-tulip tree forest (CEGL006125) indicators include sugar maple (*Acer saccharum*), blackgum (*Nyssa sylvatica*), sweet birch (*Betula lenta*), basswood (*Tilia americana*), and spice bush (*Lindera benzoin*). Whereas, American beech (*Fagus grandifolia*), sweetgum (*Liquidambar styraciflua*), sassafras (*Sassafras albidum*), American holly (*Ilex opaca*), and highbush blueberry (*Vaccinium corymbosum*) are indicators of oak-tulip tree forest (southern variant) (CEGL006075). These species can occur in either type, but we classified plots based on the prevalence of the suite of indicators.

Successional Maritime Forest

While building the initial key we noticed that three distinct types were being lumped under successional maritime forest (CEGL006145):

1. Typical successional maritime forest with black cherry (*Prunus serotina*) dominant in overstory and/or midstory with or without Sassafras (*Sassafras albidum*). Trees stunted, gnarly due to salt spray influence forming an open woodland (usually <20 tree stems in plot). Maritime shrubs are indicators when present (*Rhus glabra, Rhus copallinum, Morella pensylvanica,* and *Viburnum dentatum*). Round-leaved greenbrier (*Smilax rotundifolia*) is an indicator when present. Plots (41) that met these criteria remained classified as successional maritime forest (CEGL006145).
2. Black cherry (*Prunus serotina*) dominant in overstory and/or midstory forming a forest canopy (usually >20 tree stems in plot). Trees of normal stature and very rarely influenced by salt spray. Sassafras (*Sassafras albidum*) and maritime shrubs absent or negligible. Plots (31) that met these criteria were reclassified as successional black cherry forest (CEGL009012).
3. Sassafras (*Sassafras albidum*) dominant in overstory and/or midstory forming a forest canopy (usually >20 tree stems in plot). Trees of normal stature and very rarely influenced by salt spray. Black cherry (*Prunus serotina*) and maritime shrubs absent or negligible (CEGL004096). Plots (27) that met these criteria were reclassified as successional sassafras forest (CEGL006145).

Post Oak Forest

Eight plots in the dataset were found to have post oak (*Quercus stellata*) in either overstory or midstory. Post oak is a characteristic tree in maritime post oak forest (CEGL006373) and an associate species in the serpentine forest (CEGL6438) discussed below. Three plots with post oak were reclassified as maritime post oak forest (CEGL006373) (R143_0033, X039_0057, X039_0191). Coincidentally, plot R143_0033 was located within a polygon for maritime post oak forest NYNHP Element Occurrence (EO ID 1041) that further confirms that it should be reclassified as this type. Four other plots with post oak were reclassified as Serpentine Forest (CEGL006438) and were located within or adjacent to NYNHP Element Occurrences of

serpentine barrens. The one remaining post oak plot (Q015_0010) was in wetland and remained classified as a red maple-sweetgum swamp (CEGL006110).

Serpentine Forest

The Serpentine Forest Association (CEGL006438) was not included in the first go through of plot classification. We searched the database for upland forested plots on serpentine bedrock geology using GIS. We found 101 plots that met these criteria and entered "True" into the Forest on Serpentine field. Each candidate plot was reviewed in the database and viewed in GIS and reclassified as the Serpentine Forest Association (CEGL006438) if characteristic species were present and the plot was within or adjacent to NYNHP Element Occurrences of serpentine barrens. Of the 101 plots on serpentine, 24 were reclassified as Serpentine Forest (Table 3).

Comparison to the Ecological Covertype Map

As discussed elsewhere, the Ecological Assessment plot sampling design was not intended as a test of the Ecological Covertype Map (ECM) but it may be able to inform our interpretation of that coverage. To that end, we compared three classification levels—the Formation Subclass, Macrogroup, and Association—as determined from plots with that tagged to the ECM raster cell within which the plots were located. Unsurprisingly, the deeper into the classification hierarchy, the greater the mismatch between the ECM and the plot classification.

Of the 1053 plots located in cells whose ECM classification enabled a Formation Subclass assignment, 913 (86.7%) had a plot-based classification that matched (Table 5). When plots were restricted to those with greatest confidence in classification (NVC CLASSIFICATION OK box checked), 244 of 297 plots (82.2%) matched (Table 6).

Of the 1079 plots located in cells whose ECM classification enabled a Macrogroup assignment, 269 (24.9%) had a plot-based classification that matched (Table 7). When plots were restricted to those with greatest confidence in classification (NVC CLASSIFICATION OK box checked), 89 of 269 (33.1%) matched (Table 8).

Of the 789 plots located in cells that were classified at the Association level in the ECM, our plot-based primary classification matched that of the ECM in 163 cases (20.7%; Table 9). That count rose to 250 cases (31.7%) including the secondary or tertiary plot-based Association classification. When we included only those plots for which classification was easiest (NVC CLASSIFICATION OK box checked), 54 out of 193 plots (28.0%) matched (Table 10).

Table 5. Comparison of Formation Subclass classifications from Ecological Covertype Map and plot samples. Matching classifications are in bold text.

	Primary plot-based Formation Subclass					
ECM Formation Subclass	Shrub & Herb Wetland	Temperate & Boreal Forest & Woodland	Temperate & Boreal Grassland & Shrubland	Woody Agricultural Vegetation	None	Total
Shrub & Herb Wetland	**15**	13	2		5	35
Temperate & Boreal Forest & Woodland	3	**894**	9	1	94	1001
Temperate & Boreal Grassland & Shrubland	4	24	**4**		11	43
None	9	64	11		20	104
Total	31	995	26	1	130	1183

Table 6. Comparison of Formation Subclass classifications from Ecological Covertype Map and plot samples for which "Classification OK" was checked. Matching classifications are in bold text.

	Primary plot-based Formation Subclass					
ECM Formation Subclass	Shrub & Herb Wetland	Temperate & Boreal Forest & Woodland	Temperate & Boreal Grassland & Shrubland	Woody Agricultural Vegetation	None	Total
Shrub & Herb Wetland	**3**	5	2		5	35
Temperate & Boreal Forest & Woodland	1	**240**	9	1	94	1001
Temperate & Boreal Grassland & Shrubland	4	10	**4**		11	43
None	1	25	11		20	104
Total	9	280	26	1	130	1183

Table 7. Comparison of Macrogroup classifications from Ecological Covertype Map and plot samples. Matching classifications are in bold text.

	Primary plot-based Macrogroup										
ECM Macrogroup	M013	M033	M060	M069	M079	M123	M303	M502	M504	M883	Total
M013	**45**	20		1		4		39	16	21	191
M033		**3**						3	4		15
M060		2	**1**								3
M066							3				4
M067		1		2		1	2		1		8
M069	1			**1**			1	2			8
M079					**1**		1	1			3
M123	18	1		4		**2**		1			40
M303	2	1				1	**4**		1		12
M502	78	42		1		3		**161**	24	76	503
M504		1						1	**2**	1	6
M883	68					2	1	110	10	**49**	286
Grand Total	241	72	1	13	1	19	17	344	60	147	1183

Table 8. Comparison of Macrogroup classifications from Ecological Covertype Map and plot samples for which "Classification OK" was checked. Matching classifications are in bold text.

	Primary plot-based Macrogroup										
ECM Macrogroup	M013	M033	M060	M069	M079	M123	M303	M502	M504	M883	Total
M013	**17**	6		1		1		10	1	2	191
M033		**1**						2			15
M067				1		1	1				8
M069	1			**1**							8
M079								1			3
M123	8			4		**1**		1			40
M303	1	1									12
M502	24	9				1		**58**	2	19	503
M504								1	**1**		6
M883	23					1		34	1	**10**	286
Grand Total	241	72	1	13	1	19	17	344	60	147	1183

Table 9. Comparison of Association classifications from Ecological Covertype Map and plot samples. Matching classifications are in bold text.

	Primary plot-based Association											
ECM Association	6075	6125	6145	6336	6373	6377	6379	6438	Other	Most common nonmatching plot Associations	Number with matching secondary or tertiary Association	Total
6075									7	Various	0	7
6125	3	**43**	7	74	2	9	1		152	7216 (13), 7279 (31), 9000s (31)	16	286
6336_6377	4	71	5	**64**	1	**39**		18	237	6110 (40), 7216 (67), 9000s (27)	60	434
6373									4	Various	0	4
6379_6145			**9**				**6**		29	7279 (9), 9000s (9)	6	44
6438		4		1		1		**2**	6	4096 (3)	5	14
Group level		22	20	25		6	15	4	302	-	-	394
Total	7	140	41	164	3	55	22	24	737	-	87	1183

Table 10. Comparison of classifications from Ecological Covertype Map and plot samples for which "Classification OK" was checked. Matching classifications are in bold text.

	Primary plot-based Association									
ECM Association	6075	6125	6145	6336	6373	6377	6379	6438	Other	Total
6075									3	3
6125		**7**		28		1			33	69
6336_6377		17	1	**33**		**14**		3	33	101
6373									1	1
6379_6145			**4**				**3**		10	17
6438		2							0	2
Group level		2	10			2	4		-	105
Total	0	28	15	67	0	17	7	3	137	298

Discussion

Classification Challenges

There were several challenges to confidently classifying the NAC vegetation plots.

Plots on Ecotones

Since the plots were randomly placed within a predetermined grid system and not placed in representative locations of types that could be recognized from air photos or on the ground, plots may have species that are characteristic of two or more types. For example, if a plot was sampled on a wetland/upland ecotone it would not be surprising to find species characteristic of two widely differing Associations in the plot data. The same would be true if a plot was sampled at the boundary between a forest and open area devoid of trees.

Plots in Non-Target System or Type

NAC Plots were targeted to be sampled in either the Terrestrial (upland) or Palustrine (wetland) systems within natural areas that were designated by the New York City Department of Parks and Recreation (NYC Parks) as "Forever Wild" preserves and natural area parkland. We found upland plots that were clearly wetlands (e.g., R013_0094 and R143_0094) and vice versa (e.g., w_R106_0049 and w_X039_0086). There are numerous non-forested plots in the dataset, both Palustrine and Terrestrial. There are cultural types (e.g., mowed lawns) and even a few plots were determined to be Estuarine system types.

Plots with Incomplete or Questionable Species Identification

Numerous plots have plants identified only to the genus level (e.g., *Fraxinus* sp., *Carya* sp., *Ulmus* sp., *Acer* sp., *Cornus* sp. etc.) or to a general category (e.g., grasses, Poaceae, mowed lawn, etc.) making confident classification difficult. This is compounded by the fact that some genera and groups include native and non-native species that are characteristic of widely divergent USNVC Associations (e.g., native *Acer saccharum* vs. non-native *Acer platanoides*). In other cases, different species within the same genus may indicate wetland vs. upland (e.g., *Cornus amomum* vs. *Cornus racemosa* and *Quercus bicolor* vs. *Quercus alba*). Questionable species identifications include the following: 1) a rich shrub fen species, alder-leaved buckthorn (*Rhamnus alnifolia*), was listed as present in the overstory (10.2 cm DBH) of coastal oak-heath forest plot (X039_0191), 2) a shrub (*Quercus marilandica*) is listed as the only woody plant in the overstory in plot X039_0072 with a 57.7 cm DBH. Both examples are presumed to be either misidentified or data entry typos. There may be other cases in the dataset.

Plots with Abundant Invasive Species

As expected in urban natural areas, human-caused disturbances and proximity to development, increases the opportunity for invasive species to appear in plots. There are at least 14 USNVC Associations in this classification that are dominated by non-native, invasive plants. These invasive species along with dozens of others appear in plots that may key out to a native type. Their presence can obscure and confound the classification of Associations dominated by native species. More research into the invasiveness of the native sweetgum (*Liquidambar styraciflua*) is needed as it appears to be spreading into native upland forests types, especially on Staten Island.

Land-use History and Plot Classification

Not knowing the land use history of the site adds greater challenge to plot classification. Past land use might explain why two plots near each other in the same forest block classify as two different Associations. Areas within the forest may have been cleared at different times (e.g., before or after a particular invasive species was introduced to NYC). This may send the cleared area on a different successional trajectory compared to the adjacent forest. See discussion regarding black locust (*Robinia pseudoacacia*) in the Non-native Associations section above.

The ECM and Plot-based Classification

Our comparison between the ECM and the plot-based classification showed that a mismatch was the rule rather than the exception, especially at lower levels in the classification and for those plots for which we had less confidence in their classification. As this analysis was additional to our scope of work, we can only scratch the surface of the value of these plot data as an ECM accuracy assessment. Because the plot data were collected for a purpose other than community classification and map accuracy assessment, they do not constitute an ideal test of the accuracy of the ECM. Further, the ECM was not designed for accurate representation at the pixel level, but rather to be used at coarser scales. Regardless, here are some general thoughts about mismatches between the two data sources.

Mismatches between the ECM and the plot-based classification could result from a variety of factors. Some possible causes are the difficulties in classification from the plot data as described above. In particular, the systematic random location of plots led to many plots falling on ecotones, which means the plot center could lie within an ECM raster cell of one type, with the majority of the plot falling within another type. In addition, the ECM is a 1-m pixel map, while the plots were considerably larger. Perhaps the best test of the ECM would not be to assign an ECM value based on plot center, but assign based on the most commonly occurring type within 10 cells. This might better match the scale of the plot data. Finally, we have a better sense of the natural communities of NYC now than we did at the time the ECM was built. Some types thought five years ago to occur in NYC may not.

Potential Next Steps

These forest and wetland plot data are a tremendous resource for strategic planning and management of New York City's natural resources. Having them classified to a consistent, robust, internationally recognized vegetation classification system greatly increases their utility. Working closely with these data throughout this project gave us the opportunity to recognize additional potential for analysis that could further support NAC's mission. We briefly describe some of this below.

For example, coefficient of conservatism values have recently been assigned to all plant species known to occur in New York State. With this new list, a Floristic Quality Assessment could be conducted for all plot data (Swink and Wilhelm 1994, Chamberlain and Ingram 2012). An FQA by plot would provide information about site condition and quality that could support management prioritization.

Another perspective of site quality could be obtained by looking at the impact of local stressors on each plot. A GIS surface, the Landscape Condition Assessment, provides such a measure that can be intersected with all plots. Interpreting stressor metrics such as this in conjunction with condition estimates such as the FQA allows managers to compare those two metrics to explore the possibility of finding sites with higher restoration potential (lower

measured stressors) or sites that need additional management protection (measured as higher condition but appearing to be under high stress), for example.

Finally, we briefly explored the alignment between the ECM and the classified plots in this report. While some intriguing discrepancies emerged, further analysis may be helpful in understanding those discrepancies. Examining common mismatches and substituted Associations or Macrogroups could be informative, and a neighborhood analysis for ECM assignment to plots would better represent the scale of the vegetation plot data.

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Appendix A. Summary of Data Provided by NAC

Upland Forest workbook ("EA DATA – Upland Forest – NAC.xlsx")

Sheet (Tab in workbook)	Description
TREES	Identity, DBH, and vine information for every tree documented. Also some plot-level information from the ECM. 12581 records.
Midstory (2013)	Identity, stem count, and vine and herbivory information for all species found in the midstory for the 2013 plots. 1338 records.
MIDSTORY (2014)	Identity, vine and herbivory information for all individuals found in the midstory for the 2014 plots. 22825 records.
HERBACEOUS SPECIES PERCENTAGE	By subplot, the identity and percent cover for all species found in the herbaceous subplots. 21599 records.
WOODY SEEDLING COUNT BY PLOT	Identity and count for all tree seedlings found in each plot. 2107 records.
COUNT WOODY SPECIES BY PLOT	Identity and count by species and stratum for woody plants occurring in the overstory, midstory, and seedling strata. 8703 records.
% GROUNDCOVER	By subplot, the percent cover of 9 different coverage classes, including vegetated, rock, bare soil, and others. 5292 records.
Additional Species List	Identity of additional species documented in the plot. 8244 records.
USDA CODE LIST	A lookup table for the USDA codes (as used in all the other tables) and their associated scientific and common names. 788 records.

Freshwater Wetlands workbook ("EA DATA – FWW – NAC.xlsx")

Sheet (Tab in workbook)	Description
OVERSTORY	Identity, DBH, vigor, and vine information for every tree documented. Also some plot-level information from the ECM. 476 records.
MIDSTORY	Identity and stem count information for all species found in the midstory. 197 records.
HERBACEOUS SPECIES PERCENTAGE	By subplot, the identity, percent cover, seedling, and herbivory information for all species found in the herbaceous subplots. 1150 records.
WOODY SEEDLING COUNT BY PLOT	Identity and count for all tree seedlings found in each plot. 2107 records.

% GROUDNCOVER	By subplot, the percent cover of 12 different coverage classes, including vegetated, rock, standing water and others. 5292 records.
COUNT WOODY SPECIES BY PLOT	Identity and count by species and stratum for woody plants occurring in the overstory, midstory, and seedling strata. 305 records.
Additional Species List	Identity of additional species documented in the plot. 410 records.

Appendix B. Screen Shots of Access Database

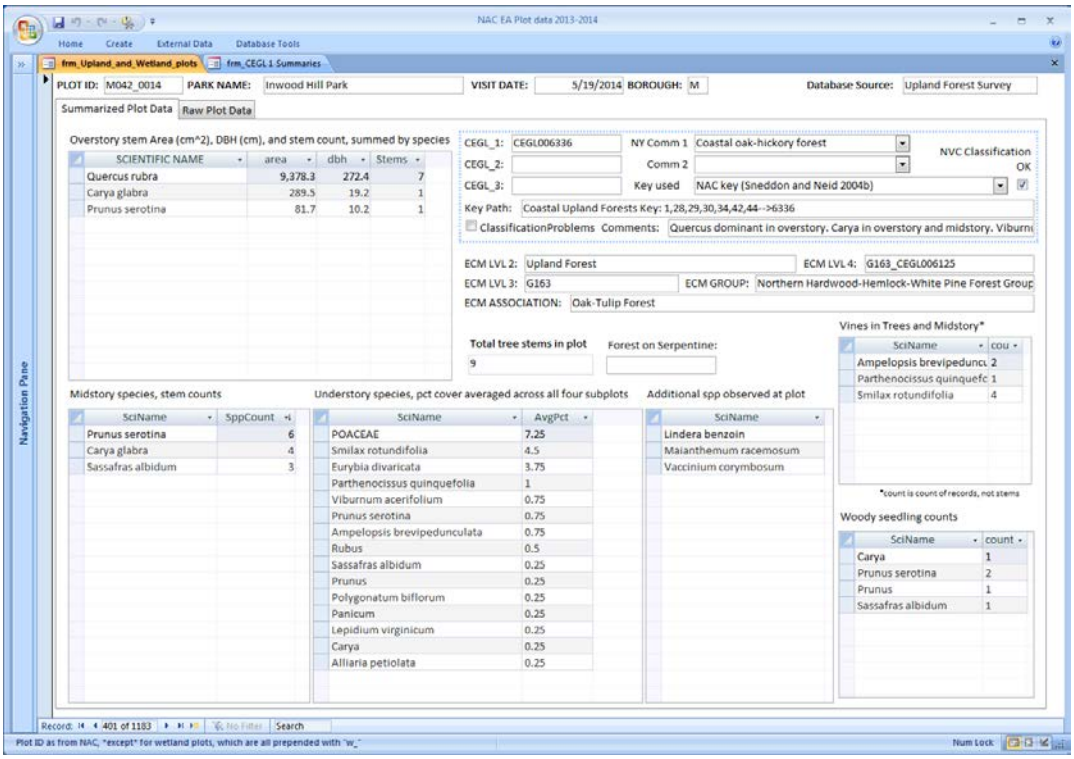

Figure B1. The first tab of the Plots form in the database

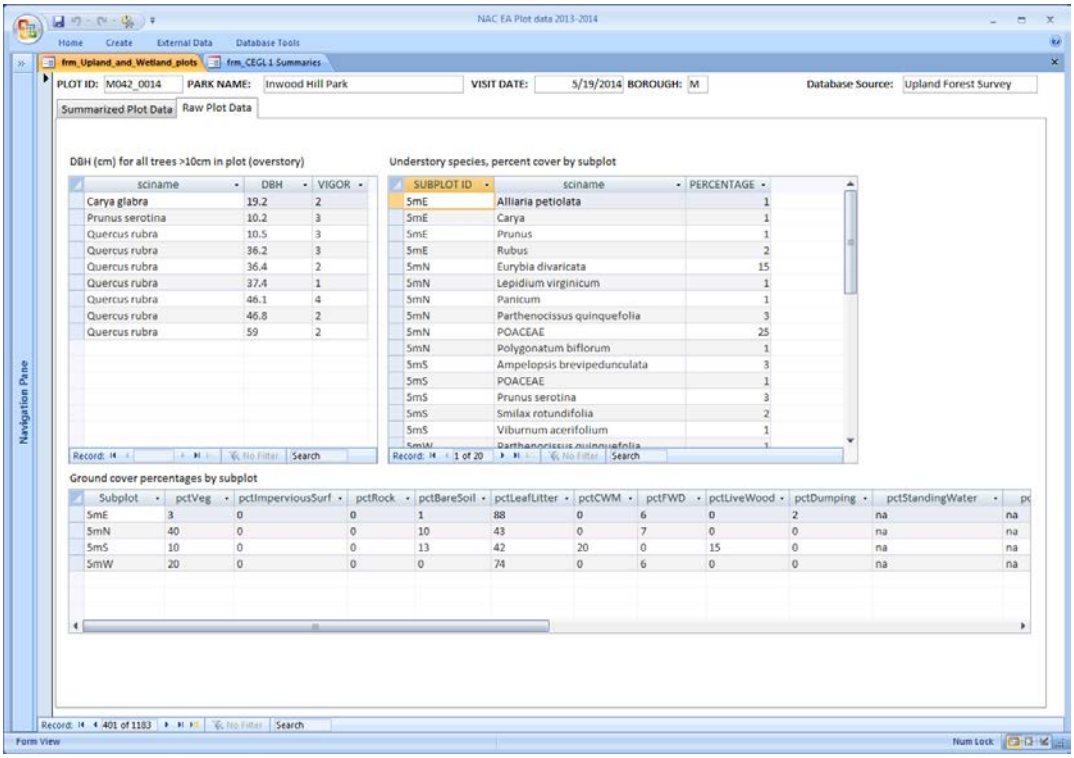

Figure B2. The second tab of the Plots form in the database.

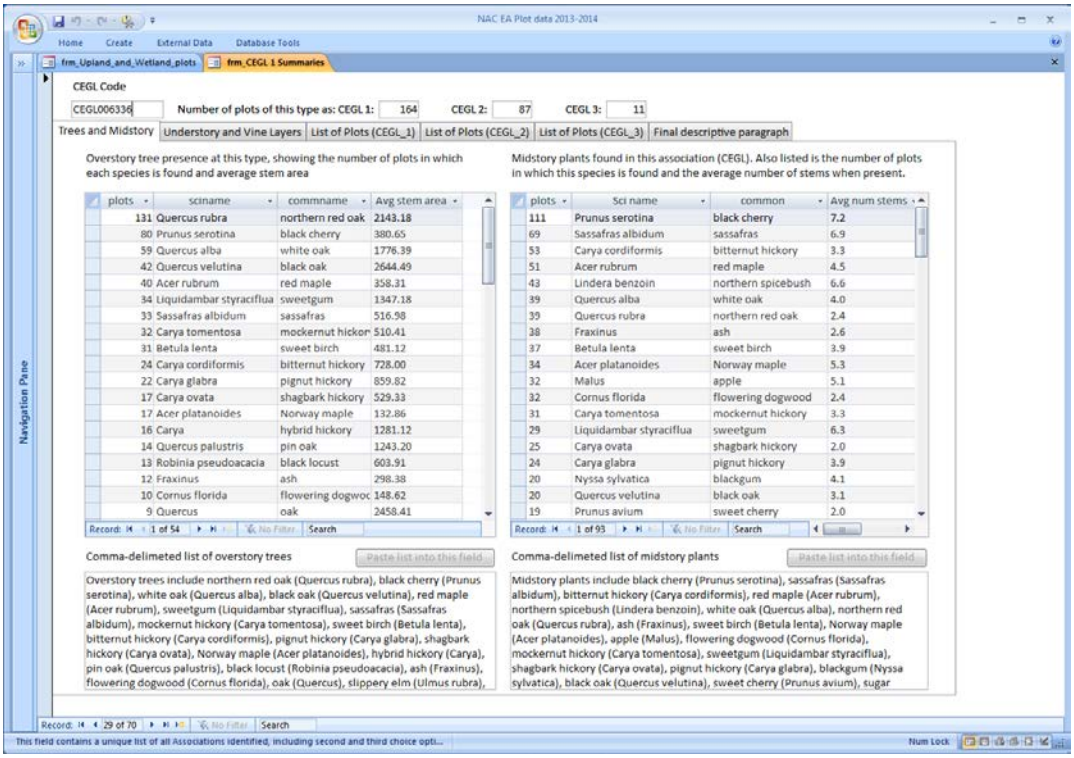

Figure B3. The first tab of the Associations form, showing the overstory and midstory plants, summarized by Association.

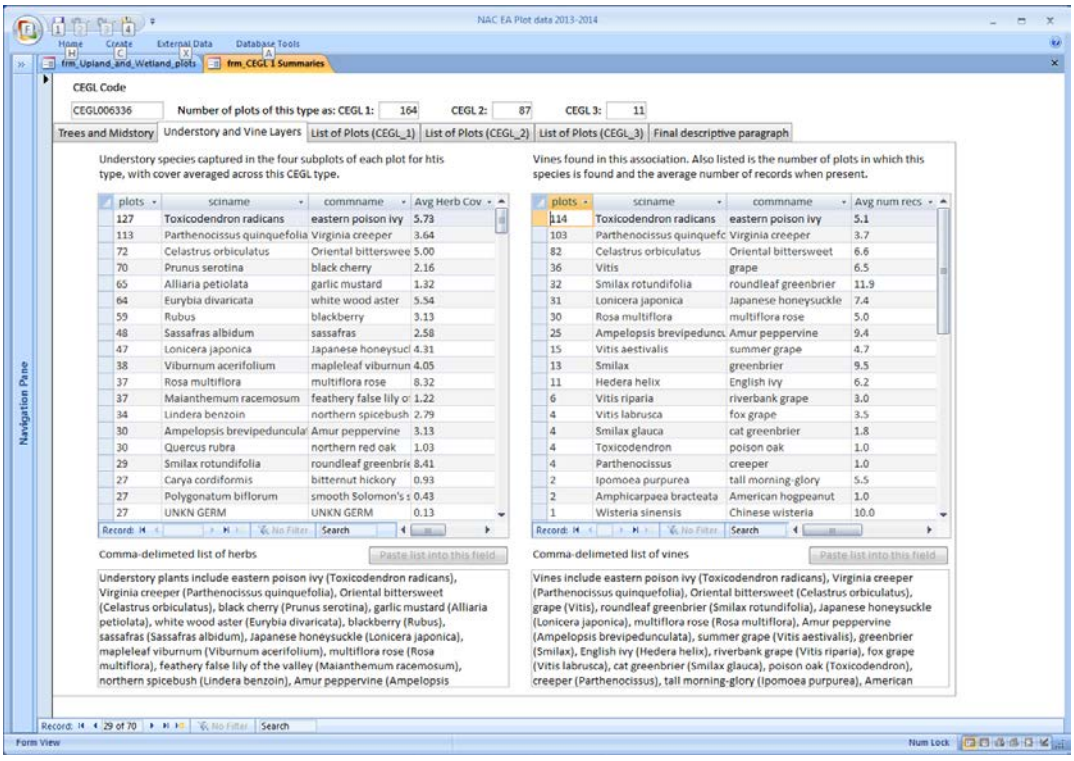

Figure B4. The second tab of the Associations form, showing the understory and vines, summarized by Association.

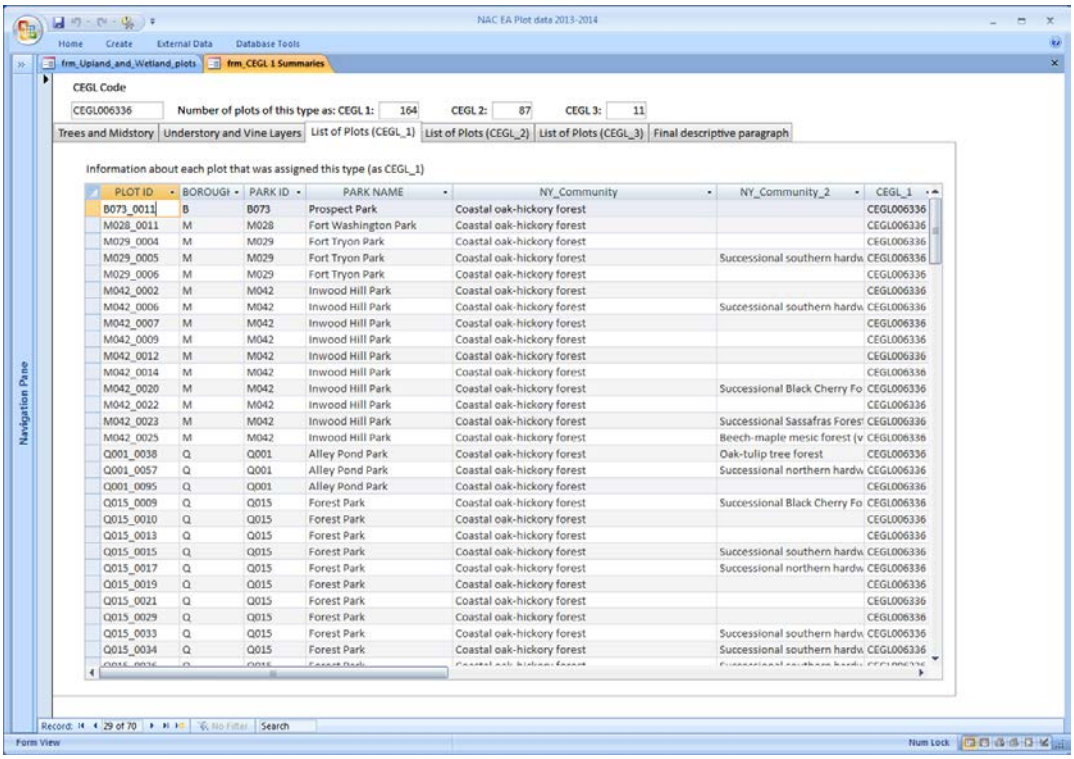

Figure B5. The third tab of the Associations form, showing the list of plots tagged to this association as CEGL_1.

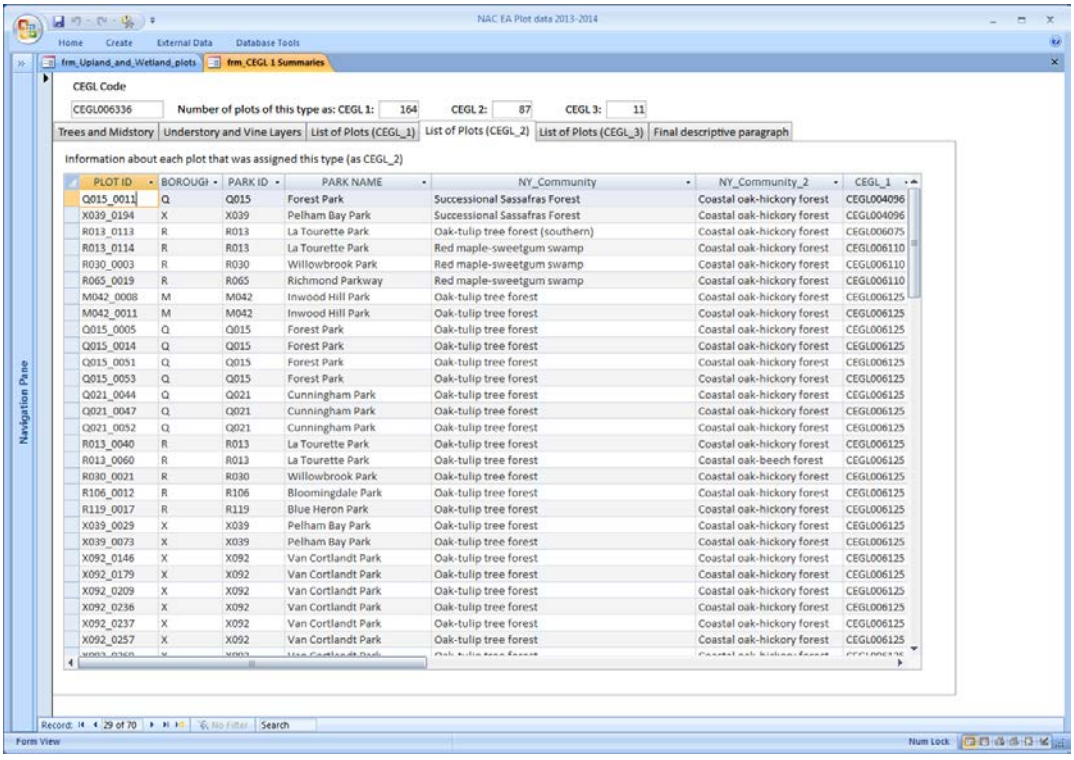

Figure B6. The fourth tab of the Associations form, showing the list of plots tagged to this association as CEGL_2.

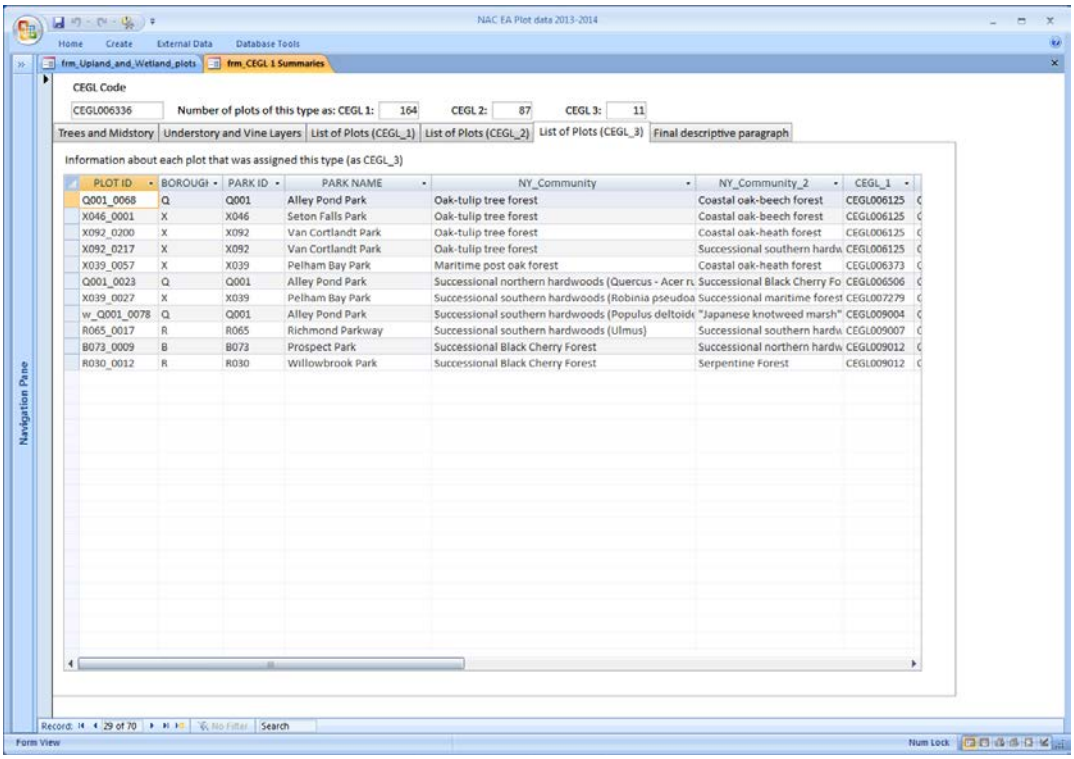

Figure B6. The fifth tab of the Associations form, showing the list of plots tagged to this association as CEGL_3.

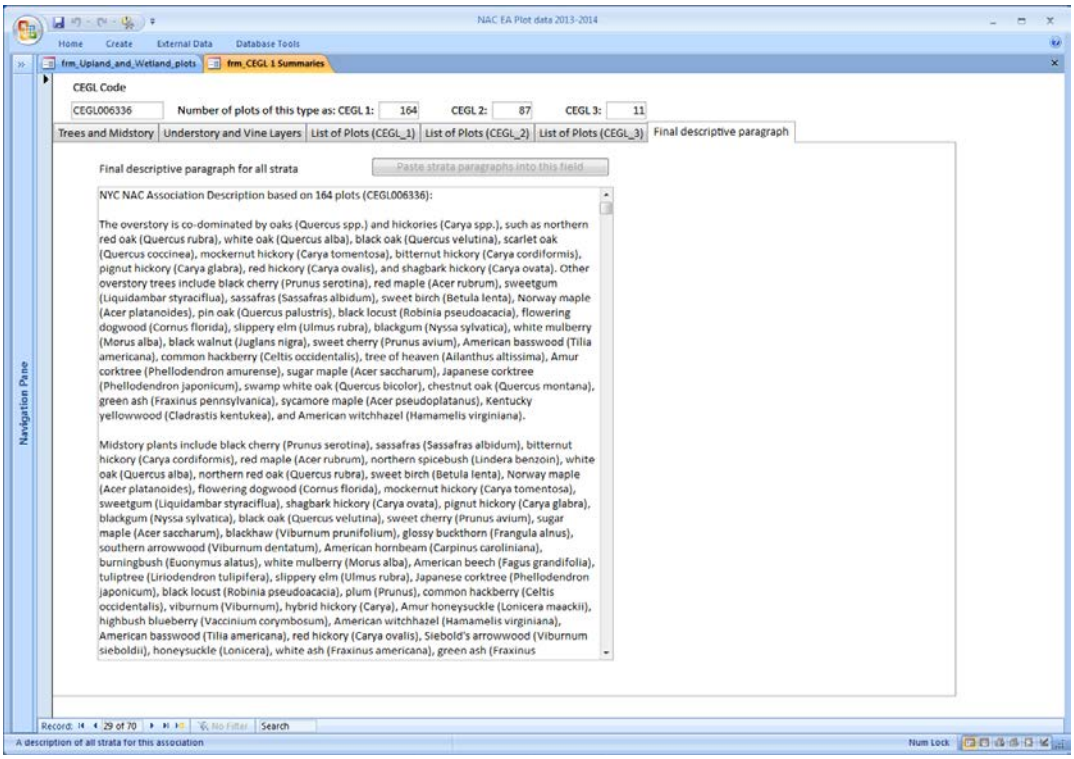

Figure B7. The final tab of the Associations form, showing the final descriptive paragraph for this type.

Appendix C. New York City Natural Areas Conservancy Plot Classification

INTERNATIONAL ECOLOGICAL CLASSIFICATION STANDARD:

TERRESTRIAL ECOLOGICAL CLASSIFICATIONS

New York City Natural Areas Conservancy Plot Classification

17 March 2016

by

NatureServe
4600 North Fairfax Drive, 7th Floor
Arlington, VA 22203

c/o University of Massachusetts at Boston
Biology Department
100 Morrissey Blvd.
Boston, MA 02125-3393

NYC NAC plot descriptions added by
Gregory J. Edinger
New York Natural Heritage Program
625 Broadway
Albany, NY 12233-4757

This subset of the International Ecological Classification Standard covers a subset of the associations of New York. This classification has been developed in consultation with many individuals and agencies and incorporates information from a variety of publications and other classifications. Comments and suggestions regarding the contents of this subset should be directed to Mary J. Russo, Central Ecology Data Manager, Durham, NC <mary_russo@natureserve.org> and Lesley A. Sneddon, Senior Regional Ecologist, Boston, MA <lesley_sneddon@natureserve.org>.

NatureServe
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Citations:

The following citation should be used in any published materials which reference ecological system and/or International Vegetation Classification (IVC hierarchy) and association data:

NatureServe. 2016. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. U.S.A. Data current as of 17 March 2016.

NatureServe
4600 North Fairfax Drive, 7th floor
Arlington, VA 22203

These data are extracted from:

NatureServe. 2016. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. U.S.A. Data current as of 17 March 2016.

This document may be generally cited as follows:

NatureServe[1]. 2016. International Ecological Classification Standard: Terrestrial Ecological Classifications. A subset of the Associations of New York. NatureServe Central Databases. Arlington, VA. Data current as of 17 March 2016.

[1] NatureServe is an international organization including NatureServe regional offices, a NatureServe central office, U.S. State Natural Heritage Programs, and Conservation Data Centres (CDC) in Canada and Latin America and the Caribbean. Ecologists from the following organizations have contributed the development of the ecological systems classification:

United States
Central NatureServe Office, Arlington, VA; Eastern Regional Office, Boston, MA; Midwestern Regional Office, Minneapolis, MN; Southeastern Regional Office, Durham, NC; Western Regional Office, Boulder, CO; Alabama Natural Heritage Program, Montgomery AL; Alaska Natural Heritage Program, Anchorage, AK; Arizona Heritage Data Management Center, Phoenix AZ; Arkansas Natural Heritage Commission Little Rock, AR; Blue Ridge Parkway, Asheville, NC; California Natural Heritage Program, Sacramento, CA; Colorado Natural Heritage Program, Fort Collins, CO; Connecticut Natural Diversity Database, Hartford, CT; Delaware Natural Heritage Program, Smyrna, DE; District of Columbia Natural Heritage Program/National Capital Region Conservation Data Center, Washington DC; Florida Natural Areas Inventory, Tallahassee, FL; Georgia Natural Heritage Program, Social Circle, GA; Great Smoky Mountains National Park, Gatlinburg, TN; Gulf Islands National Seashore, Gulf Breeze, FL; Hawaii Natural Heritage Program, Honolulu, Hawaii; Idaho Conservation Data Center, Boise, ID; Illinois Natural Heritage Division/Illinois Natural Heritage Database Program, Springfield, IL; Indiana Natural Heritage Data Center, Indianapolis, IN; Iowa Natural Areas Inventory, Des Moines, IA; Kansas Natural Heritage Inventory, Lawrence, KS; Kentucky Natural Heritage Program, Frankfort, KY; Louisiana Natural Heritage Program, Baton Rouge, LA; Maine Natural Areas Program, Augusta, ME; Mammoth Cave National Park, Mammoth Cave, KY; Maryland Wildlife & Heritage Division, Annapolis, MD; Massachusetts Natural Heritage & Endangered Species Program, Westborough, MA; Michigan Natural Features Inventory, Lansing, MI; Minnesota Natural Heritage & Nongame Research and Minnesota County Biological Survey, St. Paul, MN; Mississippi Natural Heritage Program, Jackson, MI; Missouri Natural Heritage Database, Jefferson City, MO; Montana Natural Heritage Program, Helena, MT; National Forest in North Carolina, Asheville, NC; National Forests in Florida, Tallahassee, FL; National Park Service, Southeastern Regional Office, Atlanta, GA; Navajo Natural Heritage Program, Window Rock, AZ; Nebraska Natural Heritage Program, Lincoln, NE; Nevada Natural Heritage Program, Carson City, NV; New Hampshire Natural Heritage Inventory, Concord, NH; New Jersey Natural Heritage Program, Trenton, NJ; New Mexico Natural Heritage Program, Albuquerque , NM; Maryland Natural Heritage Program, Latham, NY; North Carolina Natural Heritage Program, Raleigh, NC; North Dakota Natural Heritage Inventory, Bismarck, ND; Ohio Natural Heritage Database, Columbus, OH; Oklahoma Natural Heritage Inventory, Norman, OK; Oregon Natural Heritage Program, Portland, OR; Pennsylvania Natural Diversity Inventory, PA; Rhode Island Natural Heritage Program, Providence, RI; South Carolina Heritage Trust, Columbia, SC; South Dakota Natural Heritage Data Base, Pierre, SD; Tennessee Division of Natural Heritage, Nashville, TN; Tennessee Valley Authority Heritage Program, Norris, TN; Texas Conservation Data Center, San Antonio, TX; Utah Natural Heritage Program, Salt Lake City, UT; Vermont Nongame & Natural Heritage Program, Waterbury, VT; Virginia Division of Natural Heritage, Richmond, VA; Washington Natural Heritage Program, Olympia, WA; West Virginia Natural Heritage Program, Elkins, WV; Wisconsin Natural Heritage Program, Madison, WI; Wyoming Natural Diversity Database, Laramie, WY

Canada
Alberta Natural Heritage Information Centre, Edmonton, AB, Canada; Atlantic Canada Conservation Data Centre, Sackville, New Brunswick, Canada; British Columbia Conservation Data Centre, Victoria, BC, Canada; Manitoba Conservation Data Centre. Winnipeg, MB, Canada; Ontario Natural Heritage Information Centre, Peterborough, ON, Canada; Quebec Conservation Data Centre, Quebec, QC, Canada; Saskatchewan Conservation Data Centre, Regina, SK, Canada; Yukon Conservation Data Centre, Yukon, Canada

Latin American and Caribbean
Centro de Datos para la Conservacion de Bolivia, La Paz , Bolivia; Centro de Datos para la Conservacion de Colombia, Cali,Valle, Columbia; Centro de Datos para la Conservacion de Ecuador, Quito, Ecuador; Centro de Datos para la Conservacion de Guatemala, Ciudad de Guatemala , Guatemala; Centro de Datos para la Conservacion de Panama, Querry Heights , Panama; Centro de Datos para la Conservacion de Paraguay, San Lorenzo , Paraguay; Centro de Datos para la Conservacion de Peru, Lima, Peru; Centro de Datos para la Conservacion de Sonora, Hermosillo, Sonora , Mexico; Netherlands Antilles Natural Heritage Program, Curacao , Netherlands Antilles; Puerto Rico-Departmento De Recursos Naturales Y Ambientales, Puerto Rico; Virgin Islands Conservation Data Center, St. Thomas, Virgin Islands.

NatureServe also has partnered with many International and United States Federal and State organizations, which have also contributed significantly to the development of the International Classification. Partners include the following The Nature Conservancy; Provincial Forest Ecosystem Classification Groups in Canada; Canadian Forest Service; Parks Canada; United States Forest Service; National GAP Analysis Program; United States National Park Service; United States Fish and Wildlife Service; United States Geological Survey; United States Department of Defense; Ecological Society of America; Environmental Protection Agency; Natural Resource Conservation Services; United States Department of Energy; and the Tennessee Valley Authority. Many individual state organizations and people from academic institutions have also contributed to the development of this classification.

TABLE OF CONTENTS

1. FOREST & WOODLAND

Tropical, temperate and boreal forests, woodlands and tree savannas characterized by broadly mesomorphic (including scleromorphic) tree growth forms (including *broad-leaved, needle-leaved, sclerophyllous, palm, bamboo trees*, and *tree ferns*), typically with at least 10% cover (but tropical tree savannas up to 40% cover, when trees <8 m tall), irregular horizontal spacing of vegetation structure, and spanning humid to seasonally dry tropical to boreal and subalpine climates and wet to dry substrate conditions. Includes native forests, as well as managed, and some plantation forests where human management is infrequent.

1.B. Temperate & Boreal Forest & Woodland

Temperate & Boreal Forest & Woodland is typically dominated by broad-leaved deciduous and needle-leaved trees, with some broad-leaved evergreens in warmer regions, and a climate that varies from warm-temperate with only rare frosts to very cold subarctic conditions. It is found across the globe in the mid-latitudes, typically between 25° and 60-70°N and S latitude, and includes boreal, cool-temperate, and warm-temperate/Mediterranean forests.

1.B.1. Warm Temperate Forest & Woodland

Warm Temperate Forest & Woodland is dominated by broad-leaved evergreen trees, sometimes with dwarfed stems and small, sclerophyllous leaves (in Mediterranean climates), or various combinations of broad-leaved deciduous, broad-leaved evergreen and needle-leaved evergreen conifer trees. Winters are mild (mostly frost-free) and may be the rainiest season, springs are temperate-humid, summers are hot-dry, and autumn is often dry.

1.B.1.Na. Southeastern North American Forest & Woodland

This mixed broadleaf evergreen (oak, magnolia) and pine (longleaf) forest and woodlands occur in the southeastern U.S. Coastal Plain from southern Virginia, south to Florida and west to east Texas.

M305. Southeastern North American Ruderal Forest

This is ruderal vegetation that occurs in human-disturbed sites across the southeastern United States. Stands have canopies dominated by ruderal or exotic tree species.

G031. Southeastern Native Ruderal Forest

This native ruderal forest group is found on former agricultural or forest plantation sites, or arises from degraded native forest sites in the warmer temperate regions of the southeastern United States.

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1. Forest & Woodland
1.B.1.Na. Southeastern North American Forest & Woodland
1.B.1.Na.90.a. G031 Southeastern Native Ruderal Forest

A3232. *Liquidambar styraciflua - Celtis laevigata - Quercus nigra* Ruderal Forest Alliance

Type Concept Sentence: This alliance includes a variety of semi-natural disturbance-related upland forests dominated by *Liquidambar styraciflua, Quercus nigra, Celtis laevigata*, and other hardwoods. These forests tend to develop after logging or agricultural cropping.

OVERVIEW

Scientific Name: *Liquidambar styraciflua - Celtis laevigata - Quercus nigra* Ruderal Forest Alliance
Common Name (Translated Scientific Name): Sweetgum - Sugarberry - Water Oak Ruderal Forest Alliance
Colloquial Name: Ruderal Sweetgum - Sugarberry - Water Oak Forest

Type Concept: This alliance includes a variety of semi-natural disturbance-related upland forests dominated by *Liquidambar styraciflua, Quercus nigra, Celtis laevigata*, and other hardwoods. These forests tend to develop after logging or agricultural cropping. Some associations may have *Carya alba, Liriodendron tulipifera, Quercus alba, Quercus falcata, Quercus nigra, Quercus phellos*, and *Quercus velutina*. In addition, *Pinus taeda* may be present and abundant. *Celtis laevigata* semi-natural stands occur in highly disturbed soils in coastal areas of Georgia and possibly adjacent states. *Celtis laevigata* is the strong canopy dominant in this community. However, exotic tree species such as *Melia azedarach, Triadica sebifera*, and *Morus alba* may be scattered throughout. Ground cover species are variable but may include *Rubus trivialis* and *Ampelopsis arborea*.

Classification Comments: *Quercus laevis* and *Crataegus flava* stands formerly included here have been removed. They are strongly dominated by *Quercus laevis* and are mostly (or possibly entirely) the result of the removal and reproductive failure of *Pinus palustris*. This includes modified and/or fire-suppressed examples of *Pinus palustris - Quercus* spp.-dominated vegetation, where *Pinus palustris* has been removed and/or failed to regenerate due to fire suppression or other environmental modifications, including turpentining and logging. Canopy closure of fire-suppressed examples may exceed 60%. The relative density and diversity of the shrub and herb layers will vary with degree of fire suppression; the local expression will vary with latitude and the distributions of various shrub and herbaceous components, as well as with soil texture. It may be that these sites are better treated (at least from a conservation or restoration perspective) as lower quality (but often highly restorable) examples of various communities in the former *Pinus palustris / Quercus* spp. Woodland Alliance (A.499).

Similar NVC Types:

Diagnostic Characteristics: Stands are found in the uplands and dominated by *Liquidambar styraciflua, Quercus nigra, Celtis laevigata* (>50%) or, if >25%, with a mix of other generalist tree species, including other hardwoods, such as *Carya alba, Liriodendron tulipifera, Quercus alba, Quercus falcata, Quercus nigra, Quercus phellos*, and *Quercus velutina*, or the conifer *Pinus taeda*.

VEGETATION

Physiognomy and Structure: Stands are primarily dominated by broad-leaved deciduous hardwood trees.

Floristics: This alliance includes a variety of semi-natural disturbance-related upland forests dominated by *Liquidambar styraciflua, Quercus nigra, Celtis laevigata*, and other hardwoods. Some associations may have *Carya alba, Liriodendron tulipifera, Quercus alba, Quercus falcata, Quercus nigra, Quercus phellos*, and *Quercus velutina*. In addition, *Pinus taeda* may be present and abundant. *Celtis laevigata* semi-natural stands occur in highly disturbed soils in coastal areas of Georgia and possibly adjacent states. *Celtis laevigata* is the strong canopy dominant in this community. However, exotic tree species such as *Melia azedarach, Triadica sebifera*, and *Morus alba* may be scattered throughout. Ground cover species are variable but may include *Rubus trivialis* and *Ampelopsis arborea*.

ENVIRONMENT & DYNAMICS

Environmental Description: These forests tend to develop after logging or agricultural cropping.

Dynamics: These forests tend to develop after logging or agricultural cropping.

DISTRIBUTION

Geographic Range: This alliance is distributed throughout the southeastern United States in most physiographic provinces, ranging from Maryland to Florida and west to Arkansas and possibly Texas.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: AL, AR, DC?, DE, FL?, GA, KY, LA, MD, MS, NC, NJ, OK, SC, TN, TX?, VA
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low - Poorly Documented.

SYNONYMY

LOWER LEVEL UNITS

Associations:
- CEGL004854 *Celtis laevigata* Coastal Plain Ruderal Forest
- CEGL007021 *Quercus hemisphaerica / Smilax* spp. Ruderal Forest
- CEGL007217 *Liquidambar styraciflua - Quercus (alba, falcata)* Ruderal Forest
- CEGL007216 *Liquidambar styraciflua* Ruderal Forest
- CEGL004638 *Quercus nigra* Ruderal Forest
- CEGL007726 *Liquidambar styraciflua - Quercus nigra - Pinus taeda / Vaccinium elliottii - Morella cerifera* Ruderal Forest

AUTHORSHIP

Primary Concept Source: D. Faber-Langendoen
Author of Description: D. Faber-Langendoen

Acknowledgments:
Version Date: 12/30/2015
Classif Resp Region: Southeast

REFERENCES

References: Faber-Langendoen et al. 2016b

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1. Forest & Woodland
1.B.1.Na. Southeastern North American Forest & Woodland
A3232. *Liquidambar styraciflua - Celtis laevigata - Quercus nigra* Ruderal Forest Alliance

CEGL007216. *Liquidambar styraciflua* Ruderal Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Liquidambar styraciflua* Ruderal Forest
Common Name (Translated Scientific Name): Sweetgum Ruderal Forest
Colloquial Name: Ruderal Sweetgum Forest

Type Concept: This early-successional upland forest of the southeastern U.S. occurs on a variety of environmental settings, resulting from succession following human activities such as logging and clearing or agriculture. Stands are dominated by *Liquidambar styraciflua*, sometimes to the exclusion of other species. *Pinus taeda* is a common associate. Other associated species are highly variable and depend on location and stand history.

Classification Comments:

Similar NVC Types:
- CEGL007217 *Liquidambar styraciflua - Quercus (alba, falcata)* Ruderal Forest: of interior provinces.
- CEGL007726 *Liquidambar styraciflua - Quercus nigra - Pinus taeda / Vaccinium elliottii - Morella cerifera* Ruderal Forest: a more diverse successional forest of the Coastal Plain.
- CEGL004418 *Liquidambar styraciflua - Liriodendron tulipifera / Lindera benzoin / Arisaema triphyllum* Floodplain Forest: a later-successional bottomland association.

VEGETATION

Floristics: Stands are dominated by *Liquidambar styraciflua*, sometimes to the exclusion of other species.

ENVIRONMENT & DYNAMICS

Environmental Description: This association is found in uplands that have been heavily impacted by agriculture or other severe disturbances and are recovering.

Dynamics: These communities represent successional stands of upland *Liquidambar styraciflua*. As the stands mature, they begin to assume the characteristics of more natural community types. Over time, *Liquidambar styraciflua* declines and is replaced by oaks, hickories, and/or pines. In addition, small stream bottomland sweetgum stands in the Piedmont may recover quickly from disturbance and begin to approximate the characters of *Liquidambar styraciflua - Liriodendron tulipifera / Lindera benzoin / Arisaema triphyllum* Floodplain Forest (CEGL004418) 50 years or more after a stand-initiating disturbance.

DISTRIBUTION

Geographic Range: This association may be found throughout the southeastern United States, in the coastal plains and interior ecoregions. It is also attributed to New Jersey with the merger of CEGL006927. The status in intervening states (e.g., Delaware, Maryland) needs to be assessed.

Spatial Scale & Pattern [optional]: Large patch
Nations: US
States/Provinces: AL, AR, DC?, DE, GA, KY, LA, MD, MS, NC, NJ, OK, SC, TN, VA
TNC Ecoregions [optional]: 31:P, 32:P, 40:P, 41:C, 42:C, 43:C, 44:C, 50:C, 51:P, 52:C, 53:P, 56:P, 57:C, 58:C, 62:C
USFS Ecoregions (1994/95): 221Hc:CCC, 222Ef:CCC, 222Fa:CCP, 222Fb:CCC, 222Fe:CCP, 231Aa:CCP, 231Ab:CCC, 231Bh:CCC, 231Bi:CCC, 232Ab:CCC, 232Ac:CCC, 232Ad:CCC, 232Bd:CCC, 232Cb:CCC, M221Dc:???, M221Dd:???
Omernik Ecoregions:
Federal Lands [optional]: NPS (Big South Fork, Chickamauga-Chattanooga?, Colonial, Cowpens, George Washington Birthplace, Guilford Courthouse, Horseshoe Bend, Kings Mountain, Mammoth Cave, Moores Creek, Natchez Trace, National Capital-East, Ninety

Six, Petersburg, Shiloh, Thomas Stone, Vicksburg); USFS (Cherokee?, Oconee?, St. Francis); USFWS (Cape May, E.B. Forsythe, Patuxent, Prime Hook, Supawna Meadows)

CONSERVATION STATUS

Grank (Review Date): GNA (ruderal) (2002/8/19)
Greasons: This is an upland successional vegetation type composed of native species. Its conservation value is limited, but it may provide buffer for communities of greater conservation value.
Ranking Author (Version): M. Pyne (2004/9/30)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

Synonymy:
- = sweet gum successional forest (Collins and Anderson 1994)

AUTHORSHIP

Primary Concept Source: Southeast Ecology Group
Author of Description: R. White, mod. M. Pyne
Acknowledgments:
Version Date: 2007/07/23

REFERENCES

References: Collins and Anderson 1994, Coxe 2009, Lea et al. 2012, Lea et al. 2013, McCrain and Church 1985, McManamay et al. 2012, NatureServe 2009, NatureServe Ecology - Southeastern U.S. unpubl. data, Nordman et al. 2011, Patterson 2008c, Patterson 2008d, Patterson 2008e, Pyne et al. 2010, Schotz pers. comm., TDNH unpubl. data, White 2004, White and Govus 2003, White and Govus 2005, White and Pyne 2003.

NYC NAC Association Description based on 111 plots (CEGL007216):

The overstory is dominated by sweetgum (Liquidambar styraciflua). Other overstory trees include red maple (Acer rubrum), pin oak (Quercus palustris), northern red oak (Quercus rubra), sassafras (Sassafras albidum), black cherry (Prunus serotina), white oak (Quercus alba), blackgum (Nyssa sylvatica), tuliptree (Liriodendron tulipifera), sweet birch (Betula lenta), black locust (Robinia pseudoacacia), tree of heaven (Ailanthus altissima), bigtooth aspen (Populus grandidentata), scarlet oak (Quercus coccinea), slippery elm (Ulmus rubra), Norway maple (Acer platanoides), silver maple (Acer saccharinum), American beech (Fagus grandifolia), ash (Fraxinus sp.), swamp white oak (Quercus bicolor), American elm (Ulmus americana), American basswood (Tilia americana), apple (Malus sp.), and green ash (Fraxinus pennsylvanica).

Ther midstory is co-dominated by red maple (Acer rubrum), black cherry (Prunus serotina), and sweetgum (Liquidambar styraciflua). Other midstory plants include northern spicebush (Lindera benzoin), southern arrowwood (Viburnum dentatum), blackgum (Nyssa sylvatica), sassafras (Sassafras albidum), northern red oak (Quercus rubra), Japanese angelica tree (Aralia elata), tuliptree (Liriodendron tulipifera), highbush blueberry (Vaccinium corymbosum), green ash (Fraxinus pennsylvanica), white oak (Quercus alba), American beech (Fagus grandifolia), sweet birch (Betula lenta), Norway maple (Acer platanoides), bitternut hickory (Carya cordiformis), apple (Malus sp.), blackhaw (Viburnum prunifolium), pin oak (Quercus palustris), American hornbeam (Carpinus caroliniana), bigtooth aspen (Populus grandidentata), swamp white oak (Quercus bicolor), sweet cherry (Prunus avium), winged sumac (Rhus copallinum), American elm (Ulmus americana), tree of heaven (Ailanthus altissima), shagbark hickory (Carya ovata), coastal sweetpepperbush (Clethra alnifolia), black locust (Robinia pseudoacacia), glossy buckthorn (Frangula alnus), sugar maple (Acer saccharum), mockernut hickory (Carya tomentosa), burningbush (Euonymus alatus), white ash (Fraxinus americana), black oak (Quercus velutina), common hackberry (Celtis occidentalis), gray birch (Betula populifolia), viburnum (Viburnum), black walnut (Juglans nigra), pignut hickory (Carya glabra), and chestnut oak (Quercus montana).

Vines include eastern poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), Japanese honeysuckle (Lonicera japonica), roundleaf greenbrier (Smilax rotundifolia), Oriental bittersweet (Celastrus orbiculatus), Amur peppervine (Ampelopsis brevipedunculata), cat greenbrier (Smilax glauca), English ivy (Hedera helix), fox grape (Vitis labrusca), tall morning-glory (Ipomoea purpurea), Chinese wisteria (Wisteria sinensis), Asiatic tearthumb (Polygonum perfoliatum), climbing nightshade (Solanum dulcamara), cutleaf blackberry (Rubus laciniatus), redstar (Ipomoea coccinea), wild yam (Dioscorea villosa), trumpet creeper (Campsis radicans), Japanese wisteria (Wisteria floribunda), devil's darning needles (Clematis virginiana), wild cucumber (Echinocystis lobata), bigleaf periwinkle (Vinca major), and riverbank grape (Vitis riparia).

Understory plants include southern arrowwood (Viburnum dentatum), Canada mayflower (Maianthemum canadense), sweetgum (Liquidambar styraciflua), northern spicebush (Lindera benzoin), black cherry (Prunus serotina), blackberry (Rubus sp.), multiflora

rose (Rosa multiflora), garlic mustard (Alliaria petiolata), red maple (Acer rubrum), sassafras (Sassafras albidum), goldenrod (Solidago sp.), northern dewberry (Rubus flagellaris), Japanese angelica tree (Aralia elata), feathery false lily of the valley (Maianthemum racemosum), eastern hayscented fern (Dennstaedtia punctilobula), white wood aster (Eurybia divaricata), American pokeweed (Phytolacca americana), broadleaf enchanter's nightshade (Circaea lutetiana), northern red oak (Quercus rubra), jumpseed (Polygonum virginianum), smooth Solomon's seal (Polygonatum biflorum), jewelweed (Impatiens capensis), common wormwood (Artemisia vulgaris), Nepalese browntop (Microstegium vimineum), Japanese knotweed (Polygonum cuspidatum), coastal sweetpepperbush (Clethra alnifolia), wild sarsaparilla (Aralia nudicaulis), mapleleaf viburnum (Viburnum acerifolium), bitternut hickory (Carya cordiformis), green ash (Fraxinus pennsylvanica), cinnamon fern (Osmunda cinnamomea), sensitive fern (Onoclea sensibilis), pin oak (Quercus palustris), tuliptree (Liriodendron tulipifera), New York fern (Thelypteris noveboracensis), common reed (Phragmites australis), red chokeberry (Photinia pyrifolia), wine raspberry (Rubus phoenicolasius), burningbush (Euonymus alatus), woodsorrel (Oxalis sp.), spotted ladysthumb (Polygonum persicaria), wrinkleleaf goldenrod (Solidago rugosa), black raspberry (Rubus occidentalis), rough avens (Geum laciniatum), touch-me-not (Impatiens), tree of heaven (Ailanthus altissima), blackgum (Nyssa sylvatica), Asiatic dayflower (Commelina communis), American wintergreen (Pyrola americana), white oak (Quercus alba), highbush blueberry (Vaccinium corymbosum), great ragweed (Ambrosia trifida), cinquefoil (Potentilla sp.), glossy buckthorn (Frangula alnus), Kalm's hawkweed (Hieracium kalmii), avens (Geum sp.), bristly dewberry (Rubus hispidus), privet (Ligustrum sp.), wreath goldenrod (Solidago caesia), common mullein (Verbascum thapsus), thoroughwort (Eupatorium), annual ragweed (Ambrosia artemisiifolia), common plantain (Plantago major), beggarticks (Bidens), lowbush blueberry (Vaccinium angustifolium), eastern cottonwood (Populus deltoides), poverty rush (Juncus tenuis), American burnweed (Erechtites hieraciifolius), serviceberry (Amelanchier), and violet (Viola sp).

1.B.2. Cool Temperate Forest & Woodland

Cool Temperate Forest & Woodland includes temperate deciduous forest and woodland, temperate needle-leaved forest and woodland, and temperate rainforest, dominated by broad-leaved or needle-leaved tree growth forms.

1.B.2.Na. Eastern North American Forest & Woodland

These eastern North American forests and woodlands are dominated by cold-deciduous broadleaf trees, sometimes mixed with conifers, with strong diagnostic tree species, including *Acer rubrum, Acer saccharum, Carya* spp. (especially *Carya cordiformis, Carya glabra, Carya ovata*), *Fagus grandifolia, Fraxinus americana, Liriodendron tulipifera, Quercus* spp. (especially *Quercus alba, Quercus rubra, Quercus velutina*), and *Tilia americana*.

M502. Appalachian-Northeastern Oak - Hardwood - Pine Forest & Woodland

This northeastern macrogroup comprises forests characterized by a number of dry-site oak species (*Quercus coccinea, Quercus falcata, Quercus muehlenbergii, Quercus prinus, Quercus velutina*) and pine species (*Pinus pungens, Pinus rigida, Pinus virginiana*) occurring on substrates ranging from acidic to substrates of high base status.

G015. Appalachian Oak / Chestnut Forest

This group comprises dry oak forests of the Appalachians from New England to Georgia, with typical oaks including *Quercus prinus, Quercus alba, Quercus coccinea*, or *Quercus velutina*; *Castanea dentata* persists in the understory but was once a major canopy tree.

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
1.B.2.Na.2.a. G015 Appalachian Oak / Chestnut Forest

A0248. *Quercus prinus - Quercus coccinea* Forest Alliance

Type Concept Sentence: This alliance, ranging from southern Canada to the Southern Appalachians and Interior Low Plateau, includes dry oak forests strongly dominated by *Quercus prinus* or *Quercus prinus* with admixtures of *Quercus coccinea, Quercus velutina*, or, to the north, *Quercus rubra*.

OVERVIEW

Scientific Name: *Quercus prinus - Quercus coccinea* Forest Alliance
Common Name (Translated Scientific Name): Chestnut Oak - Scarlet Oak Forest Alliance
Colloquial Name: Chestnut Oak - Scarlet Oak Forest

Type Concept: This alliance includes dry oak forests strongly dominated by *Quercus prinus* or *Quercus prinus* with admixtures of *Quercus coccinea, Quercus velutina*, or, to the north, *Quercus rubra*. Other canopy/subcanopy associates include *Acer rubrum, Amelanchier arborea, Carya pallida, Magnolia fraseri, Nyssa sylvatica, Oxydendrum arboreum, Pinus rigida, Pinus strobus, Quercus alba, Quercus rubra, Sassafras albidum*, and *Vaccinium arboreum*. An ericaceous shrub layer is variable in cover, with species such as

Gaylussacia baccata, Gaylussacia ursina, Kalmia latifolia, Leucothoe recurva, Rhododendron maximum, Vaccinium angustifolium, Vaccinium pallidum, and *Vaccinium stamineum*. In the upper Piedmont, *Kalmia latifolia, Vaccinium arboreum*, and *Vaccinium pallidum* are common. In the montane distribution of this alliance, forests of this alliance have replaced forests formerly dominated or codominated by *Castanea dentata*, and chestnut sprouts are common in the understory. Other shrub species found in forests of this alliance include *Diospyros virginiana, Sassafras albidum*, and *Styrax grandifolius*. Herbaceous cover is typically sparse in these dry, rocky forests, and species vary with geographic location. Common species may include *Chimaphila umbellata, Danthonia spicata, Epigaea repens, Galax urceolata, Gaultheria procumbens*, and *Solidago odora*, and others. The alliance is broad-ranging, from the Southern and Central Appalachians, Ridge and Valley, Cumberland Plateau, Piedmont, Interior Low Plateau, north into the Western Allegheny Plateau, Southern New England / Northern Piedmont, to the Chaplain / St. Lawrence valleys and scattered locations of the Northern Appalachians. These forests occur on convex upper slopes, ridgetops, and south-facing slopes, over thin, rocky, infertile soils in the Appalachians, typically below 1066 m (3500 feet) elevation where windthrow and ice damage are common natural disturbances. In the Piedmont, these forests occur on low mountains and hills, on rocky, well-drained, acidic soils, sometimes associated with outcrops of quartzite or other resistant rock.

Classification Comments:

Similar NVC Types:
- A0250 *Quercus prinus - Quercus rubra* Forest Alliance
- A0224 *Castanea dentata* Forest Alliance
- A2048 *Quercus velutina - Quercus alba* Eastern Forest Alliance

Diagnostic Characteristics: Dry forest dominated by *Quercus prinus* and/or *Quercus coccinea*; ericaceous shrub layer.

VEGETATION

Physiognomy and Structure: These are closed-canopy forests, with tall-shrub layers ranging from sparse to fairly dense. A short-shrub layer is similarly variable in structure. The herbaceous layer is generally poorly developed and patchy.

Floristics: These dry oak forests are strongly dominated by *Quercus prinus* or *Quercus prinus* with admixtures of *Quercus coccinea, Quercus velutina*, or, to the north, *Quercus rubra*. Other canopy/subcanopy associates include *Acer rubrum, Amelanchier arborea, Carya pallida, Magnolia fraseri, Nyssa sylvatica, Oxydendrum arboreum, Pinus rigida, Pinus strobus, Quercus alba, Quercus rubra, Sassafras albidum*, and *Vaccinium arboreum*. An ericaceous shrub layer is variable in cover, with species such as *Gaylussacia baccata, Gaylussacia ursina, Kalmia latifolia, Leucothoe recurva, Rhododendron maximum, Vaccinium angustifolium, Vaccinium pallidum*, and *Vaccinium stamineum*. In the upper Piedmont, *Kalmia latifolia, Vaccinium arboreum*, and *Vaccinium pallidum* are common. In the montane distribution of this alliance, forests of this alliance have replaced forests formerly dominated or codominated by *Castanea dentata*, and chestnut sprouts are common in the understory. Other shrub species found in forests of this alliance include *Diospyros virginiana, Sassafras albidum*, and *Styrax grandifolius*. Herbaceous cover is typically sparse in these dry, rocky forests and species vary with geographic location. Common species may include *Chimaphila umbellata, Danthonia spicata, Epigaea repens, Galax urceolata, Gaultheria procumbens*, and *Solidago odora*, and others. Other associates may include *Galium latifolium, Goodyera pubescens, Hieracium venosum, Lysimachia quadrifolia, Medeola virginiana, Monotropa uniflora, Potentilla canadensis, Pteridium aquilinum, Stenanthium gramineum, Uvularia puberula*, and *Uvularia sessilifolia*.

ENVIRONMENT & DYNAMICS

Environmental Description: These forests occur on convex, upper slopes and ridgetops, south-facing slopes, over thin, rocky, infertile soils in the Appalachians, typically below 1066 m (3500 feet), where windthrow and ice damage are common natural disturbances. In the Piedmont these forests occur on low mountains and hills, on rocky, well-drained, acidic soils, sometimes associated with outcrops of quartzite or other resistant rock.

Dynamics: Windthrow and ice damage are common natural disturbances at higher elevations and in areas of greater exposure. In the montane distribution of this alliance, forests of this alliance have replaced forests formerly dominated or codominated by *Castanea dentata*, and chestnut sprouts are common in the understory.

DISTRIBUTION

Geographic Range: The alliance is broad-ranging, from the Southern and Central Appalachians, Ridge and Valley, Cumberland Plateau, Piedmont, Interior Low Plateau, north into the Western Allegheny Plateau, New England and southern Canada.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: AL, CT, DC, DE, GA, KY, MA, MD, ME, NC, NH, NJ, NY, ON, PA, RI, SC, TN, VA, VT, WV
TNC Ecoregions [optional]: 38:C, 44:C, 49:C, 50:C, 51:C, 52:C, 58:C, 59:C, 60:C, 61:C, 62:C, 63:C, 64:C

USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]: BIA (Eastern Band of Cherokee); DOD (Fort Knox); NPS (Appalachian Trail, Big South Fork, Blue Ridge Parkway, C&O Canal, Carl Sandburg Home, Catoctin Mountain, Chattahoochee River, Chickamauga-Chattanooga, Cumberland Gap, Delaware Water Gap, Gauley River, George Washington Parkway, Gettysburg, Great Smoky Mountains, Harpers Ferry, Hopewell Furnace, Kennesaw Mountain, Kings Mountain, Little River Canyon, Mammoth Cave, National Capital-East, New River Gorge, Obed River, Rock Creek, Russell Cave, Shenandoah, Upper Delaware, Valley Forge, Weir Farm, Wolf Trap); TVA (Tellico); USFS (Allegheny, Bankhead, Chattahoochee, Cherokee, Daniel Boone, George Washington, Hoosier, Jefferson, Land Between the Lakes, Monongahela, Nantahala, Oconee?, Pisgah, Shawnee, Sumter, Talladega?, Uwharrie, Wayne)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

- **>** *Gaylussacia - Quercus prinus* (Damman and Kershner 1977)
- **?** *Quercus prinus - Quercus velutina / Vaccinium stamineum* Association (Fleming and Moorhead 1996)
- **>** *Vaccinium - Quercus prinus - Quercus velutina* (Damman and Kershner 1977)
- **><** Appalachian sub-xeric forest (Evans 1991)
- **=** Chestnut Oak (Johnson and Ware 1982)
- **=** Chestnut Oak Community (Niering 1953)
- **=** Chestnut Oak Community (Stephenson 1965)
- **><** Chestnut Oak Forest (Schafale and Weakley 1990)
- **?** Chestnut Oak Slope and Ridge Forest (Wieland 1994b)
- **><** Chestnut Oak: 44 (Eyre 1980)
- **=** Chestnut oak type (Racine and Hardin 1975)
- **=** Dry Oak Forest (Thompson and Sorenson 2000)
- **?** Dry oak - heath forest (Fike 1999)
- **?** IA6d. Chestnut Oak Slope and Ridge Forest (Allard 1990)
- **?** IA7d. Piedmont Monadnock Forest (Allard 1990)
- **?** Oak - chestnut community (Overlease 1987)
- **><** Piedmont Monadnock Forest (Schafale and Weakley 1990)
- **?** Ridgetop Chestnut Oak (Swain and Kearsley 2001)
- **?** Xeric Central Hardwood Forest (Smith 1991)

LOWER LEVEL UNITS

Associations:

- CEGL005023 *Quercus prinus - Quercus (alba, coccinea) / Viburnum acerifolium - (Kalmia latifolia)* Forest
- CEGL008524 *Quercus prinus / Rhododendron catawbiense - Kalmia latifolia* Forest
- CEGL006299 *Quercus prinus - (Quercus coccinea, Quercus rubra) / Kalmia latifolia / Vaccinium pallidum* Forest
- CEGL006271 *Quercus (prinus, coccinea) / Kalmia latifolia / (Galax urceolata, Gaultheria procumbens)* Forest
- CEGL006281 *Quercus prinus - Quercus alba / Oxydendrum arboreum / Vitis rotundifolia* Forest
- CEGL005022 *Quercus prinus / Smilax* spp. Forest
- CEGL006282 *Quercus prinus - Quercus (rubra, velutina) / Vaccinium (angustifolium, pallidum*) Forest
- CEGL008431 *Quercus prinus - (Quercus coccinea) / Carya pallida / Vaccinium arboreum - Vaccinium pallidum* Forest

AUTHORSHIP

Primary Concept Source: W.A. Niering (1953) and S.N. Stephenson (1965)
Author of Description: D. Faber-Langendoen and D.J. Allard
Acknowledgments:
Version Date: 01/08/2014
Classif Resp Region: East

REFERENCES

References: Allard 1990, Damman and Kershner 1977, Evans 1991, Eyre 1980, Faber-Langendoen et al. 2016b, Fike 1999, Fleming and Moorhead 1996, Gibbon 1966, Johnson and Ware 1982, Niering 1953, Overlease 1987, Peet and Christensen 1980, Racine and Hardin 1975, Schafale and Weakley 1990, Smith 1991, Stephenson 1965, Swain and Kearsley 2001, Thompson and Sorenson 2000, Wieland 1994b

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A0248. *Quercus prinus - Quercus coccinea* Forest Alliance

CEGL006282. *Quercus prinus - Quercus (rubra, velutina) / Vaccinium (angustifolium, pallidum)* Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Quercus prinus - Quercus (rubra, velutina) / Vaccinium (angustifolium, pallidum*) Forest
Common Name (Translated Scientific Name): Chestnut Oak - (Northern Red Oak, Black Oak) / (Lowbush Blueberry, Blue Ridge Blueberry) Forest
Colloquial Name: Lower New England High Slope Chestnut Oak Forest

Type Concept: This dry to xeric oak-heath forest of central and southern New England ranges south to the northern Piedmont and central Appalachian Mountains. It occurs on upper slopes and ridgetops with thin, nutrient-poor, acidic soils. Windthrow, fire and ice damage are common natural disturbances. The canopy is closed to partially open and is dominated by *Quercus prinus*, which can be codominant with *Quercus rubra*. *Quercus alba, Quercus velutina*, and *Acer rubrum* are common associates, with other less frequent trees including *Betula lenta, Quercus coccinea, Amelanchier arborea, Pinus rigida*, and *Pinus strobus*. *Sassafras albidum, Cornus florida*, and *Nyssa sylvatica* can be minor associates at the southern and western portions of the range. The low-shrub layer is well-developed and comprised chiefly of ericaceous species, including *Vaccinium angustifolium, Vaccinium pallidum, Vaccinium stamineum, Gaylussacia baccata*, or *Kalmia angustifolia*. A tall-shrub layer is often lacking but when present may include *Castanea dentata, Kalmia latifolia, Viburnum acerifolium, Hamamelis virginiana, Quercus ilicifolia*, and *Viburnum prunifolium*. *Ilex montana, Rhododendron prinophyllum*, and *Menziesia pilosa* are minor shrub associates at the southern end of the range. The herbaceous layer is of sparse to moderate cover, depending on shrub cover, and may include *Carex pensylvanica, Deschampsia flexuosa, Danthonia spicata, Ageratina altissima var. altissima, Antennaria plantaginifolia, Aralia nudicaulis, Aureolaria laevigata, Gaultheria procumbens, Chimaphila maculata, Carex rosea, Carex swanii, Carex pensylvanica, Corydalis sempervirens, Comandra umbellata, Cypripedium acaule, Dryopteris marginalis, Epigaea repens, Goodyera pubescens, Hieracium venosum, Lycopodium clavatum, Medeola virginiana, Melampyrum lineare, Monotropa uniflora, Potentilla canadensis, Pteridium aquilinum*, and *Uvularia sessilifolia*.

Classification Comments: This community type is closely related to other oak / heath. It is distinguished by the presence of northern species, such as *Pinus strobus* and *Vaccinium angustifolium*, and its general lack of southern Appalachian species, such as *Gaylussacia ursina, Leucothoe recurva*, and *Galax urceolata*. In comparison to *Quercus prinus - Quercus (alba, coccinea) / Viburnum acerifolium - (Kalmia latifolia)* Forest (CEGL005023), it lacks *Oxydendrum arboreum, Pinus echinata*, and *Pinus virginiana*. It occupies poorer sites and has a more abundant ericaceous shrub component than *Quercus prinus - Quercus rubra / Hamamelis virginiana* Forest (CEGL006057). The Chestnut Oak / Low-Elevation Subtype of Virginia intergrades with the more southern *Quercus (prinus, coccinea) / Kalmia latifolia / (Galax urceolata, Gaultheria procumbens)* Forest (CEGL006271) throughout west-central Virginia. A well-developed Piedmont example of the Chestnut Oak / Low-Elevation Subtype is described by Allard and Leonard (1943). The Chestnut Oak - Northern Red Oak / High-Elevation Subtype of Virginia is similar to *Quercus prinus - Quercus rubra / Vaccinium pallidum - (Rhododendron periclymenoides)* Forest (CEGL008523) of high-elevation granitic terrain on the northern Blue Ridge, but lacks *Quercus velutina, Rhododendron periclymenoides*, and the suite of low-cover herbaceous species characteristic of mineral soil microhabitats in that unit. The recognition of global subtypes equivalent to two distinct state community types is well supported by quantitative analysis of compositional and environmental data. Further study may support the elevation of these subtypes to full association-level status in the USNVC.

Similar NVC Types: This community type (CEGL006282) is related to other oak / heath types. It is distinguished by the presence of northern species, such as *Pinus strobus* and *Vaccinium angustifolium*, and its general lack of Southern Appalachian species, such as *Gaylussacia ursina, Leucothoe recurva*, and *Galax urceolata*. In comparison to *Quercus prinus - Quercus (alba, coccinea) / Viburnum acerifolium - (Kalmia latifolia)* Forest (CEGL005023), it lacks *Oxydendrum arboreum, Pinus echinata*, and *Pinus virginiana*. It occupies poorer sites and has a more abundant ericaceous shrub component than *Quercus prinus - Quercus rubra / Hamamelis virginiana* Forest (CEGL006057).

- CEGL005023 *Quercus prinus - Quercus (alba, coccinea) / Viburnum acerifolium - (Kalmia latifolia)* Forest: of Western Alleghenies, Interior Low Plateau, etc.
- CEGL006057 *Quercus prinus - Quercus rubra / Hamamelis virginiana* Forest
- CEGL006271 *Quercus (prinus, coccinea) / Kalmia latifolia / (Galax urceolata, Gaultheria procumbens)* Forest: of Southern Appalachians.
- CEGL006336 *Quercus (alba, rubra, velutina) - Carya* spp. / *Viburnum acerifolium* Forest: is similar to the more mesic end of the range of variation found in this type at Valley Forge National Historical Park.
- CEGL007700 *Quercus prinus - Quercus* spp. / *Vaccinium arboreum - (Kalmia latifolia, Styrax grandifolius)* Forest
- CEGL006299 *Quercus prinus - (Quercus coccinea, Quercus rubra) / Kalmia latifolia / Vaccinium pallidum* Forest
- CEGL008523 *Quercus prinus - Quercus rubra / Vaccinium pallidum - (Rhododendron periclymenoides)* Forest

VEGETATION

Floristics: The canopy is closed to partially open and dominated by *Quercus prinus*, which can be codominant with *Quercus rubra*. *Quercus alba, Quercus velutina*, and *Acer rubrum* are common associates, with other less frequent trees including *Betula lenta, Quercus coccinea, Amelanchier arborea, Pinus rigida*, and *Pinus strobus*. *Sassafras albidum, Cornus florida*, and *Nyssa sylvatica* can be minor associates at the southern and western portions of the range. The low-shrub layer is well-developed and comprised chiefly of ericaceous species, including *Vaccinium angustifolium, Vaccinium pallidum, Vaccinium stamineum, Gaylussacia baccata*, or *Kalmia angustifolia*. A tall-shrub layer is often lacking but when present may include *Castanea dentata, Kalmia latifolia, Viburnum acerifolium, Hamamelis virginiana, Quercus ilicifolia*, and *Viburnum prunifolium*. *Ilex montana, Rhododendron prinophyllum*, and *Menziesia pilosa* are minor shrub associates at the southern end of the range. The herbaceous layer is of sparse to moderate cover, depending on shrub cover, and may include *Carex pensylvanica, Deschampsia flexuosa, Danthonia spicata, Ageratina altissima var. altissima, Antennaria plantaginifolia, Aralia nudicaulis, Aureolaria laevigata, Gaultheria procumbens, Chimaphila maculata, Carex rosea, Carex swanii, Carex pensylvanica, Corydalis sempervirens, Comandra umbellata, Cypripedium acaule, Dryopteris marginalis, Epigaea repens, Goodyera pubescens, Hieracium venosum, Lycopodium clavatum, Medeola virginiana, Melampyrum lineare, Monotropa uniflora, Potentilla canadensis, Pteridium aquilinum*, and *Uvularia sessilifolia*.

ENVIRONMENT & DYNAMICS

Environmental Description: This forest generally occurs on xeric upper slopes and ridgetops and steep sideslopes with shallow, acidic, rocky, infertile soils. Windthrow, fire, and ice storms are common natural disturbances in these habitats.

Dynamics: Periodic fire is likely an important ecological factor in oak regeneration.

DISTRIBUTION

Geographic Range: This community ranges from southern Maine through the Central Appalachians to higher elevations in Virginia and West Virginia, and north more locally in the Piedmont (an estimated 215,000 square km based on approximate acreage of subsections of occurrence).

Spatial Scale & Pattern [optional]: Large patch, Small patch, Matrix
Nations: US
States/Provinces: CT, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VA, VT, WV?
TNC Ecoregions [optional]: 52:C, 59:C, 60:C, 61:C, 63:C, 64:C
USFS Ecoregions (1994/95): 212Ec:CCC, 212Fb:CCC, 212Fc:CCC, 212Fd:CCC, 212Ga:CCC, 212Gb:CCC, 221Ae:CCC, 221Af:CCC, 221Ag:CCC, 221Ah:CCC, 221Am:CCC, 221Ba:CCC, 221Bb:CCC, 221Bc:CCC, 221Bd:CCC, 221Da:CCC, 221Db:CCP, 221Dc:CCC, 231Ak:CCP, 231Al:CCC, M212De:CCC, M212Ea:CCC, M212Eb:CCP, M221Aa:CCC, M221Ab:CCC, M221Ac:CCC, M221Ad:CCC, M221Ba:CCC, M221Bb:CCC, M221Bc:CCC, M221Bd:CCP, M221Bf:CCC, M221Da:CCC, M221Db:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Appalachian Trail [Central Appalachians], Appalachian Trail [Lower New England], Delaware Water Gap, Upper Delaware, Valley Forge, Weir Farm); USFS (George Washington, Jefferson, Monongahela?)

CONSERVATION STATUS

Grank (Review Date): G5 (2007/1/31)
Greasons: This is a very widely distributed oak / ericad forest that covers large areas.
Ranking Author (Version): G. Fleming, mod. S.L. Neid (2007/1/31)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:

- **?** *Quercus (prinus, rubra) / Calamagrostis porteri* Ridgetop Forest (Walton et al. 1997)
- **=** *Quercus montana - Quercus rubra / Kalmia latifolia / Vaccinium angustifolium - Gaultheria procumbens* Forest (Fleming et al. 2006)
- **=** *Quercus montana / Kalmia latifolia / Gaultheria procumbens* Association (Rawinski et al. 1994)
- **=** *Quercus prinus - Quercus (rubra, velutina) / Gaylussacia baccata* Forest (Harrison 2004)
- **=** *Quercus prinus - Quercus (rubra, velutina) / Vaccinium angustifolium* Forest (Fleming and Taverna 2006)
- **=** *Quercus prinus - Quercus (rubra, velutina) / Vaccinium angustifolium* Forest (Fleming and Patterson 2009a)
- **?** *Quercus prinus - Quercus rubra / Acer pensylvanicum* Association: *Betula lenta / Ilex montana* Subassociation (Fleming and Moorhead 1996)
- **>** *Quercus prinus - Quercus rubra / Kalmia latifolia / Vaccinium angustifolium - Gaultheria procumbens* Forest (Fleming and Coulling 2001)
- **?** *Quercus prinus / Deschampsia flexuosa* Forest (Clancy 1996)
- **?** *Quercus velutina - (Quercus prinus)* Forest (Metzler and Barrett 1996)

- **<** *Quercus velutina - Q. prinus / Gaylussacia baccata* community (Metzler and Barrett 2001)
- **?** CNE dry hardwood forest on acidic bedrock or till (Rawinski 1984a)
- **=** Chestnut Oak Forest (Breden 1989)
- **?** Chestnut Oak Woodland (Gawler 2002)
- **<** Chestnut Oak: 44 (Eyre 1980) [typical variant and chestnut oak - northern red oak variant.]
- **<** Dry Oak Woodland (Thompson 1996) [closed-canopy occurrences on deeper soils]
- **?** Oak - Chestnut (Keever 1973) [only tree spp.]
- **<** Oak / Heath Forest (Fleming et al. 2001)
- **<** SNE dry oak/pine forests on acidic bedrock or till (Rawinski 1984a)
- **?** SNE mesic oak/pine forest on acidic bedrock or till (Rawinski 1984a)

AUTHORSHIP

Primary Concept Source: Eastern Ecology Group
Author of Description: G. Fleming and P. Coulling, mod. S.L. Neid, L.A. Sneddon, S.C. Gawler
Acknowledgments:
Version Date: 2006/06/19

REFERENCES

References: Allard and Leonard 1943, Breden 1989, Breden et al. 2001, Clancy 1996, Collins and Anderson 1994, Coxe 2009, Edinger et al. 2002, Enser 1999, Enser and Lundgren 2006, Eyre 1980, Fike 1999, Fleming and Coulling 2001, Fleming and Moorhead 1996, Fleming and Moorhead 2000, Fleming and Patterson 2009a, Fleming and Patterson 2009b, Fleming and Patterson 2011a, Fleming and Taverna 2006, Fleming et al. 2001, Fleming et al. 2006, Fleming et al. 2007b, Gawler 2002, Gawler and Cutko 2010, Harrison 2004, Harrison 2011, Harshberger 1919, Hunt 1997a, Kasmer et al. 1984, Keever 1973, Metzler and Barrett 1996, Metzler and Barrett 2001, Metzler and Barrett 2006, Metzler et al. 2009, Nerurkar 1974, Overlease 1978, Overlease 1987, Pearson 1979, Perles et al. 2007, Perles et al. 2008, Podniesinski et al. 2005b, Rawinski 1984a, Rawinski et al. 1994, Rawinski et al. 1996, Russell and Schuyler 1988, Shreve et al. 1910, Sperduto 1997a, Sperduto 2000a, Sperduto and Nichols 2004, Swain and Kearsley 2000, Swain and Kearsley 2001, Thompson 1996, Thompson and Sorenson 2000, Vanderhorst 2000b, Walton et al. 1997.

NYC NAC Association Description (CEGL006282):

This association was not selected as a first choice for any NYC NAC plots.

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
1.B.2.Na.2.a. G015 Appalachian Oak / Chestnut Forest

A0624. *Quercus rubra - Quercus prinus* Woodland Alliance

Type Concept Sentence: This alliance includes woodland communities dominated by *Quercus rubra* and / or *Quercus prinus* occurring on acidic, talus slopes or rocky slopes of higher elevations (e.g., from 300-800 m [1000-2620 feet] in New England and to 1370 m [4500 feet] in West Virginia). This vegetation is known from the Appalachian Mountains, from New York and New England, south to the Blue Ridge of North Carolina.

OVERVIEW

Scientific Name: *Quercus rubra - Quercus prinus* Woodland Alliance
Common Name (Translated Scientific Name): Northern Red Oak - Chestnut Oak Woodland Alliance
Colloquial Name: Northern Red Oak - Chestnut Oak Woodland

Type Concept: This alliance includes woodland communities occurring on acidic, talus slopes or rocky slopes of higher elevations (e.g., from 300-800 m [1000-2620 feet] in New England and to 1370 m [4500 feet] in West Virginia). *Quercus rubra* is sometimes dominant but usually occurs in association with *Acer rubrum, Betula lenta, Quercus alba, Quercus prinus*, and others. Canopies are often stunted. The shrub layer may include, in the northern part of the range, *Acer spicatum, Hamamelis virginiana, Kalmia latifolia, Rhus typhina*, and *Sambucus racemosa var. racemosa (= Sambucus racemosa ssp. pubens)*, while in the southern part of the range, *Gaylussacia ursina, Leucothoe recurva, Menziesia pilosa, Rhododendron arborescens, Rhododendron calendulaceum, Rhododendron catawbiense, Rhododendron maximum, Vaccinium simulatum*, and *Viburnum nudum var. cassinoides* are more typical. Herbs include *Aralia nudicaulis, Carex pensylvanica, Corydalis sempervirens, Deschampsia flexuosa, Maianthemum canadense, Oclemena acuminata (= Aster acuminatus), Polypodium virginianum*, and *Pteridium aquilinum var. latiusculum*. This vegetation is known from the Appalachian Mountains, from New York and New England, south to the Blue Ridge of North Carolina. Soils are shallow and acidic.

Classification Comments:

Similar NVC Types:
- A0250 *Quercus prinus - Quercus rubra* Forest Alliance: occurs on more gentle slopes and deeper soils; trees are usually tall and the canopy closed to partially open.
- A3116 *Quercus rubra - Quercus alba* Montane Forest Alliance

Diagnostic Characteristics: Open canopy forest dominated by *Quercus rubra* and/or *Quercus prinus*.

VEGETATION

Physiognomy and Structure: Forests of this alliance are characterized by open, often stunted and gnarled canopies reflecting the dry and nutrient-poor site conditions.

Floristics: *Quercus rubra* is sometimes dominant but usually occurs in association with *Acer rubrum, Betula lenta, Quercus alba, Quercus prinus*, and others. Canopies are often stunted. The shrub layer may include, in the northern part of the range, *Acer spicatum, Hamamelis virginiana, Kalmia latifolia, Rhus typhina*, and *Sambucus racemosa var. racemosa (= Sambucus racemosa ssp. pubens), Gaylussacia ursina, Leucothoe recurva, Menziesia pilosa, Rhododendron arborescens, Rhododendron calendulaceum, Rhododendron catawbiense, Rhododendron maximum, Vaccinium simulatum*, and *Viburnum nudum var. cassinoides* are more typical. Herbs include *Aralia nudicaulis, Carex pensylvanica, Corydalis sempervirens, Deschampsia flexuosa, Maianthemum canadense, Oclemena acuminata (= Aster acuminatus), Polypodium virginianum*, and *Pteridium aquilinum var. latiusculum*.

ENVIRONMENT & DYNAMICS

Environmental Description: This alliance includes woodland communities occurring on acidic, talus slopes or rocky slopes of higher elevations. Soils are shallow and acidic.

Dynamics: Steep slopes and thin soils contribute to the natural maintenance of this alliance; fire is also suspected to play a role in maintaining the open character of the vegetation.

DISTRIBUTION

Geographic Range: Communities of this alliance are known from the Appalachian Mountains, from New York and New England, south to Virginia.

Spatial Scale & Pattern [optional]:
Nations: CA?, US
States/Provinces: CT, MA, MD, ME, NH, NJ, NY, PA, VA, VT, WV
TNC Ecoregions [optional]: 49:C, 50:?, 51:C, 52:?, 59:C, 60:C, 61:C, 62:C, 63:C, 64:C
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]: NPS (Acadia, Appalachian Trail, Blue Ridge Parkway, C&O Canal, Catoctin Mountain, Delaware Water Gap, Harpers Ferry, Hopewell Furnace, Saratoga, Shenandoah, Upper Delaware, Valley Forge); USFS (George Washington, Jefferson, Monongahela?, White Mountain); USFWS (Rachel Carson?)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

- **><** *Betula lenta - Quercus montana / Parthenocissus quinquefolia* Woodland (Fleming et al. 2006)
- **?** Acidic Talus Forest / Woodland (Swain and Kearsley 2001)
- **=** Chestnut oak woodland (Gawler and Cutko 2010)
- **?** Dry oak - heath woodland (Fike 1999)
- **=** Dry oak woodland (Thompson and Sorenson 2000)

LOWER LEVEL UNITS

Associations:
- CEGL008526 *Quercus prinus / Quercus ilicifolia / Danthonia spicata* Woodland
- CEGL004714 *Quercus rubra - Quercus prinus / Deschampsia flexuosa - Danthonia compressa - Calamagrostis porteri* Woodland
- CEGL006585 *Quercus rubra - Betula lenta / Polypodium virginianum* Woodland
- CEGL006134 *Quercus rubra - (Quercus prinus) / Vaccinium* spp. / *Deschampsia flexuosa* Woodland
- CEGL006074 *Quercus prinus / Rhus* spp. / *Deschampsia flexuosa* Woodland
- CEGL006565 *Betula lenta - Quercus prinus / Parthenocissus quinquefolia* Woodland

AUTHORSHIP

Primary Concept Source: E.H. Thompson and E.R. Sorenson (2000)
Author of Description: L. Sneddon
Acknowledgments:
Version Date: 01/08/2014
Classif Resp Region: East

REFERENCES

References: Faber-Langendoen et al. 2016b, Fike 1999, Fleming et al. 2006, Gawler and Cutko 2010, Swain and Kearsley 2001, Thompson and Sorenson 2000

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A0624. *Quercus rubra - Quercus prinus* Woodland Alliance

CEGL006134. *Quercus rubra - (Quercus prinus) / Vaccinium* spp. / *Deschampsia flexuosa* Woodland

Type Concept Sentence:

OVERVIEW

Scientific Name: *Quercus rubra - (Quercus prinus) / Vaccinium* spp. / *Deschampsia flexuosa* Woodland
Common Name (Translated Scientific Name): Northern Red Oak - (Chestnut Oak) / Blueberry species / Wavy Hairgrass Woodland
Colloquial Name: Red Oak / Heath Woodland Rocky Summit

Type Concept: This dry, acidic oak woodland occurs on rocky upper slopes and summits from New England south to the highest peaks in West Virginia. Typical settings are low- to mid-elevation summits and south-facing, upper slopes. Elevations of known occurrences range from near sea level to about 610 m (0-2000 feet) in New England, and to 1370 m (4500 feet) in West Virginia. Soils are shallow, well-drained, acidic, nutrient-poor gravels and coarse sands, often with prominent exposed bedrock. Canopy cover is variable, ranging from open and patchy to closed depending on site conditions. It overtops a dwarf-shrub layer that is frequently extensive and a sparse tall-shrub layer. Herb cover is patchy and variable. Bryoid cover is minor, scattered patches on the rocky substrate. The canopy is dominated by scattered, often stunted *Quercus rubra* with minor associates depending on geography and often including *Quercus velutina, Quercus prinus, Betula populifolia, Betula papyrifera, Betula lenta*, and *Acer rubrum* or *Quercus coccinea* in more coastal regions. *Quercus rubra* tends to be the only oak at the northern end of the range. *Pinus strobus, Pinus rigida*, or other conifers may be present, but only in minor amounts. The dwarf-shrub layer is strongly dominated by heaths, especially *Vaccinium angustifolium, Vaccinium pallidum, Vaccinium myrtilloides*, and *Gaylussacia baccata* with *Gaylussacia frondosa, Comptonia peregrina*, and *Kalmia angustifolia* also common. Tall shrubs may include *Quercus ilicifolia, Hamamelis virginiana, Amelanchier* spp., and *Prunus pensylvanica*. The herbaceous layer is composed of *Deschampsia flexuosa, Danthonia spicata, Carex lucorum, Pteridium aquilinum, Comandra umbellata, Melampyrum lineare, Polygala paucifolia, Epigaea repens, Gaultheria procumbens*, and *Aralia nudicaulis*. The bryophyte layer includes *Polytrichum commune, Leucobryum glaucum*, and others.

Classification Comments:

Similar NVC Types:
- CEGL006506 *Quercus rubra - Acer rubrum - Betula* spp. - *Pinus strobus* Ruderal Forest
- CEGL006585 *Quercus rubra - Betula lenta / Polypodium virginianum* Woodland
- CEGL006584 *Betula alleghaniensis - Quercus rubra / Polypodium virginianum* Woodland
- CEGL005101 (*Pinus strobus, Quercus rubra*) / *Danthonia spicata* Acidic Bedrock Scrub Grassland

VEGETATION

Floristics: The open and patchy canopy overtops a sparse tall-shrub layer, and dwarf-shrub layer is frequently extensive. Herb cover is patchy and variable. Bryoid cover is minor, scattered patches on the rocky substrate. The canopy is dominated by scattered, often stunted *Quercus rubra* with minor associates depending on geography and often including *Quercus velutina, Quercus prinus, Betula populifolia, Betula papyrifera, Betula lenta*, and *Acer rubrum* with *Quercus coccinea* in more coastal regions. *Pinus strobus, Pinus rigida*, or other conifers may be present, but only in minor amounts. The dwarf-shrub layer is strongly dominated by heaths, especially *Vaccinium angustifolium, Vaccinium pallidum, Vaccinium myrtilloides*, and *Gaylussacia baccata* with *Gaylussacia frondosa, Comptonia peregrina*, and *Kalmia angustifolia* also common. Tall shrubs may include *Quercus ilicifolia, Hamamelis virginiana, Amelanchier* spp., and *Prunus pensylvanica*. The herbaceous layer is composed of *Deschampsia flexuosa, Danthonia spicata, Carex lucorum, Pteridium aquilinum, Comandra umbellata, Melampyrum lineare, Polygala paucifolia, Epigaea repens, Gaultheria procumbens*, and *Aralia nudicaulis*. The bryophyte layer includes *Polytrichum commune, Leucobryum glaucum*, and others.

ENVIRONMENT & DYNAMICS

Environmental Description: This red oak woodland occurs on rocky upper slopes and summits from New England south to the highest peaks in West Virginia. Typical settings are low- to mid-elevation summits and south-facing, upper slopes. Elevations of known occurrences range from near sea level to about 610 m (0-2000 feet) in New England, and to 1370 m (4500 feet) in West Virginia. Soils are shallow, well-drained, acidic, nutrient-poor gravels and coarse sands, often with prominent exposed bedrock.

Dynamics: Droughty soils and increased light on the forest floor due to relatively open canopy allow drier species to predominate. Fire may be necessary to maintain *Quercus rubra* over time at more dry-mesic sites.

DISTRIBUTION

Geographic Range: This red oak woodland occurs on low- to mid-elevation summits and south-facing, steep upper slopes from New England south to Pennsylvania and New Jersey.

Spatial Scale & Pattern [optional]: Small patch
Nations: US
States/Provinces: CT, MA, ME, NH, NJ, NY, PA, VT
TNC Ecoregions [optional]: 59:C, 60:C, 61:C, 62:?, 63:C, 64:C
USFS Ecoregions (1994/95): 212Cb:CCC, 212Da:CCP, 212Dc:CCP, 212Fa:CCP, 212Fb:CCP, 212Fc:CCC, 212Fd:CCC, 212Ga:CCP, 212Gb:CCP, 221Ae:CCC, 221Af:CCC, 221Ah:CCP, 221Ai:CCC, 221Ak:CCC, 221Ba:CCC, 221Bb:CCC, 221Bc:CCC, 221Bd:CCC, 221Db:C??, M212Ba:CCC, M212Bb:CCP, M212Bd:CCC, M212Cb:CCC, M212Dc:CCP, M212De:CCC, M212Ea:CCP, M212Eb:CCP, M212F:CP, M221Aa:CPP, M221Ac:CPP, M221Bb:CPP, M221Da:CPP
Omernik Ecoregions:
Federal Lands [optional]: NPS (Acadia, Appalachian Trail [Lower New England], Appalachian Trail [Northern Appalachians], Upper Delaware); USFWS (Rachel Carson?)

CONSERVATION STATUS

Grank (Review Date): G4 (2011/5/20)
Greasons: There are nearly 300 estimated occurrences of this vegetation rangewide, occupying over 3000 square km. However, threats to this association are many. Continued residential and commercial development, road construction, and lack of land-use planning will continue to decrease the amount of this vegetation if left unchecked. As a large-patch to matrix-forming vegetation type, one of the largest threats is fragmentation. In addition, repeated gypsy moth infestations can damage, if not destroy, this vegetation. Invasive species, however, are not generally a threat.
Ranking Author (Version): L.A. Sneddon (2011/5/20)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:
- **<** *Quercus velutina - Q. prinus / Gaylussacia baccata* community (Metzler and Barrett 2001)
- **<** Dry Oak Woodland (Thompson 1996)
- **<** Northern Red Oak: 55 (Eyre 1980)
- **><** Oak - Pine Woodland (Gawler 2002)
- **?** Red oak woodlands (NAP pers. comm. 1998)
- **?** Red oak-chestnut oak acid mid-high elevation, rocky slopes (CAP pers. comm. 1998)
- **?** SNE circumneutral rocky summit/rock outcrop community (Rawinski 1984a)
- **><** White Oak - Red Oak Forest (Gawler 2002)

AUTHORSHIP

Primary Concept Source: Eastern Ecology Group 2-96
Author of Description: S.C. Gawler, mod. S.L. Neid and E. Largay
Acknowledgments:
Version Date: 2006/08/24

REFERENCES

References: Breden et al. 2001, CAP pers. comm. 1998, Edinger et al. 2002, Eyre 1980, Fike 1999, Fleming 1985, Gawler 2002, Gawler and Cutko 2010, Lubinski et al. 2003, Lundgren 1999a, Metzler and Barrett 2001, Metzler and Barrett 2003, Metzler and Barrett 2006, NAP pers. comm. 1998, Northern Appalachian Ecology Working Group 2000, Perles et al. 2008, Rawinski 1984a, Sperduto 2000a, Sperduto and Nichols 2004, Swain and Kearsley 2001, Thompson 1996, Thompson and Sorenson 2000.

NYC NAC Association Description based on 1 plot (CEGL006134):

Overstory trees include chestnut oak (Quercus montana), northern red oak (Quercus rubra), and red maple (Acer rubrum).

Midstory plants include red maple (Acer rubrum), black cherry (Prunus serotina), blackhaw (Viburnum prunifolium), and white ash (Fraxinus americana).

Vines include eastern poison ivy (Toxicodendron radicans), fox grape (Vitis labrusca), and Virginia creeper (Parthenocissus quinquefolia).

Understory plants include white wood aster (Eurybia divaricata), Allegheny blackberry (Rubus allegheniensis), red maple (Acer rubrum), mapleleaf viburnum (Viburnum acerifolium), chestnut oak (Quercus montana), northern red oak (Quercus rubra), smooth Solomon's seal (Polygonatum biflorum), black cherry (Prunus serotina), and blackhaw (Viburnum prunifolium).

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
1.B.2.Na.2.a. G015 Appalachian Oak / Chestnut Forest

A2048. *Quercus velutina - Quercus alba* Eastern Forest Alliance

Type Concept Sentence: This alliance comprises dry, nutrient-poor oak forests characterized by dominance or codominance by some combination of *Quercus alba, Quercus coccinea*, and/or *Quercus velutina*. It ranges widely in the Northeast from the Southern and Central Appalachians and Piedmont to southern Canada.

OVERVIEW

Scientific Name: *Quercus velutina - Quercus alba* Eastern Forest Alliance
Common Name (Translated Scientific Name): Black Oak - White Oak Eastern Forest Alliance
Colloquial Name: Eastern Black Oak - White Oak Dry Forest

Type Concept: Forests in this alliance represent dry oak forests characterized by dominance or codominance by some combination of *Quercus alba, Quercus coccinea*, and/or *Quercus velutina*. *Quercus velutina* is characteristic and constant. Stands are generally closed-canopy and characterized by some combination of *Quercus alba, Quercus coccinea, Quercus rubra*, and/or *Quercus velutina*. In addition, *Carya alba, Carya glabra, Carya ovata, Pinus echinata, Pinus virginiana, Quercus prinus*, and *Quercus stellata* are common associates. Other common associates can include *Acer rubrum var. rubrum, Quercus falcata, Quercus macrocarpa* (within its range), and *Sassafras albidum*. Typical understory trees include *Betula lenta, Oxydendrum arboreum*, and *Sassafras albidum*. *Ilex opaca* is an associate in portions of the Piedmont. The shrub layer is usually strongly dominated by ericaceous species, including *Gaylussacia baccata, Kalmia latifolia, Rhododendron calendulaceum, Rhododendron periclymenoides, Vaccinium angustifolium, Vaccinium pallidum*, and occasionally including *Hamamelis virginiana* and *Viburnum acerifolium*. The herbaceous composition varies considerably over the wide range of this alliance. Some common herbs include *Antennaria plantaginifolia, Carex blanda, Carex pensylvanica, Conopholis americana, Cypripedium acaule, Danthonia spicata, Desmodium nudiflorum, Dioscorea villosa, Gaultheria procumbens, Hieracium venosum, Maianthemum racemosum, Medeola virginiana, Polygonatum biflorum, Prenanthes altissima, Schizachyrium scoparium, Solidago odora*, and *Thelypteris noveboracensis*. These forests occupy dry, nutrient-poor sites on sandy or rocky soil, upper slopes, and ridgetops; the alliance also includes red maple - oak or red maple - pine forests that developed over serpentine bedrock but have sufficient duff development that serpentine chemistry is not evident in the vegetation. This alliance is wide-ranging, with a center of distribution in the Central Appalachians, south to the Southern Blue Ridge; to Cumberland, Western Allegheny, and High Allegheny plateaus; west and north to the Great Lakes; and east through Lower New England / Northern Piedmont, and the Piedmont.

Classification Comments: Dry oak associations occurring in northeastern coastal regions have been moved to North Atlantic Maritime & Coastal Plain Forest Group (G495).

Similar NVC Types:
- A0248 *Quercus prinus - Quercus coccinea* Forest Alliance: is generally found on steeper slopes and shallower soils.

Diagnostic Characteristics: Forests dominated or codominated by some combination of northern dry oaks *Quercus alba, Quercus coccinea*, and/or *Quercus velutina*. Shrub layer is characterized by species of the family Ericaceae.

VEGETATION

Physiognomy and Structure: Stands are generally closed-canopy with a well-developed to open shrub layer. The herbaceous layer is of variable cover, and may not be easily separated from the shrub layer if it is dominated by dwarf-shrubs such as *Vaccinium angustifolium, Vaccinium pallidum*, and *Gaylussacia baccata*.

Floristics: Stands are characterized by some combination of *Quercus alba, Quercus coccinea, Quercus rubra*, and/or *Quercus velutina*. In addition, *Carya alba, Carya glabra, Carya ovata, Pinus echinata, Pinus virginiana, Quercus prinus*, and *Quercus stellata* are common associates. Other common associates can include *Acer rubrum var. rubrum, Nyssa sylvatica, Prunus serotina var. serotina, Quercus falcata, Quercus macrocarpa* (within its range), and *Sassafras albidum*. Typical understory trees include *Betula lenta, Oxydendrum arboreum*, and *Sassafras albidum*. *Ilex opaca* is an associate on portions of the Coastal Plain. The shrub layer is usually strongly dominated by ericaceous species, including *Gaylussacia baccata, Kalmia latifolia, Rhododendron calendulaceum, Rhododendron periclymenoides, Vaccinium angustifolium, Vaccinium pallidum*, and occasionally including *Hamamelis virginiana* and *Viburnum acerifolium*. The herbaceous composition varies considerably over the wide range of this alliance. Some common herbs include *Antennaria plantaginifolia, Carex blanda, Carex pensylvanica, Conopholis americana, Cypripedium acaule, Danthonia spicata, Desmodium nudiflorum, Dioscorea villosa, Gaultheria procumbens, Hieracium venosum, Maianthemum racemosum, Medeola virginiana, Polygonatum biflorum, Prenanthes altissima, Schizachyrium scoparium, Solidago odora*, and *Thelypteris noveboracensis*.

ENVIRONMENT & DYNAMICS

Environmental Description: These forests occupy dry, nutrient-poor sites on sandy or rocky soil, upper slopes, and ridgetops. Stands can be found on mid to upper slopes and terraces where dry-mesic conditions persist and where soils are more sandy and/or rocky. Bedrock is sandstone, siltstone, chert, or shale. Many stands are found on coarser-textured soils.

Dynamics: Disturbance in the form of wind and logging tends to favor *Quercus velutina* in these forests.

DISTRIBUTION

Geographic Range: This alliance is wide-ranging, with a center of distribution in the Central Appalachians, south to the Southern Blue Ridge; to Cumberland, Western Allegheny, and High Allegheny plateaus, west and north to the Great Lakes, and east through Lower New England / Northern Piedmont, and Piedmont. It also occurs in Ontario, Canada.

Spatial Scale & Pattern [optional]:

Nations: US

States/Provinces: DC, GA?, KY, MA, MD, NC, NJ, NY, OH, PA, SC?, TN, VA, WV

TNC Ecoregions [optional]: 36:C, 43:C, 44:C, 45:C, 46:C, 48:C, 49:C, 50:C, 51:C, 52:C, 56:P, 57:C, 58:C, 59:C, 60:C, 61:C, 62:C

USFS Ecoregions (2007):

Omernik Ecoregions:

Federal Lands [optional]: BIA (Eastern Band of Cherokee); DOD (Arnold, Fort Belvoir, Fort Benning, Kerr Reservoir); NPS (Appalachian Trail, Appomattox Court House, Big South Fork, Blue Ridge Parkway, Buffalo River, C&O Canal, Cape Cod, Chickamauga-Chattanooga, Colonial, Cuyahoga Valley, Fire Island, Fredericksburg-Spotsylvania, George Washington Parkway, Great Smoky Mountains, Indiana Dunes, Kings Mountain, National Capital-East, Obed River, Ozark Riverways, Prince William, Rock Creek, Russell Cave, Shenandoah, Thomas Stone, Wolf Trap); TVA (Tellico); USFS (Chattahoochee?, Cherokee?, Chippewa, Daniel Boone?, George Washington, Hoosier, Huron-Manistee, Huron?, Jefferson, Manistee, Monongahela, Nantahala, Ouachita, Ozark, Pisgah, Shawnee, Sumter, Talladega, Tuskegee, Uwharrie); USFWS (Cape May, E.B. Forsythe, Massasoit?)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

- **><** Acidic sub-xeric forest (Evans 1991)
- **?** Black Oak - Scarlet Oak Forest / Woodland (Swain and Kearsley 2001)
- **><** White Oak - Black Oak - Northern Red Oak: 52 (Eyre 1980)

LOWER LEVEL UNITS

Associations:

- CEGL006018 *Quercus (velutina, alba) / Vaccinium pallidum / Pteridium aquilinum* High Allegheny Plateau, Western Allegheny Plateau Forest
- CEGL007691 *Quercus alba - Quercus coccinea - Quercus falcata / Kalmia latifolia - Vaccinium pallidum* Forest
- CEGL008521 *Quercus alba - Quercus (coccinea, velutina, prinus) / Gaylussacia baccata* Forest
- CEGL006438 *Acer rubrum - Quercus* spp. / *Smilax* spp. Serpentine Forest
- CEGL006434 *Quercus alba - Quercus stellata - Quercus velutina / Cornus florida / Andropogon gerardii* Woodland

AUTHORSHIP

Primary Concept Source: D. Faber-Langendoen, L.A. Sneddon, A.S. Weakley

Author of Description: D. Faber-Langendoen, L.A. Sneddon, A.S. Weakley

Acknowledgments:

Version Date: 01/08/2014

Classif Resp Region: Southeast

REFERENCES

References: Evans 1991, Eyre 1980, Faber-Langendoen et al. 2016b, Jones 1988a, Jones 1988b, Schafale and Weakley 1990, Swain and Kearsley 2001

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A2048. *Quercus velutina - Quercus alba* Eastern Forest Alliance

CEGL006438. *Acer rubrum - Quercus* spp. / *Smilax* spp. Serpentine Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Acer rubrum - Quercus* spp. / *Smilax* spp. Serpentine Forest
Common Name (Translated Scientific Name): Red Maple - Oak species / Greenbrier species Serpentine Forest
Colloquial Name: Red Maple - Oak / Greenbrier Serpentine Forest

Type Concept: This serpentine plant community is associated with soils derived from weathered serpentine bedrock and typically occurs on upper slopes and interfluves with a southerly aspect. Soils are typically silt loams, greater than 30 cm deep. In Pennsylvania serpentine barrens, the forest or woodland canopy is dominated by *Acer rubrum* and *Quercus alba*, as well as other oak species, including *Quercus falcata, Quercus rubra*, and *Quercus velutina*. On Staten Island, New York, the canopy includes *Betula populifolia* and *Populus tremuloides* in addition to *Quercus velutina* and *Sassafras albidum*. The subcanopy is characterized by *Acer rubrum, Quercus alba, Nyssa sylvatica*, and *Prunus serotina*. The shrub layer is dominated by *Smilax rotundifolia* and/or *Smilax glauca*. *Vaccinium pallidum, Rubus allegheniensis, Gaylussacia baccata, Prunus serotina, Morella pensylvanica (= Myrica pensylvanica), Rhus copallinum*, and/or *Viburnum recognitum* may also be present in the shrub layer. The herbaceous layer under the canopy cover is depauperate and typically dominated by *Smilax rotundifolia, Smilax glauca*, and *Microstegium vimineum*. Other typical herbaceous species include *Danthonia spicata, Carex glaucodea*, and *Lonicera japonica*.

Classification Comments: This and a number of other serpentine vegetation community types were described by Podniesinski et al. (unpubl. data 1999); subsequently, former *Pinus rigida / Schizachyrium scoparium - Scleria pauciflora* Wooded Herbaceous Vegetation (CEGL006159) was archived as the type was too broad given the recent data describing more specific community types occurring within the eastern serpentine barrens. This type has 40% or more tree cover in comparison to the open grassland types that have less than 40% tree cover.

Similar NVC Types:
- CEGL006266 *Pinus virginiana / Quercus marilandica* Serpentine Ruderal Forest
- CEGL006290 *Pinus rigida - Quercus (velutina, prinus)* Forest
- CEGL006439 *Acer rubrum - Pinus virginiana - Pinus rigida / Smilax* spp. Serpentine Forest
- CEGL006440 *Juniperus virginiana - Pinus virginiana / Smilax rotundifolia* Serpentine Forest
- CEGL006441 *Sorghastrum nutans - Schizachyrium scoparium* Serpentine Grassland
- CEGL006442 *Schizachyrium scoparium - Sporobolus heterolepis* Serpentine Grassland
- CEGL006316 *Deschampsia caespitosa - Vernonia noveboracensis* Serpentine Seep

VEGETATION

Floristics: In Pennsylvania serpentine barrens, the forest or woodland canopy is dominated by *Acer rubrum* and *Quercus alba*, as well as other oak species, including *Quercus falcata, Quercus rubra*, and *Quercus velutina*. On Staten Island, New York, the canopy includes *Betula populifolia* and *Populus tremuloides* in addition to *Quercus velutina* and *Sassafras albidum*. The subcanopy is characterized by *Acer rubrum, Quercus alba, Nyssa sylvatica*, and *Prunus serotina*. The shrub layer is dominated by *Smilax rotundifolia* and/or *Smilax glauca*. *Vaccinium pallidum, Rubus allegheniensis, Gaylussacia baccata, Prunus serotina, Morella pensylvanica (= Myrica pensylvanica), Rhus copallinum*, and/or *Viburnum recognitum* may also be present in the shrub layer. The herbaceous layer under the canopy cover is depauperate and typically dominated by *Smilax rotundifolia, Smilax glauca*, and *Microstegium vimineum*. Other typical herbaceous species include *Danthonia spicata, Carex glaucodea*, and *Lonicera japonica*.

ENVIRONMENT & DYNAMICS

Environmental Description: This serpentine plant community is associated with soils derived from weathered serpentine bedrock. It typically occurs on upper slopes and interfluves with a southerly aspect. Soils are silt loams, greater than 30 cm deep.

Dynamics: This plant community is adapted to the weathering of serpentine bedrock. It was once thought that the lack of canopy cover was maintained by the unique edaphic features of the chrome series soils, but in the last 20 years, many sites have been

invaded by dense *Pinus virginiana* (Tyndall 1992a). In Pennsylvania, red maple and white oak are the canopy dominants of this type; while in New York, dominant canopy species include black oak, sassafras, and gray birch. This phenomenon dramatically alters the light regime and promotes substantial soil development (up to 10 cm in 20 years). Under these conditions, an entirely different community develops as the influence of the bedrock is buffered by the soil/litter accumulation. This closed-canopy serpentine forest typically exhibits a dense understory of *Smilax rotundifolia*. Some of the characteristic herbaceous serpentine species apparently persist in the ground layer as scattered non-flowering individuals; other populations appear to die out but may persist in the seed bank. Selective cutting has been effective in restoring degraded sites to their previous composition and structure, but most researchers believe that without regular burning to prevent soil development the serpentine plant communities will not persist. There is substantial evidence that most of the existing areas were regularly burned by Native Americans (Marye 1920, 1955a, 1955b, 1955c) and perhaps maintained by grazing after European settlement.

DISTRIBUTION

Geographic Range: This community occurs in serpentine barrens located within Chester and Lancaster counties in Pennsylvania and on Staten Island, New York.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: NY, PA
TNC Ecoregions [optional]: 61:C, 62:C
USFS Ecoregions (1994/95): 221D:CC, 232A:CC
Omernik Ecoregions:
Federal Lands [optional]:

CONSERVATION STATUS

Grank (Review Date): G1G2 (2005/9/20)
Greasons: New ranking will need to be developed for each Pennsylvania serpentine association
Ranking Author (Version): L.A. Sneddon and E.F. Largay (2005/9/20)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low - Poorly Documented.

SYNONYMY

Synonymy:
- **<** Smith's Eastern Serpentine Barren (Podniesinski et al. 1999)

AUTHORSHIP

Primary Concept Source: G. Podniesinski, A. Leimanis, and J. Ebert (1999)
Author of Description: G. Podniesinski, A. Leimanis, J. Ebert, G. Edinger, M. Anderson
Acknowledgments:
Version Date: 2005/09/20

REFERENCES

References: Edinger et al. 2002, Fike 1999, Marye 1920, Marye 1955a, Marye 1955b, Marye 1955c, Podniesinski et al. 1999, Smith n.d.a, Tyndall 1992a.

NYC NAC Association Description based on 24 plots (CEGL006438):

Overstory trees include northern red oak (Quercus rubra), white oak (Quercus alba), sassafras (Sassafras albidum), red maple (Acer rubrum), sweetgum (Liquidambar styraciflua), black cherry (Prunus serotina), bigtooth aspen (Populus grandidentata), sweet birch (Betula lenta), black oak (Quercus velutina), pin oak (Quercus palustris), blackgum (Nyssa sylvatica), chestnut oak (Quercus montana), post oak (Quercus stellata), and gray birch (Betula populifolia).

Midstory plants include red maple (Acer rubrum), sassafras (Sassafras albidum), northern spicebush (Lindera benzoin), white oak (Quercus alba), highbush blueberry (Vaccinium corymbosum), southern arrowwood (Viburnum dentatum), sweetgum (Liquidambar styraciflua), black cherry (Prunus serotina), northern red oak (Quercus rubra), sweet birch (Betula lenta), pin oak (Quercus palustris), ash (Fraxinus sp.), blackgum (Nyssa sylvatica), American hazelnut (Corylus americana), and sweet cherry (Prunus avium).

Vines include Virginia creeper (Parthenocissus quinquefolia), roundleaf greenbrier (Smilax rotundifolia), eastern poison ivy (Toxicodendron radicans), Japanese honeysuckle (Lonicera japonica), Oriental bittersweet (Celastrus orbiculatus), Amur peppervine (Ampelopsis brevipedunculata), cat greenbrier (Smilax glauca), climbing false buckwheat (Polygonum scandens), wisteria (Wisteria sp.), smooth carrionflower (Smilax herbacea), and fox grape (Vitis labrusca).

Understory plants include northern spicebush (Lindera benzoin), northern red oak (Quercus rubra), highbush blueberry (Vaccinium corymbosum), sweetgum (Liquidambar styraciflua), black cherry (Prunus serotina), southern arrowwood (Viburnum dentatum), sassafras (Sassafras albidum), Canada mayflower (Maianthemum canadense), multiflora rose (Rosa multiflora), blackberry (Rubus sp.), mapleleaf viburnum (Viburnum acerifolium), American pokeweed (Phytolacca americana), red maple (Acer rubrum), Amur peppervine (Ampelopsis brevipedunculata), swamp azalea (Rhododendron viscosum), eastern hayscented fern (Dennstaedtia punctilobula), white wood aster (Eurybia divaricata), devil's walkingstick (Aralia spinosa), Japanese angelica tree (Aralia elata), black raspberry (Rubus occidentalis), wild sarsaparilla (Aralia nudicaulis), northern dewberry (Rubus flagellaris), lowbush blueberry (Vaccinium angustifolium), broadleaf enchanter's nightshade (Circaea lutetiana), white snakeroot (Ageratina altissima), garlic mustard (Alliaria petiolata), common wormwood (Artemisia vulgaris), feathery false lily of the valley (Maianthemum racemosum), American wintergreen (Pyrola americana), tuliptree (Liriodendron tulipifera), white oak (Quercus alba), Japanese knotweed (Polygonum cuspidatum), Nepalese browntop (Microstegium vimineum), Blue Ridge blueberry (Vaccinium pallidum), bristly dewberry (Rubus hispidus), smooth Solomon's seal (Polygonatum biflorum), deerberry (Vaccinium stamineum), wine raspberry (Rubus phoenicolasius), wayfaringtree (Viburnum lantana), white baneberry (Actaea pachypoda), coastal sweetpepperbush (Clethra alnifolia), smooth carrionflower (Smilax herbacea), wreath goldenrod (Solidago caesia), widowsfrill (Silene stellata), small enchanter's nightshade (Circaea alpina), and whorled yellow loosestrife (Lysimachia quadrifolia).

G650. Northeastern Oak - Hickory Forest & Woodland

This group encompasses eastern U.S. dry-mesic, largely deciduous forests of intermediate fertility characterized by *Quercus alba, Quercus falcata, Quercus prinus, Quercus rubra, Quercus velutina, Fagus grandifolia, Carya glabra, Carya ovata, Carya cordiformis, Carya alba), Fraxinus americana)*, and in the southern part of the range, *Liriodendron tulipifera*).

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
1.B.2.Na.2.c. G650 Northeastern Oak - Hickory Forest & Woodland

A2054. *Fagus grandifolia - Quercus rubra / Cornus florida* Forest Alliance

Type Concept Sentence: Forests in this mid-Atlantic alliance occur in non-montane or low-elevation mesic situations and are characterized by a mixture of *Fagus grandifolia, Quercus rubra, Liriodendron tulipifera, Liquidambar styraciflua, Quercus alba*, and *Nyssa sylvatica*.

OVERVIEW

Scientific Name: *Fagus grandifolia - Quercus rubra / Cornus florida* Forest Alliance
Common Name (Translated Scientific Name): American Beech - Northern Red Oak / Flowering Dogwood Forest Alliance
Colloquial Name: Northeastern Mesic Beech - Oak Forest

Type Concept: Forests in this mid-Atlantic alliance occur in non-montane or low-elevation mesic situations. The tree canopy is characterized by a mixture of *Fagus grandifolia, Quercus rubra, Liriodendron tulipifera, Liquidambar styraciflua, Quercus alba*, and *Nyssa sylvatica*. *Cornus florida* is a constant understory tree, often associated with *Ostrya virginiana* and *Carpinus caroliniana*. *Viburnum acerifolium* is a common shrub. The herb layer is of variable cover and diversity; it can be relatively lush with such species as *Polystichum acrostichoides, Podophyllum peltatum, Arisaema triphyllum, Thelypteris noveboracensis, Mitchella repens, Uvularia perfoliata*, and others. Forests in this alliance occur in non-montane or low-elevation mesic situations. These forests often occur on concave and sheltered landforms, such as north-facing slopes, low slopes, high terraces along streams, and possibly other situations.

Classification Comments:

Similar NVC Types:
- A0266 *Betula alleghaniensis - Aesculus flava* Forest Alliance
- A4209 *Quercus velutina - Quercus falcata - Pinus rigida* Coastal Plain Forest Alliance
- A2032 *Quercus velutina - Fagus grandifolia - Ilex opaca* Maritime Forest Alliance

Diagnostic Characteristics: Presence of characteristic species *Fagus grandifolia, Quercus rubra, Liriodendron tulipifera*, and *Cornus florida*; northern hardwood species such as *Acer saccharum, Betula alleghaniensis*, and others are absent or infrequent. Limited to the Piedmont and Mid-Atlantic Coastal Plain.

VEGETATION

Physiognomy and Structure: This alliance is composed of closed-canopy deciduous forests, with variable cover of shrub species, and a well-developed herbaceous layer. Conifers are absent or of low cover.

Floristics: The tree canopy is characterized by a mixture of *Fagus grandifolia, Quercus rubra, Liriodendron tulipifera, Liquidambar styraciflua, Quercus alba*, and *Nyssa sylvatica*. Additional canopy associates may include *Betula lenta, Carya alba, Carya glabra, Fraxinus americana*, and *Quercus falcata*. *Cornus florida* is a constant understory tree, often associated with *Ostrya virginiana* and *Carpinus caroliniana*. *Viburnum acerifolium* is a common shrub. Ericaceous species may include *Gaylussacia baccata, Gaylussacia frondosa, Kalmia latifolia*, and *Rhododendron periclymenoides*. The herb layer is of variable cover and diversity; it can be relatively lush with such species as *Ageratina altissima, Arisaema triphyllum, Botrychium virginianum, Desmodium nudiflorum, Galium circaezans, Goodyera pubescens, Hexastylis arifolia, Hexastylis minor, Mitchella repens, Podophyllum peltatum, Polygonatum biflorum, Polystichum acrostichoides, Thelypteris noveboracensis, Tipularia discolor, Uvularia perfoliata*, and others.

ENVIRONMENT & DYNAMICS

Environmental Description: These forests often occur on concave and sheltered landforms such as north-facing slopes, low slopes, high terraces along streams, and possibly other situations.

Dynamics: This forest alliance is relatively stable and long-lived.

DISTRIBUTION

Geographic Range: This alliance ranges from Massachusetts to Virginia.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: DC, DE, MA, MD, NJ, NY, OH, PA, RI?, VA, WV
TNC Ecoregions [optional]: 43:C, 49:C, 50:C, 51:C, 52:C, 56:C, 57:C, 58:C, 59:C, 60:C, 61:C, 62:C
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]: DOD (Falls Lake, Fort A.P. Hill, Fort Belvoir, Fort Benning, Fort Dix, Fort Pickett, Jordan Lake, Kerr Reservoir, Yorktown); NPS (Appomattox Court House, Big South Fork, Buffalo River, C&O Canal, Cape Cod, Chattahoochee River, Chickamauga-Chattanooga, Colonial, Cumberland Gap, Fort Donelson, Fredericksburg-Spotsylvania, George Washington Parkway, Guilford Courthouse, Horseshoe Bend, Kennesaw Mountain, Little River Canyon, Mammoth Cave, Morristown, Natchez Trace, National Capital-East, Ninety Six, Petersburg, Prince William, Richmond, Rock Creek, Sagamore Hill, Shenandoah, Shiloh, Thomas Stone, Upper Delaware, Wolf Trap); TVA (Tellico); USFS (Bankhead, Chattahoochee, Cherokee?, Daniel Boone, Holly Springs, Jefferson?, Land Between the Lakes, Oconee?, Ouachita, Ozark, St. Francis, Sumter, Talladega, Uwharrie); USFWS (Great Swamp, James River, Lake Isom, Prime Hook)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

- **?** *Quercus - Fagus grandifolia / Ilex opaca* Forest Alliance (Sneddon et al. 1994)
- **><** IA5g. Typic Mesic Piedmont Forest (Allard 1990)
- **?** Mesic Mixed Hardwood Forest (Piedmont Subtype) (Schafale and Weakley 1990)
- **><** Oak - Hardwood Forest (Undifferentiated) (Windisch 2014a)
- **><** Oak - Tulip Tree Forest (NYNHP 2013r)
- **><** Piedmont Mesic Broad-leaved Deciduous Forest (Ambrose 1990a)

LOWER LEVEL UNITS

Associations:
- CEGL006600 *Tsuga canadensis / Ilex opaca / Hieracium venosum* Forest
- CEGL006075 *Fagus grandifolia - Quercus (alba, rubra) - Liriodendron tulipifera / (Ilex opaca var. opaca)* Forest
- CEGL006377 *Fagus grandifolia - Quercus alba - Quercus rubra* Forest
- CEGL006919 *Fagus grandifolia - Quercus (alba, velutina, prinus) / Kalmia latifolia* Forest
- CEGL006921 *Fagus grandifolia - Betula lenta - Quercus (alba, rubra) / Carpinus caroliniana* Forest
- CEGL006144 *Quercus alba - Fagus grandifolia* Western Allegheny Plateau Forest

AUTHORSHIP

Primary Concept Source: L. Sneddon, M. Anderson, K. Metzler
Author of Description: L. Sneddon
Acknowledgments:
Version Date: 12/18/2014
Classif Resp Region: East

REFERENCES

References: Allard 1990, Ambrose 1990a, Faber-Langendoen et al. 2016b, Jones 1988a, NYNHP 2013r, Schafale and Weakley 1990, Sneddon et al. 1994, Windisch 2014a

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A2054. *Fagus grandifolia - Quercus rubra / Cornus florida* Forest Alliance

CEGL006075. *Fagus grandifolia - Quercus (alba, rubra) - Liriodendron tulipifera / (Ilex opaca var. opaca)* Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Fagus grandifolia - Quercus (alba, rubra) - Liriodendron tulipifera / (Ilex opaca var. opaca)* Forest
Common Name (Translated Scientific Name): American Beech - (White Oak, Northern Red Oak) - Tuliptree / (American Holly) Forest
Colloquial Name: Mid-Atlantic Mesic Mixed Hardwood Forest

Type Concept: This forest of mesic to submesic, well-drained soils occurs in the Piedmont and Coastal Plain of Virginia and Maryland, extending north to southern New England on the Coastal Plain. It also occurs occasionally at low elevations of the Blue Ridge and adjacent Ridge and Valley in Virginia and Maryland. It is characteristically a mixed forest dominated by *Fagus grandifolia, Quercus alba, Quercus rubra*, and *Liriodendron tulipifera* in various proportions. Overstory associates over the range include *Quercus velutina, Quercus falcata, Quercus coccinea, Liquidambar styraciflua, Acer rubrum, Nyssa sylvatica, Carya alba, Carya glabra*, and *Fraxinus americana*. The subcanopy is characterized by young *Fagus grandifolia, Acer rubrum, Carpinus caroliniana, Cornus florida*, and *Sassafras albidum*. *Ilex opaca* is particularly characteristic and abundant on the Coastal Plain. The shrub layer varies from very sparse to well-developed and can include *Asimina triloba, Viburnum acerifolium, Viburnum dentatum*, and *Euonymus americanus*. Heath shrubs, such as *Vaccinium corymbosum* and *Vaccinium pallidum*, may be common but not abundant. Vines are common, including *Parthenocissus quinquefolia, Smilax glauca*, and *Toxicodendron radicans*. In the southern part of the range, *Oxydendrum arboreum* and *Vitis rotundifolia* may be conspicuous members of the understory. The herb layer is composed of *Polystichum acrostichoides, Thelypteris noveboracensis, Uvularia perfoliata, Cypripedium acaule, Mitchella repens, Tipularia discolor, Goodyera pubescens, Eurybia divaricata (= Aster divaricatus), Chimaphila maculata, Carex swanii, Medeola virginiana, Athyrium filix-femina, Carex digitalis, Carex willdenowii, Epifagus virginiana, Maianthemum canadense, Desmodium nudiflorum, Polygonatum biflorum, Podophyllum peltatum, Arisaema triphyllum*, and *Maianthemum racemosum (= Smilacina racemosa)*.

Classification Comments: The regional circumscription of this type is very robust and supported by 170 plots from Virginia, Maryland, and the District of Columbia. These were analyzed by VDNH with a 1300-plot regional dataset compiled for the NCR and Mid-Atlantic national parks vegetation mapping projects.

Similar NVC Types:
- CEGL007226 *Quercus alba - Carya glabra* / Mixed Herbs Coastal Plain Forest
- CEGL007206 *Fagus grandifolia - Quercus alba - (Acer barbatum)* / Mixed Herbs Forest
- CEGL006921 *Fagus grandifolia - Betula lenta - Quercus (alba, rubra) / Carpinus caroliniana* Forest
- CEGL006377 *Fagus grandifolia - Quercus alba - Quercus rubra* Forest
- CEGL008465 *Fagus grandifolia - Quercus rubra / Cornus florida / Polystichum acrostichoides - Hexastylis virginica* Forest

VEGETATION

Floristics: Rangewide, this vegetation type is characteristically a mixed mesophytic forest dominated by *Fagus grandifolia, Quercus alba, Quercus rubra*, and *Liriodendron tulipifera* in various proportions. Overstory associates over the range include *Carya alba, Carya glabra, Quercus velutina, Quercus falcata, Quercus coccinea, Liquidambar styraciflua, Acer rubrum, Nyssa sylvatica*, and *Fraxinus americana*. The subcanopy is characterized by young *Fagus grandifolia, Acer rubrum, Carpinus caroliniana, Cornus florida, Ilex opaca*, and *Sassafras albidum*. The shrub layer varies from very sparse to well-developed and can include *Asimina triloba, Viburnum acerifolium, Viburnum dentatum*, and *Euonymus americanus*. Heath shrubs, such as *Vaccinium corymbosum* and *Vaccinium pallidum*, may be common but not abundant. Vines are common, including *Parthenocissus quinquefolia, Smilax glauca*, and *Toxicodendron radicans*. The herb layer is composed of *Polystichum acrostichoides, Uvularia perfoliata, Cypripedium acaule, Mitchella repens, Tipularia discolor, Goodyera pubescens, Eurybia divaricata (= Aster divaricatus), Chimaphila maculata, Carex swanii, Medeola virginiana, Athyrium filix-femina, Carex digitalis, Carex willdenowii, Epifagus virginiana, Maianthemum canadense, Desmodium nudiflorum, Polygonatum biflorum*. *Podophyllum peltatum, Arisaema triphyllum*, and *Maianthemum racemosum (= Smilacina racemosa)*.

Several intergrading compositional variants have been noted in regional and local landscape analyses. On more submesic, convex slopes, *Fagus grandifolia, Quercus alba, Cornus florida*, and *Vaccinium pallidum* tend to be prominent, while pronounced mesophytes such as *Carpinus caroliniana* and herbaceous species in general are usually sparse. Coastal Plain stands tend to have understories heavily dominated by *Ilex opaca*, while Piedmont stands generally have only scattered *Ilex opaca* as well as slightly higher herbaceous richness.

ENVIRONMENT & DYNAMICS

Environmental Description: This forest association occurs on mesic to submesic slopes or gentle gradients. Ravines in dissected topography are particularly typical sites in the Piedmont and parts of the Inner Coastal Plain. The type also occupies rolling uplands with deep soils. Soils are typically well-drained, acidic sandy and silt loams derived from parent material of low to moderate fertility. This association is found throughout the Piedmont from south-central Virginia to New Jersey and Pennsylvania, and on the Mid-Atlantic Coastal Plain from southeastern Virginia northward.

Dynamics:

DISTRIBUTION

Geographic Range: This association is currently described from Virginia northward to Long Island, New York. The type is characteristic of the Coastal Plain throughout its range and of the Piedmont from south-central Virginia through much of Maryland. Small outliers of this vegetation occur at low elevations on both flanks of the Blue Ridge in Virginia and Maryland.

Spatial Scale & Pattern [optional]: Large patch, Matrix
Nations: US
States/Provinces: DC, DE, MD, NJ, NY, PA, VA
TNC Ecoregions [optional]: 52:C, 57:C, 58:C, 59:C, 61:C, 62:C
USFS Ecoregions (1994/95): 221Db:CCC, 231Ae:CCC, 231Af:CCP, 231Ak:CCC, 231Al:CCC, 231An:CCC, 231Ao:CCP, 231Ap:CCC, 232Ac:CCC, 232Ad:CCC, 232Br:CCC, 232Bt:CCC, 232Bx:CCP, 232Bz:CCC, 232Ch:CCC, 232Cj:CCC, M221Da:CCC
Omernik Ecoregions:
Federal Lands [optional]: DOD (Fort A.P. Hill, Fort Belvoir, Kerr Reservoir, Yorktown); NPS (Appomattox Court House, C&O Canal, Colonial, Fredericksburg-Spotsylvania, George Washington Parkway, Monocacy, National Capital-East, Petersburg, Prince William, Richmond, Rock Creek, Sagamore Hill, Thomas Stone, Wolf Trap); USFWS (James River, Patuxent, Prime Hook)

CONSERVATION STATUS

Grank (Review Date): G5 (2007/1/31)
Greasons: This association is common and widespread on the northeastern Coastal Plain and the Piedmont in Virginia and Maryland.
Ranking Author (Version): L.A. Sneddon and G.P. Fleming (2007/2/14)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:

- **=** *Fagus grandifolia - Carya alba / Symplocos tinctoria - Cornus florida / Euonymus americana - Botrychium virginianum* Forest (Walton et al. 2001)
- **=** *Fagus grandifolia - Liriodendron tulipifera - Quercus (alba, rubra) / Polystichum acrostichoides - Aster divaricatus* Forest (Fleming 2002a)
- **?** *Fagus grandifolia - Liriodendron tulipifera - Quercus (alba, rubra) / Polystichum acrostichoides - Aster divaricatus* Forest (Fleming 2001a)
- **=** *Fagus grandifolia - Liriodendron tulipifera - Quercus rubra / Polystichum acrostichoides - Carex laxiculmis* Forest (Fleming 2002b)
- **=** *Fagus grandifolia - Liriodendron tulipifera - Quercus rubra / Polystichum acrostichoides* Forest (Fleming and Patterson 2003)
- **=** *Fagus grandifolia - Liriodendron tulipifera / Asimina triloba / Botrychium virginianum* Forest (McCoy and Fleming 2000)
- **=** *Fagus grandifolia - Liriodendron tulipifera / Carpinus caroliniana* Forest (McCoy and Fleming 2000)
- **=** *Fagus grandifolia - Liriodendron tulipifera / Polystichum acrostichoides* Forest (Young et al. 2007a)
- **=** *Fagus grandifolia - Quercus (alba, rubra) - Liriodendron tulipifera / (Ilex opaca var. opaca) / Polystichum acrostichoides* Forest (Fleming et al. 2007b)
- **=** *Fagus grandifolia - Quercus (alba, rubra) - Liriodendron tulipifera / (Ilex opaca var. opaca) / Polystichum acrostichoides* Forest (Fleming and Taverna 2006)
- **=** *Fagus grandifolia - Quercus (alba, rubra) - Liriodendron tulipifera / Ilex opaca var. opaca - (Asimina triloba)* Forest (Fleming 2002a)

- **?** *Fagus grandifolia - Quercus (alba, rubra) - Liriodendron tulipifera / Ilex opaca var. opaca - (Asimina triloba)* Forest (Patterson pers. comm.)
- **=** *Fagus grandifolia - Quercus alba - Liriodendron tulipifera - Carya* spp. Forest (Coulling 1999)
- **=** *Fagus grandifolia - Quercus alba - Liriodendron tulipifera - Carya* spp. Forest (Harrison 2004)
- **=** *Fagus grandifolia - Quercus alba - Liriodendron tulipifera - Liquidambar styraciflua* Forest (Clancy 1996)
- **?** *Fagus grandifolia - Quercus alba - Liriodendron tulipifera - Liquidambar styraciflua* Forest (Bartgis 1986)
- **=** *Fagus grandifolia - Quercus alba - Liriodendron tulipifera / Cornus florida* Forest (Fleming and Patterson 2003)
- **=** *Fagus grandifolia - Quercus alba / Ilex opaca - (Oxydendrum arboreum) / Vitis rotundifolia* Forest (Fleming and Patterson 2003)
- **?** *Quercus* spp. - *Carya* spp. / *Cornus florida - Ilex opaca* Mesic Forest (Clancy 1993b)
- **<** Coastal Plain Forest (Smith 1983)
- **?** Mesic Coastal Plain mixed oak forest, mixed oak - beech forest subtype (Breden 1989)
- **<** Mesic Mixed Hardwood Forest (Harrison 2004)
- **<** Mesic Mixed Hardwood Forest (Fleming et al. 2001)
- **?** Mixed oak forest of the south Jersey mesic uplands (Robichaud and Buell 1973)
- **=** Oak - Hardwood Mesic Inner Coastal Plain Forest (OH1) (Windisch 2014a)
- **?** Southern New England oak / pine forest on sandy / gravelly soils (Rawinski 1984a)

AUTHORSHIP

Primary Concept Source: L.A. Sneddon, mod. S.L. Neid, mod. G.P. Fleming
Author of Description: S.L. Neid, mod. G. Fleming and L.A. Sneddon
Acknowledgments:
Version Date: 2007/02/14

REFERENCES

References: Bartgis 1986, Berdine 1998, Bernard and Bernard 1971, Bowman 2000, Breden 1989, Breden et al. 2001, Clancy 1993b, Clancy 1996, Coulling 1999, Coxe 2009, Davis et al. 1992, Edinger et al. 2002, Edinger et al. 2008b, Fleming 2001a, Fleming 2002a, Fleming 2002b, Fleming 2007, Fleming and Coulling 2001, Fleming and Patterson 2003, Fleming and Patterson 2011a, Fleming and Taverna 2006, Fleming et al. 2001, Fleming et al. 2007b, Fleming pers. comm., Harrison 2004, Harrison 2011, Lea 2003, Lea et al. 2012, McCoy and Fleming 2000, Metzler and Barrett 2001, Patterson 2008a, Patterson 2008c, Patterson 2008e, Patterson 2008f, Patterson pers. comm., Rawinski 1984a, Robichaud and Buell 1973, Rossell et al. 2007, Smith 1983, Soil Conservation Service 1987, Taverna and Patterson 2008, Walton et al. 2001, Windisch 2014a, Young et al. 2007a.

NYC NAC Association Description based on 7 plots (CEGL006075):

Overstory trees include tuliptree (Liriodendron tulipifera), American beech (Fagus grandifolia), sweetgum (Liquidambar styraciflua), northern red oak (Quercus rubra), sassafras (Sassafras albidum), black oak (Quercus velutina), white oak (Quercus alba), white mulberry (Morus alba), Japanese corktree (Phellodendron japonicum), mockernut hickory (Carya tomentosa), flowering dogwood (Cornus florida), shagbark hickory (Carya ovata), red maple (Acer rubrum), and black cherry (Prunus serotina).

Midstory plants include tuliptree (Liriodendron tulipifera), American beech (Fagus grandifolia), sassafras (Sassafras albidum), sweetgum (Liquidambar styraciflua), black cherry (Prunus serotina), bitternut hickory (Carya cordiformis), red maple (Acer rubrum), sweet cherry (Prunus avium), flowering dogwood (Cornus florida), American hornbeam (Carpinus caroliniana), Japanese corktree (Phellodendron japonicum), shagbark hickory (Carya ovata), blackhaw (Viburnum prunifolium), mapleleaf viburnum (Viburnum acerifolium), pignut hickory (Carya glabra), mockernut hickory (Carya tomentosa), burningbush (Euonymus alatus), southern arrowwood (Viburnum dentatum), white oak (Quercus alba), northern red oak (Quercus rubra), common buckthorn (Rhamnus cathartica), and Norway maple (Acer platanoides).

Vines include eastern poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), Oriental bittersweet (Celastrus orbiculatus), summer grape (Vitis aestivalis), Japanese honeysuckle (Lonicera japonica), Amur peppervine (Ampelopsis brevipedunculata), and mapleleaf viburnum (Viburnum acerifolium).

Understory plants include blackberry (Rubus sp.), white wood aster (Eurybia divaricata), mapleleaf viburnum (Viburnum acerifolium), sassafras (Sassafras albidum), black cherry (Prunus serotina), southern arrowwood (Viburnum dentatum), feathery false lily of the valley (Maianthemum racemosum), sweetgum (Liquidambar styraciflua), broadleaf enchanter's nightshade (Circaea lutetiana), bitternut hickory (Carya cordiformis), sessileleaf bellwort (Uvularia sessilifolia), garlic mustard (Alliaria petiolata), sensitive fern (Onoclea sensibilis), devil's walkingstick (Aralia spinosa), northern spicebush (Lindera benzoin), blackhaw (Viburnum prunifolium), multiflora rose (Rosa multiflora), eastern hayscented fern (Dennstaedtia punctilobula), common wormwood (Artemisia vulgaris), jumpseed (Polygonum virginianum), black oak (Quercus velutina), fringed loosestrife (Lysimachia ciliata), intermediate woodfern (Dryopteris intermedia), northern red oak (Quercus rubra), American hogpeanut (Amphicarpaea bracteata), Allegheny

blackberry (Rubus allegheniensis), wreath goldenrod (Solidago caesia), northern dewberry (Rubus flagellaris), smooth Solomon's seal (Polygonatum biflorum), and Canada mayflower (Maianthemum canadense).

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A2054. *Fagus grandifolia - Quercus rubra / Cornus florida* Forest Alliance

CEGL006377. *Fagus grandifolia - Quercus alba - Quercus rubra* Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Fagus grandifolia - Quercus alba - Quercus rubra* Forest
Common Name (Translated Scientific Name): American Beech - White Oak - Northern Red Oak Forest
Colloquial Name: Northeastern Atlantic Coastal Beech - Oak Forest

Type Concept: This association comprises coastal oak-beech forests of the north Atlantic Coast and occurs on dry well-drained, loamy sand of morainal coves. It has a mixed canopy of *Fagus grandifolia, Quercus alba*, and *Quercus velutina* in varying proportions. *Quercus rubra* is a common associate, although it never occurs in abundance. Occasional canopy associates that occur with low cover can include *Quercus coccinea, Quercus prinus, Acer saccharum*, and *Betula papyrifera* (the latter two species are only occasionally present). There are relatively few shrubs and the herb layer includes tree seedlings, especially of *Quercus* spp. and *Fagus grandifolia*, plus *Carex swanii, Maianthemum canadense, Eurybia divaricata (= Aster divaricatus), Epifagus virginiana*, and *Maianthemum racemosum (= Smilacina racemosa)*. This community is related to oak-beech coastal plain forests of this alliance in southern New Jersey and farther south, but is differentiated from them by the presence of *Quercus rubra, Betula papyrifera*, and *Acer saccharum*, and by the absence of *Liriodendron tulipifera*.

Classification Comments: This association is the northern analog of *Fagus grandifolia - Quercus (alba, rubra) - Liriodendron tulipifera / (Ilex opaca var. opaca)* Forest (CEGL006075). This association is differentiated by the presence of *Quercus rubra, Acer saccharum*, and *Betula papyrifera* on Long Island, New York; on Cape Cod, the presence of *Fagus grandifolia* indicates this type. *Quercus rubra - Acer saccharum - Liriodendron tulipifera* Forest (CEGL006125) is an analogous inland type.

Similar NVC Types:
- CEGL006125 *Quercus rubra - Acer saccharum - Liriodendron tulipifera* Forest
- CEGL006075 *Fagus grandifolia - Quercus (alba, rubra) - Liriodendron tulipifera / (Ilex opaca var. opaca)* Forest

VEGETATION

Floristics: This coastal oak-beech forest has a mixed canopy of *Fagus grandifolia, Quercus alba*, and *Quercus velutina* in varying proportions. *Quercus rubra* is a common associate, although it never occurs in abundance. Occasional canopy associates that occur with low cover can include *Quercus coccinea, Quercus prinus, Acer saccharum*, and *Betula papyrifera*. There are relatively few shrubs and the herb layer includes tree seedlings, especially of *Quercus* spp. and *Fagus grandifolia*, plus *Carex swanii, Maianthemum canadense, Eurybia divaricata (= Aster divaricatus), Epifagus virginiana*, and *Maianthemum racemosum (= Smilacina racemosa)*.

ENVIRONMENT & DYNAMICS

Environmental Description: These forests occur on dry well-drained, loamy sand of morainal coves.

Dynamics: This is a coastal forest community and, as such, is not influenced directly by maritime processes, although it is moderately influenced by minor salt spray from severe storms. This association grades into other coastal oak forest types as well as beech-maple types.

DISTRIBUTION

Geographic Range: These forests occur along the north Atlantic Coast in Massachusetts, New York, and possibly Rhode Island.

Spatial Scale & Pattern [optional]: Large patch
Nations: US
States/Provinces: MA, NY, RI?
TNC Ecoregions [optional]: 61:C, 62:C
USFS Ecoregions (1994/95): 221Ab:CCC, 221Ac:CCP, 221Ae:CCP, 221Dc:CPP, 232Aa:CCC, 232Ab:CCC, 232Ac:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Cape Cod)

CONSERVATION STATUS

Grank (Review Date): GNR (1997/12/1)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low. Has been used consistently by several HPs and regionally reviewed; need plots.

SYNONYMY

Synonymy:

- **?** Beech forest (Godfrey et al. 1978)
- **?** CNE Mesic hardwood Forest on acidic bedrock / till (Rawinski 1984a)
- **?** Maritime forest (Rawinski 1984a)
- **?** Mixed Mesophytic Forest (Greller 1977)
- **<** Oak-Pine Forest (Enser 1999)
- **?** Southern New England oak / pine forest on sandy / gravelly soils (Rawinski 1984a)

AUTHORSHIP

Primary Concept Source: L.A. Sneddon, mod. S.L. Neid
Author of Description: S.L. Neid and L.A. Sneddon
Acknowledgments:
Version Date: 2015/07/30

REFERENCES

References: Edinger et al. 2002, Enser 1999, Godfrey et al. 1978, Greller 1977, Greller et al. 1978, Hunt 1997a, Metzler and Barrett 2001, Rawinski 1984a, Sneddon et al. 2010, Swain and Kearsley 2001.

NYC NAC Association Description based on 55 plots (CEGL006377):

The overstory is co-domianted by northern red oak (Quercus rubra) and American beech (Fagus grandifolia). Other overstory trees include sweetgum (Liquidambar styraciflua), sweet birch (Betula lenta), white oak (Quercus alba), red maple (Acer rubrum), black cherry (Prunus serotina), black oak (Quercus velutina), blackgum (Nyssa sylvatica), sassafras (Sassafras albidum), pin oak (Quercus palustris), bitternut hickory (Carya cordiformis), black locust (Robinia pseudoacacia), pignut hickory (Carya glabra), mockernut hickory (Carya tomentosa), Norway maple (Acer platanoides), slippery elm (Ulmus rubra), black walnut (Juglans nigra), chestnut oak (Quercus montana), sugar maple (Acer saccharum), tuliptree (Liriodendron tulipifera), flowering dogwood (Cornus florida), scarlet oak (Quercus coccinea), American hornbeam (Carpinus caroliniana), and shagbark hickory (Carya ovata).

Midstory plants include American beech (Fagus grandifolia), red maple (Acer rubrum), black cherry (Prunus serotina), sweetgum (Liquidambar styraciflua), sweet birch (Betula lenta), northern spicebush (Lindera benzoin), white oak (Quercus alba), sassafras (Sassafras albidum), blackgum (Nyssa sylvatica), northern red oak (Quercus rubra), highbush blueberry (Vaccinium corymbosum), sugar maple (Acer saccharum), American hornbeam (Carpinus caroliniana), flowering dogwood (Cornus florida), bitternut hickory (Carya cordiformis), southern arrowwood (Viburnum dentatum), Norway maple (Acer platanoides), tuliptree (Liriodendron tulipifera), mockernut hickory (Carya tomentosa), pignut hickory (Carya glabra), sweet cherry (Prunus avium), common hackberry (Celtis occidentalis), sycamore maple (Acer pseudoplatanus), eastern white pine (Pinus strobus), American witchhazel (Hamamelis virginiana), gray birch (Betula populifolia), black locust (Robinia pseudoacacia), burningbush (Euonymus alatus), green ash (Fraxinus pennsylvanica), Japanese maple (Acer palmatum), slippery elm (Ulmus rubra), American basswood (Tilia americana), black oak (Quercus velutina), Canada yew (Taxus canadensis), American chestnut (Castanea dentata).

Vines include eastern poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), Oriental bittersweet (Celastrus orbiculatus), roundleaf greenbrier (Smilax rotundifolia), Japanese honeysuckle (Lonicera japonica), Amur peppervine (Ampelopsis brevipedunculata), English ivy (Hedera helix), fox grape (Vitis labrusca), cat greenbrier (Smilax glauca), Chinese wisteria (Wisteria sinensis), summer grape (Vitis aestivalis), and cutleaf blackberry (Rubus laciniatus).

Understory plants include white wood aster (Eurybia divaricata), mapleleaf viburnum (Viburnum acerifolium), black cherry (Prunus serotina), sweetgum (Liquidambar styraciflua), northern spicebush (Lindera benzoin), Canada mayflower (Maianthemum canadense), sassafras (Sassafras albidum), garlic mustard (Alliaria petiolata), red maple (Acer rubrum), multiflora rose (Rosa multiflora), feathery false lily of the valley (Maianthemum racemosum), blackberry (Rubus), American beech (Fagus grandifolia), jewelweed (Impatiens capensis), smooth Solomon's seal (Polygonatum biflorum), tuliptree (Liriodendron tulipifera), northern red oak (Quercus rubra), blackgum (Nyssa sylvatica), southern arrowwood (Viburnum dentatum), highbush blueberry (Vaccinium corymbosum), broadleaf enchanter's nightshade (Circaea lutetiana), eastern hayscented fern (Dennstaedtia punctilobula), jumpseed

(Polygonum virginianum), white oak (Quercus alba), striped prince's pine (Chimaphila maculata), wine raspberry (Rubus phoenicolasius), sugar maple (Acer saccharum), wild sarsaparilla (Aralia nudicaulis), northern dewberry (Rubus flagellaris), bitternut hickory (Carya cordiformis), sweet birch (Betula lenta), common wormwood (Artemisia vulgaris), Nepalese browntop (Microstegium vimineum), Norway maple (Acer platanoides), blackhaw (Viburnum prunifolium), English ivy (Hedera helix), sweet cherry (Prunus avium), white snakeroot (Ageratina altissima), small enchanter's nightshade (Circaea alpina), lowbush blueberry (Vaccinium angustifolium), coastal sweetpepperbush (Clethra alnifolia), American wintergreen (Pyrola americana),

flowering dogwood (Cornus florida), pignut hickory (Carya glabra), sycamore maple (Acer pseudoplatanus), wrinkleleaf goldenrod (Solidago rugosa), common evening primrose (Oenothera biennis), American plum (Prunus americana), Japanese knotweed (Polygonum cuspidatum), black raspberry (Rubus occidentalis), New York fern (Thelypteris noveboracensis), spotted ladysthumb (Polygonum persicaria), winged sumac (Rhus copallinum), Solomon's seal (Polygonatum), cinnamon fern (Osmunda cinnamomea), common yellow oxalis (Oxalis stricta), Japanese pachysandra (Pachysandra terminalis), whorled yellow loosestrife (Lysimachia quadrifolia), beechdrops (Epifagus virginiana), American hazelnut (Corylus americana), American hogpeanut (Amphicarpaea bracteata), bristly dewberry (Rubus hispidus), Virginia rose (Rosa virginiana), chestnut oak (Quercus montana), and rattlesnakeroot (Prenanthes sp.)

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
1.B.2.Na.2.c. G650 Northeastern Oak - Hickory Forest & Woodland

A2053. *Quercus alba - Carya* spp. - *Fraxinus americana* Forest Alliance

Type Concept Sentence: Associations of this alliance include dry, relatively "rich" forests and open woodlands of the northeastern United States and southern Canada dominated by *Quercus* species and include *Carya* species as a prominent (rarely codominant) feature. *Fraxinus americana*, although sometimes a sporadic member, is generally characteristic of these forests. Associated canopy species include *Quercus alba, Quercus rubra, Quercus velutina, Carya ovalis, Carya glabra*, as well as other oaks and hickories. This vegetation occurs on dry upper slopes or ridgetops.

OVERVIEW

Scientific Name: *Quercus alba - Carya* spp. - *Fraxinus americana* Forest Alliance
Common Name (Translated Scientific Name): White Oak - Hickory species - White Ash Forest Alliance
Colloquial Name: Northeastern Oak - Hickory Forest

Type Concept: Associations of this alliance include dry, relatively "rich" forests and open woodlands of the northeastern United States and southern Canada dominated by *Quercus* species and include *Carya* species as a prominent (rarely codominant) feature. *Fraxinus americana*, although sometimes a sporadic member, is generally characteristic of these forests. Associated canopy species include *Quercus alba, Quercus rubra, Quercus velutina, Carya ovalis, Carya glabra*, as well as other oaks and hickories. This vegetation mainly occurs on dry upper slopes or ridgetops; one association is on a bedrock floodplain terrace. Soils are usually fertile, but often very rocky, on well-drained loams or sandy loams, predominantly on southern or eastern exposures. *Ostrya virginiana* is a common understory tree. The shrub layer is usually interrupted to absent. When present, it includes *Viburnum rafinesquianum* and *Cercis canadensis* (at the southern edge of the range). Although ericaceous species may be present and occasionally locally abundant, they are not characteristic. The herbaceous layer is characterized by forbs and may be quite diverse. Common graminoid species include *Carex pensylvanica, Carex lucorum* (at the northern range limit), *Muhlenbergia sobolifera, Elymus hystrix*, and *Danthonia spicata*. Other forbs found in these communities include *Asplenium platyneuron, Solidago caesia, Amphicarpaea bracteata, Woodsia obtusa, Selaginella rupestris, Galium circaezans*, and *Arabis laevigata*. The relatively open canopy, sparse shrub layer, and dense herbaceous layer impart a parklike appearance to many of these forests.

Classification Comments: These forests are somewhat similar to Braun's (1950) "oak-hickory forests" of the Midwest. They share many of the same canopy species and, in some cases, similar physiognomy. However, the Oak-Hickory Region of Braun supports forests that occur in close association and intergrade with prairies, and share many of the same species in the herb layer, particularly legumes. For example, *Asclepias verticillata, Lithospermum canescens, Tephrosia virginiana, Desmodium* spp., *Euphorbia corollata*, and *Liatris* spp. occur in many of the oak-hickory forests of the Ozark Plateau, and Braun (1950) suggests that they may be remnants of prairie openings invaded by forest.

Similar NVC Types:
- A3326 *Quercus velutina - Quercus alba* North-Central Forest Alliance

Diagnostic Characteristics: This alliance is characterized by a relatively open and diverse canopy. Associates vary, but species of *Quercus* and *Carya* and usually *Fraxinus americana* are present in quantity. The shrub layer is poorly developed and the herbaceous layer is diverse. The overall aspect suggests an open, parklike understory.

VEGETATION

Physiognomy and Structure: The relatively open canopy, partially developed shrub layer, and dense herbaceous layer impart a parklike appearance to many of these forests.

Floristics: Associations of this alliance include dry, relatively "rich" forests and open woodlands dominated by *Quercus* species and include *Carya* species as a prominent (rarely codominant) feature. *Fraxinus americana*, although sometimes a sporadic member, is generally characteristic of these forests. Associated canopy species include *Quercus alba, Quercus rubra, Quercus velutina, Carya ovalis, Carya glabra*, as well as other oaks and hickories. This vegetation occurs on dry upper slopes or ridgetops. *Ostrya virginiana* is a common understory tree. The shrub layer is usually interrupted to absent. When present, it includes *Viburnum rafinesquianum, Viburnum acerifolium*, and *Cercis canadensis*(at the southern edge of the range). Although ericaceous species may be present and occasionally locally abundant, they are not characteristic. The herbaceous layer is characterized by forbs and may be quite diverse. Common graminoid species include *Carex pensylvanica, Carex lucorum* (at the northern range limit), *Muhlenbergia sobolifera, Elymus hystrix*, and *Danthonia spicata*. Other forbs found in these communities include *Amphicarpaea bracteata, Arabis laevigata, Asplenium platyneuron, Galium circaezans, Selaginella rupestris, Solidago caesia*, and *Woodsia obtusa*. The relatively open canopy, sparse shrub layer, and dense herbaceous layer impart a parklike appearance to many of these forests.

ENVIRONMENT & DYNAMICS

Environmental Description: Associations of this alliance generally occur on dry or dry-mesic slopes or ridgetops, primarily with southern or eastern exposures. One association is found on a bedrock floodplain terrace of the Potomac River. Soils are usually fertile, but often very rocky, well-drained loams, silt loams, or sandy loams. Soils supporting this alliance may range from strongly acidic to circumneutral in pH, but in occurrences where soil chemistry has been analyzed, they consistently have moderately high calcium and/or magnesium levels. The combination of high calcium and magnesium concentrations with relatively low pH is common in soils weathered from mafic parent material (e.g., amphibolite, diabase, gabbro), which also have high levels of pH-lowering iron and aluminum.

Dynamics: These forests are relatively long-lived.

DISTRIBUTION

Geographic Range: This alliance is found throughout the northeastern United States and southern Canada from Quebec to Virginia.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: CT, MA, MD, ME, NH, NJ, NY, OH, PA, QC, RI, VA, VT, WV
TNC Ecoregions [optional]: 44:C, 49:C, 50:C, 51:C, 52:C, 58:C, 59:C, 60:C, 61:C, 62:C, 63:C, 64:C
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]: NPS (Appalachian Trail, Blue Ridge Parkway, C&O Canal, Catoctin Mountain, Delaware Water Gap, George Washington Parkway, Harpers Ferry, Manassas, Monocacy, Saratoga, Shenandoah, Upper Delaware); USFS (Allegheny, George Washington, Jefferson, Monongahela)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

- **=** *Fraxinus - Carya* Forests (Damman and Kershner 1977)
- **><** Basic Oak - Hickory Forests (Fleming and Patterson 2013)
- **?** Dry oak - mixed hardwood forest (Fike 1999)
- **?** Dry, Rich Acidic Oak Forest (Swain and Kearsley 2001)
- **<** Hickory - Hop Hornbeam Forest (Thompson and Sorenson 2000)
- **?** Hickory - Hop Hornbeam Forest / Woodland (Swain and Kearsley 2001)
- **><** Mesic Appalachian Oak - Hickory Forest (Sperduto and Nichols 2004)
- **><** Mesic Maple -Ash - Hickory - Oak Forest (Thompson and Sorenson 2000)
- **=** Oak - Hickory Forest (Gawler and Cutko 2010)
- **><** Pignut Hickory - White Ash (*Carya glabra - Fraxinus americana*) Forests (Metzler and Barrett 2006)
- **><** White Oak - Black Oak - Northern Red Oak: 52 (Eyre 1980)
- **?** oak-hickory forests (Braun 1950)

LOWER LEVEL UNITS

Associations:

- CEGL008515 *Quercus alba - Quercus prinus - Carya glabra / Cornus florida / Vaccinium pallidum* Forest
- CEGL008514 *Quercus rubra - Quercus prinus - Carya ovalis / (Cercis canadensis) / Solidago caesia* Forest
- CEGL003683 *Fraxinus americana - Carya glabra / Muhlenbergia sobolifera - Helianthus divaricatus - Solidago ulmifolia* Woodland
- CEGL008516 *Quercus prinus - Quercus rubra - Carya ovalis / Carex pensylvanica - (Calamagrostis porteri)* Forest
- CEGL008518 *Quercus rubra - Carya ovata - Fraxinus americana / Actaea racemosa - Hydrophyllum virginianum* Forest
- CEGL006445 *Carya cordiformis - Prunus serotina / Ageratina altissima* Forest
- CEGL006336 *Quercus (alba, rubra, velutina) - Carya* spp. / *Viburnum acerifolium* Forest
- CEGL006216 *Quercus alba - Carya glabra - Fraxinus americana / Muhlenbergia sobolifera - Elymus hystrix* Forest
- CEGL006301 *Quercus rubra - Carya (glabra, ovata) / Ostrya virginiana / Carex lucorum* Forest
- CEGL006462 *Quercus (rubra, alba) / Carpinus caroliniana - (Halesia tetraptera) / Maianthemum racemosum* Forest
- CEGL006495 *Quercus rubra - Quercus shumardii / Cercis canadensis* Floodplain Forest
- CEGL006209 *Carya glabra - Quercus (rubra, prinus) - Fraxinus americana / Viburnum rafinesquianum* Forest
- CEGL002059 *Quercus alba - Quercus rubra - Quercus prinus - Acer saccharum / Lindera benzoin* Forest
- CEGL006091 *Quercus alba - Carya (glabra, ovata) / Desmodium glutinosum* Forest

AUTHORSHIP

Primary Concept Source: A.W.H. Damman and B. Kershner (1977)
Author of Description: L. Sneddon, M. Anderson, K. Metzler
Acknowledgments:
Version Date: 12/18/2014
Classif Resp Region: East

REFERENCES

References: Braun 1950, Damman and Kershner 1977, Eyre 1980, Faber-Langendoen et al. 2016b, Fike 1999, Fleming 1999, Fleming and Patterson 2013, Fleming et al. 2001, Gawler and Cutko 2010, Metzler and Barrett 2006, Smith 1991, Sneddon et al. 1994, Sperduto and Nichols 2004, Swain and Kearsley 2001, Swain and Kearsley 2011, Thompson and Sorenson 2000

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A2053. *Quercus alba - Carya* spp. - *Fraxinus americana* Forest Alliance

CEGL006445. *Carya cordiformis - Prunus serotina / Ageratina altissima* Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Carya cordiformis - Prunus serotina / Ageratina altissima* Forest
Common Name (Translated Scientific Name): Bitternut Hickory - Black Cherry / White Snakeroot Forest
Colloquial Name: Mid-Atlantic Terrace Floodplain Forest

Type Concept: This association is characterized by the dominance or codominance of *Carya cordiformis* on mid to high floodplain terraces. Soils are derived from alluvial deposits and consist of fine sandy loams and loamy fine sand. Codominant or associate canopy species include *Quercus rubra, Juglans cinerea, Prunus serotina, Ulmus americana, Fraxinus americana*, and *Acer saccharinum*. The canopy is usually somewhat open, occasionally closed, and about 20 m in height. The subcanopy cover is usually 20 to 30%. Composition of the subcanopy is similar to the canopy layer and may also include *Acer rubrum* and *Acer saccharum*. The tall-shrub and short-shrub layers are usually sparse and include occasional saplings of canopy and subcanopy species, as well as scattered individuals of *Rosa multiflora, Lonicera morrowii, Berberis thunbergii, Rubus occidentalis*, and *Rubus flagellaris*. The herbaceous layer is weedy, with invasive exotic species common or dominant, including *Microstegium vimineum, Alliaria petiolata*, and *Glechoma hederacea*. Common native species include *Ageratina altissima var. altissima, Hydrophyllum virginianum*, and *Carex* spp.

Classification Comments:

Similar NVC Types:

VEGETATION

Floristics: This association is characterized by the dominance or codominance of *Carya cordiformis*. Codominant or associate canopy species include *Quercus rubra, Juglans cinerea, Prunus serotina, Ulmus americana, Ulmus rubra, Fraxinus americana*, and occasionally *Acer saccharinum*. The canopy is usually somewhat open, occasionally closed, and about 20 m in height. The subcanopy cover is usually 20 to 30%. Composition of the subcanopy is similar to the canopy layer and may also include *Acer rubrum, Acer saccharum*, and *Carpinus caroliniana*. The tall-shrub and short-shrub layers are usually sparse and include occasional saplings of

canopy and subcanopy species, as well as scattered individuals of *Rosa multiflora, Lonicera morrowii, Berberis thunbergii, Lindera benzoin, Cornus amomum, Rubus occidentalis*, and *Rubus flagellaris*. The herbaceous layer is weedy, with invasive exotic species common or dominant, including *Microstegium vimineum, Alliaria petiolata*, and *Glechoma hederacea*. Common native species include *Ageratina altissima var. altissima, Hydrophyllum virginianum, Matteuccia struthiopteris, Polygonum virginianum (= Persicaria virginiana), Claytonia virginica*, and *Carex* spp.

ENVIRONMENT & DYNAMICS

Environmental Description: This association occurs on mid to high floodplain terraces of mid- to large-sized rivers. It is currently documented from the Delaware and Upper Delaware, and Cheat rivers and probably occurs on other rivers within the region. Flood frequency is unknown, but it is likely flooded less often than *Platanus occidentalis* and *Acer saccharinum* forests found on lower floodplain terraces. Soils on these stabilized terraces are derived from alluvial deposits and consist of fine sandy loams and loamy fine sand.

Dynamics: Known sites are in formerly cleared and settled areas in the floodplain.

DISTRIBUTION

Geographic Range: This type is currently documented from northern New Jersey, New York, and Pennsylvania, south to northern West Virginia.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: NJ, NY, PA, WV
TNC Ecoregions [optional]: 59:C, 60:C, 61:C
USFS Ecoregions (1994/95): 212Fc:CCC, 221Bd:CCC, M221Bb:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Delaware Water Gap, Upper Delaware); USFWS (National Conservation Training Center)

CONSERVATION STATUS

Grank (Review Date): G2G3 (2011/5/23)
Greasons: This association is known from Upper Delaware Scenic and Recreational River (UPDE) and Delaware Water Gap National Recreation Area (DEWA), as well as from the Cheat and Tygart rivers in West Virginia. Much of this vegetation in West Virginia has been extirpated from agriculture, and agricultural runoff has contributed to substantial cover by invasive species. Known occurrences in West Virginia continue to face threats of conversion to agriculture.
Ranking Author (Version): L.A. Sneddon (2011/5/23)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate. Non-plot-based calculation resulted in Moderate confidence.

SYNONYMY

Synonymy:
- **=** *Carya cordiformis - Prunus serotina / Ageratina altissima* Forest (Vanderhorst and Streets 2006)
- **=** Successional floodplain forest, aka Terrace floodplain forest (Vanderhorst 2001a)

AUTHORSHIP

Primary Concept Source: G.S. Podniesinski
Author of Description: S.C. Gawler, mod. E. Largay and S.C. Gawler
Acknowledgments:
Version Date: 2006/10/04

REFERENCES

References: Edinger et al. 2002, Perles 2011, Perles et al. 2007, Perles et al. 2008, Vanderhorst 2001a, Vanderhorst and Streets 2006, Zimmerman et al. 2012.

NYC NAC Association Description based on 11 plots (CEGL006445):

The overstory is co-dominated by bitternut hickory (Carya cordiformis) and black cherry (Prunus serotina). Other overstory trees include pin oak (Quercus palustris), tuliptree (Liriodendron tulipifera), American basswood (Tilia americana), boxelder (Acer negundo), slippery elm (Ulmus rubra), sweetgum (Liquidambar styraciflua), black locust (Robinia pseudoacacia), white poplar (Populus alba), Norway maple (Acer platanoides), common hackberry (Celtis occidentalis), and white mulberry (Morus alba).

The midstory is dominated by bitternut hickory (Carya cordiformis). Other midstory trees include apple (Malus sp.), black cherry (Prunus serotina), Norway maple (Acer platanoides), burningbush (Euonymus alatus), boxelder (Acer negundo), white mulberry

(Morus alba), ash (Fraxinus sp.), slippery elm (Ulmus rubra), hawthorn (Crataegus sp.), blackgum (Nyssa sylvatica), Tatarian honeysuckle (Lonicera tatarica), northern spicebush (Lindera benzoin), privet (Ligustrum sp.), Siebold's arrowwood (Viburnum sieboldii), eastern cottonwood (Populus deltoides), pin cherry (Prunus pensylvanica), common hackberry (Celtis occidentalis), pin oak (Quercus palustris), American hornbeam (Carpinus caroliniana), and American elm (Ulmus americana).

Vines include eastern poison ivy (Toxicodendron radicans), Japanese honeysuckle (Lonicera japonica), Virginia creeper (Parthenocissus quinquefolia), Oriental bittersweet (Celastrus orbiculatus), Amur peppervine (Ampelopsis brevipedunculata), English ivy (Hedera helix), Asiatic tearthumb (Polygonum perfoliatum), common moonseed (Menispermum canadense), fox grape (Vitis labrusca), riverbank grape (Vitis riparia), American hogpeanut (Amphicarpaea bracteata), oneseed bur cucumber (Sicyos angulatus), cat greenbrier (Smilax glauca), field bindweed (Convolvulus arvensis), and roundleaf greenbrier (Smilax rotundifolia).

Understory plants include multiflora rose (Rosa multiflora), garlic mustard (Alliaria petiolata), jumpseed (Polygonum virginianum), bitternut hickory (Carya cordiformis), broadleaf enchanter's nightshade (Circaea lutetiana), northern dewberry (Rubus flagellaris), white snakeroot (Ageratina altissima), common wormwood (Artemisia vulgaris), wine raspberry (Rubus phoenicolasius), black cherry (Prunus serotina), small enchanter's nightshade (Circaea alpina), touch-me-not (Impatiens), feathery false lily of the valley (Maianthemum racemosum), southern arrowwood (Viburnum dentatum), Oriental lady's thumb (Polygonum cespitosum), Asiatic tearthumb (Polygonum perfoliatum),

common blue violet (Viola sororia), American pokeweed (Phytolacca americana), common moonseed (Menispermum canadense), American hogpeanut (Amphicarpaea bracteata), black raspberry (Rubus occidentalis), northern spicebush (Lindera benzoin), hairy Solomon's seal (Polygonatum pubescens), woodland strawberry (Fragaria vesca), Asiatic dayflower (Commelina communis), Jack in the pulpit (Arisaema), blackgum (Nyssa sylvatica), jewelweed (Impatiens capensis), interrupted fern (Osmunda claytoniana), stickywilly (Galium aparine), smallspike false nettle (Boehmeria cylindrica), climbing nightshade (Solanum dulcamara), cat greenbrier (Smilax glauca), Indian strawberry (Duchesnea indica), white wood aster (Eurybia divaricata), white avens (Geum canadense), black locust (Robinia pseudoacacia), slippery elm (Ulmus rubra), boxelder (Acer negundo), climbing false buckwheat (Polygonum scandens), sweetscented joe pye weed (Eutrochium purpureum), smooth Solomon's seal (Polygonatum biflorum).

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A2053. *Quercus alba* - *Carya* spp. - *Fraxinus americana* Forest Alliance

CEGL006336. *Quercus (alba, rubra, velutina)* - *Carya* spp. / *Viburnum acerifolium* Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Quercus (alba, rubra, velutina)* - *Carya* spp. / *Viburnum acerifolium* Forest
Common Name (Translated Scientific Name): (White Oak, Northern Red Oak, Black Oak) / Hickory species / Mapleleaf Viburnum Forest
Colloquial Name: Northeastern Dry Oak-Hickory Forest

Type Concept: This oak-hickory forest occurs on well-drained loamy sand of midslopes in the northeastern United States. This vegetation is ecologically transitional between dry-rich oak-hickory forests of relatively high diversity and dry, acidic oak species-poor forests. *Quercus rubra, Quercus alba*, and *Quercus velutina* are prominent in the canopy. *Quercus prinus* and *Quercus coccinea* are canopy associates in the southern portion of the range. Typical hickory species include *Carya glabra, Carya ovata, Carya alba (= Carya tomentosa)*, and *Carya ovalis*. Other canopy associates may include *Acer rubrum, Sassafras albidum*, and *Amelanchier arborea*. At the northern range limit of this type, *Pinus strobus* and *Betula lenta* also occur as minor associates. *Cornus florida* is a characteristic understory tree in portions of the range. The shrub layer is characterized by *Viburnum acerifolium*, with other frequent associates including *Hamamelis virginiana, Vaccinium corymbosum, Corylus cornuta*, and *Corylus americana*. A short-shrub layer may be common, but is generally not abundant, and is characterized by *Vaccinium pallidum* and *Gaylussacia baccata*, with *Vaccinium angustifolium* occurring more frequently to the north. The herbaceous layer is characterized by *Carex pensylvanica, Carex rosea, Maianthemum racemosum (= Smilacina racemosa), Aralia nudicaulis, Hieracium venosum, Solidago bicolor, Desmodium glutinosum, Desmodium paniculatum, Melampyrum lineare, Chimaphila maculata, Eurybia divaricata (= Aster divaricatus), Danthonia spicata, Aureolaria* spp., *Pteridium aquilinum, Dennstaedtia punctilobula*, and *Helianthemum canadense*.

Classification Comments:

Similar NVC Types:
- CEGL002067 *Quercus alba - Quercus rubra - Carya alba / Cornus florida* Acidic Forest: also contains *Actaea racemosa* and can occur on cherty limestone, and *Quercus velutina* is not characteristic.

- CEGL002076 *Quercus velutina - Quercus alba - Carya (glabra, ovata)* Forest: also contains *Quercus ellipsoidalis* or *Quercus macrocarpa* and is of shorter stature and more open canopy.
- CEGL002078 *Quercus velutina / Carex pensylvanica* Forest: is drier and more infertile, and lacks *Viburnum acerifolium, Hamamelis virginiana* and other shrubs.
- CEGL006293 *Pinus strobus - Quercus (rubra, velutina) - Fagus grandifolia* Forest: can intergrade with this type in New England but is characterized by *Fagus grandifolia* (more or less absent in CEGL006336), a greater amount of *Pinus strobus* in the canopy (usually >20%), and little or no *Carya*.
- CEGL008475 *Quercus alba - Quercus rubra - Carya alba / Vaccinium stamineum / Desmodium nudiflorum* Piedmont Forest: southern analogue of CEGL006336; is more diverse and occupies soils with slightly higher base status. *Quercus velutina* is not as characteristic of this type. A number of southern herbs such as *Aristolochia serpentaria* are not found in CEGL006336; northern species such as *Corylus cornuta, Vaccinium angustifolium*, and *Aralia nudicaulis* are not found in CEGL008475.
- CEGL006943 *Acer saccharum - Betula alleghaniensis - Quercus rubra / Viburnum acerifolium* Forest
- CEGL006282 *Quercus prinus - Quercus (rubra, velutina) / Vaccinium (angustifolium, pallidum*) Forest
- CEGL006375 *Quercus coccinea - Quercus velutina / Sassafras albidum / Vaccinium pallidum* Forest: lacks *Viburnum acerifolium* and *Cornus florida* and in general is less diverse and occurring on relatively more nutrient-poor soils.

VEGETATION

Floristics: This vegetation is ecologically transitional between dry-rich oak-hickory forests of relatively high diversity and dry, acidic oak-species-poor forests. *Quercus rubra, Quercus alba*, and *Quercus velutina* are prominent in the canopy. Typical hickory species include *Carya glabra, Carya ovata, Carya alba (= Carya tomentosa)*, and *Carya ovalis*. Other canopy associates may include *Acer rubrum, Quercus prinus, Sassafras albidum*, and *Amelanchier arborea*. *Pinus strobus, Tsuga canadensis*, and *Betula lenta* may also occur as minor associates. *Cornus florida* is a characteristic understory tree in portions of the range. The shrub layer is typically rather sparse and characterized by *Viburnum acerifolium*, with other frequent associates including *Hamamelis virginiana, Vaccinium corymbosum, Kalmia latifolia, Corylus cornuta*, and *Corylus americana*. A short-shrub layer may be common but generally not abundant, characterized by *Vaccinium pallidum* and *Gaylussacia baccata*, with *Vaccinium angustifolium* occurring more frequently to the north. The herbaceous layer is characterized by *Carex pensylvanica, Maianthemum racemosum (= Smilacina racemosa), Dryopteris marginalis, Aralia nudicaulis, Hieracium venosum, Solidago bicolor, Desmodium glutinosum, Desmodium paniculatum, Melampyrum lineare, Chimaphila maculata, Eurybia divaricata (= Aster divaricatus), Danthonia spicata, Deschampsia flexuosa, Dennstaedtia punctilobula, Aureolaria* spp., *Pteridium aquilinum, Dennstaedtia punctilobula*, and *Helianthemum canadense*. The invasive species *Microstegium vimineum* and *Berberis thunbergii* may also be present in this forest type.

ENVIRONMENT & DYNAMICS

Environmental Description: This forest type occurs on well-drained loamy sand of midslopes and other dry-mesic sites.

Dynamics:

DISTRIBUTION

Geographic Range: This association occurs from Maine to Maryland.

Spatial Scale & Pattern [optional]: Large patch, Matrix
Nations: US
States/Provinces: CT, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VT
TNC Ecoregions [optional]: 59:C, 60:C, 61:C, 62:C
USFS Ecoregions (1994/95): 212Fb:CC?, 212Fc:CCC, 212Fd:CC?, 212Ga:CC?, 212Gb:CC?, 221Aa:CCP, 221Ab:CCC, 221Ad:CCP, 221Ae:CCC, 221Af:CCC, 221Ag:CCC, 221Ah:CCC, 221Ai:CCC, 221Ak:CCC, 221Al:CCC, 221Am:CCC, 221Ba:CCC, 221Bb:CCC, 221Bc:CCC, 221Bd:CCC, 221Da:CCC, 221Db:CCC, 221Dc:CCC, 232Aa:CCC, 232Ab:CCC, 232Ac:CCP, 232Ad:CCC, 232Br:CCC, 232Bt:CCC, 232Bx:CC?, M212Bd:CCC, M212Cb:CCC, M212Cc:CCC, M212Ea:CC?, M212Eb:CC?, M221Ac:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Appalachian Trail [Central Appalachians], Appalachian Trail [Lower New England], Boston Harbor Islands, Cape Cod, Delaware Water Gap, Fort Necessity, Gettysburg, Minute Man, Morristown, Sagamore Hill, Saratoga, Upper Delaware, Weir Farm); USFWS (Assabet River, Cape May, Great Meadows)

CONSERVATION STATUS

Grank (Review Date): G4G5 (2005/1/24)
Greasons: This type is not naturally rare and has a wide geographic distribution. Mature stands, however, are uncommon and most stands are subject to logging disturbances or even complete destruction if located in rapidly developing suburban areas.
Ranking Author (Version): G.P. Fleming (2005/1/24)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:

- **=** *Quercus (alba, rubra, velutina) / Cornus florida - Viburnum acerifolium* Forest (Bartgis 1986)
- **=** *Quercus (alba, rubra, velutina) / Cornus florida / Viburnum acerifolium* Forest (Harrison 2004)
- **=** *Quercus rubra / Viburnum acerifolium* community (Metzler and Barrett 2001)
- **?** Mesic Coastal Plain mixed oak forest (Breden 1989)
- **><** Oak - Hickory Forest (Gawler 2002)
- **=** Oak - Hickory Forest (Swain and Kearsley 2001)
- **><** Oak - Hickory Forest (OH3) (Windisch 2014a)
- **=** Piedmont Oak-Beech-Mountain Laurel Forest (Clancy 1996)
- **?** SNE mesic central hardwood forest on acidic till (Rawinski 1984a)
- **><** White Oak - Red Oak Forest (Gawler 2002)

AUTHORSHIP

Primary Concept Source: P.C. Swain and J.B. Kearsley (2001)
Author of Description: S.L. Neid and L.A. Sneddon, mod. S.C. Gawler
Acknowledgments:
Version Date: 2012/08/23

REFERENCES

References: Bartgis 1986, Berdine 1998, Breden 1989, Breden et al. 2001, Clancy 1996, Coxe 2009, Damman 1977, Edinger et al. 2002, Edinger et al. 2007, Edinger et al. 2008b, Enser 1999, Enser and Lundgren 2006, Fike 1999, Fleming pers. comm., Gawler 2002, Gawler and Cutko 2010, Gawler et al. 2005, Harrison 2004, Harrison 2011, Hunt 1997a, Largay and Sneddon 2010, MNAP 1991, McCoy and Fleming 2000, Metzler and Barrett 2001, Metzler and Barrett 2006, Metzler et al. 2009, NRCS 2004a, Patterson pers. comm., Perles et al. 2006a, Perles et al. 2006c, Perles et al. 2007, Perles et al. 2008, Rawinski 1984a, Sneddon et al. 2008, Sneddon et al. 2010, Soil Conservation Service 1987, Sperduto 1997b, Sperduto and Nichols 2004, Swain and Kearsley 2001, Thompson and Sorenson 2000, Windisch 2014a.

NYC NAC Association Description based on 164 plots (CEGL006336):

The overstory is co-dominated by oaks (Quercus spp.) and hickories (Carya spp.), such as northern red oak (Quercus rubra), white oak (Quercus alba), black oak (Quercus velutina), scarlet oak (Quercus coccinea), mockernut hickory (Carya tomentosa), bitternut hickory (Carya cordiformis), pignut hickory (Carya glabra), red hickory (Carya ovalis), and shagbark hickory (Carya ovata). Other overstory trees include black cherry (Prunus serotina), red maple (Acer rubrum), sweetgum (Liquidambar styraciflua), sassafras (Sassafras albidum), sweet birch (Betula lenta), Norway maple (Acer platanoides), pin oak (Quercus palustris), black locust (Robinia pseudoacacia), flowering dogwood (Cornus florida), slippery elm (Ulmus rubra), blackgum (Nyssa sylvatica), white mulberry (Morus alba), black walnut (Juglans nigra), sweet cherry (Prunus avium), American basswood (Tilia americana), common hackberry (Celtis occidentalis), tree of heaven (Ailanthus altissima), Amur corktree (Phellodendron amurense), sugar maple (Acer saccharum), Japanese corktree (Phellodendron japonicum), swamp white oak (Quercus bicolor), chestnut oak (Quercus montana), green ash (Fraxinus pennsylvanica), sycamore maple (Acer pseudoplatanus), Kentucky yellowwood (Cladrastis kentukea), and American witchhazel (Hamamelis virginiana).

Midstory plants include black cherry (Prunus serotina), sassafras (Sassafras albidum), bitternut hickory (Carya cordiformis), red maple (Acer rubrum), northern spicebush (Lindera benzoin), white oak (Quercus alba), northern red oak (Quercus rubra), sweet birch (Betula lenta), Norway maple (Acer platanoides), flowering dogwood (Cornus florida), mockernut hickory (Carya tomentosa), sweetgum (Liquidambar styraciflua), shagbark hickory (Carya ovata), pignut hickory (Carya glabra), blackgum (Nyssa sylvatica), black oak (Quercus velutina), sweet cherry (Prunus avium), sugar maple (Acer saccharum), blackhaw (Viburnum prunifolium), glossy buckthorn (Frangula alnus), southern arrowwood (Viburnum dentatum), American hornbeam (Carpinus caroliniana), burningbush (Euonymus alatus), white mulberry (Morus alba), American beech (Fagus grandifolia), tuliptree (Liriodendron tulipifera), slippery elm (Ulmus rubra), Japanese corktree (Phellodendron japonicum), black locust (Robinia pseudoacacia), plum (Prunus), common hackberry (Celtis occidentalis), viburnum (Viburnum), hybrid hickory (Carya), Amur honeysuckle (Lonicera maackii), highbush blueberry (Vaccinium corymbosum), American witchhazel (Hamamelis virginiana), American basswood (Tilia americana), red hickory (Carya ovalis), Siebold's arrowwood (Viburnum sieboldii), honeysuckle (Lonicera), white ash (Fraxinus americana), green ash (Fraxinus pennsylvanica), tree of heaven (Ailanthus altissima), hawthorn (Crataegus sp.), swamp white oak (Quercus bicolor), Japanese angelica tree (Aralia elata), smooth sumac (Rhus glabra), sycamore maple (Acer pseudoplatanus), black walnut (Juglans nigra), pin oak (Quercus palustris), American elm (Ulmus americana), American chestnut (Castanea dentata), gray birch (Betula populifolia), chokecherry (Prunus virginiana), hobblebush (Viburnum lantanoides), hophornbeam (Ostrya virginiana), chestnut oak (Quercus montana), and scarlet oak (Quercus coccinea).

Vines include eastern poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), Oriental bittersweet (Celastrus orbiculatus), roundleaf greenbrier (Smilax rotundifolia), Japanese honeysuckle (Lonicera japonica), Amur peppervine (Ampelopsis brevipedunculata), summer grape (Vitis aestivalis), English ivy (Hedera helix), riverbank grape (Vitis riparia), fox grape (Vitis labrusca), cat greenbrier (Smilax glauca), tall morning-glory (Ipomoea purpurea), American hogpeanut (Amphicarpaea bracteata), Chinese wisteria (Wisteria sinensis), Boston ivy (Parthenocissus tricuspidata), wild cucumber (Echinocystis lobata), wild yam (Dioscorea villosa), devil's darning needles (Clematis virginiana), smooth carrionflower (Smilax herbacea), and northern dewberry (Rubus flagellaris).

Understory plants include black cherry (Prunus serotina), garlic mustard (Alliaria petiolata), white wood aster (Eurybia divaricata), blackberry (Rubus sp.), sassafras (Sassafras albidum), mapleleaf viburnum (Viburnum acerifolium), multiflora rose (Rosa multiflora), feathery false lily of the valley (Maianthemum racemosum), northern spicebush (Lindera benzoin), northern red oak (Quercus rubra), bitternut hickory (Carya cordiformis), smooth Solomon's seal (Polygonatum biflorum), jumpseed (Polygonum virginianum), red maple (Acer rubrum), broadleaf enchanter's nightshade (Circaea lutetiana), Canada mayflower (Maianthemum canadense), Asiatic dayflower (Commelina communis), southern arrowwood (Viburnum dentatum), wine raspberry (Rubus phoenicolasius), northern dewberry (Rubus flagellaris), sweetgum (Liquidambar styraciflua), jewelweed (Impatiens capensis), white oak (Quercus alba), American wintergreen (Pyrola americana), Norway maple (Acer platanoides), small enchanter's nightshade (Circaea alpina), wild sarsaparilla (Aralia nudicaulis), English ivy (Hedera helix), burningbush (Euonymus alatus), eastern hayscented fern (Dennstaedtia punctilobula), Oriental lady's thumb (Polygonum cespitosum), black locust (Robinia pseudoacacia), tuliptree (Liriodendron tulipifera), blackhaw (Viburnum prunifolium), black oak (Quercus velutina), American pokeweed (Phytolacca americana), white snakeroot (Ageratina altissima), onion (Allium sp.), mockernut hickory (Carya tomentosa), avens (Geum sp.), woodsorrel (Oxalis sp.), Japanese knotweed (Polygonum cuspidatum), Allegheny blackberry (Rubus allegheniensis), black raspberry (Rubus occidentalis), common wormwood (Artemisia vulgaris), Amur corktree (Phellodendron amurense), highbush blueberry (Vaccinium corymbosum), summer grape (Vitis aestivalis), Amur honeysuckle (Lonicera maackii), wreath goldenrod (Solidago caesia), blackgum (Nyssa sylvatica), Japanese angelica tree (Aralia elata), sweetscented joe pye weed (Eutrochium purpureum), slippery elm (Ulmus rubra), sweet birch (Betula lenta), bedstraw (Galium sp.), lowbush blueberry (Vaccinium angustifolium), glossy buckthorn (Frangula alnus), flowering dogwood (Cornus florida), blueberry (Vaccinium), sweet cherry (Prunus avium), sugar maple (Acer saccharum), spotted ladysthumb (Polygonum persicaria), spotted geranium (Geranium maculatum), touch-me-not (Impatiens), common hackberry (Celtis occidentalis), tree of heaven (Ailanthus altissima), lesser American hornbeam (Carpinus caroliniana), American basswood (Tilia americana), American hazelnut (Corylus americana), Jack in the pulpit (Arisaema), Japanese barberry (Berberis thunbergii), common yellow oxalis (Oxalis stricta), Canadian honewort (Cryptotaenia canadensis), Blue Ridge blueberry (Vaccinium pallidum), pignut hickory (Carya glabra), shagbark hickory (Carya ovata), annual ragweed (Ambrosia artemisiifolia), European lily of the valley (Convallaria majalis), whorled yellow loosestrife (Lysimachia quadrifolia), Nepalese browntop (Microstegium vimineum), American beech (Fagus grandifolia), striped prince's pine (Chimaphila maculata), sensitive fern (Onoclea sensibilis), pink azalea (Rhododendron periclymenoides), thinleaf sunflower (Helianthus decapetalus), wild yam (Dioscorea villosa), common ladyfern (Athyrium filix-femina), New York fern (Thelypteris noveboracensis), interrupted fern (Osmunda claytoniana), Jack in the pulpit (Arisaema triphyllum), wrinkleleaf goldenrod (Solidago rugosa), trillium (Trillium sp.), western brackenfern (Pteridium aquilinum), hophornbeam (Ostrya virginiana), Kalm's hawkweed (Hieracium kalmii), rough avens (Geum laciniatum), eastern teaberry (Gaultheria procumbens), sessileleaf bellwort (Uvularia sessilifolia), widowsfrill (Silene stellata), bloodroot (Sanguinaria canadensis), slender yellow woodsorrel (Oxalis dillenii), hepatica (Hepatica nobilis), Indianpipe (Monotropa uniflora), lespedeza (Lespedeza sp.), waxflower shinleaf (Pyrola elliptica), and American hogpeanut (Amphicarpaea bracteata).

G495. North Atlantic Maritime & Coastal Plain Forest

This group encompasses maritime forests characterized by *Pinus rigida, Pinus taeda*, dry-site oaks such as *Quercus velutina, Quercus alba, Quercus falcata*, and *Quercus stellata*, and early-successional trees that often do not exceed 5 m in height due to intense winds and salt spray. It ranges from Atlantic Canada and southern Maine to northern Virginia and is restricted to coastal regions.

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
1.B.2.Na.2.d. G495 North Atlantic Maritime & Coastal Plain Forest

A0237. *Prunus serotina - Amelanchier* spp. - *Juniperus virginiana* Maritime Scrub Forest Alliance

Type Concept Sentence: This alliance includes temperate deciduous forests and scrub forests in Atlantic maritime environments from southern Maine to northern Virginia, characterized by *Acer rubrum, Amelanchier canadensis, Nyssa sylvatica, Photinia pyrifolia, Prunus serotina var. serotina*, and *Sassafras albidum* in varying proportions.

OVERVIEW

Scientific Name: *Prunus serotina - Amelanchier* spp. - *Juniperus virginiana* Maritime Scrub Forest Alliance
Common Name (Translated Scientific Name): Black Cherry - Serviceberry species - Eastern Red-cedar Maritime Scrub Forest Alliance
Colloquial Name: Maritime Black Cherry - Red-cedar Scrub Forest

Type Concept: This alliance includes temperate deciduous forests and scrub forests in Atlantic maritime environments from southern Maine to northern Virginia. These associations are characterized by early-successional species, reflecting the disclimax maintained in this state by the maritime climate and disturbance regime. The physiognomy of this vegetation is highly variable and may range from open woodland to stunted forest to dense nearly impenetrable thicket, and individual trees tend to be wind-pruned and multi-stemmed. The canopy may contain *Acer rubrum, Amelanchier canadensis, Nyssa sylvatica, Photinia pyrifolia (= Aronia arbutifolia), Prunus serotina var. serotina*, and *Sassafras albidum* in varying proportions. *Pinus taeda, Diospyros virginiana*, and *Ilex opaca var. opaca* may occur locally on the Coastal Plain. *Morella pensylvanica* is diagnostic of this alliance and differentiates it from more inland early-successional and ruderal forests resulting from anthropogenic changes. Some examples support vines in great abundance, such as *Smilax rotundifolia, Smilax glauca, Parthenocissus quinquefolia*, and *Toxicodendron radicans*. Herbs are of variable cover, depending on the degree of sunlight penetrating the canopy. Herbaceous composition is widely variable and may include both native and exotic species. The substrate varies from pure sand to loamy sands.

Classification Comments: Although some maritime forests in this alliance also have a history of land clearance, they remain in this disclimax state due to the maritime climate.

Similar NVC Types:
- A3105 *Pinus rigida - Pinus taeda* Maritime Forest & Woodland Alliance: shares some of the same species but is coniferous.

Diagnostic Characteristics: Maritime setting; early-successional trees *Sassafras albidum, Amelanchier* spp., and *Prunus serotina* in varying proportions. *Morella pensylvanica* often present.

VEGETATION

Physiognomy and Structure: The physiognomy of this vegetation is highly variable and may range from open woodland to stunted forest to dense nearly impenetrable thicket. Individual trees tend to be wind-pruned and multiple-stemmed.

Floristics: The physiognomy of this vegetation is highly variable and may range from forest to open woodland to stunted forest to dense nearly impenetrable thicket. In maritime settings, individual trees tend to be wind-pruned and multi-stemmed. The canopy may contain *Acer rubrum, Amelanchier canadensis, Juniperus virginiana, Nyssa sylvatica, Prunus serotina var. serotina*, and *Sassafras albidum* in varying proportions. *Pinus taeda, Diospyros virginiana*, and *Ilex opaca var. opaca* may occur locally on the Coastal Plain. Shrubs may be present as part of the stunted tree canopy, but usually do not form a distinct stratum. These may include *Viburnum recognitum, Viburnum dentatum*, and *Rosa virginiana*. Some examples support vines in great abundance, such as *Smilax rotundifolia, Smilax glauca, Parthenocissus quinquefolia, Photinia pyrifolia (= Aronia arbutifolia)*, and *Toxicodendron radicans*. Herbs are of variable cover, depending on the degree of sunlight penetrating the canopy. These may include *Aralia nudicaulis, Euthamia graminifolia, Lechea intermedia, Maianthemum stellatum (= Smilacina stellata), Oenothera biennis, Panicum virgatum, Sericocarpus asteroides (= Aster paternus), Solidago rugosa, Solidago sempervirens, Spartina patens*, and *Symphyotrichum novi-belgii*.

ENVIRONMENT & DYNAMICS

Environmental Description: These scrub forests are associated with barrier islands, spits, exposed ocean/bay water fronts or headland bluffs. The substrate varies from pure sand and loamy sands in coastal regions, or loam in the interior.

Dynamics: Strong maritime influences profoundly impact the vegetation, such as constant marine winds, salt spray, sand blasting, and sporadic coastal storm damage from wave surges, salt water flooding and powerful winds. These habitats are partially to completely isolated from mainland fire regimes, so fires had a minimal role in their development. This alliance is characterized by early-successional species, reflecting the disclimax maintained in this state by the maritime climate and disturbance regime.

DISTRIBUTION

Geographic Range: This alliance occurs in maritime settings from New Hampshire to northern Virginia.

Spatial Scale & Pattern [optional]:
Nations: CA?, US
States/Provinces: CT, DE, MA, MD, NH, NJ, NY, QC?, RI, VA
TNC Ecoregions [optional]: 58:C, 62:C, 63:C
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]: NPS (Assateague Island, Boston Harbor Islands, Cape Cod, Fire Island, Gateway); USFWS (Cape May, Chincoteague, E.B. Forsythe, Monomoy, Nomans Land Island, Parker River, Prime Hook, Supawna Meadows, Wallops)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

- **<** High Xeric Thicket (Martin 1959b)
- **?** Maritime Juniper Woodland/Shrubland (Swain and Kearsley 2001)
- **?** Maritime Shrubland Community (Swain and Kearsley 2001)
- **?** Successional Maritime Forest (NYNHP 2013a)

LOWER LEVEL UNITS

Associations:

- CEGL006319 *Prunus serotina / Morella cerifera / Smilax rotundifolia* Ruderal Scrub Forest
- CEGL006212 *Juniperus virginiana var. virginiana / Morella pensylvanica* Woodland
- CEGL006145 *Prunus serotina - Sassafras albidum - Amelanchier canadensis - Quercus velutina / Smilax rotundifolia* Forest
- CEGL006379 *Amelanchier canadensis - Viburnum* spp. - *Morella pensylvanica* Scrub Forest
- CEGL006399 *Prunus serotina - Rhus typhina* Scrub Forest

AUTHORSHIP

Primary Concept Source: W.E. Martin (1959b)
Author of Description: L.A. Sneddon
Acknowledgments:
Version Date: 07/31/2015
Classif Resp Region: East

REFERENCES

References: Bellis 1992, Boule 1979, Dunlop and Crow 1985, Faber-Langendoen et al. 2016b, Martin 1959b, NYNHP 2013a, Stalter 1979, Swain and Kearsley 2001, Swain and Kearsley 2011

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A0237. *Prunus serotina - Amelanchier* spp. - *Juniperus virginiana* Maritime Scrub Forest Alliance

CEGL006379. *Amelanchier canadensis - Viburnum* spp. - *Morella pensylvanica* Scrub Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Amelanchier canadensis - Viburnum* spp. - *Morella pensylvanica* Scrub Forest
Common Name (Translated Scientific Name): Canadian Serviceberry - Viburnum species - Northern Bayberry Scrub Forest
Colloquial Name: Northern Tall Maritime Scrub Forest

Type Concept: This tall maritime shrubland or scrub forest community characteristically replaces maritime forests that have been cleared. The community is variable in composition and generally includes *Amelanchier canadensis, Prunus serotina, Sassafras albidum, Nyssa sylvatica, Acer rubrum, Juniperus virginiana* in the canopy. The oaks *Quercus velutina, Quercus stellata, Quercus alba* may or may not be present. The shrubs *Morella pensylvanica (= Myrica pensylvanica), Photinia* spp. (= *Aronia* spp.), *Viburnum* spp. may form an understory or contribute substantial cover to the canopy. Vines are often prevalent, including *Smilax* spp., *Vitis* spp., *Toxicodendron radicans, Parthenocissus quinquefolia*. The herbaceous layer is generally sparse. These shrublands are usually very dense, and often maintained in their current state by constant winds and salt spray.

Classification Comments:

Similar NVC Types:

- CEGL006145 *Prunus serotina - Sassafras albidum - Amelanchier canadensis - Quercus velutina / Smilax rotundifolia* Forest

VEGETATION

Floristics: This tall shrubland community is variable in composition and generally includes *Amelanchier canadensis, Prunus serotina, Sassafras albidum, Nyssa sylvatica, Acer rubrum*, and *Juniperus virginiana* in the canopy. The oaks *Quercus velutina, Quercus stellata*, and *Quercus alba* may or may not be present. The shrubs *Morella pensylvanica, Photinia* spp., *Viburnum* spp., and *Gaylussacia baccata* may form an understory or contribute substantial cover to the canopy. Vines are often prevalent, including *Smilax* spp., *Vitis* spp., *Toxicodendron radicans*, and *Parthenocissus quinquefolia*. The herbaceous layer is generally sparse.

ENVIRONMENT & DYNAMICS

Environmental Description: This tall maritime shrubland or scrub forest community characteristically replaces maritime forests that have been cleared. It occurs at former agricultural sites on sandy loam soils. These shrublands are usually very dense and often maintained in their current state by constant winds and salt spray.

Dynamics: This tall maritime shrubland community characteristically replaces maritime forests that have been cleared. Successional relationships with maritime forest associations need to be determined.

DISTRIBUTION

Geographic Range: This community occurs in the northeastern United States from New Jersey to New Hampshire and possibly Maine and Quebec, Canada.

Spatial Scale & Pattern [optional]: Large patch
Nations: CA?, US
States/Provinces: CT, MA, ME?, NH, NJ, NY, QC?, RI
TNC Ecoregions [optional]: 62:C
USFS Ecoregions (1994/95): 221Ab:CCC, 221Ad:CCC, 232Aa:CCC, 232Ab:CCC, 232Ac:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Cape Cod, Gateway); USFWS (Cape May, E.B. Forsythe, Monomoy, Nomans Land Island, Rachel Carson?, Supawna Meadows)

CONSERVATION STATUS

Grank (Review Date): GNR (1997/12/1)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

Synonymy:

- **<** *Quercus coccinea - Sassafras albidum* woodlands (Metzler and Barrett 2001)
- **?** Coastal dune shrubland (Breden 1989)
- **?** Coastal dune woodland (Breden 1989)
- **?** SNE coastal rocky headland community (Rawinski 1984a)

AUTHORSHIP

Primary Concept Source: L.A. Sneddon
Author of Description: L.A. Sneddon
Acknowledgments:
Version Date: 2007/05/09

REFERENCES

References: Breden 1989, Breden et al. 2001, CDPNQ unpubl. data, Edinger et al. 2002, Edinger et al. 2008a, Metzler and Barrett 2001, Metzler and Barrett 2006, NRCS 2001b, NatureServe 2009, Rawinski 1984a, Reschke 1990, Sneddon et al. 2010, Sperduto and Nichols 2004, Swain and Kearsley 2001.

NYC NAC Association Description based on 22 plots (CEGL006379):

Overstory trees and shrubs include black cherry (Prunus serotina), eastern cottonwood (Populus deltoides), smooth sumac (Rhus glabra), and northern bayberry (Morella pensylvanica).

The midstory is dominated by maritime shrubs, such as winged sumac (Rhus copallinum), northern bayberry (Morella pensylvanica), smooth sumac (Rhus glabra), and southern arrowwood (Viburnum dentatum). Other midstory plants include black cherry (Prunus serotina), black locust (Robinia pseudoacacia), autumn olive (Elaeagnus umbellata), sweetgum (Liquidambar styraciflua), and white mulberry (Morus alba)

Vines include Oriental bittersweet (Celastrus orbiculatus), Amur peppervine (Ampelopsis brevipedunculata), Virginia creeper (Parthenocissus quinquefolia), Japanese honeysuckle (Lonicera japonica), eastern poison ivy (Toxicodendron radicans), climbing hempvine (Mikania scandens), riverbank grape (Vitis riparia), climbing nightshade (Solanum dulcamara), English ivy (Hedera helix), climbing false buckwheat (Polygonum scandens), and American hogpeanut (Amphicarpaea bracteata).

The midstory is dominated by maritime shrubs, such as northern bayberry (Morella pensylvanica), winged sumac (Rhus copallinum), and smooth sumac (Rhus glabra). Other understory plants include common wormwood (Artemisia vulgaris), common reed (Phragmites australis), black cherry (Prunus serotina), goldenrod (Solidago sp.), switchgrass (Panicum virgatum), American pokeweed (Phytolacca americana), hyssopleaf thoroughwort (Eupatorium hyssopifolium), garlic mustard (Alliaria petiolata), Japanese honeysuckle (Lonicera japonica), blackberry (Rubus sp.), purple loosestrife (Lythrum salicaria), multiflora rose (Rosa multiflora), wrinkleleaf goldenrod (Solidago rugosa), early goldenrod (Solidago juncea), northern red oak (Quercus rubra), little bluestem (Schizachyrium scoparium), hairy crabgrass (Digitaria sanguinalis), marsh seedbox (Ludwigia palustris), butter and eggs (Linaria vulgaris), purple lovegrass (Eragrostis spectabilis), annual ragweed (Ambrosia artemisiifolia), roundhead lespedeza (Lespedeza capitata), Japanese knotweed (Polygonum cuspidatum), partridge pea (Chamaecrista fasciculata), tapered rosette grass (Dichanthelium acuminatum), earth loosestrife (Lysimachia terrestris), seaside goldenrod (Solidago sempervirens), spotted knapweed (Centaurea stoebe), white heath aster (Symphyotrichum ericoides), staghorn sumac (Rhus typhina), flat-top goldentop (Euthamia graminifolia), slender goldentop (Euthamia caroliniana), hairy white oldfield aster (Symphyotrichum pilosum), amberique-bean (Strophostyles helvola), American burnweed (Erechtites hieraciifolius), sensitive fern (Onoclea sensibilis), strawcolored flatsedge (Cyperus strigosus), and common sheep sorrel (Rumex acetosella).

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A0237. *Prunus serotina - Amelanchier* spp. - *Juniperus virginiana* Maritime Scrub Forest Alliance

CEGL006145. *Prunus serotina - Sassafras albidum - Amelanchier canadensis - Quercus velutina / Smilax rotundifolia* Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Prunus serotina - Sassafras albidum - Amelanchier canadensis - Quercus velutina / Smilax rotundifolia* Forest
Common Name (Translated Scientific Name): Black Cherry - Sassafras - Canadian Serviceberry - Black Oak / Roundleaf Greenbrier Forest
Colloquial Name: Northeastern Maritime Forest

Type Concept: This maritime forest community of the North Atlantic Coast Ecoregion occurs on sheltered backdunes, bluffs, or more interior coastal areas not directly influenced by overwash but affected by salt spray and wind-pruning. Vegetation in these sheltered areas is sometimes referred to as "sunken forest." This name refers to the topographic position of these examples, which are found in large depressions, lower in elevation (by 1-3 m) than the interdunes. These examples are shielded from strong prevailing winds and salt spray, which permits lush growth of broadleaf shrub and vine species. Soils are coarse, well-drained sand subject to considerable shifting during coastal storms, or till and sand deposits of terminal moraines. Physiognomy is variable and ranges from closed-canopy forest to open woodland to dense tall shrubland, and may be more accurately called scrub. Trees found in this community are usually stunted and flat-topped; the canopy may be only 3-7 m tall. Dominant trees vary locally and include *Prunus serotina, Sassafras albidum*, and *Amelanchier canadensis*, with admixtures of *Celtis occidentalis, Quercus velutina, Pinus rigida, Juniperus virginiana, Acer rubrum, Amelanchier stolonifera*, and in southern occurrences *Quercus coccinea, Quercus falcata, Liquidambar styraciflua*, and *Ilex opaca*. Additional shrub species may also contribute substantially to the canopy and include *Vaccinium corymbosum, Morella pensylvanica (= Myrica pensylvanica), Gaylussacia baccata, Viburnum recognitum, Viburnum dentatum*, and *Rosa virginiana*. A true shrub layer is generally not present. Lianas are common and can be dense in the canopy or the ground layer; species include *Parthenocissus quinquefolia, Toxicodendron radicans, Smilax rotundifolia*, and *Smilax glauca*. The understory is generally sparse with tree or vine seedlings plus herbaceous species, including *Aralia nudicaulis, Moehringia lateriflora (= Arenaria lateriflora), Maianthemum stellatum (= Smilacina stellata)*, and *Maianthemum canadense*. Several invasive species can be prevalent in this association, including *Lonicera morrowii, Lonicera japonica, Ligustrum vulgare, Berberis vulgaris*, and *Celastrus orbiculata*.

Classification Comments: *Prunus serotina / Morella cerifera / Smilax rotundifolia* Scrub Forest (CEGL006319) is the southern analog of this association and is differentiated by having species of more southern affinity such as *Morella cerifera* and *Pinus taeda*. This association is floristically similar to *Amelanchier canadensis - Viburnum* spp. - *Morella pensylvanica* Scrub Forest (CEGL006379), which is a successional type.

Other Comments: This community intergrades and shares many species with maritime forests and maritime shrublands. It is mainly identified by its occurrence in sheltered areas behind stabilized dunes, the relative lack of several characteristic shrub species such as *Morella pensylvanica* and *Prunus maritima*, and the corresponding vine-dominated understory. Northern examples of this community found in Maine, New Hampshire and northern Massachusetts are characteristically smaller and more species depauperate. Occasionally they contain *Populus tremuloides* in the canopy but rarely contain any other species besides those

previously mentioned. The stands at Prime Hook NWR in Delaware (which is on the border of Ecoregions 62 and 58) are dominated by *Liquidambar styraciflua* and *Prunus serotina* with *Acer rubrum*. The understory is dominated by *Morella pensylvanica*, with associates *Ilex opaca, Juniperus virginiana*, and *Quercus falcata*. Some of these stands have occasional *Pinus taeda* present, but no *Morella cerifera* or other characteristic species associated with CEGL006319.

Similar NVC Types:
- CEGL006319 *Prunus serotina / Morella cerifera / Smilax rotundifolia* Ruderal Scrub Forest
- CEGL006379 *Amelanchier canadensis - Viburnum* spp. - *Morella pensylvanica* Scrub Forest

VEGETATION

Floristics: This association is generally a maritime forest or scrub forest, although physiognomy can vary considerably. Trees found in this community are usually stunted and flat-topped; the canopy may be only 3-7 m tall. Dominant trees vary locally but often include *Prunus serotina, Sassafras albidum*, and *Amelanchier canadensis*, with admixtures of *Celtis occidentalis, Quercus velutina, Pinus rigida, Juniperus virginiana, Acer rubrum, Amelanchier stolonifera*, and in southern occurrences *Quercus coccinea, Quercus falcata, Liquidambar styraciflua*, and/or *Ilex opaca*. Additional shrub species may also contribute substantially to the canopy and include *Vaccinium corymbosum, Morella pensylvanica (= Myrica pensylvanica), Gaylussacia baccata, Prunus maritima, Viburnum recognitum, Viburnum dentatum*, and *Rosa virginiana*. A true shrub layer is generally not present. Lianas are common and can be dense in the canopy or in the ground layer; species include *Parthenocissus quinquefolia, Toxicodendron radicans, Smilax rotundifolia*, and *Smilax glauca*. The understory is generally sparse with tree or vine seedlings plus herbaceous species, including *Aralia nudicaulis, Moehringia lateriflora (= Arenaria lateriflora), Maianthemum stellatum (= Smilacina stellata)* and *Maianthemum canadense*. Several invasive species can be prevalent in this association, including *Lonicera morrowii, Lonicera japonica, Ligustrum vulgare, Berberis vulgaris*, and *Celastrus orbiculata*. The regionally uncommon species *Tilia americana var. heterophylla* has been reported from one occurrence (Svenson 1970).

ENVIRONMENT & DYNAMICS

Environmental Description: This association occurs most often on stabilized backdunes, generally leeward of secondary dunes or in protected hollows. It also occurs on bluffs or in more interior coastal areas. It is subject to varying degrees of wind and salt spray. Soils are coarse, well-drained sand subject to considerable shifting during coastal storms, or till and sand deposits of terminal moraines.

Dynamics: This association occupies a transitional zone between dune grasslands or low dune shrublands and maritime forest. Physiognomy is highly variable depending on degree of exposure to wind and salt spray and depending on the overall height of the surrounding dunes.

DISTRIBUTION

Geographic Range: The range of this community (estimated at 400 square km) is from southern New Hampshire to Delaware but is restricted to the coast.

Spatial Scale & Pattern [optional]: Large patch
Nations: US
States/Provinces: CT, DE, MA, ME?, NH, NJ, NY, RI
TNC Ecoregions [optional]: 62:C
USFS Ecoregions (1994/95): 221Ab:CCC, 221Ac:CC?, 221Ad:CCC, 221Ak:CCC, 221D:CP, 232Aa:CCC, 232Ab:CCC, 232Ac:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Boston Harbor Islands, Cape Cod, Fire Island, Gateway); USFWS (Parker River, Prime Hook, Rachel Carson?)

CONSERVATION STATUS

Grank (Review Date): G2G3 (2007/1/31)
Greasons: This maritime forest community is restricted in range to the coastal areas of seven northeastern states. Average occurrence size is estimated to be 20-100 acres, but many are substantially below this in size. The potential habitat of this community is naturally restricted to areas directly affected by maritime processes, e.g., salt spray and winds. Northeastern coastal areas in general are under significant threat from housing development.
Ranking Author (Version): L.A. Sneddon (2007/1/31)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:

- **<** *Quercus coccinea - Sassafras albidum* woodlands (Metzler and Barrett 2001)
- **?** Dune woodland/dune shrubland (Breden 1989)
- **>** High dune thicket (Martin 1959b)
- **><** High mesic thicket (Martin 1959b)
- **>** High xeric thicket (Martin 1959b)
- **?** Maritime Forest, Dune Subtype, Deciduous Forest (Rawinski 1984a)
- **?** SNE Maritime Forest on Dunes/Maritime Juniper Forest (Rawinski 1984a)
- **?** SNE Maritime Forest on Uplands/Maritime Oak Forest (Rawinski 1984a) [also Coastal Forest.]
- **?** SNE coastal rocky headland community (Rawinski 1984a)
- **?** Scrub Forest (McDonnell 1979)
- **?** Southern New England forest on dunes (Rawinski 1984a)
- **><** Successional Maritime Forest (Reschke 1990)
- **=** Successional Maritime Forest (Sneddon and Zaremba 2004)
- **<** Sunken Forest (Art 1987)
- **=** Sunken forest (Dunlop and Crow 1985)

AUTHORSHIP

Primary Concept Source: L.A. Sneddon, mod. S.L. Neid
Author of Description: S.L. Neid and L.A. Sneddon, mod. E. Largay
Acknowledgments:
Version Date: 2007/03/26

REFERENCES

References: Art 1987, Breden 1989, Breden et al. 2001, Coxe 2009, Dowhan and Rozsa 1989, Dunlop and Crow 1985, Edinger et al. 2002, Edinger et al. 2008a, Enser and Lundgren 2006, Klopfer et al. 2002, Largay and Sneddon 2010, Martin 1959b, McDonnell 1979, Metzler and Barrett 2001, Metzler and Barrett 2006, NRCS 2001b, Rawinski 1984a, Reschke 1990, Sneddon and Zaremba 2004, Sneddon et al. 2010, Sperduto 1997b, Sperduto and Nichols 2004, Stalter 1979, Svenson 1970, Swain and Kearsley 2001

NYC NAC Association Description based on 41 plots (CEGL006145):

Overstory trees and shrubs include black cherry (Prunus serotina), sassafras (Sassafras albidum), pin oak (Quercus palustris), red maple (Acer rubrum), northern red oak (Quercus rubra), bitternut hickory (Carya cordiformis), black oak (Quercus velutina), bigtooth aspen (Populus grandidentata), sweet birch (Betula lenta), green ash (Fraxinus pennsylvanica), sycamore maple (Acer pseudoplatanus), gray birch (Betula populifolia), plum (Prunus sp.), winged sumac (Rhus copallinum), blackhaw (Viburnum prunifolium), and northern bayberry (Morella pensylvanica).

Midstory plants include black cherry (Prunus serotina), winged sumac (Rhus copallinum), sassafras (Sassafras albidum), southern arrowwood (Viburnum dentatum), northern bayberry (Morella pensylvanica), blackgum (Nyssa sylvatica), red maple (Acer rubrum), northern red oak (Quercus rubra), blackhaw (Viburnum prunifolium), gray birch (Betula populifolia), pin oak (Quercus palustris), eastern cottonwood (Populus deltoides), smooth sumac (Rhus glabra), plum (Prunus sp.), flowering dogwood (Cornus florida), white meadowsweet (Spiraea alba), and highbush blueberry (Vaccinium corymbosum).

Vines include Virginia creeper (Parthenocissus quinquefolia), Oriental bittersweet (Celastrus orbiculatus), eastern poison ivy (Toxicodendron radicans), Japanese honeysuckle (Lonicera japonica), Amur peppervine (Ampelopsis brevipedunculata), roundleaf greenbrier (Smilax rotundifolia), cat greenbrier (Smilax glauca), climbing false buckwheat (Polygonum scandens), climbing nightshade (Solanum dulcamara), Chinese wisteria (Wisteria sinensis), fox grape (Vitis labrusca), wild yam (Dioscorea villosa), Asiatic tearthumb (Polygonum perfoliatum), and riverbank grape (Vitis riparia).

Understory plants include blackberry (Rubus sp.), common wormwood (Artemisia vulgaris), black cherry (Prunus serotina), garlic mustard (Alliaria petiolata), multiflora rose (Rosa multiflora), southern arrowwood (Viburnum dentatum), sassafras (Sassafras albidum), northern bayberry (Morella pensylvanica), winged sumac (Rhus copallinum), northern dewberry (Rubus flagellaris), broadleaf enchanter's nightshade (Circaea lutetiana), common reed (Phragmites australis), common yarrow (Achillea millefolium), switchgrass (Panicum virgatum), early goldenrod (Solidago juncea), Canada mayflower (Maianthemum canadense), red maple (Acer rubrum), feathery false lily of the valley (Maianthemum racemosum), American pokeweed (Phytolacca americana), little bluestem (Schizachyrium scoparium), white wood aster (Eurybia divaricata), wine raspberry (Rubus phoenicolasius), touch-me-not (Impatiens), white snakeroot (Ageratina altissima), northern red oak (Quercus rubra), wild sarsaparilla (Aralia nudicaulis), wrinkleleaf goldenrod (Solidago rugosa), showy ticktrefoil (Desmodium canadense), slender goldentop (Euthamia caroliniana), spotted geranium (Geranium maculatum), American holly (Ilex opaca), sand blackberry (Rubus cuneifolius), lateflowering thoroughwort (Eupatorium serotinum), Canadian serviceberry (Amelanchier canadensis), Blue Ridge blueberry (Vaccinium pallidum), partridge pea

(Chamaecrista fasciculata), striped prince's pine (Chimaphila maculata), hyssopleaf thoroughwort (Eupatorium hyssopifolium), Solomon's seal (Polygonatum biflorum), evening primrose (Oenothera sp.), and purple lovegrass (Eragrostis spectabilis).

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
1.B.2.Na.2.d. G495 North Atlantic Maritime & Coastal Plain Forest

A2032. *Quercus velutina - Fagus grandifolia - Ilex opaca* Maritime Forest Alliance

Type Concept Sentence: This alliance includes maritime and coastal forests of the Northeast characterized by *Quercus velutina* and *Quercus alba*, and others.

OVERVIEW

Scientific Name: *Quercus velutina - Fagus grandifolia - Ilex opaca* Maritime Forest Alliance
Common Name (Translated Scientific Name): Black Oak - American Beech - American Holly Maritime Forest Alliance
Colloquial Name: Maritime Oak - Beech - Holly Forest

Type Concept: This alliance includes maritime and coastal forests of the Northeast. It ranges from scrub to forest in physiognomy and is generally deciduous, but one association in this alliance is dominated by *Ilex opaca*. Oaks, especially *Quercus velutina* and *Quercus alba, Fagus grandifolia*, and the shrub *Morella pensylvanica* are characteristic. *Quercus stellata*, although infrequent, is diagnostic when occurring in the maritime zone. Vines are particularly abundant and include *Toxicodendron radicans, Smilax rotundifolia, Parthenocissus quinquefolia*, and *Vitis* spp. The herbaceous layer is sparsely to moderately developed and includes *Aralia nudicaulis, Carex pensylvanica, Maianthemum canadense, Maianthemum stellatum (= Smilacina stellata)*, and *Panicum virgatum*.

Classification Comments:

Similar NVC Types:
- A2054 *Fagus grandifolia - Quercus rubra / Cornus florida* Forest Alliance

Diagnostic Characteristics: Oak- or holly-dominated maritime forests on protected backdunes.

VEGETATION

Physiognomy and Structure: In general, these forests are dominated by broad-leaved deciduous trees forming a closed canopy and occur in maritime situations that are exposed to wind-shear, salt spray, and coastal storms, and as a result, trees may be dwarfed and gnarled. The shrub layer is variable, characterized by either deciduous or broad-leaved evergreen species. The herbaceous layer is usually poorly developed and depauperate. Vines may form a shrub layer, or sometimes climb into the canopy and contribute shade.

Floristics: Oaks, especially *Quercus velutina* and *Quercus alba, Fagus grandifolia* and the shrub *Morella pensylvanica* are characteristic. *Quercus stellata*, although infrequent, is diagnostic when occurring in the maritime zone. One association is dominated by *Ilex opaca*. Vines are particularly abundant and include *Toxicodendron radicans, Smilax rotundifolia, Parthenocissus quinquefolia*, and *Vitis* spp. Shrubs may include *Clethra alnifolia, Gaylussacia baccata, Gaylussacia frondosa, Ilex verticillata, Morella pensylvanica (= Myrica pensylvanica), Rhus copallinum*, and *Vaccinium corymbosum*. The herbaceous layer is sparsely to moderately developed and includes *Aralia nudicaulis, Carex pensylvanica, Maianthemum canadense, Maianthemum stellatum (= Smilacina stellata), Panicum virgatum*, and *Pteridium aquilinum*.

ENVIRONMENT & DYNAMICS

Environmental Description: This forest alliance occurs on nutrient-poor, well-drained acidic soils at low elevations. Topography may be undulating, and these forests may occur on steep bluffs. In maritime habitats, these forests occur on sand dunes or moraines.

Dynamics: This alliance forms in sheltered backdunes that are not fully exposed to maritime winds and salt spray, but the upper canopy may be wind-sheared where it rises above the level of the dune. Deer browsing affects the shrub and herb layers.

DISTRIBUTION

Geographic Range: This alliance occurs on the coast from southern New Hampshire to Maryland, and perhaps farther south to Virginia.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: CT, DC, DE, MA, MD, NJ, NY, RI, VA?

TNC Ecoregions [optional]: 52:C, 57:C, 58:C, 60:C, 61:C, 62:C
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]: DOD (Fort Belvoir, Fort Dix, Kerr Reservoir); NPS (Cape Cod, Colonial, National Capital-East, Prince William, Rock Creek); USFWS (Great Swamp)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

- **<** Coastal Forest/Woodland (Swain and Kearsley 2001)
- **<** Coastal Oak-Beech Forest (NYNHP 2013p)
- **<** Maritime Oak - Holly Forest / Woodland (Swain and Kearsley 2001)
- **<** Maritime Post Oak Forest (NYNHP 2013q)
- **<** Sunken Forest (Art 1976)

LOWER LEVEL UNITS

Associations:
- CEGL006043 *Fagus grandifolia / Smilax rotundifolia* Forest
- CEGL006376 *Ilex opaca / Morella pensylvanica* Forest
- CEGL006929 *Quercus falcata - Pinus rigida - Pinus echinata / Ilex opaca* Woodland
- CEGL006373 *Quercus stellata - Quercus velutina / Morella pensylvanica / Deschampsia flexuosa* Forest
- CEGL006372 *Quercus stellata - Sassafras albidum / Smilax glauca* Woodland

AUTHORSHIP

Primary Concept Source: H.W. Art (1976); D. Hunt (1997a)
Author of Description: L. Sneddon
Acknowledgments:
Version Date: 12/18/2014
Classif Resp Region: East

REFERENCES

References: Art 1976, Art 1987, Faber-Langendoen et al. 2016b, Godfrey et al. 1978, Good and Good 1970, Greller 1977, Hunt 1997a, NYNHP 2013p, NYNHP 2013q, Sneddon and Lundgren 2001, Swain and Kearsley 2001, Swain and Kearsley 2011

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A2032. *Quercus velutina - Fagus grandifolia - Ilex opaca* Maritime Forest Alliance

CEGL006373. *Quercus stellata - Quercus velutina / Morella pensylvanica / Deschampsia flexuosa* Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Quercus stellata - Quercus velutina / Morella pensylvanica / Deschampsia flexuosa* Forest
Common Name (Translated Scientific Name): Post Oak - Black Oak / Northern Bayberry / Wavy Hairgrass Forest
Colloquial Name: North Atlantic Coast Maritime Post Oak Forest

Type Concept: This vegetation is a maritime oak forest of bluffs, sand spits, and salt marsh borders along the North Atlantic Coast. It is dominated by stunted, wind- and salt-pruned *Quercus stellata, Quercus velutina, Quercus coccinea*, and *Quercus alba*. *Juniperus virginiana* may contribute a minor cover to the canopy. A dense shrub layer is made up of *Morella pensylvanica (= Myrica pensylvanica), Gaylussacia baccata*, and *Prunus serotina* with a heavy component of vines such as *Smilax rotundifolia, Toxicodendron radicans, Parthenocissus quinquefolia*, and *Vitis aestivalis*. Herbaceous species are sparse and include *Deschampsia flexuosa*. Vegetation varies to a degree along topo-edaphic gradients.

Classification Comments:

Similar NVC Types:

VEGETATION

Floristics: This maritime oak forest is dominated by stunted, wind- and salt-pruned *Quercus stellata, Quercus velutina, Quercus coccinea*, and *Quercus alba*. *Juniperus virginiana* may contribute minor cover to the canopy. A dense shrub layer is made up of

Morella pensylvanica (= Myrica pensylvanica), Gaylussacia baccata, and *Prunus serotina* with a heavy component of vines such as *Smilax rotundifolia, Toxicodendron radicans, Parthenocissus quinquefolia*, and *Vitis aestivalis*. Herbaceous species are sparse and include *Deschampsia flexuosa*. Vegetation varies to a degree along topo-edaphic gradients: a post oak-catbrier forest is the typical variety; a post oak-basswood variant occurs on dune sands atop morainal bluffs; and a post oak-blackjack oak variant occurs on reddish sandy clay loam ridges of Staten Island (Reschke et al. 2002).

ENVIRONMENT & DYNAMICS

Environmental Description: This vegetation occurs on bluffs, sand spits, and salt marsh borders within 200 m of the seacoast.

Dynamics: This community is heavily influenced by maritime processes, especially salt spray and wind-pruning.

DISTRIBUTION

Geographic Range: Currently described from Long Island, New York, and Connecticut. It possibly occurs in New Jersey.

Spatial Scale & Pattern [optional]: Small patch
Nations: US
States/Provinces: CT, MA, NJ?, NY
TNC Ecoregions [optional]: 62:C
USFS Ecoregions (1994/95): 221Ad:CPP, 221Dc:C??, 232Aa:CCC, 232Ab:CC?
Omernik Ecoregions:
Federal Lands [optional]: NPS (Fire Island)

CONSERVATION STATUS

Grank (Review Date): GNR (1997/12/1)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low - Poorly Documented.

SYNONYMY

Synonymy:

- **<** *Pinus rigida - Quercus stellata* woodlands (Metzler and Barrett 2001)
- **?** Black Oak, Post Oak-Vine Maritime Strand Forest (Greller 1977)
- **?** CNE Mesic hardwood Forest on acidic bedrock / till (Rawinski 1984a)
- **?** Dry Pine-Oak Forest, Pine-Post Oak Forest Subtype (Breden 1989)
- **?** Maritime Forest, Dune Subtype, Deciduous Forest (Rawinski 1984a)
- **?** Maritime forest (Rawinski 1984a)
- **?** SNE Maritime Forest on Dunes/Maritime Juniper Forest (Rawinski 1984a)
- **?** SNE Maritime Forest on Uplands/Maritime Oak Forest (Rawinski 1984a) [also Coastal Forest.]
- **?** Southern New England oak / pine forest on sandy / gravelly soils (Rawinski 1984a)

AUTHORSHIP

Primary Concept Source: D. Hunt (NYNHP)
Author of Description: S.L. Neid
Acknowledgments:
Version Date: 2002/05/09

REFERENCES

References: Breden 1989, Edinger et al. 2002, Greller 1977, Hunt 1997a, Klopfer et al. 2002, Metzler and Barrett 2001, Metzler and Barrett 2006, Rawinski 1984a, Reschke pers. comm., Swain and Kearsley 2001.

NYC NAC Association Description based on 3 plots (CEGL006373):

Overstory trees include white oak (Quercus alba), northern red oak (Quercus rubra), black oak (Quercus velutina), post oak (Quercus stellata), scarlet oak (Quercus coccinea), sassafras (Sassafras albidum), black cherry (Prunus serotina), and alderleaf buckthorn (Rhamnus alnifolia).

Midstory plants include white oak (Quercus alba), northern red oak (Quercus rubra), sassafras (Sassafras albidum), black oak (Quercus velutina), chestnut oak (Quercus montana), sweetgum (Liquidambar styraciflua), black cherry (Prunus serotina), post oak (Quercus stellata), swamp white oak (Quercus bicolor), and red maple (Acer rubrum).

Vines include eastern poison ivy (Toxicodendron radicans) and cat greenbrier (Smilax glauca).

Understory plants include lowbush blueberry (Vaccinium angustifolium), white oak (Quercus alba), huckleberry (Gaylussacia baccata), panicgrass (Panicum sp.), Blue Ridge blueberry (Vaccinium pallidum), northern red oak (Quercus rubra), black oak (Quercus velutina), common reed (Phragmites australis), goldenrod (Solidago sp.), Jesuit's bark (Iva frutescens),common goldstar (Hypoxis hirsuta), and black cherry (Prunus serotina).

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
1.B.2.Na.2.d. G495 North Atlantic Maritime & Coastal Plain Forest

A4209. *Quercus velutina - Quercus falcata - Pinus rigida* Coastal Plain Forest Alliance

Type Concept Sentence: This alliance includes coastal oak forests of the glaciated Northeast, as well as forests of the Coastal Plain characterized by *Quercus velutina* and / or *Quercus falcata*, and others.

OVERVIEW

Scientific Name: *Quercus velutina - Quercus falcata - Pinus rigida* Coastal Plain Forest Alliance
Common Name (Translated Scientific Name): Black Oak - Southern Red Oak - Pitch Pine Coastal Plain Forest Alliance
Colloquial Name: Coastal Plain Oak - Pitch Pine Forest

Type Concept: This alliance includes coastal forests of the glaciated Northeast, ranging south to the coastal plain of Virginia. It ranges from forest to woodland in physiognomy and is generally deciduous. *Quercus velutina* and *Quercus alba* dominate in the north, with *Quercus falcata* codominant in the south. A dwarf-shrub heath layer is characteristic, and includes *Gaylussacia baccata, Gaylussacia frondosa, Vaccinium pallidum*, and in the north, *Vaccinium angustifolium*. The herbaceous layer is sparsely to moderately developed and includes *Aralia nudicaulis, Carex pensylvanica, Maianthemum canadense, Maianthemum stellatum (= Smilacina stellata)*, and *Panicum virgatum*.

Classification Comments:

Similar NVC Types:
- A2054 *Fagus grandifolia - Quercus rubra / Cornus florida* Forest Alliance

Diagnostic Characteristics: Oak-dominated forests with a heath layer in the glaciated northeastern coastal zone, ranging to the coastal plain.

VEGETATION

Physiognomy and Structure: In general, these forests are dominated by broad-leaved deciduous trees forming a closed canopy. A tall-shrub layer may be dominated by *Kalmia latifolia*, or if deciduous, is poorly developed. A dwarf-shrub heath layer is characteristic. An herbaceous layer is generally lacking, with scattered herbs present in the dwarf-shrub layer.

Floristics: Oaks, especially *Quercus velutina* and *Quercus alba, Fagus grandifolia*, and the shrub *Morella pensylvanica* are characteristic. *Quercus stellata*, although infrequent, is diagnostic when occurring in the maritime zone. One association is dominated by *Ilex opaca*. Vines are particularly abundant and include *Toxicodendron radicans, Smilax rotundifolia, Parthenocissus quinquefolia*, and *Vitis* spp. Shrubs may include *Clethra alnifolia, Gaylussacia baccata, Gaylussacia frondosa, Ilex verticillata, Morella pensylvanica (= Myrica pensylvanica), Rhus copallinum*, and *Vaccinium corymbosum*. The herbaceous layer is sparsely to moderately developed and includes *Aralia nudicaulis, Carex pensylvanica, Maianthemum canadense, Maianthemum stellatum (= Smilacina stellata), Panicum virgatum*, and *Pteridium aquilinum*.

ENVIRONMENT & DYNAMICS

Environmental Description: This forest alliance occurs on nutrient-poor, well-drained acidic soils at low elevations. Topography may be undulating, and these forests may occur on steep bluffs. In maritime habitats, these forests occur on sand dunes or moraines.

Dynamics: This alliance forms in sheltered backdunes that are not fully exposed to maritime winds and salt spray, but the upper canopy may be wind-sheared where it rises above the level of the dune. Deer browsing affects the shrub and herb layers.

DISTRIBUTION

Geographic Range: This alliance occurs on the coast from southern New Hampshire to Maryland, and perhaps farther south to Virginia.

Spatial Scale & Pattern [optional]:

Nations: CA, US
States/Provinces: CT, DC, DE, MA, MD, NJ, NY, RI, VA?
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

- **<** Coastal Forest/Woodland (Swain and Kearsley 2001)
- **<** Coastal Oak-Beech Forest (NYNHP 2013p)
- **<** Maritime Oak - Holly Forest / Woodland (Swain and Kearsley 2001)
- **<** Maritime Post Oak Forest (NYNHP 2013q)
- **?** Oak - Pine Forest (undifferentiated) (OP) (Windisch 2014a)
- **<** Sunken Forest (Art 1976)

LOWER LEVEL UNITS

Associations:

- CEGL006374 *Quercus velutina - Quercus coccinea - Quercus prinus / Kalmia latifolia* Forest
- CEGL006382 *Pinus strobus - Quercus alba / Ilex glabra* Forest
- CEGL006290 *Pinus rigida - Quercus (velutina, prinus)* Forest
- CEGL006390 *Quercus falcata - Quercus michauxii / Ilex opaca* Forest
- CEGL006383 *Pinus rigida - (Pinus echinata) - Quercus stellata / Quercus (marilandica, ilicifolia)* Woodland
- CEGL006378 *Quercus velutina / Ilex opaca* Forest
- CEGL006375 *Quercus coccinea - Quercus velutina / Sassafras albidum / Vaccinium pallidum* Forest
- CEGL006269 *Quercus alba - Quercus falcata - (Carya pallida) / Gaylussacia frondosa* Forest
- CEGL006329 *Pinus rigida - Quercus coccinea - Quercus falcata / (Quercus marilandica) / Gaylussacia frondosa* Woodland

AUTHORSHIP

Primary Concept Source: L.A. Sneddon, in Faber-Langendoen et al. (2015)
Author of Description: L.A. Sneddon
Acknowledgments:
Version Date: 07/31/2015
Classif Resp Region: East

REFERENCES

References: Art 1976, Faber-Langendoen et al. 2016b, NYNHP 2013p, NYNHP 2013q, Swain and Kearsley 2001, Windisch 2014a

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A4209. *Quercus velutina - Quercus falcata - Pinus rigida* Coastal Plain Forest Alliance

CEGL006375. *Quercus coccinea - Quercus velutina / Sassafras albidum / Vaccinium pallidum* Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Quercus coccinea - Quercus velutina / Sassafras albidum / Vaccinium pallidum* Forest
Common Name (Translated Scientific Name): Scarlet Oak - Black Oak / Sassafras / Blue Ridge Blueberry Forest
Colloquial Name: Northeastern Coastal Oak / Heath Forest

Type Concept: This dry coastal and coastal plain oak-heath forest of New England and the northeastern Coastal Plain occurs on rapidly drained, nutrient-poor, sandy or gravelly soils. North of the glacial border, these soils are typically found on till or outwash. The canopy is dominated by *Quercus coccinea, Quercus velutina*, and *Quercus alba*, the latter species particularly characteristic of gravel substrates. Other less abundant canopy associates include *Quercus prinus, Betula lenta*, and *Ilex opaca* (usually less than 15% cover). *Pinus rigida* is a common associate but occurs at low cover. *Sassafras albidum* may occur in low cover and may indicate influence by coastal (but not maritime) climate where this type occurs. *Castanea dentata* saplings can be common. A 'lawn-like' dwarf-shrub heath layer dominated by *Vaccinium pallidum, Vaccinium angustifolium*, and *Gaylussacia baccata* is characteristic. *Gaylussacia frondosa* also occurs in some stands. The herbaceous layer is typically sparse, with *Carex pensylvanica, Pteridium aquilinum*, and *Gaultheria procumbens* being the most common. Herb diversity is greater in small canopy gaps, where *Helianthemum canadense, Tephrosia virginiana, Aureolaria* spp., *Lespedeza* spp., *Lechea* spp., and *Arctostaphylos uva-ursi* occur.

In New Jersey, this type ranges throughout the Coastal Plain and the central Pinelands. It includes oak-pine forests with a low heath stratum, found on sandy to loamy soils in the Pinelands. The forests often have a closed to partially-closed canopy characterized by dry-site oaks such as *Quercus coccinea, Quercus velutina, Quercus alba, Quercus prinus*, and *Quercus stellata*. Tree oak cover is typically 50-100%, and shrub oaks are rare or absent. Associate canopy species include *Pinus rigida* and/or *Pinus echinata*, with covers typically 5-10% (up to 25%). *Sassafras albidum* is often present in small amounts in the canopy and midstory. Fire-sensitive hardwoods and holly are absent. Low heath shrubs include *Gaylussacia baccata, Gaylussacia frondosa*, and *Vaccinium pallidum*, while some areas can have *Kalmia latifolia* joining the shrub layer. Herbs are sparse but often include *Pteridium aquilinum, Gaultheria procumbens* and *Melampyrum lineare*, with *Tephrosia virginiana* and *Carex pensylvanica* in openings.

Classification Comments:

Similar NVC Types:
- CEGL006336 *Quercus (alba, rubra, velutina) - Carya* spp. / *Viburnum acerifolium* Forest
- CEGL005030 *Quercus velutina - Quercus alba / Vaccinium (angustifolium, pallidum) / Carex pensylvanica* Forest

VEGETATION

Floristics: This dry coastal oak-heath forest is dominated by *Quercus coccinea, Quercus velutina*, and *Quercus alba*, the latter species particularly characteristic of gravel substrates. Other less abundant canopy associates include *Quercus prinus, Betula lenta*, and *Ilex opaca* (usually less than 15% cover). *Pinus rigida* is a common associate but occurs at low cover. *Sassafras albidum* may occur in low cover and may indicate influence by coastal (but not maritime) climate where this type occurs. *Castanea dentata* saplings can be common. A 'lawn-like' dwarf-shrub heath layer dominated by *Vaccinium pallidum, Vaccinium angustifolium*, and *Gaylussacia baccata* is characteristic. *Gaylussacia frondosa* also occurs in some stands. The herbaceous layer is typically sparse, with *Carex pensylvanica, Pteridium aquilinum*, and *Gaultheria procumbens* being the most common. Herb diversity is greater in small canopy gaps, where *Helianthemum canadense, Tephrosia virginiana, Aureolaria* spp., *Lespedeza* spp., *Lechea* spp., and *Arctostaphylos uva-ursi* occur.

ENVIRONMENT & DYNAMICS

Environmental Description: This association occurs on rapidly drained, nutrient-poor, sandy or gravelly soils. North of the glacial border, these soils are typically found on till or outwash.

Dynamics: This is a coastal forest that occurs beyond direct influence of maritime processes.

DISTRIBUTION

Geographic Range: This type occurs in coastal areas from New Hampshire to New Jersey.

Spatial Scale & Pattern [optional]: Matrix
Nations: US
States/Provinces: CT, MA, NH, NJ, NY, RI
TNC Ecoregions [optional]: 61:C, 62:C
USFS Ecoregions (1994/95): 221Ab:CCC, 221Ac:CCP, 221Ad:CCP, 221Ae:CCP, 221Af:CCC, 221Ag:CCC, 221Ai:CCP, 221Ak:CCC, 221Db:CPC, 221Dc:CPP, 232Aa:CCC, 232Ab:CCC, 232Ac:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Cape Cod, Fire Island); USFWS (Cape May, E.B. Forsythe, Massasoit?)

CONSERVATION STATUS

Grank (Review Date): GNR (1997/12/1)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low. Type has been regionally reviewed and used in NPS mapping. More plot data are needed.

SYNONYMY

Synonymy:
- **><** *Quercus velutina / Vaccinium pallidum* community (Metzler and Barrett 2001)
- **?** Black oak savanna (Rawinski 1984a)
- **?** CNE Mesic hardwood Forest on acidic bedrock / till (Rawinski 1984a)
- **>** Central Pinelands Oak - Pine Forest (OP1) (Windisch 2014a)

- **?** Dry oak-pine forest, scarlet oak-shortleaf pine forest subtype (Breden 1989)
- **?** Maritime Oak Forest Community (on Uplands) (Lundgren 2000)
- **?** Maritime forest (Rawinski 1984a)
- **<** Mixed Oak-Pine Forest (Enser 1999)
- **>** Oak - Heath Forest (OE1) (Windisch 2014a)
- **>** Oak - Heath Successional Woodland (SOE) (Windisch 2014a)
- **>** Oak - Pine Successional Woodland (SOP) (Windisch 2014a)
- **?** Oak-Mixed Heath Forest (Greller 1977)
- **?** Southern New England oak / pine forest on sandy / gravelly soils (Rawinski 1984a)

AUTHORSHIP

Primary Concept Source: D. Hunt (NYNHP)
Author of Description: S.L. Neid and L.A. Sneddon
Acknowledgments:
Version Date: 2015/07/31

REFERENCES

References: Breden 1989, Breden et al. 2001, Clark 1986a, Edinger et al. 2002, Enser 1999, Greller 1977, Klopfer et al. 2002, Lundgren 2000, Metzler and Barrett 2001, Metzler and Barrett 2006, Motzkin and Foster 2002, NatureServe 2009, Rawinski 1984a, Reschke 1990, Sneddon et al. 2010, Sperduto 1996, Sperduto and Nichols 2004, Swain and Kearsley 2001, Windisch 2014a.

NYC NAC Association Description based on 16 plots (CEGL006375):

Overstory trees include northern red oak (Quercus rubra), white oak (Quercus alba), red maple (Acer rubrum), sweetgum (Liquidambar styraciflua), pin oak (Quercus palustris), blackgum (Nyssa sylvatica), sassafras (Sassafras albidum), sweet birch (Betula lenta), black oak (Quercus velutina), and scarlet oak (Quercus coccinea).

Midstory plants include sassafras (Sassafras albidum), red maple (Acer rubrum), sweetgum (Liquidambar styraciflua), blackgum (Nyssa sylvatica), black cherry (Prunus serotina), highbush blueberry (Vaccinium corymbosum), northern red oak (Quercus rubra), white oak (Quercus alba), gray birch (Betula populifolia), sweet birch (Betula lenta), southern arrowwood (Viburnum dentatum), pin oak (Quercus palustris), blueberry (Vaccinium sp.), swamp white oak (Quercus bicolor), rhododendron (Rhododendron sp.), and serviceberry (Amelanchier sp.).

Vines include eastern poison ivy (Toxicodendron radicans), roundleaf greenbrier (Smilax rotundifolia), cat greenbrier (Smilax glauca), Virginia creeper (Parthenocissus quinquefolia), Oriental bittersweet (Celastrus orbiculatus), fox grape (Vitis labrusca), Amur peppervine (Ampelopsis brevipedunculata), Japanese honeysuckle (Lonicera japonica), and Amur peppervine (Ampelopsis brevipedunculata).

The understory is dominated by heaths, such as lowbush blueberry (Vaccinium angustifolium), highbush blueberry (Vaccinium corymbosum), Blue Ridge blueberry (Vaccinium pallidum), deerberry (Vaccinium stamineum), and huckleberry (Gaylussacia baccatta). Other understory plants include sassafras (Sassafras albidum), black cherry (Prunus serotina), red maple (Acer rubrum), white wood aster (Eurybia divaricata), blackgum (Nyssa sylvatica), mapleleaf viburnum (Viburnum acerifolium), coastal sweetpepperbush (Clethra alnifolia), blackberry (Rubus sp.), northern red oak (Quercus rubra), smooth Solomon's seal (Polygonatum biflorum), goldenrod (Solidago sp.), wild sarsaparilla (Aralia nudicaulis), multiflora rose (Rosa multiflora), eastern hayscented fern (Dennstaedtia punctilobula), Asiatic dayflower (Commelina communis), southern arrowwood (Viburnum dentatum), jumpseed (Polygonum virginianum), whorled yellow loosestrife (Lysimachia quadrifolia), white oak (Quercus alba), Canada mayflower (Maianthemum canadense), chestnut oak (Quercus montana), thoroughwort (Eupatorium), American wintergreen (Pyrola americana), jewelweed (Impatiens capensis), wine raspberry (Rubus phoenicolasius), American hogpeanut (Amphicarpaea bracteata), western brackenfern (Pteridium aquilinum), broadleaf enchanter's nightshade (Circaea lutetiana), white snakeroot (Ageratina altissima), feathery false lily of the valley (Maianthemum racemosum), thymeleaf speedwell (Veronica serpyllifolia), Allegheny hawkweed (Hieracium paniculatum), widowsfrill (Silene stellata), clubmoss (Lycopodium sp.), black oak (Quercus velutina), garlic mustard (Alliaria petiolata), striped prince's pine (Chimaphila maculata), Christmas fern (Polystichum acrostichoides), wreath goldenrod (Solidago caesia), large whorled pogonia (Isotria verticillata), and sessileleaf bellwort (Uvularia sessilifolia).

M883. Appalachian-Interior-Northeastern Mesic Forest

G742. Appalachian-Allegheny Northern Hardwood - Conifer Forest

This northern hardwood-conifer forest group occurs in the central and northeastern U.S., ranging from north-central New York and lower New England west to Lake Erie and south through the Central Appalachian region to the higher elevations of the Carolinas, on relatively cool, mesic sites.

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
1.B.2.Na.3.b. G742 Appalachian-Allegheny Northern Hardwood - Conifer Forest

A3301. *Acer saccharum - Fagus grandifolia - Tilia americana* Forest Alliance

Type Concept Sentence: This forested alliance is dominated by a variety of mesic - transitional northern hardwoods, including *Acer rubrum, Acer saccharum, Betula alleghaniensis, Betula lenta, Fagus grandifolia, Fraxinus americana, Liriodendron tulipifera, Prunus serotina, Quercus rubra*, and *Tilia americana*. It occurs in the northeastern U.S., ranging from central New England west to the Lake Erie-Lake Ontario ecoregion in southern Ontario and south to the higher elevations of Virginia and West Virginia.

OVERVIEW

Scientific Name: *Acer saccharum - Fagus grandifolia - Tilia americana* Forest Alliance
Common Name (Translated Scientific Name): Sugar Maple - American Beech - American Basswood Forest Alliance
Colloquial Name: Central & Southern Appalachian Rich Northern Hardwood Forest

Type Concept: This forested alliance is dominated by hardwoods, such as *Acer saccharum, Acer rubrum, Fagus grandifolia, Fraxinus americana*, and *Tilia americana*, with common associates of *Betula alleghaniensis, Betula lenta, Liriodendron tulipifera, Prunus serotina*, and *Quercus* spp. (most commonly *Quercus rubra*). The shrub layer is characterized by *Acer pensylvanicum, Amelanchier* spp., *Cornus florida* (most common in the southern part of range), *Hamamelis virginiana, Lindera benzoin, Sambucus racemosa (= Sambucus pubens), Staphylea trifolia*, and *Viburnum* spp. This community is characterized by a fairly diverse herbaceous flora. Typical herbs include *Allium tricoccum, Anemone quinquefolia, Asarum canadense, Caulophyllum thalictroides, Cystopteris bulbifera, Dicentra cucullaria, Sanguinaria canadensis*, among others. Characteristic graminoids include *Brachyelytrum erectum, Carex platyphylla, Carex sprengelii, Elymus hystrix (= Hystrix patula)*, and *Piptatherum racemosum (= Oryzopsis racemosa)*. This alliance occurs in the northeastern U.S., ranging from central New England west to the Lake Erie-Lake Ontario ecoregion in southern Ontario and south to the higher elevations of Virginia and West Virginia. It Stands occur on both glaciated and unglaciated till, on deep, typically circumneutral to somewhat alkaline, mesic soils. This type is one of the matrix forest types in the region.

Classification Comments: Northward, this alliance is replaced by alliances in Laurentian-Acadian Hardwood Forest Group (G743), such as *Acer saccharum - Fagus grandifolia - Betula alleghaniensis* Forest Alliance (A3224) and *Acer saccharum - Tilia americana - Fraxinus americana* Forest Alliance (A3240). Stands on colder conditions of the Allegheny Plateau and in central New England may more strongly resemble the alliances in G743. The USFS ecological province lines provide a general delimiter, with areas in Provinces 211 and M211 (but excluding 211F and 211G (Allegheny Plateau)) mostly belonging to G743, and areas in Provinces 221 and M221, M211F and M211G belonging to alliances in this group (G742). In Ontario, this type is restricted to the Lake Erie-Lake Ontario ecoregion (Crins et al. 2009). The range of *Betula lenta, Carya cordiformis, Carya ovata, Liriodendron tulipifera*, and *Quercus prinus (= Quercus montana)* provide a suite of diagnostics for the northern limit of this range, but they can be relatively uncommon. See also Appalachian (Hemlock)-Northern Hardwood Forest (CES202.593).

Similar NVC Types:
- A3303 *Quercus rubra - Acer saccharum - Betula lenta* Forest Alliance
- A3224 *Acer saccharum - Fagus grandifolia - Betula alleghaniensis* Forest Alliance: is typical northern hardwood.
- A3302 *Tsuga canadensis - Betula lenta - Betula alleghaniensis* Forest Alliance
- A4126 *Acer saccharum - Tilia americana - Quercus rubra* Rocky Forest Alliance: is a rocky forest/woodland alliance that may be a subtype of A3301.
- A3240 *Acer saccharum - Tilia americana - Fraxinus americana* Forest Alliance: is rich northern hardwood.

Diagnostic Characteristics: Northern hardwoods such as *Acer saccharum, Betula alleghaniensis*, and *Fagus grandifolia* are characteristic, with *Betula lenta, Carya cordiformis, Carya ovata, Liriodendron tulipifera*, and *Quercus prinus* among the key diagnostics that separate this type from similar northern hardwood alliances in Laurentian & Acadian Hardwood Forest Group (G743).

VEGETATION

Physiognomy and Structure: Closed-canopy forests dominated by broad-leaved deciduous hardwoods.

Floristics: Stands are dominated by hardwoods, such as *Acer saccharum, Acer rubrum, Fagus grandifolia, Fraxinus americana*, and *Tilia americana*, and common associates of *Betula alleghaniensis, Betula lenta, Liriodendron tulipifera, Prunus serotina*, and *Quercus* spp. (most commonly *Quercus rubra*). On logged sites, *Populus tremuloides* may be common. The shrub layer is characterized by *Acer pensylvanicum, Amelanchier* spp. *Hamamelis virginiana, Lindera benzoin, Sambucus racemosa (= Sambucus pubens), Staphylea trifolia*, and *Viburnum* spp. This community is characterized by a fairly diverse herbaceous flora. Typical herbs include *Allium tricoccum, Anemone quinquefolia, Asarum canadense, Caulophyllum thalictroides, Cystopteris bulbifera, Dicentra cucullaria, Sanguinaria canadensis*, among others. Characteristic graminoids include *Brachyelytrum erectum, Carex platyphylla, Carex sprengelii, Elymus hystrix (= Hystrix patula)*, and *Piptatherum racemosum (= Oryzopsis racemosa)*.

ENVIRONMENT & DYNAMICS

Environmental Description: Stands occur on both glaciated and unglaciated till, on deep, typically circumneutral to somewhat alkaline, mesic soils.

Dynamics: Disturbances include windthrow, ice-storm damage, and insects. Fires are very rare.

DISTRIBUTION

Geographic Range: This is found in the southern Lake Erie-Lake Ontario ecoregion, Allegheny Plateau, and Lower New England south to the Central Appalachians. It is of more limited extent and more ecologically constrained in the southern part of its range, in northern parts of Virginia and West Virginia.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: CT, MA, MD, NC, NH, NJ, NY, OH, ON, PA, QC?, TN, VA, VT, WV
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

LOWER LEVEL UNITS

Associations:

- CEGL006045 *Acer saccharum - Betula alleghaniensis - Prunus serotina* Forest
- CEGL006473 *Acer saccharum - Liriodendron tulipifera / Galium concinnum - Carex laxiculmis* Forest
- CEGL006459 *Acer saccharum - Fraxinus americana / Carpinus caroliniana / Podophyllum peltatum* Forest
- CEGL006632 *Acer saccharum - Fagus grandifolia - Fraxinus americana / Arisaema triphyllum* Forest
- CEGL006637 *Acer saccharum - Tilia americana / Acer pensylvanicum / Caulophyllum thalictroides* Forest
- CEGL006956 *Acer saccharum - Betula alleghaniensis - Fraxinus pennsylvanica / Lindera benzoin* Forest

AUTHORSHIP

Primary Concept Source: D. Faber-Langendoen
Author of Description: D. Faber-Langendoen
Acknowledgments:
Version Date: 12/18/2014
Classif Resp Region: East

REFERENCES

References: Crins et al. 2009, Faber-Langendoen et al. 2016b, Golden 1974, Weakley 2010

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A3301. *Acer saccharum - Fagus grandifolia - Tilia americana* Forest Alliance

CEGL006459. *Acer saccharum - Fraxinus americana / Carpinus caroliniana / Podophyllum peltatum* Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Acer saccharum - Fraxinus americana / Carpinus caroliniana / Podophyllum peltatum* Forest
Common Name (Translated Scientific Name): Sugar Maple - White Ash / American Hornbeam / Mayapple Forest
Colloquial Name: Mid-Atlantic High Terrace Hardwood Floodplain Forest

Type Concept: These rich floodplain forests are found on slightly elevated alluvial terraces and active floodplains of larger rivers in the mid-Atlantic states, interior to the Coastal Plain. The setting is a raised river terrace; however, this forest may occur very close to the riverbank if the water channel is well-entrenched. The alluvial soils are slightly acidic to alkaline and less regularly inundated than the soils supporting floodplain forests dominated by silver maple or sycamore. Stands on lower terraces may flood occasionally, but the period of inundation is short. The canopy is closed to somewhat open, and a subcanopy is often present. Shrubs are typically sparse but may range up to about 30% cover. The herb layer is well-developed, fairly diverse, and seasonally variable, with spring ephemerals giving way to taller ferns, graminoids and forbs. Bryoids are very minor. The canopy dominants are usually some combination of *Acer saccharum, Fraxinus americana*, and sometimes *Carya cordiformis*. Canopy associates include *Quercus rubra, Juglans nigra, Prunus serotina, Fraxinus nigra, Liriodendron tulipifera, Ulmus americana, Tilia americana*, and *Fagus grandifolia*. *Carpinus caroliniana* is often present as a small tree, along with *Acer saccharum*. *Lindera benzoin* is the most common shrub; *Asimina triloba* is characteristic in the southern portion of this type's range. Vines such as *Toxicodendron radicans* and *Parthenocissus quinquefolia* are frequent but usually at low cover. The herb layer usually features spring ephemerals, including *Claytonia virginica, Dicentra canadensis*, and *Erythronium americanum*, followed by a mixture of ferns, forbs and graminoids. Characteristic species include *Arisaema triphyllum, Caulophyllum thalictroides, Carex laxiculmis, Deparia acrostichoides, Elymus virginicus, Elymus riparius, Onoclea sensibilis*, and *Podophyllum peltatum*. Exotic species, such as *Microstegium vimineum, Glechoma hederacea*, and *Alliaria petiolata*, may be abundant, especially in disturbed areas. These terrace forests are related to lower floodplain forests, e.g. *Platanus occidentalis - Acer negundo - Juglans nigra / Asimina triloba / Mertensia virginica* Floodplain Forest (CEGL004073), but distinguished by the reduced importance of *Acer saccharinum* and *Platanus occidentalis*; they differ from enriched upland hardwood forests, e.g., *Acer saccharum - Tilia americana / Asimina triloba / Jeffersonia diphylla - Caulophyllum thalictroides* Forest (CEGL008412), in their alluvial soils and flooding regime.

Classification Comments: This community has been drastically reduced from its original extent, as it makes excellent fertile farmland. Originally it was probably a large-patch type.

Similar NVC Types:
- CEGL006114 *Acer saccharum - Fraxinus* spp. - *Tilia americana / Matteuccia struthiopteris - Ageratina altissima* Floodplain Forest
- CEGL006314 *Liriodendron tulipifera - Fraxinus* spp. / *Lindera benzoin - Viburnum prunifolium / Podophyllum peltatum* Floodplain Forest
- CEGL006405 *Tilia americana - Acer saccharum - Acer nigrum / Laportea canadensis* Floodplain Forest
- CEGL006430 *Acer saccharum - Juglans cinerea / Carpinus caroliniana / Matteuccia struthiopteris* Forest

VEGETATION

Floristics: The canopy is closed to somewhat open, and a subcanopy is often present. Shrubs are typically sparse but may range up to about 30% cover. The herb layer is well-developed, fairly diverse, and seasonally variable, with spring ephemerals giving way to taller ferns, graminoids and forbs. Bryoids are very minor. The canopy dominants are usually some combination of *Acer saccharum, Fraxinus americana*, and sometimes *Carya cordiformis*. Canopy associates include *Quercus rubra, Juglans nigra, Prunus serotina, Fraxinus nigra, Liriodendron tulipifera, Ulmus americana, Tilia americana, Celtis occidentalis*, and *Fagus grandifolia*. *Carpinus caroliniana* is often present as a small tree, along with *Acer saccharum* and *Acer negundo*. *Lindera benzoin* is the most common shrub; *Asimina triloba* is characteristic in the southern portion of this type's range. Vines such as *Toxicodendron radicans* and *Parthenocissus quinquefolia* are frequent but usually at low cover. The herb layer usually features spring ephemerals, including *Claytonia virginica, Dicentra canadensis*, and *Erythronium americanum*, followed by a mixture of ferns, forbs and graminoids. Characteristic species include *Arisaema triphyllum, Caulophyllum thalictroides, Carex laxiculmis, Deparia acrostichoides, Elymus virginicus, Elymus riparius, Onoclea sensibilis*, and *Podophyllum peltatum*. *Matteuccia struthiopteris* may form local dominance patches in this type along the Potomac River in Maryland and Virginia. Exotic species, such as *Microstegium vimineum, Glechoma hederacea*, and *Alliaria petiolata*, may be abundant, especially in disturbed areas.

ENVIRONMENT & DYNAMICS

Environmental Description: These rich floodplain forests are found on slightly elevated alluvial terraces of mid-sized to larger rivers. The setting is a raised river terrace; however, this forest may occur very close to the riverbank if the water channel is well-entrenched. The alluvial soils are slightly acidic to alkaline. Stands on lower terraces may flood occasionally, but the period of inundation is short. Along the Potomac River west of Washington, DC, this community occupies alluvial fill overlying terraces interpreted as the Penholoway and Wicomico. It is often the higher of paired alluvial benches downstream of defending bedrock outcrops on major islands, with *Platanus occidentalis - Acer negundo - Juglans nigra / Asimina triloba / Mertensia virginica*

Floodplain Forest (CEGL004073) occupying the lower bench. Soils are generally deep sandy loams, loamy sands or sands and are likely Inceptisols. The mean flooding recurrence interval along the Potomac is 15 to 30 years.

Dynamics:

DISTRIBUTION

Geographic Range: This association is known from the mid-Atlantic states from New York south to the James River in Virginia.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: MD, NJ, NY, PA, VA
TNC Ecoregions [optional]: 59:C, 60:C, 61:C
USFS Ecoregions (1994/95): 212Fc:CCC, 221Bd:CCC, 221Da:CCP, 221Db:CCP
Omernik Ecoregions:
Federal Lands [optional]: NPS (Appalachian Trail [Lower New England], C&O Canal, Delaware Water Gap, George Washington Parkway, Monocacy, Upper Delaware); USFS (Jefferson)

CONSERVATION STATUS

Grank (Review Date): G3? (2006/10/5)
Greasons: This type is fairly widely distributed in the mid-Atlantic states, but it occurs in small patches in restricted environmental settings that are typically cleared for agriculture, and intact examples are not well-documented.
Ranking Author (Version): G.P. Fleming (2006/10/5)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate. Plot data were used to define type, but they are limited.

SYNONYMY

Synonymy:

- **=** *Acer saccharum - Fraxinus americana - Carya cordiformis / Erythronium americanum* Forest (Fleming et al. 2006)
- **=** *Acer saccharum / Ptelea trifoliata / Uniola latifolia* Association (Rawinski et al. 1996)
- **<** Montane - Piedmont Bottomland Forest (Harrison 2004)
- **?** Palustrine Broad-leaved Deciduous Forested Wetland, Seasonally Flooded (PFO1C) (Cowardin et al. 1979)
- **<** Piedmont / Mountain Floodplain Forest (Fleming et al. 2001)
- **<** Sugar Maple - Basswood: 26 (Eyre 1980)

AUTHORSHIP

Primary Concept Source: S.C. Gawler
Author of Description: S.C. Gawler; mod. G.P. Fleming
Acknowledgments:
Version Date: 2006/10/05

REFERENCES

References: Cowardin et al. 1979, Edinger et al. 2002, Eyre 1980, Fleming 2007, Fleming and Coulling 2001, Fleming and Patterson 2009b, Fleming and Patterson 2011a, Fleming and Taverna 2006, Fleming et al. 2001, Fleming et al. 2006, Harrison 2004, Harrison and Stango 2003, Lea 2000, Perles et al. 2007, Perles et al. 2008, Rawinski et al. 1996, Thomson et al. 1999.

NYC NAC Association Description (CEGL006459):

This association was not selected as a first choice for any NYC NAC plots.

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
1.B.2.Na.3.b. G742 Appalachian-Allegheny Northern Hardwood - Conifer Forest

A3303. *Quercus rubra - Acer saccharum - Betula lenta* Forest Alliance

Type Concept Sentence: This alliance, found in the Allegheny, Lake Erie-Lake Ontario, and Lower New England regions south to the Central Appalachians, contains mesic forests dominated by *Quercus rubra* with a variety of mesic hardwoods, on shallow to deep, moist to well-drained loams and silt loams on north and east midslopes and coves.

OVERVIEW

Scientific Name: *Quercus rubra - Acer saccharum - Betula lenta* Forest Alliance
Common Name (Translated Scientific Name): Northern Red Oak - Sugar Maple - Sweet Birch Forest Alliance

Colloquial Name: Northern Red Oak - Sugar Maple - Sweet Birch Forest

Type Concept: This alliance, found in the Allegheny, Lake Erie-Lake Ontario, and Lower New England regions south to the Central Appalachians, contains mesic forests dominated by *Quercus rubra* with a variety of mesic hardwoods, including *Acer rubrum, Acer saccharum, Betula lenta, Fagus grandifolia, Fraxinus americana, Quercus alba*, and *Tilia americana*. Typical shrubs include *Amelanchier* spp., *Hamamelis virginiana, Lindera benzoin*, and *Viburnum acerifolium*. Herbs include *Polystichum acrostichoides, Medeola virginiana*, and *Geranium maculatum*. These forests typically occur on deep, moist to well-drained loams and silt loams on north and east midslopes and coves.

Classification Comments: This alliance may show some overlap with alliances and associations in Appalachian-Central Interior Mesic Forest Group (G020). In that group, *Fagus grandifolia - Betula lenta - Liriodendron tulipifera - Acer saccharum* Forest (CEGL006296) should be compared with members of this alliance, especially *Quercus rubra - Acer saccharum - Liriodendron tulipifera* Forest (CEGL006125). This alliance may also be a suballiance within *Acer saccharum - Fagus grandifolia - Tilia americana* Forest Alliance (A3301). In Ontario, this type is restricted to the Lake Erie-Lake Ontario ecoregion (Crins et al. 2009).

Similar NVC Types:
- A3301 *Acer saccharum - Fagus grandifolia - Tilia americana* Forest Alliance: is a more diverse set of mesic northern hardwoods.
- A3241 *Quercus rubra - Acer saccharum* Forest Alliance

Diagnostic Characteristics: Strong dominance by *Quercus rubra* (>25%), in association with other mesic hardwoods in the Central Appalachian - Allegheny - Lake Plain and Lower New England regions.

VEGETATION

Physiognomy and Structure: The canopy is typically closed (60-100%) and dominated by broad-leaved deciduous trees.

Floristics: This alliance is dominated by *Quercus rubra* with a variety of mesic hardwoods, including *Acer rubrum, Acer saccharum, Betula lenta, Fagus grandifolia, Fraxinus americana, Quercus alba*, and *Tilia americana*. On logged sites, *Populus tremuloides* may be common. Typical shrubs include *Amelanchier* spp., *Cornus florida* (southern part of range), *Hamamelis virginiana, Lindera benzoin*, and *Viburnum acerifolium*. Herbs include *Polystichum acrostichoides, Medeola virginiana*, and *Geranium maculatum*, among others.

ENVIRONMENT & DYNAMICS

Environmental Description: These forests typically occur on deep, moist to well-drained loams and silt loams on north and east midslopes and coves. The role of fire in these mesic red oak stands is not clear.

Dynamics: Current *Quercus rubra*-dominated stands in parts of this alliance's range may result from a combination of natural and human-caused disturbances (Nowacki et al. 1990).

DISTRIBUTION

Geographic Range: This alliance is found in high-elevation areas of the Central Appalachians in Virginia, West Virginia, Maryland, and Pennsylvania. Northward, it occurs in lower elevations across southern Ontario, much of New York (excluding much of the Adirondacks, Catskills and St. Lawrence River valley) and across Lower New England. In Virginia, this vegetation type is widely but locally distributed at higher elevations of the Northern Blue Ridge, Ridge and Valley, and Allegheny Mountains. It is rare and local on the Blue Ridge south of Roanoke Gap, and in the Cumberland Mountains of southwestern Virginia.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: CT, MA, MD, NJ, NY, OH, ON, PA, QC?, RI?, VA, WV
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

- **?** Northern Red Oak: 55 (Eyre 1980)
- **?** Red Oak - Sugar Maple Transition Forest (Swain and Kearsley 2001)
- **?** Red oak - mixed hardwood forest (Fike 1999)

LOWER LEVEL UNITS

Associations:

- CEGL008517 *Quercus rubra - Acer saccharum / Ostrya virginiana / Cardamine concatenata* Forest
- CEGL006125 *Quercus rubra - Acer saccharum - Liriodendron tulipifera* Forest
- CEGL006566 *Quercus rubra - Tsuga canadensis - Liriodendron tulipifera / Hamamelis virginiana* Forest
- CEGL006635 *Quercus rubra - Acer saccharum / Viburnum acerifolium - Lindera benzoin* Forest
- CEGL006046 *Acer saccharum - Quercus rubra / Hepatica nobilis var. obtusa* Forest
- CEGL006000 *Quercus rubra - Betula alleghaniensis / Osmunda cinnamomea* Forest
- CEGL006943 *Acer saccharum - Betula alleghaniensis - Quercus rubra / Viburnum acerifolium* Forest

AUTHORSHIP

Primary Concept Source: D. Faber-Langendoen
Author of Description: D. Faber-Langendoen
Acknowledgments:
Version Date: 12/18/2014
Classif Resp Region: East

REFERENCES

References: Crins et al. 2009, Crow 1988, Eyre 1980, Faber-Langendoen et al. 2016b, Fike 1999, Nowacki et al. 1990, Swain and Kearsley 2001

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A3303. *Quercus rubra - Acer saccharum - Betula lenta* Forest Alliance

CEGL006125. *Quercus rubra - Acer saccharum - Liriodendron tulipifera* Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Quercus rubra - Acer saccharum - Liriodendron tulipifera* Forest
Common Name (Translated Scientific Name): Northern Red Oak - Sugar Maple - Tuliptree Forest
Colloquial Name: High Allegheny Rich Red Oak - Sugar Maple Forest

Type Concept: This red oak - sugar maple community is found primarily in the Allegheny Plateau and Appalachian Mountains of the United States, as well as on the northern Piedmont north to the Hudson Valley, with possible extensions east and west of those areas. It is typically found in coves, on moist north- and east-facing slopes and on well-drained flats. Soils are slightly acidic and of intermediate fertility. The closed-canopy tree layer is dominated by a mixture of oaks, primarily *Quercus alba* and *Quercus rubra*, with other hardwoods including *Acer saccharum, Acer rubrum*, and *Liriodendron tulipifera*. *Carya ovata, Carya alba (= Carya tomentosa), Nyssa sylvatica*, and *Quercus velutina* are possible associates. *Carya* spp. may share dominance in some stands. Dominance by *Acer rubrum* or *Liriodendron* may indicate a past disturbance history. A wide variety of more mesic associates, such as *Betula alleghaniensis, Betula lenta, Fagus grandifolia, Fraxinus americana*, and *Tilia americana* could occur but are negligible in dominance. In addition to *Acer saccharum* reproduction, some understory species may include *Carpinus caroliniana, Cercis canadensis, Cornus florida*, and *Ostrya virginiana*. Shrub and vine species include *Amelanchier laevis, Amelanchier arborea, Cornus* spp., *Hamamelis virginiana, Lindera benzoin, Viburnum acerifolium, Viburnum recognitum*, and *Vitis riparia*. Ericaceous shrubs, such as *Kalmia latifolia, Vaccinium angustifolium* and *Vaccinium pallidum*, may also be present but are not abundant. The ground layer species are highly variable but include *Caulophyllum thalictroides, Ageratina altissima, Dennstaedtia punctilobula, Podophyllum peltatum, Maianthemum racemosum (= Smilacina racemosa), Medeola virginiana, Thelypteris noveboracensis, Dryopteris marginalis, Dryopteris intermedia, Actaea* spp., and *Uvularia sessilifolia*. Exotic species, including *Rosa multiflora* and *Alliaria petiolata*, may be present in the shrub and herb layers of disturbed stands.

Classification Comments: According to Anderson (1982) in Ohio, where this community is found in the southeastern unglaciated plateau region, it is differentiated from the oak-maple type, *Quercus alba - Quercus rubra - Quercus prinus - Acer saccharum / Lindera benzoin* Forest (CEGL002059), and the Appalachian oak forest type, *Quercus prinus - Quercus (alba, coccinea) / Viburnum acerifolium - (Kalmia latifolia)* Forest (CEGL005023), by the substantial presence (over 20% canopy or basal area) of *Liriodendron tulipifera* and insignificant amounts of *Fagus grandifolia* or other mesic tree species. This type concept may overlap considerably with that of the oak-maple type, *Quercus alba - Quercus rubra - Quercus prinus - Acer saccharum / Lindera benzoin* Forest (CEGL002059). Braun (1950, e.g., p. 140) reports stands similar to this type in the Shawnee Hills and Mammoth Cave area of Kentucky, as well as other Interior Low Plateau sites. In New York, this type is reported primarily from the southeastern part of the State (Reschke 1990). In the mid-Atlantic states, this type is differentiated from *Quercus (alba, rubra, velutina) - Carya* spp. /

Viburnum acerifolium Forest (CEGL006336) by somewhat more mesic conditions, a higher non-oak canopy component, and the absence of *Quercus prinus*.

Similar NVC Types:
- CEGL002059 *Quercus alba - Quercus rubra - Quercus prinus - Acer saccharum / Lindera benzoin* Forest
- CEGL005023 *Quercus prinus - Quercus (alba, coccinea) / Viburnum acerifolium - (Kalmia latifolia)* Forest
- CEGL007233 *Quercus alba - Quercus rubra - Carya ovalis / Acer saccharum / Polystichum acrostichoides* Forest: is a related type to the south and west.
- CEGL006377 *Fagus grandifolia - Quercus alba - Quercus rubra* Forest
- CEGL006566 *Quercus rubra - Tsuga canadensis - Liriodendron tulipifera / Hamamelis virginiana* Forest
- CEGL007698 *Quercus rubra - Acer saccharum - Tilia americana var. heterophylla - Aesculus flava - (Cladrastis kentukea)* Forest
- CEGL008517 *Quercus rubra - Acer saccharum / Ostrya virginiana / Cardamine concatenata* Forest: related vegetation occurring on calcareous substrates at low elevations in the Ridge and Valley province of Virginia and Maryland.

VEGETATION

Floristics: Stands of this red oak - sugar maple forest contain a closed-canopy tree layer. *Acer saccharum, Liriodendron tulipifera, Quercus alba*, and *Quercus rubra* are the leading dominants. *Acer rubrum, Carya ovata, Carya alba (= Carya tomentosa), Nyssa sylvatica*, and *Quercus velutina* are associates on various sites. *Liriodendron tulipifera* dominance may indicate a past disturbance history, and *Carya* spp. may share dominance in some stands. A wide variety of more mesic associates, such as *Betula alleghaniensis, Betula lenta, Fagus grandifolia*, and *Fraxinus americana*, may occur but are negligible in dominance. In addition to *Acer saccharum* reproduction, understory species may include *Carpinus caroliniana, Cercis canadensis*, and *Ostrya virginiana*. Shrub and vine species include *Amelanchier laevis, Amelanchier arborea, Cornus* spp., *Hamamelis virginiana, Lindera benzoin, Viburnum acerifolium, Viburnum recognitum*, and *Vitis riparia*. Ericaceous shrubs such as *Kalmia latifolia, Vaccinium angustifolium* and *Vaccinium pallidum* may also be present. The ground layer species are highly variable but include *Caulophyllum thalictroides, Dennstaedtia punctilobula, Podophyllum peltatum, Maianthemum racemosum (= Smilacina racemosa), Medeola virginiana, Thelypteris noveboracensis*, and *Uvularia sessilifolia*. At the southern end of the type's range in the Catoctin Mountains of Maryland, *Liriodendron tulipifera* and *Quercus rubra* are the leading overstory dominants, with *Acer saccharum* common in both the overstory and understory. Minor tree associates include *Fraxinus americana, Tilia americana, Quercus alba, Betula lenta, Fagus grandifolia*, and *Acer rubrum*. *Lindera benzoin* and *Hamamelis virginiana* are the most constant and abundant species in a rather open shrub layer. The most constant herbs in eight plot samples are *Arisaema triphyllum, Brachyelytrum erectum, Carex digitalis, Erythronium americanum, Eurybia divaricata (= Aster divaricatus), Galium triflorum, Pilea pumila, Polystichum acrostichoides, Thalictrum thalictroides, Uvularia sessilifolia, Viola pubescens*, and *Viola sororia*. Many other species occur at lower constancies.

ENVIRONMENT & DYNAMICS

Environmental Description: Throughout the range, stands are typically found in coves, on moist north- and east-facing slopes, and on well-drained flats. Soils are slightly acidic and of intermediate fertility (Anderson 1982, Reschke 1990, Fike 1999). In the Catoctin Mountains of Maryland, sites occupied by this community are often covered by bouldery colluvium weathered from metabasalt bedrock. Soils collected from these sites are strongly acidic (mean pH = 4.8) but have moderately high calcium and magnesium levels, typical of soils weathered from iron- and aluminum-rich mafic bedrock.

Dynamics: Catoctin Mountain, Maryland, stands have been degraded by past clearing, cutting and more recent invasion by introduced species, including *Microstegium vimineum* and *Alliaria petiolata*.

DISTRIBUTION

Geographic Range: This red oak - sugar maple community is found primarily in the Allegheny Plateau and Appalachian Mountain regions of the United States, with possible extensions east and west of those areas, ranging from Massachusetts and New Jersey west to southeastern Ohio.

Spatial Scale & Pattern [optional]: Matrix
Nations: US
States/Provinces: CT, MA, MD, NJ, NY, OH, PA, WV
TNC Ecoregions [optional]: 48:C, 49:C, 50:C, 59:C, 60:C, 61:C
USFS Ecoregions (1994/95): 212Fa:CCC, 212Fc:CCC, 212Fd:CCC, 212Ga:CCC, 212Gb:CCP, 221Ae:CCC, 221Am:CCC, 221Ba:CCC, 221Bb:CCP, 221Bd:CCC, 221Da:CCC, 221Db:CCP, 221Dc:CCC, 221Ea:CCC, 221Ec:CCC, 221Ed:CCC, 221Ee:CCC, 221Ef:CCC, 221Eg:CCC, 221Fa:CCC, 221Fb:CCC, 221He:CCC, M212Ea:CPP, M212Eb:CPP, M221Aa:CCC, M221Ac:CCC, M221Ad:CCC, M221Ba:CCC, M221Bb:CCC, M221Bc:CCC, M221Bd:CC?, M221Be:CC?, M221Bf:CCC, M221C:C?
Omernik Ecoregions:
Federal Lands [optional]: NPS (Allegheny Portage Railroad, Appalachian Trail [Central Appalachians], Appalachian Trail [Lower New England], Catoctin Mountain, Delaware Water Gap, Fort Necessity, Friendship Hill, Upper Delaware); USFS (Wayne); USFWS (Erie)

CONSERVATION STATUS

Grank (Review Date): G4? (2006/10/2)
Greasons: This community is reported as a matrix or large-patch type in every ecoregion where it occurs. Despite covering large areas, high-quality stands are probably rare because of widespread historical impacts and ongoing susceptibility to exotics weeds.
Ranking Author (Version): G.P. Fleming (2006/10/2)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:

- **=** *Fagus grandifolia - Quercus alba - Quercus rubra - Liriodendron tulipifera* forests (Metzler and Barrett 2001)
- **<** Basic Mesic Forest (Harrison 2004)
- **?** Dry-Mesic Inland Mixed Oak Forest, mixed oak-hardwood type (Breden 1989)

AUTHORSHIP

Primary Concept Source: D. Faber-Langendoen
Author of Description: D. Faber-Langendoen, mod. E. Largay, S.C. Gawler, G.P. Fleming
Acknowledgments:
Version Date: 2006/10/02

REFERENCES

References: Anderson 1982, Braun 1950, Breden 1989, Breden et al. 2001, Edinger et al. 2002, Fike 1999, Fleming 1999, Harrison 2004, Lundgren 2001, Metzler and Barrett 2001, Metzler and Barrett 2006, ONHD unpubl. data, Perles et al. 2006a, Perles et al. 2006b, Perles et al. 2006d, Perles et al. 2007, Perles et al. 2008, Reschke 1990, Swain and Kearsley 2011.

NYC NAC Association Description based on 140 plots (CEGL006125):

The overstory is co-dominated by oaks (Quercus spp.) and tuliptree (Liriodendron tulipifera). Overstory oaks include red oak (Quercus rubra), white oak (Quercus alba), black oak (Quercus velutina), and scarlet oak (Quercus coccinea). Other overstory trees include northern sweetgum (Liquidambar styraciflua), black cherry (Prunus serotina), sweet birch (Betula lenta), red maple (Acer rubrum), sassafras (Sassafras albidum), ash (Fraxinus sp.), Norway maple (Acer platanoides), American beech (Fagus grandifolia), blackgum (Nyssa sylvatica), slippery elm (Ulmus rubra), bitternut hickory (Carya cordiformis), black locust (Robinia pseudoacacia), sugar maple (Acer saccharum), Amur corktree (Phellodendron amurense), pignut hickory (Carya glabra), American basswood (Tilia americana), flowering dogwood (Cornus florida), pin oak (Quercus palustris), black walnut (Juglans nigra), mockernut hickory (Carya tomentosa), eastern white pine (Pinus strobus), chestnut oak (Quercus montana), swamp white oak (Quercus bicolor), American elm (Ulmus americana), tree of heaven (Ailanthus altissima), and northern spicebush (Lindera benzoin).

Midstory plants include black cherry (Prunus serotina), tuliptree (Liriodendron tulipifera), northern spicebush (Lindera benzoin), red maple (Acer rubrum), sweetgum (Liquidambar styraciflua), Norway maple (Acer platanoides), sassafras (Sassafras albidum), sweet birch (Betula lenta), bitternut hickory (Carya cordiformis), northern red oak (Quercus rubra), flowering dogwood (Cornus florida), sweet cherry (Prunus avium), white oak (Quercus alba), sugar maple (Acer saccharum), American beech (Fagus grandifolia), blackgum (Nyssa sylvatica), American hornbeam (Carpinus caroliniana), mockernut hickory (Carya tomentosa), Japanese angelica tree (Aralia elata), Amur corktree (Phellodendron amurense), slippery elm (Ulmus rubra), southern arrowwood (Viburnum dentatum), sycamore maple (Acer pseudoplatanus), pignut hickory (Carya glabra), blackhaw (Viburnum prunifolium), viburnum (Viburnum), black oak (Quercus velutina), white mulberry (Morus alba), burningbush (Euonymus alatus), black locust (Robinia pseudoacacia), American basswood (Tilia americana), Japanese corktree (Phellodendron japonicum), common hackberry (Celtis occidentalis), hybrid hickory (Carya), boxelder (Acer negundo), hawthorn (Crataegus), chestnut oak (Quercus montana), plum (Prunus), littleleaf linden (Tilia cordata), tree of heaven (Ailanthus altissima), pin oak (Quercus palustris), black elderberry (Sambucus nigra), highbush blueberry (Vaccinium corymbosum), serviceberry (Amelanchier), American witchhazel (Hamamelis virginiana), California privet (Ligustrum ovalifolium), red mulberry (Morus rubra), shagbark hickory (Carya ovata), glossy buckthorn (Frangula alnus), black walnut (Juglans nigra), European spindletree (Euonymus europaeus), castor aralia (Kalopanax septemlobus), American chestnut (Castanea dentata), eastern white pine (Pinus strobus), chokecherry (Prunus virginiana), Japanese maple (Acer palmatum), paper mulberry (Broussonetia papyrifera), swamp white oak (Quercus bicolor), hackberry (Celtis), green ash (Fraxinus pennsylvanica), American elm (Ulmus americana), coastal sweetpepperbush (Clethra alnifolia), river birch (Betula nigra), common persimmon (Diospyros virginiana), and Canadian serviceberry (Amelanchier canadensis).

Vines include eastern poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), Oriental bittersweet (Celastrus orbiculatus), Japanese honeysuckle (Lonicera japonica), grape (Vitis sp), roundleaf greenbrier (Smilax rotundifolia), Amur peppervine (Ampelopsis brevipedunculata), summer grape (Vitis aestivalis), greenbrier (Smilax sp.), English ivy (Hedera helix), cat

greenbrier (Smilax glauca), Boston ivy (Parthenocissus tricuspidata), fox grape (Vitis labrusca), riverbank grape (Vitis riparia), common moonseed (Menispermum canadense), and winter creeper (Euonymus fortunei).

Understory plants include white wood aster (Eurybia divaricata), garlic mustard (Alliaria petiolata), blackberry (Rubus sp.), northern spicebush (Lindera benzoin), multiflora rose (Rosa multiflora), black cherry (Prunus serotina), jumpseed (Polygonum virginianum), broadleaf enchanter's nightshade (Circaea lutetiana), Japanese honeysuckle (Lonicera japonica), tuliptree (Liriodendron tulipifera), mapleleaf viburnum (Viburnum acerifolium), Canada mayflower (Maianthemum canadense), jewelweed (Impatiens capensis), sweetgum (Liquidambar styraciflua), bitternut hickory (Carya cordiformis), sassafras (Sassafras albidum), wine raspberry (Rubus phoenicolasius), red maple (Acer rubrum), southern arrowwood (Viburnum dentatum), northern red oak (Quercus rubra), smooth Solomon's seal (Polygonatum biflorum), feathery false lily of the valley (Maianthemum racemosum), small enchanter's nightshade (Circaea alpina), northern dewberry (Rubus flagellaris), American pokeweed (Phytolacca americana), eastern hayscented fern (Dennstaedtia punctilobula), Japanese angelica tree (Aralia elata), black raspberry (Rubus occidentalis), Asiatic dayflower (Commelina communis), American wintergreen (Pyrola americana), Japanese knotweed (Polygonum cuspidatum), common wormwood (Artemisia vulgaris), wild sarsaparilla (Aralia nudicaulis), spotted ladysthumb (Polygonum persicaria), blackgum (Nyssa sylvatica), wreath goldenrod (Solidago caesia), white snakeroot (Ageratina altissima), trillium (Trillium sp.), spotted geranium (Geranium maculatum), Norway maple (Acer platanoides), white oak (Quercus alba), Nepalese browntop (Microstegium vimineum), red chokeberry (Photinia pyrifolia), black locust (Robinia pseudoacacia), Amur honeysuckle (Lonicera maackii), sweet cherry (Prunus avium), Canadian honewort (Cryptotaenia canadensis), American hornbeam (Carpinus caroliniana), tree of heaven (Ailanthus altissima), New York fern (Thelypteris noveboracensis), silky dogwood (Cornus amomum), flowering dogwood (Cornus florida), common hackberry (Celtis occidentalis), sensitive fern (Onoclea sensibilis), black elderberry (Sambucus nigra), wild yam (Dioscorea villosa), devil's walkingstick (Aralia spinosa), burningbush (Euonymus alatus), American basswood (Tilia americana), Jack in the pulpit (Arisaema triphyllum), waxflower shinleaf (Pyrola elliptica), intermediate woodfern (Dryopteris intermedia), coastal sweetpepperbush (Clethra alnifolia), cinnamon fern (Osmunda cinnamomea), Japanese barberry (Berberis thunbergii), bishop's goutweed (Aegopodium podagraria), sugar maple (Acer saccharum), swamp smartweed (Polygonum hydropiperoides), common ladyfern (Athyrium filix-femina), white avens (Geum canadense), wood anemone (Anemone quinquefolia), highbush blueberry (Vaccinium corymbosum), common blue violet (Viola sororia), American lopseed (Phryma leptostachya), hairy Solomon's seal (Polygonatum pubescens), sweet birch (Betula lenta), chokecherry (Prunus virginiana), dogtooth violet (Erythronium americanum), joe pye weed (Eutrochium sp.), boxelder (Acer negundo), Canadian clearweed (Pilea pumila), Amur corktree (Phellodendron amurense), black oak (Quercus velutina), lowbush blueberry (Vaccinium angustifolium), stickywilly (Galium aparine), rattlesnakeroot (Prenanthes sp.), bedstraw (Galium), wild chives (Allium schoenoprasum), common yellow oxalis (Oxalis stricta), Indianpipe (Monotropa uniflora), skunk cabbage (Symplocarpus foetidus), pink azalea (Rhododendron periclymenoides), rough avens (Geum laciniatum), bloodroot (Sanguinaria canadensis), wayfaringtree (Viburnum lantana), Pennsylvania blackberry (Rubus pensilvanicus), and Canada lettuce (Lactuca canadensis).

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A3303. *Quercus rubra - Acer saccharum - Betula lenta* Forest Alliance

CEGL006635. *Quercus rubra - Acer saccharum / Viburnum acerifolium - Lindera benzoin* Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Quercus rubra - Acer saccharum / Viburnum acerifolium - Lindera benzoin* Forest
Common Name (Translated Scientific Name): Northern Red Oak - Sugar Maple / Mapleleaf Viburnum - Northern Spicebush Forest
Colloquial Name: Red Oak - Transitional Northern Hardwood Forest

Type Concept: These mesic forests of oak and northern hardwoods, sometimes mixed with hemlock or pine, are distributed across the Allegheny Plateau, Lake Ontario and Lake Erie plains and Lower New England regions of the northeastern United States. They occur on slightly acidic, well-drained loamy and often rocky soils of intermediate fertility, most often positioned on midslopes and coves. Soil depth is often shallow, but some stands occur on deep tills. Most are at low to mid elevations, usually under 520 m (1700 feet), but they may range up to 765 m (2500 feet). The deciduous-to-mixed canopy is mostly closed, and the lower layers are variable in extent. Tall shrubs are well-represented, although scattered, with occasional denser patches. Herbs are sparse and bryoids are nearly absent. Ericads and other dwarf-shrubs are also nearly absent, a characteristic that distinguishes this association from most other red oak forests in the Northeast. Canopy composition is a variable mixture of *Quercus rubra* (usually at least 30% of the canopy), *Fagus grandifolia, Acer saccharum, Acer rubrum*, and in some stands *Pinus strobus* or *Tsuga canadensis*. Conifers generally make up less than 20% of the canopy cover, and even in mixed stands the cover of deciduous trees exceeds that of conifers. Minor canopy associates include *Fraxinus americana, Tilia americana, Betula lenta, Juglans cinerea*, and *Ulmus americana*. *Acer pensylvanicum* is common as a small tree; in the central and southern portions of the distribution, *Cornus florida* and *Prunus serotina* are common small trees as well. *Corylus cornuta, Viburnum acerifolium*, and *Hamamelis virginiana* are typical shrubs, with

Kalmia latifolia and *Lindera benzoin* occasional in all but the northern portions of the range. Typical species in the herb layer include *Gaultheria procumbens, Maianthemum canadense, Aralia nudicaulis, Trientalis borealis, Uvularia sessilifolia, Medeola virginiana, Brachyelytrum erectum, Dryopteris intermedia, Polystichum acrostichoides, Dennstaedtia punctilobula, Pteridium aquilinum*, and *Thelypteris noveboracensis*. On more nutrient-rich soils, the herb layer may contain *Solidago caesia, Caulophyllum thalictroides, Dryopteris marginalis*, and *Eurybia divaricata (= Aster divaricatus)*. This association is distinguished from other transitional northern hardwood forests by its greater amount of oak, from other oak forests by its greater prominence of northern hardwoods and lack of dwarf-shrub ericads, and from hemlock-hardwoods by the relatively low importance of hemlock.

Classification Comments: This type was formerly included in CEGL006173. It was separated from *Quercus rubra - Acer saccharum - Fagus grandifolia / Viburnum acerifolium* Forest (CEGL006633) to more clearly distinguish the Allegheny Plateau and Lower New England characteristics from the Northern Appalachian region stands.

Similar NVC Types: This type is distinguished from *Tsuga canadensis - Fagus grandifolia - Quercus rubra* Forest (CEGL006088), which is usually in somewhat drier settings, by the greater abundance of *Acer saccharum* and/or *Betula alleghaniensis* and the lower importance of *Tsuga canadensis*. This type is distinguished from *Quercus rubra - Acer saccharum - Fagus grandifolia / Viburnum acerifolium* Forest (CEGL006633) by the presence of more central hardwood species, including *Betula lenta, Cornus florida, Lindera benzoin*, and *Kalmia latifolia*.

- CEGL006632 *Acer saccharum - Fagus grandifolia - Fraxinus americana / Arisaema triphyllum* Forest
- CEGL006293 *Pinus strobus - Quercus (rubra, velutina) - Fagus grandifolia* Forest
- CEGL005005 *Acer saccharum - Pinus strobus / Acer pensylvanicum* Forest
- CEGL006506 *Quercus rubra - Acer rubrum - Betula* spp. - *Pinus strobus* Ruderal Forest
- CEGL006633 *Quercus rubra - Acer saccharum - Fagus grandifolia / Viburnum acerifolium* Forest
- CEGL007698 *Quercus rubra - Acer saccharum - Tilia americana var. heterophylla - Aesculus flava - (Cladrastis kentukea)* Forest
- CEGL006943 *Acer saccharum - Betula alleghaniensis - Quercus rubra / Viburnum acerifolium* Forest
- CEGL002461 *Quercus rubra - Acer saccharum - (Betula alleghaniensis)* Forest
- CEGL006088 *Tsuga canadensis - Fagus grandifolia - Quercus rubra* Forest
- CEGL002462 *Quercus rubra - Quercus alba - (Quercus velutina, Acer rubrum) / Viburnum acerifolium* Forest

VEGETATION

Floristics: The deciduous-to-mixed canopy is mostly closed, and the lower layers are variable in extent. Tall shrubs are well represented, although scattered, with occasional denser patches. Herbs are sparse, and bryoids are nearly absent. Ericads and other dwarf-shrubs are also nearly absent, a characteristic that distinguishes this association from most other red oak forests in the Northeast. Canopy composition is a variable mixture of *Quercus rubra* (usually at least 30% of the canopy), *Fagus grandifolia, Acer saccharum, Acer rubrum*, and, in some stands, *Pinus strobus* or *Tsuga canadensis*. In mixed stands, the cover of deciduous trees exceeds that of conifers. Minor canopy associates include *Fraxinus americana, Tilia americana, Betula lenta, Juglans cinerea*, and *Ulmus americana*. *Acer pensylvanicum* is common as a small tree; in the central and southern portions of the distribution, *Cornus florida* and *Prunus serotina* are common small trees as well. *Corylus cornuta, Viburnum acerifolium*, and *Hamamelis virginiana* are typical shrubs, with *Kalmia latifolia* and *Lindera benzoin* occasional in all but the northern portions of the range. Typical species in the herb layer include *Gaultheria procumbens, Maianthemum canadense, Aralia nudicaulis, Trientalis borealis, Uvularia sessilifolia, Medeola virginiana, Brachyelytrum erectum, Dryopteris intermedia, Polystichum acrostichoides, Dennstaedtia punctilobula, Pteridium aquilinum*, and *Thelypteris noveboracensis*. On more nutrient-rich soils, the herb layer may contain *Solidago caesia, Caulophyllum thalictroides*, and *Eurybia divaricata (= Aster divaricatus)*.

ENVIRONMENT & DYNAMICS

Environmental Description: These forests occur on slightly acidic, well-drained loamy and often rocky soils of intermediate fertility, most often positioned on midslopes and coves. Soil depth is often shallow, but some occur on deep tills. Stands often occur at low to mid elevations, usually under 520 m (1700 feet), but in the southern portion of their distribution they may range up to 760 m (2500 feet).

Dynamics:

DISTRIBUTION

Geographic Range: This association occurs in the Allegheny Plateau, Lake Ontario and Lake Erie plains and Lower New England regions and south to New Jersey.

Spatial Scale & Pattern [optional]: Large patch, Matrix
Nations: CA, US
States/Provinces: CT, MA, NH, NJ, NY, ON, PA, RI
TNC Ecoregions [optional]: 48:C, 59:?, 60:C, 61:C, 62:C, 64:C

USFS Ecoregions (1994/95): 212Fb:CPP, 221Aa:CCP, 221Ae:CCC, 221Af:CCC, 221Ag:CCC, 221Ah:CCC, 221Ai:CCC, 221Ak:CCC, 221Al:CCC, 221Bb:CCC, 221Bc:CCC, 221D:CC, 221E:C?, 221F:CP, 222Ib:CCC, 222Id:CCP
Omernik Ecoregions:
Federal Lands [optional]: NPS (Appalachian Trail [Lower New England], Minute Man, Saratoga); USFS (Finger Lakes); USFWS (Iroquois)

CONSERVATION STATUS

Grank (Review Date): G4? (2014/12/2)
Greasons: This association is well-distributed, but patchy throughout its range.
Ranking Author (Version): D. Faber-Langendoen (2014/12/2)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:
- **<** CNE mesic hardwood forest on acidic bedrock/till (Rawinski 1984a)
- **<** Mesic Beech-Maple Forest (Enser 1999)
- **<** Northern Red Oak: 55 (Eyre 1980)

AUTHORSHIP

Primary Concept Source: Northern Appalachian Planning Team
Author of Description: S.C. Gawler, mod. D. Faber-Langendoen
Acknowledgments:
Version Date: 2014/12/02

REFERENCES

References: Breden et al. 2001, Edinger et al. 2002, Edinger et al. 2007, Enser 1999, Enser and Lundgren 2006, Eyre 1980, Fike 1999, Gawler et al. 2005, Metzler and Barrett 2001, NRCS 2004a, Rawinski 1984a, Sperduto 2000a, Sperduto and Nichols 2004, Swain and Kearsley 2001.

NYC NAC Association Description based on 7 plots (CEGL006635):

The overstory is co-dominated by red oak (Quercus rubra) and sugar maple (Acer saccharum). Other overstory trees include northern slippery elm (Ulmus rubra), black cherry (Prunus serotina), black walnut (Juglans nigra), sassafras (Sassafras albidum), swamp white oak (Quercus bicolor), American hornbeam (Carpinus caroliniana), sweetgum (Liquidambar styraciflua), American basswood (Tilia americana), red maple (Acer rubrum), bitternut hickory (Carya cordiformis), and sycamore maple (Acer pseudoplatanus).

The midstory is dominated by sugar maple (Acer saccharum). Other midstory plants include bitternut hickory (Carya cordiformis), red maple (Acer rubrum), black cherry (Prunus serotina), flowering dogwood (Cornus florida), Norway maple (Acer platanoides), ash (Fraxinus sp.), sassafras (Sassafras albidum), sweetgum (Liquidambar styraciflua), northern red oak (Quercus rubra), slippery elm (Ulmus rubra), Japanese angelica tree (Aralia elata), American hornbeam (Carpinus caroliniana), Siebold's arrowwood (Viburnum sieboldii), northern spicebush (Lindera benzoin), mockernut hickory (Carya tomentosa), sweet birch (Betula lenta), eastern white pine (Pinus strobus), black locust (Robinia pseudoacacia), blackhaw (Viburnum prunifolium), and American witchhazel (Hamamelis virginiana).

Vines include Oriental bittersweet (Celastrus orbiculatus), grape (Vitis sp.), eastern poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), Japanese honeysuckle (Lonicera japonica), English ivy (Hedera helix), greenbrier (Smilax sp.), and Asiatic tearthumb (Polygonum perfoliatum).

Understory plants include sugar maple (Acer saccharum), jumpseed (Polygonum virginianum), multiflora rose (Rosa multiflora), garlic mustard (Alliaria petiolata), white wood aster (Eurybia divaricata), broadleaf enchanter's nightshade (Circaea lutetiana), touch-me-not (Impatiens), common reed (Phragmites australis), wine raspberry (Rubus phoenicolasius), northern dewberry (Rubus flagellaris), bitternut hickory (Carya cordiformis), black raspberry (Rubus occidentalis), sassafras (Sassafras albidum), northern spicebush (Lindera benzoin), striped prince's pine (Chimaphila maculata), black cherry (Prunus serotina), jewelweed (Impatiens capensis), Oriental lady's thumb (Polygonum cespitosum), feathery false lily of the valley (Maianthemum racemosum), spotted geranium (Geranium maculatum), white snakeroot (Ageratina altissima), burningbush (Euonymus alatus), and Japanese maple (Acer palmatum).

1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
1.B.2.Na.3.b. G742 Appalachian-Allegheny Northern Hardwood - Conifer Forest

A3302. *Tsuga canadensis - Betula lenta - Betula alleghaniensis* Forest Alliance

Type Concept Sentence: This mixed conifer-hardwood forest alliance is dominated by *Tsuga canadensis*, in combination with *Pinus strobus*, mesic hardwoods such as *Acer saccharum, Acer rubrum, Betula alleghaniensis*, and *Fagus grandifolia*, with minor associates of *Betula lenta, Liriodendron tulipifera, Prunus serotina*, and *Quercus rubra*. It occurs in the northeastern U.S. ranges from Lower New England west to the Lake Erie-Lake Ontario ecoregion in Ontario and south to the higher elevations of Virginia and West Virginia.

OVERVIEW

Scientific Name: *Tsuga canadensis - Betula lenta - Betula alleghaniensis* Forest Alliance
Common Name (Translated Scientific Name): Eastern Hemlock - Sweet Birch - Yellow Birch Forest Alliance
Colloquial Name: Central & Southern Appalachian Hemlock - Northern Hardwood Forest

Type Concept: This mixed conifer-hardwood forested alliance is dominated by *Tsuga canadensis*, alone or in combination with *Pinus strobus*, and a variety of mesic hardwoods such as *Acer rubrum, Acer saccharum*, and *Fagus grandifolia*. Other common and sometimes dominant trees include *Betula alleghaniensis, Betula lenta, Liriodendron tulipifera, Prunus serotina*, and *Quercus* spp. (most commonly *Quercus rubra*). It occurs in the northeastern U.S., ranging from central New England west to the Lake Erie-Lake Ontario ecoregion in Ontario and south to the higher elevations of Virginia and West Virginia. Stands are often found in ravines or low cool sites, on a variety of primarily mesic soils.

Classification Comments: Northward, this alliance is replaced by *Tsuga canadensis - Betula alleghaniensis - Acer saccharum* Forest Alliance (A4072) and *Pinus strobus - Tsuga canadensis* Forest Alliance (A3251) in Laurentian-Acadian Hemlock - White Pine - Hardwood Forest Group (G741). This alliance (A3302) may most resemble those alliances on cooler sites in the Allegheny Plateau (Sections 211F and 211G) and in central New England. The USFS ecological province lines provide a general delimiter of the northern extent of this type, which is limited to areas in the northern parts of Provinces 221 and M221, 222I (Lake Erie-Lake Ontario ecoregion) and Sections 211F and 211G (Allegheny Plateau), but not otherwise in Provinces 211 or M211. In Ontario, see Crins et al. (2009). The ranges of *Betula lenta, Carya cordiformis, Carya ovata, Liriodendron tulipifera, Quercus prinus*, and others are a good approximator for the northern limit of this alliance's range, but these species may be relatively uncommon in the stands. *Liriodendron* and *Tsuga canadensis* occur along with other mixed mesophytic species in Appalachian-Central Interior Mesic Forest Group (G020), in *Tsuga canadensis - Liriodendron tulipifera* Forest Alliance (A3304), but northern hardwoods are uncommon in that alliance. See also ecological system Appalachian (Hemlock)-Northern Hardwood Forest (CES202.593).

Similar NVC Types:
- A4072 *Tsuga canadensis - Betula alleghaniensis - Acer saccharum* Forest Alliance
- A3251 *Pinus strobus - Tsuga canadensis* Forest Alliance
- A3301 *Acer saccharum - Fagus grandifolia - Tilia americana* Forest Alliance

Diagnostic Characteristics: This type has *Tsuga canadensis* and *Pinus strobus* with >25% cover and in combination with northern hardwoods such as *Acer rubrum, Acer saccharum*, and *Fagus grandifolia*. Other common and sometimes dominant trees include Betula alleghaniensis, Betula lenta, Liriodendron tulipifera, Prunus serotina, and *Quercus* spp. (most commonly *Quercus rubra*).

VEGETATION

Floristics: Stands are dominated by *Tsuga canadensis*, alone or in combination with *Pinus strobus* and a variety of mesic hardwoods such as *Acer rubrum, Acer saccharum*, and *Fagus grandifolia*. Other common and sometimes dominant trees include *Quercus* spp. (most commonly *Quercus rubra*), *Liriodendron tulipifera, Prunus serotina, Betula alleghaniensis*, and *Betula lenta*. A summary of the shrub and herb layers is needed.

ENVIRONMENT & DYNAMICS

Environmental Description: This mixed conifer-hardwood forested alliance of the northeastern U.S. ranges from lower elevations in central New England west to the Lake Erie-Lake Ontario ecoregion in Ontario and south to higher elevations in Virginia and West Virginia. Stands are often found in ravines or low cool sites, on a variety of primarily mesic soils.

Dynamics:

DISTRIBUTION

Geographic Range: This mixed conifer-hardwood forest alliance of the northeastern U.S. ranges from Lower New England west to the Lake Erie-Lake Ontario ecoregion in Ontario and south to the higher elevations of Virginia and West Virginia.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: MD, NH, NJ, NY, OH, ON, PA, RI?, VA, WV
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

LOWER LEVEL UNITS

Associations:

- CEGL006206 *Tsuga canadensis - Betula alleghaniensis - Prunus serotina / Rhododendron maximum* Forest
- CEGL006019 *Pinus strobus - Tsuga canadensis / Acer pensylvanicum / Polystichum acrostichoides* Forest
- CEGL008513 *Tsuga canadensis - (Betula alleghaniensis, Quercus rubra) / Ilex montana / Rhododendron catawbiense* Forest
- CEGL006573 *Tsuga canadensis - Betula lenta / Acer spicatum / Polypodium virginianum* Woodland
- CEGL006639 *Tsuga canadensis - Acer saccharum - Fagus grandifolia / Dryopteris intermedia* Forest
- CEGL007099 *Pinus strobus / Vaccinium pallidum* Forest
- CEGL006328 *Pinus strobus - Tsuga canadensis* Lower New England-Northern Piedmont Forest
- CEGL006559 *Pinus strobus - Acer saccharum - Prunus serotina* Forest

AUTHORSHIP

Primary Concept Source: D. Faber-Langendoen
Author of Description: D. Faber-Langendoen
Acknowledgments:
Version Date: 12/18/2014
Classif Resp Region: East

REFERENCES

References: Crins et al. 2009, Faber-Langendoen et al. 2016b

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A3302. *Tsuga canadensis - Betula lenta - Betula alleghaniensis* Forest Alliance

CEGL006328. *Pinus strobus - Tsuga canadensis* Lower New England-Northern Piedmont Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Pinus strobus - Tsuga canadensis* Lower New England-Northern Piedmont Forest
Common Name (Translated Scientific Name): Eastern White Pine - Eastern Hemlock Lower New England-Northern Piedmont Forest
Colloquial Name: Lower New England-Northern Piedmont White Pine - Hemlock Dry-Mesic Forest

Type Concept: This dry-mesic coniferous forest of usually sloping (moderately to steeply) sites is dominated by *Pinus strobus* and/or *Tsuga canadensis*. It can occur in somewhat sheltered ravines where *Tsuga canadensis* is nearly monotypic in all layers. Other frequent tree species depend on geography and can include *Betula papyrifera, Quercus rubra*, and *Acer rubrum*, with *Pinus rigida, Prunus serotina, Quercus velutina, Carya alba, Betula lenta, Acer saccharum, Fraxinus americana, Betula alleghaniensis*, and *Betula populifolia* occurring less frequently. Although frequent, deciduous tree species generally occur with low abundance. Canopy cover is typically 80-90%. The subcanopy is often sparse but may extend up to 40% cover. *Acer pensylvanicum* is a common, though rarely abundant, small tree. Shrubs are absent or sparse but when present may include *Hamamelis virginiana, Kalmia latifolia, Rhododendron maximum, Vaccinium angustifolium*, and *Viburnum acerifolium*. The herbaceous layer is generally not well-developed nor diverse and is generally characterized by *Gaultheria procumbens, Medeola virginiana, Polystichum acrostichoides*, and *Thelypteris noveboracensis*. Other herbaceous associates often include *Aralia nudicaulis, Uvularia sessilifolia, Mitchella repens, Trientalis borealis, Monotropa uniflora, Dryopteris intermedia, Dryopteris marginalis, Dryopteris carthusiana, Polypodium virginianum*, and *Maianthemum canadense*. *Deschampsia flexuosa* and other grasses may be present in small openings and gaps.

Nonvascular plants tend to be sparse but can include *Leucobryum albidum* and *Polytrichum* and *Dicranum* species. Soils are moderately to extremely well-drained (dry-mesic to mesic) loamy sands and sandy loams, often sandy, stony or bouldery. The major natural disturbance in this forest type is generally single-tree blowdowns.

Classification Comments: This association is differentiated from *Pinus strobus - Tsuga canadensis - Picea rubens* Forest (CEGL006324) by its lack of *Picea rubens*.

Similar NVC Types:
- CEGL006019 *Pinus strobus - Tsuga canadensis / Acer pensylvanicum / Polystichum acrostichoides* Forest
- CEGL002590 *Pinus strobus - Tsuga canadensis* Great Lakes Forest
- CEGL006324 *Pinus strobus - Tsuga canadensis - Picea rubens* Forest

VEGETATION

Floristics: This coniferous forest type is dominated by *Pinus strobus* and/or *Tsuga canadensis*. Other frequent tree species depend on geography and can include *Betula papyrifera, Quercus rubra*, and *Acer rubrum*, with *Pinus rigida, Prunus serotina, Quercus velutina, Carya alba, Betula lenta, Acer saccharum, Fraxinus americana, Betula alleghaniensis*, and *Betula populifolia* occurring less frequently. Although frequent, deciduous tree species generally occur with low abundance. Canopy cover is typically 80-90%. The subcanopy is often sparse but may extend up to 40% cover. *Acer pensylvanicum* is a common, though rarely abundant, small tree. Shrubs are absent or sparse but when present may include *Hamamelis virginiana, Kalmia latifolia, Rhododendron maximum, Vaccinium angustifolium*, and *Viburnum acerifolium*. The herbaceous layer is generally not well-developed nor diverse and is generally characterized by *Gaultheria procumbens, Medeola virginiana, Polystichum acrostichoides*, and *Thelypteris noveboracensis*. Other herbaceous associates often include *Aralia nudicaulis, Uvularia sessilifolia, Mitchella repens, Trientalis borealis, Monotropa uniflora, Dryopteris intermedia, Dryopteris marginalis, Dryopteris carthusiana, Polypodium virginianum*, and *Maianthemum canadense*. *Deschampsia flexuosa* and other grasses may be present in small openings and gaps. Nonvascular plants tend to be sparse but can include *Leucobryum albidum* and *Polytrichum* and *Dicranum* species.

ENVIRONMENT & DYNAMICS

Environmental Description: This dry-mesic coniferous forest is usually found on sloping (moderately to steeply) sites or in sheltered ravines. Soils are moderately to extremely well-drained (dry-mesic to mesic), loamy sands and sandy loams, often sandy, stony, or bouldery.

Dynamics: The major natural disturbance in this forest type is generally single-tree blowdowns. Fire is not a particularly important feature of this forest type.

DISTRIBUTION

Geographic Range: This association occurs in the northeastern United States and possibly adjacent Canada.

Spatial Scale & Pattern [optional]: Large patch, Matrix, Small patch
Nations: CA?, US
States/Provinces: CT, MA, ME, NH, NJ, NY, PA, QC?, RI, VT
TNC Ecoregions [optional]: 60:C, 61:C, 62:C, 63:C, 64:C
USFS Ecoregions (1994/95): 212Da:CCC, 212E:C?, 212Fa:CCP, 212Fb:CCP, 212Fc:CCC, 212Fd:CCP, 212Ga:CCP, 212Gb:CCP, 221Ae:CCC, 221Af:CCC, 221Ah:CCP, 221Ai:CCC, 221Ak:CCC, 221Al:CCC, 221Bb:CCC, 221Bc:CCC, 221Bd:CCC, 222I:??, M212Bb:CCC, M212Bc:CCC, M212Bd:CCC, M212Cb:CCC, M212Cc:CCC, M212Ea:CCP, M212Eb:CCP
Omernik Ecoregions:
Federal Lands [optional]: NPS (Appalachian Trail [Lower New England], Appalachian Trail [Northern Appalachians], Delaware Water Gap, Saint-Gaudens, Saratoga); USFWS (Assabet River, Great Meadows, Oxbow, Rachel Carson)

CONSERVATION STATUS

Grank (Review Date): G5 (1999/3/22)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:
- **?** CNE dry transitional forest on sandy / gravelly soils (Rawinski 1984a)
- **<** CNE mesic conifer [transition] forest on acidic bedrock/till (Rawinski 1984a)

- **<** Eastern Hemlock: 23 (Eyre 1980)
- **<** Hemlock Forest (Thompson 1996)
- **><** Hemlock Forest (Gawler 2002)
- **<** White Pine - Hemlock: 22 (Eyre 1980)
- **><** White Pine - Mixed Conifer Forest (Gawler 2002)

AUTHORSHIP

Primary Concept Source: L.A. Sneddon, K. Metzler, and M. Anderson, mod. Northern Appalachian Planning Team, mod. S.L. Neid
Author of Description: S.L. Neid, mod. S.C. Gawler
Acknowledgments:
Version Date: 2006/06/19

REFERENCES

References: Brown et al. 1982a, Edinger et al. 2002, Edinger et al. 2007, Enser 1999, Enser and Lundgren 2006, Eyre 1980, Fike 1999, Gawler 2002, Gawler and Bowman 2012, Gawler and Cutko 2010, Gordon 1937a, Hough 1943, Hough and Forbes 1943, MNAP 1991, Metzler and Barrett 2001, Metzler and Barrett 2006, NAP pers. comm. 1998, NRCS 2004a, Perles et al. 2007, Rawinski 1984a, Sperduto and Nichols 2004, Swain and Kearsley 2001, Thompson 1996, Thompson and Sorenson 2000.

NYC NAC Association Description (CEGL006328):

This association was not selected as a first choice for any NYC NAC plots.

M014. Laurentian-Acadian Mesic Hardwood - Conifer Forest

This macrogroup represents the mesic conifer - northern hardwoods of the eastern cool-temperate forests, ranging from the Upper Great Lakes region eastward to the Acadian region of southeastern Canada, to New York and Pennsylvania, and south along the Appalachians to northern North Carolina and eastern Tennessee; forests vary from pure hardwood dominance by *Acer saccharum, Betula alleghaniensis, Fagus grandifolia, Quercus rubra*, and *Tilia americana* to strong conifer dominance by *Pinus strobus* and *Tsuga canadensis* and (more eastward) *Picea rubens*.

G741. Laurentian-Acadian Hemlock - White Pine - Hardwood Forest

This conifer or mixed conifer-deciduous forest is found from the northeastern United States and maritime Canada to the western Great Lakes area. Stands have at least 25% cover by *Pinus strobus, Thuja occidentalis*, and *Tsuga canadensis* mixed with northern hardwoods such as *Acer saccharum, Betula alleghaniensis*, and *Fagus grandifolia* and are found on neutral to acidic upland soils.

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
1.B.2.Na.7.b. G741 Laurentian-Acadian Hemlock - White Pine - Hardwood Forest

A4072. *Tsuga canadensis - Betula alleghaniensis - Acer saccharum* Forest Alliance

Type Concept Sentence: This alliance is composed of cool, mesic hemlock - northern hardwood forests of the Laurentian-Acadian region ranging from New Brunswick and Nova Scotia to Ontario and possibly Quebec, south to New England and northern Pennsylvania, and west to Wisconsin.

OVERVIEW

Scientific Name: *Tsuga canadensis - Betula alleghaniensis - Acer saccharum* Forest Alliance
Common Name (Translated Scientific Name): Eastern Hemlock - Yellow Birch - Sugar Maple Forest Alliance
Colloquial Name: Laurentian-Acadian Mesic Hemlock - Northern Hardwood Forest

Type Concept: Forests in this alliance are late-successional upland forests dominated by coniferous and deciduous trees. *Tsuga canadensis* and some combination of *Acer saccharum, Betula alleghaniensis, Fagus grandifolia, Picea rubens*, and *Thuja occidentalis* (in the Midwest) are typically the dominant trees. Associated trees include *Acer rubrum, Betula lenta* (in the eastern portion of this alliance's range), *Betula papyrifera, Pinus strobus*, and *Prunus serotina var. serotina*. *Picea rubens* can be found in northern New England. The shade from the canopy and dense saplings and seedlings inhibit the growth of many other species. These stands often have depauperate ground layer strata. Where the shade is not as complete, shrubs such as *Corylus cornuta, Diervilla lonicera, Hamamelis virginiana, Sambucus racemosa var. racemosa (= Sambucus pubens)*, and *Viburnum lantanoides (= Viburnum alnifolium)* are common. The herbaceous layer consists of species such as *Anemone quinquefolia, Cornus canadensis, Dryopteris carthusiana, Maianthemum canadense, Medeola virginiana, Mitchella repens, Oxalis montana, Trientalis borealis, Trillium grandiflorum*, and *Viola* spp. This alliance is known from the Laurentian-Acadian region ranging from New Brunswick and Nova Scotia to Ontario and possibly Quebec, south to New England and northern Pennsylvania, and west to Wisconsin. Stands of this alliance tend to be on dry-

mesic to mesic loam and sand soils. The soil is typically acidic with parent material of glacial till in the north. Stands can be on flat to moderately steep slopes of any aspect.

Classification Comments: This alliance is limited to the Laurentian-Acadian and northern Great Lakes portion of the range of the nominal species.

Similar NVC Types:
- A3302 *Tsuga canadensis - Betula lenta - Betula alleghaniensis* Forest Alliance: is similar in terms of canopy dominants, but associated tree and understory species are those with more southern distributions.

Diagnostic Characteristics: *Tsuga canadensis* is the diagnostic tree with some combination of *Acer saccharum, Betula alleghaniensis, Fagus grandifolia, Picea rubens*, and *Thuja occidentalis* (in the Midwest). Tree and understory species are those with more northern distributions to similar types of vegetation found further south.

VEGETATION

Physiognomy and Structure: This alliance is composed of closed-canopy forests dominated or codominated by needle-leaved evergreen trees and broad-leaved cold-deciduous species. Depending on canopy cover, the understory may have sparse to moderate cover and be composed of broad-leaved cold-deciduous shrubs and forbs. Graminoids may be present, but sparse.

Floristics: *Tsuga canadensis* and some combination of *Acer saccharum, Betula alleghaniensis, Fagus grandifolia, Picea rubens*, and *Thuja occidentalis* (in the Midwest) are typically the dominant trees. *Fagus grandifolia* is not found in stands west of eastern Wisconsin. Associated trees include *Acer rubrum, Betula lenta* (in the eastern portion of this alliance's range), *Betula papyrifera, Pinus strobus*, and *Prunus serotina var. serotina*. *Picea rubens* can be found in northern New England. The small trees *Acer spicatum* and *Ostrya virginiana* are often present in the subcanopy. The shade from the canopy and dense saplings and seedlings inhibit the growth of many other species. These stands often have depauperate ground layer strata. Where the shade is not as complete, shrubs such as *Corylus cornuta, Diervilla lonicera, Hamamelis virginiana, Sambucus racemosa var. racemosa (= Sambucus pubens)*, and *Viburnum lantanoides (= Viburnum alnifolium)* are common. The herbaceous layer consists of species such as *Anemone quinquefolia, Aralia nudicaulis, Circaea lutetiana ssp. canadensis (= Circaea quadrisulcata), Clintonia borealis, Coptis trifolia, Cornus canadensis, Dryopteris carthusiana, Gaultheria procumbens, Lycopodium* spp., *Maianthemum canadense, Medeola virginiana, Mitchella repens, Oxalis montana, Thelypteris noveboracensis, Trientalis borealis, Trillium grandiflorum*, and *Viola* spp. In northern settings (e.g., where red spruce is common), the herb layer may contain more boreal species such as *Dryopteris campyloptera, Huperzia lucidula*, and *Trillium undulatum*.

ENVIRONMENT & DYNAMICS

Environmental Description: Stands of this alliance tend to be on dry-mesic to mesic loam and sand soils. The soil is typically acidic with parent material of glacial till in the north. Sites include flat to moderately steep sheltered slopes of any aspect at moderate elevations (30-1000 m). Hillslopes, stream valleys, ravines, and river or kame terraces are typical settings.

Dynamics:

DISTRIBUTION

Geographic Range: This alliance ranges from New Brunswick and Nova Scotia to Ontario and possibly Quebec, south to New England and northern Pennsylvania, and west to Wisconsin. One wide-ranging association reaches as far south as Virginia but should be evaluated for possible split.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: CT, MA, MD, ME, MI, NB, NH, NJ, NS, NY, ON, PA, QC, RI, VT, WI
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

LOWER LEVEL UNITS

Associations:

- CEGL005042 *Tsuga canadensis - Fagus grandifolia - (Acer saccharum)* Great Lakes Forest
- CEGL006088 *Tsuga canadensis - Fagus grandifolia - Quercus rubra* Forest
- CEGL006638 *Tsuga canadensis - Betula alleghaniensis - Acer saccharum / Dryopteris intermedia* Forest
- CEGL006129 *Tsuga canadensis - (Betula alleghaniensis) - Picea rubens / Cornus canadensis* Forest
- CEGL002597 *Tsuga canadensis - Acer saccharum / (Hepatica nobilis var. acuta)* Driftless Forest
- CEGL002598 *Tsuga canadensis - (Betula alleghaniensis)* Forest
- CEGL005044 *Tsuga canadensis - Acer saccharum - Betula alleghaniensis* Forest
- CEGL005005 *Acer saccharum - Pinus strobus / Acer pensylvanicum* Forest

AUTHORSHIP

Primary Concept Source: D. Faber-Langendoen
Author of Description: M.E. Hall
Acknowledgments:
Version Date: 09/26/2014
Classif Resp Region: East

REFERENCES

References: Faber-Langendoen et al. 2016b

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A4072. *Tsuga canadensis - Betula alleghaniensis - Acer saccharum* Forest Alliance

CEGL006088. *Tsuga canadensis - Fagus grandifolia - Quercus rubra* Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Tsuga canadensis - Fagus grandifolia - Quercus rubra* Forest
Common Name (Translated Scientific Name): Eastern Hemlock - American Beech - Northern Red Oak Forest
Colloquial Name: Hemlock - Beech - Red Oak Forest

Type Concept: This association comprises dry-mesic hemlock-mixed hardwood forests of the northeastern United States. It occurs on dry to dry-mesic, nutrient-poor, well-drained, often stony sandy loams or loamy sands over acidic bedrock. The canopy is a mixture of *Tsuga canadensis*, with *Fagus grandifolia* and/or *Quercus rubra* in variable proportions depending on soil (site) and disturbance characteristics. The overstory can range from mostly coniferous to mostly deciduous; drier sites tend to have more abundant beech or oak, and cooler sites tend to have more abundant hemlock. Associated tree species include *Betula lenta* (sometimes replaced by *Betula papyrifera* at the northern end of this type's range), *Pinus strobus*, and *Acer rubrum*. Shrubs are often sparse but locally abundant and, in addition to saplings of canopy species, include *Hamamelis virginiana, Acer pensylvanicum, Viburnum acerifolium, Kalmia latifolia*, and in the south *Ilex montana*. Though heaths may be present, they are rarely prominent. The herb layer is generally sparse but usually includes several of the following: *Mitchella repens, Lycopodium digitatum (= Diphasiastrum digitatum), Lycopodium obscurum, Lycopodium annotinum, Epifagus virginiana, Gaultheria procumbens, Maianthemum canadense, Trientalis borealis, Medeola virginiana, Aralia nudicaulis, Uvularia sessilifolia, Pteridium aquilinum, Dryopteris intermedia, Monotropa uniflora*, and occasionally *Lycopodium dendroideum, Coptis trifolia*, and *Dennstaedtia punctilobula*.

Classification Comments: At least in the southern portion of this type's range, the *Tsuga canadensis* component of this community type appears to have been heavily reduced by past disturbances because of this species' commercial timber value and its vulnerability to fire.

Similar NVC Types: This association (CEGL006088) differs from *Tsuga canadensis - Acer saccharum - Fagus grandifolia / Dryopteris intermedia* Forest (CEGL006639) and *Tsuga canadensis - (Betula alleghaniensis) - Picea rubens / Cornus canadensis* Forest (CEGL006129) in its lack of abundant northern hardwood species such as *Acer saccharum* and *Betula alleghaniensis*; this association is distinguished by having abundant *Quercus* spp. (primarily *Quercus rubra*) and usually *Betula lenta*. Examples of *Quercus rubra - Acer saccharum - Fagus grandifolia / Viburnum acerifolium* Forest (CEGL006633) and *Quercus rubra - Acer saccharum / Viburnum acerifolium - Lindera benzoin* Forest (CEGL006635) where *Tsuga* is present may be similar to this type but generally will have well under 25% conifer cover in the canopy and also have *Acer saccharum* and/or *Betula alleghaniensis* present in more than token amounts. It overlaps conceptually with CEGL006293 but is distinguished by having only *Quercus rubra* for oaks and in usually having more hemlock than pine in the canopy.
- CEGL005042 *Tsuga canadensis - Fagus grandifolia - (Acer saccharum)* Great Lakes Forest
- CEGL006129 *Tsuga canadensis - (Betula alleghaniensis) - Picea rubens / Cornus canadensis* Forest

- CEGL006293 *Pinus strobus - Quercus (rubra, velutina) - Fagus grandifolia* Forest
- CEGL006474 *Tsuga canadensis - Fagus grandifolia - Quercus (prinus, alba)* Forest
- CEGL006638 *Tsuga canadensis - Betula alleghaniensis - Acer saccharum / Dryopteris intermedia* Forest
- CEGL005043 *Tsuga canadensis - Fagus grandifolia - Acer saccharum / (Hamamelis virginiana, Kalmia latifolia)* Forest
- CEGL006633 *Quercus rubra - Acer saccharum - Fagus grandifolia / Viburnum acerifolium* Forest
- CEGL006635 *Quercus rubra - Acer saccharum / Viburnum acerifolium - Lindera benzoin* Forest
- CEGL006639 *Tsuga canadensis - Acer saccharum - Fagus grandifolia / Dryopteris intermedia* Forest

VEGETATION

Floristics: The canopy is a mixture of *Tsuga canadensis* with *Fagus grandifolia* and/or *Quercus rubra* in variable proportions depending on soil (site) and disturbance characteristics; drier sites tend to have more abundant beech or oak and cooler sites tend to have more abundant hemlock. Associated tree species include *Betula lenta* (sometimes replaced by *Betula papyrifera* at the northern end of this type's range), *Pinus strobus*, and *Acer rubrum*. Shrubs are often sparse but locally abundant and, in addition to saplings of canopy species, include *Hamamelis virginiana, Acer pensylvanicum, Viburnum acerifolium, Kalmia latifolia*, and in the south *Ilex montana*. Though heaths may be present, they are rarely prominent. The herb layer is generally sparse but usually includes several of the following: *Mitchella repens, Lycopodium digitatum (= Diphasiastrum digitatum), Lycopodium obscurum, Lycopodium annotinum, Epifagus virginiana, Gaultheria procumbens, Maianthemum canadense, Trientalis borealis, Medeola virginiana, Aralia nudicaulis, Uvularia sessilifolia, Dryopteris intermedia, Monotropa uniflora*, and occasionally *Lycopodium dendroideum, Coptis trifolia*, and *Dennstaedtia punctilobula*.

ENVIRONMENT & DYNAMICS

Environmental Description: This forest occurs on dry to dry-mesic, nutrient-poor, well-drained, often stony sandy loams or loamy sands. Underlying bedrock is acidic. In Virginia, it occupies extremely acidic (mean pH = 3.8), infertile silt loams on mesic to submesic valley sideslopes and broad, convex ridges at elevations from 1000-1200 m. In New England, it is a common forest type found on dry-mesic acidic soils on various landscape settings.

Dynamics: Composition of stands of this forest association vary with soil (site) and disturbance characteristics. At the drier end, *Fagus grandifolia* and/or *Quercus rubra* tend to be more prevalent. Cooler sites, where soils may freeze for longer durations, have especially abundant *Tsuga canadensis*. Disturbance affects composition as *Fagus grandifolia* can regenerate profusely through root-suckering. Stands of this vegetation on Allegheny Mountain in Virginia have low species richness (mean = 15 taxa per 400-square-meter plot samples) and were heavily impacted by logging and subsequent fires during the late 1920s and early 1930s. *Fagus grandifolia* is the most abundant tree in contemporary stands, sometimes forming nearly pure, even-aged forests that originated from root-suckers. *Tsuga canadensis* is present in the understories of most stands, and large *Tsuga* codominates the canopies of a few older stands that escaped fire damage. Small pieces of charred wood and thin charcoal horizons deposited in historical fires were present in the duff layers at most sites examined (Fleming and Moorhead 1996). Insect pests and pathogens, such as the hemlock woolly adelgid (*Adelges tsugae*) and beech bark disease (also called beech scale / *Nectria* complex) are serious threats to the dominant canopy trees in this association. *Betula lenta* is the most common successional invader of stands decimated by hemlock woolly adelgid.

DISTRIBUTION

Geographic Range: This association is widespread in southern New England and ranges south locally in the northern Piedmont and high Allegheny Mountains to Virginia and West Virginia. In Virginia, the type is confined to the Allegheny Mountain / Laurel Fork area in northwestern Highland County.

Spatial Scale & Pattern [optional]: Large patch
Nations: US
States/Provinces: CT, MA, ME, NH, NY, VT
TNC Ecoregions [optional]: 52:C, 59:C, 60:C, 61:C, 62:C, 63:C
USFS Ecoregions (1994/95): 212Fc:CCC, 221Aa:CCP, 221Ae:CCC, 221Af:CCC, 221Ag:CCC, 221Ah:CCC, 221Ai:CCC, 221Ak:CCC, 221Al:CCC, 221Ba:CCC, 221Bb:CCC, 221Bc:CCC, 221D:C?, M212Ba:CCC, M212Bb:CCC, M212Bc:CCC, M212Bd:CCC, M212Cb:CCC, M221Ba:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Appalachian Trail [Lower New England], Appalachian Trail [Northern Appalachians], Marsh-Billings-Rockefeller, Saint-Gaudens, Saratoga, Upper Delaware); USFS (George Washington)

CONSERVATION STATUS

Grank (Review Date): G4G5 (1998/6/26)
Greasons: This community type is widely distributed in the northern part of its range. Its long-term viability is threatened by pathogens associated with its two dominant canopy trees.

Ranking Author (Version): G. Fleming, mod. S.L. Neid (2004/1/30)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:

- **><** *Acer saccharum - Fagus grandifolia / Viburnum lantanoides* community (Metzler and Barrett 2001)
- **><** *Tsuga canadensis* forests (Metzler and Barrett 2001)
- **?** CNE dry transitional forest on sandy / gravelly soils (Rawinski 1984a)
- **<** CNE mesic conifer [transition] forest on acidic bedrock/till (Rawinski 1984a)
- **<** CNE mesic hardwood forest on acidic bedrock/till (Rawinski 1984a)
- **<** Central New England mesic conifer forest on acidic bedrock / till (Rawinski 1984a)
- **<** Eastern Hemlock: 23 (Eyre 1980)
- **<** Hemlock Forest (Thompson 1996)
- **<** Mixed Hardwood-Conifer Forest (Gawler 2002)

AUTHORSHIP

Primary Concept Source: Eastern Ecology Group, mod. S.L. Neid
Author of Description: G. Fleming and P. Coulling, mod. S.L. Neid and S.C. Gawler
Acknowledgments:
Version Date: 2005/12/08

REFERENCES

References: Edinger et al. 2002, Edinger et al. 2007, Enser and Lundgren 2006, Eyre 1980, Gawler 2002, Gawler and Bowman 2012, Gawler and Cutko 2010, Metzler and Barrett 2001, Metzler and Barrett 2006, NRCS 2004a, Perles et al. 2008, Rawinski 1984a, Reschke 1990, Sperduto and Nichols 2004, Swain and Kearsley 2001, Thompson 1996, Thompson and Sorenson 2000.

NYC NAC Association Description based on 1 plot (CEGL006088):

Overstory trees include northern red oak (Quercus rubra), eastern hemlock (Tsuga canadensis), sassafras (Sassafras albidum), sweetgum (Liquidambar styraciflua), and black cherry (Prunus serotina).

Midstory plants include northern spicebush (Lindera benzoin), ash (Fraxinus sp.), sweetgum (Liquidambar styraciflua), flowering dogwood (Cornus florida), and black cherry (Prunus serotina).

Understory plants include sweetgum (Liquidambar styraciflua), silky dogwood (Cornus amomum), jewelweed (Impatiens capensis), eastern poison ivy (Toxicodendron radicans), and northern spicebush (Lindera benzoin).

M013. Eastern North American Ruderal Forest

This ruderal forest macrogroup is found in eastern temperate North America, and shows evidence of former and heavy human disturbance, including to the soil, and contains a disparate mix of exotic and generalist native tree, shrub and herb species.

G030. Eastern North American Native Ruderal Forest

This native ruderal forest group is found on former agricultural or forest plantation sites, or arises from degraded native forest sites, in the cool temperate regions of the eastern United States and Canada.

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
1.B.2.Na.90.a. G030 Eastern North American Native Ruderal Forest

A3229. *Acer rubrum - Prunus serotina - Pinus strobus* Ruderal Forest Alliance

Type Concept Sentence: This early-successional forest vegetation of the northeastern United States occurs on sites that are becoming reforested after having been cleared for agriculture, long abandoned plantations or otherwise heavily modified in the past, with a generalist set of native, non-planted species, including *Acer rubrum, Fraxinus americana, Liriodendron tulipifera, Pinus strobus, Prunus serotina*, and *Robinia pseudoacacia*.

OVERVIEW

Scientific Name: *Acer rubrum - Prunus serotina - Pinus strobus* Ruderal Forest Alliance
Common Name (Translated Scientific Name): Red Maple - Black Cherry - Eastern White Pine Ruderal Forest Alliance
Colloquial Name: Northeastern Ruderal Conifer - Hardwood Forest

Type Concept: This early-successional forest vegetation of the northeastern United States occurs on sites that are becoming reforested after having been cleared for agriculture or otherwise heavily modified in the past. Environmental setting varies, but generally sites are dry-mesic to mesic, with small seepage inclusions in some examples. Physiognomy of this vegetation is highly variable, ranging from closed forest to open woodland and scrub. The generalist set of native, non-planted species include a combination of tree species, such as *Acer rubrum, Fraxinus americana, Liriodendron tulipifera, Pinus strobus*, and *Prunus serotina*. Other associates can include *Acer negundo, Acer saccharinum, Ailanthus altissima, Amelanchier* spp., *Betula lenta, Betula populifolia, Juglans nigra, Juniperus virginiana, Pinus strobus, Populus grandidentata, Quercus* spp., *Robinia pseudoacacia, Sassafras albidum*, and *Ulmus americana*. The low-shrub layer, if present, is usually characterized by the presence of *Rubus* spp. such as *Rubus allegheniensis, Rubus flagellaris, Rubus hispidus*, or *Rubus phoenicolasius*. This layer is often dominated by exotic species such as *Berberis thunbergii, Crataegus* spp., *Lonicera morrowii, Lonicera tatarica, Rhamnus cathartica*, and *Rosa multiflora*. The herbaceous layer is variable, often containing grasses and forbs of both native and exotic origin. The invasive species *Alliaria petiolata, Microstegium vimineum*, and *Polygonum caespitosum* can be abundant in this disturbed forest type. These forests are often young and resulted from the colonization of old agricultural fields by woody species. Recent disturbance or abundant invasive species give these forest stands a weedy character. It is unlikely that these stands will succeed to a natural plant community dominated by native species.

Classification Comments: This vegetation is broadly defined and varies widely in composition across its range, presenting a classification challenge at the alliance level. Its concept has not been described in the literature before.

Similar NVC Types:
- A3227 *Juniperus virginiana - Pinus virginiana - Pinus echinata* Ruderal Forest Alliance: is more strongly conifer-dominated.
- A3228 *Liriodendron tulipifera - Juglans nigra - Robinia pseudoacacia* Ruderal Forest Alliance: more directly originates from abandoned plantings of these species, rather than as a successional stage following abandonment.

Diagnostic Characteristics: Tree species include some combination of *Prunus serotina, Liriodendron tulipifera, Fraxinus americana, Robinia pseudoacacia*, and *Acer rubrum* that singly or together exceed 80 (90?)% canopy cover. Other associates can include *Acer negundo, Acer saccharinum, Ailanthus altissima, Amelanchier* spp., *Betula lenta, Betula populifolia, Juglans nigra, Juniperus virginiana, Pinus strobus, Populus grandidentata, Quercus* spp., Sassafras albidum, and *Ulmus americana*. The low-shrub layer, if present, is usually characterized by the presence of generalist shrubs such as *Rubus* spp. such as *Rubus flagellaris, Rubus allegheniensis, Rubus phoenicolasius*, or *Rubus hispidus*, and or by exotic species such as *Berberis thunbergii, Crataegus* spp., *Lonicera morrowii, Lonicera tatarica, Rhamnus cathartica*, and *Rosa multiflora*. The herbaceous layer is variable, often containing grasses and forbs of both native and exotic origin.

VEGETATION

Physiognomy and Structure: Physiognomy of this vegetation is highly variable, ranging from closed forest to open woodland and scrub.

Floristics: Early-successional woody species dominate the canopy in a widely variable mix, depending on geographic location. Tree species often include some combination of native, non-planted species, such as *Acer rubrum, Fraxinus americana, Liriodendron tulipifera, Pinus strobus, Prunus serotina*, and *Robinia pseudoacacia*. Other associates can include *Acer negundo, Acer saccharinum, Ailanthus altissima, Amelanchier* spp., *Betula lenta, Betula populifolia, Juglans nigra, Juniperus virginiana, Pinus strobus, Populus grandidentata, Quercus* spp., Sassafras albidum, and *Ulmus americana*. Other woody species may contribute to the canopy or form a tall-shrub layer, including *Lindera benzoin* and *Carpinus caroliniana*. The low-shrub layer, if present, is usually characterized by the presence of *Rubus* spp., such as *Rubus allegheniensis, Rubus flagellaris, Rubus hispidus*, or *Rubus phoenicolasius*. This layer is often dominated by exotic species such as *Berberis thunbergii, Crataegus* spp., *Lonicera morrowii, Lonicera tatarica, Rhamnus cathartica*, and *Rosa multiflora*. The herbaceous layer is variable, often containing grasses and forbs of both native and exotic origin. Common species include *Ageratina altissima var. altissima, Allium vineale, Arisaema triphyllum, Calystegia sepium ssp. sepium, Dennstaedtia punctilobula, Galium aparine, Glechoma hederacea, Impatiens capensis, Oxalis stricta, Polygonum persicaria, Polygonum virginianum, Polystichum acrostichoides*, and *Veronica officinalis*, among many others. The invasive species *Alliaria petiolata, Microstegium vimineum*, and *Polygonum caespitosum* can be abundant in this disturbed forest type. Vines can be absent or abundant. In stands with high vine cover, the vegetation structure can be altered by the weight of the vines pulling down trees and shrubs. Common vines include *Parthenocissus quinquefolia, Toxicodendron radicans, Vitis labrusca*, and the invasive vines *Celastrus orbiculata* and *Lonicera japonica*.

ENVIRONMENT & DYNAMICS

Environmental Description: This vegetation occurs on sites that have been cleared for agriculture, were planted with conifer plantation species and then abandoned, or were otherwise heavily modified in the past. Generally sites are dry-mesic and may have

small seepage inclusions in some examples. Occasionally this type may occur in former agricultural bottomlands, in which case the soils may be temporarily flooded or saturated.

Dynamics: These forests are often young and resulted from the colonization of old agricultural fields by woody species. Early-successional woody species dominate the canopy in a widely variable mix, depending on geographic location. In the Central Appalachians and Mid-Atlantic Piedmont, many stands represent decadent forests that were once dominated by *Robinia pseudoacacia* but are now mixed with various mid-successional hardwoods; other stands in this region regenerated as mixed stands, or from abandoned plantations, such as those of *Picea abies*. Recent disturbance or abundant invasive species give these forest stands a weedy character. It is unlikely that these stands will succeed to a natural plant community dominated by native species.

DISTRIBUTION

Geographic Range: This alliance is found in the northern and central U.S. from southern Maine south to Virginia and west to eastern Ohio, Kentucky, and Tennessee.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: CT, DE, IN, KY, MA, MD, ME, NB, NH, NJ, NY, PA, QC, RI, TN, VA, VT, WV
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

LOWER LEVEL UNITS

Associations:
- CEGL008503 *Betula lenta - Acer rubrum / Lycopodium annotinum - Dennstaedtia punctilobula* Ruderal Forest
- CEGL006599 *Prunus serotina - Liriodendron tulipifera - Acer rubrum - Fraxinus americana - (Robinia pseudoacacia)* Ruderal Forest
- CEGL006506 *Quercus rubra - Acer rubrum - Betula* spp. - *Pinus strobus* Ruderal Forest
- CEGL006303 *Populus (tremuloides, grandidentata) - Betula (populifolia, papyrifera)* Ruderal Woodland
- CEGL006560 *Populus tremuloides - Betula populifolia* Ruderal Forest
- CEGL004133 *Prunus serotina - Sassafras albidum - (Fraxinus americana) / Juniperus virginiana* Ruderal Forest
- CEGL005208 *Pinus* spp. - *Picea abies - Acer rubrum - Liriodendron tulipifera* Ruderal Forest
- CEGL006628 *Acer saccharum - Betula* spp. - *Fagus grandifolia* Ruderal Forest

AUTHORSHIP

Primary Concept Source: D. Faber-Langendoen
Author of Description: D. Faber-Langendoen
Acknowledgments:
Version Date: 01/08/2014
Classif Resp Region: East

REFERENCES

References: Faber-Langendoen et al. 2016b

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A3229. *Acer rubrum - Prunus serotina - Pinus strobus* Ruderal Forest Alliance

CEGL008503. *Betula lenta - Acer rubrum / Lycopodium annotinum - Dennstaedtia punctilobula* Ruderal Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Betula lenta - Acer rubrum / Lycopodium annotinum - Dennstaedtia punctilobula* Ruderal Forest
Common Name (Translated Scientific Name): Sweet Birch - Red Maple / Stiff Clubmoss - Eastern Hay-scented Fern Ruderal Forest
Colloquial Name: Central Appalachian Ruderal Sweet Birch - Red Maple Forest

Type Concept: This vegetation type is associated with generally infertile sites that have been altered by logging and fires. Its distribution is centered in the Central Appalachians. Stands are floristically depauperate and characterized by even-aged, nearly pure *Betula lenta, Acer rubrum*, or mixtures of the two. Associated species, minor in importance, vary somewhat with geography and include *Betula alleghaniensis, Fraxinus americana, Fagus grandifolia, Prunus serotina, Quercus rubra, Quercus alba, Quercus velutina, Liriodendron tulipifera, Populus tremuloides, Populus grandidentata*, and/or *Robinia pseudoacacia*. *Magnolia acuminata* and *Magnolia fraseri* are sometimes associates in the southern portion of the range. The subcanopy, when developed, consists mainly of *Fagus grandifolia*. *Tsuga canadensis* forms a scattered canopy or understory in some stands. *Ilex montana* is a characteristic shrub in the southern portion of the type's range, and *Lindera benzoin* is typical elsewhere. Shrub associates include *Kalmia latifolia, Acer pensylvanicum, Hamamelis virginiana, Amelanchier arborea, Viburnum prunifolium, Fagus* sprouts, *Rhododendron calendulaceum, Rhododendron periclymenoides*, and *Rhododendron maximum*. Herb layers may be dominated by dense and extensive colonies of *Lycopodium annotinum*, often in association with *Lycopodium dendroideum, Lycopodium clavatum*, and/or *Lycopodium digitatum*, or by *Dennstaedtia punctilobula*. Herbaceous associates include *Thelypteris noveboracensis, Polystichum acrostichoides, Carex swanii*, and others.

Classification Comments: Because of the consistent dominance of *Betula lenta* and/or *Acer rubrum* and locally dense *Lycopodium* or *Dennstaedtia punctilobula* ground cover, this community type is readily identifiable in the field. *Lycopodium* spp. as well as *Dennstaedtia punctilobula* are specialized colonizers of moist, sterile, exposed mineral soils, which were plentiful in these habitats after the burning off of the original forest humus. Current stand composition suggests that the likely successors to this association in Virginia are *Tsuga canadensis - Fagus grandifolia - Quercus rubra* Forest (CEGL006088) or *Picea rubens / Betula alleghaniensis / Bazzania trilobata* Forest (CEGL008501). However, potentially devastating impacts of beech bark disease and hemlock woolly adelgid on Allegheny Mountain could alter some of the present successional trends (Fleming and Moorhead 1996).

Similar NVC Types:

- CEGL006506 *Quercus rubra - Acer rubrum - Betula* spp. - *Pinus strobus* Ruderal Forest: occupies similar mid-successional settings but is generally more northern (*Betula papyrifera* more typical than *Betula lenta*)and contains a component of white pine.

VEGETATION

Floristics: Stands are floristically depauperate and characterized by even-aged, nearly pure *Betula lenta, Acer rubrum*, or mixtures of the two. Associated species vary somewhat with geography and include *Betula alleghaniensis, Fraxinus americana, Fagus grandifolia, Prunus serotina, Quercus rubra, Quercus alba, Quercus velutina, Populus tremuloides, Populus grandidentata*, and/or *Robinia pseudoacacia*. *Magnolia acuminata* and *Magnolia fraseri* are sometimes associates in the southern portion of the range. The subcanopy, when developed, consists mainly of *Fagus grandifolia*. *Tsuga canadensis* forms a scattered canopy or understory in some stands. *Ilex montana* is a characteristic shrub in the southern portion of the type's range, and *Lindera benzoin* is typical elsewhere. Shrub associates include *Kalmia latifolia, Acer pensylvanicum, Amelanchier arborea, Viburnum prunifolium, Fagus* sprouts, *Rhododendron calendulaceum, Rhododendron periclymenoides*, and *Rhododendron maximum*. Herb layers may be dominated by dense and extensive colonies of *Lycopodium annotinum*, often in association with *Lycopodium dendroideum, Lycopodium clavatum*, and/or *Lycopodium digitatum*, or by *Dennstaedtia punctilobula*. Herbaceous associates include *Thelypteris noveboracensis, Polystichum acrostichoides, Carex swanii, Dryopteris intermedia, Smilax rotundifolia, Medeola virginiana, Maianthemum canadense, Monotropa uniflora*, and *Oclemena acuminata (= Aster acuminatus)*. Mean species richness of plot-sampled stands in Virginia is 15 taxa per 400 m2.

ENVIRONMENT & DYNAMICS

Environmental Description: This vegetation type is associated with generally infertile sites that have been severely altered by logging and fires. It occupies various slope and aspect positions. The type is rarely found on bouldery or rocky sites. Soils vary but are often acidic and low in base status. Deep surficial duff, with small pieces of charred wood or thin charcoal lenses are typical of soils at Virginia sampling sites (Fleming and Moorhead 1996).

Dynamics: This community occurs on infertile sites that have been severely altered by disturbance including but not limited to logging and fires.

DISTRIBUTION

Geographic Range: This community has been documented from the Central Appalachians in Virginia and West Virginia, north to New York, Pennsylvania and New Jersey. Its range may extend further in the northeastern United States.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: MD?, NJ, NY, PA, VA, WV?
TNC Ecoregions [optional]: 59:C, 60:C, 61:C
USFS Ecoregions (1994/95): 212Fc:CCC, 221Bd:CCC, M221Ba:CCC

Omernik Ecoregions:

Federal Lands [optional]: NPS (Appalachian Trail [Central Appalachians], Appalachian Trail [Lower New England], Delaware Water Gap, Upper Delaware); USFS (George Washington, Monongahela); USFWS (Great Swamp)

CONSERVATION STATUS

Grank (Review Date): GNA (ruderal) (2001/6/21)

Greasons: This association appears to be an early-successional but persistent vegetation type resulting from major anthropogenic disturbances. It has some significance for conservation in Virginia, however, since its successional development most likely will result in one of the state-rare community types that are confined in Virginia to Allegheny Mountain. For conservation planning in Virginia it is best considered a low-quality occurrence of *Tsuga canadensis - Fagus grandifolia - Quercus rubra* Forest (CEGL006088) or *Picea rubens / Betula alleghaniensis / Bazzania trilobata* Forest (CEGL008501).

Ranking Author (Version): G. Fleming, mod. S.C. Gawler (2006/6/19)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:

- **?** *Betula lenta / Ilex montana / Lycopodium annotinum* Association (Fleming and Moorhead 1996)
- **=** *Betula lenta / Ilex montana / Lycopodium annotinum* Forest (Fleming and Coulling 2001)
- **=** *Betula lenta / Ilex montana / Lycopodium annotinum* Forest (Fleming et al. 2004)
- **<** Successional / Modified Terrestrial Forest (Fleming et al. 2006)

AUTHORSHIP

Primary Concept Source: K.D. Patterson and G.P. Fleming, mod. S.C. Gawler
Author of Description: G. Fleming, mod. S.C. Gawler
Acknowledgments:
Version Date: 2006/06/19

REFERENCES

References: Edinger et al. 2002, Fike 1999, Fleming and Coulling 2001, Fleming and Moorhead 1996, Fleming and Patterson 2011a, Fleming et al. 2001, Fleming et al. 2004, Fleming et al. 2006, Perles et al. 2007, Perles et al. 2008.

NYC NAC Association Description based on 6 plots (CEGL008503):

The overstory is dominated by sweet birch (Betula lenta). Black cherry (Prunus serotina) is a common associate in the overstory. Other overstory trees include sweetgum (Liquidambar styraciflua), northern red oak (Quercus rubra), American beech (Fagus grandifolia), black oak (Quercus velutina), Norway maple (Acer platanoides), white ash (Fraxinus americana), red maple (Acer rubrum), pignut hickory (Carya glabra), American hornbeam (Carpinus caroliniana), and ash (Fraxinus sp.).

The midstory is dominated by sweet birch (Betula lenta). Black cherry (Prunus serotina) is a common associate in the midstory. Other midstory plants include Norway maple (Acer platanoides), red maple (Acer rubrum), sweet cherry (Prunus avium), bitternut hickory (Carya cordiformis), flowering dogwood (Cornus florida), American hornbeam (Carpinus caroliniana), apple (Malus sp.), coastal sweetpepperbush (Clethra alnifolia), American beech (Fagus grandifolia), Japanese maple (Acer palmatum), sweetgum (Liquidambar styraciflua), southern arrowwood (Viburnum dentatum), Japanese corktree (Phellodendron japonicum), chokecherry (Prunus virginiana), white oak (Quercus alba), sassafras (Sassafras albidum), and ash (Fraxinus sp.).

Vines include eastern poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), Japanese honeysuckle (Lonicera japonica), summer grape (Vitis aestivalis), English ivy (Hedera helix), roundleaf greenbrier (Smilax rotundifolia), and Oriental bittersweet (Celastrus orbiculatus).

Understory plants include eastern white wood aster (Eurybia divaricata), mapleleaf viburnum (Viburnum acerifolium), black cherry (Prunus serotina), Asiatic dayflower (Commelina communis), garlic mustard (Alliaria petiolata), coastal sweetpepperbush (Clethra alnifolia), multiflora rose (Rosa multiflora), American hornbeam (Carpinus caroliniana), broadleaf enchanter's nightshade (Circaea lutetiana), London planetree (Platanus × hispanica), jumpseed (Polygonum virginianum), Japanese angelica tree (Aralia elata), sweetscented joe pye weed (Eutrochium purpureum), Norway maple (Acer platanoides), Canada mayflower (Maianthemum canadense), blackberry (Rubus sp.), smooth Solomon's seal (Polygonatum biflorum), sweetgum (Liquidambar styraciflua), northern red oak (Quercus rubra), and American wintergreen (Pyrola americana).

A3229. *Acer rubrum - Prunus serotina - Pinus strobus* Ruderal Forest Alliance

CEGL006303. *Populus (tremuloides, grandidentata) - Betula (populifolia, papyrifera)* Ruderal Woodland

Type Concept Sentence:

OVERVIEW

Scientific Name: *Populus (tremuloides, grandidentata) - Betula (populifolia, papyrifera)* Ruderal Woodland
Common Name (Translated Scientific Name): (Quaking Aspen, Bigtooth Aspen) - (Gray Birch, Paper Birch) Ruderal Woodland
Colloquial Name: Ruderal Aspen - Birch Woodland

Type Concept: This is a common successional deciduous woodland/forest of the northern Appalachian Mountains, from New England, New York and adjacent Canada across to the northern Great Lakes. Small patches of this type are found on the Coastal Plain but are dominated by one or more of the following: *Populus tremuloides, Populus grandidentata* or the non-native *Populus alba*, and *Betula populifolia*. It occurs in various settings, often over thin glacial till. Elevation and aspect vary. The community is broadly defined and includes vegetation developing after severe disturbance such as logging, fires, severe hurricanes, or simply heavily fragmented residential development. This community can occur as closed-canopy forest or open woodland; in a few very exposed areas, it has been seen to grade to shrubland. Understory shrub cover varies from sparse to well-developed depending primarily on canopy closure. Herbs are typically sparse but may be locally dense. Bryoids are typically minor. The tree canopy is a heterogeneous mixture of light-requiring, wind-dispersed trees usually composed of several codominant species, including *Populus tremuloides, Populus grandidentata, Betula papyrifera, Betula populifolia, Populus balsamifera, Acer rubrum, Prunus serotina*, and/or *Prunus pensylvanica*. More minor components can include *Pinus strobus, Picea rubens, Abies balsamea, Acer saccharum, Quercus rubra, Fraxinus americana, Fraxinus pennsylvanica*, or *Ulmus americana* in the northern portions of the range. Scattered individuals of *Juniperus virginiana* may occur in southern examples of this community. The shrub layer can include *Viburnum dentatum, Lonicera morrowii, Frangula alnus (= Rhamnus frangula), Rhus typhina, Rhus copallinum, Morella pensylvanica, Rubus* spp., and/or *Viburnum dentatum*, in the southern portion of the range, or *Sorbus americana, Acer pensylvanicum, Viburnum nudum var. cassinoides*, or *Hamamelis virginiana*. *Vaccinium angustifolium, Kalmia angustifolia, Gaylussacia baccata*, and *Comptonia peregrina* may form a dwarf-shrub layer in the northern portion of the range. Associated herbs to the north typically include *Pteridium aquilinum, Deschampsia flexuosa, Festuca trachyphylla (= Festuca ovina), Cornus canadensis, Doellingeria umbellata (= Aster umbellatus), Eurybia macrophylla (= Aster macrophyllus), Danthonia spicata, Carex lucorum* and related species, and *Maianthemum canadense*. Typical bryoids include *Polytrichum commune, Polytrichum juniperinum, Dicranum* spp., and *Cladonia* spp. Herbs in southern examples of this community are typically old-field grasses and *Solidago* spp. In the absence of major disturbance, these forests mostly succeed to northern hardwood, spruce-fir, mixed northern hardwood-spruce-fir, or red oak - northern hardwood forests in the northern portion of the range.

Classification Comments: Given the recent use of this community outside of the spruce-fir zone, the concept used at Acadia National Park was broadened to include all of the Northeast stands dominated by *Populus (tremuloides, grandidentata) - Betula (populifolia, papyrifera)* regardless of the spruce-fir component.

Similar NVC Types:

VEGETATION

Floristics: This community can occur as closed-canopy forest or open woodland; in a few very exposed areas, it has been seen to grade to shrubland. Understory shrub cover varies from sparse to well-developed depending primarily on canopy closure. Herbs are typically sparse, but may be locally dense. Bryoids are typically minor. The tree canopy is a heterogeneous mixture of light-requiring, wind-dispersed trees usually composed of several codominant species including *Populus tremuloides, Populus grandidentata, Betula papyrifera, Betula populifolia, Populus balsamifera, Acer rubrum, Prunus serotina*, and/or *Prunus pensylvanica*. More minor components can include *Pinus strobus, Picea rubens, Abies balsamea, Acer saccharum, Quercus rubra, Fraxinus americana, Fraxinus pennsylvanica*, or *Ulmus americana*. The shrub layer in the northern portion of the range includes *Sorbus americana, Acer pensylvanicum, Viburnum nudum var. cassinoides*, or *Hamamelis virginiana*. *Vaccinium angustifolium, Kalmia angustifolia, Gaylussacia baccata*, and *Comptonia peregrina* may form a dwarf-shrub layer. Associated herbs to the north typically include *Pteridium aquilinum, Deschampsia flexuosa, Festuca trachyphylla (= Festuca ovina), Cornus canadensis, Doellingeria umbellata (= Aster umbellatus), Eurybia macrophylla (= Aster macrophyllus), Danthonia spicata, Carex lucorum* and related species, and *Maianthemum canadense*. Typical bryoids include *Polytrichum commune, Polytrichum juniperinum, Dicranum* spp., and *Cladonia* spp. Herbs in southern examples of this community are typically old-field grasses and *Solidago* spp. Small patches of this type are found on the Coastal Plain but are dominated by one or more of the following: *Populus tremuloides, Populus grandidentata*, or the non-native *Populus alba*, and *Betula populifolia* (usually not *Betula lenta* or *Betula alleghaniensis*).

ENVIRONMENT & DYNAMICS

Environmental Description: It occurs in various settings, often over thin glacial till. Elevation and aspect vary. The community is broadly defined, and includes vegetation developing after severe disturbance such as logging, fires, severe hurricanes, or simply heavily fragmented residential development.

Dynamics: In the absence of major disturbance, these forests mostly succeed to northern hardwood, spruce-fir, mixed northern hardwood-spruce-fir, or red oak - northern hardwood forests.

DISTRIBUTION

Geographic Range: This is a common successional deciduous woodland/forest of the northern Appalachian Mountains, from New England, New York and adjacent Canada across to the northern Great Lakes. Small patches of this type are found on the Coastal Plain.

Spatial Scale & Pattern [optional]: Matrix
Nations: CA, US
States/Provinces: MA, ME, NB, NH, NJ, NY, QC, VT
TNC Ecoregions [optional]: 48:C, 61:C, 62:C, 63:C
USFS Ecoregions (1994/95): 212A:CP, 212Bb:CCC, 212Ca:CCP, 212Cb:CCC, 212Da:CCC, 212Dc:CCC, 212Fb:CPP, 221Ae:CCC, 221Bc:CCC, 222Ib:CCC, 222O:CP, 232Aa:CCC, 232Ac:CCC, M212Aa:CCC, M212Ab:CCC, M212Ac:CCC, M212Ae:CCC, M212Af:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Acadia, Appalachian Trail [Lower New England], Appalachian Trail [Northern Appalachians], Boston Harbor Islands, Gateway, Saratoga); USFS (Finger Lakes); USFWS (Aroostook, Assabet River, Carlton Pond?, Iroquois, Moosehorn, Nulhegan Basin, Rachel Carson)

CONSERVATION STATUS

Grank (Review Date): GNA (ruderal) (2015/2/18)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

Synonymy:

- **=** Aspen - Birch Woodland/Forest Complex (Gawler 2002)
- **<** CNE mesic hardwood forest on acidic bedrock/till (Rawinski 1984a)
- **=** Deciduous Forest Transition (Bridges 1976)
- **<** Mesic Northern Hardwood Forest (Beech-Birch-Maple Forest) (Thompson 1996)

AUTHORSHIP

Primary Concept Source: Northern Appalachian Planning Team
Author of Description: S.C. Gawler, mod. E. Largay
Acknowledgments:
Version Date: 2007/03/26

REFERENCES

References: Bridges 1976, CDPNQ unpubl. data, Edinger et al. 2002, Edinger et al. 2007, Edinger et al. 2008a, Gawler 2002, Gawler and Cutko 2010, Largay and Sneddon 2010, Lubinski et al. 2003, NRCS 2001b, NRCS 2004a, Rawinski 1984a, Swain and Kearsley 2001, Thompson 1996, Thompson and Sorenson 2000, Walz et al. 2008.

NYC NAC Association Description based on 20 plots (CEGL006303):

The overstory is dominated or codominated by aspens, such as bigtooth aspen (Populus grandidentata) or quaking aspen (Populus tremuloides), and/or birches, such as gray birch (Betula populifolia). Other overstory trees and shrubs include pin oak (Quercus palustris), sweetgum (Liquidambar styraciflua), white poplar (Populus alba), northern red oak (Quercus rubra), sassafras (Sassafras albidum), white mulberry (Morus alba), red maple (Acer rubrum), black cherry (Prunus serotina), black locust (Robinia pseudoacacia), willow oak (Quercus phellos), blackgum (Nyssa sylvatica), boxelder (Acer negundo), sycamore maple (Acer pseudoplatanus), slippery elm (Ulmus rubra), and bitternut hickory (Carya cordiformis).

Midstory plants include gray birch (Betula populifolia), black cherry (Prunus serotina), sassafras (Sassafras albidum), sweetgum (Liquidambar styraciflua), red maple (Acer rubrum), bigtooth aspen (Populus grandidentata), quaking aspen (Populus tremuloides),

pin oak (Quercus palustris), highbush blueberry (Vaccinium corymbosum), southern arrowwood (Viburnum dentatum), winged sumac (Rhus copallinum), northern red oak (Quercus rubra), white poplar (Populus alba), Japanese angelica tree (Aralia elata), common persimmon (Diospyros virginiana), eastern baccharis (Baccharis halimifolia), northern bayberry (Morella pensylvanica), eastern cottonwood (Populus deltoides), blackgum (Nyssa sylvatica), white oak (Quercus alba), tuliptree (Liriodendron tulipifera), American sycamore (Platanus occidentalis), northern spicebush (Lindera benzoin), flowering dogwood (Cornus florida), white ash (Fraxinus americana), boxelder (Acer negundo), sweet birch (Betula lenta), black elderberry (Sambucus nigra), common hackberry (Celtis occidentalis), Amur honeysuckle (Lonicera maackii), and spindletree (Euonymus sp.).

Vines include Japanese honeysuckle (Lonicera japonica), roundleaf greenbrier (Smilax rotundifolia), eastern poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), Oriental bittersweet (Celastrus orbiculatus), Amur peppervine (Ampelopsis brevipedunculata), riverbank grape (Vitis riparia), poison oak (Toxicodendron), climbing nightshade (Solanum dulcamara), cat greenbrier (Smilax glauca), and Asiatic tearthumb (Polygonum perfoliatum).

Understory plants include goldenrod (Solidago sp.), blackberry (Rubus sp.), black cherry (Prunus serotina), common reed (Phragmites australis), multiflora rose (Rosa multiflora), sweetgum (Liquidambar styraciflua), common wormwood (Artemisia vulgaris), southern arrowwood (Viburnum dentatum), annual ragweed (Ambrosia artemisiifolia), sassafras (Sassafras albidum), red maple (Acer rubrum), northern spicebush (Lindera benzoin), Nepalese browntop (Microstegium vimineum), white poplar (Populus alba), garlic mustard (Alliaria petiolata), northern dewberry (Rubus flagellaris), wrinkleleaf goldenrod (Solidago rugosa), American pokeweed (Phytolacca americana), northern bayberry (Morella pensylvanica), gray birch (Betula populifolia), eastern hayscented fern (Dennstaedtia punctilobula), quaking aspen (Populus tremuloides), hyssopleaf thoroughwort (Eupatorium hyssopifolium), small enchanter's nightshade (Circaea alpina), cinquefoil (Potentilla), stickywilly (Galium aparine), spotted ladysthumb (Polygonum persicaria), white snakeroot (Ageratina altissima), deertongue (Dichanthelium clandestinum), flat-top goldentop (Euthamia graminifolia), avens (Geum sp.), Amur honeysuckle (Lonicera maackii), slender goldentop (Euthamia caroliniana), jewelweed (Impatiens capensis), flowering dogwood (Cornus florida), pin oak (Quercus palustris), jumpseed (Polygonum virginianum), Japanese angelica tree (Aralia elata), smallspike false nettle (Boehmeria cylindrica), cutleaf blackberry (Rubus laciniatus), yellow nutsedge (Cyperus esculentus), American burnweed (Erechtites hieraciifolius), broadleaf enchanter's nightshade (Circaea lutetiana), violet (Viola sp.), shaggy soldier (Galinsoga quadriradiata), Allegheny hawkweed (Hieracium paniculatum), rough hawkweed (Hieracium scabrum), highbush blueberry (Vaccinium corymbosum), lespedeza (Lespedeza sp.), broadleaf sedge (Carex platyphylla), northern red oak (Quercus rubra), woodsorrel (Oxalis sp.), Japanese knotweed (Polygonum cuspidatum), poverty rush (Juncus tenuis), wild chives (Allium schoenoprasum), white mulberry (Morus alba), winged sumac (Rhus copallinum), dock (Rumex sp.), white heath aster (Symphyotrichum ericoides), slippery elm (Ulmus rubra), and Canada mayflower (Maianthemum canadense).

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A3229. *Acer rubrum - Prunus serotina - Pinus strobus* Ruderal Forest Alliance

CEGL006506. *Quercus rubra - Acer rubrum - Betula* spp. - *Pinus strobus* Ruderal Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Quercus rubra - Acer rubrum - Betula* spp. - *Pinus strobus* Ruderal Forest
Common Name (Translated Scientific Name): Northern Red Oak - Red Maple - Birch species - Eastern White Pine Ruderal Forest
Colloquial Name: Northeastern Ruderal Oak - Red Maple Forest

Type Concept: This deciduous to mixed forest of northern New England is a broadly defined community, usually developing after severe disturbance, including clearing, pasturing, logging, fires, severe hurricanes, or simply heavily fragmented residential development. While in some cases it is a successional type, it may persist in some settings, particularly where soils are limited, for example along ridgelines. The canopy trees are mostly 40-100 years old. The canopy ranges from somewhat open to closed; the shrub, herb and bryoid layers are patchy and rarely extensive. Composition is variable depending on site history. The canopy is usually mostly deciduous, dominated by a heterogeneous mixture of *Quercus rubra, Acer rubrum, Pinus strobus*, and *Fagus grandifolia*. Typically these occur in association with light-requiring, wind-dispersed trees such as *Populus tremuloides, Populus grandidentata, Betula papyrifera, Betula populifolia, Fraxinus americana*, and *Prunus serotina*. Minor associates include *Picea rubens* and *Acer saccharum*. Understory species tend to reflect predisturbance conditions and include *Acer pensylvanicum, Corylus cornuta, Viburnum acerifolium*, or *Hamamelis virginiana* in the shrub layer. *Vaccinium angustifolium* is a typical low shrub, although it does not form a coherent layer. *Pteridium aquilinum* is characteristic and may be abundant in the herbaceous layer; other common herbs include *Trientalis borealis, Maianthemum canadense, Deschampsia flexuosa*, and *Aralia nudicaulis*. The bryophyte layer is of variable cover and may include *Polytrichum commune* and *Dicranum polysetum*. This association is differentiated from similar forests and woodlands by its thin canopy that usually includes early-successional species, particularly *Acer rubrum*, low abundance of tolerant

hardwoods other than red oak, and the lack of a well-developed heath shrub layer (as is typical in oak-pine woodlands). Unlike oak and oak-pine forests to the south, *Quercus rubra* is the only oak species present in any abundance.

Classification Comments: This association was first described from the Northern Appalachian-Acadian ecoregion, where it approaches a matrix landscape pattern in the southern portions of the region while being absent from areas to the north. Similar forests extend southward. Further work in Lower New England suggests that this type may represent an earlier successional version of *Pinus strobus - Quercus (rubra, velutina) - Fagus grandifolia* Forest (CEGL006293), and possibly of other later-successional types, distinguished by the preponderance of *Acer rubrum* in the canopy.

Similar NVC Types:
- CEGL006134 *Quercus rubra - (Quercus prinus) / Vaccinium* spp. / *Deschampsia flexuosa* Woodland
- CEGL006293 *Pinus strobus - Quercus (rubra, velutina) - Fagus grandifolia* Forest
- CEGL006635 *Quercus rubra - Acer saccharum / Viburnum acerifolium - Lindera benzoin* Forest
- CEGL008503 *Betula lenta - Acer rubrum / Lycopodium annotinum - Dennstaedtia punctilobula* Ruderal Forest
- CEGL006633 *Quercus rubra - Acer saccharum - Fagus grandifolia / Viburnum acerifolium* Forest
- CEGL006454 *Quercus (rubra, velutina, alba) - Betula lenta - (Pinus strobus)* Forest

VEGETATION

Floristics: Canopy trees are mostly 40-100 years old. The canopy ranges from somewhat open to closed; the shrub, herb, and bryoid layers are patchy and rarely extensive. Composition is variable depending on site history. The canopy is usually mostly deciduous, dominated by a heterogeneous mixture of *Quercus rubra, Pinus strobus*, and *Fagus grandifolia*. Typically these occur in association with light-requiring, wind-dispersed trees such as *Acer rubrum, Populus tremuloides, Populus grandidentata, Betula papyrifera, Betula populifolia, Fraxinus americana*, and *Prunus serotina*. Minor associates include *Picea rubens* and *Acer saccharum*. Understory species tend to reflect predisturbance conditions and include *Acer pensylvanicum, Corylus cornuta, Viburnum acerifolium*, or *Hamamelis virginiana* in the shrub layer. *Vaccinium angustifolium* is a typical low shrub. *Pteridium aquilinum* is characteristic, and may be abundant, in the herbaceous layer; other common herbs include *Trientalis borealis, Maianthemum canadense, Deschampsia flexuosa*, and *Aralia nudicaulis*. The bryophyte layer is of variable cover and may include *Polytrichum commune* and *Dicranum polysetum*.

ENVIRONMENT & DYNAMICS

Environmental Description: This deciduous to mixed forest of northern New England is a broadly defined community, usually developing after severe disturbance including clearing, pasturing, logging, fires, severe hurricanes, or simply heavily fragmented residential development. While in some cases it is a successional type, it may persist in some settings, particularly where soils are limited, for example along ridgelines.

Dynamics:

DISTRIBUTION

Geographic Range: This forest occurs in northern and central New England and adjacent Canada, south to Pennsylvania.

Spatial Scale & Pattern [optional]: Matrix
Nations: CA, US
States/Provinces: CT, MA, ME, NB, NH, NY, PA, QC, RI, VT
TNC Ecoregions [optional]: 60:C, 61:C, 63:C
USFS Ecoregions (1994/95): 212Cb:CCC, 212Da:CCC, 212Db:CCC, 212Dc:CCC, 212Fc:CCC, 221Ae:CCC, 221Bc:CCC, M212Ag:CCC, M212C:CC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Acadia, Appalachian Trail [Lower New England], Appalachian Trail [Northern Appalachians], Minute Man, Saratoga, Upper Delaware); USFWS (Assabet River, Eastern Massachusetts, Great Meadows, Montezuma, Moosehorn?, Oxbow, Rachel Carson)

CONSERVATION STATUS

Grank (Review Date): GNA (ruderal) (2012/5/14)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:

- **<** Oak - Pine Forest (Gawler 2002)

AUTHORSHIP

Primary Concept Source: Northern Appalachian Planning Team, mod. L.A. Sneddon
Author of Description: S.C. Gawler
Acknowledgments:
Version Date: 2005/12/07

REFERENCES

References: CDPNQ unpubl. data, Edinger et al. 2002, Edinger et al. 2007, Gawler 2002, Gawler and Cutko 2010, Gawler et al. 2005, Küchler 1956, Lubinski et al. 2003, Moore and Taylor 1927, NRCS 2004a, Perles et al. 2008, Sperduto 2000a, Thompson and Jenkins 1992, Thompson and Sorenson 2000.

NYC NAC Association Description based on 16 plots (CEGL006506):

Overstory trees include northern red oak (Quercus rubra), sweet birch (Betula lenta), black cherry (Prunus serotina), white oak (Quercus alba), red maple (Acer rubrum), sassafras (Sassafras albidum), sweetgum (Liquidambar styraciflua), Norway maple (Acer platanoides), hawthorn (Crataegus sp.), sweet cherry (Prunus avium), common hackberry (Celtis occidentalis), eastern white pine (Pinus strobus), black oak (Quercus velutina), black locust (Robinia pseudoacacia), pin oak (Quercus palustris), Amur corktree (Phellodendron amurense), and American basswood (Tilia americana).

Midstory plants include black cherry (Prunus serotina), red maple (Acer rubrum), sweet birch (Betula lenta), ash (Fraxinus sp.), Norway maple (Acer platanoides), northern spicebush (Lindera benzoin), hawthorn (Crataegus sp.), northern red oak (Quercus rubra), flowering dogwood (Cornus florida), sweet cherry (Prunus avium), sweetgum (Liquidambar styraciflua), southern arrowwood (Viburnum dentatum), Japanese angelica tree (Aralia elata), sassafras (Sassafras albidum), Japanese maple (Acer palmatum), Japanese corktree (Phellodendron japonicum), blackhaw (Viburnum prunifolium), blackgum (Nyssa sylvatica), white mulberry (Morus alba), burningbush (Euonymus alatus), sycamore maple (Acer pseudoplatanus), glossy buckthorn (Frangula alnus), black oak (Quercus velutina), common hackberry (Celtis occidentalis), hophornbeam (Ostrya), mockernut hickory (Carya tomentosa), common serviceberry (Amelanchier arborea), white oak (Quercus alba), and white ash (Fraxinus americana).

Vines include Virginia creeper (Parthenocissus quinquefolia), eastern poison ivy (Toxicodendron radicans), Oriental bittersweet (Celastrus orbiculatus), Japanese honeysuckle (Lonicera japonica), fox grape (Vitis labrusca), English ivy (Hedera helix), Amur peppervine (Ampelopsis brevipedunculata), roundleaf greenbrier (Smilax rotundifolia), common periwinkle (Vinca minor), Chinese wisteria (Wisteria sinensis), riverbank grape (Vitis riparia), common moonseed (Menispermum canadense), and summer grape (Vitis aestivalis).

Understory plants include white wood aster (Eurybia divaricata), garlic mustard (Alliaria petiolata), broadleaf enchanter's nightshade (Circaea lutetiana), black cherry (Prunus serotina), multiflora rose (Rosa multiflora), feathery false lily of the valley (Maianthemum racemosum), northern dewberry (Rubus flagellaris), mapleleaf viburnum (Viburnum acerifolium), black raspberry (Rubus occidentalis), wine raspberry (Rubus phoenicolasius), Norway maple (Acer platanoides), bitternut hickory (Carya cordiformis), northern spicebush (Lindera benzoin), northern red oak (Quercus rubra), American pokeweed (Phytolacca americana), jumpseed (Polygonum virginianum), Amur peppervine (Ampelopsis brevipedunculata), purpleflowering raspberry (Rubus odoratus), devil's walkingstick (Aralia spinosa), Canada mayflower (Maianthemum canadense), and sessileleaf bellwort (Uvularia sessilifolia).

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
1.B.2.Na.90.a. G030 Eastern North American Native Ruderal Forest

A3227. *Juniperus virginiana - Pinus virginiana - Pinus echinata* Ruderal Forest Alliance

Type Concept Sentence: This semi-natural forest is found in locally disturbed areas, most commonly in old fields and pastures, and cleared land, with three variants: *Juniperus virginiana var. virginiana* stands, mixed *Juniperus virginiana var. virginiana - Quercus* spp. stands, and *Pinus* spp. (especially *Pinus echinata, Pinus strobus*, and *Pinus virginiana*) stands.

OVERVIEW

Scientific Name: *Juniperus virginiana - Pinus virginiana - Pinus echinata* Ruderal Forest Alliance
Common Name (Translated Scientific Name): Eastern Red-cedar - Virginia Pine - Shortleaf Pine Ruderal Forest Alliance
Colloquial Name: Ruderal Eastern Red-cedar - Virginia Pine - Mixed Conifer Forest

Type Concept: This semi-natural forest is found in locally disturbed areas, most commonly in old fields and pastures, and cleared land. Three dominance-based suballiances may be recognized: (1) *Juniperus virginiana var. virginiana* stands occur widely and are more common on calcareous sites. Stand may be very dense, and the stature may be rather low. Associated species include *Acer rubrum, Carya alba, Carya ovata, Cercis canadensis, Fraxinus americana*, and *Pinus virginiana*. The midstory is typically sparse, with canopy species, as well as *Cornus florida, Ilex opaca, Liquidambar styraciflua*, and *Prunus serotina var. serotina*. The vegetation may vary in structure from open-canopy woodland (particularly as it invades herbaceous old fields) to dense, closed-canopy forest. (2) A mixed *Juniperus virginiana var. virginiana - Quercus* spp. suballiance represents stands that may be fire-suppressed native stands, and may not be natural in character. Various oaks (including *Quercus coccinea, Quercus phellos, Quercus rubra, Quercus velutina*) are present. (3) *Pinus* spp. (especially *Pinus echinata, Pinus strobus*, and *Pinus virginiana*) stands occur on old fields (often from abandoned farmland), old pastures, clearcuts, and eroded areas. Soils are typically dry, acidic, and infertile. This forest typically has a very dense canopy of *Pinus virginiana* and little understory vegetation. The dense canopy may also include admixtures of other *Pinus* species (e.g., *Pinus taeda, Pinus echinata, Pinus rigida, Pinus strobus*) or other early-successional deciduous trees (e.g., *Acer rubrum, Liquidambar styraciflua, Prunus serotina, Liriodendron tulipifera, Fraxinus americana, Nyssa sylvatica*). Associated woody and herbaceous species vary with geography but are typically ruderal or exotic species. Shrub and herb layers are frequently very sparse. *Lonicera japonica* and *Rosa multiflora* are common. The herb layer is characterized by weedy natives and exotics such as *Lycopodium digitatum, Achillea millefolium var. occidentalis, Hieracium caespitosum*, and *Lespedeza cuneata*.

Classification Comments: This very wide-ranging alliance could be split into northern versus southern alliances based on co-associated tree species. It is more typically found in the central United States. This alliance should exclude natural stands that may be either open rocky juniper woodlands or fire-suppressed native oak-juniper types, where associated woody species include *Quercus muehlenbergii, Quercus stellata, Celtis tenuifolia, Ulmus alata, Cercis canadensis*, and *Fraxinus quadrangulata* on calcareous or circumneutral sites.

The *Juniperus virginiana* suballiance formerly included elements that represented mature (100+ year) stands, on limestone or chalk, mostly in blacklands (as in the Blackbelt of Alabama, on the margins of Chalk Prairies), and also on sandstone (e.g., in Oklahoma).

Similar NVC Types:

- A3229 *Acer rubrum - Prunus serotina - Pinus strobus* Ruderal Forest Alliance: is more hardwood-dominated.

Diagnostic Characteristics: *Juniperus virginiana* and/or *Pinus virginiana* (less often *Pinus echinata* or *Pinus strobus*) are dominant or at least 25% cover and mixed with a variety of other hardwoods, Ground layer species vary with geography but are typically ruderal or exotic species; *Lonicera japonica* and *Rosa multiflora* are common. The herb layer is characterized by weedy natives and exotics such as *Lycopodium digitatum, Achillea millefolium var. occidentalis, Hieracium caespitosum*, and *Lespedeza cuneata*.

VEGETATION

Physiognomy and Structure: Three dominance-based suballiances may be recognized: (1) *Juniperus virginiana var. virginiana* stands may be very dense, and the stature may be rather low. The vegetation may vary in structure from open-canopy woodland (particularly as it invades herbaceous old fields) to dense, closed-canopy forest. (2) A mixed *Juniperus virginiana var. virginiana - Quercus* spp. suballiance represents stands that may be fire-suppressed native stands, and may not be more natural in character. (3) *Pinus* spp. (especially *Pinus echinata, Pinus strobus*, and *Pinus virginiana*) stands typically have a very dense canopy of *Pinus virginiana* and little understory vegetation.

Floristics: Three dominance-based suballiances may be recognized: (1) *Juniperus virginiana var. virginiana* stands occur widely and are more common on calcareous sites. Associated species include *Acer rubrum, Carya alba, Carya ovata, Cercis canadensis, Fraxinus americana*, and *Pinus virginiana*. The midstory is typically sparse, with canopy species as well as *Cornus florida, Ilex opaca, Liquidambar styraciflua*, and *Prunus serotina var. serotina*. (2) A mixed *Juniperus virginiana var. virginiana - Quercus* spp. suballiance represents stands, includes various oaks (including *Quercus coccinea, Quercus phellos, Quercus rubra, Quercus velutina*) are present. Review is needed to determine if this suballiance should be moved to a native alliance or group. (3) *Pinus* spp. (especially *Pinus echinata, Pinus strobus*, and *Pinus virginiana*) contains a dense canopy of *Pinus virginiana* and may also include admixtures of other *Pinus* species (e.g., *Pinus taeda, Pinus echinata, Pinus rigida, Pinus strobus*) or other early-successional deciduous trees (e.g., *Acer rubrum, Liquidambar styraciflua, Prunus serotina, Liriodendron tulipifera, Fraxinus americana, Nyssa sylvatica*). Associated woody and herbaceous species vary with geography but are typically ruderal or exotic species. Shrub and herb layers are frequently very sparse. *Lonicera japonica* and *Rosa multiflora* are common. The herb layer is often very sparse and characterized by weedy natives and exotics such as *Lycopodium digitatum, Achillea millefolium var. occidentalis, Hieracium caespitosum*, and *Lespedeza cuneata*. (Eyre 1980, Foti 1994).

ENVIRONMENT & DYNAMICS

Environmental Description: Forests in this alliance occur on usually high pH, fire-suppressed sites or old fields. The habitat for this alliance is most commonly old fields and pastures, successional cleared land, and other variously locally disturbed areas, especially on calcareous rocks.

Dynamics:

DISTRIBUTION

Geographic Range: This alliance is found in the northeastern U.S. from Massachusetts and New York, adjacent Ontario, Canada, to the southeastern U.S. from Virginia to Oklahoma and Texas, to the midwestern U.S. from Iowa to Missouri, and possibly elsewhere.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: AL, AR, CT, DC, DE, GA, IA, IN, KY, LA, MA, MD, ME, MI, MN, MO, MS, NC, NH, NJ, NY, OH?, OK, ON, PA, RI, SC, TN, TX, VA, VT, WI, WV
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

LOWER LEVEL UNITS

Associations:
- CEGL004935 *Quercus stellata - Juniperus virginiana var. virginiana* Ruderal Forest
- CEGL007704 *Juniperus virginiana var. virginiana / Rhus copallinum / Schizachyrium scoparium* Ruderal Woodland
- CEGL004731 *Juniperus virginiana var. virginiana - Quercus* spp. Ruderal Forest
- CEGL002593 *Juniperus virginiana* Midwest Ruderal Forest
- CEGL006024 *Juniperus virginiana* Ruderal Forest
- CEGL007816 *Juniperus virginiana var. virginiana - Pinus echinata - Ulmus alata / Rhus glabra* Ruderal Forest
- CEGL007124 *Juniperus virginiana var. virginiana* - (*Quercus* spp.) Ruderal Forest
- CEGL007944 *Pinus strobus* Ruderal Forest
- CEGL006327 *Pinus echinata* Ruderal Forest
- CEGL007121 *Pinus virginiana - Juniperus virginiana var. virginiana - Ulmus alata* Ruderal Forest
- CEGL002591 *Pinus virginiana* Ruderal Forest
- CEGL003628 *Juniperus virginiana var. virginiana / Schizachyrium scoparium* Ruderal Forest

AUTHORSHIP

Primary Concept Source: D. Faber-Langendoen, D.J. Allard and M. Pyne
Author of Description: D. Faber-Langendoen
Acknowledgments:
Version Date: 01/08/2014
Classif Resp Region: Midwest

REFERENCES

References: Eyre 1980, Faber-Langendoen et al. 2016b, Foti et al. 1994

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A3227. *Juniperus virginiana - Pinus virginiana - Pinus echinata* Ruderal Forest Alliance

CEGL007944. *Pinus strobus* Ruderal Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Pinus strobus* Ruderal Forest
Common Name (Translated Scientific Name): Eastern White Pine Ruderal Forest
Colloquial Name: Ruderal Eastern White Pine Forest

Type Concept: This is an early-successional forest dominated by *Pinus strobus*, typically with a very dense canopy and little understory. It is considered ruderal because it is commonly associated with anthropogenic disturbance (e.g., former old fields and formerly cleared flats along streams) that have caused a mix of species not found with natural disturbances. Associated woody and herbaceous species vary with geography. In the northeastern states, the tree canopy is often monotypic and even-aged, with occasional associates including *Acer rubrum, Juniperus virginiana, Liriodendron tulipifera* (within its range), or scattered *Quercus rubra* or *Quercus velutina*. In regions where northern hardwoods are more prevalent, canopy associates include *Fraxinus americana* and *Acer saccharum*. In the Southern Blue Ridge and nearby areas, typical canopy and subcanopy associates include *Liriodendron tulipifera, Acer rubrum, Pinus rigida*, and *Liquidambar styraciflua*, with *Tsuga canadensis* often forming a dense shrub stratum. The understory is typically poorly developed or characterized by scattered individuals found in the canopy. The herbaceous cover is variable depending on the density of tree and shrub cover, and may be characterized by ruderal or exotic species that favor openings or disturbance. In more open stands, typical species are those associated with old fields, including *Solidago rugosa, Solidago gigantea, Anthoxanthum odoratum, Poa pratensis, Schizachyrium scoparium, Elymus repens (= Elytrigia repens), Bromus inermis, Agrostis gigantea, Euthamia graminifolia, Achillea millefolium*, and *Daucus carota*. In stands that are more heavily forested, typical herbs include *Aralia nudicaulis, Ageratina altissima, Galium triflorum, Maianthemum canadense, Trientalis borealis, Mitchella repens, Polystichum acrostichoides*, and *Lycopodium* species. The particular composition of the herb layer will vary with geography. The substrate is usually covered by a thick layer of pine needle duff. In the Daniel Boone National Forest of Kentucky, *Pinus strobus* is spreading from plantings, especially in the Red River Gorge.

Classification Comments: This semi-natural type may be expected to occur throughout the range of the alliance but has primarily been attributed in areas where The Nature Conservancy ecoregional planning or other project-specific needs have documented its occurrence. Rangewide review should greatly expand its geographic scope. Association may need to be split based on northern hardwood associates and central hardwood associates.

Similar NVC Types:
- CST007178 Eastern White Pine Plantation

VEGETATION

Floristics: The tree canopy ranges from woodland to forest closure, with 25-85% cover. It is often monotypic and even-aged *Pinus strobus*, with occasional associates, including *Acer rubrum, Betula lenta, Juniperus virginiana*, or scattered *Quercus rubra* or *Quercus velutina*. In regions where northern hardwoods are more prevalent, canopy associates include *Fraxinus americana* and *Acer saccharum*. In the Southern Blue Ridge and nearby areas, typical canopy and subcanopy associates include *Liriodendron tulipifera, Acer rubrum, Pinus rigida*, and *Liquidambar styraciflua*, with *Tsuga canadensis* often forming a dense shrub stratum. The understory is poorly developed or characterized by scattered individuals found in the canopy. Shrubs are often present in the more open stands and include native species, such as *Cornus racemosa, Rhus glabra, Viburnum prunifolium*, and *Rubus* spp., as well as exotics, such as *Elaeagnus umbellata, Rosa multiflora, Lonicera morrowii*, and *Berberis thunbergii*. The herbaceous cover is variable depending on the density of tree and shrub cover, and may be characterized by ruderal or exotic species that favor openings or disturbance. In more open stands, typical species are those associated with old fields, such as *Solidago rugosa, Solidago gigantea, Anthoxanthum odoratum, Poa pratensis, Schizachyrium scoparium, Elymus repens (= Elytrigia repens), Bromus inermis, Agrostis gigantea, Euthamia graminifolia, Achillea millefolium*, and *Daucus carota*. In stands that are more heavily forested, typical herbs include *Aralia nudicaulis, Ageratina altissima, Galium triflorum, Maianthemum canadense, Medeola virginiana, Polystichum acrostichoides, Trientalis borealis, Mitchella repens*, and *Lycopodium* species. The particular composition of the herb layer will vary with geography. The substrate is usually covered by a thick layer of pine needle duff.

ENVIRONMENT & DYNAMICS

Environmental Description: This wide-ranging semi-natural forest is commonly associated with anthropogenic disturbance. It typically occurs on former agricultural lands and old fields that are no longer intensively mowed, plowed or managed, developing as *Pinus strobus* colonizes the open fields. Associated woody and herbaceous species vary with geography but are typically ruderal or exotic species that favor openings or disturbance.

Dynamics: In the Daniel Boone National Forest of Kentucky, *Pinus strobus* is spreading from plantings, especially in the Red River Gorge.

DISTRIBUTION

Geographic Range: This semi-natural type may be expected to occur throughout the range of the alliance (i.e., from Michigan, northern Wisconsin, northern and eastern Minnesota, extreme northeastern Iowa, and from Maine and New Hampshire south to Georgia and Tennessee, as well as in Ontario, Canada). It has been documented primarily in areas where project-specific needs have required it.

Spatial Scale & Pattern [optional]:

Nations: US
States/Provinces: CT, GA, KY, MA, MD?, ME, MI, MN, NC, NH, NJ?, NY, OH?, PA, RI, SC, TN, VA, VT, WI, WV
TNC Ecoregions [optional]: 47:P, 48:P, 49:C, 50:C, 51:C, 59:C, 60:C, 61:C, 63:C
USFS Ecoregions (1994/95): 212Fc:CCC, 221Ae:CCC, 221Bc:CCC, 221Bd:CCC, 221Da:CCC, 221Fa:CCC, 221Ha:CCC, 221Hc:CCC, 221He:CCC, 222En:CCC, 222Eo:CCC, M212Ba:CCC, M212Bb:CCC, M221Aa:CCC, M221Ab:CCC, M221Be:CCC, M221Cb:CCC, M221Cd:CCC, M221Da:CCC, M221Db:CCC, M221Dc:CCC, M221Dd:CCC
Omernik Ecoregions:
Federal Lands [optional]: BIA (Eastern Band of Cherokee); NPS (Appalachian Trail [Central Appalachians], Appalachian Trail [Lower New England], Appalachian Trail [Northern Appalachians], Appalachian Trail [Southern Blue Ridge], Big South Fork, Blue Ridge Parkway, Bluestone, Carl Sandburg Home, Delaware Water Gap, Gettysburg, Great Smoky Mountains, Marsh-Billings-Rockefeller, Natchez Trace, New River Gorge, Obed River, Saint-Gaudens, Saratoga); USFS (Cherokee?, Daniel Boone, George Washington, Jefferson, Monongahela); USFWS (Great Meadows, Moosehorn)

CONSERVATION STATUS

Grank (Review Date): GNA (ruderal) (2013/6/23)
Greasons: This forest represents semi-natural vegetation, i.e., the vegetation contains combinations of species that are not found under natural disturbance regimes, many of them exotic. Thus it is not of high conservation concern and does not receive a conservation status rank.
Ranking Author (Version): K.D. Patterson, mod. D. Faber-Langendoen (2013/6/23)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: High.

SYNONYMY

Synonymy:
- **=** *Pinus strobus / (Diphasiastrum digitatum, Lycopodium obscurum)* forest (Vanderhorst 2001b)
- **=** Eastern White Pine Successional Forest (Edinger et al. 2007)
- **<** Semi-Natural (MNNHP 1993)
- **<** Semi-Natural (Faber-Langendoen 2001)
- **<** Successional / Modified Terrestrial Forest (Fleming et al. 2006)
- **<** White Pine - White Oak - Chestnut Oak Type (Schmalzer and DeSelm 1982)
- **?** semi-natural (Chapman et al. 1989)

AUTHORSHIP

Primary Concept Source: K.D. Patterson
Author of Description: K.D. Patterson, mod. L.A. Sneddon and S.C. Gawler
Acknowledgments:
Version Date: 2013/06/23

REFERENCES

References: Chapman et al. 1989, Edinger 2003b, Edinger et al. 2002, Edinger et al. 2007, Faber-Langendoen 2001, Fleming and Coulling 2001, Fleming and Patterson 2011a, Fleming et al. 2006, Gawler and Bowman 2012, MNNHP 1993, NRCS 2004a, NatureServe Ecology - Southeastern U.S. unpubl. data, Perles et al. 2007, Schmalzer and DeSelm 1982, Swain and Kearsley 2001, TDNH unpubl. data, Vanderhorst 2001b, Vanderhorst et al. 2007, Vanderhorst et al. 2008, WVNHP unpubl. data b, White 2003.

NYC NAC Association Description based on 9 plots (CEGL007944):

Overstory trees include eastern white pine (Pinus strobus), black cherry (Prunus serotina), black locust (Robinia pseudoacacia), sweetgum (Liquidambar styraciflua), bitternut hickory (Carya cordiformis), willow oak (Quercus phellos), pin oak (Quercus palustris), white oak (Quercus alba), white ash (Fraxinus americana), American basswood (Tilia americana), river birch (Betula nigra), northern red oak (Quercus rubra), green ash (Fraxinus pennsylvanica), white mulberry (Morus alba), and boxelder (Acer negundo).

Midstory plants include eastern white pine (Pinus strobus), black cherry (Prunus serotina), bitternut hickory (Carya cordiformis), boxelder (Acer negundo), northern spicebush (Lindera benzoin), northern red oak (Quercus rubra), sweetgum (Liquidambar styraciflua), southern arrowwood (Viburnum dentatum), eastern cottonwood (Populus deltoides), osage orange (Maclura pomifera), tuliptree (Liriodendron tulipifera), blackhaw (Viburnum prunifolium), chestnut oak (Quercus montana), common hackberry (Celtis occidentalis), black locust (Robinia pseudoacacia), white mulberry (Morus alba), Callery pear (Pyrus calleryana), white ash (Fraxinus americana), gray birch (Betula populifolia), common serviceberry (Amelanchier arborea), and silver maple (Acer saccharinum).

Vines include eastern poison ivy (Toxicodendron radicans), Amur peppervine (Ampelopsis brevipedunculata), Oriental bittersweet (Celastrus orbiculatus), Virginia creeper (Parthenocissus quinquefolia), Japanese honeysuckle (Lonicera japonica), fox grape (Vitis

labrusca), common moonseed (Menispermum canadense), roundleaf greenbrier (Smilax rotundifolia), climbing false buckwheat (Polygonum scandens), Louise's swallow-wort (Cynanchum louiseae), and American hogpeanut (Amphicarpaea bracteata).

Understory plants include eastern garlic mustard (Alliaria petiolata), wine raspberry (Rubus phoenicolasius), jumpseed (Polygonum virginianum), common wormwood (Artemisia vulgaris), blackberry (Rubus sp.), American pokeweed (Phytolacca americana), avens (Geum sp.), multiflora rose (Rosa multiflora), Asiatic tearthumb (Polygonum perfoliatum), broadleaf enchanter's nightshade (Circaea lutetiana), white wood aster (Eurybia divaricata), black cherry (Prunus serotina), bitternut hickory (Carya cordiformis), goldenrod (Solidago sp.), sweetgum (Liquidambar styraciflua), small enchanter's nightshade (Circaea alpina), Canadian honewort (Cryptotaenia canadensis), sycamore maple (Acer pseudoplatanus), jewelweed (Impatiens capensis), stinging nettle (Urtica dioica), southern arrowwood (Viburnum dentatum), black elderberry (Sambucus nigra), eastern cottonwood (Populus deltoides), winged sumac (Rhus copallinum), red maple (Acer rubrum), slippery elm (Ulmus rubra), black locust (Robinia pseudoacacia), smooth Solomon's seal (Polygonatum biflorum), common dandelion (Taraxacum officinale), Indian strawberry (Duchesnea indica), white snakeroot (Ageratina altissima), and northern dewberry (Rubus flagellaris).

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
1.B.2.Na.90.a. G030 Eastern North American Native Ruderal Forest

A3228. *Liriodendron tulipifera - Juglans nigra - Robinia pseudoacacia* Ruderal Forest Alliance

Type Concept Sentence: This ruderal forest alliance includes deciduous forests dominated by *Gleditsia triacanthos, Juglans nigra, Liriodendron tulipifera*, or *Robinia pseudoacacia* primarily in areas which were once clearcut, old fields, or cleared by fire or other natural disturbances and often planted to these species, but not maintained.

OVERVIEW

Scientific Name: *Liriodendron tulipifera - Juglans nigra - Robinia pseudoacacia* Ruderal Forest Alliance
Common Name (Translated Scientific Name): Tuliptree - Black Walnut - Black Locust Ruderal Forest Alliance
Colloquial Name: Ruderal Tuliptree - Black Walnut - Black Locust Forest

Type Concept: This alliance includes deciduous forests dominated by *Gleditsia triacanthos, Juglans nigra, Liriodendron tulipifera*, or *Robinia pseudoacacia* primarily in areas which were once clearcut, old fields, or cleared by fire or other natural disturbances, and then planted to these species, but with no regular maintenance. Three suballiances are recognized based on dominant species: (1) *Liriodendron tulipifera* stands occur on old clearcut sites and old fields. This suballiance includes pure, often even-aged stands of *Liriodendron tulipifera*. Associated species vary with geographic location. Throughout most of the range of this suballiance *Acer rubrum, Robinia pseudoacacia, Betula lenta, Acer saccharum*, and *Acer negundo* are common components. (2) *Juglans nigra - Gleditsia triacanthos* stands are often associated with former homesites or other disturbances on fertile alluvial deposits. Associated canopy trees vary from site to site and can include *Liriodendron tulipifera, Juglans cinerea, Robinia pseudoacacia, Fraxinus americana, Ulmus americana, Platanus occidentalis, Acer saccharum, Acer nigrum*, and *Morus rubra*. The shrub layer may or may not be well-developed; common species include *Asimina triloba, Viburnum prunifolium, Lindera benzoin, Corylus americana*, and the exotic invasive *Rosa multiflora*. (3) *Robinia pseudoacacia* stands occur in pure stands or makes up the majority of the canopy. These are short-lived forests that typically result from planting or invasion following land abandonment or fire, or from other severe disturbance.

Classification Comments: This type is often planted, but sites are not maintained by regular human activity, so they have native and naturalized species that establish. Non-planted stands may have an overall composition that resembles stands in *Acer rubrum - Prunus serotina - Pinus strobus* Ruderal Forest Alliance (A3229).

Similar NVC Types:

- A3229 *Acer rubrum - Prunus serotina - Pinus strobus* Ruderal Forest Alliance: is a successional stage following abandonment, rather than directly originating from abandoned plantings of these species.

Diagnostic Characteristics: This alliance includes pure, often even-aged, and often planted, but not maintained stands of *Liriodendron tulipifera, Robinia pseudoacacia, Gleditsia triacanthos*, or *Juglans nigra*, as well as mixed forests of these species with other species favored by human-caused disturbances. Associated species vary with geographic location. Throughout most of the range of this alliance, *Acer rubrum, Betula lenta, Acer saccharum*, and *Acer negundo* are common components.

VEGETATION

Floristics: This alliance includes deciduous forests dominated by *Gleditsia triacanthos, Juglans nigra, Liriodendron tulipifera*, or *Robinia pseudoacacia*. Three suballiances are recognized based on dominant species: (1) *Liriodendron tulipifera* stands occur on old clearcut sites and old fields. This alliance includes pure, often even-aged stands of *Liriodendron tulipifera*. Associated species vary

with geographic location. Throughout most of the range of this alliance, *Acer rubrum, Robinia pseudoacacia, Betula lenta, Acer saccharum*, and *Acer negundo* are common components. (2) *Juglans nigra - Gleditsia triacanthos* stands are often associated with former homesites or other disturbances on fertile alluvial deposits. Associated canopy trees vary from site to site and can include *Liriodendron tulipifera, Juglans cinerea, Robinia pseudoacacia, Fraxinus americana, Ulmus americana, Platanus occidentalis, Acer saccharum, Acer nigrum*, and *Morus rubra*. *Sassafras albidum* and/or *Carpinus caroliniana* may be present as small trees. The shrub layer may or may not be well-developed; common species include *Asimina triloba, Viburnum prunifolium, Lindera benzoin, Corylus americana*, and the exotic invasive *Rosa multiflora*. The herb layer is variable, often with one or a few species providing most of the cover. *Verbesina alternifolia* (within its range) and *Ageratina altissima* are characteristic and may be dominant. The invasive exotics *Microstegium vimineum, Alliaria petiolata*, and *Polygonum caespitosum* can be common in this community. (3) *Robinia pseudoacacia* stands are often mono-dominant. These are short-lived forests that typically result from planting or invasion following land abandonment or fire, or from other severe disturbance. Stands are usually small (10-15 ha [30-40 acres]), with associated species varying widely depending on geography and habitat.

ENVIRONMENT & DYNAMICS

Environmental Description: These forests often occur in areas which were once clearcut, old fields, or cleared by fire or other natural disturbances, and then planted to these species, but with no regular maintenance.

Dynamics: These forests may not persist with the current set of dominant tree species after the first generation of trees dies, but the direction of long-term development is unclear.

DISTRIBUTION

Geographic Range: Forests in this alliance are found locally throughout the eastern United States and in extreme southeastern Canada on a wide range of disturbed sites.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: AL, DC, DE, GA, IA, IL, IN, KY, MD, MI, MO, NC, NJ, NY, OH, PA, SC, TN, VA, WV
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

LOWER LEVEL UNITS

Associations:
- CEGL007219 *Liriodendron tulipifera - Acer rubrum - Robinia pseudoacacia* Ruderal Forest
- CEGL004697 *Celtis (laevigata, occidentalis) - Ulmus* spp. - (*Aesculus glabra*) Ruderal Forest
- CEGL004693 *Juglans nigra - Celtis occidentalis* Ruderal Forest
- CEGL004345 *Gleditsia triacanthos - Juglans nigra / Bromus secalinus - Poa pratensis* Ruderal Woodland
- CEGL007281 *Robinia pseudoacacia - Celtis occidentalis - (Fraxinus americana, Liriodendron tulipifera)* Ruderal Forest
- CEGL007279 *Robinia pseudoacacia* Ruderal Forest
- CEGL007879 *Juglans nigra / Verbesina alternifolia* Ruderal Forest
- CEGL005239 *Fraxinus pennsylvanica - Ulmus americana - (Juglans nigra, Celtis occidentalis)* Ruderal Forest
- CEGL003686 *Gleditsia triacanthos - Ulmus (alata, rubra)* Ruderal Woodland
- CEGL007184 *Liriodendron tulipifera - Acer negundo* Ruderal Forest
- CEGL007220 *Liriodendron tulipifera / (Cercis canadensis) / (Lindera benzoin)* Ruderal Forest
- CEGL007221 *Liriodendron tulipifera - Quercus* spp. Ruderal Forest
- CEGL007218 *Liriodendron tulipifera* Ruderal Forest
- CEGL004184 *Crataegus punctata - Crataegus flabellata* Ruderal Forest
- CEGL004096 *Sassafras albidum - Quercus* spp. Ruderal Forest

AUTHORSHIP

Primary Concept Source: D. Faber-Langendoen
Author of Description: D. Faber-Langendoen
Acknowledgments:
Version Date: 01/08/2014
Classif Resp Region: Southeast

REFERENCES

References: Faber-Langendoen et al. 2016b

1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A3228. *Liriodendron tulipifera - Juglans nigra - Robinia pseudoacacia* Ruderal Forest Alliance

CEGL007879. *Juglans nigra / Verbesina alternifolia* Ruderal Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Juglans nigra / Verbesina alternifolia* Ruderal Forest
Common Name (Translated Scientific Name): Black Walnut / Wingstem Ruderal Forest
Colloquial Name: Ruderal Black Walnut Forest

Type Concept: This successional black walnut forest of the eastern United States occurs in a variety of habitats, all associated with disturbance, and frequently associated with rich or circumneutral soils, usually having a neutral to basic pH. These habitats include ridgetops, slopes, floodplains, alluvial terraces, and the floors of sinkholes. These are all generally areas that were cleared for agriculture or homesites. It has been documented from various-sized drainages. The community was originally defined from former homesites in Great Smoky Mountains National Park, where this association is an open, successional forest. It has since been found on some old pasture sites, associated with former settlements, from Georgia northeast to Pennsylvania, and is potentially a wide-ranging type. It has also been sampled from the floors of sinkholes and other related areas at Mammoth Cave National Park. The canopy can be closed to somewhat open. *Juglans nigra* forms at least half of the canopy and is often the sole canopy tree. Associated canopy trees vary from site to site and can include *Liriodendron tulipifera, Juglans cinerea, Robinia pseudoacacia, Fraxinus americana, Ulmus americana, Platanus occidentalis, Acer saccharum, Acer nigrum, Morus rubra*, and *Aesculus flava*. Additional tree species in the subcanopy can include *Carya cordiformis* and *Celtis occidentalis*. *Sassafras albidum* and/or *Carpinus caroliniana* may be present as small trees. The shrub layer may or may not be well-developed; common species include *Asimina triloba, Viburnum prunifolium, Lindera benzoin, Corylus americana*, and the exotic invasive *Rosa multiflora*. The herb layer is variable, often with one or a few species providing most of the cover. *Verbesina alternifolia* (within its range) and *Ageratina altissima* are characteristic and may be dominant; other herbs include *Ambrosia trifida, Amphicarpaea bracteata, Agrimonia pubescens, Apios americana, Cryptotaenia canadensis, Galium triflorum, Osmorhiza longistylis, Dichanthelium clandestinum, Packera aurea, Polygonum virginianum, Rudbeckia laciniata, Podophyllum peltatum, Impatiens capensis, Circaea lutetiana ssp. canadensis, Viola striata*, and *Ambrosia trifida*. The invasive exotics *Microstegium vimineum, Alliaria petiolata, Rosa multiflora*, and *Polygonum caespitosum* can be common in this community.

Classification Comments: This association was originally described from Great Smoky Mountains National Park where this association can be distinguished with aerial photography.

Similar NVC Types:

- CEGL006599 *Prunus serotina - Liriodendron tulipifera - Acer rubrum - Fraxinus americana - (Robinia pseudoacacia)* Ruderal Forest: is a modified successional forest that may also have a large component of *Juglans nigra* and occurs on disturbed sites, but it is largely dominated by early-successional trees in the canopy.

VEGETATION

Floristics: The canopy can be closed to somewhat open. *Juglans nigra* forms at least half of the canopy and is often the sole canopy tree. Associated canopy trees vary from site to site and can include *Liriodendron tulipifera, Juglans cinerea, Robinia pseudoacacia, Fraxinus americana, Ulmus americana, Platanus occidentalis, Acer saccharum, Acer nigrum, Morus rubra*, and *Aesculus flava*. Additional tree species in the subcanopy can include *Carya cordiformis* and *Celtis occidentalis*. *Sassafras albidum* and/or *Carpinus caroliniana* may be present as small trees. The shrub layer may or may not be well-developed; common species include *Asimina triloba, Viburnum prunifolium, Lindera benzoin, Corylus americana*, and the exotic invasive *Rosa multiflora*. The herb layer is variable, often with one or a few species providing most of the cover. *Verbesina alternifolia* (within its range) and *Ageratina altissima* are characteristic and may be dominant; other herbs include *Amphicarpaea bracteata, Agrimonia pubescens, Apios americana, Cryptotaenia canadensis, Galium triflorum, Osmorhiza longistylis, Dichanthelium clandestinum, Packera aurea, Polygonum virginianum, Rudbeckia laciniata, Podophyllum peltatum, Impatiens capensis, Circaea lutetiana ssp. canadensis, Viola striata*, and *Ambrosia trifida*. The invasive exotics *Microstegium vimineum, Alliaria petiolata*, and *Polygonum caespitosum* can be common in this community.

ENVIRONMENT & DYNAMICS

Environmental Description: This successional community occurs in a variety of habitats, all associated with disturbance, and frequently associated with rich or circumneutral soils. These habitats include ridgetops, slopes, floodplains, alluvial terraces, and the floors of sinkholes. These are all generally areas that were cleared for agriculture or homesites. It has been sampled on former homesites along streams at 460-610 m (1500-2000 feet) elevation in the Smokies, as well as on ridgetops, slopes, and stream areas in the Cumberlands, Alleghenies, and Central Appalachians at 430-1070 m (1400-3500 feet). In addition, the association was sampled from the Piedmont of South Carolina in low-lying, poor-drainage areas from approximately 170-200 m (550-650 feet) in elevation. At Mammoth Cave National Park, it was most frequently sampled from terraces in the bottoms of sinkholes. Along the Delaware River and nearby waters, the substrate varies from silt loam to gravelly sandy loams.

Dynamics: Since this community is the product of an anthropogenic catastrophic disturbance, the canopy is likely to change drastically as new species of trees colonize gaps left by senescent walnuts. *Juglans nigra* may obtain canopy dominance it is resistant to grazing pressure on young seedlings due to the unpalatable juglone present in the leaves and stems. This allelopathic compound also inhibits the growth of *Rubus argutus, Rubus allegheniensis*, and other related species (blackberries), which would help keep the shrub layer open and reduce species diversity.

DISTRIBUTION

Geographic Range: This association is currently known from Georgia and the Carolinas to Tennessee and Kentucky, north to Pennsylvania and New Jersey where *Juglans nigra* is near the northern end of its range. It may range into adjacent states.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: GA, KY, MD, NC, NJ, NY?, PA, SC, TN, VA, WV
TNC Ecoregions [optional]: 44:C, 50:C, 51:C, 52:C, 59:C, 60:C, 61:C
USFS Ecoregions (1994/95): 212Fc:CCC, 221Bd:CCC, 221Hc:CCC, 221Ja:C??, 222Dg:CCC, 231Aa:PPP, 231Ae:PPP, M221Bb:CCC, M221Be:CCC, M221Cc:CCC, M221Ce:CCC, M221Dd:CCC
Omernik Ecoregions:
Federal Lands [optional]: BIA (Eastern Band of Cherokee); NPS (Antietam, Appalachian Trail [Central Appalachians], Appalachian Trail [Lower New England], Appalachian Trail [Southern Blue Ridge], Appomattox Court House, Big South Fork, Blue Ridge Parkway, Bluestone, C&O Canal, Chickamauga-Chattanooga, Colonial, Cumberland Gap, Delaware Water Gap, Great Smoky Mountains, Harpers Ferry, Kings Mountain, Mammoth Cave, Manassas, Monocacy, Ninety Six, Richmond); USFS (Monongahela)

CONSERVATION STATUS

Grank (Review Date): GNA (ruderal) (2001/4/2)
Greasons: This association represents vegetation created by anthropogenic disturbance and is thus not a conservation priority.
Ranking Author (Version): M. Pyne (2001/4/2)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

Synonymy:
- **=** *Juglans nigra - Robinia pseudoacacia / Lonicera japonica / Verbesina alternifolia* Association (Rawinski et al. 1996)
- **<** Successional / Modified Terrestrial Forest (Fleming et al. 2006)

AUTHORSHIP

Primary Concept Source: K.D. Patterson
Author of Description: K.D. Patterson, mod. R. White, S.C. Gawler, M. Pyne
Acknowledgments:
Version Date: 2009/10/21

REFERENCES

References: Fleming and Patterson 2011a, Fleming et al. 2006, Holman pers. comm., Lea 2004, NatureServe Ecology - Southeastern U.S. unpubl. data, Patterson 2008a, Patterson 2008c, Patterson 2008f, Peet et al. unpubl. data, Perles et al. 2007, Pyne et al. 2010, Rawinski et al. 1996, TDNH unpubl. data, Vanderhorst et al. 2008, WVNHP unpubl. data b, White 2006, White and Govus 2003, White and Govus 2005.

NYC NAC Association Description based on 10 plots (CEGL007879):

The overstory is dominated by black walnut (Juglans nigra) and/or common hackberry (Celtis occidentalis). Other overstory trees include white mulberry (Morus alba), black cherry (Prunus serotina), red maple (Acer rubrum), London planetree (Platanus ×

hispanica), silver maple (Acer saccharinum), scarlet oak (Quercus coccinea), osage orange (Maclura pomifera), Ohio buckeye (Aesculus glabra), sweet cherry (Prunus avium), and black locust (Robinia pseudoacacia).

Midstory plants include common hackberry (Celtis occidentalis), northern spicebush (Lindera benzoin), black cherry (Prunus serotina), green ash (Fraxinus pennsylvanica), black walnut (Juglans nigra), black locust (Robinia pseudoacacia), bitternut hickory (Carya cordiformis), sassafras (Sassafras albidum), red maple (Acer rubrum), winged sumac (Rhus copallinum), white ash (Fraxinus americana), Amur honeysuckle (Lonicera maackii), black elderberry (Sambucus nigra), tree of heaven (Ailanthus altissima), white mulberry (Morus alba), hawthorn (Crataegus sp.), southern arrowwood (Viburnum dentatum), tuliptree (Liriodendron tulipifera), sweet cherry (Prunus avium), sweet birch (Betula lenta), sugar maple (Acer saccharum), sycamore maple (Acer pseudoplatanus), and Norway maple (Acer platanoides).

Vines include Oriental bittersweet (Celastrus orbiculatus), Japanese honeysuckle (Lonicera japonica), Amur peppervine (Ampelopsis brevipedunculata), Virginia creeper (Parthenocissus quinquefolia), eastern poison ivy (Toxicodendron radicans), fox grape (Vitis labrusca), American hogpeanut (Amphicarpaea bracteata), roundleaf greenbrier (Smilax rotundifolia), common moonseed (Menispermum canadense), black nightshade (Solanum nigrum), tall morning-glory (Ipomoea purpurea), and devil's darning needles (Clematis virginiana).

Understory plants include garlic mustard (Alliaria petiolata), broadleaf enchanter's nightshade (Circaea lutetiana), northern spicebush (Lindera benzoin), common hackberry (Celtis occidentalis), white snakeroot (Ageratina altissima), touch-me-not (Impatiens), wine raspberry (Rubus phoenicolasius), burningbush (Euonymus alatus), jumpseed (Polygonum virginianum), black raspberry (Rubus occidentalis), multiflora rose (Rosa multiflora), feathery false lily of the valley (Maianthemum racemosum), white vervain (Verbena urticifolia), black cherry (Prunus serotina), tree of heaven (Ailanthus altissima), Spanish needles (Bidens bipinnata), red maple (Acer rubrum), green ash (Fraxinus pennsylvanica), southern arrowwood (Viburnum dentatum), white ash (Fraxinus americana), Japanese knotweed (Polygonum cuspidatum), winter creeper (Euonymus fortunei), stickywilly (Galium aparine), Ohio buckeye (Aesculus glabra), sassafras (Sassafras albidum), lateflowering thoroughwort (Eupatorium serotinum), American pokeweed (Phytolacca americana), slippery elm (Ulmus rubra), black elderberry (Sambucus nigra), white mulberry (Morus alba), Oriental lady's thumb (Polygonum cespitosum), black nightshade (Solanum nigrum), poverty rush (Juncus tenuis), cup plant (Silphium perfoliatum), Japanese angelica tree (Aralia elata), pin oak (Quercus palustris), common moonseed (Menispermum canadense), white avens (Geum canadense), woodsorrel (Oxalis sp.), and annual ragweed (Ambrosia artemisiifolia).

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A3228. *Liriodendron tulipifera - Juglans nigra - Robinia pseudoacacia* Ruderal Forest Alliance

CEGL007221. *Liriodendron tulipifera - Quercus* spp. Ruderal Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Liriodendron tulipifera - Quercus* spp. Ruderal Forest
Common Name (Translated Scientific Name): Tuliptree - Oak species Ruderal Forest
Colloquial Name: Ruderal Tuliptree Forest (Typic Type)

Type Concept: This broadly defined ruderal or successional community is one of several described upland associations dominated by *Liriodendron tulipifera*. It ranges from the southern Cumberland Plateau, Piedmont, and Interior Low Plateau of the southeastern U.S. north to the northern Piedmont of New Jersey. These successional forests often follow cropping, clearcut logging, or other severe disturbance, and are successional to mixed oak-hickory forests. Examples are common across large areas of the upland landscape which have previously been disturbed. Soils usually exhibit evidence of disturbance and may have little to no organic horizon development. They are typically acidic and well-drained, dry to moist sand, sandy loam, sandy clay loam, or silt loam. Environmental setting is variable, ranging from level to gently sloping uplands to well-drained floodplains and stream terraces. Species found in stands attributable to this type may include a fairly diverse and varied composition. *Acer rubrum, Quercus* spp., *Betula lenta, Oxydendrum arboreum, Acer saccharum*, and occasionally *Liquidambar styraciflua, Ilex opaca*, or *Robinia pseudoacacia* may be common in stands of this type. Where oaks are present, they are frequently multi-stemmed, resulting from coppicing. The conifer *Tsuga canadensis* is abundant in the understories of some stands. Shrub composition is variable but may include *Sambucus nigra ssp. canadensis, Rhododendron maximum, Hamamelis virginiana*, and *Vaccinium pallidum*. Herbs are likewise variable; West Virginia samples feature *Dioscorea quaternata, Lysimachia quadrifolia, Maianthemum racemosum, Solidago curtisii, Symphyotrichum prenanthoides, Polystichum acrostichoides, Dryopteris intermedia, Arisaema triphyllum ssp. triphyllum, Packera aurea, Amphicarpaea bracteata, Thelypteris noveboracensis, Lycopodium digitatum*, and *Geranium maculatum*.

Classification Comments: It differs from other described types within its range based on the lack of a significant pine component [see *Liriodendron tulipifera - Pinus taeda* Ruderal Forest (CEGL007521)] and the absence of species affiliated with circumneutral conditions [see *Liriodendron tulipifera / (Cercis canadensis) / (Lindera benzoin)* Ruderal Forest (CEGL007220)]; it is later successional and more diverse than *Liriodendron tulipifera* Ruderal Forest (CEGL007218) and tends to be found on more stable soil substrates and less steep slopes than *Liriodendron tulipifera - Acer rubrum - Robinia pseudoacacia* Ruderal Forest (CEGL007219).

Similar NVC Types:
- CEGL007184 *Liriodendron tulipifera - Acer negundo* Ruderal Forest: a bottomland type.
- CEGL007219 *Liriodendron tulipifera - Acer rubrum - Robinia pseudoacacia* Ruderal Forest: is generally found on steeper slopes and/or shallow soils and with a more intense history of disturbance.
- CEGL007218 *Liriodendron tulipifera* Ruderal Forest: more early-successional.
- CEGL004133 *Prunus serotina - Sassafras albidum - (Fraxinus americana) / Juniperus virginiana* Ruderal Forest
- CEGL006599 *Prunus serotina - Liriodendron tulipifera - Acer rubrum - Fraxinus americana - (Robinia pseudoacacia)* Ruderal Forest
- CEGL007220 *Liriodendron tulipifera / (Cercis canadensis) / (Lindera benzoin)* Ruderal Forest: is generally found on calcareous or at least pH neutral soils.

VEGETATION

Floristics: The canopy of this ruderal upland association is dominated by *Liriodendron tulipifera*. *Quercus* species (*Quercus alba, Quercus rubra, Quercus falcata, Quercus nigra, Quercus velutina*) are often present; additional associates may include *Acer barbatum, Acer rubrum, Carya* spp., *Fagus grandifolia, Nyssa sylvatica, Cornus florida*, and *Robinia pseudoacacia*. *Betula lenta* is a common associate at the northern range limit. Shrub layers may include saplings of the canopy species and *Acer pensylvanicum, Amelanchier arborea, Hamamelis virginiana, Lindera benzoin* (in small amounts), and *Vaccinium pallidum*. Herbs vary across the range but may include *Actaea racemosa, Dichanthelium clandestinum, Dioscorea quaternata, Galium circaezans, Geranium maculatum, Goodyera pubescens, Medeola virginiana, Potentilla simplex, Scutellaria serrata, Thelypteris noveboracensis*, and *Uvularia perfoliata*. *Lycopodium digitatum* may be abundant in some stands.

ENVIRONMENT & DYNAMICS

Environmental Description: These ruderal upland deciduous forests are found primarily in areas which were once clearcuts, old fields, or were cleared by fire or other natural disturbances. These successional forests often follow cropping, clearcut logging, or other severe disturbance, and are successional to mixed oak-hickory forests. Examples are common across large areas of the upland landscape which have previously been disturbed. Soils usually exhibit evidence of disturbance and may have little to no organic horizon development. Environmental setting is variable, ranging from level to gently sloping uplands to well-drained floodplains and stream terraces.

Dynamics: This community is widespread in areas that had stand-initiating disturbance such as heavy logging or plowing in the recent past. In areas that have been protected for more than 80 years, this community is uncommon.

DISTRIBUTION

Geographic Range: This association is known from the southern Cumberland Plateau, Piedmont, and Interior Low Plateau of the southeastern U.S. and may also occur in the Upper East Gulf Coastal Plain. It ranges north to the northern Piedmont of New Jersey and adjacent Pennsylvania. It is also known from Alabama, Georgia, Kentucky, Maryland, North Carolina, South Carolina, Tennessee, West Virginia, Virginia, and possibly Delaware.

Spatial Scale & Pattern [optional]: Large patch
Nations: US
States/Provinces: AL, DC, DE?, GA, KY, MD, NC, NJ, PA, SC, TN, VA, WV
TNC Ecoregions [optional]: 43:P, 44:C, 50:C, 51:C, 52:C, 58:C, 59:C, 61:C
USFS Ecoregions (1994/95): 221Hc:CCC, 221He:CCC, 222Cg:CCC, 222Dg:CCC, 222Eb:CCC, 222Eg:CCC, 222En:CCC, 222Eo:CCC, 231Aa:CCP, 231Ab:CCC, 231Ae:CCC, 231Ak:CCC, 231An:CCC, 231Bc:CCC, 231Bh:CCC, 231Cd:CCP, 231Dc:CCC, 232Ad:C??, 232Br:CCC, M221Bb:CCC, M221Ca:CCC, M221Cb:CCC, M221Cd:CCC, M221Dd:CCC
Omernik Ecoregions:
Federal Lands [optional]: BIA (Eastern Band of Cherokee); DOD (Fort Benning); NPS (Appalachian Trail [Central Appalachians], Appalachian Trail [Southern Blue Ridge], Appomattox Court House, Big South Fork, Blue Ridge Parkway, Booker T. Washington, C&O Canal, Carl Sandburg Home, Catoctin Mountain, Chattahoochee River, Chickamauga-Chattanooga?, Cowpens, Cumberland Gap, Fredericksburg-Spotsylvania, Gauley River, George Washington Parkway, Guilford Courthouse, Horseshoe Bend, Kennesaw Mountain, Kings Mountain, Mammoth Cave, Morristown, Natchez Trace, National Capital-East, New River Gorge, Ninety Six, Obed River, Petersburg, Prince William, Richmond, Rock Creek, Shiloh, Valley Forge, Wolf Trap); USFS (Bankhead, Daniel Boone, Oconee?, Talladega, Talladega (Oakmulgee)?, Talladega (Talladega)); USFWS (Patuxent)

CONSERVATION STATUS

Grank (Review Date): GNA (ruderal) (2002/8/19)
Greasons: This forest represents early-successional vegetation and is thus not a priority for conservation. This is a successional vegetation type composed of native species. Its conservation value is limited, but mature examples could provide buffer for communities of greater conservation value. It may also support rare animal and plant species.
Ranking Author (Version): K.D. Patterson (2010/2/4)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

Synonymy:

- **<** Successional forest of low-elevation plateaus (Vanderhorst 2001a)
- **<** Tulip Poplar Type (Schmalzer and DeSelm 1982)
- **=** Yellow Poplar community (Ehrenfeld 1977)

AUTHORSHIP

Primary Concept Source: A.S. Weakley and A. Andreu
Author of Description: R.E. Evans and M. Pyne, mod. L.A. Sneddon, R. White, S.C. Gawler
Acknowledgments:
Version Date: 2011/12/22

REFERENCES

References: Ehrenfeld 1977, Fleming 2002b, Fleming and Patterson 2003, Gallyoun et al. 1996, Keever 1973, NatureServe Ecology - Southeastern U.S. unpubl. data, Nordman et al. 2011, Overlease 1987, Patterson 2008a, Patterson 2008b, Patterson 2008e, Patterson 2008f, Podniesinski et al. 2005b, Pyne et al. 2010, Russell and Schuyler 1988, Schmalzer and DeSelm 1982, Schotz pers. comm., Sneddon et al. 2008, TDNH unpubl. data, Taverna and Patterson 2008, Vanderhorst 2001a, Vanderhorst and Streets 2006, Vanderhorst et al. 2007, Vanderhorst et al. 2010, White 2003, White 2004, White 2006, White and Govus 2003, White and Govus 2005, White and Pyne 2003.

NYC NAC Association Description based on 12 plots (CEGL007221):

The overstory is dominated by tuliptree (Liriodendron tulipifera). Other overstory trees include black cherry (Prunus serotina), black locust (Robinia pseudoacacia), ash (Fraxinus sp.), Norway maple (Acer platanoides), eastern cottonwood (Populus deltoides), black walnut (Juglans nigra), elm (Ulmus sp.), boxelder (Acer negundo), sugar maple (Acer saccharum), sweet birch (Betula lenta), and red maple (Acer rubrum).

The midstory is dominated by tuliptree (Liriodendron tulipifera). Other overstory plants includeblack cherry (Prunus serotina), northern spicebush (Lindera benzoin), sweetgum (Liquidambar styraciflua), bitternut hickory (Carya cordiformis), ash (Fraxinus sp.), black elderberry (Sambucus nigra), red maple (Acer rubrum), sweet birch (Betula lenta), American beech (Fagus grandifolia), northern red oak (Quercus rubra), black locust (Robinia pseudoacacia), boxelder (Acer negundo), slippery elm (Ulmus rubra), common hackberry (Celtis occidentalis), American hazelnut (Corylus americana), sassafras (Sassafras albidum), winged sumac (Rhus copallinum), honeysuckle (Lonicera), flowering dogwood (Cornus florida), Japanese angelica tree (Aralia elata), redosier dogwood (Cornus sericea), devil's walkingstick (Aralia spinosa), sugar maple (Acer saccharum), American witchhazel (Hamamelis virginiana), white ash (Fraxinus americana), paper mulberry (Broussonetia papyrifera), blackhaw (Viburnum prunifolium), sycamore (Platanus), silver maple (Acer saccharinum), sycamore maple (Acer pseudoplatanus), and Norway maple (Acer platanoides).

Vines include Amur peppervine (Ampelopsis brevipedunculata), eastern poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), Japanese honeysuckle (Lonicera japonica), Oriental bittersweet (Celastrus orbiculatus), riverbank grape (Vitis riparia), Asiatic tearthumb (Polygonum perfoliatum), field bindweed (Convolvulus arvensis), fox grape (Vitis labrusca), summer grape (Vitis aestivalis), climbing nightshade (Solanum dulcamara), roundleaf greenbrier (Smilax rotundifolia), and American hogpeanut (Amphicarpaea bracteata).

Understory plants include broadleaf enchanter's nightshade (Circaea lutetiana), garlic mustard (Alliaria petiolata), white wood aster (Eurybia divaricata), wine raspberry (Rubus phoenicolasius), multiflora rose (Rosa multiflora), blackberry (Rubus sp.), northern red oak (Quercus rubra), American pokeweed (Phytolacca americana), jumpseed (Polygonum virginianum), touch-me-not (Impatiens), black cherry (Prunus serotina), jewelweed (Impatiens capensis), devil's walkingstick (Aralia spinosa), bishop's goutweed (Aegopodium podagraria), white snakeroot (Ageratina altissima), common wormwood (Artemisia vulgaris), southern arrowwood (Viburnum dentatum), blackhaw (Viburnum prunifolium), goldenrod (Solidago sp.), northern spicebush (Lindera benzoin), white mulberry (Morus alba), Norway maple (Acer platanoides), Oriental lady's thumb (Polygonum cespitosum), avens (Geum sp.),

woodsorrel (Oxalis sp.), Chinese silvergrass (Miscanthus sinensis), red maple (Acer rubrum), black locust (Robinia pseudoacacia), Asiatic tearthumb (Polygonum perfoliatum), mapleleaf viburnum (Viburnum acerifolium), New York fern (Thelypteris noveboracensis), smallspike false nettle (Boehmeria cylindrica), tuliptree (Liriodendron tulipifera), aster (Symphyotrichum sp.), Japanese snowball (Viburnum plicatum), common blue violet (Viola sororia), currant (Ribes sp.), sycamore maple (Acer pseudoplatanus), Indian strawberry (Duchesnea indica), bitternut hickory (Carya cordiformis), wreath goldenrod (Solidago caesia), northern dewberry (Rubus flagellaris), European privet (Ligustrum vulgare), black raspberry (Rubus occidentalis), smooth Solomon's seal (Polygonatum biflorum), and feathery false lily of the valley (Maianthemum racemosum).

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A3228. *Liriodendron tulipifera - Juglans nigra - Robinia pseudoacacia* Ruderal Forest Alliance

CEGL007279. *Robinia pseudoacacia* Ruderal Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Robinia pseudoacacia* Ruderal Forest
Common Name (Translated Scientific Name): Black Locust Ruderal Forest
Colloquial Name: Ruderal Black Locust Forest

Type Concept: This black locust ruderal forest is found locally throughout the eastern United States. Stands often establish on old fields abandoned after agricultural cropping or pasturing or around old homesites. In some areas it occurs on post-agricultural floodplain terraces. This vegetation has also become established following the planting of *Robinia pseudoacacia* to stabilize and enrich nutrient-poor soils that are subject to erosion. The vegetation is dominated by *Robinia pseudoacacia*. Associated woody species vary from site to site and include *Prunus serotina, Juniperus virginiana, Ulmus americana, Ulmus rubra, Carya ovata, Celtis occidentalis, Juglans nigra, Quercus rubra, Ulmus rubra*, and in some areas *Acer platanoides* or *Ailanthus altissima*. Understory vegetation is highly variable depending on site history and often includes *Toxicodendron radicans*; *Lindera benzoin* is sometimes present. The invasive non-native *Rosa multiflora* may be present as a shrub, along with the non-native bramble *Rubus phoenicolasius*. Non-native species such as *Alliaria petiolata, Chelidonium majus, Glechoma hederacea*, and *Convallaria majalis* can characterize the herb layer, which may also have a native component.

Classification Comments:

Similar NVC Types:
- CEGL007281 *Robinia pseudoacacia - Celtis occidentalis - (Fraxinus americana, Liriodendron tulipifera)* Ruderal Forest
- CEGL006599 *Prunus serotina - Liriodendron tulipifera - Acer rubrum - Fraxinus americana - (Robinia pseudoacacia)* Ruderal Forest: can have *Robinia* as an important canopy component but is not dominated by it as is this type.
- CEGL004133 *Prunus serotina - Sassafras albidum - (Fraxinus americana) / Juniperus virginiana* Ruderal Forest

VEGETATION

Floristics: The vegetation is dominated by *Robinia pseudoacacia* forming a partial to nearly complete canopy. Associated woody species vary from site to site and include *Prunus serotina, Juniperus virginiana, Ulmus americana, Ulmus rubra, Carya ovata, Celtis occidentalis, Juglans nigra, Quercus rubra, Ulmus rubra, Acer rubrum, Nyssa sylvatica*, and in some areas *Acer platanoides* or *Ailanthus altissima*. In addition, *Cornus florida* may be present in the subcanopy. Understory vegetation is highly variable depending on site history and often includes *Toxicodendron radicans*; *Lindera benzoin* is sometimes present. The invasive non-natives *Rosa multiflora* and *Elaeagnus umbellata* are typically the most common shrubs, along with the non-native bramble *Rubus phoenicolasius*. Non-native species such as *Alliaria petiolata, Chelidonium majus, Glechoma hederacea, Dactylis glomerata, Daucus carota*, and *Convallaria majalis* can characterize the herb layer, which may have a native component as well, for example with (depending on geography) *Ageratina altissima, Dichanthelium clandestinum, Elymus hystrix var. hystrix, Leersia virginica, Parthenocissus quinquefolia, Pilea pumila, Solidago canadensis, Solidago rugosa, Verbesina alternifolia, Verbesina occidentalis*, and *Viola* spp.

ENVIRONMENT & DYNAMICS

Environmental Description: This type often establishes on old fields abandoned after agricultural cropping or pasturing or around old home sites. This vegetation has also become established following the planting of *Robinia pseudoacacia* to stabilize and enrich nutrient-poor soils that are subject to erosion (Rabie 2000). Soils are variable and may be highly acidic, especially where established on old mine sites.

Dynamics:

DISTRIBUTION

Geographic Range: This black locust ruderal forest is found locally throughout the eastern United States.

Spatial Scale & Pattern [optional]: Small patch
Nations: US
States/Provinces: AR, DC?, DE, IA, KY, MA, MD, MS, NC, NJ, NY, OH, OK, PA, TN, VA, VT, WV
TNC Ecoregions [optional]: 38:C, 39:C, 43:C, 44:C, 48:C, 49:C, 50:C, 51:C, 59:C, 61:C, 62:C, 63:C
USFS Ecoregions (1994/95): 221Aa:CCP, 221Ab:CCC, 221Ae:CCC, 221Ai:CCC, 221Bc:CCC, 221Fa:CCC, 222Ab:CCC, 222Ag:CCC, 222An:CCC, 222Ic:CCC, 231Bh:CCC, 232Ad:CCC, M212Ba:CCC, M221Aa:CCC, M221Ab:CCC, M221Ac:CCP, M221Ad:CCP, M221Ba:CCP, M221Bb:CCC, M221Bc:CCP, M221Bd:CCP, M221Be:CCC, M221Bf:CCP, M221Ca:CPP, M221Cb:CPP, M221Cc:CPP, M221Ce:CPP, M221Da:CCC, M221Db:CCC, M221Dc:CCC, M221Dd:CCP, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Antietam, Appalachian Trail [Southern Blue Ridge], Blue Ridge Parkway, Bluestone, Buffalo River?, C&O Canal, Cape Cod, Catoctin Mountain, Cuyahoga Valley, George Washington Birthplace, Marsh-Billings-Rockefeller, Minute Man, Morristown, Natchez Trace, National Capital-East, New River Gorge, Saratoga, Vicksburg); USFS (George Washington, Jefferson, Monongahela, Nantahala, Ouachita, Ouachita (Mountains), Ozark, Pisgah); USFWS (Montezuma)

CONSERVATION STATUS

Grank (Review Date): GNA (ruderal) (2002/10/24)
Greasons: Although *Robinia pseudoacacia* is a native species found in the Central Appalachians and Ozark Mountains, it does not typically become a dominant species in these natural habitats (Elias 1980). It is now widespread in the eastern U.S. in disturbed habitats. This forest represents early-successional vegetation and is thus not of high conservation concern and does not receive a conservation status rank.
Ranking Author (Version): (2000/4/14)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:
- **?** *Juglans nigra - Robinia pseudoacacia / Lonicera japonica / Verbesina alternifolia* Association (Rawinski et al. 1996)
- **=** *Robinia pseudoacacia* Successional Forest (Fleming et al. 2006)
- **<** Successional / Modified Terrestrial Forest (Fleming et al. 2006)
- **?** Successional black locust disturbed forests (CAP pers. comm. 1998)
- **<** Successional communities (Ehrenfeld 1977)

AUTHORSHIP

Primary Concept Source: A.S. Weakley, mod. D. Faber-Langendoen and S.C. Gawler
Author of Description: D. Faber-Langendoen, mod. S.C. Gawler and L.A. Sneddon
Acknowledgments:
Version Date: 2008/01/29

REFERENCES

References: Baalman 1965, CAP pers. comm. 1998, Edinger et al. 2002, Edinger et al. 2007, Ehrenfeld 1977, Elias 1980, Fike 1999, Fleming and Coulling 2001, Fleming and Patterson 2011a, Fleming et al. 2006, Gaertner 1955, Gawler et al. 2005, Hoagland 2000, INAI n.d., Lea et al. 2013, McDonald 1938, NRCS 2004a, Patterson 2008d, Rabie 2000, Rawinski et al. 1996, Sneddon et al. 2008, Sneddon et al. 2010, TDNH unpubl. data, Vanderhorst et al. 2007, Vanderhorst et al. 2008, WVNHP unpubl. data.

NYC NAC Association Description based on 89 plots (CEGL007279):

The overstory is dominated by black locust (Robinia pseudoacacia). Other overstory trees include black cherry (Prunus serotina), white mulberry (Morus alba), bitternut hickory (Carya cordiformis), northern red oak (Quercus rubra), tree of heaven (Ailanthus altissima), black walnut (Juglans nigra), pin oak (Quercus palustris), sassafras (Sassafras albidum), red maple (Acer rubrum), eastern cottonwood (Populus deltoides), black oak (Quercus velutina), sweetgum (Liquidambar styraciflua), Norway maple (Acer platanoides), ash (Fraxinus sp.), apple (Malus sp.), slippery elm (Ulmus rubra), American elm (Ulmus americana), boxelder (Acer negundo), sycamore maple (Acer pseudoplatanus), silver maple (Acer saccharinum), sugar maple (Acer saccharum), shagbark hickory (Carya ovata), sweet birch (Betula lenta), white willow (Salix alba), tuliptree (Liriodendron tulipifera), sweet cherry (Prunus avium), common hackberry (Celtis occidentalis), white oak (Quercus alba).

The midstory is dominated by black locust (Robinia pseudoacacia). Other midstory plants include black cherry (Prunus serotina), white mulberry (Morus alba), apple (Malus sp.), northern spicebush (Lindera benzoin), bitternut hickory (Carya cordiformis),

southern arrowwood (Viburnum dentatum), tree of heaven (Ailanthus altissima), sassafras (Sassafras albidum), Norway maple (Acer platanoides), staghorn sumac (Rhus typhina), Amur honeysuckle (Lonicera maackii), winged sumac (Rhus copallinum), red maple (Acer rubrum), smooth sumac (Rhus glabra), common hackberry (Celtis occidentalis), northern red oak (Quercus rubra), glossy buckthorn (Frangula alnus), black elderberry (Sambucus nigra), boxelder (Acer negundo), sycamore maple (Acer pseudoplatanus), tuliptree (Liriodendron tulipifera), northern bayberry (Morella pensylvanica), sweetgum (Liquidambar styraciflua), slippery elm (Ulmus rubra), silver maple (Acer saccharinum), blackhaw (Viburnum prunifolium), sweet birch (Betula lenta), eastern cottonwood (Populus deltoides), blackgum (Nyssa sylvatica), sweet cherry (Prunus avium), black oak (Quercus velutina), pin oak (Quercus palustris), pignut hickory (Carya glabra), privet (Ligustrum), honeysuckle (Lonicera), American witchhazel (Hamamelis virginiana), Siebold's arrowwood (Viburnum sieboldii), green ash (Fraxinus pennsylvanica), European privet (Ligustrum vulgare), white ash (Fraxinus americana), Japanese angelica tree (Aralia elata), American elm (Ulmus americana), American sycamore (Platanus occidentalis), London planetree (Platanus ×hispanica), jetbead (Rhodotypos scandens), goldenrain tree (Koelreuteria paniculata), chestnut oak (Quercus montana), gray dogwood (Cornus racemosa), gray birch (Betula populifolia), and Tatarian honeysuckle (Lonicera tatarica).

Vines include Virginia creeper (Parthenocissus quinquefolia), eastern poison ivy (Toxicodendron radicans), Japanese honeysuckle (Lonicera japonica), Oriental bittersweet (Celastrus orbiculatus), Amur peppervine (Ampelopsis brevipedunculata), Asiatic tearthumb (Polygonum perfoliatum), English ivy (Hedera helix), roundleaf greenbrier (Smilax rotundifolia), fox grape (Vitis labrusca), climbing false buckwheat (Polygonum scandens), climbing nightshade (Solanum dulcamara), winter creeper (Euonymus fortunei), riverbank grape (Vitis riparia), cat greenbrier (Smilax glauca), American hogpeanut (Amphicarpaea bracteata), tall morning-glory (Ipomoea purpurea), summer grape (Vitis aestivalis), and trumpet creeper (Campsis radicans).

Understory plants include garlic mustard (Alliaria petiolata), multiflora rose (Rosa multiflora), blackberry (Rubus), common wormwood (Artemisia vulgaris), jumpseed (Polygonum virginianum), broadleaf enchanter's nightshade (Circaea lutetiana), black cherry (Prunus serotina), white wood aster (Eurybia divaricata), American pokeweed (Phytolacca americana), Asiatic tearthumb (Polygonum perfoliatum), wine raspberry (Rubus phoenicolasius), black locust (Robinia pseudoacacia), jewelweed (Impatiens capensis), common reed (Phragmites australis), bitternut hickory (Carya cordiformis), Japanese knotweed (Polygonum cuspidatum), white snakeroot (Ageratina altissima), southern arrowwood (Viburnum dentatum), northern red oak (Quercus rubra), wrinkleleaf goldenrod (Solidago rugosa), northern dewberry (Rubus flagellaris), feathery false lily of the valley (Maianthemum racemosum), touch-me-not (Impatiens), smooth Solomon's seal (Polygonatum biflorum), onion (Allium sp.), black raspberry (Rubus occidentalis), Oriental lady's thumb (Polygonum cespitosum), Asiatic dayflower (Commelina communis), stickywilly (Galium aparine), sassafras (Sassafras albidum), white mulberry (Morus alba), northern spicebush (Lindera benzoin), small enchanter's nightshade (Circaea alpina), celandine (Chelidonium majus), black elderberry (Sambucus nigra), Amur corktree (Phellodendron amurense), common periwinkle (Vinca minor), white oak (Quercus alba), annual ragweed (Ambrosia artemisiifolia), European privet (Ligustrum vulgare), Pennsylvania blackberry (Rubus pensilvanicus), lambsquarters (Chenopodium album), rough avens (Geum laciniatum), smooth sumac (Rhus glabra), sycamore maple (Acer pseudoplatanus), sweetclover (Melilotus officinalis), wild sarsaparilla (Aralia nudicaulis), white avens (Geum canadense), common milkweed (Asclepias syriaca), common blue violet (Viola sororia), common yellow oxalis (Oxalis stricta), staghorn sumac (Rhus typhina), Amur honeysuckle (Lonicera maackii), winged sumac (Rhus copallinum), boxelder (Acer negundo), poverty rush (Juncus tenuis), Canadian horseweed (Conyza canadensis), tree of heaven (Ailanthus altissima), spotted ladysthumb (Polygonum persicaria), eastern daisy fleabane (Erigeron annuus), and plantain (Plantago sp.).

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A3228. *Liriodendron tulipifera - Juglans nigra - Robinia pseudoacacia* Ruderal Forest Alliance

CEGL004096. *Sassafras albidum - Quercus* spp. Ruderal Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Sassafras albidum - Quercus* spp. Ruderal Forest
Common Name (Translated Scientific Name): Sassafras - Oak species Ruderal Forest
Colloquial Name: Southern Blue Ridge Ruderal Sassafras Forest

Type Concept: This community consists of deciduous forests dominated or codominated by *Sassafras albidum*. Most occurrences developed through catastrophic disturbance such as fire and/or partial clearcuts. These upland forests are found in patches along exposed slopes. Forests are primarily below 915 m (3000 feet) elevation and are usually associated with acidic slopes heavily disturbed by catastrophic fire. Forests occur primarily in the Southern Blue Ridge and Cumberland Mountains. This community includes pure, often even-aged stands of *Sassafras albidum*, as well as forests with *Liriodendron tulipifera* and *Quercus* spp. Throughout most of the range, *Carya alba* and *Castanea dentata* are often subcanopy dominants. The herbaceous layer varies widely depending upon geology but is often sparse.

Classification Comments:

Similar NVC Types:

VEGETATION

Floristics: This community includes pure, often even-aged stands of *Sassafras albidum*, as well as forests with *Liriodendron tulipifera* and *Quercus* spp. Throughout most of the range, *Carya alba* and *Castanea dentata* are often subcanopy dominants. The herbaceous layer is often sparse and varies, depending upon the underlying geology.

ENVIRONMENT & DYNAMICS

Environmental Description: This community consists of deciduous forests dominated or codominated by *Sassafras albidum*. Most examples are heavily impacted by natural catastrophic fire and/or partial clearcuts. These upland forests are found in patches along exposed slopes. Examples are found primarily below 915 m (3000 feet) elevation and are usually associated with acidic slopes heavily disturbed by catastrophic fire. Forests occur primarily in the Southern Blue Ridge and Cumberland Mountains.

Dynamics: A short-lived community type, this forest develops after catastrophic fire on some dry slopes and may exist for 10-30 years before the *Sassafras* canopy is overtopped by other taller forest trees.

DISTRIBUTION

Geographic Range: This association is known from the Southern Blue Ridge and Cumberland Mountains of the southeastern U.S. It is known from Virginia and may also occur in North Carolina, Kentucky, and Tennessee.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: KY?, NC?, TN?, VA?
TNC Ecoregions [optional]: 50:C, 51:C
USFS Ecoregions (1994/95): M221Cc:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Cumberland Gap)

CONSERVATION STATUS

Grank (Review Date): GNA (ruderal) (2015/2/18)
Greasons: Although this forest is a successional type, it is most likely caused by natural and/or anthropogenic catastrophic fire and probably has existed on the landscape in some form or another for quiet a while. As a consequence, this vegetation type is considered to be a common natural type.
Ranking Author (Version): R. White (2006/1/31)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low - Poorly Documented.

SYNONYMY

Synonymy:

AUTHORSHIP

Primary Concept Source: R. White
Author of Description: R. White
Acknowledgments:
Version Date: 2006/02/01

REFERENCES

References: TDNH unpubl. data, White 2006.

NYC NAC Association Description based on 27 plots (CEGL004096):

Sassafras (Sassafras albidum) is dominant in the overstory. Other overstory trees include pin oak (Quercus palustris), black cherry (Prunus serotina), red maple (Acer rubrum), black locust (Robinia pseudoacacia), sweetgum (Liquidambar styraciflua), northern red oak (Quercus rubra), sweet birch (Betula lenta), bigtooth aspen (Populus grandidentata), white mulberry (Morus alba), tuliptree (Liriodendron tulipifera), and blackgum (Nyssa sylvatica).

Sassafras (Sassafras albidum) is dominant in the midstory. Other midstory plants includered red maple (Acer rubrum), black cherry (Prunus serotina), sweetgum (Liquidambar styraciflua), northern red oak (Quercus rubra), Norway maple (Acer platanoides), bitternut hickory (Carya cordiformis), white mulberry (Morus alba), sweet birch (Betula lenta), flowering dogwood (Cornus florida), northern spicebush (Lindera benzoin), black locust (Robinia pseudoacacia), white oak (Quercus alba), gray birch (Betula populifolia), tree of heaven (Ailanthus altissima), mockernut hickory (Carya tomentosa), black walnut (Juglans nigra), and common hackberry (Celtis occidentalis).

Vines include Oriental bittersweet (Celastrus orbiculatus), Japanese honeysuckle (Lonicera japonica), eastern poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), roundleaf greenbrier (Smilax rotundifolia), Amur peppervine (Ampelopsis brevipedunculata), summer grape (Vitis aestivalis), Chinese wisteria (Wisteria sinensis), fox grape (Vitis labrusca), and English ivy (Hedera helix).

Understory plants include sassafras (Sassafras albidum), multiflora rose (Rosa multiflora), blackberry (Rubus sp.), garlic mustard (Alliaria petiolata), white wood aster (Eurybia divaricata), black cherry (Prunus serotina), jumpseed (Polygonum virginianum), feathery false lily of the valley (Maianthemum racemosum), Asiatic dayflower (Commelina communis), bitternut hickory (Carya cordiformis), wine raspberry (Rubus phoenicolasius), white oak (Quercus alba), Canada mayflower (Maianthemum canadense), smooth Solomon's seal (Polygonatum biflorum), sweetgum (Liquidambar styraciflua), broadleaf enchanter's nightshade (Circaea lutetiana), small enchanter's nightshade (Circaea alpina), red maple (Acer rubrum), white snakeroot (Ageratina altissima), Japanese angelica tree (Aralia elata), mapleleaf viburnum (Viburnum acerifolium), wild sarsaparilla (Aralia nudicaulis), common wormwood (Artemisia vulgaris), flowering dogwood (Cornus florida), Nepalese browntop (Microstegium vimineum), gray birch (Betula populifolia), American pokeweed (Phytolacca americana), Oriental lady's thumb (Polygonum cespitosum), northern dewberry (Rubus flagellaris), southern arrowwood (Viburnum dentatum), northern red oak (Quercus rubra), Norway maple (Acer platanoides), northern spicebush (Lindera benzoin), glossy buckthorn (Frangula alnus), pin oak (Quercus palustris), and common hackberry (Celtis occidentalis).

G032. Eastern North American Exotic Ruderal Forest

This ruderal forest group is dominated by exotic tree species that establish on former agricultural or forest plantation sites, or on degraded native forest sites, in the cool temperate regions of the eastern United States and Canada.

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
1.B.2.Na.90.b. G032 Eastern North American Exotic Ruderal Forest

A3230. *Acer platanoides - Ailanthus altissima - Pinus* spp. Exotic Ruderal Forest Alliance

Type Concept Sentence: These semi-natural forests are dominated by naturalized *Acer platanoides, Ailanthus altissima, Pinus thunbergiana, Pinus nigra*, or *Paulownia tomentosa* in the eastern United States.

OVERVIEW

Scientific Name: *Acer platanoides - Ailanthus altissima - Pinus* spp. Exotic Ruderal Forest Alliance
Common Name (Translated Scientific Name): Norway Maple - Tree-of-Heaven - Pine species Exotic Ruderal Forest Alliance
Colloquial Name: Eastern Exotic Ruderal Forest

Type Concept: This alliance includes semi-natural forests dominated by naturalized *Acer platanoides, Ailanthus altissima, Paulownia tomentosa, Pinus nigra*, or *Pinus thunbergiana*. These are all exotic tree species that have locally established in the region. *Pinus thunbergiana* stands occur in the northeastern coastal region and likely beyond, on well-drained to xeric sandy soils, usually on sand dunes or near-coastal glacial tills. Stands are of variable canopy height and closure and dominated by *Pinus thunbergiana* or *Pinus nigra*. *Ailanthus altissima* is a native of eastern Asia. This forest occurs mostly in disturbed areas, along roadsides, urban abandoned lands, and on limestone clifftops. In some parts of the range, this forest is associated with calcareous soils. *Acer platanoides* stands often occur to the exclusion of virtually all other canopy species. Most documented stands are at low elevations, on flat or rolling topography both above and below the glacial boundary. In some stands, native trees, including *Fraxinus americana* and *Acer saccharum* (the latter especially susceptible to exclusion by *Acer platanoides*), may be present in very limited amounts. Other stands may have non-native associates, including *Pinus nigra, Pinus sylvestris*, or *Robinia pseudoacacia*. The deep shade cast by *Acer platanoides* limits understory growth, aside from regeneration of *Acer platanoides*, or incursions by non-native shrubs such as *Rosa multiflora, Berberis vulgaris, Lonicera japonica*, or *Lonicera morrowii*. Native herbs are few, especially compared to more natural deciduous forests in similar settings. A few native or exotic herbaceous species or vines may occupy the ground layer, such as *Alliaria petiolata, Eurybia divaricata (= Aster divaricatus), Toxicodendron radicans*, and *Vinca minor*. *Paulownia tomentosa*, a native of Asia, has become naturalized in portions of the eastern United States, where it occurs as small, scattered populations along roadsides, in disturbed woodlots, and in streamside forests.

Classification Comments: This alliance contains a somewhat heterogeneous set of exotic tree species that dominate or have invaded a variety of disturbed sites. Further review may show that a suite of associated species that differentiate different site types can be used to refine or split the alliance. Currently the mix of species includes *Acer platanoides, Ailanthus altissima, Paulownia tomentosa, Pinus nigra*, or *Pinus thunbergiana*, which have come to dominate a site to the point that the pre-invasion forest type cannot be distinguished. Where forests have been invaded, but where sufficient native trees and other flora still exist to determine the pre-invasion forest type, they are classified as degraded examples of those pre-invasion types.

Similar NVC Types:
- A3233 *Albizia julibrissin - Broussonetia papyrifera - Triadica sebifera* Ruderal Forest Alliance

Diagnostic Characteristics: Forests dominated by *Acer platanoides, Ailanthus altissima, Paulownia tomentosa, Pinus nigra*, or *Pinus thunbergiana*, that singly or together have >80% canopy cover.

VEGETATION

Physiognomy and Structure: Stands are open to closed, and range from pure conifer to pure hardwood.

Floristics: These semi-natural forests are dominated by naturalized *Acer platanoides, Ailanthus altissima, Paulownia tomentosa, Pinus nigra*, or *Pinus thunbergiana*. These are all exotic tree species that have locally established in the region. *Pinus thunbergiana* stands occur in the northeastern coastal region and likely beyond. Stands are of variable canopy height and closure and dominated by *Pinus thunbergiana* or *Pinus nigra*. A frequent canopy associate can be *Pinus rigida*. The shrub layer is not well-developed, and the herbaceous layer is of variable composition. *Toxicodendron radicans* is common in all strata of this community (Sneddon and Lundgren 2001). *Ailanthus altissima* is a native of eastern Asia. This forest occurs mostly in disturbed areas, along roadsides, urban abandoned lands, and on limestone clifftops. In some parts of the range, this forest is associated with calcareous soils. *Acer platanoides* stands often occur to the exclusion of virtually all other canopy species. Most documented stands are at low elevations, on flat or rolling topography both above and below the glacial boundary. *Acer platanoides* is the overwhelmingly dominant tree, typically forming a closed or nearly closed canopy. In some stands native trees, including *Fraxinus americana* and *Acer saccharum* (the latter especially susceptible to exclusion by *Acer platanoides*), may be present in very limited amounts. Other stands may have non-native associates, including *Pinus nigra, Pinus sylvestris*, or *Robinia pseudoacacia*. The deep shade cast by *Acer platanoides* limits understory growth, aside from regeneration of *Acer platanoides*, or incursions by non-native shrubs such as *Rosa multiflora, Berberis vulgaris, Lonicera japonica*, or *Lonicera morrowii*. Native herbs are few, especially compared to more natural deciduous forests in similar settings. A few native or exotic herbaceous species or vines may occupy the ground layer, such as *Alliaria petiolata, Eurybia divaricata (= Aster divaricatus), Toxicodendron radicans*, and *Vinca minor* (Patterson 1976). *Paulownia tomentosa* forests are found on disturbed, usually steep and rocky areas. This species is native to eastern Asia, where it is a minor component of deciduous mesophytic forests. It has become naturalized in portions of the eastern United States, where it occurs as small, scattered populations along roadsides, in disturbed woodlots, and in streamside forests (Williams 1993).

ENVIRONMENT & DYNAMICS

Environmental Description: These forests occur mostly in disturbed areas, along roadsides, on well-drained to xeric sandy soils, including sand dunes or near-coastal glacial tills, steep rocky sites, urban abandoned lands, and calcareous sites (Patterson 1976, Williams 1993, Sneddon and Lundgren 2001).

Dynamics: The long-term persistence of these stands is not clear. They are not likely to become strongly invasive, since they require large-scale, substrate-scarifying disturbance for optimal establishment and maintenance (Patterson 1976, Williams 1993, Sneddon and Lundgren 2001).

DISTRIBUTION

Geographic Range: The alliance is localized but widespread, occurring in locally disturbed areas throughout the Midwest, Northeast and Central United States.

Spatial Scale & Pattern [optional]:
Nations: CA?, US
States/Provinces: AR, CT, DE, KY, MA, NC, NJ, NY, ON?, PA, RI, TN, VA, WV
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

LOWER LEVEL UNITS

Associations:
- CEGL006012 *Pinus thunbergiana - (Pinus nigra)* Ruderal Forest
- CEGL006407 *Acer platanoides* Ruderal Forest
- CEGL003687 *Paulownia tomentosa* Ruderal Woodland
- CEGL007191 *Ailanthus altissima* Ruderal Forest

AUTHORSHIP

Primary Concept Source: D. Faber-Langendoen, A. Weakley, L. Sneddon
Author of Description: D. Faber-Langendoen
Acknowledgments: We have incorporated significant descriptive information previously compiled by Alan Weakley, Lesley Sneddon, Steve Simon, Gary Kauffman and D.M. Danley.
Version Date: 01/08/2014
Classif Resp Region: Southeast

REFERENCES

References: Faber-Langendoen et al. 2016b, Patterson 1976, Sneddon and Lundgren 2001, Williams 1993

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A3230. *Acer platanoides - Ailanthus altissima - Pinus* spp. Exotic Ruderal Forest Alliance

CEGL006407. *Acer platanoides* Ruderal Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Acer platanoides* Ruderal Forest
Common Name (Translated Scientific Name): Norway Maple Ruderal Forest
Colloquial Name: Ruderal Norway Maple Forest

Type Concept: This association represents forests in the northeastern United States strongly dominated by the invasive tree *Acer platanoides*, often to the exclusion of virtually all other canopy species. Most documented stands are at low elevations, on flat or rolling topography both above and below the glacial boundary. *Acer platanoides* is the overwhelmingly dominant tree, typically forming a closed or nearly closed canopy. In some stands native trees, including *Fraxinus americana* and *Acer saccharum* (the latter especially susceptible to exclusion by Norway maple), may be present in very limited amounts. Other stands may have non-native associates, including *Pinus nigra, Pinus sylvestris*, or *Robinia pseudoacacia*. The deep shade cast by *Acer platanoides* limits understory growth, aside from regeneration of *Acer platanoides*, or incursions by non-native shrubs such as *Rosa multiflora, Berberis vulgaris, Lonicera japonica*, or *Lonicera morrowii*. Native herbs are few, especially compared to more natural deciduous forests in similar settings. A few native or exotic herbaceous species or vines may occupy the ground layer, such as *Alliaria petiolata, Eurybia divaricata (= Aster divaricatus), Toxicodendron radicans*, and *Vinca minor*. This is a very species-poor vegetation type.

Classification Comments: This association is intended for those forests so invaded by *Acer platanoides* that the pre-invasion forest type cannot be distinguished. Forests that have been invaded, but where sufficient native trees and other flora still exist to determine the pre-invasion forest type, are classified as degraded examples of those pre-invasion types.

Similar NVC Types:

VEGETATION

Floristics: This association represents forests in the northeastern United States strongly dominated by the invasive tree *Acer platanoides*, often to the exclusion of virtually all other canopy species. *Acer platanoides* is the overwhelmingly dominant tree, typically forming a closed or nearly closed canopy. In some stands native trees, including *Fraxinus americana* and *Acer saccharum* (the latter especially susceptible to exclusion by Norway maple), may be present in very limited amounts. Other stands may have non-native associates, including *Pinus nigra* (black pine), *Pinus sylvestris* (Scotch pine), or *Robinia pseudoacacia* (black locust). The deep shade cast by *Acer platanoides* limits understory growth, aside from regeneration of *Acer platanoides*, or incursions by non-native shrubs such as *Rosa multiflora, Berberis vulgaris, Lonicera japonica*, or *Lonicera morrowii*. Native herbs are few, especially compared to more natural deciduous forests in similar settings. A few native or exotic herbaceous species or vines may occupy the ground layer, such as *Alliaria petiolata, Eurybia divaricata (= Aster divaricatus), Toxicodendron radicans*, and *Vinca minor*. This is a very species-poor vegetation type.

ENVIRONMENT & DYNAMICS

Environmental Description: Most documented stands are at low elevations, on flat or rolling topography both above and below the glacial boundary.

Dynamics:

DISTRIBUTION

Geographic Range: This association is found in the northeastern United States, perhaps extending into southern Ontario, Canada. Its westward extent has not been determined, but it may extend to Wisconsin.

Spatial Scale & Pattern [optional]:
Nations: CA?, US
States/Provinces: CT?, MA, MD?, NJ?, NY, ON?, PA?
TNC Ecoregions [optional]: 48:P, 60:P, 61:C, 62:C, 63:P
USFS Ecoregions (1994/95): 221Aa:CCC, 221Ae:CCC, 221Ai:CCP, 221D:CC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Boston Harbor Islands, Minute Man, Sagamore Hill)

CONSERVATION STATUS

Grank (Review Date): GNA (invasive) (2005/12/6)
Greasons: This is a non-native vegetation type dominated by an invasive tree species.
Ranking Author (Version): S.C. Gawler (2005/12/6)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low - Poorly Documented.

SYNONYMY

Synonymy:

AUTHORSHIP

Primary Concept Source: S.C. Gawler
Author of Description: S.C. Gawler
Acknowledgments:
Version Date: 2006/02/23

REFERENCES

References: Anderson 1999c, Edinger et al. 2002, Edinger et al. 2008b, Elliman 2003, Gawler et al. 2005, Largay and Sneddon 2010, Soil Conservation Service 1987, Thompson and Jenkins 1992, Wyckoff and Webb 1996.

NYC NAC Association Description based on 27 plots (CEGL006407):

The overstory is domanted by Norway maple (Acer platanoides). Other overstory trees include , northern red oak (Quercus rubra), black cherry (Prunus serotina), slippery elm (Ulmus rubra), red maple (Acer rubrum), sassafras (Sassafras albidum), black oak (Quercus velutina), black walnut (Juglans nigra), bitternut hickory (Carya cordiformis), white mulberry (Morus alba), American beech (Fagus grandifolia), pin oak (Quercus palustris), black locust (Robinia pseudoacacia), sweet birch (Betula lenta), sycamore maple (Acer pseudoplatanus), and tree of heaven (Ailanthus altissima).

The midstory is domanted by Norway maple (Acer platanoides). Other midstory trees include black cherry (Prunus serotina), apple (Malus sp.), northern spicebush (Lindera benzoin), slippery elm (Ulmus rubra), common hackberry (Celtis occidentalis), sycamore maple (Acer pseudoplatanus), white mulberry (Morus alba), bitternut hickory (Carya cordiformis), ash (Fraxinus sp.), tree of heaven (Ailanthus altissima), sassafras (Sassafras albidum), black locust (Robinia pseudoacacia), southern arrowwood (Viburnum dentatum), tuliptree (Liriodendron tulipifera), sweet cherry (Prunus avium), burningbush (Euonymus alatus), red maple (Acer rubrum), honeysuckle (Lonicera sp.), Japanese angelica tree (Aralia elata), and devil's walkingstick (Aralia spinosa).

Vines include eastern poison ivy (Toxicodendron radicans), Oriental bittersweet (Celastrus orbiculatus), Virginia creeper (Parthenocissus quinquefolia), English ivy (Hedera helix), Amur peppervine (Ampelopsis brevipedunculata), Japanese honeysuckle (Lonicera japonica), roundleaf greenbrier (Smilax rotundifolia), Chinese wisteria (Wisteria sinensis), chocolate vine (Akebia quinata), fox grape (Vitis labrusca), and oneseed bur cucumber (Sicyos angulatus).

Understory plants include garlic mustard (Alliaria petiolata), multiflora rose (Rosa multiflora), Norway maple (Acer platanoides), bitternut hickory (Carya cordiformis), jumpseed (Polygonum virginianum), jewelweed (Impatiens capensis), black cherry (Prunus

serotina), Japanese knotweed (Polygonum cuspidatum), northern dewberry (Rubus flagellaris), feathery false lily of the valley (Maianthemum racemosum), American pokeweed (Phytolacca americana), common wormwood (Artemisia vulgaris), broadleaf enchanter's nightshade (Circaea lutetiana), white wood aster (Eurybia divaricata), goldenrod (Solidago), burningbush (Euonymus alatus), small enchanter's nightshade (Circaea alpina), white snakeroot (Ageratina altissima), woodsorrel (Oxalis sp.), northern spicebush (Lindera benzoin), jetbead (Rhodotypos scandens), tree of heaven (Ailanthus altissima), spotted ladysthumb (Polygonum persicaria), wine raspberry (Rubus phoenicolasius), Asiatic dayflower (Commelina communis), Oriental lady's thumb (Polygonum cespitosum), lambsquarters (Chenopodium album), and tuliptree (Liriodendron tulipifera).

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1. Forest & Woodland
1.B.2.Na. Eastern North American Forest & Woodland
A3230. *Acer platanoides - Ailanthus altissima - Pinus* spp. Exotic Ruderal Forest Alliance

CEGL007191. *Ailanthus altissima* Ruderal Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Ailanthus altissima* Ruderal Forest
Common Name (Translated Scientific Name): Tree-of-Heaven Ruderal Forest
Colloquial Name: Ruderal Tree-of-Heaven Forest

Type Concept: This forest association generally occurs on nutrient-rich substrates, in disturbed situations on slopes, urban abandoned lands, and on rocky limestone slopes, in association with a wide variety of other exotic species and generalist native species. There are floodplain forests in which invasive exotic *Ailanthus altissima* makes up 25-50% of the canopy; with other associated canopy species of *Fraxinus pennsylvanica* and *Acer saccharinum*. At this time, these forests are treated as D-ranked examples of native types.

Classification Comments:

Similar NVC Types:

VEGETATION

Floristics: This southeastern forest association is strongly dominated by the alien *Ailanthus altissima*.

ENVIRONMENT & DYNAMICS

Environmental Description: This community occurs generally on nutrient-rich substrates, in disturbed situations on slopes, urban abandoned lands, and on rocky limestone slopes.

Dynamics:

DISTRIBUTION

Geographic Range: *Ailanthus altissima* Forest occurs throughout the Appalachians, the Piedmont, the Interior Low Plateau, eastern Kentucky, and in the Ozarks and Ouachita Mountains, and probably other areas in the northeastern United States.

Spatial Scale & Pattern [optional]: Small patch
Nations: US
States/Provinces: AR, CT, KY, MD, NC, NJ?, NY, PA, TN, VA, WV?
TNC Ecoregions [optional]: 38:C, 39:C, 43:P, 44:C, 50:P, 51:C, 52:C, 59:C, 61:C
USFS Ecoregions (1994/95): 221Ae:CCC, 222Eg:CCC, 231A:CC, 231G:CC, 232:C, M221Aa:CPP, M221Ab:CPP, M221Ac:CPP, M221Ad:CPP, M221Ba:CPP, M221Bb:CPP, M221Bc:CPP, M221Bd:CPP, M221Be:CPP, M221Bf:CPP, M221Da:CCP, M221Dc:CCC, M221Dd:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Antietam, Appalachian Trail [Central Appalachians], Appalachian Trail [Lower New England], Appomattox Court House, C&O Canal, Colonial, Natchez Trace); USFS (Ouachita (Mountains)?, Ouachita?, Ozark?)

CONSERVATION STATUS

Grank (Review Date): GNA (invasive) (2000/1/4)
Greasons: This vegetation is dominated by an invasive, alien species and is thus not a conservation priority.
Ranking Author (Version): K.D. Patterson (2000/1/4)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low - Poorly Documented.

SYNONYMY

Synonymy:

AUTHORSHIP

Primary Concept Source: A.S. Weakley
Author of Description: A.S. Weakley
Acknowledgments:
Version Date: 2011/12/23

REFERENCES

References: Edinger et al. 2002, Nordman et al. 2011, Patterson 1976, Patterson 2008a, Patterson 2008c, TDNH unpubl. data.

NYC NAC Association Description based on 25 plots (CEGL007191):

The overstory is dominated by tree of heaven (Ailanthus altissima). Other overstory trees include black cherry (Prunus serotina), northern red oak (Quercus rubra), black locust (Robinia pseudoacacia), sassafras (Sassafras albidum), red maple (Acer rubrum), slippery elm (Ulmus rubra), pin oak (Quercus palustris), white mulberry (Morus alba), ash (Fraxinus sp.).

The midstory is dominated by tree of heaven (Ailanthus altissima). Other midstory plants include northern spicebush (Lindera benzoin), black cherry (Prunus serotina), Japanese angelica tree (Aralia elata), apple (Malus sp.), winged sumac (Rhus copallinum), red maple (Acer rubrum), Norway maple (Acer platanoides), sweetgum (Liquidambar styraciflua), white mulberry (Morus alba), common buckthorn (Rhamnus cathartica), and sweet cherry (Prunus avium).

Vines include Virginia creeper (Parthenocissus quinquefolia), Oriental bittersweet (Celastrus orbiculatus), Japanese honeysuckle (Lonicera japonica), eastern poison ivy (Toxicodendron radicans), Amur peppervine (Ampelopsis brevipedunculata), roundleaf greenbrier (Smilax rotundifolia), tall morning-glory (Ipomoea purpurea), climbing false buckwheat (Polygonum scandens), devil's darning needles (Clematis virginiana), stickywilly (Galium aparine), English ivy (Hedera helix), Japanese hop (Humulus japonicus), climbing nightshade (Solanum dulcamara), and riverbank grape (Vitis riparia).

Understory plants include garlic mustard (Alliaria petiolata), common wormwood (Artemisia vulgaris), multiflora rose (Rosa multiflora), tree of heaven (Ailanthus altissima), black cherry (Prunus serotina), goldenrod (Solidago sp.), northern spicebush (Lindera benzoin), blackberry (Rubus sp.), common reed (Phragmites australis), white snakeroot (Ageratina altissima), sassafras (Sassafras albidum), American pokeweed (Phytolacca americana), broadleaf enchanter's nightshade (Circaea lutetiana), sweetgum (Liquidambar styraciflua), Japanese angelica tree (Aralia elata), milkweed (Asclepias sp.), avens (Geum sp.), smooth sumac (Rhus glabra), woodsorrel (Oxalis sp.), annual ragweed (Ambrosia artemisiifolia), southern arrowwood (Viburnum dentatum), Allegheny blackberry (Rubus allegheniensis), Japanese knotweed (Polygonum cuspidatum), lambsquarters (Chenopodium album), feathery false lily of the valley (Maianthemum racemosum), and eastern hayscented fern (Dennstaedtia punctilobula).

1.B.3. Temperate Flooded & Swamp Forest

Temperate Flooded & Swamp Forest is a tree-dominated wetland influenced by minerotrophic groundwater, either on mineral or organic (peat) soil, found in mid-latitudes of the globe.

1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest

This division includes swamp and floodplain forests and woodlands found in poorly-drained basins or along lakeshores and deciduous wet forests along small- to large-sized rivers (on a wide range of soil types), ranging across much of cool-temperate eastern North America.

M029. Central Hardwood Floodplain Forest

The macrogroup includes hardwood floodplain forests typically dominated by a combination of *Acer negundo, Acer saccharinum, Celtis laevigata, Celtis occidentalis, Fraxinus pennsylvanica, Liquidambar styraciflua, Platanus occidentalis, Populus deltoides*, and/or *Ulmus americana*. It occurs in the central, south-central, and north-central U.S. and extreme southern Ontario and Quebec in Canada.

G652. Silver Maple - Green Ash - Sycamore Floodplain Forest

The group includes hardwood floodplain forests in the central and north-central U.S. and extreme southern Ontario in Canada, and is typically dominated by *Acer saccharinum*, *Fraxinus pennsylvanica*, *Platanus occidentalis*, or *Acer rubrum*.

1. Forest & Woodland
1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest
1.B.3.Na.1.a. G652 Silver Maple - Green Ash - Sycamore Floodplain Forest

A3710. *Acer saccharinum - Populus deltoides* Floodplain Forest Alliance

Type Concept Sentence: This alliance contains floodplain forests of major rivers in the central midwestern United States and in southern Ontario and southern Quebec, Canada, where *Acer saccharinum* and *Populus deltoides* are generally dominant. Other tree associates include *Celtis occidentalis, Ulmus americana, Acer negundo, Fraxinus pennsylvanica, Ulmus rubra, Betula nigra*, and *Salix nigra*.

OVERVIEW

Scientific Name: *Acer saccharinum - Populus deltoides* Floodplain Forest Alliance
Common Name (Translated Scientific Name): Silver Maple - Eastern Cottonwood Floodplain Forest Alliance
Colloquial Name: Silver Maple - Eastern Cottonwood Floodplain Forest

Type Concept: This alliance contains floodplain forests of major rivers in the central midwestern United States and in southern Ontario and southern Quebec, Canada, where *Acer saccharinum* and *Populus deltoides* are generally dominant. Other tree associates include *Celtis occidentalis, Ulmus americana, Acer negundo, Fraxinus pennsylvanica, Ulmus rubra, Betula nigra*, and *Salix nigra*. Stands occur on well-drained, sandy soils, on infrequently flooded bottomlands, on levees, and on deep silts on stabilized sites along larger rivers and lake margins.

Classification Comments: Further review is needed to separate alliances in this group versus those in Silver Maple - Green Ash - Black Ash Floodplain Forest Group (G653). Considerable overlap in range and species occur with these associations. Although placed in Silver Maple - Green Ash - Sycamore Floodplain Forest Group (G652), these associations overlap G653 and may be too broad. *Populus deltoides - Salix nigra - Acer saccharinum* Floodplain Forest (CEGL002018) is also included in this alliance because it shares similar species and range, but it may need its own alliance. Further review of the associations within this alliance is needed. The western limit of this alliance is set by the distribution and abundance of *Acer saccharinum*.

Similar NVC Types:
- A3423 *Populus deltoides* Floodplain Forest Alliance

Diagnostic Characteristics: Floodplain forests dominated by *Acer saccharinum* and *Populus deltoides*.

VEGETATION

Physiognomy and Structure: These floodplain forests are dominated by broadleaf deciduous trees that vary from small-statured (5-15 m tall) stands to taller (15-25 m) mature stands.

Floristics: This alliance contains floodplain forests of major rivers where *Acer saccharinum* and *Populus deltoides* are generally dominant. Other tree associates include *Celtis occidentalis, Ulmus americana, Acer negundo, Fraxinus pennsylvanica, Ulmus rubra, Betula nigra*, and *Salix nigra*.

ENVIRONMENT & DYNAMICS

Environmental Description: This alliance occurs on well-drained, sandy soils, on infrequently flooded bottomlands, on levees, and on deep silts on stabilized sites along larger rivers and lake margins. It also may occur along smaller rivers, but is most common along bigger rivers where there is more scour and more silt deposition, riverfronts, where they develop on bare, moist soil on newly formed sand bars, front-land ridges, low streambanks, overflow areas, and well-drained flats along major streams, rivers and lake margins.

Dynamics: *Acer saccharinum* and *Populus deltoides* floodplain forests often grow within an alluvial environment that is continually changing due to the ebb and flow of the river. Riparian vegetation is constantly being "re-set" by flooding disturbance. These forests are early, mid- or late-seral, depending on the age class of the trees and the associated species of the stand. Mature stands do not regenerate in place, but regenerate by "moving" up and down a river reach. Over time, a healthy riparian area supports all stages of development. Periodic flooding events can leave sandbars of bare, mineral substrate. *Populus deltoides* seedlings germinate and become established on newly-deposited, moist sandbars. In the absence of large floods in subsequent years, seedlings begin to trap sediment. In time, the sediment accumulates and the sandbar rises. The young forest community is then above the annual flood zone of the river channel. In this newly elevated position, with an absence of excessive browsing, fire, or agricultural conversion, the *Populus deltoides* community can grow into a mature riparian forest. At the same time, the river channel continually erodes streambanks and creates fresh, new surfaces for establishment. This results in a dynamic patchwork of different age classes, plant associations and habitats. As trees mature, other tree species may become established. If the land surface is subject to reworking by

the river, the successional processes will start over with erosion and subsequent flooding deposition. If the land surface is not subject to alluvial processes, for example on a high terrace, the *Populus deltoides* stands will have upland shrub or tree species move in from adjacent areas.

DISTRIBUTION

Geographic Range: This alliance contains floodplain forests of major rivers in the central midwestern United States and in southern Ontario and southern Quebec, Canada, where *Acer saccharinum* and *Populus deltoides* are generally dominant.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: IA, IL, IN, KS, KY?, MI, MN, MO, NE, NY?, OH, OK, ON, QC?, WI, WV
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

- **?** *Acer saccharinum - Populus deltoides / Aster* community (Voigt and Mohlenbrock 1964) [New Haven, Illinois]
- **?** *Populus deltoides* forest alliance (Hoagland 1998a)
- **><** *Populus-Salix* wetland forest (No. 24) (Vankat 1990)
- **?** Southern Wet Forest (Curtis 1959) [Wisconsin]

LOWER LEVEL UNITS

Associations:
- CEGL002103 *Salix nigra* Central Floodplain Forest
- CEGL006629 *Salix nigra - (Populus deltoides)* Floodplain Forest
- CEGL002018 *Populus deltoides - Salix nigra - Acer saccharinum* Floodplain Forest
- CEGL002586 *Acer saccharinum - Fraxinus pennsylvanica - Ulmus americana* Floodplain Forest
- CEGL006147 *Acer saccharinum - (Populus deltoides) / Matteuccia struthiopteris - Laportea canadensis* Floodplain Forest

AUTHORSHIP

Primary Concept Source: D. Faber-Langendoen
Author of Description: D. Faber-Langendoen
Acknowledgments:
Version Date: 12/18/2014
Classif Resp Region: Midwest

REFERENCES

References: Curtis 1959, Eyre 1980, Faber-Langendoen et al. 1996, Faber-Langendoen et al. 2016b, Hoagland 1997, Hoagland 1998a, Vankat 1990, Voigt and Mohlenbrock 1964

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1. Forest & Woodland
1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest
A3710. *Acer saccharinum - Populus deltoides* Floodplain Forest Alliance

CEGL006147. *Acer saccharinum - (Populus deltoides) / Matteuccia struthiopteris - Laportea canadensis* Floodplain Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Acer saccharinum - (Populus deltoides) / Matteuccia struthiopteris - Laportea canadensis* Floodplain Forest
Common Name (Translated Scientific Name): Silver Maple - (Eastern Cottonwood) / Ostrich Fern - Canadian Woodnettle Floodplain Forest
Colloquial Name: Silver Maple Floodplain Levee Forest

Type Concept: These are silver maple floodplain forests along major rivers in the temperate northeastern United States. They occur on the deep, alluvial, silty to somewhat coarse soils of point bars, levees, and adjacent terraces of medium to large, high-energy and moderate-gradient rivers with heavy erosion and sedimentation, and are subjected to spring flooding. The more-or-less closed canopy is high and arching, and the dominant below-canopy feature is the lush and extensive herb layer, with ferns especially

prominent. Shrubs are scattered and the overall shrub cover is low. Bryoids are very minor. The canopy is strongly dominated by *Acer saccharinum*. Other trees may be locally common, or scattered, including *Populus deltoides, Quercus rubra, Acer negundo, Ulmus rubra, Juglans nigra, Fraxinus americana*, and *Fraxinus pennsylvanica*. *Populus deltoides* tends to be characteristic of the siltier soils and levees within these forests. Typical shrubs include *Lindera benzoin, Cornus amomum, Sambucus canadensis*, and potentially invasive non-native *Lonicera* spp., *Rosa multiflora*, or *Ligustrum vulgare*. Vines such as *Vitis riparia* are common at some sites. The dominant herbs are *Matteuccia struthiopteris* and *Laportea canadensis*. Associated herbs include *Elymus riparius, Elymus virginicus, Amphicarpaea bracteata, Ageratina altissima (= Eupatorium rugosum), Arisaema triphyllum, Circaea lutetiana, Thalictrum pubescens, Onoclea sensibilis*, and *Polygonum virginianum (= Tovara virginiana)*. Particularly in the southern portions of this type's range, non-native herbs such as *Alliaria petiolata, Allium vineale, Ranunculus ficaria*, and *Microstegium vimineum* may essentially replace the native herbs. This association is distinguished from the related *Acer saccharinum / Onoclea sensibilis - Boehmeria cylindrica* Floodplain Forest (CEGL006176) by its greater abundance of *Matteuccia struthiopteris* relative to *Onoclea sensibilis* and its better-drained soils. Flood duration is usually shorter in the ostrich fern type. It is distinguished from floodplain forests to the south by the absence (or only very rare presence) of *Platanus occidentalis* and *Celtis occidentalis*.

Classification Comments: Two variations in the herb flora have been described (NHNHI 2002). In the ostrich fern variant, *Matteuccia struthiopteris* is more abundant than *Laportea canadensis, Ageratina altissima*, and *Impatiens* spp. are often abundant, and *Toxicodendron radicans* and *Boehmeria cylindrica* are infrequent. In the wood nettle variant, *Laportea canadensis* exceeds *Matteuccia struthiopteris* in abundance, and *Toxicodendron radicans, Leersia virginica, Boehmeria cylindrica*, and *Cinna arundinacea* are more frequent and abundant.

Similar NVC Types:
- CEGL002586 *Acer saccharinum - Fraxinus pennsylvanica - Ulmus americana* Floodplain Forest: midwestern counterpart.
- CEGL006176 *Acer saccharinum / Onoclea sensibilis - Boehmeria cylindrica* Floodplain Forest
- CEGL006114 *Acer saccharum - Fraxinus* spp. - *Tilia americana / Matteuccia struthiopteris - Ageratina altissima* Floodplain Forest
- CEGL007304 *Acer saccharinum* Floodplain Forest [Placeholder]
- CEGL006217 *Acer saccharinum - Acer negundo / Ageratina altissima - Laportea canadensis - (Elymus virginicus)* Floodplain Forest
- CEGL006036 *Platanus occidentalis - Fraxinus pennsylvanica* Floodplain Forest

VEGETATION

Floristics: The more-or-less closed canopy is high and arching, and the dominant below-canopy feature is the lush and extensive herb layer, with ferns especially prominent. Shrubs are scattered and the overall shrub cover is low. Bryoids are very minor. The canopy is strongly dominated by *Acer saccharinum*. Other trees may be locally common, or scattered, including *Populus deltoides, Quercus rubra, Acer negundo, Ulmus rubra, Juglans nigra, Fraxinus americana*, and *Fraxinus pennsylvanica*. *Populus deltoides* tends to be characteristic of the siltier soils and levees within these forests. Typical shrubs include *Lindera benzoin, Cornus amomum, Sambucus canadensis*, and potentially invasive non-native *Lonicera* spp., *Rosa multiflora*, or *Ligustrum vulgare*. Vines such as *Vitis riparia* are common at some sites. The dominant herbs are *Matteuccia struthiopteris* and *Laportea canadensis*. Associated herbs include *Elymus riparius, Elymus virginicus, Amphicarpaea bracteata, Ageratina altissima (= Eupatorium rugosum), Arisaema triphyllum, Circaea lutetiana, Thalictrum pubescens, Onoclea sensibilis*, and *Polygonum virginianum (= Tovara virginiana)*. Particularly in the southern portions of this type's range, non-native herbs such as *Alliaria petiolata, Allium vineale, Ranunculus ficaria*, and *Microstegium vimineum* may essentially replace the native herbs.

ENVIRONMENT & DYNAMICS

Environmental Description: These are silver maple floodplain forests along major rivers in the temperate northeastern United States. They occur on the deep, alluvial, silty to somewhat coarse soils of point bars, levees, and adjacent terraces of medium to large, high-energy and moderate-gradient rivers with heavy erosion and sedimentation, and are subjected to spring flooding.

Dynamics:

DISTRIBUTION

Geographic Range: This association occurs in the northeastern United States from New Hampshire, Vermont, and New York south to Connecticut and Pennsylvania and possibly Maryland.

Spatial Scale & Pattern [optional]: Small patch, Large patch
Nations: CA?, US
States/Provinces: CT, MA, MD?, NH, NJ, NY, PA, QC?, VT
TNC Ecoregions [optional]: 48:C, 60:C, 61:C, 62:C, 63:C, 64:C
USFS Ecoregions (1994/95): 212Fa:CCC, 212Fb:CCC, 212Ga:CCC, 221Ak:CCC, 221Bc:CCC, 221D:C?, 222Ic:CCC, M212Ad:CCP, M212Ae:CCC, M212Af:CCC, M212Ag:CCC, M212Ba:CCC, M212Ca:CCC, M212Cd:CCC, M212De:CCC
Omernik Ecoregions:

Federal Lands [optional]: NPS (Appalachian Trail [Central Appalachians], Appalachian Trail [Lower New England], Appalachian Trail [Northern Appalachians], Saratoga); USFWS (Great Meadows?, Montezuma)

CONSERVATION STATUS

Grank (Review Date): G4G5 (2012/2/14)
Greasons: Despite its wide range and low state ranks, high-quality examples of this type are relatively uncommon. Major threats include invasive species.
Ranking Author (Version): L.A. Sneddon (2012/2/14)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:
- **=** *Acer saccharinum / Ageratina altissima* community (Metzler and Barrett 2004)
- **=** *Acer saccharinum / Matteuccia / Laportea* (Type 3) (Sperduto and Crowley 2002a)
- **?** *Acer saccharinum / Onoclea sensibilis* Community, *Matteuccia struthiopteris* variant (Metzler 1984)
- **?** Palustrine Broad-leaved Deciduous Forested Wetland, Seasonally Flooded (PFO1C) (Cowardin et al. 1979)
- **<** Riverine Floodplain Forest (Thompson 1996)
- **?** Riverine floodplain forest: medium-gradient stream (NAP pers. comm. 1998)
- **<** Silver Maple - American Elm: 62 (Eyre 1980)

AUTHORSHIP

Primary Concept Source: Northern Appalachian Planning Team
Author of Description: S.C. Gawler
Acknowledgments:
Version Date: 2012/01/04

REFERENCES

References: Breden et al. 2001, CDPNQ unpubl. data, Cowardin et al. 1979, Edinger et al. 2002, Edinger et al. 2007, Enser 1993, Eyre 1980, Fike 1999, Metzler 1984, Metzler and Barrett 1982, Metzler and Barrett 2001, Metzler and Barrett 2004, Metzler and Barrett 2006, Metzler and Damman 1985, NAP pers. comm. 1998, NRCS 2004a, Overlease 1987, Sperduto 2000b, Sperduto and Crowley 2002a, Sperduto and Nichols 2004, Swain and Kearsley 2001, Thompson 1996, Thompson and Sorenson 2000, Zimmerman 2011k, Zimmerman et al. 2012.

NYC NAC Association Description (CEGL006147):

This association was not selected as a first choice for any NYC NAC plots.

G673. Silver Maple - Sugarberry - Sweetgum Floodplain Forest

This complex and widespread group of floodplain forests is dominated by some combination of *Acer saccharinum, Betula nigra, Celtis laevigata, Fraxinus pennsylvanica, Liquidambar styraciflua, Liriodendron tulipifera, Platanus occidentalis*, and *Ulmus americana*. Stands are found in a broad band in the northeastern and middle parts of the eastern United States from southern New England and the Ontario lakeplains of New York south and west through the Interior Low Plateau of Ohio, Indiana, Illinois and Kentucky to the Ozarks of Arkansas and Missouri.

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1. Forest & Woodland
1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest
1.B.3.Na.1.b. G673 Silver Maple - Sugarberry - Sweetgum Floodplain Forest

A3697. *Acer saccharinum - Acer negundo* Appalachian-Piedmont Floodplain Forest Alliance

Type Concept Sentence: This alliance contains floodplain forests where *Acer saccharinum* is prevalent along major rivers in the Piedmont, Central Appalachians, and Chesapeake Bay regions from Maryland and Virginia north to Pennsylvania and New Jersey.

OVERVIEW

Scientific Name: *Acer saccharinum - Acer negundo* Appalachian-Piedmont Floodplain Forest Alliance
Common Name (Translated Scientific Name): Silver Maple - Box-elder Appalachian-Piedmont Floodplain Forest Alliance
Colloquial Name: Appalachian-Piedmont Silver Maple Floodplain Forest

Type Concept: This alliance contains floodplain forests where *Acer saccharinum* is prevalent. Other tree associates include *Acer negundo, Betula nigra, Fraxinus pennsylvanica, Platanus occidentalis, Populus deltoides, Quercus palustris, Salix nigra, Ulmus americana*, and *Ulmus rubra*. Common shrub species include *Alnus serrulata, Asimina triloba, Cephalanthus occidentalis, Ilex*

decidua, and *Lindera benzoin*. Characteristic herbs include *Boehmeria cylindrica, Impatiens capensis, Laportea canadensis, Leersia lenticularis, Matteuccia struthiopteris, Onoclea sensibilis, Pilea pumila*, and others. This alliance occurs along major rivers in the Piedmont, Central Appalachians, and Chesapeake Bay regions from Maryland and Virginia north to Pennsylvania and New Jersey.

Classification Comments: Three associations currently placed here (CEGL006915, CEGL006944, CEGL006946) are New Jersey nonstandards whose ranges are unclear. Descriptive information is primarily derived from former *Acer saccharinum* Temporarily Flooded Forest Alliance (A.279).

Similar NVC Types: All of the alliances in this group share some of their canopy dominants, and some are overlapping in their ranges.

- A3698 *Betula nigra - Platanus occidentalis - Acer saccharinum* Ozark & West Gulf Riverfront Forest Alliance: contains *Acer saccharinum* but with a different, more western range.
- A3699 *Betula nigra - Platanus occidentalis* Appalachian-Piedmont Floodplain Forest Alliance: overlaps the range but lacks *Acer saccharinum*.
- A3702 *Platanus occidentalis - Liquidambar styraciflua - Liriodendron tulipifera* Southern Appalachian Floodplain Forest Alliance: overlaps the range but lacks *Acer saccharinum*.
- A3701 *Platanus occidentalis - Fraxinus pennsylvanica - Liriodendron tulipifera* Central Appalachian-Piedmont Floodplain Forest Alliance: overlaps the range but lacks *Acer saccharinum*.
- A3700 *Fraxinus pennsylvanica - Platanus occidentalis - Acer saccharinum* Ozark-Ouachita Floodplain Forest Alliance: contains *Acer saccharinum* but with a different, more western range.

Diagnostic Characteristics: This alliance contains floodplain forests where *Acer saccharinum* is prevalent along major rivers in the Piedmont, Central Appalachians, and Chesapeake Bay regions from Maryland and Virginia north to Pennsylvania and New Jersey. This combination of floristics and biogeography should be diagnostic.

VEGETATION

Physiognomy and Structure: These are broad-leaved deciduous forests, with canopy trees typically averaging 20 m in height. The shrub and herbaceous layers range from sparse to relatively lush, and in some cases the shrubs can be nearly impenetrable. There is often an abundance of woody vines.

Floristics: *Acer saccharinum* is generally dominant in these floodplain forests of major rivers. Other tree associates include *Acer negundo, Betula nigra, Carya illinoinensis, Celtis laevigata, Fraxinus pennsylvanica, Platanus occidentalis, Populus deltoides, Salix nigra, Ulmus americana*, and *Ulmus rubra*. Common shrub species include *Alnus serrulata, Asimina triloba, Cephalanthus occidentalis, Ilex decidua, Lindera benzoin*. Characteristic herbs include *Boehmeria cylindrica, Impatiens capensis, Laportea canadensis, Leersia lenticularis, Matteuccia struthiopteris, Onoclea sensibilis, Pilea pumila*, and others.

ENVIRONMENT & DYNAMICS

Environmental Description: This alliance occurs on well-drained, sandy soils, on infrequently flooded bottomlands, on levees, and on deep silts on stabilized sites along larger rivers. It also may occur along smaller rivers, but is most common along bigger rivers where there is more scour and more silt deposition.

Dynamics:

DISTRIBUTION

Geographic Range: The associations reliably assigned to this alliance are found in the Piedmont, Central Appalachians, and Chesapeake Bay regions from Maryland and Virginia north to Pennsylvania and New Jersey.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: DC, MD, NJ, PA, VA, WV
TNC Ecoregions [optional]: 52:C, 58:C, 59:C, 61:C
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

- **><** Cottonwood: 63 (Eyre 1980)
- **><** Floodplain Forest (Smith 1991)

- **?** Floodplain Swamp (Smith 1991)
- **?** Red maple - elm - willow floodplain swamp (Fike 1999)
- **><** Silver Maple - American Elm: 62 (Eyre 1980)
- **?** Silver maple floodplain forest (Fike 1999)

LOWER LEVEL UNITS

Associations:
- CEGL006217 *Acer saccharinum - Acer negundo / Ageratina altissima - Laportea canadensis - (Elymus virginicus)* Floodplain Forest
- CEGL007304 *Acer saccharinum* Floodplain Forest [Placeholder]
- CEGL006042 *Acer saccharinum - Ulmus americana / Physocarpus opulifolius* Floodplain Forest

AUTHORSHIP

Primary Concept Source: M. Pyne
Author of Description: M. Pyne
Acknowledgments:
Version Date: 09/26/2014
Classif Resp Region: Southeast

REFERENCES

References: Eyre 1980, Faber-Langendoen et al. 2016b, Fike 1999, Smith 1991

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1. Forest & Woodland
1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest
A3697. *Acer saccharinum - Acer negundo* Appalachian-Piedmont Floodplain Forest Alliance

CEGL006217. *Acer saccharinum - Acer negundo / Ageratina altissima - Laportea canadensis - (Elymus virginicus)* Floodplain Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Acer saccharinum - Acer negundo / Ageratina altissima - Laportea canadensis - (Elymus virginicus)* Floodplain Forest
Common Name (Translated Scientific Name): Silver Maple - Box-elder / White Snakeroot - Canadian Woodnettle - (Virginia Wildrye) Floodplain Forest
Colloquial Name: Piedmont-Central Appalachian Silver Maple Floodplain Forest

Type Concept: This is a forested community of large river floodplains in the Mid-Atlantic states of Maryland, Virginia, West Virginia, and Pennsylvania. These forests occupy banks and first bottoms of major rivers with nutrient-rich silt loams, sand loams, and sands that are temporarily inundated, annually or less often, in major flood events. Canopies are closed and dominated by *Acer saccharinum*, with *Acer negundo* dominating a subcanopy layer. Other minor overstory and understory associates include *Populus deltoides, Celtis occidentalis, Fraxinus pennsylvanica, Ulmus americana*, and *Juglans nigra*. The shrub layer ranges from sparse to dense but is usually dominated by *Lindera benzoin*. Characteristic species of the herb layer are *Ageratina altissima, Laportea canadensis, Impatiens pallida, Viola sororia, Leersia virginica, Verbesina alternifolia, Urtica dioica ssp. dioica, Elymus virginicus, Elymus riparius, Geum canadense, Pilea pumila, Rudbeckia laciniata*, and *Cryptotaenia canadensis*. Vines of *Toxicodendron radicans* and *Parthenocissus quinquefolia* are common. Early-successional stands are usually strongly dominated by even-aged *Acer saccharinum*.

Classification Comments: This type was defined through analysis of 41 plot samples from Virginia and Maryland and through consultation with ecologists from those states and West Virginia. It has also been confirmed for Pennsylvania by ecologists in that state. Data analysis supports the decision to split this unit from the more broadly defined USNVC unit *Acer saccharinum - Fraxinus pennsylvanica - Ulmus americana* Floodplain Forest (CEGL002586).

Similar NVC Types:
- CEGL006147 *Acer saccharinum - (Populus deltoides) / Matteuccia struthiopteris - Laportea canadensis* Floodplain Forest
- CEGL002586 *Acer saccharinum - Fraxinus pennsylvanica - Ulmus americana* Floodplain Forest
- CEGL007304 *Acer saccharinum* Floodplain Forest [Placeholder]
- CEGL007334 *Platanus occidentalis - Acer saccharinum - Juglans nigra - Ulmus rubra* Floodplain Forest
- CEGL006475 *Platanus occidentalis - Fraxinus pennsylvanica - Acer negundo / Sanicula odorata - Elymus virginicus* Floodplain Forest
- CEGL004073 *Platanus occidentalis - Acer negundo - Juglans nigra / Asimina triloba / Mertensia virginica* Floodplain Forest

VEGETATION

Floristics: This community is a closed forest typically dominated by *Acer saccharinum*, with *Acer negundo* dominating a subcanopy layer. Along the Potomac, particularly on sandier sites, *Platanus occidentalis* may codominate the canopy layer. Minor overstory and understory associates include *Populus deltoides, Celtis occidentalis, Fraxinus pennsylvanica, Ulmus americana*, and *Juglans nigra*. At topographically lower sites, the shrub layer is often sparse; on higher surfaces, it may be moderately dense, with *Lindera benzoin* usually the dominant species. Characteristic species of the herb layer are *Ageratina altissima, Laportea canadensis, Impatiens pallida, Viola sororia, Leersia virginica, Verbesina alternifolia, Urtica dioica ssp. dioica, Elymus virginicus, Elymus riparius, Geum canadense, Pilea pumila, Rudbeckia laciniata*, and *Cryptotaenia canadensis*. Vines of *Toxicodendron radicans* and *Parthenocissus quinquefolia* are common. Invasive introduced species such as *Alliaria petiolata, Stellaria media, Microstegium vimineum, Glechoma hederacea, Urtica dioica ssp. dioica*, and *Humulus japonicus* are often rampant in this vegetation type. Early-successional stands are assigned to the same type and are usually strongly dominated by even-aged *Acer saccharinum*.

ENVIRONMENT & DYNAMICS

Environmental Description: This community is restricted to large river floodplains, where it occurs on first bottoms and banks immediately adjacent to the river. Sites are usually well-drained to moderately well-drained. Soils are nutrient-rich with textures ranging from silt loams to sandy loams and occasionally sands. Habitats are temporarily inundated, annually or less often, in major flood events. In the Potomac Gorge, the average flood-return interval was from about 0.5 to 2.5 years (Lea 2000).

Dynamics: Early-successional stands are usually strongly dominated by even-aged *Acer saccharinum*.

DISTRIBUTION

Geographic Range: This community occurs on floodplains of major Mid-Atlantic rivers, including the Potomac, Shenandoah, James, Rappahannock, Monocacy, and Susquehanna, extending north to Massachusetts.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: DC, MA, MD, NJ, NY, PA, VA, WV
TNC Ecoregions [optional]: 52:C, 58:C, 59:C, 61:C
USFS Ecoregions (1994/95): 222Db:CCC, 231Ae:CCC, 231Ak:CCC, 231Al:CCC, 231An:CCC, 231Ap:CCC, 232Ad:CCC, 232Br:CCC, M221Aa:CCC, M221Ab:CCC, M221Da:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Appalachian Trail [Central Appalachians], Appalachian Trail [Lower New England], Blue Ridge Parkway, C&O Canal, Fredericksburg-Spotsylvania, George Washington Parkway, Harpers Ferry, Monocacy, National Capital-East); USFS (George Washington); USFWS (National Conservation Training Center)

CONSERVATION STATUS

Grank (Review Date): G4 (2005/1/24)
Greasons: The type is not rare but has a restricted geographic range, is confined to larger rivers in the Mid-Atlantic region, and is subject to continuing degradation by invasive species.
Ranking Author (Version): G.P. Fleming and K.D. Patterson (2005/1/24)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:

- **=** *Acer saccharinum - Acer negundo - Ulmus americana / Eupatorium rugosum* Forest (Lea 2000)
- **=** *Acer saccharinum - Acer negundo / Ageratina altissima - Laportea canadensis - (Elymus virginicus)* Forest (Fleming and Patterson 2003)
- **=** *Acer saccharinum - Acer negundo / Ageratina altissima - Laportea canadensis - (Elymus virginicus)* Forest (Fleming and Taverna 2006)
- **=** *Acer saccharinum - Acer negundo / Ageratina altissima - Laportea canadensis - (Elymus virginicus)* Forest (VDNH 2003)
- **=** *Acer saccharinum - Acer negundo / Elymus virginicus - Laportea canadensis* Forest (Fleming and Coulling 2001)
- **=** *Acer saccharinum - Ulmus americana - (Populus deltoides)* Forest (Thomson et al. 1999)
- **=** *Acer saccharinum* Floodplain Forest (Vanderhorst 2000b)
- **<** Montane - Piedmont Bottomland Forest (Harrison 2004)
- **<** Piedmont / Mountain Floodplain Forest (Fleming et al. 2001)
- **=** Silver Maple Floodplain Forest (Podniesinski and Wagner 2002)

AUTHORSHIP

Primary Concept Source: G. Fleming, C. Lea, J. Vanderhorst

Author of Description: G.P. Fleming and K.D. Patterson, mod. G.P. Fleming
Acknowledgments:
Version Date: 2006/10/02

REFERENCES

References: Fleming 2002b, Fleming 2007, Fleming and Coulling 2001, Fleming and Patterson 2003, Fleming and Patterson 2011a, Fleming and Taverna 2006, Fleming et al. 2001, Fleming pers. comm., Fowells 1965, Harrison 2004, Harrison 2011, Lea 2000, Lea 2004, Patterson 2008e, Podniesinski and Wagner 2002, Taverna and Patterson 2008, Thomson et al. 1999, VDNH 2003, Vanderhorst 2000b.

NYC NAC Association Description based on 6 plots (CEGL006217):

The dominant overstory tree is boxelder (Acer negundo). Other overstory trees include eastern cottonwood (Populus deltoides), white mulberry (Morus alba), black locust (Robinia pseudoacacia), green ash (Fraxinus pennsylvanica), tuliptree (Liriodendron tulipifera), black cherry (Prunus serotina), silver maple (Acer saccharinum), pin cherry (Prunus pensylvanica), river birch (Betula nigra), hawthorn (Crataegus sp.), sassafras (Sassafras albidum), sweetgum (Liquidambar styraciflua), American sycamore (Platanus occidentalis), sycamore maple (Acer pseudoplatanus), Norway maple (Acer platanoides), Amur corktree (Phellodendron amurense), and tree of heaven (Ailanthus altissima).

The dominant overstory tree is boxelder (Acer negundo). Other overstory trees include silver maple (Acer saccharinum), white mulberry (Morus alba), sycamore maple (Acer pseudoplatanus), Norway maple (Acer platanoides), Siberian elm (Ulmus pumila), willow (Salix sp.), Amur corktree (Phellodendron amurense), sweetgum (Liquidambar styraciflua), paper mulberry (Broussonetia papyrifera), tree of heaven (Ailanthus altissima), green ash (Fraxinus pennsylvanica), American sycamore (Platanus occidentalis), sassafras (Sassafras albidum), hawthorn (Crataegus sp.), American hornbeam (Carpinus caroliniana), tuliptree (Liriodendron tulipifera), river birch (Betula nigra), smooth sumac (Rhus glabra), black elderberry (Sambucus nigra), and black walnut (Juglans nigra).

Vines include Amur peppervine (Ampelopsis brevipedunculata), Oriental bittersweet (Celastrus orbiculatus), eastern poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), English ivy (Hedera helix), and Japanese honeysuckle (Lonicera japonica).

Understory plants include garlic mustard (Alliaria petiolata), multiflora rose (Rosa multiflora), jumpseed (Polygonum virginianum), Japanese knotweed (Polygonum cuspidatum), common wormwood (Artemisia vulgaris), broadleaf enchanter's nightshade (Circaea lutetiana), boxelder (Acer negundo), black cherry (Prunus serotina), bishop's goutweed (Aegopodium podagraria), honeysuckle (Lonicera sp.), spotted ladysthumb (Polygonum persicaria), Japanese honeysuckle (Lonicera japonica), Siberian elm (Ulmus pumila), sweet birch (Betula lenta), blackberry (Rubus sp.), white wood aster (Eurybia divaricata), red maple (Acer rubrum), rattlesnakeroot (Prenanthes), black raspberry (Rubus occidentalis), jewelweed (Impatiens capensis), Amur honeysuckle (Lonicera maackii), swamp white oak (Quercus bicolor), white snakeroot (Ageratina altissima), goldenrod (Solidago sp.), American pokeweed (Phytolacca americana), bull thistle (Cirsium vulgare), northern dewberry (Rubus flagellaris), avens (Geum sp.), sycamore maple (Acer pseudoplatanus), English ivy (Hedera helix), common yellow oxalis (Oxalis stricta), and stickywilly (Galium aparine).

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1. Forest & Woodland
1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest
1.B.3.Na.1.b. G673 Silver Maple - Sugarberry - Sweetgum Floodplain Forest

A3701. *Platanus occidentalis - Fraxinus pennsylvanica - Liriodendron tulipifera* Central Appalachian-Piedmont Floodplain Forest Alliance

Type Concept Sentence: These are high-energy floodplain forests of rocky streambeds and alluvial deposits, found in the Appalachian and Piedmont regions, typically dominated by *Fraxinus pennsylvanica* and *Platanus occidentalis* with *Liquidambar styraciflua* and/or *Liriodendron tulipifera*.

OVERVIEW

Scientific Name: *Platanus occidentalis - Fraxinus pennsylvanica - Liriodendron tulipifera* Central Appalachian-Piedmont Floodplain Forest Alliance
Common Name (Translated Scientific Name): American Sycamore - Green Ash - Tuliptree Central Appalachian-Piedmont Floodplain Forest Alliance
Colloquial Name: Central Appalachian-Piedmont Sycamore - Green Ash - Tuliptree Floodplain Forest

Type Concept: Stands are typically dominated by *Fraxinus pennsylvanica* and *Platanus occidentalis* with *Liquidambar styraciflua* and/or *Liriodendron tulipifera*. Other canopy and understory species that may be present include *Acer rubrum, Aesculus sylvatica* (within its range), *Alnus serrulata, Asimina triloba, Carpinus caroliniana, Cornus florida, Fagus grandifolia, Fraxinus americana*, and *Ulmus americana*, in the non-montane part of the distribution. Species present in the montane occurrences include *Betula alleghaniensis, Betula lenta, Liriodendron tulipifera*, and *Platanus occidentalis*, with *Betula nigra, Carpinus caroliniana, Fraxinus americana, Hamamelis virginiana, Liquidambar styraciflua, Pinus strobus, Pinus virginiana*, and *Tsuga canadensis*. *Euonymus americanus* is a typical shrub species in the lower elevation occurrences, while *Leucothoe fontanesiana* and *Rhododendron maximum* are common at higher elevations. These are high-energy floodplain forests of the Appalachian and Piedmont regions from Massachusetts, New York, and Connecticut south to Tennessee and Georgia. They typically occur on rocky streambeds and alluvial deposits of relatively high-gradient rivers.

Classification Comments:

Similar NVC Types: The presence of *Liriodendron tulipifera* separates this from similar Ozark-Ouachita alliances.

- A3700 *Fraxinus pennsylvanica - Platanus occidentalis - Acer saccharinum* Ozark-Ouachita Floodplain Forest Alliance: contains *Fraxinus* and *Platanus* but with a different, more western range.
- A3699 *Betula nigra - Platanus occidentalis* Appalachian-Piedmont Floodplain Forest Alliance
- A3697 *Acer saccharinum - Acer negundo* Appalachian-Piedmont Floodplain Forest Alliance
- A3702 *Platanus occidentalis - Liquidambar styraciflua - Liriodendron tulipifera* Southern Appalachian Floodplain Forest Alliance: is related and with overlapping range but different composition.

Diagnostic Characteristics: These are high-energy floodplain forests of the Appalachian and Piedmont regions typically dominated by *Fraxinus pennsylvanica* and *Platanus occidentalis* with *Liquidambar styraciflua* and/or *Liriodendron tulipifera*. This combination of environment, floristics and biogeography should be diagnostic.

VEGETATION

Physiognomy and Structure: These are broad-leaved deciduous forests, with canopy trees typically averaging 20 m in height. The shrub and herbaceous layers range from sparse to relatively lush. There is often an abundance of woody vines.

Floristics: These forests are typically dominated by some combination of *Fraxinus pennsylvanica* and *Platanus occidentalis* with *Liquidambar styraciflua* and/or *Liriodendron tulipifera*. Other woody species that may be present include *Acer negundo, Acer saccharinum, Carya cordiformis, Celtis laevigata, Celtis occidentalis, Juglans nigra, Salix nigra*, and *Ulmus americana* In addition, *Asimina triloba, Crataegus spathulata, Crataegus viridis*, and *Lindera benzoin* may be fairly dense in the understory. Herbaceous species that may be present include *Boehmeria cylindrica, Carex abscondita, Carex grayi, Carex lupulina, Chasmanthium latifolium, Elymus virginicus, Leersia lenticularis, Pilea pumila, Polygonum virginianum*, and others.

ENVIRONMENT & DYNAMICS

Environmental Description: These are high-energy floodplain forests of rocky streambeds and alluvial deposits.

Dynamics:

DISTRIBUTION

Geographic Range: Stands of this alliance are found in the Appalachian and Piedmont regions from Massachusetts, New York, and Connecticut south to Tennessee and Georgia.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: CT, DC, DE, KY, MA, MD, NH, NJ, NY, PA, RI, VA, WV
TNC Ecoregions [optional]: 44:?, 48:C, 49:C, 50:C, 51:C, 52:C, 58:C, 59:C, 60:C, 61:C, 62:C, 63:C
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

LOWER LEVEL UNITS

Associations:

- CEGL006466 *Platanus occidentalis / Aesculus flava* Floodplain Forest
- CEGL006476 *Platanus occidentalis - Acer saccharinum - Fraxinus pennsylvanica / Boehmeria cylindrica - Carex emoryi* Floodplain Forest
- CEGL006469 *Populus heterophylla - Acer rubrum - Quercus palustris - Liquidambar styraciflua* Forest
- CEGL006575 *Fraxinus pennsylvanica - (Juglans nigra, Platanus occidentalis)* Floodplain Forest
- CEGL006314 *Liriodendron tulipifera - Fraxinus* spp. / *Lindera benzoin - Viburnum prunifolium / Podophyllum peltatum* Floodplain Forest
- CEGL006458 *Platanus occidentalis - Fraxinus pennsylvanica / Carpinus caroliniana / Verbesina alternifolia* Floodplain Forest
- CEGL006255 *Liriodendron tulipifera - Platanus occidentalis - Betula lenta / Lindera benzoin / Circaea lutetiana ssp. canadensis* Floodplain Forest
- CEGL006492 *Liriodendron tulipifera - Acer negundo - (Platanus occidentalis) / Carpinus caroliniana / Polygonum virginianum* Floodplain Forest
- CEGL004073 *Platanus occidentalis - Acer negundo - Juglans nigra / Asimina triloba / Mertensia virginica* Floodplain Forest
- CEGL006218 *Quercus bicolor - Fraxinus pennsylvanica - (Platanus occidentalis) / Chasmanthium latifolium - Zizia aurea* Floodplain Forest
- CEGL006475 *Platanus occidentalis - Fraxinus pennsylvanica - Acer negundo / Sanicula odorata - Elymus virginicus* Floodplain Forest
- CEGL006036 *Platanus occidentalis - Fraxinus pennsylvanica* Floodplain Forest
- CEGL006901 *Platanus occidentalis - Fraxinus pennsylvanica - Ulmus americana / Cornus sericea* Floodplain Forest

AUTHORSHIP

Primary Concept Source: M. Pyne
Author of Description: M. Pyne
Acknowledgments:
Version Date: 09/26/2014
Classif Resp Region: Southeast

REFERENCES

References: Faber-Langendoen et al. 2016b

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1. Forest & Woodland
1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest
A3701. *Platanus occidentalis - Fraxinus pennsylvanica - Liriodendron tulipifera* Central Appalachian-Piedmont Floodplain Forest A

CEGL006575. *Fraxinus pennsylvanica - (Juglans nigra, Platanus occidentalis)* Floodplain Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Fraxinus pennsylvanica - (Juglans nigra, Platanus occidentalis)* Floodplain Forest
Common Name (Translated Scientific Name): Green Ash - (Black Walnut, American Sycamore) Floodplain Forest
Colloquial Name: Green Ash - Mixed Hardwood Floodplain Forest

Type Concept: This is a green ash - mixed hardwood floodplain forest of the northern Piedmont in the mid-Atlantic eastern United States. It occurs behind levees and on low terraces that are flooded annually for short durations (less than one week per year). Water table is high for the majority of the growing season. Soils are generally silts or clay loams but can have coarser substrates where flood water velocity is higher. The canopy is codominated by *Fraxinus pennsylvanica* with *Juglans nigra* and/or *Platanus occidentalis*. Additional associates include *Ulmus americana, Celtis occidentalis, Acer rubrum, Acer saccharinum*, and *Quercus palustris*. In some areas *Fraxinus americana* may be present in place of *Fraxinus pennsylvanica*. Subcanopy and shrub layers are sparse and generally composed of canopy species regeneration plus *Carpinus caroliniana, Carya cordiformis, Lindera benzoin, Cornus amomum, Viburnum prunifolium*, and *Viburnum dentatum*. The invasive shrubs *Rosa multiflora, Lonicera morrowii, Berberis thunbergii*, and *Lonicera japonica* can be problematic. Herbaceous species, where exotics are not rampant, can include *Impatiens pallida, Impatiens capensis, Laportea canadensis, Verbesina alternifolia, Thalictrum pubescens, Hydrophyllum canadense, Podophyllum peltatum, Symplocarpus foetidus, Circaea lutetiana, Boehmeria cylindrica, Onoclea sensibilis, Arisaema triphyllum*, and *Viola* spp. Woody vines include *Toxicodendron radicans* and *Parthenocissus quinquefolia*. Exotic species tend to dominate the herb layer, including *Alliaria petiolata, Glechoma hederacea*, and *Microstegium vimineum*. Diagnostic features of this floodplain forest include the presence of *Juglans nigra* and rich herbs.

Classification Comments:

Similar NVC Types:

- CEGL006901 *Platanus occidentalis - Fraxinus pennsylvanica - Ulmus americana / Cornus sericea* Floodplain Forest
- CEGL002014 *Fraxinus pennsylvanica - Ulmus* spp. - *Celtis occidentalis* Floodplain Forest

VEGETATION

Floristics: The canopy is codominated by *Fraxinus pennsylvanica* with *Juglans nigra* and/or *Platanus occidentalis*. Additional associates include *Ulmus americana, Celtis occidentalis, Acer rubrum, Acer saccharinum*, and *Quercus palustris*. Subcanopy and shrub layers are sparse and generally composed of canopy species regeneration plus *Carpinus caroliniana, Carya cordiformis, Lindera benzoin, Cornus amomum, Viburnum prunifolium*, and *Viburnum dentatum*. The invasive shrubs *Rosa multiflora, Lonicera morrowii, Berberis thunbergii*, and *Lonicera japonica* can be problematic. Herbaceous species, where exotics are not rampant, can include *Impatiens pallida, Impatiens capensis, Laportea canadensis, Verbesina alternifolia, Thalictrum pubescens, Hydrophyllum canadense, Podophyllum peltatum, Symplocarpus foetidus, Circaea lutetiana, Boehmeria cylindrica, Onoclea sensibilis, Arisaema triphyllum*, and *Viola* spp. Woody vines include *Toxicodendron radicans* and *Parthenocissus quinquefolia*. Exotic species tend to dominate the herb layer, including *Alliaria petiolata, Glechoma hederacea*, and *Microstegium vimineum*. Diagnostic features of this floodplain forest include the presence of *Juglans nigra* and rich herbs.

ENVIRONMENT & DYNAMICS

Environmental Description: These floodplain forests occur behind levees and on low terraces or mid terraces that are flooded annually for short durations (less than one week per year). It also occurs on islands, bars, and mid-terrace shorelines. The water table is high for the majority of the growing season. Soils are generally silts, sandy loams, or clay loams but can have coarser substrates where floodwater velocity is higher.

Dynamics:

DISTRIBUTION

Geographic Range: Currently described from the northern Piedmont of Pennsylvania, Delaware, New Jersey, and possibly Maryland.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: CT, DE, MD?, NJ, NY, PA
TNC Ecoregions [optional]: 48:C, 59:C, 60:C, 61:C
USFS Ecoregions (1994/95): 212Fc:CCC, 221Bc:CCC, 221Bd:CCC, 221Db:CCC, 221Dc:CCC, 222Ic:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Appalachian Trail [Lower New England], Saratoga); USFWS (Montezuma)

CONSERVATION STATUS

Grank (Review Date): GNR (2004/4/21)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:
- = Green Ash - Mixed Hardwood Floodplain Forest (Edinger et al. 2007)
- = Green Ash - Mixed Hardwood Floodplain Forest (Fike 1999)
- = Green Ash - Mixed Hardwood Floodplain Forest (Podniesinski and Wagner 2002)
- = Sycamore - Green Ash Floodplain Forest (Clancy 1996)

AUTHORSHIP

Primary Concept Source: G. Podniesinski and J. Wagner
Author of Description: S.L. Neid, mod. S.C. Gawler
Acknowledgments:
Version Date: 2006/06/20

REFERENCES

References: Bowman 2000, Breden et al. 2001, Clancy 1996, Coxe 2009, Edinger et al. 2002, Edinger et al. 2007, Fike 1999, NRCS 2004a, PDCNR 1999, Podniesinski and Wagner 2002, Stone et al. 2006, WPC and TNC 2002, Zimmerman 2011c, Zimmerman et al. 2012.

NYC NAC Association Description based on 2 plots (CEGL006575):

The overstory is dominated by ashes (Fraxinus spp.), such as green ash (Fraxinus pennsylvanica). Other overstory trees include pin oak (Quercus palustris), silver maple (Acer saccharinum), sweetgum (Liquidambar styraciflua), and northern red oak (Quercus rubra).

Midstory plants include ashes (Fraxinus spp.), sweetgum (Liquidambar styraciflua), northern spicebush (Lindera benzoin), highbush blueberry (Vaccinium corymbosum), common winterberry (Ilex verticillata), southern arrowwood (Viburnum dentatum), and oak (Quercus sp.).

Vines include eastern poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), Japanese honeysuckle (Lonicera japonica), Oriental bittersweet (Celastrus orbiculatus), Japanese wisteria (Wisteria floribunda), and roundleaf greenbrier (Smilax rotundifolia).

Understory plants include sweetgum (Liquidambar styraciflua), northern spicebush (Lindera benzoin), multiflora rose (Rosa multiflora), wrinkleleaf goldenrod (Solidago rugosa), pin oak (Quercus palustris), blackgum (Nyssa sylvatica), garlic mustard (Alliaria petiolata), and jewelweed (Impatiens capensis).

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1. Forest & Woodland
1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest
A3701. *Platanus occidentalis - Fraxinus pennsylvanica - Liriodendron tulipifera* Central Appalachian-Piedmont Floodplain Forest A

CEGL006314. *Liriodendron tulipifera - Fraxinus spp. / Lindera benzoin - Viburnum prunifolium / Podophyllum peltatum* Floodplain Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Liriodendron tulipifera - Fraxinus* spp. / *Lindera benzoin - Viburnum prunifolium / Podophyllum peltatum* Floodplain Forest
Common Name (Translated Scientific Name): Tuliptree - Ash species / Northern Spicebush - Blackhaw / Mayapple Floodplain Forest
Colloquial Name: Mid-Atlantic Terrace Hardwood Floodplain Forest

Type Concept: These rich floodplain forests are found on slightly elevated alluvial terraces and active floodplains of larger rivers of the Delaware Estuary watershed and possibly other watersheds in the mid-Atlantic. The canopy dominants can vary from site to site but are usually some combination of *Liriodendron tulipifera* and *Fraxinus americana, Fraxinus pennsylvanica, Fraxinus nigra, Fraxinus profunda, Carya cordiformis, Carya alba (= Carya tomentosa), Carya ovata, Fagus grandifolia, Quercus rubra, Ulmus americana, Nyssa sylvatica*, and *Prunus serotina*. *Acer saccharum* is often codominant along with *Tilia americana* in Pennsylvania; however, these species are less common or do not occur in New Jersey and Delaware. Minor canopy associates include *Juglans cinerea* and *Acer rubrum*. Shrubs include *Lindera benzoin, Viburnum prunifolium, Carpinus caroliniana, Staphylea trifolia, Viburnum dentatum, Corylus americana, Viburnum lentago*, and *Prunus virginiana*; vines such as *Toxicodendron radicans, Parthenocissus* spp., or *Vitis* spp. may be locally common. The herb layer usually features *Matteuccia struthiopteris* and a mixture of other ferns, forbs and graminoids. Characteristic species include *Mertensia virginica, Podophyllum peltatum, Ageratina altissima (= Eupatorium rugosum), Eurybia divaricata (= Aster divaricatus), Carex radiata*, and a very rich spring ephemeral flora. The presence of *Liriodendron tulipifera, Fraxinus profunda*, and *Mertensia virginica* differentiate this type from similar associations in the alliance.

Classification Comments: Related vegetation farther south, in Virginia, is treated as *Acer saccharum - Fraxinus americana / Carpinus caroliniana / Podophyllum peltatum* Forest (CEGL006459).

Similar NVC Types:
- CEGL006459 *Acer saccharum - Fraxinus americana / Carpinus caroliniana / Podophyllum peltatum* Forest
- CEGL006114 *Acer saccharum - Fraxinus* spp. - *Tilia americana / Matteuccia struthiopteris - Ageratina altissima* Floodplain Forest

VEGETATION

Floristics: The canopy dominants can vary from site to site but are usually some combination of *Liriodendron tulipifera* and *Fraxinus americana, Fraxinus pennsylvanica, Fraxinus nigra*, and/or *Fraxinus profunda, Carya cordiformis, Carya alba (= Carya tomentosa), Carya ovata, Fagus grandifolia, Quercus rubra, Ulmus americana, Nyssa sylvatica*, and *Prunus serotina*. *Acer saccharum* is often codominant along with *Tilia americana* in Pennsylvania; however, these species are less common or do not occur in New Jersey and Delaware. Minor canopy associates include *Juglans cinerea* and *Acer rubrum*. Shrubs include *Lindera benzoin, Viburnum prunifolium, Carpinus caroliniana, Staphylea trifolia, Viburnum dentatum, Corylus americana, Viburnum lentago*, and *Prunus virginiana*; vines such as *Toxicodendron radicans, Parthenocissus* spp., or *Vitis* spp. may be locally common. The herb layer usually features *Mertensia*

virginica, Podophyllum peltatum, Matteuccia struthiopteris, and a mixture of other ferns, forbs and graminoids. Characteristic species include *Ageratina altissima (= Eupatorium rugosum), Eurybia divaricata (= Aster divaricatus), Carex radiata*, and a very rich spring ephemeral flora. The presence of *Liriodendron tulipifera, Fraxinus profunda*, and *Mertensia virginica* differentiate this type from similar associations in the alliance.

ENVIRONMENT & DYNAMICS

Environmental Description: These rich floodplain forests are found on slightly elevated alluvial terraces and active floodplains of larger rivers of the Delaware Estuary watershed and possible other watersheds in the Mid-Atlantic.

Dynamics: These are floodplain forests of larger rivers that actively flood.

DISTRIBUTION

Geographic Range: This community type occurs along the active floodplains of larger rivers in the Delaware Estuary in New Jersey, Delaware and Pennsylvania.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: DE?, MD?, NJ, PA
TNC Ecoregions [optional]: 58:P, 61:C, 62:C
USFS Ecoregions (1994/95): 221Db:CCC, 232Ac:CCC, 232Bt:CPP
Omernik Ecoregions:
Federal Lands [optional]:

CONSERVATION STATUS

Grank (Review Date): GNR (2005/9/21)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low - Poorly Documented.

SYNONYMY

Synonymy:
- **<** Flood Plains (Shreve 1910)
- **<** Floodplain Forest (Breden 1989)
- **?** Palustrine Broad-leaved Deciduous Forested Wetland, Seasonally Flooded (PFO1C) (Cowardin et al. 1979)
- **?** Riverine floodplain forest: terraces (NAP pers. comm. 1998)
- **?** SNE Riverside/streamside mesic, deciduous forest (Rawinski 1984a)
- **<** Sugar Maple - Basswood: 26 (Eyre 1980)
- **<** Upstream Vegetation Patterns (Hupp 1986)

AUTHORSHIP

Primary Concept Source: S. Perles and G. Podniesinski
Author of Description: S. Perles, G. Podniesinski, W. McAvoy, K. Walz
Acknowledgments:
Version Date: 2005/09/21

REFERENCES

References: Breden 1989, Breden et al. 2001, Cowardin et al. 1979, Coxe 2009, Eyre 1980, Hupp 1982, Hupp 1986, McAvoy pers. comm., NAP pers. comm. 1998, Perles pers. comm., Podniesinski pers. comm., Rawinski 1984a, Shreve 1910.

NYC NAC Association Description (CEGL006314):

This association was not selected as a first choice for any NYC NAC plots.

M503. Central Hardwood Swamp Forest

This swamp forest vegetation encompasses a variety of seepage, wet flatwood and depression, and lake or pond fringe forests (nonriverine) found in the eastern United States and adjacent Canada, primarily exclusive of the coastal plains, dominated by hardwood trees, including *Acer rubrum var. trilobum, Acer saccharinum, Betula nigra, Fagus grandifolia, Fraxinus pennsylvanica, Liriodendron tulipifera, Liquidambar styraciflua, Nyssa biflora, Nyssa sylvatica, Platanus occidentalis, Quercus alba, Quercus bicolor, Quercus lyrata, Quercus michauxii, Quercus palustris*, and *Quercus phellos*.

G597. Central Hardwood Flatwoods & Swamp Forest

This is a diverse group of wooded wetland vegetation types encompassing primarily non-alluvial wetlands of the central to east-central United States and adjacent Canada, including depression swamps, ponds, and various kinds of flatwoods. Many examples are dominated by *Quercus bicolor, Quercus palustris*, or other oak species, or a mix of hardwoods, including *Acer rubrum, Fagus grandifolia, Fraxinus* spp., and *Ulmus americana*.

1. Forest & Woodland
1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest
1.B.3.Na.2.c. G597 Central Hardwood Flatwoods & Swamp Forest

A3408. *Quercus palustris - Quercus bicolor* Flooded & Swamp Forest Alliance

Type Concept Sentence: These floodplain swamp forests are found along smaller rivers in southern New England and the northern Piedmont, as well as in West Virginia, and are dominated by some combination of *Acer rubrum, Carya cordiformis, Fraxinus americana, Fraxinus nigra, Fraxinus pennsylvanica, Nyssa sylvatica, Platanus occidentalis, Quercus bicolor, Quercus palustris*, and *Ulmus americana*.

OVERVIEW

Scientific Name: *Quercus palustris - Quercus bicolor* Flooded & Swamp Forest Alliance
Common Name (Translated Scientific Name): Pin Oak - Swamp White Oak Flooded & Swamp Forest Alliance
Colloquial Name: Pin Oak - Swamp White Oak Flooded & Swamp Forest

Type Concept: This floodplain forest occurs along smaller rivers in southern New England and the northern Piedmont, as well as in West Virginia. The setting can range from high terraces to any broad flat area with diffuse or braided drainage. The canopies of examples in New England and the northern Piedmont contain *Fraxinus pennsylvanica, Quercus palustris*, and *Ulmus americana*, with *Acer rubrum* and occasionally with *Quercus bicolor*. In addition, *Carya cordiformis, Fraxinus americana, Fraxinus nigra, Nyssa sylvatica*, and/or *Platanus occidentalis* may be present. West Virginia examples are dominated by *Quercus palustris* in association with *Acer rubrum, Carya ovata, Fraxinus americana, Fraxinus nigra, Nyssa sylvatica*, and *Quercus bicolor*. The shrub layer is dominated by *Carpinus caroliniana, Cornus amomum, Ilex verticillata, Lindera benzoin*, and *Viburnum dentatum*.

Classification Comments:

Similar NVC Types: These alliances are all closely related and may be difficult to distinguish from one another. Stands of *Quercus palustris - Quercus bicolor* Flatwoods & Swamp Forest Alliance (A0329) may be of similar composition to those of this alliance (A3408), but are found in different hydrological settings.

- A0329 *Quercus palustris - Quercus bicolor* Flatwoods & Swamp Forest Alliance
- A0230 *Quercus alba - Fagus grandifolia* Flatwoods & Swamp Forest Alliance
- A3881 *Acer rubrum - Fraxinus* spp. - *Quercus bicolor* Swamp Forest Alliance

Diagnostic Characteristics: These are floodplain and swamp forests typically dominated by *Quercus palustris* and *Quercus bicolor*.

VEGETATION

Physiognomy and Structure: Stands are generally characterized by a closed to partially open canopy of wetland trees. The shrub layer is often poorly developed, and the herbaceous layer is variable in composition and usually dense.

Floristics: The canopies of examples in New England and the northern Piedmont contain *Fraxinus pennsylvanica, Quercus palustris*, and *Ulmus americana*, with *Acer rubrum* and occasionally with *Quercus bicolor*. In addition, *Carya cordiformis, Fraxinus americana, Fraxinus nigra, Nyssa sylvatica*, and/or *Platanus occidentalis* may be present. *Carpinus caroliniana* may be present as a small tree. The shrub layer includes *Cornus amomum, Cornus obliqua, Lindera benzoin, Sambucus canadensis*, and/or *Viburnum recognitum*. The herbaceous layer is variable in composition and usually dense. There may be abundant sedges, including *Carex crinita, Carex grayi, Carex intumescens, Carex lupulina, Carex lurida, Carex prasina*, or *Carex rosea*, with additional species such as *Arisaema triphyllum, Athyrium filix-femina, Cinna arundinacea, Geum canadense, Impatiens* spp., *Iris versicolor, Leersia virginica, Onoclea sensibilis, Panax trifolius, Polygonum virginianum (= Tovara virginiana), Symplocarpus foetidus, Toxicodendron radicans*, and *Viola sororia*. West Virginia examples are dominated by *Quercus palustris* in association with *Acer rubrum, Carya ovata, Fraxinus americana, Fraxinus nigra, Nyssa sylvatica*, and *Quercus bicolor*. The shrub layer is dominated by *Carpinus caroliniana, Cornus amomum, Ilex verticillata, Lindera benzoin*, and *Viburnum dentatum*. Abundant species in the herbaceous layer include *Boehmeria cylindrica, Carex bromoides, Carex stricta, Cinna arundinacea, Leersia oryzoides, Lycopus uniflorus, Osmunda regalis, Onoclea sensibilis, Pilea pumila, Packera aurea (= Senecio aureus)*, and *Toxicodendron radicans*.

ENVIRONMENT & DYNAMICS

Environmental Description: The environment of this forest type includes alluvial deposits in the floodplains and terraces of small rivers. Flooding occurs during local events, especially during winter months. These areas can be seasonally, temporarily or intermittently flooded, often with networks of small drainages and pools throughout. Many of these areas were previously used as pasture. One association assigned to this alliance is the "matrix" community of the Meadow River wetlands in southeast West Virginia (Greenbrier County).

Dynamics:

DISTRIBUTION

Geographic Range: This alliance is found in the northeastern U.S., in the northern Piedmont and southern New England, as well as in Quebec, Canada.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: CT, MA, NH, NJ, NY, PA, QC, RI, WV
TNC Ecoregions [optional]: 50:C, 60:C, 61:C, 62:C
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

- **?** Alluvial Red Maple Swamp (Swain and Kearsley 2001)
- **?** Bottomland oak - hardwood palustrine forest (Fike 1999)
- **?** Circumneutral Broadleaf Swamp (Smith 1991)
- **><** perched swamp white oak swamp (Reschke 1990)

LOWER LEVEL UNITS

Associations:

- CEGL007399 *Quercus palustris - (Fraxinus nigra) / Lindera benzoin / Carex bromoides* Wet Forest
- CEGL006185 *Quercus palustris - Acer rubrum / Carex grayi - Geum canadense* Wet Forest
- CEGL006386 *Quercus bicolor - Acer rubrum / Carpinus caroliniana* Wet Forest

AUTHORSHIP

Primary Concept Source: M. Pyne
Author of Description: S. Menard and M. Pyne
Acknowledgments: We have incorporated information compiled by D.J. Allard and D. Faber-Langendoen.
Version Date: 12/18/2014
Classif Resp Region: East

REFERENCES

References: Eyre 1980, Faber-Langendoen et al. 1996, Faber-Langendoen et al. 2016b, Fike 1999, Reschke 1990, Smith 1991, Swain and Kearsley 2001

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1. Forest & Woodland
1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest
A3408. *Quercus palustris - Quercus bicolor* Flooded & Swamp Forest Alliance

CEGL006185. *Quercus palustris - Acer rubrum / Carex grayi - Geum canadense* Wet Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Quercus palustris - Acer rubrum / Carex grayi - Geum canadense* Wet Forest
Common Name (Translated Scientific Name): Pin Oak - Red Maple / Gray's Sedge - White Avens Wet Forest
Colloquial Name: Pin Oak Small River Floodplain Forest

Type Concept: This freely drained floodplain forest occurs along smaller rivers in southern New England and the northern Piedmont. The setting can range from high terraces to any broad flat area with diffuse or braided drainage. The canopy is composed of *Quercus palustris, Fraxinus pennsylvanica, Acer rubrum, Ulmus americana*, and occasionally *Quercus bicolor, Fraxinus americana, Fraxinus*

nigra, Carya cordiformis, Nyssa sylvatica, and/or *Platanus occidentalis*. More typically upland trees sometimes found on these terraces include *Quercus alba, Liriodendron tulipifera, Betula alleghaniensis, Pinus strobus*, and *Acer saccharum*. *Carpinus caroliniana* may be present as a small tree. The shrub layer includes *Lindera benzoin, Viburnum recognitum, Cornus amomum, Cornus obliqua*, or *Sambucus canadensis*. The herbaceous layer is variable in composition and usually dense. It can have abundant sedges, including *Carex lurida, Carex crinita, Carex intumescens, Carex rosea, Carex prasina, Carex lupulina*, or *Carex grayi*, with additional species such as *Cinna arundinacea, Leersia virginica, Panax trifolius, Symplocarpus foetidus, Geum canadense, Polygonum virginianum (= Tovara virginiana), Impatiens* spp., *Onoclea sensibilis, Athyrium filix-femina, Arisaema triphyllum, Iris versicolor, Viola sororia*, and *Toxicodendron radicans*. *Berberis thunbergii* and *Microstegium vimineum* are common invasive species in these forests.

Classification Comments:

Similar NVC Types:

- CEGL006240 *Quercus palustris - (Quercus bicolor) - Acer rubrum / Vaccinium corymbosum / Osmunda cinnamomea* Wet Forest: basin swamp with *Quercus palustris* and *Acer rubrum*.

VEGETATION

Floristics: The canopy is composed of *Quercus palustris, Fraxinus pennsylvanica, Acer rubrum, Ulmus americana*, and occasionally *Quercus bicolor, Fraxinus americana, Fraxinus nigra, Carya cordiformis, Nyssa sylvatica*, and/or *Platanus occidentalis*. More typically upland trees sometimes found on these terraces include *Quercus alba, Liriodendron tulipifera, Betula alleghaniensis, Pinus strobus*, and *Acer saccharum*. *Carpinus caroliniana* may be present as a small tree. The shrub layer includes *Lindera benzoin, Viburnum recognitum, Cornus amomum, Cornus obliqua*, or *Sambucus canadensis*. The herbaceous layer is variable in composition and usually dense. It can have abundant sedges, including *Carex lurida, Carex crinita, Carex intumescens, Carex rosea, Carex prasina, Carex lupulina*, or *Carex grayi*, with additional species such as *Cinna arundinacea, Leersia virginica, Panax trifolius, Symplocarpus foetidus, Geum canadense, Polygonum virginianum (= Tovara virginiana), Impatiens* spp., *Onoclea sensibilis, Athyrium filix-femina, Arisaema triphyllum, Iris versicolor, Viola sororia*, and *Toxicodendron radicans*. *Berberis thunbergii* and *Microstegium vimineum* are common invasive species in these forests.

ENVIRONMENT & DYNAMICS

Environmental Description: This forest occurs on alluvial deposits in the floodplain of small rivers. Flooding occurs during local events, especially during winter months. These areas can be seasonally, temporarily or intermittently flooded, often with networks of small drainages and pools throughout. Many of these areas were previously used as pasture.

Dynamics:

DISTRIBUTION

Geographic Range: This association is currently known from southern New England to New Jersey and Pennsylvania.

Spatial Scale & Pattern [optional]: Small patch
Nations: US
States/Provinces: CT, MA, NJ, NY, PA, RI
TNC Ecoregions [optional]: 60:C, 61:C, 62:C
USFS Ecoregions (1994/95): 212Fc:CCC, 221Ac:CCC, 221Ae:CCC, 221Af:CCC, 221Bd:CCC, 221Da:CCC, 221Dc:CCC, 232Ac:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Appalachian Trail [Lower New England], Delaware Water Gap, Eisenhower, Gettysburg); USFWS (Great Swamp)

CONSERVATION STATUS

Grank (Review Date): G3 (2011/5/20)
Greasons: Approximately 50 occurrences occupying 10,000 acres or less are estimated over a somewhat limited range from southern New England to central New Jersey. This vegetation has likely declined over the short term and long term due to a number of human activities. Since many occurrences are located not far from large urban centers, existing occurrences face continued threats of construction and agriculture and associated runoff, as well as from hydrological manipulations such as culverts.
Ranking Author (Version): L.A. Sneddon (2011/5/20)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:

- **=** *Quercus palustris - Fraxinus pennsylvanica* temporally flooded forests (Metzler and Barrett 2001)

- **?** Bottomland Oak - Hardwood Palustrine Forest (Fike 1999)
- **?** Southern New England floodplain forest (Rawinski 1984a)

AUTHORSHIP

Primary Concept Source: L.A. Sneddon and K. Metzler
Author of Description: S.L. Neid, mod. L.A. Sneddon and S.C. Gawler
Acknowledgments:
Version Date: 2006/06/20

REFERENCES

References: Barrett and Enser 1997, Breden et al. 2001, Edinger et al. 2002, Enser 1999, Enser and Lundgren 2006, Fike 1999, Metzler and Barrett 2001, Metzler and Barrett 2006, Perles et al. 2006c, Perles et al. 2007, Rawinski 1984a, Swain and Kearsley 2001, Zimmerman 2011f, Zimmerman et al. 2012.

NYC NAC Association Description based on 11 plots (CEGL006185):

Overstory trees include pin oak (Quercus palustris), red maple (Acer rubrum), black cherry (Prunus serotina), blackgum (Nyssa sylvatica), white oak (Quercus alba), northern red oak (Quercus rubra), sassafras (Sassafras albidum), sweetgum (Liquidambar styraciflua), eastern cottonwood (Populus deltoides), slippery elm (Ulmus rubra), black walnut (Juglans nigra), princesstree (Paulownia tomentosa), bigtooth aspen (Populus grandidentata), gray birch (Betula populifolia), northern catalpa (Catalpa speciosa), pin cherry (Prunus pensylvanica), and green ash (Fraxinus pennsylvanica).

Midstory plants include red maple (Acer rubrum), pin oak (Quercus palustris), blackgum (Nyssa sylvatica), sassafras (Sassafras albidum), black cherry (Prunus serotina), sweetgum (Liquidambar styraciflua), green ash (Fraxinus pennsylvanica), gray birch (Betula populifolia), Russian olive (Elaeagnus angustifolia), bitternut hickory (Carya cordiformis), serviceberry (Amelanchier), blackhaw (Viburnum prunifolium), tree of heaven (Ailanthus altissima), Tatarian honeysuckle (Lonicera tatarica), pin cherry (Prunus pensylvanica), northern red oak (Quercus rubra), staghorn sumac (Rhus typhina), boxelder (Acer negundo), glossy buckthorn (Frangula alnus), northern catalpa (Catalpa speciosa), white oak (Quercus alba), Japanese angelica tree (Aralia elata), slippery elm (Ulmus rubra), southern arrowwood (Viburnum dentatum), Norway maple (Acer platanoides), and northern spicebush (Lindera benzoin).

Vines include eastern poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), Japanese honeysuckle (Lonicera japonica), roundleaf greenbrier (Smilax rotundifolia), Oriental bittersweet (Celastrus orbiculatus), Amur peppervine (Ampelopsis brevipedunculata), cat greenbrier (Smilax glauca), grape (Vitis sp.), climbing nightshade (Solanum dulcamara), trumpet creeper (Campsis radicans), and cutleaf blackberry (Rubus laciniatus).

Understory plants include red maple (Acer rubrum), sassafras (Sassafras albidum), sweetgum (Liquidambar styraciflua), multiflora rose (Rosa multiflora), common wormwood (Artemisia vulgaris), blackberry (Rubus sp.), southern arrowwood (Viburnum dentatum), goldenrod (Solidago sp.), pin oak (Quercus palustris), white snakeroot (Ageratina altissima), black cherry (Prunus serotina), American pokeweed (Phytolacca americana), northern spicebush (Lindera benzoin), woodsorrel (Oxalis sp.), blackgum (Nyssa sylvatica), redosier dogwood (Cornus sericea), devil's beggartick (Bidens frondosa), northern dewberry (Rubus flagellaris), wine raspberry (Rubus phoenicolasius), Canadian clearweed (Pilea pumila), jewelweed (Impatiens capensis), eastern hayscented fern (Dennstaedtia punctilobula), black raspberry (Rubus occidentalis), spotted ladysthumb (Polygonum persicaria), Canada mayflower (Maianthemum canadense), Christmas fern (Polystichum acrostichoides), mapleleaf viburnum (Viburnum acerifolium), annual ragweed (Ambrosia artemisiifolia), great ragweed (Ambrosia trifida), broadleaf enchanter's nightshade (Circaea lutetiana), garlic mustard (Alliaria petiolata), avens (Geumsp.), dogbane (Apocynum sp.), wild yam (Dioscorea villosa), Nepalese browntop (Microstegium vimineum), broadleaf helleborine (Epipactis helleborine), Indian strawberry (Duchesnea indica), smooth Solomon's seal (Polygonatum biflorum), tuliptree (Liriodendron tulipifera), bull thistle (Cirsium vulgare), northern catalpa (Catalpa speciosa), Japanese knotweed (Polygonum cuspidatum), Canada goldenrod (Solidago altissima), common yellow oxalis (Oxalis stricta), and silktree (Albizia julibrissin).

M504. Laurentian-Acadian-North Atlantic Coastal Flooded & Swamp Forest

This swamp forest macrogroup of the northeastern and north-central U.S. and southeastern Canada is characterized by a mixture of deciduous trees (*Acer rubrum, Betula alleghaniensis, Fraxinus nigra, Nyssa sylvatica, Ulmus americana*) and coniferous trees (*Chamaecyparis thyoides, Larix laricina, Picea rubens, Pinus strobus, Thuja occidentalis, Tsuga canadensis*) on organic or mineral soils spanning the pH spectrum from acidic to alkaline.

G653. Silver Maple - Green Ash - Black Ash Floodplain Forest

The group includes hardwood floodplain forests in the Laurentian-Acadian areas of the northeastern and midwestern U.S. and southern Canada, and is typically dominated by *Acer rubrum, Acer saccharinum, Acer saccharum, Fraxinus pennsylvanica, Tilia americana*, or *Ulmus americana*. Northward stands with *Picea glauca* or *Populus balsamifera* may occur.

1. Forest & Woodland
1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest
1.B.3.Na.3.a. G653 Silver Maple - Green Ash - Black Ash Floodplain Forest

A3715. *Acer saccharinum - Acer rubrum - Ulmus americana* Floodplain Forest Alliance

Type Concept Sentence: This alliance is dominated by *Acer rubrum, Acer saccharinum, Ulmus americana*, and occasionally *Fraxinus pennsylvanica* and occurs in the northeastern U.S. and temperate regions of eastern Canada, west to the upper Great Lakes region of Minnesota and Ontario, where it occurs along small and large rivers, on higher terraces, and beside lake and larger streams.

OVERVIEW

Scientific Name: *Acer saccharinum - Acer rubrum - Ulmus americana* Floodplain Forest Alliance
Common Name (Translated Scientific Name): Silver Maple - Red Maple - American Elm Floodplain Forest Alliance
Colloquial Name: Silver Maple - Red Maple - American Elm Floodplain Forest

Type Concept: Characteristic dominant species include *Acer rubrum, Acer saccharinum, Ulmus americana*, and occasionally *Fraxinus pennsylvanica*. In the northern Great Lakes region of the Midwest and Canada, *Fraxinus nigra* can be dominant. Shrub layer ranges from high in patches to generally sparse. *Onoclea sensibilis* and *Boehmeria cylindrica* are characteristic in the herb layer. This alliance occurs in the northeastern U.S. and temperate regions of eastern Canada, west to the upper Great Lakes region of Minnesota and Ontario. It includes communities along small and large rivers, on higher terraces of river bottoms and floodplains and beside lakes and larger streams. The terrain is relatively flat, and hummock-and-hollow microtopography is absent or poorly developed. The soils are alluvial loams to silt loams typically temporarily inundated during spring floods. The soils are well-drained to imperfectly drained mineral soils but a limited organic horizon may occur in some examples.

Classification Comments: Further review is needed to separate alliances in this group versus those in Silver Maple - Green Ash - Sycamore Floodplain Forest Group (G652). As defined, this type is primarily found in the Laurentian-Acadian region from northern Minnesota and northwestern Ontario east to Atlantic Canada, and southward into Lower New England, the Allegheny Plateau and lower Great Lakes. But it may be that the southward part is a better fit with Silver Maple - Sugarberry - Sweetgum Floodplain Forest Group (G673), because of the presence of *Platanus occidentalis, Salix nigra*, and other central hardwood floodplain species.

Similar NVC Types: This alliance overlaps with those in Silver Maple - Green Ash - Sycamore Floodplain Forest Group (G652).

Diagnostic Characteristics: Forests dominated by *Acer rubrum, Acer saccharinum, Ulmus americana*, and occasionally *Fraxinus nigra* primarily in the Laurentian-Acadian regions of the northeastern and northern midwestern U.S. and southern Canada. Diagnostics that distinguish this type from central floodplains in the northeast and north-central United States are needed.

VEGETATION

Physiognomy and Structure: Floodplain deciduous forests that can range from closed-canopy to woodland structure.

Floristics: Characteristic canopy species include *Acer rubrum, Acer saccharinum*, and *Ulmus americana*. In the northern Great Lakes region of the Midwest and Canada, *Fraxinus nigra* can be dominant. Other associated species vary according to elevation within the floodplain and can include *Fraxinus americana, Fraxinus pennsylvanica, Populus deltoides, Prunus serotina, Quercus bicolor, Quercus macrocarpa, Picea glauca*, and *Prunus serotina*. *Quercus rubra* and *Pinus strobus* can occur along higher elevations of the floodplain, grading into upland forests. The shrub layer is generally sparse to locally dense, containing canopy species and occasional wetland shrubs such as *Carpinus caroliniana, Cephalanthus occidentalis, Cornus* spp., *Ilex verticillata, Lindera benzoin, Vaccinium corymbosum, Viburnum* spp., and *Vitis* spp. *Onoclea sensibilis* and *Boehmeria cylindrica* are characteristic in the herb layer. Other herbs that may be present include *Arisaema triphyllum, Asclepias incarnata, Athyrium filix-femina, Carex* spp., *Cinna* spp., *Eupatorium* spp., *Galium* spp., *Impatiens capensis, Laportea canadensis, Lycopus uniflorus, Matteuccia struthiopteris, Osmunda* spp., *Phalaris arundinacea*, and *Pilea pumila*.

ENVIRONMENT & DYNAMICS

Environmental Description: This alliance is found on higher terraces along the lower reaches of larger rivers, and along smaller rivers and large streams, often as a linear band within lower alluvial terraces, backwaters, bars, and islands of minor rivers and smaller tributaries, creeks and drainages. The terrain is relatively flat, and hummock-and-hollow microtopography is absent or poorly developed. The soils are alluvial loams to silt loams, temporarily inundated during spring floods, and ranges from well-drained to

imperfectly drained. They can range from acidic to being associated with calcareous or sedimentary bedrock and with fine-grained surficial deposits. Soils may be organic, especially in the northern Great Lakes region, or mineral, especially in the Northeast and ranging into the Great Lakes.

Dynamics: This community is adapted to the periodic flooding of the associated river or stream system. The soil is saturated for at least part of the growing season and may stay inundated for extended periods of time.

DISTRIBUTION

Geographic Range: This alliance is found across the northern Great Lakes states in the Midwest ranging to northeastern U.S. and adjacent Canadian provinces.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: CT, MA, MB, ME, MI, MN, NB, ND, NH, NJ, NY, ON, PA, QC, RI, SD, VT, WI
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

- **?** *Boehmeria - Acer saccharinum* community (Metzler and Damman 1985) [Connecticut]
- **?** *Populus - Acer saccharinum, Eupatorium - Acer saccharinum, Onoclea - Acer saccharinum* community (Metzler and Damman 1985) [Connecticut]
- **><** Cottonwood: 63 (Eyre 1980)
- **><** Floodplain Forest (Smith 1991)
- **?** Floodplain Swamp (Smith 1991)
- **?** Major-River Floodplain Forest (Swain and Kearsley 2001)
- **?** Red maple - elm - willow floodplain swamp (Fike 1999)
- **><** Silver Maple - American Elm: 62 (Eyre 1980)
- **?** Silver maple floodplain forest (Fike 1999)
- **?** Southern Wet Forest (Curtis 1959) [Wisconsin]

LOWER LEVEL UNITS

Associations:

- CEGL006501 *Acer rubrum - Abies balsamea / Viburnum nudum var. cassinoides* Floodplain Forest
- CEGL006165 *Acer rubrum - Fraxinus pennsylvanica / Polygonum* spp. Floodplain Forest
- CEGL006001 *Acer saccharinum - Ulmus americana / Onoclea sensibilis* Floodplain Forest
- CEGL006503 *Acer rubrum - Prunus serotina / Cornus amomum* Floodplain Forest
- CEGL006176 *Acer saccharinum / Onoclea sensibilis - Boehmeria cylindrica* Floodplain Forest
- CEGL005488 *Fraxinus nigra - Acer saccharinum* Upper Great Lakes Floodplain Forest
- CEGL005489 *Acer saccharinum* Upper Great Lakes Low Floodplain Forest

AUTHORSHIP

Primary Concept Source: K.J. Metzler and A.W.H. Damman (1985); Minnesota Department of Natural Resources (2003)
Author of Description: S. Menard
Acknowledgments:
Version Date: 12/18/2014
Classif Resp Region: Midwest

REFERENCES

References: Curtis 1959, Eyre 1980, Faber-Langendoen et al. 1996, Faber-Langendoen et al. 2016b, Fike 1999, Metzler and Damman 1985, Minnesota DNR 2003, Smith 1991, Swain and Kearsley 2001

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1. Forest & Woodland
1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest
A3715. *Acer saccharinum - Acer rubrum - Ulmus americana* Floodplain Forest Alliance

CEGL006001. *Acer saccharinum - Ulmus americana / Onoclea sensibilis* Floodplain Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Acer saccharinum - Ulmus americana / Onoclea sensibilis* Floodplain Forest
Common Name (Translated Scientific Name): Silver Maple - American Elm / Sensitive Fern Floodplain Forest
Colloquial Name: Northeastern Silver Maple - Elm Floodplain Forest

Type Concept: This floodplain forest is currently described from higher terraces along the lower reaches of larger rivers of the northeastern United States where flood depth and duration are relatively less than immediately adjacent to the river channel. The canopy is strongly dominated by *Acer saccharinum*. *Ulmus rubra, Ulmus americana, Prunus serotina*, and *Fraxinus pennsylvanica* can occur in the subcanopy. *Populus deltoides* can occur sporadically, generally identifying locations of former sandy, drainage channels. The shrub layer is present, unlike adjacent areas on lower terraces. Species include *Viburnum recognitum, Viburnum dentatum, Lindera benzoin*, and *Cornus sericea*. The herb layer is strongly dominated by *Onoclea sensibilis* interspersed with lesser amounts of *Cinna arundinacea, Geum canadense, Chelone glabra, Impatiens capensis, Carex crinita, Carex lupulina*, and *Carex grayi*. Often occurs in association with *Acer saccharinum - Populus deltoides* floodplain forests, or on larger rivers than those supporting the *Quercus palustris - Acer rubrum*.

Classification Comments:

Similar NVC Types:

VEGETATION

Floristics: The canopy is strongly dominated by *Acer saccharinum*. *Ulmus rubra, Ulmus americana, Prunus serotina*, and *Fraxinus pennsylvanica* can occur in the subcanopy. *Populus deltoides* can occur sporadically, generally identifying locations of former sandy, drainage channels. The shrub layer is present, unlike adjacent areas on lower terraces. Species include *Viburnum recognitum, Viburnum dentatum, Lindera benzoin*, and *Cornus sericea*. The herb layer is strongly dominated by *Onoclea sensibilis* interspersed with lesser amounts of *Cinna arundinacea, Geum canadense, Chelone glabra, Impatiens capensis, Carex crinita, Carex lupulina*, and *Carex grayi*. Often occurs in association with *Acer saccharinum - Populus deltoides* floodplain forests, or on larger rivers than those supporting *Quercus palustris - Acer rubrum*.

ENVIRONMENT & DYNAMICS

Environmental Description: This floodplain forest occurs on fine soils on upper terraces along the lower reaches of larger rivers of the northeastern United States where flood depth and duration are relatively less than immediately adjacent to the river channel.

Dynamics: This floodplain forest is found higher in the floodplain (not immediately adjacent to river channel) of major rivers.

DISTRIBUTION

Geographic Range: This floodplain forest is currently described from higher terraces along the lower reaches of larger rivers of the northeastern United States.

Spatial Scale & Pattern [optional]: Large patch
Nations: CA?, US
States/Provinces: CT, DE?, MA, MI, NJ, NY, QC?
TNC Ecoregions [optional]: 60:?, 61:C, 62:C, 64:?
USFS Ecoregions (1994/95): 212E:CP, 212Fa:CCP, 212Fb:CCP, 212Fc:CCP, 212Ga:CCP, 221A:CC, 221Bc:CCC, 221Bd:CCP, 221D:CC, 222I:PP, 222O:PP, M212B:CC, M212Dc:CCC, M212Eb:CCP
Omernik Ecoregions:
Federal Lands [optional]: NPS (Appalachian Trail [Lower New England], Saratoga); USFWS (Great Meadows, Oxbow)

CONSERVATION STATUS

Grank (Review Date): GNR (1997/12/1)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low - Poorly Documented. Compare this type to *Acer saccharinum - Acer negundo / Ageratina altissima - Laportea canadensis - (Elymus virginicus)/* Forest (CEGL006217) and *Acer saccharinum - (Populus deltoides) / Matteuccia struthiopteris - Laportea canadensis* Forest (CEGL006147); clarify.

SYNONYMY

Synonymy:

- = *Acer saccharinum / Onoclea sensibilis* community (Metzler and Barrett 2001)

- **<** Lakeside Floodplain Forest (Thompson 1996) [if present]
- **<** Riverine Floodplain Forest (Thompson 1996) [if present]
- **?** Southern New England floodplain forest (Rawinski 1984a)

AUTHORSHIP

Primary Concept Source: Northern Appalachian Planning Team
Author of Description: S.L. Neid, mod. E. Largay
Acknowledgments:
Version Date: 2013/04/08

REFERENCES

References: CDPNQ unpubl. data, Coxe 2009, Edinger et al. 2002, Edinger et al. 2007, Kost et al. 2007, Metzler and Barrett 2001, Metzler and Barrett 2006, NRCS 2004a, Rawinski 1984a, Swain and Kearsley 2001, Thompson 1996.

NYC NAC Association Description based on 2 plots (CEGL006001):

The overstory is dominated by silver maple (Acer saccharinum). Other overstory trees include sweetgum (Liquidambar styraciflua), black cherry (Prunus serotina), and red maple (Acer rubrum).

Midstory plants include southern arrowwood (Viburnum dentatum), northern spicebush (Lindera benzoin), sassafras (Sassafras albidum), sweetgum (Liquidambar styraciflua), black cherry (Prunus serotina), pride-of-Rochester (Deutzia sp.), and red maple (Acer rubrum).

Vines include eastern poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), Japanese honeysuckle (Lonicera japonica), grape (Vitis sp.), Oriental bittersweet (Celastrus orbiculatus), and roundleaf greenbrier (Smilax rotundifolia).

Understory plants include southern arrowwood (Viburnum dentatum), northern spicebush (Lindera benzoin), jewelweed (Impatiens capensis), red maple (Acer rubrum), common boneset (Eupatorium perfoliatum), Japanese knotweed (Polygonum cuspidatum), blackberry (Rubus sp.), American burnweed (Erechtites hieraciifolius), and broadleaf enchanter's nightshade (Circaea lutetiana).

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1. Forest & Woodland
1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest
1.B.3.Na.3.a. G653 Silver Maple - Green Ash - Black Ash Floodplain Forest

A3714. *Acer saccharum - Tilia americana* Mesic Floodplain Forest Alliance

Type Concept Sentence: Varying canopy dominants typically include some combination of *Acer saccharum, Tilia americana, Fraxinus* spp., *Fraxinus pennsylvanica, Prunus serotina, Quercus rubra*, and *Ulmus americana*. This alliance ranges across the northeastern United States and the St. Lawrence and Atlantic regions of Canada along slightly elevated alluvial terraces and active floodplains, streams with small watersheds, high-gradient or submontane portions of major rivers.

OVERVIEW

Scientific Name: *Acer saccharum - Tilia americana* Mesic Floodplain Forest Alliance
Common Name (Translated Scientific Name): Sugar Maple - American Basswood Mesic Floodplain Forest Alliance
Colloquial Name: Sugar Maple - American Basswood Mesic Floodplain Forest

Type Concept: The canopy dominants can vary from site to site but are usually some combination of *Acer saccharum, Tilia americana, Quercus rubra, Ulmus americana, Fraxinus americana, Fraxinus pennsylvanica*, and *Prunus serotina*. Shrubs are typically minor. The herbaceous layer is typically diverse and often features *Matteuccia struthiopteris* along with a variety of graminoids, ferns and forbs. This alliance ranges across the northeastern United States and the St. Lawrence and Atlantic regions of southern Canada. It occurs along slightly elevated alluvial terraces and active floodplains, streams with small watersheds (<2 square miles), high-gradient or submontane portions of major rivers. Soils range from alluvial sands to sand and silt loams.

Classification Comments: This alliance is more mesic than the other alliance in this group (G653). It can be difficult to distinguish from upland maple forests or lower terrace floodplain forests. This alliance may need to move to a more mesic group. A similar alliance occurs within Silver Maple - Green Ash - Sycamore Floodplain Forest Group (G652). More review of this separation is needed. As defined, this type is primarily found in the Acadian and St. Lawrence regions of eastern Canada, and southward into Lower New England, the Allegheny Plateau and lower Great Lakes. But it may be that the southward part is a better fit with Silver Maple - Sugarberry - Sweetgum Floodplain Forest Group (G673), because of the presence of *Platanus occidentalis, Salix nigra*, and other central hardwood floodplain species. And it could be expected in the western Great Lakes states of Michigan, Wisconsin, and northwest Minnesota [but see also *Acer saccharinum* Upper Great Lakes Low Floodplain Forest (CEGL005489)].

Similar NVC Types: This alliance overlaps with those in Silver Maple - Green Ash - Sycamore Floodplain Forest Group (G652).

Diagnostic Characteristics: Mesic floodplain forests dominated by a combination *Acer saccharum, Tilia americana, Quercus rubra, Ulmus americana*, and *Fraxinus* spp. Diagnostics that distinguish this type from central floodplains in the northeast and north-central United States are needed.

VEGETATION

Physiognomy and Structure: Deciduous floodplain forests with closed to somewhat open canopy and a rich, well-developed herb layer.

Floristics: Canopy dominants can vary from site to site, but are usually some combination of *Acer saccharum, Fraxinus americana, Fraxinus pennsylvanica, Prunus serotina, Quercus rubra, Tilia americana*, and *Ulmus americana*. Other canopy associates can include *Acer rubrum, Acer saccharinum, Betula alleghaniensis, Carpinus caroliniana, Carya ovata, Fraxinus nigra*, and *Juglans cinerea*. Shrubs are occasional, but typically do not form high cover and may include *Corylus americana, Prunus virginiana*, and *Viburnum lentago*. Vines such as *Parthenocissus* spp., *Toxicodendron radicans*, or *Vitis* spp. may be locally common. The herb layer is typically rich and well-developed and seasonally variable, with spring ephemerals giving way to taller ferns, graminoids, and forbs. The herb layer often features *Matteuccia struthiopteris* and a mixture of other ferns, forbs, and graminoids. Characteristic species include *Ageratina altissima (= Eupatorium rugosum), Allium* spp., *Asarum canadense, Athyrium filix-femina, Caulophyllum thalictroides, Carex* spp., *Danthonia spicata, Elymus* spp., *Laportea canadensis, Onoclea sensibilis, Sanguinaria canadensis*, and *Solidago* spp. in addition to abundant spring ephemerals in the early growing season. Non-native and invasive species are often present and may include *Lonicera morrowii* and *Rhamnus cathartica*.

ENVIRONMENT & DYNAMICS

Environmental Description: It occurs along slightly elevated alluvial terraces and active floodplains, streams with small (<2 square mile) watersheds, high-gradient or submontane portions of major rivers. Soils range from alluvial sands to sand and silt loams and range from well-drained to poorly drained with very shallow or no organic horizons. These soils are typically less regularly inundated than the soils supporting silver maple floodplain forests. Even with the floodplain setting, some examples may be considered uplands rather than wetlands.

Dynamics: Forests are flooded during spring runoff periods and perhaps during other peak floods and less regularly inundated than the soils supporting silver maple floodplain forests.

DISTRIBUTION

Geographic Range: This alliance is found across northeastern U.S. and the St. Lawrence and Atlantic regions of Canada.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: CT, MA, MD, ME, NB, NH, NJ, NY, PA, QC, VT
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

- **><** Sugar Maple: 27 (Eyre 1980)

LOWER LEVEL UNITS

Associations:
- CEGL006430 *Acer saccharum - Juglans cinerea / Carpinus caroliniana / Matteuccia struthiopteris* Forest
- CEGL006504 *Acer saccharum / Ostrya virginiana / Brachyelytrum erectum* Floodplain Forest
- CEGL006405 *Tilia americana - Acer saccharum - Acer nigrum / Laportea canadensis* Floodplain Forest
- CEGL006114 *Acer saccharum - Fraxinus* spp. - *Tilia americana / Matteuccia struthiopteris - Ageratina altissima* Floodplain Forest

AUTHORSHIP

Primary Concept Source: Eastern Ecology Group
Author of Description: S. Menard
Acknowledgments:

Version Date: 12/18/2014
Classif Resp Region: East

REFERENCES

References: Eyre 1980, Faber-Langendoen et al. 1996, Faber-Langendoen et al. 2016b

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1. Forest & Woodland
1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest
A3714. *Acer saccharum - Tilia americana* Mesic Floodplain Forest Alliance

CEGL006114. *Acer saccharum - Fraxinus* spp. - *Tilia americana / Matteuccia struthiopteris - Ageratina altissima* Floodplain Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Acer saccharum - Fraxinus* spp. - *Tilia americana / Matteuccia struthiopteris - Ageratina altissima* Floodplain Forest
Common Name (Translated Scientific Name): Sugar Maple - Ash species - American Basswood / Ostrich Fern - White Snakeroot Floodplain Forest
Colloquial Name: Terrace Hardwood Floodplain Forest

Type Concept: These rich floodplain forests are found on slightly elevated alluvial terraces and active floodplains of larger rivers throughout the glaciated Northeast. The setting is a raised river terrace; however, this forest may occur very close to the riverbank, if the water channel is well-entrenched, and may even be on sloping banks along some river reaches. The alluvial soils are coarse and less regularly inundated than the soils supporting silver maple floodplain forests. Many of our examples occur on circumneutral to slightly calcareous soils. The canopy is closed to somewhat open, and unlike lower elevation floodplain forests, a subcanopy is often present. Shrubs are occasional but do not form high cover. The herb layer is well-developed and seasonally variable, with spring ephemerals giving way to taller ferns, graminoids and forbs. Bryoids are very minor. The canopy dominants can vary from site to site but are usually some combination of *Acer saccharum, Tilia americana, Quercus rubra, Ulmus americana, Fraxinus americana, Fraxinus pennsylvanica*, and *Prunus serotina*. Minor canopy associates include *Acer saccharinum, Juglans cinerea, Fraxinus nigra*, and *Acer rubrum*. Shrubs include *Corylus americana, Viburnum lentago*, and *Prunus virginiana*; vines, such as *Toxicodendron radicans, Parthenocissus* spp., or *Vitis* spp., may be locally common. The herb layer usually features *Matteuccia struthiopteris* and a mixture of other ferns, forbs and graminoids. Characteristic species include *Ageratina altissima (= Eupatorium rugosum), Allium tricoccum, Allium canadense, Athyrium filix-femina, Caulophyllum thalictroides, Carex gracillima, Carex intumescens, Carex sprengelii, Deparia acrostichoides, Elymus virginicus, Elymus riparius, Elymus wiegandii (= Elymus canadensis var. wiegandii), Onoclea sensibilis, Sanguinaria canadensis, Solidago flexicaulis, Solidago rugosa*, and *Solidago gigantea*, in addition to abundant spring ephemerals in the early growing season. Exotic species, such as *Lysimachia nummularia, Glechoma hederacea*, and *Hesperis matronalis*, may be abundant, especially in disturbed areas. These terrace forests are distinguished from lower floodplain forests by the reduced importance of *Acer saccharinum*; they differ from enriched northern hardwood forests, e.g., *Acer saccharum - Fraxinus americana / Acer spicatum / Caulophyllum thalictroides* Forest (CEGL006636) and *Acer saccharum - Tilia americana / Acer pensylvanicum / Caulophyllum thalictroides* Forest (CEGL006637), in their alluvial soils and flooding regime; also, *Matteuccia struthiopteris* is generally not found in enriched northern hardwood forests.

Classification Comments: Drastically reduced from original extent, as most make excellent fertile farmland. Originally probably a large patch type; now small patch.

Similar NVC Types:
- CEGL006459 *Acer saccharum - Fraxinus americana / Carpinus caroliniana / Podophyllum peltatum* Forest
- CEGL006430 *Acer saccharum - Juglans cinerea / Carpinus caroliniana / Matteuccia struthiopteris* Forest
- CEGL006147 *Acer saccharinum - (Populus deltoides) / Matteuccia struthiopteris - Laportea canadensis* Floodplain Forest
- CEGL006405 *Tilia americana - Acer saccharum - Acer nigrum / Laportea canadensis* Floodplain Forest
- CEGL006314 *Liriodendron tulipifera - Fraxinus* spp. / *Lindera benzoin - Viburnum prunifolium / Podophyllum peltatum* Floodplain Forest

VEGETATION

Floristics: The canopy is closed to somewhat open, and unlike lower-elevation floodplain forests, a subcanopy is often present. Shrubs are occasional, but do not form high cover. The herb layer is well-developed and seasonally variable, with spring ephemerals giving way to taller ferns, graminoids, and forbs. Bryoids are very minor. The canopy dominants can vary from site to site, but are usually some combination of *Acer saccharum, Tilia americana, Quercus rubra, Ulmus americana, Fraxinus americana, Fraxinus pennsylvanica*, and *Prunus serotina*. Minor canopy associates include *Acer saccharinum, Juglans cinerea, Fraxinus nigra*, and *Acer*

rubrum. Shrubs include *Corylus americana, Viburnum lentago*, and *Prunus virginiana*; vines such as *Toxicodendron radicans, Parthenocissus* spp., or *Vitis* spp. may be locally common. The herb layer usually features *Matteuccia struthiopteris* and a mixture of other ferns, forbs, and graminoids. Characteristic species include *Ageratina altissima (= Eupatorium rugosum), Allium tricoccum, Allium canadense, Athyrium filix-femina, Caulophyllum thalictroides, Carex gracillima, Carex intumescens, Carex sprengelii, Deparia acrostichoides, Elymus virginicus, Elymus riparius, Elymus wiegandii (= Elymus canadensis var. wiegandii), Onoclea sensibilis, Sanguinaria canadensis, Solidago flexicaulis, Solidago rugosa*, and *Solidago gigantea* in addition to abundant spring ephemerals in the early growing season. Exotic species, such as *Lysimachia nummularia, Glechoma hederacea*, and *Hesperis matronalis*, may be abundant, especially in disturbed areas.

ENVIRONMENT & DYNAMICS

Environmental Description: These rich floodplain forests are found on slightly elevated alluvial terraces as well as active floodplains of larger rivers throughout the glaciated Northeast. The setting is a raised river terrace; however, this forest may occur very close to the riverbank if the water channel is well entrenched, and may even be on sloping banks along some river reaches. The alluvial soils are coarse and less regularly inundated than the soils supporting silver maple floodplain forests. Many of our examples occur on circumneutral to slightly calcareous soils.

Dynamics:

DISTRIBUTION

Geographic Range: This association occurs in the glaciated Northeast from New Brunswick, Canada, to New Jersey.

Spatial Scale & Pattern [optional]: Small patch
Nations: CA, US
States/Provinces: CT, MA, MD, ME, NB, NH, NY, PA, QC, VT
TNC Ecoregions [optional]: 60:C, 61:C, 63:C, 64:C
USFS Ecoregions (1994/95): 212Aa:CPP, 212Ab:CPP, 212Ba:CCC, 212Bb:CCC, 212Ca:CPP, 212Da:CCC, 212Fa:CCP, 212Fb:CCP, 212Fc:CCP, 221Ak:CCC, 221Bc:CCC, 221Bd:CCP, 221D:C?, M212Ae:CCC, M212Af:CCC, M212Ag:CCC, M212Ba:CCC, M212Ca:CCC, M212Cd:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Appalachian Trail [Lower New England], Appalachian Trail [Northern Appalachians], Saratoga)

CONSERVATION STATUS

Grank (Review Date): GNR (1997/12/1)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate. Additional plots were used to define the type. Should be available from ME or NH HPs.

SYNONYMY

Synonymy:

- **=** *Acer saccharum - Acer saccharinum - Fraxinus americana* variant (Type 5) (Sperduto and Crowley 2002a)
- **=** *Acer saccharum - Fraxinus americana / Carex sprengelii* community (Metzler and Barrett 2001)
- **=** *Acer saccharum - Fraxinus* spp. - *Tilia americana / Matteuccia struthiopteris - Ageratina altissima* Forest (Harrison 2004)
- **<** Floodplain Forest (Breden 1989)
- **<** Hardwood River Terrace Forest (Gawler 2002)
- **?** Palustrine Broad-leaved Deciduous Forested Wetland, Seasonally Flooded (PFO1C) (Cowardin et al. 1979)
- **?** Riverine Floodplain Forest (Thompson 1996)
- **?** Riverine floodplain forest: terraces (NAP pers. comm. 1998)
- **?** SNE Riverside/streamside mesic, deciduous forest (Rawinski 1984a)
- **<** Sugar Maple - Basswood: 26 (Eyre 1980)

AUTHORSHIP

Primary Concept Source: Northern Appalachian Planning Team
Author of Description: S.C. Gawler
Acknowledgments:
Version Date: 2003/01/27

REFERENCES

References: Breden 1989, Breden et al. 2001, CDPNQ unpubl. data, Cowardin et al. 1979, Edinger et al. 2002, Edinger et al. 2007, Eyre 1980, Gawler 2002, Gawler and Cutko 2010, Harrison 2004, Harrison 2011, Harrison and Stango 2003, Metzler and Barrett

2001, Metzler and Barrett 2006, NAP pers. comm. 1998, NRCS 2004a, PNHP 2002, Rawinski 1984a, Rhoads and Block 2008a, Sperduto 2000a, Sperduto 2000b, Sperduto and Crowley 2002a, Sperduto and Nichols 2004, Swain and Kearsley 2001, Thompson 1996, Thompson and Sorenson 2000, Zimmerman 2011j, Zimmerman and Podniesinski 2008, Zimmerman et al. 2012.

NYC NAC Association Description based on 2 plots (CEGL006114):

Overstory trees include sugar maple (Acer saccharum), white mulberry (Morus alba), Norway maple (Acer platanoides), boxelder (Acer negundo), and sweet birch (Betula lenta).

Midstory plants include sugar maple (Acer saccharum), slippery elm (Ulmus rubra), burningbush (Euonymus alatus), boxelder (Acer negundo), eastern white pine (Pinus strobus), ash (Fraxinus sp.), and bitternut hickory (Carya cordiformis).

Vines include Amur peppervine (Ampelopsis brevipedunculata), Oriental bittersweet (Celastrus orbiculatus), and Virginia creeper (Parthenocissus quinquefolia).

Understory plants include sugar maple (Acer saccharum), jewelweed (Impatiens capensis), wine raspberry (Rubus phoenicolasius), Oriental lady's thumb (Polygonum cespitosum), Japanese knotweed (Polygonum cuspidatum), jumpseed (Polygonum virginianum), white wood aster (Eurybia divaricata), burningbush (Euonymus alatus), multiflora rose (Rosa multiflora), slippery elm (Ulmus rubra), bitternut hickory (Carya cordiformis), and garlic mustard (Alliaria petiolata).

G045. Laurentian-Acadian-Appalachian Acidic Swamp

This group includes north-temperate acidic, nutrient-poor swamps of the northeastern U.S. and adjacent Canada, where *Acer rubrum* is the nearly constant and dominant tree species and the herbaceous and shrub layers tend to be fairly species-poor. Other codominants include deciduous trees *Fraxinus* spp., *Betula alleghaniensis*, or *Nyssa sylvatica*, or conifers *Tsuga canadensis* and *Picea rubens*.

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1. Forest & Woodland
1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest
1.B.3.Na.3.c. G045 Laurentian-Acadian-Appalachian Acidic Swamp

A3706. *Acer rubrum - Fraxinus pennsylvanica* Northeastern Swamp Forest Alliance

Type Concept Sentence: This alliance contains swamp forests of poorly drained flats, watercourses, seepage areas, and backswamps of floodplains. *Fraxinus pennsylvanica* is characteristic, and *Acer rubrum* is nearly always present. The substrate is generally muck rather than peat, overlying mineral soils.

OVERVIEW

Scientific Name: *Acer rubrum - Fraxinus pennsylvanica* Northeastern Swamp Forest Alliance
Common Name (Translated Scientific Name): Red Maple - Green Ash Northeastern Swamp Forest Alliance
Colloquial Name: Northeastern Red Maple - Green Ash Swamp Forest

Type Concept: This alliance contains swamp forests in which *Fraxinus pennsylvanica* is characteristic, and *Acer rubrum* is nearly always present. Canopy composition differs sharply from the surrounding upland and varies with geography. It differs from associated temporarily flooded forests by the absence or unimportance of floodplain species such as *Acer saccharinum, Betula nigra, Platanus occidentalis*, and *Populus deltoides*. Other canopy species across the range of this alliance include *Betula lenta, Fraxinus americana, Liquidambar styraciflua, Liriodendron tulipifera, Quercus bicolor, Quercus palustris, Ulmus americana*, and *Ulmus rubra*. Understory and shrub species include *Alnus serrulata, Carpinus caroliniana, Cornus* spp., *Ilex verticillata, Lindera benzoin*, and *Vaccinium corymbosum*; *Nemopanthus mucronatus* often occurs in the northern portion of the range. Typical habitats include forested seeps on hillsides or along watercourses, edges and backswamps of floodplains that may be saturated by seepage from adjacent slopes, and other poorly drained depressions. Flooding occurs during the winter and spring and often extends into the growing season. Surface water is superficial, but the substrate is saturated to the surface by groundwater for extended periods during the growing season, or water may be ponded for most of the year. The substrate is generally muck rather than peat, overlying mineral soils.

Classification Comments: This alliance combines the northeastern portion of two former alliances, *Acer rubrum - Fraxinus pennsylvanica* Seasonally Flooded Forest Alliance and *Acer rubrum - Fraxinus pennsylvanica* Saturated Forest Alliance. The two alliances are differentiated largely by hydroperiod and water source. However, the gradient separating the two is more-or-less continuous, and shared floristics suggested their merging.

Similar NVC Types: This alliance is differentiated from *Acer rubrum - Nyssa sylvatica* Swamp Forest Alliance (A2058) in the importance of *Fraxinus pennsylvanica* or *Fraxinus americana*, the relative unimportance or absence of *Nyssa sylvatica*, and a generally higher species diversity.

- A2058 *Acer rubrum - Nyssa sylvatica* Swamp Forest Alliance
- A3358 *Acer rubrum / Alnus serrulata - Ilex verticillata* Appalachian-Piedmont Seepage Forest Alliance
- A0653 *Acer rubrum* Swamp Woodland Alliance

Diagnostic Characteristics: Swamp forests with abundant *Fraxinus pennsylvanica* or *Fraxinus americana* occurring in seasonally flooded or saturated basins or backswamps. This alliance is not influenced by alluvial flooding and does not occur in floodplains outside of backswamps. Seepage may be important.

VEGETATION

Physiognomy and Structure: These swamp forests are generally closed to partially open deciduous forests with well-developed shrub and herbaceous layers. The bryophyte layer may be well-developed.

Floristics: Forests in this alliance have variable canopy composition, but *Acer rubrum* and *Fraxinus pennsylvanica* are characteristic and often dominant components. Canopy composition differs sharply from the surrounding upland and varies with geography. It differs from associated temporarily flooded forests by the absence or unimportance of floodplain species such as *Platanus occidentalis, Acer saccharinum, Betula nigra*, and *Populus deltoides*. Other canopy species across the range of this alliance include *Betula lenta, Fraxinus americana, Liquidambar styraciflua, Liriodendron tulipifera, Quercus bicolor, Quercus palustris, Ulmus americana*, and *Ulmus rubra*. Understory and shrub species include *Alnus serrulata, Carpinus caroliniana, Cornus* spp., *Ilex verticillata*, and *Lindera benzoin*. Characteristic herbaceous species are *Boehmeria cylindrica, Carex* spp., *Glyceria* spp., *Impatiens capensis, Juncus* spp., *Laportea canadensis, Leersia* spp., *Osmunda* spp., *Pilea* spp., *Symplocarpus foetidus*, and *Thelypteris palustris*. *Vitis* spp. are characteristic vines of stands of this alliance, but *Toxicodendron radicans* and, to the south, *Campsis radicans* are also prominent *Sphagnum* spp. and other bryophytes are often abundant.

ENVIRONMENT & DYNAMICS

Environmental Description: These wetland forests occur where surface water may be superficial, but the substrate is saturated to the surface by groundwater for extended periods during the growing season. Typical habitats include forested seeps on hillsides or along headwater streams, edges of floodplains saturated by seepage from adjacent slopes, and other poorly drained depressions. Complex microtopography with pronounced hummocks, hollows, and braided channels is typical. Soils supporting this alliance range from moderately acidic to strongly basic. Individual occurrences of these forests tend to be small in extent and can provide habitat for rare plant species. Flooding occurs during the winter and spring and often extends into the growing season. Surface water is superficial, but the substrate is saturated to the surface by groundwater for extended periods during the growing season, or water may be ponded for most of the year.

Dynamics: Many of the habitats can be characterized as groundwater slope wetlands (*sensu* Golet et al. 1993), in which groundwater is drained away (sometimes very slowly) as streamflow. In others, flooding occurs during the winter and spring and often extends into the growing season.

DISTRIBUTION

Geographic Range: This alliance occurs in the northeast from southeastern Canada and New England to Virginia and west to Indiana.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: CT, DC, DE, IN, KY, MA, MD, ME, NB, NC, NH, NJ, NY, PA, QC?, RI, VA, VT, WV
TNC Ecoregions [optional]: 44:C, 50:C, 52:C, 58:C, 59:C, 61:C, 62:C
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]: NPS (C&O Canal, George Washington Parkway, Harpers Ferry, Mammoth Cave, Manassas, National Capital-East); USFS (Daniel Boone?)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

LOWER LEVEL UNITS

Associations:

- CEGL008416 *Acer rubrum - Fraxinus nigra - Betula alleghaniensis / Veratrum viride - Carex bromoides* Seep Forest

- CEGL006606 *Acer rubrum - Fraxinus pennsylvanica / Saururus cernuus* Swamp Forest
- CEGL006413 *Acer rubrum - Fraxinus pennsylvanica / Packera aurea - Carex bromoides - Pilea fontana* Swamp Forest
- CEGL006548 *Acer (rubrum, saccharinum) - Fraxinus pennsylvanica - Ulmus americana / Boehmeria cylindrica* Floodplain Forest
- CEGL006220 *Acer rubrum / Nemopanthus mucronatus - Vaccinium corymbosum* Swamp Forest
- CEGL006406 *Acer rubrum - Fraxinus (pennsylvanica, americana) / Lindera benzoin / Symplocarpus foetidus* Swamp Forest

AUTHORSHIP

Primary Concept Source: L. Sneddon et al. (1996) and G.P. Fleming
Author of Description: L. Sneddon
Acknowledgments:
Version Date: 01/08/2014
Classif Resp Region: East

REFERENCES

References: Breden 1989, Breden et al. 2001, Cowardin et al. 1979, Edinger et al. 2002, Ehrenfeld 1977, Enser 1993, Enser and Lundgren 2006, Faber-Langendoen et al. 2016b, Fleming et al. 2001, Gawler and Cutko 2010, Golet et al. 1993, Harrison 2004, Metzler and Barrett 2001, Metzler and Barrett 2006, Reschke 1990, Robertson et al. 1984, Sneddon et al. 1996, Sperduto and Nichols 2004, Swain and Kearsley 2001, Thompson 1996, Thompson and Sorenson 2000, VDNH 2003, Wharton et al. 1982

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1. Forest & Woodland
1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest
A3706. *Acer rubrum - Fraxinus pennsylvanica* Northeastern Swamp Forest Alliance

CEGL006406. *Acer rubrum - Fraxinus (pennsylvanica, americana) / Lindera benzoin / Symplocarpus foetidus* Swamp Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Acer rubrum - Fraxinus (pennsylvanica, americana) / Lindera benzoin / Symplocarpus foetidus* Swamp Forest
Common Name (Translated Scientific Name): Red Maple - (Green Ash, White Ash) / Northern Spicebush / Skunk-cabbage Swamp Forest
Colloquial Name: Southern New England-Northern Piedmont Red Maple Seepage Swamp Forest

Type Concept: This association is a seepage swamp dominated by *Acer rubrum* and ranging from southern New England south to the Piedmont of Virginia. It generally occurs in saturated situations on slightly sloping hillsides, along small streams, or in basins that receive overland flooding in addition to groundwater influence. In general, these swamps are moderately acidic to moderately basic and have some seepage indicators but are not particularly species-rich. Soils are shallow to moderately deep mucks over mineral soils. *Acer rubrum* dominates the canopy; *Fraxinus pennsylvanica* or *Fraxinus americana* are usually also found in the canopy and can be codominant. *Fraxinus nigra* is not generally associated with this type at the northern portion of the range, and, if present, occurs only as scattered individuals, but this species does occur in this type in Pennsylvania. Other canopy or subcanopy associates may include *Liriodendron tulipifera, Quercus bicolor, Quercus palustris, Prunus serotina, Fagus grandifolia, Betula lenta, Ulmus americana*, and *Ulmus rubra*. Conifers such as *Tsuga canadensis* or *Pinus strobus* are generally absent or occur in very low abundance. The shrub layer may be fairly open to quite dense, depending on the amount of canopy closure. Shrub species commonly include *Ilex verticillata, Rhododendron viscosum, Clethra alnifolia, Lindera benzoin, Cornus amomum, Alnus serrulata*, and less commonly *Vaccinium corymbosum, Lyonia ligustrina, Ilex montana, Toxicodendron vernix, Viburnum dentatum*, and *Viburnum nudum var. cassinoides (= Viburnum cassinoides)*. The herbaceous layer is variable in cover; *Symplocarpus foetidus* and *Osmunda cinnamomea* are nearly always present. In some areas, tall ferns (*Osmunda cinnamomea, Onoclea sensibilis, Osmunda regalis, Thelypteris palustris, Thelypteris noveboracensis*) form an herbaceous canopy within which other species are scattered. Microtopography is generally pronounced, resulting from tip-ups. Tree seedlings and *Sphagnum* mosses are common on hummocks but do not in general form extensive carpets. Additional nonvascular species can include *Plagiomnium cuspidatum (= Mnium cuspidatum)* and *Calliergon* spp. Invasive shrubs and herbs, including *Berberis thunbergii, Rosa multiflora, Lonicera morrowii, Alliaria petiolata*, and *Microstegium vimineum*, may be abundant.

Classification Comments: Classification of this type at the southern end of the range is supported by analysis of a 1250-plot regional dataset compiled for the NCR and Mid-Atlantic national parks vegetation mapping project. In that analysis, this association was represented a group of 18 Maryland and Virginia plots.

Similar NVC Types:
- CEGL006936 *Acer rubrum - Betula alleghaniensis / Lindera benzoin* Forest
- CEGL006156 *Acer rubrum / Rhododendron viscosum - Clethra alnifolia* Swamp Forest

- CEGL006502 *Acer rubrum - Fraxinus nigra - (Tsuga canadensis) / Tiarella cordifolia* Swamp Forest
- CEGL006220 *Acer rubrum / Nemopanthus mucronatus - Vaccinium corymbosum* Swamp Forest
- CEGL006965 *Acer rubrum - Fraxinus pennsylvanica - Liquidambar styraciflua* Floodplain Forest

VEGETATION

Floristics: *Acer rubrum* dominates the canopy; *Fraxinus pennsylvanica* or *Fraxinus americana* are usually also found in the canopy and either can be codominant in the canopy. *Fraxinus nigra* is not generally associated with this type and, if present, occurs only as scattered individuals. Other canopy or subcanopy associates may include *Liriodendron tulipifera, Quercus bicolor, Quercus palustris, Prunus serotina, Fagus grandifolia, Betula lenta, Ulmus americana*, and *Ulmus rubra*. Conifers such as *Tsuga canadensis* or *Pinus strobus* are generally absent or occur in very low abundance. The shrub layer may be fairly open to quite dense, depending on the amount of canopy closure. Shrub species commonly include *Ilex verticillata, Rhododendron viscosum, Clethra alnifolia, Lindera benzoin, Cornus amomum, Alnus serrulata, Carpinus caroliniana*, and less commonly *Vaccinium corymbosum, Lyonia ligustrina, Ilex montana, Toxicodendron vernix, Viburnum dentatum*, and *Viburnum nudum var. cassinoides (= Viburnum cassinoides)*. The herbaceous layer is variable in cover; *Symplocarpus foetidus* and *Osmunda cinnamomea* are nearly always present. In some areas, tall ferns (*Osmunda cinnamomea, Onoclea sensibilis, Osmunda regalis, Thelypteris palustris, Thelypteris noveboracensis*) form an herbaceous canopy within which other species are scattered. These other herbaceous species include *Impatiens capensis, Galium aparine, Geum canadense, Arisaema triphyllum, Carex stricta, Carex gracillima, Carex intumescens, Carex radiata, Carex laevivaginata, Veratrum viride, Boehmeria cylindrica, Chelone glabra, Cardamine pensylvanica, Pilea pumila*, and *Glyceria* spp. At the southern end of the range in Maryland and Virginia, *Symplocarpus foetidus* is usually greatly dominant (>50% cover) early in the growing season, with *Saururus cernuus* frequently assuming patch-dominance during the summer. Tree seedlings and *Sphagnum* mosses are common on hummocks but do not in general form extensive carpets. Additional nonvascular species can include *Plagiomnium cuspidatum (= Mnium cuspidatum)* and *Calliergon* spp. Invasive shrubs and herbs, including *Berberis thunbergii, Rosa multiflora, Lonicera morrowii, Alliaria petiolata*, and *Microstegium vimineum*, may be abundant.

ENVIRONMENT & DYNAMICS

Environmental Description: This association is a seepage swamp dominated by *Acer rubrum* and ranging from southern New England to Virginia. It generally occurs in saturated soils on slightly sloping hillsides, along small headwater streams, or in depressions at the edges of floodplains that receive overland flooding in addition to groundwater inputs. In general, these swamps are moderately acidic to moderately basic and have some seepage indicators but are not particularly species-rich. Soils are shallow to moderately deep mucks over mineral soils. Microtopography is generally pronounced, resulting from tip-ups and the braided character of the drainage. Soil samples collected from 18 Maryland and Virginia plot samples are "intermediate" in chemistry, i.e., mean pH = 5.2, mean Ca = 1071 ppm, mean Mg = 195 ppm, mean total base saturation = 57%, but are more "basic" than "acidic" in their calcium and magnesium content.

Dynamics:

DISTRIBUTION

Geographic Range: This vegetation occurs in southern New England south through the mid-Atlantic states to Virginia.

Spatial Scale & Pattern [optional]: Large patch
Nations: US
States/Provinces: CT, DC, DE, IN, MA, MD, NH, NJ, NY, PA, RI, VA, VT
TNC Ecoregions [optional]: 48:C, 52:C, 58:C, 59:C, 60:C, 61:C, 62:C
USFS Ecoregions (1994/95): 212Fa:CCP, 212Fb:CCP, 212Fc:CCC, 212Fd:CCP, 221Aa:CCP, 221Ab:CCC, 221Ac:CCC, 221Ad:CCC, 221Ae:CCC, 221Af:CCC, 221Ag:CCC, 221Ai:CCC, 221Ak:CCC, 221Al:CCC, 221Ba:CCC, 221Bc:CCC, 221Bd:CCC, 221Da:CCC, 221Db:CCC, 221Dc:CCC, 222Ib:CCC, 222Ic:CCC, 222Jj:CCC, 231Ae:CCC, 231Ak:CCC, 232Aa:CCP, 232Br:CCC, M221Ac:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Appalachian Trail [Central Appalachians], Appalachian Trail [Lower New England], Appomattox Court House, C&O Canal, Delaware Water Gap, Gateway, George Washington Parkway, Indiana Dunes, Minute Man, Morristown, Prince William, Rock Creek, Saratoga, Upper Delaware, Weir Farm, Wolf Trap); USFWS (Great Meadows?, Iroquois, Montezuma, Patuxent)

CONSERVATION STATUS

Grank (Review Date): G4G5 (2007/1/30)
Greasons: Although this is a small-patch community, its environmental requirements are quite general, and it occurs where acidic groundwater seepage emerges on the headwaters of stream drainages. The range extent crosses several ecoregions and 10 states. The major threat to this community is housing development, with disruption of groundwater source a lesser threat.
Ranking Author (Version): L.A. Sneddon (2007/1/30)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:

- **=** *Acer rubrum - Fraxinus (pennsylvanica, americana) / Lindera benzoin / Symplocarpus foetidus* Forest (Harrison 2004)
- **=** *Acer rubrum - Fraxinus pennsylvanica / Lindera benzoin / Symplocarpus foetidus* Forest (Fleming and Patterson 2003)
- **=** *Acer rubrum / Lindera benzoin* community (Metzler and Barrett 2001)
- **<** Coastal Plain - Piedmont Basic Seepage Swamp (Harrison 2004)
- **<** Coastal Plain / Piedmont Basic Seepage Swamp (Fleming et al. 2001)
- **<** Inland Red Maple Swamp (Breden 1989)
- **?** Palustrine Broad-leaved Deciduous Forested Wetlands (PFO1) (Cowardin et al. 1979)
- **<** Red Maple - Black-gum Palustrine Forest (Fike 1999)
- **?** Red or Silver Maple-Green Ash Swamp (Thompson 1996)

AUTHORSHIP

Primary Concept Source: Eastern Ecology Group
Author of Description: L.A. Sneddon, mod. S.C. Gawler and G.P. Fleming
Acknowledgments:
Version Date: 2012/02/15

REFERENCES

References: Breden 1989, Breden et al. 2001, Cowardin et al. 1979, Coxe 2009, Davis 2011f, Edinger et al. 2002, Edinger et al. 2007, Edinger et al. 2008a, Ehrenfeld 1977, Enser 1993, Enser and Lundgren 2006, Fike 1999, Fleming 2007, Fleming and Patterson 2003, Fleming and Patterson 2011a, Fleming et al. 2001, Fleming et al. 2007b, Gawler et al. 2005, Golet et al. 1993, Harrison 2004, Harrison 2011, Hop et al. 2009, Lea and Riley 2005, Metzler and Barrett 2001, Metzler and Barrett 2006, Metzler et al. 2009, NRCS 2001b, NRCS 2004a, Patterson 2008a, Perles et al. 2007, Perles et al. 2008, Reschke 1990, Sneddon et al. 2008, Sperduto and Nichols 2004, Swain and Kearsley 2001, Thompson 1996, Thompson and Sorenson 2000, Zimmerman et al. 2012.

NYC NAC Association Description based on 26 plots (CEGL006406):

Overstory trees include red maple (Acer rubrum), green ash (Fraxinus pennsylvanica), black willow (Salix nigra), pin oak (Quercus palustris), swamp white oak (Quercus bicolor), black cherry (Prunus serotina), northern red oak (Quercus rubra), slippery elm (Ulmus rubra), Norway maple (Acer platanoides), and American elm (Ulmus americana).

Midstory plants include northern spicebush (Lindera benzoin), red maple (Acer rubrum), southern arrowwood (Viburnum dentatum), green ash (Fraxinus pennsylvanica), black cherry (Prunus serotina), silky dogwood (Cornus amomum), common buttonbush (Cephalanthus occidentalis), blackhaw (Viburnum prunifolium), common winterberry (Ilex verticillata), black willow (Salix nigra), tuliptree (Liriodendron tulipifera), burningbush (Euonymus alatus), Japanese angelica tree (Aralia elata), sassafras (Sassafras albidum), American hornbeam (Carpinus caroliniana), blackgum (Nyssa sylvatica), nannyberry (Viburnum lentago), slippery elm (Ulmus rubra), American elm (Ulmus americana), multiflora rose (Rosa multiflora), swamp white oak (Quercus bicolor), and coastal sweetpepperbush (Clethra alnifolia),

Vines include Virginia creeper (Parthenocissus quinquefolia), eastern poison ivy (Toxicodendron radicans), Japanese honeysuckle (Lonicera japonica), Oriental bittersweet (Celastrus orbiculatus), roundleaf greenbrier (Smilax rotundifolia), Amur peppervine (Ampelopsis brevipedunculata), fox grape (Vitis labrusca), wild cucumber (Echinocystis lobata), summer grape (Vitis aestivalis), American hogpeanut (Amphicarpaea bracteata), wine raspberry (Rubus phoenicolasius), English ivy (Hedera helix), and climbing hempvine (Mikania scandens).

Understory plants include northern spicebush (Lindera benzoin), jewelweed (Impatiens capensis), Amur peppervine (Ampelopsis brevipedunculata), multiflora rose (Rosa multiflora), southern arrowwood (Viburnum dentatum), garlic mustard (Alliaria petiolata), Canada mayflower (Maianthemum canadense), skunk cabbage (Symplocarpus foetidus), smallspike false nettle (Boehmeria cylindrica), red maple (Acer rubrum), sweetgum (Liquidambar styraciflua), common reed (Phragmites australis), green ash (Fraxinus pennsylvanica), black cherry (Prunus serotina), Nepalese browntop (Microstegium vimineum), Japanese angelica tree (Aralia elata), goldenrod (Solidago), Canadian clearweed (Pilea pumila), Virginia water horehound (Lycopus virginicus), silky dogwood (Cornus amomum), marshpepper knotweed (Polygonum hydropiper), black willow (Salix nigra), sassafras (Sassafras albidum), northern red oak (Quercus rubra), common winterberry (Ilex verticillata), common plantain (Plantago major), common wormwood (Artemisia vulgaris), spikemoss (Selaginella), cat greenbrier (Smilax glauca), marsh seedbox (Ludwigia palustris), tuliptree (Liriodendron tulipifera), lizard's tail (Saururus cernuus), cinnamon fern (Osmunda cinnamomea),

spotted water hemlock (Cicuta maculata), fringed loosestrife (Lysimachia ciliata), black elderberry (Sambucus nigra), broadleaf enchanter's nightshade (Circaea lutetiana), Japanese knotweed (Polygonum cuspidatum), common buttonbush (Cephalanthus

occidentalis), Jack in the pulpit (Arisaema triphyllum), green arrow arum (Peltandra virginica), jumpseed (Polygonum virginianum), arrowleaf tearthumb (Polygonum sagittatum), intermediate woodfern (Dryopteris intermedia), New York fern (Thelypteris noveboracensis), swamp smartweed (Polygonum hydropiperoides), tussock sedge (Carex stricta), beggarticks (Bidens sp.), groundnut (Apios americana), white snakeroot (Ageratina altissima), American elm (Ulmus americana), smooth Solomon's seal (Polygonatum biflorum), white avens (Geum canadense), northern dewberry (Rubus flagellaris), meadow-rue (Thalictrum), wild cucumber (Echinocystis lobata), blackgum (Nyssa sylvatica), spinulose woodfern (Dryopteris carthusiana), feathery false lily of the valley (Maianthemum racemosum), and black raspberry (Rubus occidentalis).

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1. Forest & Woodland
1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest
A3706. *Acer rubrum - Fraxinus pennsylvanica* Northeastern Swamp Forest Alliance

CEGL006606. *Acer rubrum - Fraxinus pennsylvanica / Saururus cernuus* Swamp Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Acer rubrum - Fraxinus pennsylvanica / Saururus cernuus* Swamp Forest
Common Name (Translated Scientific Name): Red Maple - Green Ash / Lizard's-tail Swamp Forest
Colloquial Name: Chesapeake-Piedmont Red Maple / Lizard's-tail Swamp Forest

Type Concept: This red maple swamp community of the Mid-Atlantic Coastal Plain of the Chesapeake Bay and Piedmont regions occurs on poorly drained to very poorly drained soils on flats and along watercourses that are seasonally to semipermanently flooded. The organic horizon is of variable depth and overlies sandy or silt clay loam soils. This swamp has pronounced hummock-and-hollow microtopography. The tree canopy is closed to partially open and dominated by *Acer rubrum* and *Fraxinus pennsylvanica*. Other canopy associates may include *Nyssa sylvatica, Liquidambar styraciflua, Ulmus americana, Quercus lyrata, Quercus phellos, Quercus lyrata*, and *Populus heterophylla*. The shrub layer includes *Lindera benzoin, Leucothoe racemosa, Ilex verticillata, Viburnum* spp., and *Fraxinus pennsylvanica* saplings. The herb layer is characterized by *Saururus cernuus, Peltandra virginica, Boehmeria cylindrica, Triadenum walteri, Cinna arundinacea, Pilea pumila, Impatiens capensis, Osmunda regalis, Leersia oryzoides, Leersia virginica, Glyceria striata, Commelina virginica, Rumex verticillatus, Carex* spp., and *Polygonum arifolium*.

Classification Comments: Classification is supported by analysis of a 1250-plot regional dataset compiled for the NCR and MAR national parks vegetation mapping projects. In that analysis, this association was represented by 22 Maryland and Virginia plots.

Similar NVC Types:
- CEGL007031 *Acer rubrum / Alnus serrulata - Lindera benzoin / Glyceria striata - Impatiens capensis* Seep Forest
- CEGL006548 *Acer (rubrum, saccharinum) - Fraxinus pennsylvanica - Ulmus americana / Boehmeria cylindrica* Floodplain Forest

VEGETATION

Floristics: This forest type is characterized by a well-developed tree canopy codominated by *Acer rubrum* and *Fraxinus pennsylvanica* in variable proportions. Other canopy associates may include *Nyssa sylvatica, Quercus phellos, Quercus lyrata, Ulmus americana*, and *Populus heterophylla*. At the southern end of the range, *Nyssa biflora* and *Taxodium distichum* may be minor associates. The shrub layer is of variable cover but usually not dense. The most common species are *Lindera benzoin, Leucothoe racemosa, Vaccinium corymbosum, Ilex verticillata, Carpinus caroliniana, Rosa palustris*, and *Viburnum dentatum*. Other shrub associates may include *Rhododendron viscosum, Cephalanthus occidentalis, Alnus serrulata*, and *Cornus amomum*. The herb layer is diverse and generally characterized by abundant *Saururus cernuus*, typically in hollows. Other associates are many and varied but generally include *Peltandra virginica, Impatiens capensis, Pontederia cordata, Boehmeria cylindrica, Glyceria* spp., *Cinna arundinacea, Bidens connata, Thelypteris palustris, Onoclea sensibilis, Osmunda regalis, Carex stricta, Carex lurida, Carex crinita, Triadenum walteri, Lobelia cardinalis, Lycopus virginicus, Pilea pumila, Carex tribuloides, Polygonum punctatum, Polygonum arifolium, Cicuta maculata, Leersia oryzoides, Galium obtusum, Commelina virginica*, and others. Vines may include *Toxicodendron radicans, Smilax rotundifolia, Campsis radicans*, and *Parthenocissus quinquefolia*. Mosses are generally sparse to absent, except on logs and tree bases above the high-water line.

ENVIRONMENT & DYNAMICS

Environmental Description: This swamp forest occurs in backswamps, watercourses, flats and depressions that are flooded for significant portions of the growing season. These areas receive some nutrient inputs from adjacent uplands or overland flooding and have soils that are moderately calcareous. The substrate is deep muck with a pronounced hummock-and-hollow microtopography.

Dynamics:

DISTRIBUTION

Geographic Range: This red maple - green ash swamp community occurs in the Coastal Plain of the Chesapeake Bay region and rarely in the adjacent Piedmont from New Jersey to North Carolina.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: DC, DE, MD, NC, NJ, VA
TNC Ecoregions [optional]: 52:C, 57:C, 58:C, 61:C, 62:C
USFS Ecoregions (1994/95): 232Ad:CCC, 232Br:CCC, 232Bt:CCC, 232Bx:CCC, 232Ch:CCC, 232Cj:CCC
Omernik Ecoregions:
Federal Lands [optional]: DOD (Fort Belvoir); NPS (Colonial, National Capital-East); USFWS (Chesapeake Marshlands, Great Swamp, Patuxent, Supawna Meadows)

CONSERVATION STATUS

Grank (Review Date): G3G4 (2012/2/14)
Greasons: This association is geographically restricted to the Mid-Atlantic Coastal Plain and in limited areas of the Piedmont. It occurs in small patches, generally less than 20 acres. As of December 2011, it is ranked as S3 in Maryland and S3S4 in Virginia, where it is reportedly widespread in the backswamps of the Coastal Plain. In New Jersey, this type is documented from Great Swamp on the transition from Inner Coastal Plain to Piedmont. This type also is likely to occur in Delaware but its classification requires further resolution there. Beaver impoundments have been observed to threaten this vegetation.
Ranking Author (Version): L.A. Sneddon (2012/2/14)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:

- **?** *Acer rubrum - Fraxinus pennsylvanica / Impatiens capensis - Saururus cernuus* Forest (Bowman 2000)
- **=** *Acer rubrum - Fraxinus pennsylvanica / Saururus cernuus* Forest (Thomson et al. 1999)
- **=** *Acer rubrum - Fraxinus pennsylvanica / Saururus cernuus* Forest (Fleming and Patterson 2011a)
- **=** *Fraxinus pennsylvanica - Acer rubrum / Cinna arundinacea - Saururus cernuus - Boehmeria cylindrica* Forest (VDNH 2003)
- **=** *Fraxinus pennsylvanica - Acer rubrum / Cinna arundinacea - Saururus cernuus - Boehmeria cylindrica* Forest (Fleming and Patterson 2003)
- **=** *Fraxinus pennsylvanica / Asimina triloba - Lindera benzoin - Ilex (decidua, verticillata) / Triadenum walteri - Saururus cernuus* Forest (Walton et al. 2001)
- **=** *Fraxinus pennsylvanica / Boehmeria cylindrica - Saururus cernuus* Forest (Fleming 2002a)
- **=** *Fraxinus pennsylvanica / Cinna arundinacea - Poa trivialis* Semipermanently Flooded Forest (McCoy and Fleming 2000)
- **<** Coastal Plain - Piedmont Bottomland Forest (Harrison 2004)
- **<** Coastal Plain / Piedmont Swamp Forest (Fleming et al. 2006)
- **=** Red Maple - Green Ash - Lizard's Tail Swamp (CML2) (Windisch 2014a)

AUTHORSHIP

Primary Concept Source: D. Thomson, J. Meininger, and L.A. Sneddon
Author of Description: D. Thomson, J. Meininger, L.A. Sneddon, mod. G.P. Fleming
Acknowledgments:
Version Date: 2007/08/07

REFERENCES

References: Bowman 2000, Breden et al. 2001, Coxe 2009, Fleming 2001a, Fleming 2002a, Fleming 2002b, Fleming and Moorhead 1998, Fleming and Patterson 2003, Fleming and Patterson 2011a, Fleming and Patterson 2011b, Fleming et al. 2006, Fleming et al. 2007b, Harrison 2004, Harrison 2011, Harrison and Stango 2003, McCoy and Fleming 2000, Meininger 1998, Patterson 2008c, Schafale 2012, Thomson et al. 1999, VDNH 2003, Walton et al. 2001, Windisch 2014a.

NYC NAC Association Description (CEGL006606):

This association was not selected as a first choice for any NYC NAC plots.

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1. Forest & Woodland
1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest
1.B.3.Na.3.c. G045 Laurentian-Acadian-Appalachian Acidic Swamp

A2058. *Acer rubrum - Nyssa sylvatica* Swamp Forest Alliance

Type Concept Sentence: This alliance covers nutrient-poor deciduous forested swamps and "basin swamps" characterized by *Nyssa sylvatica*, of the northeastern United States ranging from southern Vermont to the Coastal Plain of Virginia.

OVERVIEW

Scientific Name: *Acer rubrum - Nyssa sylvatica* Swamp Forest Alliance
Common Name (Translated Scientific Name): Red Maple - Blackgum Swamp Forest Alliance
Colloquial Name: Red Maple - Blackgum Swamp Forest

Type Concept: Forests in this alliance have variable canopy composition, but typical canopy species across the range of this alliance include *Acer rubrum var. trilobum* and *Nyssa sylvatica*; associated trees in the northern portion of the range may include *Picea rubens, Betula alleghaniensis, Tsuga canadensis*, and *Pinus strobus*. *Liquidambar styraciflua* and *Magnolia virginiana* are characteristic in the southern portions of the range. These forests are nutrient-poor and generally acidic, and occur in basins and seepage areas. The alliance ranges from southern Vermont to the northern Coastal Plain of Virginia.

Classification Comments: Although *Nyssa sylvatica* may also occur in other more eutrophic swamps, it is characteristic of this alliance and often occurs in abundance.

Similar NVC Types:
- A3706 *Acer rubrum - Fraxinus pennsylvanica* Northeastern Swamp Forest Alliance
- A3358 *Acer rubrum / Alnus serrulata - Ilex verticillata* Appalachian-Piedmont Seepage Forest Alliance
- A3416 *Betula alleghaniensis - Tsuga canadensis* Swamp Forest Alliance

Diagnostic Characteristics: Swamps of poorly drained topographic basins characterized by *Nyssa sylvatica* in addition to *Acer rubrum*. Nutrient regime is oligotrophic, with sphagnum peat forming the substrate.

VEGETATION

Physiognomy and Structure: This is a deciduous swamp forest, with scattered conifers in some occurrences at the northern range limit. Conifers are all but lacking in the southern and central portions of the range. The shrub layer is usually well-developed, and the herbaceous layer is of variable cover. There is usually pronounced hummock-and-hollow microtopography and pools of standing water. Substrate is usually peat overlying mineral soils.

Floristics: Forests in this alliance have variable canopy composition, but typical canopy species across the range of this alliance include *Acer rubrum var. trilobum* and *Nyssa sylvatica*; associated trees in the northern portion of the range may include *Picea rubens, Betula alleghaniensis, Tsuga canadensis*, and *Pinus strobus*. *Liquidambar styraciflua* and *Magnolia virginiana* are characteristic in the southern portions of the range. Understory and shrub species include *Clethra alnifolia, Ilex verticillata, Lindera benzoin, Nemopanthus mucronatus, Rhododendron viscosum, Vaccinium corymbosum*, and *Viburnum nudum var. cassinoides*. Characteristic herbaceous species are *Carex folliculata, Carex intumescens, Coptis trifolia, Osmunda cinnamomea, Osmunda regalis*, and *Symplocarpus foetidus*. *Sphagnum* spp. are typical.

ENVIRONMENT & DYNAMICS

Environmental Description: These wetland forests include forested acidic seeps on hillsides or streamheads, and in poorly drained depressions. Hummock-and-hollow microtopography is usually evident, with pools of standing water present in the spring. These wetland forests occur where surface water is seldom present, but the substrate is saturated to the surface for extended periods during the growing season, and include forested acidic seeps on hillsides or streamheads, and other poorly drained depressions. Individual occurrences of these forests tend to be small in extent and can provide habitat for rare plant species.

Dynamics: Groundwater is the primary water source, with minimal overland flow, limiting nutrient inputs. The peaty substrate is usually saturated, contributing to frequent treefalls with canopy openings.

DISTRIBUTION

Geographic Range: This alliance ranges from New England south to the Coastal Plain of Virginia.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: CT, DC, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VA, VT
TNC Ecoregions [optional]: 49:C, 50:C, 51:C, 52:C, 58:C, 59:C, 60:C, 61:C, 62:C, 63:C, 64:C
USFS Ecoregions (2007):
Omernik Ecoregions:

Federal Lands [optional]: BIA (Eastern Band of Cherokee); DOD (Fort A.P. Hill, Fort Belvoir, Fort Jackson, Pine Bluff Arsenal); NPS (Appalachian Trail, Assateague Island, Big South Fork, Blue Ridge Parkway, Boston Harbor Islands, C&O Canal?, Cape Cod, Catoctin Mountain, Delaware Water Gap, Fire Island, Fredericksburg-Spotsylvania, Gateway, Gauley River, George Washington Birthplace, George Washington Parkway?, Kennesaw Mountain, Kings Mountain, Little River Canyon, Mammoth Cave, Minute Man, Natchez Trace, National Capital-East, New River Gorge, Petersburg, Prince William, Richmond, Shenandoah, Shiloh, Thomas Stone, Weir Farm); USFS (Allegheny, Bankhead, Chattahoochee, Cherokee, Daniel Boone, George Washington, Green Mountain, Monongahela, Ouachita, Ozark, Pisgah, Talladega?, Uwharrie, White Mountain); USFWS (Assabet River, Cape May, E.B. Forsythe, Felsenthal?, Great Meadows, Great Swamp, Mountain Longleaf, Overflow?, Oxbow, Parker River, Pee Dee, Pond Creek?)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

- **?** Red Maple - Black Gum Swamp (Undifferentiated) Alliance (AN) (Windisch 2014a)

LOWER LEVEL UNITS

Associations:

- CEGL006013 *Acer rubrum - Nyssa sylvatica - Liquidambar styraciflua - Populus heterophylla* Swamp Forest
- CEGL006219 *Nyssa sylvatica - Magnolia virginiana / Rhododendron viscosum - Toxicodendron vernix / Smilax pseudochina* Swamp Woodland
- CEGL006156 *Acer rubrum / Rhododendron viscosum - Clethra alnifolia* Swamp Forest
- CEGL006014 *Acer rubrum - Nyssa sylvatica - Betula alleghaniensis / Sphagnum* spp. Swamp Forest
- CEGL006396 *Acer rubrum / Rhododendron maximum* Swamp Forest
- CEGL006238 *Acer rubrum - Nyssa sylvatica - Magnolia virginiana / Viburnum nudum var. nudum / Osmunda cinnamomea* Swamp Forest
- CEGL006953 *Acer rubrum / Lindera benzoin - Alnus serrulata* Forest
- CEGL006936 *Acer rubrum - Betula alleghaniensis / Lindera benzoin* Forest

AUTHORSHIP

Primary Concept Source: H.W. Vogelmann (1976)
Author of Description: L.A. Sneddon
Acknowledgments:
Version Date: 01/08/2014
Classif Resp Region: East

REFERENCES

References: Breden 1989, Conard 1935, Damman and Kershner 1977, Edinger et al. 2002, Eichelberger 2011i, Eichelberger 2011o, Enser and Lundgren 2006, Eyre 1980, Faber-Langendoen et al. 2016b, Fike 1999, Fleming et al. 2001, Fleming et al. 2004, Gawler and Cutko 2010, Hanks 1985, Harvill 1967, Heckscher 1994, Metzler and Barrett 2006, Robichaud and Buell 1973, Smith 1991, Sperduto and Nichols 2004, Swain and Kearsley 2001, Thompson and Sorenson 2000, Tiner 1985a, Vogelmann 1969, Vogelmann 1976, Windisch 2014a

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1. Forest & Woodland
1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest
A2058. *Acer rubrum - Nyssa sylvatica* Swamp Forest Alliance

CEGL006156. *Acer rubrum / Rhododendron viscosum - Clethra alnifolia* Swamp Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Acer rubrum / Rhododendron viscosum - Clethra alnifolia* Swamp Forest
Common Name (Translated Scientific Name): Red Maple / Swamp Azalea - Coastal Sweet-pepperbush Swamp Forest
Colloquial Name: Lower New England Red Maple Swamp Forest

Type Concept: This red maple swamp occurs in poorly drained depressions containing acidic, tannic water without substantial nutrient input from overland flow. The core of distribution is the North Atlantic Coast and adjacent Lower New England / Northern Piedmont ecoregions. Soils are organic and hummock-hollow microtopography is evident. *Acer rubrum* dominates the canopy often with abundant *Nyssa sylvatica*. The subcanopy varies from sparse to fairly well-developed and may feature *Ulmus americana* or occasionally *Quercus bicolor*, along with additional *Acer rubrum*. The shrub layer is characterized by *Vaccinium corymbosum, Clethra alnifolia, Ilex verticillata, Rhododendron viscosum, Leucothoe racemosa*, and on the Atlantic Coastal Plain *Ilex glabra* may also be present. The herbaceous layer is not particularly diverse, characterized by *Osmunda cinnamomea, Symplocarpus foetidus, Carex intumescens, Osmunda regalis, Arisaema triphyllum*, and *Onoclea sensibilis*. *Sphagnum* mosses make up the bryophyte layer. This

community is differentiated from *Acer rubrum - Nyssa sylvatica - Betula alleghaniensis / Sphagnum* spp. Swamp Forest (CEGL006014) by the absence or infrequent occurrence of *Tsuga canadensis, Betula alleghaniensis, Nemopanthus mucronatus, Carex trisperma, Clintonia borealis*, and by the presence of species with more southern affinities such as *Clethra alnifolia, Ilex glabra*, and *Rhododendron viscosum*.

Classification Comments:

Similar NVC Types: This community is differentiated from *Acer rubrum - Nyssa sylvatica - Betula alleghaniensis / Sphagnum* spp. Swamp Forest (CEGL006014) by the absence or low abundance of *Nyssa sylvatica* and *Picea rubens*. *Acer rubrum / Nemopanthus mucronatus - Vaccinium corymbosum* Swamp Forest (CEGL006220) differs in its greater abundance and frequency of hardwood canopy associates and northern conifers such as *Picea rubens* and *Abies balsamea*. This association differs from seasonally flooded seepage swamps, *Acer rubrum - Fraxinus (pennsylvanica, americana) / Lindera benzoin / Symplocarpus foetidus* Swamp Forest (CEGL006406) and *Acer rubrum / Carex stricta - Onoclea sensibilis* Wet Woodland (CEGL006119), by its lower species diversity. Red maple wooded wetlands on deeper peat soils include *Acer rubrum / Alnus incana - Ilex verticillata / Osmunda regalis* Woodland (CEGL006395) and *Acer rubrum - Fraxinus nigra - (Larix laricina) / Rhamnus alnifolia* Swamp Forest (CEGL006009).

- CEGL006014 *Acer rubrum - Nyssa sylvatica - Betula alleghaniensis / Sphagnum* spp. Swamp Forest
- CEGL006395 *Acer rubrum / Alnus incana - Ilex verticillata / Osmunda regalis* Woodland
- CEGL006936 *Acer rubrum - Betula alleghaniensis / Lindera benzoin* Forest
- CEGL006220 *Acer rubrum / Nemopanthus mucronatus - Vaccinium corymbosum* Swamp Forest
- CEGL006406 *Acer rubrum - Fraxinus (pennsylvanica, americana) / Lindera benzoin / Symplocarpus foetidus* Swamp Forest
- CEGL006119 *Acer rubrum / Carex stricta - Onoclea sensibilis* Wet Woodland

VEGETATION

Floristics: This type includes red maple basin swamp of Lower New England and adjacent areas. These swamps occur in poorly drained depressions characterized by acidic, tannic water that does not receive substantial nutrient input from overland flow or groundwater seepage. *Acer rubrum* dominates the canopy. Other common species that generally occur in low abundance include *Betula alleghaniensis, Fraxinus* spp., *Ulmus americana, Nyssa sylvatica, Tsuga canadensis*, or *Pinus strobus*. The shrub layer is well-developed and often dense. *Vaccinium corymbosum* and *Ilex verticillata* are common and abundant. *Clethra alnifolia, Alnus incana, Lindera benzoin, Viburnum dentatum, Viburnum nudum var. cassinoides (= Viburnum cassinoides), Spiraea alba var. latifolia (= Spiraea latifolia), Rosa palustris, Nemopanthus mucronatus*, and *Rhododendron viscosum* are frequent but less abundant, and on the Atlantic Coastal Plain *Ilex glabra, Rhododendron maximum*, and *Leucothoe racemosa* may also be present. The herbaceous layer has scattered herbs and commonly includes *Osmunda cinnamomea, Symplocarpus foetidus, Veratrum viride, Thelypteris palustris, Dryopteris cristata, Lycopus uniflorus, Impatiens capensis, Calla palustris, Carex folliculata, Carex stricta, Carex intumescens, Osmunda regalis*, and *Onoclea sensibilis*. Hummock-and-hollow microtopography is evident, and tree seedlings and upland species occur on the hummocks, such as *Coptis trifolia, Aralia nudicaulis, Trientalis borealis*, and *Gaultheria procumbens*. *Sphagnum* mosses are dominant or abundant in hollows and at the bases of hummocks. This community is differentiated from *Acer rubrum - Nyssa sylvatica - Betula alleghaniensis / Sphagnum* spp. Swamp Forest (CEGL006014) by the absence or low abundance of *Nyssa sylvatica* and *Picea rubens*.

ENVIRONMENT & DYNAMICS

Environmental Description: These are poorly drained basins with acidic, nutrient-poor, peat soils. There is little overland flow or groundwater contribution to the water budget.

Dynamics:

DISTRIBUTION

Geographic Range: The core of distribution of this association is the North Atlantic Coast and adjacent Lower New England / Northern Piedmont ecoregions. It ranges from New Hampshire south to New Jersey.

Spatial Scale & Pattern [optional]: Small patch, Large patch
Nations: US
States/Provinces: CT, MA, NH, NJ, NY, RI
TNC Ecoregions [optional]: 60:C, 61:C, 62:C
USFS Ecoregions (1994/95): 212Fc:CCC, 221Aa:CCP, 221Ab:CCC, 221Ac:CCC, 221Ad:CCC, 221Ae:CCC, 221Af:CCC, 221Ag:CCC, 221Ah:CCP, 221Ai:CCC, 221Ak:CCP, 221Al:CCP, 221Am:CCC, 221Bb:CCP, 221Bd:CCC, 221Da:CCC, 221Dc:CCC, M212Bc:CCP, M212Cb:CCC, M212Cc:CCP, M212Eb:CCP
Omernik Ecoregions:
Federal Lands [optional]: NPS (Boston Harbor Islands, Cape Cod, Fire Island, Minute Man, Weir Farm); USFWS (Assabet River, Great Meadows, Great Swamp, Oxbow, Parker River)

CONSERVATION STATUS

Grank (Review Date): GNR (1997/12/1)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:

- **=** *Acer rubrum - Nyssa sylvatica / Clethra alnifolia* Community (Metzler and Barrett 1996)
- **<** *Acer rubrum / Ilex verticillata - Vaccinium corymbosum* community (Metzler and Barrett 2001)
- **<** Inland Red Maple Swamp (Breden 1989)
- **>** Red Maple - (Black Gum) Swamp (AN3) (Windisch 2014a)

AUTHORSHIP

Primary Concept Source: L.A. Sneddon and K. Metzler
Author of Description: S.L. Neid and L.A. Sneddon
Acknowledgments:
Version Date: 2005/12/08

REFERENCES

References: Breden 1989, Breden et al. 2001, Dowhan and Rozsa 1989, Edinger et al. 2002, Enser 1999, Enser and Lundgren 2006, Gawler et al. 2005, Golet et al. 1993, Hopping 2000, Klopfer et al. 2002, Largay and Sneddon 2010, Metzler and Barrett 1996, Metzler and Barrett 2001, Metzler and Barrett 2006, Metzler et al. 2009, Reschke 1990, Sneddon et al. 2010, Sperduto 2000a, Sperduto and Nichols 2004, Swain and Kearsley 2001, Thompson and Jenkins 1992, Windisch 2014a.

NYC NAC Association Description based on 29 plots (CEGL006156):

Overstory trees include blackgum (Nyssa sylvatica), red maple (Acer rubrum), pin oak (Quercus palustris), sweetgum (Liquidambar styraciflua), northern red oak (Quercus rubra), sassafras (Sassafras albidum), white oak (Quercus alba), black cherry (Prunus serotina), bigtooth aspen (Populus grandidentata), green ash (Fraxinus pennsylvanica), bitternut hickory (Carya cordiformis), gray birch (Betula populifolia), and swamp white oak (Quercus bicolor)

Midstory plants include blackgum (Nyssa sylvatica), red maple (Acer rubrum), northern spicebush (Lindera benzoin), sassafras (Sassafras albidum), highbush blueberry (Vaccinium corymbosum), sweetgum (Liquidambar styraciflua), black cherry (Prunus serotina), southern arrowwood (Viburnum dentatum), gray birch (Betula populifolia), green ash (Fraxinus pennsylvanica), pin oak (Quercus palustris), common buttonbush (Cephalanthus occidentalis), Canadian serviceberry (Amelanchier canadensis), and American hornbeam (Carpinus caroliniana).

Vines include eastern poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), roundleaf greenbrier (Smilax rotundifolia), Japanese honeysuckle (Lonicera japonica), Oriental bittersweet (Celastrus orbiculatus), Amur peppervine (Ampelopsis brevipedunculata), English ivy (Hedera helix), Asiatic tearthumb (Polygonum perfoliatum), amberique-bean (Strophostyles helvola), climbing nightshade (Solanum dulcamara), smooth carrionflower (Smilax herbacea), and cat greenbrier (Smilax glauca).

Understory plants include blackgum (Nyssa sylvatica), southern arrowwood (Viburnum dentatum), Canada mayflower (Maianthemum canadense), northern spicebush (Lindera benzoin), sweetgum (Liquidambar styraciflua), red maple (Acer rubrum), black cherry (Prunus serotina), multiflora rose (Rosa multiflora), jewelweed (Impatiens capensis), sassafras (Sassafras albidum), common reed (Phragmites australis), northern dewberry (Rubus flagellaris), Japanese angelica tree (Aralia elata), broadleaf enchanter's nightshade (Circaea lutetiana), garlic mustard (Alliaria petiolata), eastern hayscented fern (Dennstaedtia punctilobula), sensitive fern (Onoclea sensibilis), northern red oak (Quercus rubra), tuliptree (Liriodendron tulipifera), wine raspberry (Rubus phoenicolasius), marsh seedbox (Ludwigia palustris), smooth Solomon's seal (Polygonatum biflorum), Virginia water horehound (Lycopus virginicus), Nepalese browntop (Microstegium vimineum), pin oak (Quercus palustris), duckweed (Lemna sp.), Allegheny blackberry (Rubus allegheniensis), coastal sweetpepperbush (Clethra alnifolia), green arrow arum (Peltandra virginica), silky dogwood (Cornus amomum), redosier dogwood (Cornus sericea), swamp loosestrife (Decodon verticillatus), wild sarsaparilla (Aralia nudicaulis), highbush blueberry (Vaccinium corymbosum), chokecherry (Prunus virginiana), cinnamon fern (Osmunda cinnamomea), yellow loosestrife (Lysimachia sp.), purpleleaf willowherb (Epilobium coloratum), white wood aster (Eurybia divaricata), bristly dewberry (Rubus hispidus), black raspberry (Rubus occidentalis), jumpseed (Polygonum virginianum), mayapple (Podophyllum peltatum), flatsedge (Cyperus sp.), trillium (Trillium sp.), Virginia marsh St. Johnswort (Triadenum virginicum), American water

plantain (Alisma subcordatum), smallspike false nettle (Boehmeria cylindrica), cutgrass (Leersia sp.), Canadian clearweed (Pilea pumila), swamp smartweed (Polygonum hydropiperoides), watermeal (Wolffia sp.), crimsoneyed rosemallow (Hibiscus moscheutos), green ash (Fraxinus pennsylvanica), and skunk cabbage (Symplocarpus foetidus)

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1. Forest & Woodland
1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest
1.B.3.Na.3.c. G045 Laurentian-Acadian-Appalachian Acidic Swamp

A3416. *Betula alleghaniensis - Tsuga canadensis* Swamp Forest Alliance

Type Concept Sentence: This alliance includes swamp forests of the Northeast, often dominated by *Tsuga canadensis, Betula alleghaniensis*, and *Acer rubrum*, with closed to open canopies and an open to dense shrub layer, interspersed with small *Sphagnum* - herb-dominated depressions, ranging from southeastern Canada through New England to the Central Appalachians, Blue Ridge, and Ridge and Valley. Forests in this alliance are typically at elevations below 1200 m (4000 feet), in poorly drained bottomlands, generally with visible microtopography of ridges and sloughs or depressions. They often occur near streams and are undoubtedly occasionally flooded.

OVERVIEW

Scientific Name: *Betula alleghaniensis - Tsuga canadensis* Swamp Forest Alliance
Common Name (Translated Scientific Name): Yellow Birch - Eastern Hemlock Swamp Forest Alliance
Colloquial Name: Central Appalachian Hemlock - Hardwood Swamp Forest

Type Concept: This alliance includes swamp forests of the Great Lakes states and Northeast, ranging from southeastern Canada through New England to the Central Appalachians, Blue Ridge, and Ridge and Valley. Stands are often dominated by *Tsuga canadensis, Betula alleghaniensis*, and *Acer rubrum*, with closed to open canopies and an open to dense shrub layer, interspersed with small *Sphagnum* - herb-dominated depressions. Canopies are composed of various mixtures of evergreen and deciduous species. Minor canopy associates include *Acer rubrum, Fraxinus americana, Fraxinus pennsylvanica, Pinus strobus*, and *Nyssa sylvatica*; *Liriodendron tulipifera* may be a component at the southern limit, while *Picea rubens* may occur as scattered individuals in the north. Shrubs include *Acer pensylvanicum, Alnus incana ssp. rugosa, Hamamelis virginiana, Ilex montana, Ilex verticillata, Kalmia latifolia, Lindera benzoin, Nemopanthus mucronatus, Rhododendron maximum, Vaccinium corymbosum, Viburnum lantanoides*, and *Viburnum nudum var. cassinoides*. Herbs in the forested areas include *Coptis trifolia, Cornus canadensis, Glyceria melicaria, Lycopodium obscurum, Maianthemum canadense, Onoclea sensibilis, Osmunda regalis var. spectabilis*, and *Thelypteris noveboracensis*. Soils of this alliance vary from saturated muck to imperfectly drained mineral soils and are often acidic. Communities in this alliance occur in upland valleys created by bedrock depressions, on lower slopes, or adjacent to streams and lakes.

Classification Comments: This alliance includes swamp forests in which *Tsuga canadensis* can be strongly dominant, causing heavy shade and sparse understory, to those in which there is a substantial deciduous component and well-developed shrub and herb layers.

Similar NVC Types: This alliance bears a floristic resemblance to *Acer rubrum - Nyssa sylvatica* Swamp Forest Alliance (A2058) in that *Acer rubrum* and *Nyssa sylvatica*, as well as members of the shrub and herb layers, may be present. However, the importance of conifers, in particular *Tsuga canadensis*, as well as the importance of *Betula alleghaniensis*, differentiates this alliance (A3416) from A2058.

- A2058 *Acer rubrum - Nyssa sylvatica* Swamp Forest Alliance

Diagnostic Characteristics: Swamp forest dominated by *Tsuga canadensis* or codominated with *Betula alleghaniensis* and *Acer rubrum*.

VEGETATION

Physiognomy and Structure: This swamp forest ranges from strongly coniferous to mixed coniferous-deciduous. The tree canopy is generally closed, but ranges to partially open with numerous canopy gaps. The shrub and herb layers tend to be well-developed, except in cases where *Tsuga canadensis* is strongly dominant. The nonvascular layer may be poorly to well-developed.

Floristics: This alliance includes palustrine forests, often dominated by *Tsuga canadensis* and *Acer rubrum*, with closed to open canopies and an open to dense shrub layer, interspersed with small *Sphagnum* - herb-dominated depressions. Canopies are composed of various mixtures of evergreen and deciduous species, with canopy dominants varying with elevation. Associates at lower elevations or at the southern end of the range include *Acer rubrum, Liriodendron tulipifera*, and/or *Nyssa sylvatica*, while examples at higher elevations or at the northern end of the range are usually dominated by *Tsuga canadensis* and *Betula alleghaniensis* with *Pinus strobus* as an associate. *Chamaecyparis thyoides* may be a minor component in the eastern portion of the

range. The dominant shrubs are usually *Corylus cornuta* (in the west), *Vaccinium corymbosum, Lindera benzoin* (in the east and center), *Ilex verticillata, Rhododendron maximum*, and *Kalmia latifolia*, but other shrubs can include *Alnus serrulata, Cornus amomum, Ilex montana, Salix nigra, Toxicodendron vernix*, and *Viburnum nudum var. cassinoides*. Herbs in *Sphagnum* - herb-dominated openings include *Carex folliculata, Carex gynandra, Carex leptalea, Carex scabrata, Carex stricta, Dalibarda repens, Leersia virginica, Osmunda cinnamomea, Sagittaria latifolia (= var. pubescens), Sarracenia purpurea, Solidago patula var. patula*, and *Symphyotrichum puniceum (= Aster puniceus)*. Herbs in the forested areas include *Coptis trifolia, Cornus canadensis, Glyceria melicaria, Lycopodium obscurum, Maianthemum canadense, Onoclea sensibilis, Osmunda regalis var. spectabilis, Symplocarpus foetidus, Thelypteris noveboracensis*, and *Trientalis borealis*. The nonvascular layer may be poorly to well-developed, and generally characterized by species of *Sphagnum*, as well as *Bazzania trilobata* and *Pleurozium schreberi*.

ENVIRONMENT & DYNAMICS

Environmental Description: Communities in this alliance occur in upland valleys created by bedrock depressions, on lower slopes, or adjacent to streams and lakes. In some cases they are transitional between wetland and upland vegetation. Microtopography is sometimes characterized by mounds and depressions caused by uprooted trees. Soils of this alliance vary from saturated muck to imperfectly drained mineral soils (Kotar et al. 1988) and are often acidic. In the south, sites are usually located in high-elevation valleys or slope concavities, in diffuse stream headwaters and lateral, groundwater-saturated flats along larger streams. Occasionally, stands occupy gentle depressions or basins influenced by seasonally perched groundwater but without flowing streams. Elevation ranges from 670-1200 m (2200-4000 feet), though most occurrences are above 900 m (3000 feet).

Dynamics: In the south, defoliation by the hemlock woolly adelgid (*Adelges tsugae*) has resulted in 90-100% hemlock mortality, and the virtual elimination of the hemlock component of these swamps. This near-complete removal of *Tsuga canadensis* from the canopy has led to the release of massive numbers of shrub and birch seedlings in the understory. Tip-up mounds are often created by uprooted trees.

DISTRIBUTION

Geographic Range: This alliance ranges from the Northern Blue Ridge and Ridge and Valley provinces of Virginia, the high Allegheny Mountains of Virginia and West Virginia, the Maryland Blue Ridge, and the Ridge and Valley of east-central West Virginia, ranging north to the mid-Atlantic and New England states and southeastern Canada, and west to Michigan.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: CT, MA, MD, ME, MI, NB, NH, NJ, NS?, NY, OH, PA, QC, RI, VA, VT, WV
TNC Ecoregions [optional]: 49:C, 50:C, 59:C, 61:C, 62:C, 63:C
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

LOWER LEVEL UNITS

Associations:
- CEGL006279 *Tsuga canadensis / Rhododendron maximum / Sphagnum* spp. Swamp Forest
- CEGL006380 *Betula alleghaniensis - Acer rubrum - (Tsuga canadensis, Abies balsamea) / Osmunda cinnamomea* Swamp Forest
- CEGL006226 *Tsuga canadensis - Betula alleghaniensis / Ilex verticillata / Sphagnum* spp. Swamp Forest
- CEGL008533 *Tsuga canadensis - Betula alleghaniensis / Veratrum viride - Carex scabrata - Oclemena acuminata* Swamp Forest
- CEGL006955 *Betula alleghaniensis - Acer rubrum - Tsuga canadensis / Sphagnum* spp. Forest

AUTHORSHIP

Primary Concept Source: L. Sneddon et al. (1996) and Midwestern Ecology Group
Author of Description: L. Sneddon
Acknowledgments:
Version Date: 01/08/2014
Classif Resp Region: East

REFERENCES

References: Enser and Lundgren 2006, Eyre 1980, Faber-Langendoen et al. 2016b, Fike 1999, Fleming et al. 2004, Kotar et al. 1988, Metzler and Barrett 2006, Motzkin 1991, Nichols 1915, Paratley and Fahey 1986, Smith 1991, Sneddon et al. 1996, Sperduto and Nichols 2004, Swain and Kearsley 2001, Thompson and Sorenson 2000, Walbridge and Lang 1982

1. Forest & Woodland
1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest
A3416. *Betula alleghaniensis - Tsuga canadensis* Swamp Forest Alliance

CEGL006380. *Betula alleghaniensis - Acer rubrum - (Tsuga canadensis, Abies balsamea) / Osmunda cinnamomea* Swamp Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Betula alleghaniensis - Acer rubrum - (Tsuga canadensis, Abies balsamea) / Osmunda cinnamomea* Swamp Forest
Common Name (Translated Scientific Name): Yellow Birch - Red Maple - (Eastern Hemlock, Balsam Fir) / Cinnamon Fern Swamp Forest
Colloquial Name: Hardwood - Conifer Seepage Forest

Type Concept: This mixed forest type occurs in moist ecotonal areas between uplands and wetlands in New England and the Northern Appalachians. Settings include stream drainages, seepage channels, inactive river terraces, and slope bottoms, but not permanently saturated basins. Perennial seepage from upslope or an impervious soil layer keeps water near the surface. There is often pronounced hummock-and-hollow microtopography. The somewhat acidic to circumneutral mineral soils are typically saturated early in the season but may dry out as summer progresses. The canopy closure ranges from somewhat open to nearly closed. Shrubs are sparse; the herb layer is patchy and may be locally dense. The bryoid layer is typically fairly sparse. The canopy is codominated by *Tsuga canadensis* and mixed hardwoods such as *Betula alleghaniensis, Fraxinus americana*, and *Acer rubrum*. Less frequent species can include *Pinus strobus, Fraxinus pennsylvanica*, and *Fraxinus nigra*. *Picea rubens* may occur sporadically at the northern extent of this community, and *Nyssa sylvatica* may occur to the south. The shrub layer often includes *Lindera benzoin, Viburnum lantanoides (= Viburnum alnifolium)*, and *Acer pensylvanicum*. The herb layer reflects the underlying moisture gradients, with *Osmunda cinnamomea, Osmunda claytoniana, Geum rivale, Impatiens capensis, Thelypteris palustris, Arisaema triphyllum, Symplocarpus foetidus, Hydrocotyle americana*, and *Cardamine pensylvanica* in the more moist areas, and *Coptis trifolia, Thelypteris noveboracensis, Athyrium filix-femina, Oclemena acuminata (= Aster acuminatus), Dryopteris intermedia, Cornus canadensis, Aralia nudicaulis*, and *Clintonia borealis* typical of the areas grading to upland. Bryophyte cover is variable and often includes *Sphagnum girgensohnii, Thuidium delicatulum, Bazzania trilobata*, and *Mnium* spp. These forests are somewhat similar to *Tsuga canadensis - Betula alleghaniensis / Ilex verticillata / Sphagnum* spp. Swamp Forest (CEGL006226) but occur on mineral soils, not in peaty basins, and have understory species that indicate somewhat more nutrient-enriched conditions.

Classification Comments: Conifers are characteristic but not necessarily prominent. The more southerly examples have hemlock as an associate, while more northerly examples tend to have balsam fir.

Similar NVC Types:
- CEGL006226 *Tsuga canadensis - Betula alleghaniensis / Ilex verticillata / Sphagnum* spp. Swamp Forest

VEGETATION

Floristics: The canopy closure ranges from somewhat open to nearly closed. Shrubs are sparse; the herb layer is patchy and may be locally dense. The bryoid layer is typically fairly sparse. The canopy is codominated by *Tsuga canadensis* and mixed hardwoods such as *Betula alleghaniensis* and *Acer rubrum*. Less frequent species can include *Pinus strobus, Fraxinus pennsylvanica*, and *Fraxinus nigra*. *Picea rubens* and/or *Abies balsamea* may occur sporadically at the northern extent of this community, and *Nyssa sylvatica* may occur to the south. The shrub layer often includes *Lindera benzoin, Viburnum lantanoides (= Viburnum alnifolium)*, and *Acer pensylvanicum*. The herb layer reflects the underlying moisture gradients, with *Osmunda cinnamomea, Osmunda claytoniana, Geum rivale, Impatiens capensis, Thelypteris palustris, Arisaema triphyllum, Symplocarpus foetidus, Hydrocotyle americana*, and *Cardamine pensylvanica* in the more moist areas, and *Coptis trifolia, Thelypteris noveboracensis, Oclemena acuminata (= Aster acuminatus), Dryopteris intermedia, Cornus canadensis, Aralia nudicaulis*, and *Clintonia borealis* typical of the areas grading to upland. Bryophyte cover is spotty, and often includes *Sphagnum girgensohnii, Bazzania trilobata*, and *Mnium* spp.

ENVIRONMENT & DYNAMICS

Environmental Description: This mixed forest type occurs in moist ecotonal areas between uplands and wetlands in New England and the Northern Appalachians. Settings include stream drainages, seepage channels, inactive river terraces, and slope bottoms where an impervious soil layer keeps water near the surface, but not permanently saturated basins. The somewhat acidic to circumneutral mineral soils are typically saturated early in the season, but may dry out as summer progresses. There is often pronounced hummock-and-hollow microtopography.

Dynamics:

DISTRIBUTION

Geographic Range: This mixed forest type occurs in moist ecotonal areas between uplands and wetlands in New England and the Northern Appalachians, and adjacent Canada.

Spatial Scale & Pattern [optional]: Small patch
Nations: CA, US
States/Provinces: CT, MA, ME, NB, NH, NY, QC, RI, VT
TNC Ecoregions [optional]: 61:C, 62:C, 63:C
USFS Ecoregions (1994/95): 212Cb:CCC, 212Da:CCC, 212Dc:CCC, 221Ae:CCC, 221Ag:CCP, 221Ai:CCC, 221Ak:CCC, 221Al:CCP, M212Ad:CCC, M212Ba:CCC, M212Bc:CCP, M212Bd:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Appalachian Trail [Lower New England], Appalachian Trail [Northern Appalachians], Marsh-Billings-Rockefeller)

CONSERVATION STATUS

Grank (Review Date): G4? (1997/12/1)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low - Poorly Documented.

SYNONYMY

Synonymy:

- **=** Hardwood Seepage Forest (Gawler 2002)
- **?** Hardwood seepage forest (Gawler 2000)
- **<** Hemlock - Yellow Birch: 24 (Eyre 1980)
- **<** Hemlock Swamp (Thompson 1996)
- **?** Palustrine Needle-leaved Evergreen Forested Wetland (PFO4) (Cowardin et al. 1979)

AUTHORSHIP

Primary Concept Source: Northern Appalachian Planning Team
Author of Description: S.C. Gawler, mod. S.L. Neid
Acknowledgments:
Version Date: 2005/12/08

REFERENCES

References: CDPNQ unpubl. data, Cowardin et al. 1979, Edinger et al. 2002, Enser 1999, Enser and Lundgren 2006, Eyre 1980, Gawler 2000, Gawler 2002, Gawler and Cutko 2010, Metzler and Barrett 2001, Metzler and Barrett 2006, Sperduto 1997b, Sperduto 2000b, Sperduto and Nichols 2004, Swain and Kearsley 2000, Swain and Kearsley 2001, Thompson 1996, Thompson and Sorenson 2000.

NYC NAC Association Description based on 1 plot (CEGL006380):

Overstory trees include tuliptree (Liriodendron tulipifera), eastern white pine (Pinus strobus), eastern hemlock (Tsuga canadensis), and black cherry (Prunus serotina).

Midstory plants include southern arrowwood (Viburnum dentatum), black cherry (Prunus serotina), and bitternut hickory (Carya cordiformis).

Vines include Virginia creeper (Parthenocissus quinquefolia), Oriental bittersweet (Celastrus orbiculatus), eastern poison ivy (Toxicodendron radicans), Asiatic tearthumb (Polygonum perfoliatum), and Amur peppervine (Ampelopsis brevipedunculata).

Understory plants include broadleaf enchanter's nightshade (Circaea lutetiana), jumpseed (Polygonum virginianum), bitternut hickory (Carya cordiformis), white wood aster (Eurybia divaricata), mayapple (Podophyllum peltatum), and Jack in the pulpit (Arisaema triphyllum).

1.B.3.Nb. Southeastern North American Flooded & Swamp Forest

These wetland forests occur in a variety of wetland settings, such as floodplain / riparian, isolated basins, and seepage slopes, centered in the Southeastern Coastal Plain of the United States.

M033. Southern Coastal Plain Basin Swamp & Flatwoods

These are forests of poorly drained basins and wet flats in the coastal plains of the southeastern United States, including nonriverine wetland hardwood forests, dominated by some combination of *Quercus* species and *Nyssa* species, with *Liquidambar styraciflua, Taxodium distichum*, and other trees and shrubs that can tolerate wet conditions.

G038. Coastal Plain Hardwood Basin Swamp

These are forests which occur in poorly drained basins and wet flats in the Southern Coastal Plain, dominated by some combination of *Nyssa biflora*, occasionally *Nyssa ogeche* and/or *Nyssa sylvatica*, and *Taxodium distichum*. Several *Quercus* species more tolerant of wet conditions (such as *Quercus laurifolia, Quercus michauxii*, and *Quercus phellos*) may be present.

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1. Forest & Woodland
1.B.3.Nb. Southeastern North American Flooded & Swamp Forest
1.B.3.Nb.2.a. G038 Coastal Plain Hardwood Basin Swamp

A3637. *Liquidambar styraciflua - Acer rubrum / Morella cerifera* Mid-Atlantic Swamp Forest Alliance

Type Concept Sentence: These are forests dominated by *Liquidambar styraciflua* with *Acer rubrum*. They are found in seasonally flooded depressions and range from North Carolina and Virginia north through the Chesapeake Bay into the northern Atlantic Coast and northern Piedmont of New Jersey, Pennsylvania and New York.

OVERVIEW

Scientific Name: *Liquidambar styraciflua - Acer rubrum / Morella cerifera* Mid-Atlantic Swamp Forest Alliance
Common Name (Translated Scientific Name): Sweetgum - Red Maple / Wax-myrtle Mid-Atlantic Swamp Forest Alliance
Colloquial Name: Mid-Atlantic Coastal Plain Sweetgum Depression Swamp Forest

Type Concept: These forests are dominated by *Liquidambar styraciflua*. Some stands may be dominated or codominated by *Acer rubrum*. Other woody species that may be present include *Cornus foemina, Fraxinus pennsylvanica, Quercus lyrata, Quercus palustris, Quercus phellos*, and *Salix nigra*. Shrubs that may be present include *Cephalanthus occidentalis, Clethra alnifolia, Ilex opaca, Leucothoe racemosa, Magnolia virginiana*, and *Vaccinium corymbosum*. In addition, *Sphagnum* spp. are common in the ground layer. Known examples of this alliance occur in seasonally flooded depressions rather than in floodplains. One association included here is a saturated forest dominated by *Pinus taeda* that may occur adjacent to salt marshes on the bay side of barrier islands. These forests range from the Atlantic Coastal Plain and adjacent southern Piedmont of North Carolina and Virginia north through the Chesapeake Bay and northern Piedmont to the northern Atlantic Coast of New Jersey, Pennsylvania and New York.

Classification Comments: Description is largely based on the old alliance *Liquidambar styraciflua - (Acer rubrum)* Seasonally Flooded Forest Alliance (A.321). Similar stands on floodplains are found in other groups and alliances.

Similar NVC Types:

Diagnostic Characteristics: This alliance includes forests of the Atlantic Coastal Plain and adjacent southern Piedmont. They are dominated by *Liquidambar styraciflua* with *Acer rubrum* and are found in seasonally flooded depressions rather than floodplains. The combination of the environment, biogeography, and floristics are diagnostic.

VEGETATION

Floristics: Examples are dominated by *Liquidambar styraciflua* perhaps with *Acer rubrum*. Other woody species that may be present include *Cornus foemina, Fraxinus pennsylvanica, Quercus lyrata, Quercus palustris, Quercus phellos*, and *Salix nigra*. Shrubs that may be present include *Cephalanthus occidentalis, Clethra alnifolia, Ilex opaca, Leucothoe racemosa, Magnolia virginiana*, and *Vaccinium corymbosum*. The understory may have strong dominance by vine species, including *Parthenocissus quinquefolia, Smilax rotundifolia*, and *Toxicodendron radicans*. In addition, *Sphagnum* spp. are common in the herbaceous layer. Other taxa that may be present vary with geography, but can include *Carex joorii, Osmunda regalis var. spectabilis, Pinus rigida*, and *Pinus taeda*. One Delaware association contains *Acer rubrum, Populus heterophylla*, and *Quercus palustris*.

ENVIRONMENT & DYNAMICS

Environmental Description: Known examples of this alliance occur in seasonally flooded depressions rather than in floodplains. One association included here is a saturated forest dominated by *Pinus taeda* that may occur adjacent to salt marshes on the bay side of barrier islands.

Dynamics:

DISTRIBUTION

Geographic Range: This alliance is found from the Atlantic Coastal Plain and adjacent southern Piedmont of North Carolina and Virginia north through the Chesapeake Bay and northern Piedmont to the northern Atlantic Coast of New Jersey, Pennsylvania and New York.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: DC, DE, MD, NC, NJ, NY, PA, VA
TNC Ecoregions [optional]: 52:C, 57:C, 58:C, 61:C, 62:C
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

- **?** Coastal Plain Forest (Smith 1991)
- **?** Estuarine Fringe Loblolly Pine Forest (Schafale and Weakley 1990)
- **><** IIA10c. Wet Marl Forest (Allard 1990)
- **><** IIA10e. Nonriverine Wet Hardwood Forest (Allard 1990)
- **><** Nonriverine Wet Hardwood Forest (Schafale and Weakley 1990)
- **?** Red maple - magnolia Coastal Plain palustrine forest (Fike 1999)
- **>** Sweet Gum - Red Maple - Palustrine Forest (Undifferentiated) (LA) (Windisch 2014a)
- **><** Woodland community (Hill 1986)
- **?** coniferous swamp (Shreve et al. 1910)
- **><** loblolly pine association (Brush et al. 1980)
- **><** mature loblolly pine stands of wet sites (Bratton and Davison 1987)
- **><** pine woodland (Higgins et al. 1971)

LOWER LEVEL UNITS

Associations:

- CEGL004424 *Taxodium distichum - Liquidambar styraciflua - Platanus occidentalis / Asimina triloba* Swamp Forest
- CEGL006223 *Liquidambar styraciflua - Acer rubrum - Nyssa biflora / Carex joorii* Swamp Forest
- CEGL006137 *Pinus taeda / Morella cerifera / Osmunda regalis var. spectabilis* Swamp Forest
- CEGL006317 *Acer rubrum / Alnus maritima ssp. maritima* Swamp Woodland
- CEGL006110 *Liquidambar styraciflua - Acer rubrum - Quercus phellos / Leucothoe racemosa* Swamp Forest
- CEGL006925 *Liquidambar styraciflua - Acer rubrum - (Pinus rigida)* Forest

AUTHORSHIP

Primary Concept Source: M. Pyne
Author of Description: M. Pyne
Acknowledgments: We have incorporated significant descriptive information previously compiled by L. Sneddon, A.S. Weakley, and K.D. Patterson.
Version Date: 03/14/2014
Classif Resp Region: Southeast

REFERENCES

References: Allard 1990, Bratton and Davison 1987, Brush et al. 1980, Faber-Langendoen et al. 2016b, Fike 1999, Fleming 1998, Fleming pers. comm., Higgins et al. 1971, Hill 1986, Kologiski 1977, Levy and Walker 1979, Schafale and Weakley 1990, Shreve et al. 1910, Smith 1991, Weakley et al. 1996, Windisch 2014a

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1. Forest & Woodland
1.B.3.Nb. Southeastern North American Flooded & Swamp Forest
A3637. *Liquidambar styraciflua - Acer rubrum / Morella cerifera* Mid-Atlantic Swamp Forest Alliance

CEGL006110. *Liquidambar styraciflua - Acer rubrum - Quercus phellos / Leucothoe racemosa* Swamp Forest

Type Concept Sentence:

OVERVIEW

Scientific Name: *Liquidambar styraciflua - Acer rubrum - Quercus phellos / Leucothoe racemosa* Swamp Forest
Common Name (Translated Scientific Name): Sweetgum - Red Maple - Willow Oak / Swamp Doghobble Swamp Forest

Colloquial Name: Sweetgum - Red Maple Swamp Forest

Type Concept: This association is a seasonally flooded forest of shallow basins and other depressions of the Coastal Plain of the Chesapeake Bay region. The substrate is characterized by mineral soils, generally acidic, gleyed to mottled, sandy or clay loams. Characteristic tree species include *Acer rubrum, Liquidambar styraciflua*, and *Nyssa sylvatica*, which are nearly constant in the canopy. Associates include *Ilex opaca, Magnolia virginiana, Nyssa biflora, Sassafras albidum, Quercus palustris, Pinus taeda*, and *Quercus phellos*, and occasionally *Quercus falcata, Quercus lyrata*, or *Betula nigra*. The shrub layer is characterized by *Leucothoe racemosa, Vaccinium corymbosum, Clethra alnifolia, Lindera benzoin, Ilex verticillata*, and *Rhododendron viscosum*. *Smilax rotundifolia* is a particularly characteristic vine. The herbaceous layer is generally sparse but may include *Mitchella repens, Osmunda cinnamomea, Chasmanthium laxum, Woodwardia areolata, Onoclea sensibilis, Osmunda regalis, Carex albolutescens, Carex debilis var. debilis, Scirpus cyperinus, Juncus effusus*, and *Polygonum* spp. *Carex joorii* is inconstant but locally abundant in some stands in the southern part of the range.

Classification Comments: Classification of this type is supported by two regional analyses of Maryland and Virginia plot data conducted by VDNH for the NCR vegetation mapping project. It is represented by 15 plots from the greater NCR region and an additional 57 plots from The Peninsula in York County, Virginia (Grafton Ponds complex). Delaware examples contain *Quercus* spp. and *Magnolia virginiana*. In Maryland, *Clethra alnifolia* is more prominent than *Leucothoe racemosa*, and *Quercus phellos* is less characteristic than *Nyssa sylvatica*.

Similar NVC Types:
- CEGL007403 *Quercus phellos / Carex (albolutescens, intumescens, joorii) / Climacium americanum* Wet Forest: of the Virginia Piedmont and more southerly areas, dominated by *Quercus phellos*.
- CEGL006469 *Populus heterophylla - Acer rubrum - Quercus palustris - Liquidambar styraciflua* Forest
- CEGL006240 *Quercus palustris - (Quercus bicolor) - Acer rubrum / Vaccinium corymbosum / Osmunda cinnamomea* Wet Forest
- CEGL006953 *Acer rubrum / Lindera benzoin - Alnus serrulata* Forest
- CEGL006965 *Acer rubrum - Fraxinus pennsylvanica - Liquidambar styraciflua* Floodplain Forest
- CEGL004644 *Quercus (phellos, michauxii) / Ilex opaca var. opaca / Clethra alnifolia / Woodwardia areolata* Wet Forest
- CEPS006470 *Pinus serotina / Magnolia virginiana / Vaccinium corymbosum / Carex atlantica* Woodland

VEGETATION

Floristics: Characteristic tree species include *Acer rubrum, Liquidambar styraciflua*, and *Nyssa sylvatica*, which are nearly constant in the canopy. *Quercus phellos* is an important associate or codominant in many stands. Other associates include *Ilex opaca, Magnolia virginiana, Nyssa biflora, Sassafras albidum, Quercus palustris, Pinus taeda*, and occasionally *Quercus falcata, Quercus lyrata*, or *Betula nigra*. The shrub layer is characterized by *Leucothoe racemosa, Vaccinium corymbosum, Vaccinium fuscatum, Vaccinium formosum, Clethra alnifolia, Lindera benzoin, Ilex verticillata*, and *Rhododendron viscosum*. *Smilax rotundifolia* is a particularly characteristic vine, often forming dense tangles among the shrubs. The herbaceous layer is generally sparse but may include *Mitchella repens, Osmunda cinnamomea, Chasmanthium laxum, Woodwardia areolata, Onoclea sensibilis, Osmunda regalis, Carex albolutescens, Carex debilis var. debilis, Scirpus cyperinus, Juncus effusus*, and *Polygonum* spp. *Carex joorii* is inconstant but locally abundant in some stands in the southern part of the range.

ENVIRONMENT & DYNAMICS

Environmental Description: This type occurs in seasonally flooded shallow basins or depressions. Substrates are acidic, gleyed to mottled, sandy or clay loams. Sites are commonly flooded by perched groundwater to depths up to about 50 cm during the winter and early part of the growing season, but commonly are drawn down by late summer. Soils collected from 12 Virginia plot samples were extremely acidic (mean pH = 4.1) with very low cation levels and total base saturation.

Dynamics:

DISTRIBUTION

Geographic Range: This association is a seasonally flooded forest of shallow basins and depressions in the mid-Atlantic region. It is primarily associated with the Coastal Plain but occurs locally in gentle, highly acidic terrain of the eastern Piedmont in central and southern Virginia.

Spatial Scale & Pattern [optional]: Small patch, Large patch
Nations: US
States/Provinces: DC, DE, MD, NJ, NY, PA, VA
TNC Ecoregions [optional]: 52:C, 57:C, 58:C, 61:C, 62:C
USFS Ecoregions (1994/95): 221Ae:CCC, 221Dc:CCC, 231Ae:CCC, 231Ak:CCC, 231An:CCC, 232Aa:CCC, 232Ab:CCC, 232Ac:CCC, 232Ad:CCC, 232Br:CCC, 232Bt:CCC, 232Bx:CCC, 232Ch:CCC, 232Cj:CCC

Omernik Ecoregions:

Federal Lands [optional]: DOD (Fort Belvoir, Yorktown); NPS (Colonial, Fredericksburg-Spotsylvania, National Capital-East, Thomas Stone); USFWS (Cape May, Chesapeake Marshlands, E.B. Forsythe, Prime Hook, Supawna Meadows)

CONSERVATION STATUS

Grank (Review Date): G3 (2012/1/6)

Greasons: This association occurs naturally in small patches and is restricted to southeastern New York, and the coastal plain of New Jersey, Delaware, Maryland, and Virginia. The New York Natural Heritage Program notes that the acreage of this type likely declined from historical numbers as a result of increasing development and agriculture. The principal causes of wetland loss in the Northeast prior to the mid-1800s include conversion of wetlands to agriculture, the construction of impoundments for hydropower and water supply, and the cutting of swamp timber for lumber, fence posts, and fuel wood (Golet et al. 1993). Extensive historical extirpation of red maple-sweetgum swamps has been cited by Stevens (1992). More wetlands are being drained and filled for development as undeveloped uplands in the metropolitan New York City area have become very scarce. Reportedly, no old-growth examples remain north of Richmond County (Stevens 1992). The Virginia Natural Heritage Program has observed that although occurrences are fairly numerous, they are small and widely degraded by ditching and draining, clearcutting, and outright clearing and conversion to agriculture. This type may actually be more threatened by these kinds of disturbances than more deeply flooded depressions (e.g., CEGL006223 or CEGL006242) because they are drier and easier to drain. In addition, willow oaks attain great size in these habitats and are prime targets for logging (G. Fleming pers. comm. 2011).

Ranking Author (Version): L.A. Sneddon (2012/1/6)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:

- **=** *Acer rubrum - Liquidambar styraciflua - (Quercus phellos) / Vaccinium corymbosum* Forest (VDNH 2003)
- **=** *Acer rubrum - Liquidambar styraciflua - (Quercus phellos) / Vaccinium corymbosum* Forest (Fleming and Patterson 2003)
- **<** *Acer rubrum - Liquidambar styraciflua - Nyssa sylvatica* Swamp Forest (Clancy 1996)
- **=** *Acer rubrum - Liquidambar styraciflua / Leucothoe racemosa* Community (Sneddon and Anderson 1994)
- **=** *Acer rubrum - Quercus phellos - Liquidambar styraciflua / Leucothoe racemosa* Community (Sneddon et al. 1996)
- **=** *Liquidambar styraciflua - Acer rubrum - Quercus phellos / Leucothoe racemosa* Forest (Harrison 2004)
- **?** *Liquidambar-Acer* hardwood swamp (Breden 1989)
- **=** *Pinus taeda - Quercus phellos / Ilex opaca / Chasmanthium laxum* Association (Rawinski 1997)
- **=** *Quercus phellos - Acer rubrum - Liquidambar styraciflua / Vaccinium (corymbosum, formosum, fuscatum)* Forest (Fleming et al. 2006)
- **=** *Quercus phellos - Acer rubrum - Liquidambar styraciflua / Vaccinium (corymbosum, formosum, fuscatum)* Forest (Fleming et al. 2007b)
- **<** Coastal Plain Depression Wetland (Fleming et al. 2006)
- **=** Red Maple - Sweetgum Community (Hunt 1998)
- **>** Sweet Gum - Red Maple - Mid-successional Forest (LA2) (Windisch 2014a)
- **=** Sweet Gum - Red Maple - Willow Oak - Holly Palustrine Forest (LA1) (Windisch 2014a)
- **=** Sweetgum - Red Maple Depression Swamp (Bowman 2000)
- **<** Upland Depression Swamp (Harrison 2004)

AUTHORSHIP

Primary Concept Source: L.A. Sneddon

Author of Description: L.A. Sneddon, mod. E. Largay and G.P. Fleming

Acknowledgments:

Version Date: 2007/02/15

REFERENCES

References: Bowman 2000, Breden 1989, Breden et al. 2001, Clancy 1996, Coxe 2009, Edinger et al. 2002, Fleming 2002b, Fleming and Patterson 2003, Fleming and Patterson 2011a, Fleming and Patterson 2011b, Fleming et al. 2001, Fleming et al. 2006, Fleming et al. 2007b, Fleming pers. comm., Golet et al. 1993, Harrison 2004, Harrison 2011, Hunt 1998, Lea et al. 2012, McCoy and Fleming 2000, NatureServe 2009, Patterson 2008c, Patterson 2008e, Rawinski 1997, Rhoads and Block 2011a, Sneddon and Anderson 1994, Sneddon et al. 1996, Stevens 1992, Taverna and Patterson 2008, VDNH 2003, Windisch 2014a, Zimmerman et al. 2012.

NYC NAC Association Description based on 72 plots (CEGL006110):

The overstory is co-dominated by sweetgum (Liquidambar styraciflua) and red maple (Acer rubrum). Other overstory trees include pin oak (Quercus palustris), northern red oak (Quercus rubra), blackgum (Nyssa sylvatica), slippery elm (Ulmus rubra), green ash

(Fraxinus pennsylvanica), sassafras (Sassafras albidum), tuliptree (Liriodendron tulipifera), white oak (Quercus alba), black locust (Robinia pseudoacacia), black cherry (Prunus serotina), swamp white oak (Quercus bicolor), tree of heaven (Ailanthus altissima), and sweet birch (Betula lenta).

Midstory plants include red maple (Acer rubrum), sweetgum (Liquidambar styraciflua), southern arrowwood (Viburnum dentatum), blackgum (Nyssa sylvatica), northern spicebush (Lindera benzoin), black cherry (Prunus serotina), highbush blueberry (Vaccinium corymbosum), tuliptree (Liriodendron tulipifera), slippery elm (Ulmus rubra), green ash (Fraxinus pennsylvanica), northern red oak (Quercus rubra), sassafras (Sassafras albidum), coastal sweetpepperbush (Clethra alnifolia), gray birch (Betula populifolia), American hornbeam (Carpinus caroliniana), tree of heaven (Ailanthus altissima), pin oak (Quercus palustris), white oak (Quercus alba), dogwood (Cornus sp.), serviceberry (Amelanchier sp.), black locust (Robinia pseudoacacia), white mulberry (Morus alba), black elderberry (Sambucus nigra), sweet birch (Betula lenta), American beech (Fagus grandifolia), blackhaw (Viburnum prunifolium), red chokeberry (Photinia pyrifolia), Norway maple (Acer platanoides), redosier dogwood (Cornus sericea), common hackberry (Celtis occidentalis), Japanese angelica tree (Aralia elata), common buttonbush (Cephalanthus occidentalis), buckthorn (Rhamnus sp.), common winterberry (Ilex verticillata), white ash (Fraxinus americana), winged sumac (Rhus copallinum), mockernut hickory (Carya tomentosa), sweet cherry (Prunus avium), smooth sumac (Rhus glabra), shagbark hickory (Carya ovata), hawthorn (Crataegus sp.), pignut hickory (Carya glabra), and silky dogwood (Cornus amomum).

Vines include eastern poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), roundleaf greenbrier (Smilax rotundifolia), Japanese honeysuckle (Lonicera japonica), Oriental bittersweet (Celastrus orbiculatus), Amur peppervine (Ampelopsis brevipedunculata), cat greenbrier (Smilax glauca), English ivy (Hedera helix), fox grape (Vitis labrusca), tall morning-glory (Ipomoea purpurea), climbing nightshade (Solanum dulcamara), and cutleaf blackberry (Rubus laciniatus).

Understory plants include southern arrowwood (Viburnum dentatum), northern spicebush (Lindera benzoin), red maple (Acer rubrum), Canada mayflower (Maianthemum canadense), sweetgum (Liquidambar styraciflua), multiflora rose (Rosa multiflora), black cherry (Prunus serotina), northern dewberry (Rubus flagellaris), cinnamon fern (Osmunda cinnamomea), jewelweed (Impatiens capensis), garlic mustard (Alliaria petiolata), Nepalese browntop (Microstegium vimineum), blackgum (Nyssa sylvatica), blackberry (Rubus sp.), sassafras (Sassafras albidum), eastern hayscented fern (Dennstaedtia punctilobula), feathery false lily of the valley (Maianthemum racemosum), Japanese knotweed (Polygonum cuspidatum), avens (Geum sp.), coastal sweetpepperbush (Clethra alnifolia), spotted ladysthumb (Polygonum persicaria), English ivy (Hedera helix), smooth Solomon's seal (Polygonatum biflorum), slippery elm (Ulmus rubra), tuliptree (Liriodendron tulipifera), bristly dewberry (Rubus hispidus), highbush blueberry (Vaccinium corymbosum), common reed (Phragmites australis), white wood aster (Eurybia divaricata), northern red oak (Quercus rubra), wild sarsaparilla (Aralia nudicaulis), Japanese angelica tree (Aralia elata), rice cutgrass (Leersia oryzoides), broadleaf enchanter's nightshade (Circaea lutetiana), skunk cabbage (Symplocarpus foetidus), green ash (Fraxinus pennsylvanica), common wormwood (Artemisia vulgaris), American burnweed (Erechtites hieraciifolius), wine raspberry (Rubus phoenicolasius), pin oak (Quercus palustris), arrow bamboo (Pseudosasa japonica), marsh seedbox (Ludwigia palustris), groundnut (Apios americana), swamp loosestrife (Decodon verticillatus), Canadian clearweed (Pilea pumila), red chokeberry (Photinia pyrifolia), purple loosestrife (Lythrum salicaria), winged sumac (Rhus copallinum), whorled yellow loosestrife (Lysimachia quadrifolia), white ash (Fraxinus americana), Jack in the pulpit (Arisaema triphyllum), common boneset (Eupatorium perfoliatum), American beech (Fagus grandifolia), lowbush blueberry (Vaccinium angustifolium), wrinkleleaf goldenrod (Solidago rugosa), aster (Symphyotrichum), Virginia water horehound (Lycopus virginicus), climbing false buckwheat (Polygonum scandens), white avens (Geum canadense), Allegheny blackberry (Rubus allegheniensis), mapleleaf viburnum (Viburnum acerifolium), wild yam (Dioscorea villosa), American pokeweed (Phytolacca americana), burningbush (Euonymus alatus), common dandelion (Taraxacum officinale), lizard's tail (Saururus cernuus), crimsoneyed rosemallow (Hibiscus moscheutos), common threeseed mercury (Acalypha rhomboidea), netted chainfern (Woodwardia areolata), American water plantain (Alisma subcordatum), steeplebush (Spiraea tomentosa), swamp smartweed (Polygonum hydropiperoides), ditch stonecrop (Penthorum sedoides), shallow sedge (Carex lurida), New York fern (Thelypteris noveboracensis), sensitive fern (Onoclea sensibilis), lateflowering thoroughwort (Eupatorium serotinum), small enchanter's nightshade (Circaea alpina), maleberry (Lyonia ligustrina), gray dogwood (Cornus racemosa), fringed sedge (Carex crinita), silky dogwood (Cornus amomum), spinulose woodfern (Dryopteris carthusiana), joe pye weed (Eutrochium sp.), purpleleaf willowherb (Epilobium coloratum), jumpseed (Polygonum virginianum), cursed buttercup (Ranunculus sceleratus), smallspike false nettle (Boehmeria cylindrica), black elderberry (Sambucus nigra), nightshade (Solanum), arrowleaf tearthumb (Polygonum sagittatum), mannagrass (Glyceria sp.), St. Johnswort (Hypericum sp.), common rush (Juncus effusus), chokeberry (Photinia sp.), common serviceberry (Amelanchier arborea), marshpepper knotweed (Polygonum hydropiper), and beggarticks (Bidens sp.).

2. SHRUB & HERB VEGETATION

Grasslands, shrublands, open tree savannas, marshes, bogs and fens dominated by broadly mesomorphic (including scleromorphic) shrub and herb growth forms (including *broad-leaved, needle-leaved*, and *sclerophyllous shrubs*, and *forb* and *graminoid herbs*) with

an irregular horizontal canopy structure, mesomorphic trees typically <10% cover (but tropical tree savannas typically <40%), tropical to boreal and subalpine climates, and wet to dry substrate conditions.

2.B. Temperate & Boreal Grassland & Shrubland

Temperate & Boreal Grassland & Shrubland is dominated by mesomorphic grasses and shrubs, with or without scattered trees (and trees typically <10% cover), ranging from temperate coastal to inland lowland and montane grasslands and shrublands, with a strongly seasonal climate and at least some frost to extended cold seasons.

2.B.2. Temperate Grassland & Shrubland

Temperate Grassland, Meadow & Shrubland is dominated by perennial grasses, forbs and shrubs typical of moderately dry to moist habitats, and is found in the mid-latitude regions of all continents (23° to 55°N and S), varying from large open grassland landscapes to droughty hillside meadows in forested landscapes.

2.B.2.Nc. Eastern North American Grassland & Shrubland

This division consists of open grasslands and shrublands in the northern and central regions of eastern Canada and the United States. Vegetation occurs on a variety of soil types and depth, with acidic to basic pH, that range in depth from deep loams to exposed rock. Vegetation types are colloquially known as alvars, balds, barrens, flatrocks, and glades, and often contain a prairie-like flora, but with distinctive eastern elements.

M123. Eastern North American Ruderal Grassland & Shrubland

These ruderal grasslands and shrublands are found in the northern and central regions of the eastern United States on sites that have been cleared and plowed (for farming or development) and then abandoned, and are now dominated by a wide variety of exotic and weedy native forbs, grasses, ferns, and shrubs, but have not succeeded to a recognizable native type.

G059. Eastern North American Ruderal Meadow & Shrubland

This group encompasses old fields in the northern and central regions of the eastern United States dominated by native and exotic forbs, grasses, ferns and shrubs that occur on sites that have been cleared and plowed (for farming or development), and then abandoned.

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2. Shrub & Herb Vegetation
2.B.2.Nc. Eastern North American Grassland & Shrubland
2.B.2.Nc.90.a. G059 Eastern North American Ruderal Meadow & Shrubland

A1190. *Dactylis glomerata - Festuca* spp. - *Solidago canadensis* Ruderal Mesic Meadow Alliance

Type Concept Sentence: This broadly defined type includes mesic old-field grasslands found on abandoned pastures and agricultural fields and is largely composed of non-native cool-season grasses and herbs (generally of European origin) in early stages of succession.

OVERVIEW

Scientific Name: *Dactylis glomerata - Festuca* spp. - *Solidago canadensis* Ruderal Mesic Meadow Alliance
Common Name (Translated Scientific Name): Orchardgrass - Fescue species - Canada Goldenrod Ruderal Mesic Meadow Alliance
Colloquial Name: Northern & Central Ruderal Mesic Old-field Meadow

Type Concept: This broadly defined type includes mesic abandoned pastures and agricultural fields and is largely composed of non-native cool-season grasses and herbs (generally of European origin) in the early stages of succession. The fields are typically mowed every one to five years. Physiognomically, these grasslands are generally composed of mid-height (0.5 to 1 m tall) grasses and forbs, with occasional scattered shrubs (<25%). Species composition varies from site to site, depending on land-use history and perhaps soil type, but in general this vegetation is quite wide-ranging in northeastern and midwestern states and at higher elevations (610-1220 m [2000-4000 feet]) in the southeastern states. Dominant grasses vary from site to site but generally include the exotic grasses *Agrostis stolonifera, Agrostis hyemalis, Anthoxanthum odoratum, Bromus inermis, Bromus tectorum, Dactylis glomerata, Lolium arundinaceum (= Schedonorus arundinaceum), Lolium perenne, Phleum pratense* as well as weedy natives such as *Elymus repens, Poa pratensis*, and, less commonly, *Schizachyrium scoparium*. Forbs may be minor or dominant and include the exotic forbs *Achillea millefolium, Cerastium arvense* (and hybrids), *Daucus carota, Hieracium* spp., *Vicia cracca*, as well as weedy natives such as *Ambrosia artemisiifolia, Asclepias syriaca, Euthamia graminifolia, Oenothera biennis, Potentilla simplex, Solidago altissima, Solidago canadensis, Solidago juncea, Solidago nemoralis, Solidago rugosa, Trifolium* spp., *Symphyotrichum lanceolatum (= Aster simplex),*

Symphyotrichum lateriflorum (= Aster lateriflorus), Symphyotrichum novae-angliae (= Aster novae-angliae), and many others. This vegetation is quite wide-ranging in northeastern and midwestern states and possibly occurs at higher elevations in the southeastern states and southern Canada.

Classification Comments:

Similar NVC Types:
- A3934 *Poa compressa - Solidago nemoralis - Centaurea biebersteinii* Ruderal Dry Meadow & Shrubland Alliance

Diagnostic Characteristics: This is a broadly defined type, and diagnostic features are complex. Shrubs are <25% and trees are <10% cover. Dominant grasses vary from site to site but generally include the exotic grasses *Agrostis stolonifera, Agrostis hyemalis, Anthoxanthum odoratum, Bromus inermis, Bromus tectorum, Dactylis glomerata, Lolium arundinaceum (= Schedonorus arundinaceum), Lolium perenne, Phleum pratense*, as well as weedy natives such as *Elymus repens, Poa pratensis* and, less commonly *Schizachyrium scoparium*. Forbs may be minor or dominant and include the exotic forbs *Achillea millefolium, Cerastium arvense* (and hybrids), *Daucus carota, Hieracium* spp., *Vicia cracca*, as well as weedy natives such as *Ambrosia artemisiifolia, Asclepias syriaca, Euthamia graminifolia, Oenothera biennis, Potentilla simplex, Solidago altissima, Solidago canadensis, Solidago juncea, Solidago nemoralis, Solidago rugosa, Trifolium* spp., *Symphyotrichum lanceolatum (= Aster simplex), Symphyotrichum lateriflorum (= Aster lateriflorus), Symphyotrichum novae-angliae (= Aster novae-angliae)*, and many others.

VEGETATION

Physiognomy and Structure: Physiognomically, these grasslands are generally composed of mid-height (0.5 to 1 m tall) grasses and forbs, with occasional scattered shrubs.

Floristics: Species composition varies from site to site, depending on land-use history and perhaps soil type, but in general this vegetation is quite wide-ranging in northeastern and midwestern states and at higher elevations (610-1220 m [2000-4000 feet]) in the southeastern states. Dominant grasses vary from site to site but generally include the exotic grasses *Agrostis stolonifera, Agrostis hyemalis, Anthoxanthum odoratum, Bromus inermis, Bromus tectorum, Dactylis glomerata, Lolium arundinaceum (= Schedonorus arundinaceum), Lolium perenne, Phleum pratense*, as well as weedy natives such as *Elymus repens, Poa pratensis* and, less commonly *Schizachyrium scoparium*. Forbs may be minor or dominant and include the exotic forbs *Achillea millefolium, Cerastium arvense* (and hybrids), *Daucus carota, Hieracium* spp., *Vicia cracca*, as well as weedy natives such as *Ambrosia artemisiifolia, Asclepias syriaca, Euthamia graminifolia, Oenothera biennis, Potentilla simplex, Solidago altissima, Solidago canadensis, Solidago juncea, Solidago nemoralis, Solidago rugosa, Trifolium* spp., *Symphyotrichum lanceolatum (= Aster simplex), Symphyotrichum lateriflorum (= Aster lateriflorus), Symphyotrichum novae-angliae (= Aster novae-angliae)*, and many others.

A variant dominated by *Phleum pratense*, a native of Europe, is currently known throughout the northeastern United States and from high-elevation pastures or grass balds in the Southern Appalachians. It includes grasslands primarily dominated by alien species not native to North America, presumably originally planted or introduced by grazing animals. Vegetation of this alliance is widely distributed in the northeastern United States, as well as in montane and higher-elevation areas of the southeastern United States. Occurrences are variable and patchy, often with local dominance of tall forbs. Other characteristic species include *Hieracium caespitosum (= Hieracium pratense)* (alien), *Potentilla canadensis*, and *Ranunculus acris* (alien). These grasslands are maintained by periodic mowing or, in some instances, prescribed burning.

ENVIRONMENT & DYNAMICS

Environmental Description: This broadly defined alliance includes pasture and post-agricultural fields, and is largely composed of non-native grasses and herbs (generally of European origin).

Dynamics: These grasslands are maintained by periodic mowing or, in some instances, prescribed burning, and in other cases are succeeding to ruderal forests.

DISTRIBUTION

Geographic Range: This vegetation is quite wide-ranging in northeastern and midwestern states and possibly occurs at higher elevations in the southeastern states and southern Canada.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: CT, DE, IL, KY, MA, MB, MD, ME, MI, MN, NB?, NC, NH, NJ, NS?, NY, OH, ON, PA, QC?, RI, TN, VA, VT, WI, WV
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

- **><** Grassy Bald (Schafale and Weakley 1990) [Grassy balds have a complex natural and human history, and review is needed to determine whether the *Phleum pratense* part of grassy balds should just be treated as a (degraded?) variant of that type, rather than tracked as a variant within this ruderal alliance.]

LOWER LEVEL UNITS

Associations:

- CEGL004018 *Phleum pratense - Bromus pubescens - Helenium autumnale* Ruderal Meadow
- CEGL005459 *Solidago canadensis - Coronilla varia* Ruderal Meadow
- CEGL006107 *Dactylis glomerata - Phleum pratense - Festuca* spp. - *Solidago* spp. Ruderal Meadow
- CEGL005249 *Phleum pratense - (Calamagrostis canadensis)* Ruderal Meadow

AUTHORSHIP

Primary Concept Source: D. Faber-Langendoen
Author of Description: D. Faber-Langendoen
Acknowledgments:
Version Date: 09/26/2014
Classif Resp Region: East

REFERENCES

References: Faber-Langendoen et al. 2016b, Schafale and Weakley 1990

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2. Shrub & Herb Vegetation
2.B.2.Nc. Eastern North American Grassland & Shrubland
A1190. *Dactylis glomerata - Festuca* spp. - *Solidago canadensis* Ruderal Mesic Meadow Alliance

CEGL006107. *Dactylis glomerata - Phleum pratense - Festuca* spp. - *Solidago* spp. Ruderal Meadow

Type Concept Sentence:

OVERVIEW

Scientific Name: *Dactylis glomerata - Phleum pratense - Festuca* spp. - *Solidago* spp. Ruderal Meadow
Common Name (Translated Scientific Name): Orchardgrass - Timothy - Fescue species - Goldenrod species Ruderal Meadow
Colloquial Name: Northeastern Old-field Meadow

Type Concept: This broadly defined vegetation type includes pastures and post-agricultural fields and is largely composed of non-native cool-season grasses and herbs (generally of European origin) in the early stages of succession. The fields are typically mowed at least annually. Physiognomically, these grasslands are generally composed of mid-height (1-3 feet tall) grasses and forbs, with occasional scattered shrubs. Species composition varies from site to site, depending on land-use history and perhaps soil type, but in general this vegetation is quite wide-ranging in northeastern and midwestern states and at higher elevations (610-1220 m [2000-4000 feet]) in the southeastern states. Dominant grasses vary from site to site but generally feature the nominal species. Other graminoid associates may include *Agrostis stolonifera, Agrostis hyemalis, Elymus repens, Bromus inermis, Bromus tectorum, Lolium perenne, Poa pratensis, Poa compressa, Schizachyrium scoparium* (not in abundance), and *Anthoxanthum odoratum*. Forbs scattered among the grasses are varied but include *Hieracium* spp., *Oxalis stricta, Achillea millefolium, Asclepias syriaca, Solidago rugosa, Solidago nemoralis, Solidago juncea, Solidago canadensis, Solidago altissima, Euthamia graminifolia, Cerastium arvense, Oenothera biennis, Potentilla simplex, Symphyotrichum lateriflorum (= Aster lateriflorus), Symphyotrichum novae-angliae (= Aster novae-angliae), Symphyotrichum lanceolatum (= Aster simplex), Daucus carota, Ambrosia artemisiifolia, Vicia cracca, Trifolium* spp., and many others.

Classification Comments: *Schizachyrium scoparium - (Andropogon virginicus) - Solidago* spp. Ruderal Meadow (CEGL006333) is similar to this type but is dominated by warm-season grasses.

Similar NVC Types: Associations in *Andropogon virginicus - Ambrosia artemisiifolia - Conyza canadensis* Eastern Ruderal Grassland Alliance (A3321) have been used to describe similar grasslands in the southeastern U.S.

- CEGL004018 *Phleum pratense - Bromus pubescens - Helenium autumnale* Ruderal Meadow
- CEGL006616 *Panicum virgatum - (Andropogon virginicus)* Ruderal Meadow
- CEGL006333 *Schizachyrium scoparium - (Andropogon virginicus) - Solidago* spp. Ruderal Meadow: has a greater component of native species and occurs on drier soils.
- CEGL004048 *Lolium (arundinaceum, pratense)* Ruderal Grassland

VEGETATION

Floristics: In addition to *Dactylis glomerata* and *Phleum pratense*, these grassy fields are characterized by graminoids including *Agrostis stolonifera, Agrostis hyemalis, Elymus repens, Bromus inermis, Bromus tectorum, Lolium perenne, Poa pratensis, Poa compressa, Schizachyrium scoparium* (not in abundance), and *Anthoxanthum odoratum*. Forbs scattered among the grasses are varied but include *Hieracium* spp., *Oxalis stricta, Achillea millefolium, Asclepias syriaca, Solidago rugosa, Solidago nemoralis, Solidago juncea, Solidago canadensis, Solidago altissima, Euthamia graminifolia, Cerastium arvense, Oenothera biennis, Potentilla simplex, Symphyotrichum lateriflorum (= Aster lateriflorus), Symphyotrichum novae-angliae (= Aster novae-angliae), Symphyotrichum lanceolatum (= Aster simplex), Daucus carota, Ambrosia artemisiifolia, Vicia cracca, Trifolium* spp., and many others.

ENVIRONMENT & DYNAMICS

Environmental Description: This association occurs on pastures and land that has been tilled. Generally the fields are mowed at least annually.

Dynamics: These pastures and post-agricultural fields are largely composed of non-native cool-season grasses and herbs (generally of European origin) in the early stages of succession. The fields are typically mowed at least annually.

DISTRIBUTION

Geographic Range: This vegetation is quite wide-ranging in northeastern and midwestern states and possibly occurs at higher elevations in the southeastern states.

Spatial Scale & Pattern [optional]:
Nations: CA?, US
States/Provinces: CT, DE, KY, MA, MD, ME, NB?, NH, NJ, NS?, NY, PA, QC?, RI, TN, VA, VT, WV?
TNC Ecoregions [optional]: 48:C, 49:C, 50:P, 52:C, 58:C, 59:C, 60:C, 61:C, 62:C
USFS Ecoregions (1994/95): 212D:CC, 212Fc:CCC, 221Aa:CCP, 221Ab:CCC, 221Ae:CCC, 221Ai:CCC, 221Bc:CCC, 221Bd:CCC, 221Da:CCC, 221Ea:CCC, 221Fa:CCC, 222Ib:CCC, 222Ic:CCC, 231Ae:CCC, 231Ak:CCC, 231An:CCC, 232Ab:CCC, 232Ac:CCC, 232Br:CCC, M212A:CP, M212Ba:CCC, M212Bb:CCC, M221Ac:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Allegheny Portage Railroad, Appalachian Trail [Central Appalachians], Appalachian Trail [Lower New England], Appalachian Trail [Northern Appalachians], Appomattox Court House, Booker T. Washington, Boston Harbor Islands, Cape Cod, Colonial, Delaware Water Gap, Fire Island, Fort Necessity, Fredericksburg-Spotsylvania, Friendship Hill, Gateway, George Washington Birthplace, Gettysburg, Johnstown Flood, Marsh-Billings-Rockefeller, Minute Man, Morristown, Petersburg, Richmond, Saint-Gaudens, Saratoga, Upper Delaware, Valley Forge, Weir Farm); USFWS (Aroostook, Assabet River, Cape May, Carlton Pond, E.B. Forsythe, Erie, Great Meadows, Iroquois, Montezuma, Moosehorn, Nulhegan Basin, Oxbow, Parker River, Rachel Carson, Supawna Meadows)

CONSERVATION STATUS

Grank (Review Date): GNA (ruderal) (2005/12/8)
Greasons: This vegetation type includes pasture and post-agricultural fields and is largely composed of non-native grasses and herbs (generally of European origin).
Ranking Author (Version): M. Pyne (2002/1/28)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate. There are a lot of plot data and descriptive data, but this is a very broadly defined type.

SYNONYMY

Synonymy:
- **<** Cultural Grassland (Swain and Kearsley 2000)
- **=** Mowing Fields (Conard 1935)

AUTHORSHIP

Primary Concept Source: Eastern Ecology Group
Author of Description: S.C. Gawler
Acknowledgments:
Version Date: 2013/05/01

REFERENCES

References: Clark 1986a, Conard 1935, Coxe 2009, Dowhan and Rozsa 1989, Edinger et al. 2002, Edinger et al. 2007, Edinger et al. 2008a, Ehrenfeld 1977, Elliman 2003, Gawler and Bowman 2012, Gawler et al. 2005, Keever 1979, Klopfer et al. 2002, Largay and

Sneddon 2010, Metzler et al. 2009, NRCS 2004a, NatureServe 2009, Patterson 2008a, Patterson 2008b, Patterson 2008c, Patterson 2008d, Patterson 2008e, Patterson 2008f, Perles et al. 2006a, Perles et al. 2006b, Perles et al. 2006c, Perles et al. 2006d, Perles et al. 2006e, Perles et al. 2007, Perles et al. 2008, Podniesinski et al. 2005b, Sneddon et al. 1995, Sneddon et al. 2008, Sneddon et al. 2010, Swain and Kearsley 2000, Swain and Kearsley 2001, TDNH unpubl. data, Taverna and Patterson 2008, Walz et al. 2008.

NYC NAC Association Description based on 8 plots (CEGL006107):

Overstory trees are very sparse and include northern red oak (Quercus rubra), American basswood (Tilia americana), sweetgum (Liquidambar styraciflua), white mulberry (Morus alba), slippery elm (Ulmus rubra), bitternut hickory (Carya cordiformis), and blackhaw (Viburnum prunifolium).

Midstory plants usually have less than 50% cover and include privet (Ligustrum sp.), blackhaw (Viburnum prunifolium), sweetgum (Liquidambar styraciflua), gray birch (Betula populifolia), black locust (Robinia pseudoacacia), eastern cottonwood (Populus deltoides), and Norway maple (Acer platanoides).

Vines include eastern poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), Oriental bittersweet (Celastrus orbiculatus), climbing nightshade (Solanum dulcamara), Japanese honeysuckle (Lonicera japonica), climbing hempvine (Mikania scandens), roundleaf greenbrier (Smilax rotundifolia), Amur peppervine (Ampelopsis brevipedunculata), black bindweed (Polygonum convolvulus), tall morning-glory (Ipomoea purpurea), and fox grape (Vitis labrusca).

Understory plants include various grasses, common wormwood (Artemisia vulgaris), woodsorrel (Oxalis sp.), red clover (Trifolium pratense), goldenrod (Solidago sp.), Japanese knotweed (Polygonum cuspidatum), spotted ladysthumb (Polygonum persicaria), common plantain (Plantago major), narrowleaf plantain (Plantago lanceolata), bird's-foot trefoil (Lotus corniculatus), alfalfa (Medicago sp.), aster (Symphyotrichum sp.), amberique-bean (Strophostyles helvola), annual ragweed (Ambrosia artemisiifolia), Canadian horseweed (Conyza canadensis), milkweed (Asclepias sp.), white heath aster (Symphyotrichum ericoides), Jack in the pulpit (Arisaema triphyllum), Oriental lady's thumb (Polygonum cespitosum), common blue violet (Viola sororia), lespedeza (Lespedeza sp), broadleaf enchanter's nightshade (Circaea lutetiana), slender goldentop (Euthamia caroliniana), white clover (Trifolium repens), eastern redcedar (Juniperus virginiana), partridge pea (Chamaecrista fasciculata), northern dewberry (Rubus flagellaris), white snakeroot (Ageratina altissima), white wood aster (Eurybia divaricata), bitter dock (Rumex obtusifolius), seaside sandmat (Chamaesyce polygonifolia), common evening primrose (Oenothera biennis), multiflora rose (Rosa multiflora), black nightshade (Solanum nigrum), hyssopleaf thoroughwort (Eupatorium hyssopifolium), rush (Juncus sp.), blackeyed Susan (Rudbeckia hirta), bull thistle (Cirsium vulgare), purple loosestrife (Lythrum salicaria), wine raspberry (Rubus phoenicolasius), Pennsylvania pellitory (Parietaria pensylvanica), spear saltbush (Atriplex patula), sweetclover (Melilotus officinalis), common reed (Phragmites australis), sumac (Rhus sp.), lateflowering thoroughwort (Eupatorium serotinum), common threeseed mercury (Acalypha rhomboidea), white mulberry (Morus alba), rabbitfoot clover (Trifolium arvense), garlic mustard (Alliaria petiolata), violet (Viola sp.), threadstalk speedwell (Veronica filiformis), jumpseed (Polygonum virginianum), cinquefoil (Potentilla sp.), northern bayberry (Morella pensylvanica), shaggy soldier (Galinsoga quadriradiata),and Indian strawberry (Duchesnea indica).

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2. Shrub & Herb Vegetation
2.B.2.Nc. Eastern North American Grassland & Shrubland
2.B.2.Nc.90.a. G059 Eastern North American Ruderal Meadow & Shrubland

A3935. *Rhamnus cathartica - Rosa multiflora - Elaeagnus umbellata* Ruderal Mesic Shrubland Alliance

Type Concept Sentence: This alliance is common in former agricultural areas in the northeastern and midwestern U.S. and temperate regions of eastern Canada. It comprises shrubby old fields dominated by exotic shrubs, such as *Elaeagnus angustifolia, Lonicera japonica, Lonicera morrowii, Ligustrum vulgare, Rhamnus cathartica*, and *Rosa multiflora*, sometimes mixed with "weedy native" shrubs such as *Cornus racemosa, Rhus glabra*, and *Rhus typhina*.

OVERVIEW

Scientific Name: *Rhamnus cathartica - Rosa multiflora - Elaeagnus umbellata* Ruderal Mesic Shrubland Alliance
Common Name (Translated Scientific Name): Common Buckthorn - Multiflora Rose - Autumn-olive Ruderal Mesic Shrubland Alliance
Colloquial Name: Northern & Central Ruderal Mesic Old-field Shrubland

Type Concept: This alliance is common in former agricultural areas in the northeastern and midwestern United States and temperate regions of eastern Canada. It comprises primarily shrubby old fields dominated by exotic shrubs, such as *Berberis thunbergii, Elaeagnus angustifolia, Euonymus alatus, Lonicera japonica, Lonicera morrowii, Ligustrum vulgare, Rhamnus cathartica*, and *Rosa multiflora*, as well as weedy natives, such as *Cornus racemosa, Rhus glabra, Rhus typhina*, and *Viburnum prunifolium* Less commonly, *Gaylussacia baccata, Vaccinium pallidum, Vaccinium stamineum*, and/or *Vaccinium angustifolium* may be dominant.

Sapling or small trees are often present but form <10% cover; they include exotic trees such as *Robinia pseudoacacia*, and many weedy natives, such as *Acer rubrum, Betula populifolia, Cornus florida, Fraxinus americana, Juglans nigra, Juniperus virginiana, Populus deltoides, Prunus serotina*, and *Prunus virginiana*. The herbaceous layer is variable depending on the density of shrub cover. Common species include exotics such as *Achillea millefolium, Agrostis gigantea, Alliaria petiolata, Anthoxanthum odoratum, Bromus inermis, Centaurea* spp., *Daucus carota, Galium mollugo, Lolium arundinaceum (= Schedonorus arundinaceum), Trifolium repens*, as well as weedy natives such as *Euthamia graminifolia, Festuca rubra, Monarda fistulosa, Oxalis stricta, Poa pratensis, Solidago rugosa, Solidago gigantea*, and *Solidago nemoralis*, among many others. Vines can be absent or dominant, sometimes covering the tall and short shrubs. Common vines are exotic *Celastrus orbiculata* and *Lonicera japonica*, and weedy natives such as *Parthenocissus quinquefolia, Toxicodendron radicans, Vitis aestivalis*, and *Vitis labrusca*.

Classification Comments: This is a broadly defined type intended for exotic shrubby vegetation on abandoned cropland or pasture. Other associations related to this alliance include Successional Heath Shrubland, *Gaylussacia baccata - Vaccinium pallidum - Vaccinium corymbosum* Shrubland (CEGL006622), but that is placed in *Vaccinium angustifolium - Vaccinium pallidum* Sandy Heath Alliance (A3913) in North-Central Appalachian Acidic Scrub & Grassland Group (G789), which can also contain a variety of exotics.

Similar NVC Types:

Diagnostic Characteristics: This alliance is common in former agricultural areas in the northeastern and midwestern U.S. and temperate regions of eastern Canada. It is dominated by exotic shrubs such as *Berberis thunbergii, Elaeagnus angustifolia, Euonymus alatus, Lonicera japonica, Lonicera morrowii, Ligustrum vulgare, Rhamnus cathartica*, and *Rosa multiflora*, sometimes mixed with "weedy native" shrubs such as *Cornus racemosa, Rhus glabra*, and *Rhus typhina*. Together these shrubs have at least 25% absolute cover and >80% relative cover among all shrub species.

VEGETATION

Physiognomy and Structure: The vegetation of this alliance consists of thickets or patches of shrubs 1-3 m tall, often with a more-or-less continuous herb layer and scattered trees.

Floristics: Stands are primarily dominated by exotic shrubs such as *Berberis thunbergii, Elaeagnus angustifolia, Euonymus alatus, Lonicera japonica, Lonicera morrowii, Ligustrum vulgare, Rhamnus cathartica*, and *Rosa multiflora*, as well as weedy natives such as *Cornus racemosa, Rhus glabra, Rhus typhina*, and *Viburnum prunifolium*. Less commonly, *Gaylussacia baccata, Vaccinium pallidum, Vaccinium stamineum*, and/or *Vaccinium angustifolium* may be dominant. Sapling or small weedy native trees are often present but form <10% cover; they include exotic trees such as *Robinia pseudoacacia*, and many weedy natives such as *Acer rubrum, Betula populifolia, Cornus florida, Fraxinus americana, Juglans nigra, Juniperus virginiana, Prunus serotina*, and *Prunus virginiana*. The herbaceous layer is variable depending on the density of shrub cover. Common exotic species include *Achillea millefolium, Agrostis gigantea, Alliaria petiolata, Anthoxanthum odoratum, Bromus inermis, Centaurea* spp., *Daucus carota, Galium mollugo, Lolium arundinaceum (= Schedonorus arundinaceum), Trifolium repens*, as well as weedy natives such as *Euthamia graminifolia, Festuca rubra, Monarda fistulosa, Oxalis stricta, Poa pratensis, Solidago rugosa, Solidago gigantea*, and *Solidago nemoralis*, among many others. Vines can be absent or dominant, sometimes covering the tall and short shrubs. Common vines are exotic *Celastrus orbiculata* and *Lonicera japonica*, and weedy natives such as *Parthenocissus quinquefolia, Toxicodendron radicans, Vitis aestivalis*, and *Vitis labrusca*.

ENVIRONMENT & DYNAMICS

Environmental Description: Stands are typically found on abandoned agricultural sites or other sites disturbed by human activity, such as roadsides and abandoned quarries.

Dynamics:

DISTRIBUTION

Geographic Range: This alliance is typically found in the northeastern and midwestern U.S. and temperate regions of eastern Canada.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: CT, DE, IA, IL, IN, MA, MD, ME, MI, MN, MO, NH, NJ, NY, OH, PA, RI, VA, VT, WI, WV
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

LOWER LEVEL UNITS

Associations:

- CEGL005460 *Lonicera (x bella, morrowii, tatarica) - Rhus glabra - Zanthoxylum americanum* Ruderal Shrubland
- CEGL006451 *Elaeagnus umbellata - Cornus racemosa - Rosa multiflora - Juniperus virginiana* Ruderal Shrubland
- CEGL005461 *Rhamnus cathartica* Ruderal Shrubland
- CEGL005207 *Elaeagnus umbellata - Crataegus* spp. - *Rosa multiflora* Ruderal Shrubland

AUTHORSHIP

Primary Concept Source: D. Faber-Langendoen
Author of Description: D. Faber-Langendoen
Acknowledgments:
Version Date: 09/26/2014
Classif Resp Region: East

REFERENCES

References: Faber-Langendoen et al. 2016b

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2. Shrub & Herb Vegetation
2.B.2.Nc. Eastern North American Grassland & Shrubland
A3935. *Rhamnus cathartica - Rosa multiflora - Elaeagnus umbellata* Ruderal Mesic Shrubland Alliance

CEGL006451. *Elaeagnus umbellata - Cornus racemosa - Rosa multiflora - Juniperus virginiana* Ruderal Shrubland

Type Concept Sentence:

OVERVIEW

Scientific Name: *Elaeagnus umbellata - Cornus racemosa - Rosa multiflora - Juniperus virginiana* Ruderal Shrubland
Common Name (Translated Scientific Name): Autumn-olive - Gray Dogwood - Multiflora Rose - Eastern Red-cedar Ruderal Shrubland
Colloquial Name: Northeastern Ruderal Shrubland

Type Concept: This association comprises shrubby old fields dominated by thickets of *Elaeagnus angustifolia, Cornus racemosa, Viburnum prunifolium, Lonicera japonica, Lonicera morrowii, Ligustrum vulgare, Euonymus alatus, Rosa multiflora, Rhus glabra*, and *Rhus typhina*, with patches of herbaceous vegetation among the shrubs. Shorter shrubs include *Berberis thunbergii* and *Rubus* spp., and in some fields *Gaylussacia baccata, Vaccinium pallidum, Vaccinium stamineum*, and/or *Vaccinium angustifolium*. Small trees are often present but form <25% cover; they include *Juniperus virginiana, Betula populifolia, Prunus virginiana, Cornus florida, Acer rubrum, Juglans nigra, Prunus serotina, Robinia pseudoacacia*, and *Fraxinus americana*. The herbaceous layer is variable depending on the density of shrub cover. Typical species are those associated with old fields, grasslands, and agricultural sites. Common species include *Solidago rugosa, Solidago gigantea, Solidago nemoralis, Monarda fistulosa, Anthoxanthum odoratum, Poa pratensis, Oxalis stricta, Viola sororia, Euthamia graminifolia, Festuca rubra, Schizachyrium scoparium, Pycnanthemum virginianum, Alliaria petiolata, Galium mollugo, Potentilla simplex, Achillea millefolium, Daucus carota, Trifolium repens, Bromus inermis, Agrostis gigantea*, and *Elymus repens (= Elytrigia repens)*, among many others. Vines can be absent or dominant, sometimes covering the tall and short shrubs. Common vines are *Vitis aestivalis, Vitis labrusca, Toxicodendron radicans, Celastrus orbiculata, Parthenocissus quinquefolia*, and *Lonicera japonica*.

Classification Comments: This is a broadly defined type intended for shrubby vegetation on abandoned cropland or pasture.

Similar NVC Types:

- CEGL006622 *Gaylussacia baccata - Vaccinium pallidum - Vaccinium corymbosum* Shrubland
- CEGL006576 *Cornus (amomum, sericea) - Viburnum dentatum - Rosa multiflora* Ruderal Shrub Swamp

VEGETATION

Floristics: The structure of this association varies from open fields with scattered tall and short shrubs covering 25% of the field, with herbaceous vegetation in the interstices, to dense "closed-canopy" tall shrublands with sparse ground layer vegetation. Common shrubs include *Elaeagnus angustifolia, Cornus racemosa, Viburnum prunifolium, Lonicera japonica, Lonicera morrowii, Ligustrum*

vulgare, Euonymus alatus, Rosa multiflora, Rhus glabra, and *Rhus typhina*, with patches of herbaceous vegetation among the shrubs. Shorter shrubs include *Berberis thunbergii* and *Rubus* spp., and in some fields *Gaylussacia baccata, Vaccinium pallidum, Vaccinium stamineum*, and/or *Vaccinium angustifolium*. Small trees are often present but form <25% cover; they include *Juniperus virginiana, Betula populifolia, Prunus virginiana, Cornus florida, Acer rubrum, Juglans nigra, Prunus serotina, Robinia pseudoacacia*, and *Fraxinus americana*. The herbaceous layer is variable depending on the density of shrub cover. Typical species are those associated with old fields, grasslands, and agricultural sites. Common species include *Solidago rugosa, Solidago gigantea, Solidago nemoralis, Monarda fistulosa, Anthoxanthum odoratum, Poa pratensis, Oxalis stricta, Viola sororia, Euthamia graminifolia, Festuca rubra, Schizachyrium scoparium, Pycnanthemum virginianum, Alliaria petiolata, Galium mollugo, Potentilla simplex, Achillea millefolium, Daucus carota, Trifolium repens, Bromus inermis, Agrostis gigantea*, and *Elymus repens (= Elytrigia repens)*, among many others. Vines can be absent or dominant, sometimes covering the tall and short shrubs. Common vines are *Vitis aestivalis, Vitis labrusca, Toxicodendron radicans, Celastrus orbiculata, Parthenocissus quinquefolia*, and *Lonicera japonica*.

ENVIRONMENT & DYNAMICS

Environmental Description: This association occurs on former agricultural lands and old fields that are no longer intensively mowed, plowed or managed. These sites contain moderately well-drained to well-drained soils. The shrublands are flat to gently sloping, often bounded by stonewalls or fencerows.

Dynamics: This association develops as woody species colonize open fields, typically from the outer edges of the field into the center or as scattered clumps throughout the field.

DISTRIBUTION

Geographic Range: This community is common in former agricultural areas in the northeastern U.S.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: CT, DE, MA, NJ, NY, PA, VA, WV
TNC Ecoregions [optional]: 48:C, 59:C, 60:C, 61:C, 62:C
USFS Ecoregions (1994/95): 212Fc:CCC, 221Ae:CCC, 221Bc:CCC, 221Bd:CCC, 221Db:CCC, 222Ib:CCC, 222Ic:CCC, 232Ab:CCC, 232Ac:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Appalachian Trail [Central Appalachians], Appalachian Trail [Lower New England], Appalachian Trail [Northern Appalachians], Boston Harbor Islands, Delaware Water Gap, Gateway, Saratoga, Upper Delaware, Valley Forge); USFWS (Cape May, E.B. Forsythe, Iroquois, Montezuma, Prime Hook, Supawna Meadows)

CONSERVATION STATUS

Grank (Review Date): GNA (ruderal) (2006/6/23)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

Synonymy:
- **<** Old Fields (Newbold et al. 1988)

AUTHORSHIP

Primary Concept Source: J. Lundgren and G. Podniesinski
Author of Description: S.C. Gawler
Acknowledgments:
Version Date: 2006/06/23

REFERENCES

References: Edinger et al. 2002, Edinger et al. 2007, Edinger et al. 2008a, Largay and Sneddon 2010, NRCS 2001b, NRCS 2004a, NatureServe 2009, Newbold et al. 1988, Overlease 1987, Perles et al. 2007, Perles et al. 2008, Podniesinski et al. 2005b, Walz et al. 2008.

NYC NAC Association Description based on 11 plots (CEGL006451):

Overstory trees typicall have <50% cover and may include white mulberry (Morus alba), gray birch (Betula populifolia), northern red oak (Quercus rubra), London planetree (Platanus ×hispanica), pin oak (Quercus palustris), red maple (Acer rubrum), common hackberry (Celtis occidentalis), black locust (Robinia pseudoacacia), eastern cottonwood (Populus deltoides), slippery elm (Ulmus

rubra), sassafras (Sassafras albidum), black walnut (Juglans nigra), Norway maple (Acer platanoides), hawthorn (Crataegus sp.), and staghorn sumac (Rhus typhina).

Shrubs and small trees are dominant in the midstory plants and include staghorn sumac (Rhus typhina), northern spicebush (Lindera benzoin), gray dogwood (Cornus racemosa), southern arrowwood (Viburnum dentatum), white mulberry (Morus alba), honeysuckle (Lonicera sp.), black cherry (Prunus serotina), sassafras (Sassafras albidum), tree of heaven (Ailanthus altissima), black locust (Robinia pseudoacacia), multiflora rose (Rosa multiflora), eastern cottonwood (Populus deltoides), and white ash (Fraxinus americana).

Vines include Amur peppervine (Ampelopsis brevipedunculata), Oriental bittersweet (Celastrus orbiculatus), Japanese honeysuckle (Lonicera japonica), eastern poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), roundleaf greenbrier (Smilax rotundifolia), and Asiatic tearthumb (Polygonum perfoliatum).

Understory plants include multiflora rose (Rosa multiflora), garlic mustard (Alliaria petiolata), common reed (Phragmites australis), common wormwood (Artemisia vulgaris), Japanese knotweed (Polygonum cuspidatum), American pokeweed (Phytolacca americana), wine raspberry (Rubus phoenicolasius), broadleaf enchanter's nightshade (Circaea lutetiana), jewelweed (Impatiens capensis), annual ragweed (Ambrosia artemisiifolia), gray dogwood (Cornus racemosa), eastern baccharis (Baccharis halimifolia), winged sumac (Rhus copallinum), goldenrod (Solidago sp.), switchgrass (Panicum virgatum), Allegheny blackberry (Rubus allegheniensis), honeysuckle (Lonicera sp.), lateflowering thoroughwort (Eupatorium serotinum), black locust (Robinia pseudoacacia), glossy buckthorn (Frangula alnus), hairy white oldfield aster (Symphyotrichum pilosum), touch-me-not (Impatiens), hairy crabgrass (Digitaria sanguinalis), white snakeroot (Ageratina altissima), southern arrowwood (Viburnum dentatum), New York ironweed (Vernonia noveboracensis), arrowleaf plantain (Plantago lanceolata), rabbit-tobacco (Pseudognaphalium obtusifolium), white wood aster (Eurybia divaricata), common yarrow (Achillea millefolium), purple loosestrife (Lythrum salicaria), garden yellowrocket (Barbarea vulgaris), blackberry (Rubus sp.), Japanese angelica tree (Aralia elata), red maple (Acer rubrum), common mullein (Verbascum thapsus), early goldenrod (Solidago juncea), interrupted fern (Osmunda claytoniana), Queen Anne's lace (Daucus carota), partridge pea (Chamaecrista fasciculata), flowering dogwood (Cornus florida), white avens (Geum canadense), and common selfheal (Prunella vulgaris).

2.B.4. Temperate to Polar Scrub & Herb Coastal Vegetation

Temperate to Polar Scrub & Herb Coastal Vegetation is found in temperate to polar coastal habitats, including beaches, bluffs and dunes, where wind and water are major drivers of the vegetation, across the mid to polar latitudes from 23° to 60-70°N and S latitude, dominated by prostrate perennials on the beach and foredune, and graminoids and scrub on backdunes and bluffs.

2.B.4.Na. Eastern North American Coastal Scrub & Herb Vegetation

This division is comprised of shrub and herbaceous upland vegetation growing on rapidly drained sandy and, occasionally, rocky substrates along the immediate coasts of the Great Lakes, the Gulf of Saint Lawrence, the Atlantic Ocean, the Gulf of Mexico, Lake Champlain, and possibly other large lakes in eastern North America, and that is subjected to maritime processes of wave disturbance, constant wind, freezing spray, and/or salt spray.

M060. Eastern North American Coastal Beach & Rocky Shore

This macrogroup encompasses sparse annual vegetation occurring on the irregularly flooded tidal zone of coastal beaches of the Atlantic and Gulf of Mexico coasts of North America.

G660. North Atlantic Coastal Beach

This group covers non-forested, sparsely to moderately vegetated boulder, cobble, and gravel shores characterized by *Cakile edentula*, above the normal high-tide line along the immediate Atlantic Coast, from northern North Carolina to the Canadian Maritimes.

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2. Shrub & Herb Vegetation
2.B.4.Na. Eastern North American Coastal Scrub & Herb Vegetation
2.B.4.Na.1.b. G660 North Atlantic Coastal Beach

A3639. *Cakile edentula ssp. edentula* Atlantic Beach Alliance

Type Concept Sentence: This alliance includes annual-dominated sandy, gravel, or cobble beach of upper ocean beaches of the northeastern U.S. and Canadian Maritime Provinces, within the reach of storm tides and extreme lunar tides. Vegetative cover is variable, depending on the amount of exposure to wave and wind action, but on average is sparse; no species can be considered dominant. Annual or biennial species more-or-less restricted to beach habitats are characteristic of this alliance, including *Cakile edentula ssp. edentula*.

OVERVIEW

Scientific Name: *Cakile edentula ssp. edentula* Atlantic Beach Alliance
Common Name (Translated Scientific Name): American Searocket Atlantic Beach Alliance
Colloquial Name: Atlantic Upper Beach

Type Concept: This alliance includes annual-dominated sandy, gravel, or cobble beach of upper ocean beaches of the northeastern U.S. and Canadian Maritime Provinces, within the reach of storm tides and extreme lunar tides. Vegetative cover is variable, depending on the amount of exposure to wave and wind action, but on average is sparse; no species can be considered dominant. Annual or biennial species more-or-less restricted to beach habitats are characteristic of this alliance, including *Ammophila breviligulata, Cakile edentula ssp. edentula*, as well as *Salsola kali ssp. kali (= Salsola caroliniana), Chamaesyce polygonifolia, Honckenya peploides, Cenchrus tribuloides, Amaranthus retroflexus, Chenopodium album, Erechtites hieraciifolia, Atriplex cristata (= Atriplex arenaria)*, and *Triplasis purpurea*. In Maine and the Maritime Provinces, *Suaeda maritima, Mertensia maritima, Glaux maritima, Honckenya peploides, Carex silicea*, and *Elymus repens (= Elytrigia repens)* may be more typical associates.

Classification Comments: This alliance had been split between North Atlantic Coastal Beach Group (G660) and former North American Atlantic Rocky Strand Group (G564), but that resulted in single association groups with similar floristics and environmental processes. G654 has been archived. Consider removing North Carolina from the range.

Similar NVC Types:
- A4008 *Cakile edentula* Great Lakes Beach Alliance

Diagnostic Characteristics: Any combination of *Cakile edentula, Salsola kali, Chamaesyce polygonifolia, Glaux maritima*, and *Honckenya peploides* occurring on upper beaches from northern North Carolina to Maine and the Canadian Maritime Provinces.

VEGETATION

Physiognomy and Structure: Vegetative cover is variable, depending on the amount of exposure to wave and wind action, but on average is sparse; no species can be considered dominant.

Floristics: Annual or biennial species more-or-less restricted to upper beach habitats are characteristic of this alliance, including *Cakile edentula ssp. edentula*, as well as *Salsola kali ssp. kali (= Salsola caroliniana), Chamaesyce polygonifolia, Honckenya peploides, Cenchrus tribuloides, Amaranthus retroflexus, Chenopodium album, Erechtites hieraciifolia, Sesuvium portulacastrum, Triplasis purpurea*, and *Atriplex cristata (= Atriplex arenaria)*. *Amaranthus pumilus*, a globally rare species, is restricted to this habitat.

ENVIRONMENT & DYNAMICS

Environmental Description: Annual-dominated sand flats on island end flats and upper ocean beaches, within the reach of storm tides and extreme lunar tides. This vegetation can occur at the base of dunes, and usually has substantial algal wrack.

Dynamics: This vegetation is extremely dynamic, inhabiting the upper reach of Atlantic coastal beaches where storm tides and neap tides deposit wrack. It is removed by extreme wave action, and can establish in newly deposited sandy beaches following storms.

DISTRIBUTION

Geographic Range: This alliance occurs from northern North Carolina along the immediate coastline to and including the Maritime Provinces of Canada.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: CT, DE, LB?, MA, MD, ME, NB?, NC, NF?, NH, NJ, NS?, NY, PE?, QC?, RI, VA
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

- **=** *Cakile edentula-Chenopodium album* community (Metzler and Barrett 2006)
- **=** *Cakiletum edentula* (Conard 1935)
- **?** Beach community (Hill 1986)
- **?** Beach community (Johnson 1985b)
- **=** Beach strand community (MNAP 1991)
- **?** Marine intertidal gravel/sand beach community (Breden 1989)
- **=** Maritime Beach Strand Community (Swain and Kearsley 2011)
- **><** Upper Beach (Schafale and Weakley 1990)
- **?** beach (McDonnell 1979)
- **?** beach (Higgins et al. 1971)
- **?** beach community (Baumann 1978b)
- **?** beach vegetation (Moul 1973)
- **?** dune-strand area (Clovis 1968)
- **?** embryo dune (Klotz 1986)
- **?** marine sandy beach (Clancy 1993b)
- **?** maritime beach (Reschke 1990)
- **?** middle beach (Shreve et al. 1910)
- **?** pioneer beach community (Boule 1979)
- **=** sea-strand vegetation, beach formation (Harshberger 1900)

LOWER LEVEL UNITS

Associations:

- CEGL004400 *Cakile edentula ssp. edentula - Chamaesyce polygonifolia* Sparse Beach Vegetation
- CEGL006106 *Cakile edentula ssp. edentula - Mertensia maritima* Sparse Beach Vegetation

AUTHORSHIP

Primary Concept Source: H.S. Conard (1935)
Author of Description: L. Sneddon
Acknowledgments:
Version Date: 12/18/2014
Classif Resp Region: East

REFERENCES

References: Baumann 1978b, Boule 1979, Breden 1989, Clancy 1993b, Clovis 1968, Conard 1935, Faber-Langendoen et al. 2016b, Fender 1937, Harshberger 1900, Higgins et al. 1971, Hill 1986, Johnson 1985b, Klotz 1986, MNAP 1991, McDonnell 1979, Metzler and Barrett 2006, Moul 1973, Nichols 1920, Reschke 1990, Schafale and Weakley 1990, Shreve et al. 1910, Swain and Kearsley 2011

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2. Shrub & Herb Vegetation
2.B.4.Na. Eastern North American Coastal Scrub & Herb Vegetation
A3639. *Cakile edentula ssp. edentula* Atlantic Beach Alliance

CEGL004400. *Cakile edentula ssp. edentula - Chamaesyce polygonifolia* Sparse Beach Vegetation

Type Concept Sentence:

OVERVIEW

Scientific Name: *Cakile edentula ssp. edentula - Chamaesyce polygonifolia* Sparse Beach Vegetation
Common Name (Translated Scientific Name): American Searocket - Seaside Sandmat Sparse Beach Vegetation
Colloquial Name: North Atlantic Upper Ocean Beach

Type Concept: This is a sparsely vegetated upper beach community occurring on unstable sands and often gravels and cobbles just above mean high tide on maritime beaches and foredunes along the middle and northern Atlantic Coast. It also occurs on small bay islands and bay sides of barrier beaches. This association occurs at the wrack line where there is regular deposition of wave-deposited flotsam. The setting of this association is often dry sand, but is irregularly flooded by spring or storm tides. Vegetation cover is variable, depending on the amount of exposure to wave and wind action, but is generally sparse and characterized by annuals and biennials. Species composition can change dramatically from year to year but frequently includes *Cakile edentula ssp. edentula*, as well as *Salsola kali ssp. kali (= Salsola caroliniana), Chamaesyce polygonifolia, Honckenya peploides, Cenchrus tribuloides, Amaranthus retroflexus, Chenopodium album, Erechtites hieraciifolia, Xanthium strumarium*, and *Atriplex cristata (=*

Atriplex arenaria). *Panicum amarum var. amarum* is a frequent component south of the Delaware Bay. Globally rare species such as *Polygonum glaucum* and *Amaranthus pumilus* occur in this habitat. Sparse *Ammophila breviligulata* can occur sporadically as a common associate, colonizing from the adjacent beachgrass community. Diagnostic species are *Cakile edentula ssp. edentula, Salsola kali ssp. kali, Atriplex cristata (= Atriplex pentandra)*, and *Chamaesyce polygonifolia*. This community occurs in maritime coastal areas from southern Maine to Cape Hatteras, North Carolina.

Classification Comments: This community is common on maritime dunes of the Northeast but is vulnerable to development and shifting wave action due to jetties. J. Harrison (pers. comm. 2006): "In the Chesapeake Marshlands, in Maryland, a small patch of this vegetation was observed on South Marsh Island [see Observation Point CM-15]. Please note many of the associated "maritime" species are not present in the refuge. Although not as well-developed in estuarine environments, consider expanding concept to include narrow sandy shorelines on bay islands."

Similar NVC Types:
- CEGL004401 *Cakile edentula ssp. harperi* Sparse Beach Vegetation
- CEGL006106 *Cakile edentula ssp. edentula - Mertensia maritima* Sparse Beach Vegetation
- CEGL005162 *Cakile edentula* Great Lakes Shore Sparse Vegetation

VEGETATION

Floristics: This is a sparsely vegetated association characterized by annuals and biennials. Species composition is variable, but frequently includes *Cakile edentula ssp. edentula, Honckenya peploides, Salsola kali (= Salsola caroliniana), Atriplex patula, Cenchrus tribuloides, Chamaesyce polygonifolia, Atriplex cristata (= Atriplex arenaria, = Atriplex pentandra), Xanthium strumarium*, and *Chenopodium* spp. *Panicum amarum var. amarum* is a frequent component south of the Delaware Bay. Globally rare species such as *Polygonum glaucum* and *Amaranthus pumilus* occur in this habitat. *Ammophila breviligulata* can occur sporadically, colonizing from the adjacent beachgrass community. Additional infrequent species can include *Chenopodium rubrum, Chenopodium album, Chenopodium berlandieri var. macrocalycium, Cyperus filicinus, Triplasis purpurea*, and *Sesuvium maritimum*. Bare substrate can comprise greater than 95% cover in this association.

ENVIRONMENT & DYNAMICS

Environmental Description: This association occurs on unstable sands and often gravels and cobbles just above mean high tide on beaches and foredunes washed over by spring and storm tides and impacted by wind erosion. It also occurs on small bay islands and bay sides of barrier beaches.

Dynamics: This association occurs at the wrack line; there is regular deposition of wave-deposited flotsam. It is irregularly flooded by very high tides, scoured by storm tides, and is constantly reworked by wind. Species composition is dominated by annuals and biennials and can change dramatically from year to year. If the habitat is protected from regular disturbance, perennial-dominated dune grass communities tend to develop.

DISTRIBUTION

Geographic Range: This association ranges from southern Maine to North Carolina.

Spatial Scale & Pattern [optional]: Linear
Nations: US
States/Provinces: CT, DE, MA, MD, ME, NC, NH, NJ, NY, RI, VA
TNC Ecoregions [optional]: 57:C, 58:C, 62:C
USFS Ecoregions (1994/95): 221Ab:CCC, 221Ac:CCC, 221Ak:CCC, 232Aa:CCC, 232Ab:CCC, 232Ac:CCC, 232Bz:CCC, 232Ch:CCC, 232Ci:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Assateague Island, Boston Harbor Islands, Cape Cod, Cape Hatteras, Fire Island, Gateway, Sagamore Hill); USFWS (Back Bay, Cape May, Chesapeake Marshlands, Chincoteague, E.B. Forsythe, Monomoy, Muskeget Island, Nomans Land Island, Parker River, Rachel Carson)

CONSERVATION STATUS

Grank (Review Date): G4G5 (1997/12/1)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: High.

SYNONYMY

Synonymy:

- = *Cakile edentula - Chenopodium album* community (Metzler and Barrett 2001)
- = *Cakile edentula - Chenopodium album* community (Metzler and Barrett 1992) [Connecticut.]
- = *Cakile edentula ssp. edentula - Chamaesyce polygonifolia* Sparse Vegetation (Harrison 2004)
- = *Cakile edentula ssp. edentula - Chamaesyce polygonifolia* Sparse Vegetation (Sneddon and Zaremba 2004)
- **?** *Cakile edentula ssp. edentula* Sparse Vegetation (Clancy 1996)
- = *Cakile edentula* ssp. *edentula - Salsola caroliniana* Sparse Vegetation (Bartgis 1986)
- = *Cakiletum edentula* (Conard 1935) [New York.]
- = Beach (Higgins et al. 1971) [Assateague Island.]
- = Beach (McDonnell 1979) [Massachusetts.]
- = Beach (Fender 1937) [New Jersey.]
- **<** Beach Strand (Gawler 2002)
- **?** Beach community (Johnson 1985b)
- = Beach community (Baumann 1978b) [Virginia.]
- = Beach community (Hill 1986) [Assateague Island.]
- = Beach strand community (MNAP 1991) [Maine.]
- = Beach vegetation (Moul 1973) [Massachusetts.]
- **<** Coastal Beach and Overwash Flat (Harrison 2004)
- = Coastal beach strand (Sperduto 1994) [New Hampshire.]
- **?** Coastal beach strand community (Rawinski 1984a)
- **<** Dune and swale community (Stalter 1990) [Virginia portion of Assateague.]
- = Dune community (Jenkins 1974) [Chesapeake Bay.]
- = Dune-strand area (Clovis 1968) [Virginia.]
- = Embryo dune (Klotz 1986)
- = Marine intertidal gravel/sand beach community (Breden 1989) [New Jersey.]
- = Marine sandy beach (Clancy 1993b) [Delaware.]
- = Maritime Beach (Enser 1999)
- = Maritime beach (Reschke 1990) [New York.]
- = Middle beach (Shreve et al. 1910) [Maryland.]
- = Middle beach (Nichols 1920) [Connecticut.]
- = Pioneer beach community (Boule 1979) [Virginia.]
- = Sea-strand vegetation, beach formation (Harshberger 1900) [New Jersey.]
- **<** Upper Beach (Schafale and Weakley 1990)
- **<** Upper Beach / Overwash Flat (Fleming et al. 2001)

AUTHORSHIP

Primary Concept Source: L.A. Sneddon 11-95, mod. Eastern Ecology Group 12-95, mod. S.L. Neid
Author of Description: S.L. Neid, mod. L.A. Sneddon
Acknowledgments:
Version Date: 2013/09/06

REFERENCES

References: Bartgis 1986, Baumann 1978b, Berdine 1998, Boule 1979, Bowman 2000, Breden 1989, Breden et al. 2001, Clancy 1993b, Clancy 1996, Clovis 1968, Conard 1935, Coxe 2009, Dowhan and Rozsa 1989, Edinger et al. 2002, Edinger et al. 2008a, Edinger et al. 2008b, Enser 1999, Enser and Lundgren 2006, Fender 1937, Fleming and Patterson 2011a, Fleming et al. 2001, Gawler 2001, Gawler 2002, Gawler and Cutko 2010, Godfrey et al. 1978, Harrison 2004, Harrison 2011, Harrison, J. pers. comm., Harshberger 1900, Higgins et al. 1971, Hill 1986, Jenkins 1974, Johnson 1985b, Klopfer et al. 2002, Klotz 1986, Largay and Sneddon 2010, MNAP 1991, McDonnell 1979, Metzler and Barrett 1992, Metzler and Barrett 2001, Metzler and Barrett 2006, Moul 1973, NatureServe 2009, Nichols 1920, Rawinski 1984a, Reschke 1990, Schafale 2012, Schafale and Weakley 1990, Shreve et al. 1910, Sneddon and Zaremba 2004, Sneddon et al. 2010, Sperduto 1994, Sperduto 2000a, Sperduto 2000b, Sperduto and Nichols 2004, Stalter 1990, Swain and Kearsley 2001, TNC 1995c.

NYC NAC Association Description based on 1 plot (CEGL004400):

The understory is very sparsely vegetated and includes seaside goldenrod (Solidago sempervirens), black cherry (Prunus serotina), early goldenrod (Solidago juncea), and winged sumac (Rhus copallinum).

M057. Eastern North American Coastal Dune & Grassland

This coastal grassland, shrubland and open vegetation type is found on well-drained to excessively drained sands on dunes and along shorelines around the Great Lakes and along the Atlantic and Gulf coasts, on rocky headlands in the North Atlantic, and sandplains near the New England coast.

G493. North Atlantic Coastal Dune & Grassland

This group encompasses northeastern maritime dune vegetation comprising grasses, low shrubs, dwarf-shrubs, and forbs ranging from sparse to patchy in cover. It occupies sandy coastlines and barrier islands, ranging from northernmost North Carolina northward to southern Maine where extensive sandy coastlines are replaced by rocky coasts.

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2. Shrub & Herb Vegetation
2.B.4.Na. Eastern North American Coastal Scrub & Herb Vegetation
2.B.4.Na.2.c. G493 North Atlantic Coastal Dune & Grassland

A0902. *Morella pensylvanica* Dune Shrubland Alliance

Type Concept Sentence: This alliance includes maritime shrublands and dune thickets of the Mid-Atlantic Coast dominated by *Morella pensylvanica*, with *Baccharis halimifolia* and *Rhus copallinum*, ranging from North Carolina to southern Maine.

OVERVIEW

Scientific Name: *Morella pensylvanica* Dune Shrubland Alliance
Common Name (Translated Scientific Name): Northern Bayberry Dune Shrubland Alliance
Colloquial Name: Northern Bayberry Dune Shrubland

Type Concept: This alliance includes maritime shrublands and dune thickets of the Mid-Atlantic Coast dominated by *Morella pensylvanica (= Myrica pensylvanica)*, with *Baccharis halimifolia, Rhus copallinum*, as well as vines such as *Smilax glauca, Smilax rotundifolia, Vitis rotundifolia, Parthenocissus quinquefolia*, or *Toxicodendron radicans*. *Prunus maritima* is characteristic of this community from Maryland to the north. The constant movement of sand in this community limits the herbaceous cover. Typical herbaceous species include *Ammophila breviligulata, Cenchrus tribuloides, Chamaesyce polygonifolia, Cyperus grayi, Dichanthelium acuminatum, Diodia teres, Hudsonia tomentosa, Lechea maritima, Oenothera humifusa, Panicum amarum var. amarulum, Parthenocissus quinquefolia, Rumex acetosella, Solidago sempervirens, Spartina patens (= var. monogyna)*, and *Triplasis purpurea*. This maritime shrubland usually occupies the intermediate areas between the very unstable oceanward portions of the dunes and the more protected backdunes, where it forms open shrubland with much bare sand to dense shrub thickets. The substrate is sand with no soil profile development, and with variable amounts of accumulated leaf litter. Where this community occupies the lee side of foredunes, greater exposure to winds and storms contributes to a shorter stature and more open aspect of the vegetation. Here there are large patches of open unvegetated or sparsely vegetated sand.

Classification Comments:

Similar NVC Types:

- A1062 *Hudsonia tomentosa* Dune Dwarf-shrubland Alliance: is often adjacent and shares some of the same species, but occurs in more protected interdunes.

Diagnostic Characteristics: Dominance by *Morella pensylvanica* occurring on foredunes and backdunes with variable amounts of exposed sand.

VEGETATION

Physiognomy and Structure: This alliance is generally patchy, with substantial areas of bare sand where it is on more exposed foredunes, but greater shrub cover in more sheltered locations. Deciduous shrubs are dominant, and vines may be prominent, sometimes with little to no other shrub cover. In some cases, the vines are low-growing and occur directly on the sand surface, but in others, the vegetation has a height of 1 m or more, with vines growing over older stems of the same species, or over other shrubs.

Floristics: This vegetation is dominated by *Morella pensylvanica (= Myrica pensylvanica)*, with *Baccharis halimifolia, Rhus copallinum*, as well as vines such as *Smilax glauca, Smilax rotundifolia, Vitis rotundifolia, Parthenocissus quinquefolia*, or *Toxicodendron radicans*. *Prunus maritima* is characteristic of this community from Maryland to the north. The constant movement of sand in this community limits the herbaceous cover. Typical herbaceous species include *Ammophila breviligulata, Cenchrus tribuloides, Chamaesyce polygonifolia, Cyperus grayi, Dichanthelium acuminatum, Diodia teres, Hudsonia tomentosa, Lechea maritima, Oenothera humifusa, Panicum amarum var. amarulum, Parthenocissus quinquefolia, Rumex acetosella, Solidago sempervirens, Spartina patens (= var. monogyna)*, and *Triplasis purpurea*.

ENVIRONMENT & DYNAMICS

Environmental Description: This maritime shrubland usually occupies the intermediate areas between the very unstable oceanward portions of the dunes and the more protected backdunes, where it forms partially open to dense shrub thickets. The substrate is sand with no soil profile development, and with variable amounts of accumulated leaf litter.

Dynamics: Where this community occupies the lee side of foredunes, greater exposure to winds and storms contributes to a shorter stature and more open aspect of the vegetation. Here there are large patches of open unvegetated or sparsely vegetated sand. Sand burial can kill shrubs, resulting in expansion of the vine component where partial stems can re-establish over the sand surface.

DISTRIBUTION

Geographic Range: This alliance ranges from northern North Carolina along the coast to southern Maine.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: CT, DE, MA, MD, ME, NC, NH, NJ, NY, RI, VA
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

- **=** *Prunus maritima-Myrica pensylvanica* coastal dune scrub (Clancy 1993b)
- **?** Greenbrier thicket (Martin 1959b)
- **?** Maritime Dune Community (Swain and Kearsley 2011)
- **><** Maritime Shrub (Schafale and Weakley 1990)
- **?** Maritime Shrubland Community (Swain and Kearsley 2011)
- **><** Shrub succession community (Hill 1986)
- **><** dunegrass-shrub transition zone (Higgins et al. 1971)
- **><** upland (dune) thicket (Klotz 1986)

LOWER LEVEL UNITS

Associations:

- CEGL003881 *Morella pensylvanica / Diodia teres* Shrubland
- CEGL006457 *Morella pensylvanica / Panicum virgatum* Shrubland
- CEGL003886 *Smilax glauca - Toxicodendron radicans* Vine-Shrubland
- CEGL006295 *Morella pensylvanica - Prunus maritima* Shrubland

AUTHORSHIP

Primary Concept Source: W.E. Martin (1959b)
Author of Description: L. Sneddon
Acknowledgments:
Version Date: 12/18/2014
Classif Resp Region: East

REFERENCES

References: Clancy 1993b, Faber-Langendoen et al. 2016b, Higgins et al. 1971, Hill 1986, Klotz 1986, Martin 1959b, Schafale and Weakley 1990, Sneddon et al. 1996, Swain and Kearsley 2011

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2. Shrub & Herb Vegetation
2.B.4.Na. Eastern North American Coastal Scrub & Herb Vegetation
A0902. *Morella pensylvanica* Dune Shrubland Alliance

CEGL006295. *Morella pensylvanica - Prunus maritima* Shrubland

Type Concept Sentence:

OVERVIEW

Scientific Name: *Morella pensylvanica - Prunus maritima* Shrubland
Common Name (Translated Scientific Name): Northern Bayberry - Beach Plum Shrubland
Colloquial Name: Northern Bayberry Dune Shrubland

Type Concept: This association comprises maritime dune shrublands of protected slopes and hollows of dry, stabilized maritime backdunes along the northern Atlantic Coast. It is dominated by *Morella pensylvanica (= Myrica pensylvanica)* and *Prunus maritima*. Additional shrubs that are commonly present but with low cover can include *Rosa carolina, Rosa rugosa, Baccharis halimifolia, Rhus typhina*, or *Juniperus virginiana*. Although *Rosa rugosa* is not a native species, it is naturalized and is nearly restricted to this vegetation, where it grows in similar habit and physiognomy as the other two shrubs characteristic of this vegetation. The herbaceous layer tends to be sparse and low, particularly where shrub growth is dense, and can include dune grassland or adjacent upland species such as *Ammophila breviligulata, Solidago sempervirens, Hudsonia tomentosa, Lechea maritima, Juncus greenei, Carex silicea, Polygonella articulata, Symphyotrichum subulatum (= Aster subulatus), Solidago rugosa, Achillea millefolium, Oenothera parviflora, Euthamia* spp., *Cyperus grayi, Cyperus polystachyos, Schizachyrium scoparium*, and others. Typical vine associates are *Toxicodendron radicans, Parthenocissus quinquefolia*, and *Smilax* spp. Large patches of open unvegetated or sparsely vegetated sand are present in some examples. Depending on exposure, these shrublands range from over 2 m tall in sheltered areas to less than 1 m tall in areas with greater exposure to winds and storms.

Classification Comments: This vegetation is compositionally similar to maritime rocky headland, *Prunus serotina - Rhus typhina* Scrub Forest (CEGL006399). *Morella pensylvanica / Diodia teres* Shrubland (CEGL003881) is the southern analog of this association.

Similar NVC Types:
- CEGL006399 *Prunus serotina - Rhus typhina* Scrub Forest
- CEGL006457 *Morella pensylvanica / Panicum virgatum* Shrubland
- CEGL003881 *Morella pensylvanica / Diodia teres* Shrubland

VEGETATION

Floristics: This shrubland vegetation is dominated by *Morella pensylvanica (= Myrica pensylvanica)* and *Prunus maritima*. Additional shrubs that are commonly present but with low cover can include *Rosa carolina, Rosa rugosa, Baccharis halimifolia, Rhus copallinum, Rhus typhina*, or *Juniperus virginiana*. The herbaceous layer tends to be sparse and can include dune grassland or adjacent upland species such as *Ammophila breviligulata, Solidago sempervirens, Hudsonia tomentosa, Lechea maritima, Juncus greenei, Carex silicea, Polygonella articulata, Symphyotrichum subulatum (= Aster subulatus), Solidago rugosa, Achillea millefolium, Oenothera parviflora, Euthamia* spp., *Cyperus grayi, Cyperus polystachyos, Schizachyrium scoparium*, and others. Typical vine associates are *Toxicodendron radicans, Parthenocissus quinquefolia*, and *Smilax* spp. Large patches of open unvegetated or sparsely vegetated sand are present in some examples. Depending on exposure, these shrublands range from over 2 m tall in sheltered areas to less than 1 m tall in areas with greater exposure to winds and storms.

ENVIRONMENT & DYNAMICS

Environmental Description: This association occurs on protected slopes and hollows of dry, stabilized maritime backdunes where the water table is greater than 1 m from the surface.

Dynamics: This vegetation can be a probable intermediate in succession between beach dune and sunken forest; further dune development and protection from salt spray allows development of sunken forest vegetation (Art 1976).

DISTRIBUTION

Geographic Range: This association occurs from Maine to New Jersey.

Spatial Scale & Pattern [optional]: Small patch
Nations: US
States/Provinces: CT, DE?, MA, ME, NH, NJ, NY, RI
TNC Ecoregions [optional]: 62:C
USFS Ecoregions (1994/95): 221Ab:CCC, 221Ac:CCC, 221Ad:CCC, 221Ak:CCC, 232Aa:CCC, 232Ab:CCC, 232Ac:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Cape Cod, Fire Island, Gateway); USFWS (E.B. Forsythe, Monomoy, Muskeget Island, Nomans Land Island, Parker River)

CONSERVATION STATUS

Grank (Review Date): G4 (1997/12/1)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:

- **=** *Morella pensylvanica - Prunus maritima* shrublands (Metzler and Barrett 2001)
- **?** *Myrica* thicket (Chrysler 1930)
- **?** Coastal dune community (Rawinski 1984a)
- **=** Dune Shrubland (Enser 1999)
- **?** Dune shrubland (Breden 1989)
- **>** Low xeric thicket (Martin 1959b) ["Low dune thicket" type (too small to be mapped) should be considered an inclusion in this synonymy.]
- **?** Maritime Shrubland on Dunes (Lundgren 2000)
- **<** Rose - Bayberry Maritime Shrubland (Gawler 2002)
- **?** SNE coastal rocky headland community (Rawinski 1984a)
- **?** Short shrub thicket (Dunlop and Crow 1985)

AUTHORSHIP

Primary Concept Source: Eastern Ecology Group, mod. S.L. Neid
Author of Description: S.L. Neid and L.A. Sneddon, mod. E. Largay
Acknowledgments:
Version Date: 2007/03/26

REFERENCES

References: Art 1976, Breden 1989, Breden et al. 2001, Chrysler 1930, Conard 1935, Dunlop and Crow 1985, Edinger et al. 2002, Edinger et al. 2008a, Enser 1999, Enser and Lundgren 2006, Gawler 2002, Gawler and Cutko 2010, Klopfer et al. 2002, Lundgren 2000, Martin 1959b, McDonnell 1979, Metzler and Barrett 2001, Metzler and Barrett 2004, Metzler and Barrett 2006, Moul 1969, NRCS 2001b, NatureServe 2009, Nelson and Fink 1980, Nichols 1920, Rawinski 1984a, Reschke 1990, Sneddon and Lundgren 2001, Sneddon et al. 2010, Sperduto 1997b, Sperduto 2000a, Sperduto and Nichols 2004, Swain and Kearsley 2001.

NYC NAC Association Description (CEGL006295):

This association was not selected as a first choice for any NYC NAC plots.

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2. Shrub & Herb Vegetation
2.B.4.Na. Eastern North American Coastal Scrub & Herb Vegetation
A0902. *Morella pensylvanica* Dune Shrubland Alliance

CEGL006457. *Morella pensylvanica / Panicum virgatum* Shrubland

Type Concept Sentence:

OVERVIEW

Scientific Name: *Morella pensylvanica / Panicum virgatum* Shrubland
Common Name (Translated Scientific Name): Northern Bayberry / Switchgrass Shrubland
Colloquial Name: Maritime Morainal Shrubland

Type Concept: This maritime shrubland of southern New England occurs on well-drained soils of morainal landscapes. It is currently documented from Nomans Land Island National Wildlife Refuge, Massachusetts, where it occupies much of the landscape matrix, and Block Island, Rhode Island. It may also occur on the Elizabeth Islands in Massachusetts, eastern Long Island, New York, and other terminal moraines. It is of variable structure and composition, ranging from dense low shrubland to a complex of patchy shrubs and grasses, most characteristically *Morella pensylvanica* and *Panicum virgatum*. In general, this is a low to medium-height shrubland ranging from 1-2 m tall. Associated shrubs may include *Rhus typhina, Rhus copallinum, Toxicodendron radicans, Rubus hispidus, Rosa virginiana*, and *Viburnum dentatum*. Associated herbs may include *Dichanthelium clandestinum, Andropogon virginicus, Andropogon glomeratus, Euthamia graminifolia, Solidago rugosa*, and *Solidago sempervirens*. Exotic species are often present, including *Rosa rugosa* and pasture grasses and forbs such as *Elymus repens (= Agropyron repens), Dactylis glomerata, Bromus hordeaceus (= Bromus mollis), Phleum pratense, Daucus carota, Achillea millefolium*, and the like. This vegetation is likely of natural origin on the immediate coastline where it is maintained by strong winds and salt spray, but further inland is often of anthropogenic origin as a result of forest clearing and grazing.

Classification Comments: This association is considered provisional until additional data are collected and analyzed.

Similar NVC Types:

- CEGL006399 *Prunus serotina - Rhus typhina* Scrub Forest

- CEGL006295 *Morella pensylvanica - Prunus maritima* Shrubland
- CEGL003881 *Morella pensylvanica / Diodia teres* Shrubland

VEGETATION

Floristics: Vegetation is of variable structure and composition, ranging from dense low shrubland to a complex of patchy shrubs and grasses, most characteristically *Morella pensylvanica* and *Panicum virgatum*. In general, this is a low to medium-height shrubland ranging from 1-2 m tall. Associated shrubs may include *Rhus typhina, Rhus copallinum, Toxicodendron radicans, Rubus hispidus, Rosa virginiana*, and *Viburnum dentatum*. Associated herbs may include *Dichanthelium clandestinum, Andropogon virginicus, Andropogon glomeratus, Euthamia graminifolia, Solidago rugosa*, and *Solidago sempervirens*. Exotic and/or invasive species are often present, including *Rosa rugosa* and pasture grasses and forbs such as *Elymus repens (= Agropyron repens), Dactylis glomerata, Bromus hordeaceus (= Bromus mollis), Phleum pratense, Daucus carota, Achillea millefolium*, and the like.

ENVIRONMENT & DYNAMICS

Environmental Description: This maritime shrubland of southern New England occurs on well-drained soils of morainal landscapes.

Dynamics: This vegetation is likely of natural origin on the immediate coastline where it is maintained by strong winds and salt spray, but further inland is often of anthropogenic origin as a result of forest clearing and grazing.

DISTRIBUTION

Geographic Range: This association is currently documented from Nomans Land Island National Wildlife Refuge in Massachusetts and Block Island, Rhode Island. It may also occur on eastern Long Island, New York and on the Elizabeth Islands in Massachusetts, as well as other morainal landforms.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: MA, NY, RI
TNC Ecoregions [optional]: 62:C
USFS Ecoregions (1994/95): 221Ab:CCC, 232Aa:CCC
Omernik Ecoregions:
Federal Lands [optional]: USFWS (Monomoy, Nomans Land Island)

CONSERVATION STATUS

Grank (Review Date): GNR (2011/1/25)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low - Poorly Documented.

SYNONYMY

Synonymy:
- **=** Dune Shrubland (Enser 1999)
- **?** Grassland (Fogg 1930)
- **?** Grassland Community (O'Neill 1981)

AUTHORSHIP

Primary Concept Source: L.A. Sneddon
Author of Description: L.A. Sneddon
Acknowledgments:
Version Date: 2011/01/25

REFERENCES

References: Enser 1999, Fogg 1930, Hadjian 1995, O'Neill 1981, Sneddon 2010, Swain and Kearsley 2001.

NYC NAC Association Description based on 4 plots (CEGL006457):

Overstory trees are sparse and include black cherry (Prunus serotina)

Midstory plants include winged sumac (Rhus copallinum), black cherry (Prunus serotina), and white poplar (Populus alba).

Understory plants include switchgrass (Panicum virgatum), winged sumac (Rhus copallinum), Indian goosegrass (Eleusine indica), common wormwood (Artemisia vulgaris), hairy white oldfield aster (Symphyotrichum pilosum), hairy crabgrass (Digitaria sanguinalis), common reed (Phragmites australis), common yarrow (Achillea millefolium), Canada bluegrass (Poa compressa), early goldenrod (Solidago juncea), white poplar (Populus alba), goldenrod (Solidago sp.), partridge pea (Chamaecrista fasciculata), coastal jointweed (Polygonella articulata), pinweed (Lechea sp.), cinquefoil (Potentilla sp.), and annual ragweed (Ambrosia artemisiifolia).

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2. Shrub & Herb Vegetation
2.B.4.Na. Eastern North American Coastal Scrub & Herb Vegetation
2.B.4.Na.2.c. G493 North Atlantic Coastal Dune & Grassland

A3638. *Schizachyrium littorale - Schizachyrium scoparium* Northern Coastal Plain Grassland Alliance

Type Concept Sentence: This alliance comprises vegetation occurring on sandplains or on naturally stabilized backdunes of the Atlantic coast in which *Schizachyrium littorale* is characteristic.

OVERVIEW

Scientific Name: *Schizachyrium littorale - Schizachyrium scoparium* Northern Coastal Plain Grassland Alliance
Common Name (Translated Scientific Name): Shore Little Bluestem - Little Bluestem Northern Coastal Plain Grassland Alliance
Colloquial Name: Northern Coastal Plain Little Bluestem Grassland

Type Concept: This alliance comprises vegetation occurring on sandplains or on naturally stabilized backdunes where the substrate is naturally more stabilized than that foredunes. *Schizachyrium littorale (= Schizachyrium scoparium ssp. littorale)* is characteristic, although stands are highly variable in species composition. *Aristida tuberculosa* is also characteristic of this vegetation where it occurs. The typical expression of this alliance is characterized by a predominance (25-50% cover) of bunchgrasses, including *Ammophila breviligulata, Andropogon virginicus, Deschampsia flexuosa, Dichanthelium acuminatum, Dichanthelium scoparium, Panicum amarum var. amarulum, Panicum virgatum, Schizachyrium littorale*, and *Schizachyrium scoparium*. Occasionally *Spartina patens (= var. monogyna)* forms the dominant graminoid cover. Shrubs such as *Morella pensylvanica (= Myrica pensylvanica)* are often present at variable cover. Sandplain grasslands usually occur somewhat interior to the coast, and are characterized by additional species such as *Asclepias tuberosa, Viola pedata*, and *Baptisia tinctoria*.

Classification Comments: This alliance is somewhat broadly defined to cover sandplain grasslands, including the rare Hempstead prairie on Long Island, New York, as well as coastal backdunes of barrier islands. *Deschampsia flexuosa* Grassland (CEGL006621) is also included here due to its restriction to stabilized dunes of Cape Cod and occasional presence of *Schizachyrium scoparium*.

Similar NVC Types:
- A3913 *Vaccinium angustifolium - Vaccinium pallidum* Sandy Heath Alliance
- A1207 *Ammophila breviligulata* Dune Grassland Alliance: shares some species in common, but occurs on exposed dune crests and dune faces.

Diagnostic Characteristics: Dominance by bunchgrasses on sand dunes or sandplains. Characteristic species include *Schizachyrium littorale, Schizachyrium scoparium, Panicum virgatum*, and *Aristida tuberculosa*.

VEGETATION

Floristics: *Schizachyrium littorale (= Schizachyrium scoparium ssp. littorale)* is characteristic of this alliance. Although highly variable in species composition, the typical expression of this alliance is characterized by a predominance (25-50% cover) of bunchgrasses, including *Ammophila breviligulata, Andropogon virginicus, Deschampsia flexuosa, Dichanthelium acuminatum, Dichanthelium scoparium, Panicum amarum var. amarulum, Panicum virgatum, Schizachyrium littorale*, and *Schizachyrium scoparium*. Generally one or two of these species dominate while the others occur as more infrequent, scattered clumps. Occasionally *Spartina patens*, growing in a dry "wispy" condition, will form the dominant graminoid cover. Shrubs of *Morella pensylvanica (= Myrica pensylvanica)* are sparse, and stunted *Baccharis halimifolia* and *Diospyros virginiana* are even less frequent. Dense tangles of *Toxicodendron radicans* are very characteristic of this alliance as they sprawl over the bare ground and sparse vegetation. *Rubus argutus* is also scattered throughout. Much of the remaining dry sands are exposed with sparsely distributed herbs. Characteristic herb species include *Cirsium horridulum, Diodia teres, Euthamia caroliniana (= Euthamia tenuifolia), Nuttallanthus canadensis, Oenothera humifusa, Pseudognaphalium obtusifolium (= Gnaphalium obtusifolium)*, and *Solidago sempervirens*.

ENVIRONMENT & DYNAMICS

Environmental Description: This alliance occurs on deep well-drained sands of old leveled interdunes, or on sandplains within a few miles of the ocean.

Dynamics: The environmental setting of this vegetation is more protected and stabilized than are other dune grasslands. Fire and grazing were important processes maintaining the open character of interior sandplains; most are now maintained by prescribed burning. On stabilized backdunes, this vegetation is maintained by coastal winds and salt spray.

DISTRIBUTION

Geographic Range: This alliance ranges from northern Virginia north to Maine.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: CT, DE, MA, MD, ME?, NJ, NY, RI, VA
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

- **?** Hempstead Plains Grassland (Reschke 1990)
- **?** Sandplain Grassland (Swain and Kearsley 2011)

LOWER LEVEL UNITS

Associations:
- CEGL006621 *Deschampsia flexuosa* Grassland
- CEGL006187 *Schizachyrium scoparium - Sorghastrum nutans - Hypoxis hirsuta - Baptisia tinctoria* Grassland
- CEGL004240 *Morella (pensylvanica, cerifera) / Schizachyrium littorale - Eupatorium hyssopifolium* Shrub Grassland
- CEGL006161 *(Morella pensylvanica) / Schizachyrium littorale - Aristida tuberculosa* Shrub Grassland
- CEGL006067 *Morella pensylvanica / Schizachyrium littorale - Danthonia spicata* Shrub Grassland

AUTHORSHIP

Primary Concept Source: L. Sneddon
Author of Description: L. Sneddon
Acknowledgments:
Version Date: 12/18/2014
Classif Resp Region: East

REFERENCES

References: Faber-Langendoen et al. 2016b, Higgins et al. 1971, Hill 1986, Reschke 1990, Sneddon et al. 1996, Swain and Kearsley 2011

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2. Shrub & Herb Vegetation
2.B.4.Na. Eastern North American Coastal Scrub & Herb Vegetation
A3638. *Schizachyrium littorale - Schizachyrium scoparium* Northern Coastal Plain Grassland Alliance

CEGL006161. *(Morella pensylvanica) / Schizachyrium littorale - Aristida tuberculosa* Shrub Grassland

Type Concept Sentence:

OVERVIEW

Scientific Name: *(Morella pensylvanica) / Schizachyrium littorale - Aristida tuberculosa* Shrub Grassland
Common Name (Translated Scientific Name): (Northern Bayberry) / Shore Little Bluestem - Seaside Three-awn Shrub Grassland
Colloquial Name: North Atlantic Coast Backdune Grassland

Type Concept: This association comprises diverse grasslands of stabilized interdunes and backdunes along the north Atlantic Coast. It occurs on deep stabilized sands within the influence of offshore winds and salt spray. The vegetation is variable but generally dominated by bunchgrasses and forbs. Common species include *Aristida tuberculosa, Schizachyrium littorale, Artemisia campestris ssp. caudata (= Artemisia caudata), Lechea maritima, Toxicodendron radicans, Cenchrus tribuloides, Polygonella articulata, Solidago sempervirens, Liatris scariosa var. novae-angliae, Eragrostis spectabilis, Opuntia humifusa (= Opuntia compressa), Spartina patens, Cirsium horridulum, Pityopsis falcata, Lathyrus japonicus, Cyperus grayi, Carex silicea, Oenothera parviflora, Triplasis purpurea, Trichostema dichotomum*, and others. On Cape Cod, *Deschampsia flexuosa* is characteristic. *Hudsonia tomentosa* and *Ammophila breviligulata* may occur with very low cover. Shrubs and stunted trees may be scattered throughout, including *Morella pensylvanica, Prunus maritima, Pinus rigida*, and *Juniperus virginiana*.

Classification Comments:

Similar NVC Types:
- CEGL006621 *Deschampsia flexuosa* Grassland
- CEGL004240 *Morella (pensylvanica, cerifera) / Schizachyrium littorale - Eupatorium hyssopifolium* Shrub Grassland

VEGETATION

Floristics: This grassland is dominated by bunchgrasses and forbs that occur in a mosaic with variable dominance. Common species include *Aristida tuberculosa, Schizachyrium littorale, Artemisia campestris ssp. caudata (= Artemisia caudata), Lechea maritima, Toxicodendron radicans, Cenchrus tribuloides, Polygonella articulata, Solidago sempervirens, Liatris scariosa var. novae-angliae, Eragrostis spectabilis, Opuntia humifusa (= Opuntia compressa), Spartina patens, Cirsium horridulum, Pityopsis falcata, Lathyrus japonicus, Cyperus grayi, Carex silicea, Oenothera parviflora, Triplasis purpurea, Trichostema dichotomum*, and others. On Cape Cod, *Deschampsia flexuosa* is characteristic. *Hudsonia tomentosa* and *Ammophila breviligulata* may occur with very low cover. Shrubs and stunted trees may be scattered throughout, including *Morella pensylvanica, Prunus maritima, Pinus rigida*, and *Juniperus virginiana*.

ENVIRONMENT & DYNAMICS

Environmental Description: This community occurs on deep stabilized sands of old leveled interdunes and backdunes. It usually occurs within the influence of offshore winds and salt spray.

Dynamics: These backdune grasslands occur on more stabilized sands behind primary backdunes dominated by *Ammophila breviligulata*. There is much higher species diversity in the stabilized areas relative to the adjacent primary dunes that have active sand accumulation.

DISTRIBUTION

Geographic Range: This community occurs along the north Atlantic Coast from New York to Massachusetts and possibly to Maine.

Spatial Scale & Pattern [optional]: Large patch
Nations: US
States/Provinces: CT, MA, ME?, NY
TNC Ecoregions [optional]: 62:C
USFS Ecoregions (1994/95): 221Ab:CCC, 221Ad:CCC, 221Ak:CCC, 232Aa:CCC, 232Ac:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Gateway); USFWS (Parker River)

CONSERVATION STATUS

Grank (Review Date): GNR (2002/5/6)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:
- **?** Interdune (McDonnell 1979)

AUTHORSHIP

Primary Concept Source: North Atlantic Coast Ecology Group and S.L. Neid
Author of Description: S.L. Neid
Acknowledgments:
Version Date: 2002/05/13

REFERENCES

References: Edinger et al. 2002, Edinger et al. 2008a, Gwilliam unpubl. data 1998, McDonnell 1979, Metzler and Barrett 2001, Metzler and Barrett 2006, NRCS 2001b, Reschke 1990, Swain and Kearsley 2000, Swain and Kearsley 2001, Walz et al. 2008.

NYC NAC Association Description based on 1 plot (CEGL006161):

Midstory plants include sparse amounts of eastern cottonwood (Populus deltoides)

Understory plants include grasses, rough cocklebur (Xanthium strumarium), black locust (Robinia pseudoacacia), field sagewort (Artemisia campestris), common wormwood (Artemisia vulgaris), and milkweed (Asclepias sp.).

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2. Shrub & Herb Vegetation
2.B.4.Na. Eastern North American Coastal Scrub & Herb Vegetation
2.B.4.Na.2.c. G493 North Atlantic Coastal Dune & Grassland

A1274. *Spartina patens - Schoenoplectus pungens* Atlantic Overwash Dune Grassland Alliance

Type Concept Sentence: This alliance includes upland dune grasslands formed by storm surges and overwash of dunes of the northern Atlantic Coast in which *Spartina patens (= var. monogyna)* is usually dominant or characteristic, and *Schoenoplectus pungens* is often present and indicates the recent overwash of interdunal swales.

OVERVIEW

Scientific Name: *Spartina patens - Schoenoplectus pungens* Atlantic Overwash Dune Grassland Alliance
Common Name (Translated Scientific Name): Saltmeadow Cordgrass - Common Threesquare Atlantic Overwash Dune Grassland Alliance
Colloquial Name: Atlantic Overwash Dune Grassland

Type Concept: This alliance includes upland dune grassland formed by storm surges and overwash of dunes of the northern Atlantic Coast. *Spartina patens (= var. monogyna)* is usually dominant or characteristic, and *Schoenoplectus pungens (= Scirpus pungens)* is often present and indicates the recent overwash of interdunal swales. Other components of this vegetation may include *Atriplex patula, Cenchrus tribuloides, Distichlis spicata, Elymus repens, Polygonum glaucum, Setaria parviflora, Solidago sempervirens, Spergularia salina (= Spergularia marina)*, or *Thinopyrum pycnanthum*.

Classification Comments:

Similar NVC Types:
- A1207 *Ammophila breviligulata* Dune Grassland Alliance: shares some species in common, but is more common on dune crests and fronts.

Diagnostic Characteristics: *Spartina patens (= var. monogyna)* is characteristic; occurs on overwash fans of coastal dunes.

VEGETATION

Physiognomy and Structure: This alliance is characterized by graminoids, usually less than 0.5m in height. The vegetation may be sparse, with expanses of bare sand evident.

Floristics: *Spartina patens* and *Schoenoplectus pungens (= Scirpus pungens)* are characteristically dominant, though other graminoids such as *Schoenoplectus pungens, Sporobolus virginicus, Cenchrus spinifex (= Cenchrus incertus), Cenchrus tribuloides*, and *Paspalum distichum* may be codominant or prominent within their respective ranges. In parts of the range of this alliance, *Spartina patens* is dominant and *Schoenoplectus pungens* may be absent. Total vegetation cover is variable, ranging from quite sparse (25% cover) to dense. Species diversity is variable; although it may be quite low and confined to the nominal species in the northern part of the range, it may be of greater diversity. Other components of this vegetation include *Ammophila breviligulata, Atriplex patula, Bassia hirsuta* (an exotic), *Cakile edentula ssp. edentula, Cenchrus tribuloides, Distichlis spicata, Fimbristylis castanea, Polygonum glaucum, Sabatia stellaris, Salicornia bigelovii, Salicornia virginica, Setaria parviflora, Solidago sempervirens, Spergularia salina (= Spergularia marina), Strophostyles helvula*, and *Suaeda linearis*. Woody species may include scattered individuals of *Toxicodendron radicans, Solidago sempervirens, Lythrum lineare, Kosteletzkya virginica*, and seedlings of *Baccharis halimifolia*.

ENVIRONMENT & DYNAMICS

Environmental Description: This alliance includes upland dune grasslands of barrier islands of the mid-Atlantic coast. This community characteristically occupies overwash terraces or low dunes, less well-developed than those dominated by *Uniola paniculata* (from North Carolina south and west to Texas and Tamaulipas, Mexico) or by *Ammophila breviligulata* (from North Carolina northwards). Bare sand is often visible through the vegetation, and there is no soil profile development.

Dynamics: The plants of this community are influenced by sand deposited by storm surges. Storm overwash is a prevalent natural disturbance to this community. This community appears to be successional between interdunal herbaceous wetlands and interdunal herbaceous/shrub uplands.

DISTRIBUTION

Geographic Range: This association occurs on coastal dunes from North Carolina to Massachusetts.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: DE, MA, MD, NC, NJ, NY, VA
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

- **?** Dry community of barrier flats (Travis and Godfrey 1976)
- **?** Maritime Dry Grassland (Schafale and Weakley 1990)
- **?** Wash (Hill 1986)
- **><** dunegrass community (Higgins et al. 1971)
- **?** grassland community (Baumann 1978b)
- **?** low dune community (Boule 1979)
- **?** secondary dunes (Klotz 1986)
- **?** wash (Higgins et al. 1971)

LOWER LEVEL UNITS

Associations:
- CEGL004097 *Spartina patens - Schoenoplectus pungens - Solidago sempervirens* Grassland
- CEGL006149 *Spartina patens - Thinopyrum pycnanthum* Grassland

AUTHORSHIP

Primary Concept Source: M.P. Schafale and A.S. Weakley (1990)
Author of Description: L. Sneddon
Acknowledgments:
Version Date: 12/18/2014
Classif Resp Region: East

REFERENCES

References: Baumann 1978b, Boule 1979, Dunwiddie et al. 1996, Faber-Langendoen et al. 2016b, Higgins et al. 1971, Hill 1986, Klotz 1986, Schafale and Weakley 1990, Travis and Godfrey 1976

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2. Shrub & Herb Vegetation
2.B.4.Na. Eastern North American Coastal Scrub & Herb Vegetation
A1274. *Spartina patens - Schoenoplectus pungens* Atlantic Overwash Dune Grassland Alliance

CEGL004097. *Spartina patens - Schoenoplectus pungens - Solidago sempervirens* Grassland

Type Concept Sentence:

OVERVIEW

Scientific Name: *Spartina patens - Schoenoplectus pungens - Solidago sempervirens* Grassland
Common Name (Translated Scientific Name): Saltmeadow Cordgrass - Common Threesquare - Seaside Goldenrod Grassland
Colloquial Name: Overwash Dune Grassland

Type Concept: This community is an upland dune grassland or overwash area of Atlantic barrier islands on embryo dunes or back sides of beaches forming from wave-deposited sand during spring tides or storms. This vegetation sometimes arises when overwash sand is deposited on interdunal swales, resulting in the occasional presence of wetland indicators. This association ranges from Massachusetts to North Carolina.. Sand movement, plant burial, and dune formation rates are not so high as to form *Ammophila breviligulata*-dominated primary dunes, but can be found as a fringe around the outer edge of those dunes. *Spartina patens* is dominant, ranging from quite sparse (25% cover) to dense, and can be monotypic in early-successional expressions. Where it forms over buried interdunal swales, remnant individuals of *Schoenoplectus pungens (= Scirpus pungens)* may be present. *Solidago sempervirens* is a common associate. Less common associates can include *Cyperus grayi, Cenchrus tribuloides, Setaria parviflora, Festuca rubra, Schizachyrium littorale, Pseudognaphalium obtusifolium (= Gnaphalium obtusifolium)*, and occasional scattered individuals of *Toxicodendron radicans* and seedlings of *Baccharis halimifolia*. Bare sand is often visible through the vegetation, and there is no soil profile development. *Ammophila breviligulata* and, at the southern end of the range, *Uniola paniculata, Panicum amarum var. amarum*, or *Panicum amarum var. amarulum* may invade from the surrounding dunes. On the Virginia Eastern Shore, a somewhat xerophytic variant of this community occurs on low, narrow, relatively stable backdune ridges between interdune swales,

dominated by *Spartina patens* but supporting a number of drought-tolerant associates such as *Triplasis purpurea, Oenothera humifusa, Opuntia humifusa, Physalis walteri, Cirsium horridulum var. horridulum*, and *Eragrostis spectabilis*.

Classification Comments: This community differs ecologically from dune grasslands dominated by *Ammophila breviligulata* or *Uniola paniculata*, which are primarily impacted by wind-deposited sand. This community is impacted by wave-deposited sand. It is drier than brackish swales and vegetation that immediately colonizes water-borne sand from storm overwash, such as *Spartina patens - Eleocharis parvula* Marsh (CEGL006342). *Spartina patens - Schizachyrium maritimum - Solidago sempervirens* Grassland (CEGL008445) is a southern analog of this association that occurs along the Gulf Coast.

Similar NVC Types:
- CEGL008445 *Spartina patens - Schizachyrium maritimum - Solidago sempervirens* Grassland
- CEGL006342 *Spartina patens - Eleocharis parvula* Marsh

VEGETATION

Floristics: *Spartina patens* is dominant, ranging from quite sparse (25% cover) to dense, and can be monotypic in early-successional expressions. Where it forms over buried interdunal swales, remnant individuals of *Schoenoplectus pungens (= Scirpus pungens)* may be present. As the vegetation develops, common associated species can include *Solidago sempervirens*. Less common associates can include *Cyperus grayi, Cenchrus tribuloides, Setaria parviflora, Festuca rubra, Schizachyrium littorale, Pseudognaphalium obtusifolium (= Gnaphalium obtusifolium)*, and occasional scattered individuals of *Toxicodendron radicans* and seedlings of *Baccharis halimifolia*. *Ammophila breviligulata* and, at the southern end of the range, *Uniola paniculata* may invade from the surrounding dunes. This community is characterized by upland maritime dune grassland vegetation. *Spartina patens*, and sometimes *Schoenoplectus pungens*, or both are dominant on dunes or overwash terraces. Total vegetation cover is variable, ranging from quite sparse (25% cover) to dense. Bare sand is often visible through the vegetation, and there is no soil profile development. Species diversity is variable; although it may be quite low and confined to the nominate species in the northern part of the range, it may be of greater diversity, including *Strophostyles helvula, Solidago sempervirens, Cenchrus tribuloides, Setaria parviflora, Distichlis spicata, Sabatia stellaris, Ammophila breviligulata, Suaeda linearis, Bassia hirsuta, Atriplex patula, Fimbristylis castanea*, and *Cakile edentula ssp. edentula*. On the Virginia Eastern Shore, associates of the drier microhabitats supporting this community include *Triplasis purpurea, Oenothera humifusa, Opuntia humifusa, Physalis walteri, Cirsium horridulum var. horridulum*, and *Eragrostis spectabilis*.

ENVIRONMENT & DYNAMICS

Environmental Description: This community is an upland dune grassland or overwash area of Atlantic barrier islands on embryo dunes or back sides of beaches forming from overwash terraces. The plants of this community are influenced by water-deposited sand caused by storm surges. They differ ecologically from dune grasslands dominated by *Ammophila breviligulata* or *Uniola paniculata*, which are primarily impacted by wind-deposited sand. Storm overwash is a prevalent natural disturbance to this community. On the Virginia Eastern Shore, a somewhat xerophytic variant of this community occurs on low, narrow, relatively stable backdune ridges between interdune swales.

Dynamics: This association forms a drier, later successional phase of an overwash community begun from water-deposited sand of storm overwash; it appears to be a successional step between interdunal herbaceous wetlands and interdunal herbaceous/shrub uplands. Undisturbed water-deposited sand is colonized by *Spartina patens* and/or *Schoenoplectus pungens* plus additional associates like *Suaeda linearis, Bassia hirsuta, Atriplex patula*, and *Fimbristylis castanea* that have low percent cover. This wetter, early-successional phase is currently covered by *Spartina patens - Eleocharis parvula* Marsh (CEGL006342). With time since overwash, sand movement, plant burial, and dune formation rates increase, but are not so high as to form *Ammophila breviligulata*-dominated primary dunes. However, this association can be found as a fringe around the lower, outer edge of those dunes.

DISTRIBUTION

Geographic Range: This community is an upland dune grassland or overwash area of Atlantic barrier islands from Massachusetts to North Carolina.

Spatial Scale & Pattern [optional]: Small patch
Nations: US
States/Provinces: DE, MA, MD, NC, NJ?, NY, VA
TNC Ecoregions [optional]: 57:C, 58:C, 62:C
USFS Ecoregions (1994/95): 221Ab:CCC, 232Aa:CCC, 232Ab:CCC, 232Ac:CCC, 232Bz:CCC, 232Ch:CCC, 232Ci:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Assateague Island, Boston Harbor Islands, Cape Hatteras, Cape Lookout, Fire Island, Gateway, Sagamore Hill); USFWS (Back Bay?, Cape Romain, Cedar Island, Chincoteague, E.B. Forsythe, Monomoy, Prime Hook)

CONSERVATION STATUS

Grank (Review Date): G2G3 (1998/11/4)

Greasons: This dune grassland community is restricted to overwash areas of major maritime dune systems. It is typically small in extent, not usually more than a few acres in size. It is best developed on barrier islands of Delaware, Maryland, Virginia, and North Carolina; it extends sporadically farther north to Massachusetts. As part of a dynamic system, the community is in a sense ephemeral, being buried over time by sand deposition, and being formed anew in other areas subjected to overwash. Because of the dynamic forces structuring the community, it requires sufficient area in large dune systems to accommodate this shifting mosaic. Although not extremely rare (an estimated 100-200 occurrence exist rangewide), the community is restricted to a specialized habitat and is threatened by a number of activities, including dune stabilization, and outright destruction of habitat through human activities.

Ranking Author (Version): L.A. Sneddon (1998/11/4)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:

- **=** *Spartina patens - Schoenoplectus pungens - Solidago sempervirens* Herbaceous Vegetation (TNC 1997a)
- **=** *Spartina patens - Schoenoplectus pungens - Solidago sempervirens* Herbaceous Vegetation (Harrison 2004)
- **=** *Spartina patens - Schoenoplectus pungens - Solidago sempervirens* Herbaceous Vegetation (Bowman 2000)
- **<** Dry community of barrier flats (Travis and Godfrey 1976) [North Carolina]
- **?** Dry maritime grassland (Lea 2002b) [Assateague Island]
- **=** Grassland community (Baumann 1978b) [Virginia]
- **=** Low dune community (Boule 1979) [Virginia]
- **?** Maritime Dry Grassland (Schafale and Weakley 1990)
- **=** Maritime Dry Grassland (Typic Subtype) (Schafale 2000)
- **<** Maritime Dune Grassland (Fleming et al. 2001)
- **<** Maritime Dune Grassland (Harrison 2004)
- **<** Secondary dunes (Klotz 1986) [Virginia]
- **=** Wash (Higgins et al. 1971) [Assateague Island]
- **=** Wash (Hill 1986) [Assateague Island]

AUTHORSHIP

Primary Concept Source: L.A. Sneddon and A. Berdine, mod. S.L. Neid
Author of Description: L.A. Sneddon
Acknowledgments:
Version Date: 2013/09/06

REFERENCES

References: Baumann 1978b, Berdine 1998, Boule 1979, Bowman 2000, Breden et al. 2001, Coxe 2009, Edinger et al. 2002, Edinger et al. 2008a, Edinger et al. 2008b, Fleming and Patterson 2011a, Fleming et al. 2001, Harrison 2004, Harrison 2011, Harrison and Stango 2003, Higgins et al. 1971, Hill 1986, Klopfer et al. 2002, Klotz 1986, Largay and Sneddon 2010, Lea 2002b, NRCS 2001b, NatureServe 2009, Reschke 1990, Schafale 2000, Schafale 2003b, Schafale 2012, Schafale and Weakley 1990, TNC 1995c, TNC 1997a, Travis and Godfrey 1976, Zaremba and Leatherman 1984.

NYC NAC Association Description based on 1 plot (CEGL004097):

Overstory and midstory trees are sparse and include eastern cottonwood (Populus deltoides) and black locust (Robinia pseudoacacia).

Vines include Amur peppervine (Ampelopsis brevipedunculata).

The understory is dominated by saltmeadow cordgrass (Spartina patens). Other understory plants include rough cocklebur (Xanthium strumarium) and seaside goldenrod (Solidago sempervirens).

2.C. Shrub & Herb Wetland

Shrub & Herb Wetland includes open bogs, fens, fresh and saltwater marshes, wet meadows and wet shrublands. The vegetation occurs from tropical to polar regions.

2.C.4. Temperate to Polar Freshwater Marsh, Wet Meadow & Shrubland

Temperate to Polar Freshwater Marsh, Wet Meadow & Shrubland includes wet riparian and swamp shrublands, wet meadows, wet prairies, and shallow and deep emergent marshes. The vegetation comprises seasonal green emergent, hydrophytic shrubs and herbs with at least 10% cover, on mucky, inundated or saturated soils across the mid-latitudes of the Northern and Southern hemispheres from 23° to 70°.

2.C.4.Nd. Eastern North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland

This division consists of vegetation in eastern cool-temperate and boreal North America, including the Great Plains. Stands are dominated by shrubs and/or non-hydromorphic herbaceous plants that are facultatively to obligately adapted to freshwater wetland conditions and that grow in mineral or mucky organic soils with regular (intermittent to permanent) saturated and flooded conditions.

M069. Eastern North American Marsh, Wet Meadow & Shrubland

This largely freshwater wetland macrogroup encompasses shrub swamps, marshes, wet meadows and wet prairies of temperate and boreal eastern North America, north of the southern Atlantic and Gulf coastal plains and east of the Great Plains and Yukon Territory. It is dominated by graminoids (e.g., species of the genera *Calamagrostis, Carex, Echinochloa, Glyceria, Juncus, Leersia, Schoenoplectus, Scirpus, Sparganium, Typha, Zizania*), forbs (e.g., species of the genera *Bidens, Eupatorium, Lobelia, Polygonum, Rumex, Sagittaria*), and shrubs (e.g., *Alnus incana, Alnus serrulata, Cornus sericea*, other *Cornus* spp., *Salix* spp., *Spiraea* spp., *Viburnum* spp.) in a widely variable composition and structure. This macrogroup also contains eastern inland saline meadows characterized by *Atriplex patula, Juncus gerardii*, and others.

G125. Eastern North American Freshwater Marsh

This group is composed of freshwater emergent herbaceous marshes in the cool-temperate region of eastern North America from western Minnesota and northern Missouri east. Stands of this group are usually dominated by medium to tall graminoids, though short forbs dominate some stands in the east. Sites are flooded for a few weeks to the entire growing season but water depth is shallow.

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2. Shrub & Herb Vegetation
2.C.4.Nd. Eastern North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland
2.C.4.Nd.2.a. G125 Eastern North American Freshwater Marsh

A3669. *Peltandra virginica - Pontederia cordata - Sagittaria* spp. Marsh Alliance

Type Concept Sentence: This alliance includes very wet or partially submerged forb vegetation the northeastern and midwestern United States and adjacent Canada. Dominants vary greatly and may include *Peltandra virginica, Polygonum amphibium, Polygonum hydropiper, Carex emoryi, Impatiens capensis, Pontederia cordata, Bidens cernua*, and *Verbena hastata*.

OVERVIEW

Scientific Name: *Peltandra virginica - Pontederia cordata - Sagittaria* spp. Marsh Alliance
Common Name (Translated Scientific Name): Green Arrow-arum - Pickerelweed - Arrowhead species Marsh Alliance
Colloquial Name: Rivershore & Lakeshore Green Arrow-arum - Pickerelweed Marsh

Type Concept: This alliance includes very wet or partially submerged forb vegetation in the northeastern and midwestern United States and adjacent Canada. Dominants vary depending on water levels, recent disturbances, etc. A wide variety of forbs can dominate, including *Peltandra virginica, Polygonum amphibium, Polygonum hydropiper, Carex emoryi, Impatiens capensis, Pontederia cordata, Bidens cernua*, and *Verbena hastata*. Typical associates include *Nuphar* ssp., *Glyceria striata, Polygonum sagittatum, Schoenoplectus tabernaemontani (= Scirpus validus), Schoenoplectus americanus (= Scirpus americanus)*, and *Sagittaria latifolia*. Stands occur on the banks of rivers and lakes and sometimes of artificial ponds and impoundments.

Classification Comments: This alliance is highly variable and includes vegetation of the low zone of freshwater tidal marshes as well as the margins of inland lakes, rivers, and marshes. Dominants in individual stands vary greatly and the treatment of these dynamic shoreline wetlands should be considered across this alliance as well as similar ones in Eastern North American Wet Shoreline Vegetation Group (G756) and possibly Laurentian-Northeastern Wet Meadow Group (G771). This alliance should be compared to *Polygonum* spp. Wet Meadow Shoreline Alliance (A1881), in particular. Some associations in these two alliances may be better moved between them.

Similar NVC Types:

- A1881 *Polygonum* spp. Shoreline Wet Meadow Alliance: appears very similar to at least parts of A3669. There may not be real differences between parts of them and re-alignment of the alliances should be considered.
- A3661 *Impatiens capensis - Impatiens pallida - Eupatorium* spp. Wet Meadow Alliance: is usually found in wet meadows where the flooding regime is less variable and lacks a strong presence of *Peltandra virginica, Polygonum amphibium, Polygonum hydropiper, Pontederia cordata*, and *Bidens cernua*.
- A3405 *Panicum rigidulum - Polygonum hydropiperoides - Polygonum punctatum* Southeastern Sandbar Alliance

Diagnostic Characteristics: This alliance has a variety of dominant species, though all are low forbs in partially submerged rivershores and lakeshores. Common dominants include *Peltandra virginica, Polygonum amphibium, Polygonum hydropiper, Carex emoryi, Impatiens capensis, Pontederia cordata, Bidens cernua*, and *Verbena hastata*.

VEGETATION

Physiognomy and Structure: This alliance is dominated by low forbs (generally <1 m tall). Graminoids and shrubs can occur but are uncommon.

Floristics: Dominants in this alliance vary depending on water levels, recent disturbances, etc. A wide variety of forbs can dominate, including *Peltandra virginica, Polygonum amphibium, Polygonum hydropiper, Carex emoryi, Impatiens capensis, Pontederia cordata, Bidens cernua*, and *Verbena hastata*. Typical associates include *Nuphar* ssp., *Glyceria striata, Polygonum sagittatum, Schoenoplectus tabernaemontani (= Scirpus validus), Schoenoplectus americanus (= Scirpus americanus)*, and *Sagittaria latifolia*.

ENVIRONMENT & DYNAMICS

Environmental Description: This alliance includes very wet or partially submerged forb vegetation of rivershores and lakeshores, and sometimes of artificial ponds and impoundments.

Dynamics:

DISTRIBUTION

Geographic Range: This alliance is found in the northeastern and midwestern United States from Virginia north to New York and Maine and west to Minnesota, Iowa, and possibly into the Great Plains. It also occurs in southern Quebec.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: AL?, AR, CT, IA, IL, KY, MA, ME, MI, MN, MS, NH, NJ, NY, ON, PA, QC, RI, SC, SD, TN, VA, VT, WI, WV
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

- **><** Artificial Pond (Smith 1991)
- **><** Natural Pond (Smith 1991)
- **?** Pickerel-weed - arrow-arum - arrowhead wetland (Fike 1999)
- **><** Stable Natural Pool (Smith 1991)

LOWER LEVEL UNITS

Associations:
- CEGL005240 *Sagittaria latifolia - Leersia oryzoides* Marsh
- CEGL006764 *Polygonum (hydropiper, punctatum, lapathifolium) - Bidens connata - Leersia oryzoides* Marsh
- CEGL007696 *Peltandra virginica - Saururus cernuus - Boehmeria cylindrica / Climacium americanum* Marsh
- CEGL004986 *Pontederia cordata - Sagittaria graminea - Sagittaria latifolia* Marsh
- CEGL005189 Low Forb Aquatic Marsh
- CEGL005151 (*Lemna* spp., *Rorippa* spp., *Heteranthera* spp., *Hydrocharis* spp.) Marsh
- CEGL006446 *Bidens cernua - Verbena hastata - Polygonum* spp. Marsh
- CEGL006191 *Pontederia cordata - Peltandra virginica - Sagittaria latifolia* Marsh
- CEGL004291 *Pontederia cordata - Peltandra virginica* Marsh
- CEGL006244 *Peltandra virginica - Polygonum amphibium var. emersum - Carex stricta - Impatiens capensis* Marsh

AUTHORSHIP

Primary Concept Source: J. Drake
Author of Description: J. Drake
Acknowledgments:
Version Date: 12/18/2014
Classif Resp Region: Midwest

REFERENCES

References: Faber-Langendoen et al. 2016b, Fike 1999, Smith 1991, Sneddon et al. 1996

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2. Shrub & Herb Vegetation
2.C.4.Nd. Eastern North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland
A3669. *Peltandra virginica - Pontederia cordata - Sagittaria* spp. Marsh Alliance

CEGL006446. *Bidens cernua - Verbena hastata - Polygonum* spp. Marsh

Type Concept Sentence:

OVERVIEW

Scientific Name: *Bidens cernua - Verbena hastata - Polygonum* spp. Marsh
Common Name (Translated Scientific Name): Nodding Beggarticks - Swamp Verbena - Smartweed species Marsh
Colloquial Name: Mixed Forb Marsh

Type Concept: This variable wetland type occurs in depressions, drainages, and basins that contain ponded water throughout the year. In general, waterflow out of the sites is restricted, either due to naturally occurring depressions or from beaver activity, roads, or berms. The vegetation is dominated by species that are tolerant of standing water, and species composition is extremely variable among sites. Common species may include *Eleocharis acicularis, Verbena hastata, Bidens cernua, Eupatorium maculatum, Leersia oryzoides, Polygonum hydropiper, Polygonum sagittatum, Equisetum arvense, Symphyotrichum novae-angliae, Schoenoplectus americanus, Carex stipata, Carex vulpinoidea, Eupatorium perfoliatum, Poa trivialis, Ludwigia palustris*, and/ or *Toxicodendron radicans*.

Classification Comments:

Similar NVC Types:

VEGETATION

Floristics: This herbaceous-dominated association contains standing water for most or all of the year and is often associated with impounded drainages, ponded areas near streams, or saturated areas surrounding drainages. The vegetation is dominated by species that are tolerant of standing water, and species composition is extremely variable among sites. Common species include *Eleocharis acicularis, Verbena hastata, Bidens cernua, Eupatorium maculatum, Leersia oryzoides, Polygonum hydropiper, Polygonum sagittatum, Equisetum arvense, Symphyotrichum novae-angliae, Schoenoplectus americanus, Carex stipata, Carex vulpinoidea, Eupatorium perfoliatum, Poa trivialis, Ludwigia palustris*, and/ or *Toxicodendron radicans*.

ENVIRONMENT & DYNAMICS

Environmental Description: This variable wetland type occurs in depressions, drainages, and basins that contain ponded water throughout the year. Waterflow out of the sites is typically restricted, either due to naturally occurring depressions or from beaver activity, roads, or berms. The vegetation is often restricted to the edges of the basins, with open water remaining in the center. These wetlands typically occur on very poorly drained soils such as mucky silt loam, shallow mucky peat, and, less occasionally, on ponded gravelly sand.

Dynamics:

DISTRIBUTION

Geographic Range: This community is described from Pennsylvania and New Jersey and probably ranges northward.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: CT?, MA?, NJ, NY, PA, RI?, VT?
TNC Ecoregions [optional]: 48:C, 60:C, 61:C, 62:C
USFS Ecoregions (1994/95): 212Fc:CCC, 221Ae:CCC, 221Bc:CCC, 221Bd:CCC, 222Ib:CCC
Omernik Ecoregions:

Federal Lands [optional]: NPS (Appalachian Trail [Lower New England], Delaware Water Gap, Gateway, Saratoga, Upper Delaware); USFWS (Iroquois)

CONSERVATION STATUS

Grank (Review Date): GNR (2006/2/7)
Greasons: Better data on this community are needed in order to assign a conservation rank to it.
Ranking Author (Version): E. Largay (2007/6/28)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Unassigned.

SYNONYMY

Synonymy:
- **<** Mixed Forb Marsh (Fike 1999) [low confidence]

AUTHORSHIP

Primary Concept Source: S.J. Perles
Author of Description: S.C. Gawler, mod. E. Largay
Acknowledgments:
Version Date: 2007/06/28

REFERENCES

References: Edinger et al. 2002, Edinger et al. 2007, Edinger et al. 2008a, FNA Editorial Committee 2006, Fike 1999, NRCS 2001b, NRCS 2004a, Perles et al. 2007, Perles et al. 2008, Walz et al. 2008.

NYC NAC Association Description based on 5 plots (CEGL006446):

Overstory trees are sparse and may include white mulberry (Morus alba) and silver maple (Acer saccharinum).

Midstory plants are sparse and may include redosier dogwood (Cornus sericea) and boxelder (Acer negundo).

Vines include eastern poison ivy (Toxicodendron radicans), Amur peppervine (Ampelopsis brevipedunculata), .

Understory plants include common reed (Phragmites australis), common wormwood (Artemisia vulgaris), jewelweed (Impatiens capensis), marshpepper knotweed (Polygonum hydropiper), marsh seedbox (Ludwigia palustris), purple loosestrife (Lythrum salicaria), common yellow oxalis (Oxalis stricta), Nepalese browntop (Microstegium vimineum), American water plantain (Alisma subcordatum), Canada lettuce (Lactuca canadensis), crimsoneyed rosemallow (Hibiscus moscheutos), bull thistle (Cirsium vulgare), tall blue lettuce (Lactuca biennis), eastern baccharis (Baccharis halimifolia), jumpseed (Polygonum virginianum), spikerush (Eleocharis sp.), stinging nettle (Urtica dioica), silver maple (Acer saccharinum), common blue violet (Viola sororia), green arrow arum (Peltandra virginica), spotted ladysthumb (Polygonum persicaria), common rush (Juncus effusus), deadnettle (Lamium sp.), boxelder (Acer negundo), garlic mustard (Alliaria petiolata), American burnweed (Erechtites hieraciifolius), neckweed (Veronica peregrina), hop sedge (Carex lupulina), goldenrod (Solidago sp.), beggarticks (Bidens), whitegrass (Leersia virginica), duckweed (Lemna sp.), multiflora rose (Rosa multiflora), and Canadian clearweed (Pilea pumila).

G167. Eastern North American Shrub Swamp

This group encompasses mineral-soil wetlands dominated by tall shrubs in the northeastern and north-central United States and adjacent Canada, commonly dominated by either *Alnus incana ssp. rugosa* or *Alnus serrulata*, with *Cornus sericea* and/or *Spiraea alba*.

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2. Shrub & Herb Vegetation
2.C.4.Nd. Eastern North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland
2.C.4.Nd.2.b. G167 Eastern North American Shrub Swamp

A3670. *Cephalanthus occidentalis - Decodon verticillatus* Shrub Swamp Alliance

Type Concept Sentence: This buttonbush swamp shrubland occurs in wetlands throughout glaciated regions of the midwestern and northeastern United States and adjacent Canada. *Cephalanthus occidentalis* or *Decodon verticillatus* typically comprises nearly 90% of the shrub layer in waters 1-2 m deep.

OVERVIEW

Scientific Name: *Cephalanthus occidentalis - Decodon verticillatus* Shrub Swamp Alliance
Common Name (Translated Scientific Name): Common Buttonbush - Swamp-loosestrife Shrub Swamp Alliance
Colloquial Name: Buttonbush - Swamp-loosestrife Shrub Swamp

Type Concept: The alliance is wide-ranging, throughout glaciated regions of the midwestern and northeastern United States and adjacent Canada. The vegetation is characterized by *Cephalanthus occidentalis* or *Decodon verticillatus* and occurs in depressions, oxbow ponds, and backwater sloughs of stream and river floodplains in waters 1-2 m deep. Occasional shrub associates include any number of *Salix* spp. or *Cornus* spp., as well as *Ilex verticillata, Rosa palustris, Vaccinium corymbosum*, and *Viburnum dentatum*. Floating aquatics, such as *Lemna* spp., can be common in deepwater habitats, whereas a variety of forbs and graminoids are associates under less flooded conditions. These include *Bidens tripartita, Boehmeria cylindrica, Glyceria* spp., *Leersia oryzoides, Polygonum* spp., *Scutellaria lateriflora, Sium suave*, and a wide variety of *Carex* spp. Inundation is usually continuous throughout the year, but these sites can become dry in mid or late summer or during periods of prolonged drought.

Classification Comments: Review is needed to see if both *Cephalanthus occidentalis* and *Decodon verticillatus* stands share enough in common to be treated within the same alliance.

Similar NVC Types:
- A1011 *Cephalanthus occidentalis* Shrub Swamp Alliance

Diagnostic Characteristics: Dominance by either *Cephalanthus occidentalis* or *Decodon verticillatus*, in semipermanently flooded settings with water up to 2 m deep.

VEGETATION

Physiognomy and Structure: Stands vary from dense tall-shrub thickets to open shrublands. Tree canopy may reach 10% in some stands.

Floristics: The vegetation is characterized by *Cephalanthus occidentalis* or *Decodon verticillatus* as dominants. Occasional shrub associates include any number of *Salix* spp. or *Cornus* spp., as well as *Ilex verticillata, Rosa palustris, Vaccinium corymbosum*, and *Viburnum dentatum*. Floating aquatics, such as *Lemna* spp., can be common in deepwater habitats, whereas a variety of forbs and graminoids are associates under less flooded conditions. These include *Bidens tripartita, Boehmeria cylindrica, Glyceria* spp., *Leersia oryzoides, Polygonum* spp., *Scutellaria lateriflora, Sium suave*, and a wide variety of *Carex* spp. (Anderson 1982, Tyrrell 1987, Faber-Langendoen and Maycock 1989).

ENVIRONMENT & DYNAMICS

Environmental Description: This shrubland occupies shallow water depressions, oxbow ponds, sinkhole ponds, and backwater sloughs of stream and river floodplains throughout swampy forested areas. Inundation is usually continuous throughout the year, but these sites can become dry in mid or late summer or during periods of prolonged drought (Faber-Langendoen and Maycock 1989). *Cephalanthus* appears to be very tolerant of extended periods of inundation which, by slowing canopy closure of trees and maintaining higher light levels, may favor this shrub (Conner et al. 1981). Soils can vary in texture from clays to sands, with organic horizons overlying these soils.

Dynamics:

DISTRIBUTION

Geographic Range: The alliance is wide-ranging and is found throughout glaciated regions of the midwestern and northeastern United States and adjacent Canada.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: CT, DC, DE, IA, IL, IN, MA, MD, ME, MI, NH, NJ, NY, OH, ON, PA, QC, RI, VA, VT, WV
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

- **?** Buttonbush wetland (Fike 1999)
- **?** Water-willow (*Decodon verticillatus*) shrub wetland (Fike 1999)

LOWER LEVEL UNITS

Associations:

- CEGL006069 *Cephalanthus occidentalis - Decodon verticillatus* Shrub Swamp
- CEGL002190 *Cephalanthus occidentalis / Carex* spp. Northern Shrub Swamp
- CEGL003905 *Decodon verticillatus* Southeastern Shrub Swamp
- CEGL002191 *Cephalanthus occidentalis / Carex* spp. - *Lemna* spp. Southern Shrub Swamp
- CEGL005089 *Decodon verticillatus* Shrub Swamp
- CEGL004075 *Cephalanthus occidentalis - (Leucothoe racemosa) / Carex joorii* Shrub Swamp

AUTHORSHIP

Primary Concept Source: D. Faber-Langendoen
Author of Description: D. Faber-Langendoen
Acknowledgments:
Version Date: 12/18/2014
Classif Resp Region: East

REFERENCES

References: Anderson 1982, Conner et al. 1981, Faber-Langendoen and Maycock 1989, Faber-Langendoen et al. 1996, Faber-Langendoen et al. 2016b, Fike 1999, Tyrrell 1987

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2. Shrub & Herb Vegetation
2.C.4.Nd. Eastern North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland
A3670. *Cephalanthus occidentalis - Decodon verticillatus* Shrub Swamp Alliance

CEGL006069. *Cephalanthus occidentalis - Decodon verticillatus* Shrub Swamp

Type Concept Sentence:

OVERVIEW

Scientific Name: *Cephalanthus occidentalis - Decodon verticillatus* Shrub Swamp
Common Name (Translated Scientific Name): Common Buttonbush - Swamp-loosestrife Shrub Swamp
Colloquial Name: Northeastern Buttonbush Shrub Swamp

Type Concept: This buttonbush swamp occurs in the northeastern United States. These swamps experience prolonged or semipermanent flooding for much of the growing season, with water tables receding below the soil surface only during drought or very late in the growing season. They occur in a variety of environmental settings, including backwater sloughs or oxbow ponds, wet swales in floodplains, pond and lake borders, and small, isolated depressions where water levels recede very slowly, such as those with perched water tables. The substrate is typically loose muck. *Cephalanthus occidentalis* is dominant and often monotypic. Occasional associates depend on the environmental setting and most often occur in drier areas. They include *Vaccinium corymbosum, Rhododendron viscosum, Acer rubrum, Cornus* spp. closer to upland borders, or *Acer saccharinum, Fraxinus pennsylvanica*, and *Viburnum dentatum* where adjacent to floodplains, or *Decodon verticillatus, Chamaedaphne calyculata*, and *Spiraea alba var. latifolia* in more stagnant basins. Herbaceous species tend to be sparse but can include *Glyceria canadensis, Dulichium arundinaceum, Carex stricta, Scirpus cyperinus, Thelypteris palustris, Leersia oryzoides, Acorus calamus, Alisma plantago-aquatica, Polygonum* spp., *Sparganium* spp., and floating or submerged aquatic species such as *Lemna minor, Potamogeton natans*, and *Nuphar variegata (= Nuphar lutea ssp. variegata)*. Bryophytes, if present, cling to shrub bases and include *Warnstorfia fluitans (= Drepanocladus fluitans), Drepanocladus aduncus*, or *Sphagnum fallax*. In disturbed areas, these wetland may be invaded by *Lythrum salicaria*.

Classification Comments: This type may be synonymous with *Cephalanthus occidentalis / Carex* spp. Northern Shrub Swamp (CEGL002190), although it also ranges south of the glaciation boundary in the east. CEGL002190 is distributed from the Western Allegheny Plateau (TNC Ecoregion 49) and Great Lakes (TNC Ecoregion 48) west to the Central Tallgrass Prairie (TNC Ecoregion 36), while this type occurs from the Central Appalachian Forest (TNC Ecoregion 59) and High Allegheny Plateau (TNC Ecoregion 60) east.

Other Comments: J. Harrison (pers. comm. 2006) states: "In the Chesapeake Marshlands National Wildlife Refuge complex, an example of this community occurs at the Buttons Creek headwater swamp. It is a nontidal shrub swamp characterized by *Rosa palustris, Cephalanthus occidentalis*, and *Decodon verticillatus*. Associates include *Acer rubrum, Polygonum* spp., *Leucothoe racemosa, Smilax rotundifolia*, and *Cyperus* sp. Distinct hummock-and-hollow microtopography is apparent throughout the swamp. Along the upland edge interface species such as *Carex crinita, Osmunda regalis, Thelypteris palustris*, and *Ilex verticillata* grow beneath a canopy of *Liquidambar styraciflua, Acer rubrum , Nyssa sylvatica*, and *Quercus* spp. In contrast, *Chamaedaphne calyculata*, *Acer saccharinum*, and *Spiraea alba var. latifolia* do not occur in the Chesapeake Marshlands examples of this community."

Similar NVC Types:
- CEGL002190 *Cephalanthus occidentalis / Carex* spp. Northern Shrub Swamp
- CEGL004075 *Cephalanthus occidentalis - (Leucothoe racemosa) / Carex joorii* Shrub Swamp
- CEGL002191 *Cephalanthus occidentalis / Carex* spp. - *Lemna* spp. Southern Shrub Swamp

VEGETATION

Floristics: This association includes buttonbush swamps of the eastern and northeastern United States. These swamps experience prolonged or semipermanent flooding for much of the growing season with water tables receding below the soil surface only during drought or very late in the growing season. They occur in a variety of environmental settings including backwater sloughs or oxbow ponds, wet swales in floodplains, pond and lake borders, and small isolated depressions where water levels recede very slowly, such as those with perched water tables. *Cephalanthus occidentalis* is dominant and often monotypic. Scattered *Acer rubrum* trees may be present in the wetland. Occasional associates depend on the environmental setting, and some only occur in drier areas. They include *Vaccinium corymbosum, Rhododendron viscosum, Acer rubrum, Salix* spp., *Cornus amomum* or *Cornus sericea* closer to upland borders, or *Acer saccharinum, Fraxinus pennsylvanica*, or *Viburnum dentatum* where adjacent to floodplains, or *Decodon verticillatus, Chamaedaphne calyculata*, and *Spiraea alba var. latifolia* in more stagnant basins. Herbaceous species tend to be sparse but can include *Glyceria canadensis, Dulichium arundinaceum, Carex stricta, Scirpus cyperinus, Osmunda regalis, Thelypteris palustris, Bidens* spp., *Sium suave, Scutellaria lateriflora, Alisma plantago-aquatica, Polygonum* spp., *Sparganium* spp., and floating or submerged aquatic species such as *Lemna minor, Potamogeton natans*, and *Nuphar variegata (= Nuphar lutea ssp. variegata)*. Bryophytes, if present, cling to shrub bases and include *Warnstorfia fluitans (= Drepanocladus fluitans), Drepanocladus aduncus*, or *Sphagnum fallax*.

ENVIRONMENT & DYNAMICS

Environmental Description: This association includes buttonbush swamps that experience prolonged or semipermanent flooding for much of the growing season with water tables receding below the soil surface only during drought or very late in the growing season. They occur in a variety of environmental settings including backwater sloughs or oxbow ponds, wet swales in floodplains, pond and lake borders, and small, isolated depressions where water levels recede very slowly, such as those with perched water tables. Soils are often organic mucks or silt loams.

Dynamics:

DISTRIBUTION

Geographic Range: This association is found throughout the northeastern United States (an estimated 450,000 square km based on subsection attribution).

Spatial Scale & Pattern [optional]: Small patch
Nations: CA, US
States/Provinces: CT, DC, DE, MA, MD, ME, NH, NJ, NY, PA, QC, RI, VA, VT
TNC Ecoregions [optional]: 49:C, 58:C, 59:C, 60:C, 61:C, 62:C, 63:C
USFS Ecoregions (1994/95): 212Dc:CCC, 212Fa:CCC, 212Fb:CCC, 212Fc:CCC, 212Fd:CCC, 212Ga:CCC, 212Gb:CCC, 221Aa:CCP, 221Ab:CCC, 221Ae:CCC, 221Af:CCC, 221Ag:CCC, 221Ah:CCC, 221Ai:CCC, 221Al:CCC, 221Ba:CCC, 221Bb:CCC, 221Bc:CCC, 221Bd:CCC, 221Da:CCC, 221Ea:CCC, 221Fa:CCC, 231:C, 232Ad:CCC, 232Bt:CCC, 232C:CC, 234:C, M212A:CP, M212Bb:CCC, M212Bd:CCC, M212Cb:CCC, M212Cc:CCC, M212De:CCC, M212Ea:CCC, M212Eb:CCC, M221Aa:CCC, M221Ab:CCC, M221Ac:CCC, M221Ad:CCC, M221Bb:CCC, M221Bd:CCC, M221Be:CCC, M221Bf:CCP, M221Da:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Appalachian Trail [Lower New England], Boston Harbor Islands, C&O Canal, Cape Cod, Delaware Water Gap, Minute Man, National Capital-East, Saratoga, Weir Farm); USFWS (Assabet River?, Chesapeake Marshlands, Great Meadows, Great Swamp, Monomoy, Nomans Land Island, Oxbow, Patuxent)

CONSERVATION STATUS

Grank (Review Date): G4G5 (2007/1/31)
Greasons: This association is widely distributed in the northeastern U.S. and relatively common in its small-patch setting. It is vulnerable to groundwater disruption, agricultural runoff, and adjacent forest clearing.
Ranking Author (Version): S.C. Gawler, mod. L.A. Sneddon (2007/1/31)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:
- = *Cephalanthus occidentalis / Glyceria canadensis* Shrubland (Harrison 2004)

- = *Cephalanthus occidentalis / Glyceria canadensis* community (Metzler and Barrett 2001)
- ? *Cephalanthus occidentalis* Semi-permanently Flooded Shrubland (Clancy 1996)
- ? Buttonbush Swamp (Kettle Basin Shrub Swamp) (Thompson 1996)
- ? Buttonbush Wetland (Fike 1999)
- ? Buttonbush semipermanently flooded shrub swamp (CAP pers. comm. 1998)
- < Mixed Graminoid - Shrub Marsh (Gawler 2002)
- ? Palustrine Broad-leaved Deciduous Scrub-Shrub Wetland, Seasonally Flooded (PSS1C) (Cowardin et al. 1979)
- = Scrub/Shrub Wetland, *Cephalanthus occidentalis* variant (Enser 1999)

AUTHORSHIP

Primary Concept Source: S.L. Neid
Author of Description: S.L. Neid, mod. E. Southgate, L.A. Sneddon, S.C. Gawler, E. Largay
Acknowledgments:
Version Date: 2006/06/21

REFERENCES

References: Bowman 2000, Breden et al. 2001, CAP pers. comm. 1998, Clancy 1996, Cowardin et al. 1979, Coxe 2009, Edinger et al. 2002, Edinger et al. 2007, Eichelberger and Zimmerman 2011b, Elliman 2003, Enser 1999, Fike 1999, Fleming and Patterson 2011a, Fleming et al. 2001, Gawler 2002, Gawler and Cutko 2010, Gawler et al. 2005, Harrison 2004, Harrison 2011, Harrison, J. pers. comm., Hopping 2000, Karanaukas 2001, Largay and Sneddon 2010, Metzler and Barrett 2001, Metzler and Barrett 2006, Metzler et al. 2009, NRCS 2004a, Nichols et al. 2001, Perles et al. 2007, Sneddon et al. 2010, Sperduto 2000b, Sperduto and Nichols 2004, Swain and Kearsley 2001, Thompson 1996, Thompson and Sorenson 2000, Zimmerman et al. 2012.

NYC NAC Association Description based on 3 plots (CEGL006069):

The midstory is dominated by common buttonbush (Cephalanthus occidentalis). Black willow (Salix nigra) may be present in the midstory.

The understory is dominated by common buttonbush (Cephalanthus occidentalis) and swamp loosestrife (Decodon verticillatus). Other understory plants include Virginia marsh St. Johnswort (Triadenum virginicum), green arrow arum (Peltandra virginica), duckweed (Lemna sp.), beggarticks (Bidens), swamp smartweed (Polygonum hydropiperoides), dodder (Cuscuta sp.), smallspike false nettle (Boehmeria cylindrica), rice cutgrass (Leersia oryzoides), marshpepper knotweed (Polygonum hydropiper), blue skullcap (Scutellaria lateriflora), and common marsh bedstraw (Galium palustre).

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2. Shrub & Herb Vegetation
2.C.4.Nd. Eastern North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland
2.C.4.Nd.2.b. G167 Eastern North American Shrub Swamp

A3656. *Cornus sericea - Salix* spp. Shrub Swamp Alliance

Type Concept Sentence: This alliance, which is widespread in the midwestern and northeastern United States and eastern temperate Canada, is a wet shrub swamp with typically organic soils. Stands are dominated by deciduous shrubs 1-2 m tall, including *Cornus sericea, Salix bebbiana, Salix discolor*, and *Salix exigua*.

OVERVIEW

Scientific Name: *Cornus sericea - Salix* spp. Shrub Swamp Alliance
Common Name (Translated Scientific Name): Red-osier Dogwood - Willow species Shrub Swamp Alliance
Colloquial Name: Red-osier Dogwood - Willow Shrub Swamp

Type Concept: This alliance, which is widespread in the midwestern and northeastern United States and eastern temperate Canada, is a wet shrub swamp with organic or mineral soils. Stands are dominated by deciduous shrubs 1-2 m tall with a moderate to nearly continuous shrub canopy. Dominant shrubs are *Cornus sericea, Salix bebbiana, Salix discolor*, and *Salix exigua*. *Vaccinium corymbosum* is codominant in some stands. Other common shrubs include *Alnus incana, Alnus serrulata, Cornus racemosa, Cornus amomum, Sambucus canadensis*, and *Spiraea alba*. Herbaceous and woody vines may be abundant. Typical ground layer species include *Asclepias incarnata, Calamagrostis* spp., *Carex* spp., *Clematis virginiana, Parthenocissus vitacea, Toxicodendron radicans*, and *Typha latifolia*. Scattered trees, such as *Acer* spp., *Fraxinus pennsylvanica*, and *Ulmus americana*, can occasionally be found in this alliance. It is usually found on organic soils, either consolidated peats or mucks. Some stands are on mineral substrates. These sites are usually inundated for part of the growing season and remain wet for most of the year, except in drought years.

Classification Comments: This alliance is often found as a ring around open water or more permanently flooded vegetation (White and Madany 1978). Most examples of this alliance in pre-European settlement times were probably small (Curtis 1959, Anderson

1982). Since settlement, large stands have developed in some places after the cutting of swamp forests. Most sites are probably non-alluvial. In the northeastern U.S. this type is not as clearly recognizable (e.g., see Thompson and Sorenson 2000, Sperduto and Nichols 2004), whereas the alluvial (mineral soil) versus swamp (organic soil) distinction is recognized.

Similar NVC Types:
- A1018 *Vaccinium corymbosum* Peat Shrubland Alliance

Diagnostic Characteristics: Dominant shrubs are *Cornus sericea, Salix bebbiana, Salix discolor*, and *Salix exigua*. *Vaccinium corymbosum* is codominant in some stands.

VEGETATION

Physiognomy and Structure: Stands are dominated by deciduous shrubs 1-2 m tall with a moderate to nearly continuous shrub canopy.

Floristics: Dominant shrubs are *Cornus sericea, Salix bebbiana, Salix discolor*, and *Salix exigua*. *Vaccinium corymbosum* is codominant in some stands. Other common shrubs include *Alnus incana, Alnus serrulata, Cornus racemosa, Cornus amomum, Sambucus canadensis*, and *Spiraea alba*. Herbaceous and woody vines may be abundant (Curtis 1959). Typical ground layer species include *Asclepias incarnata, Calamagrostis* spp., *Carex* spp., *Clematis virginiana, Parthenocissus vitacea, Toxicodendron radicans*, and *Typha latifolia*. Scattered trees, such as *Acer* spp., *Fraxinus pennsylvanica*, and *Ulmus americana*, can occasionally be found in this alliance (Chapman 1986).

ENVIRONMENT & DYNAMICS

Environmental Description: This alliance is usually found on organic soils, either consolidated peats or mucks. Some stands are on mineral substrates (MNNHP 1993). These sites are usually inundated for part of the growing season and remain wet for most of the year, except in drought years. Though they probably occur most often in non-alluvial settings, it's possible that they may be found in alluvial settings too.

Dynamics:

DISTRIBUTION

Geographic Range: This alliance is widespread in the midwestern and northeastern United States and eastern temperate Canada.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: CT, IA, IL, IN, MA, MB, MI, MN, ND, NJ, NY, OH, ON, PA, QC, WI
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

- **?** Shrub-Carr (Curtis 1959) [Wisconsin]

LOWER LEVEL UNITS

Associations:
- CEGL002187 *Cornus sericea - Salix (bebbiana, discolor, petiolaris) / Calamagrostis stricta* Shrub Swamp
- CEGL002186 *Cornus sericea - Salix* spp. - (*Rosa palustris*) Shrub Swamp
- CEGL006576 *Cornus (amomum, sericea) - Viburnum dentatum - Rosa multiflora* Ruderal Shrub Swamp
- CEGL005206 *Cornus racemosa - Salix* spp. - *Baptisia australis* Shrub Swamp

AUTHORSHIP

Primary Concept Source: J. Drake
Author of Description: D. Faber-Langendoen
Acknowledgments:
Version Date: 12/18/2014
Classif Resp Region: East

REFERENCES

References: Anderson 1982, Chapman et al. 1989, Curtis 1959, Faber-Langendoen et al. 1996, Faber-Langendoen et al. 2016b, MNNHP 1993, Sperduto and Nichols 2004, Thompson and Sorenson 2000, White and Madany 1978

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2. Shrub & Herb Vegetation
2.C.4.Nd. Eastern North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland
A3656. *Cornus sericea - Salix* spp. Shrub Swamp Alliance

CEGL006576. *Cornus (amomum, sericea) - Viburnum dentatum - Rosa multiflora* Ruderal Shrub Swamp

Type Concept Sentence:

OVERVIEW

Scientific Name: *Cornus (amomum, sericea) - Viburnum dentatum - Rosa multiflora* Ruderal Shrub Swamp
Common Name (Translated Scientific Name): (Silky Dogwood, Red-osier Dogwood) - Southern Arrow-wood - Multiflora Rose Ruderal Shrub Swamp
Colloquial Name: Ruderal Dogwood - Arrow-wood Shrub Swamp

Type Concept: This tall successional shrub community typically floods early in the growing season and may be saturated to near the surface for some of the growing season, but it is generally dry for much of the year. It typically occurs in low-lying areas of old fields or pastures, or the edges of beaver-impacted wetlands or impoundments. The vegetation is dominated by tall shrubs, usually 2-4 m in height. This is a successional community in transition between a successional old field and a modified successional forest. Vegetation can be highly variable, and no one species is dominant. *Cornus amomum, Cornus sericea, Viburnum dentatum, Spiraea alba var. latifolia, Rosa multiflora, Rubus allegheniensis*, and *Rubus hispidus* are all typically present and abundant. *Salix* spp. may also be present but are less common. Scattered individuals of *Acer rubrum* or *Fraxinus pennsylvanica* may also occur within the shrubland. Herbaceous species are inversely proportional to shrub cover; they can be dense where the shrub canopy is open. Species can include *Solidago rugosa, Solidago gigantea, Eupatorium maculatum, Phragmites australis, Phalaris arundinacea, Apocynum cannabinum, Vernonia* sp., and *Onoclea sensibilis*.

Classification Comments:

Similar NVC Types:

- CEGL006451 *Elaeagnus umbellata - Cornus racemosa - Rosa multiflora - Juniperus virginiana* Ruderal Shrubland: is an upland successional shrubland occurring on abandoned old fields and pastures.
- CEGL005087 *Cornus amomum - Salix* spp. - *Toxicodendron vernix - Rhamnus lanceolata* Fen: is a tall shrub fen.
- CEGL005088 *Cornus sericea - Cornus amomum - Photinia melanocarpa - Viburnum lentago* Fen: is a tall shrub fen.
- CEGL002186 *Cornus sericea - Salix* spp. - (*Rosa palustris*) Shrub Swamp: is a midwestern circumneutral shrub swamp type that does not contain alder and is dominated by *Salix* spp. and *Cornus sericea*.
- CEGL006062 *Alnus incana - Cornus (amomum, sericea) / Clematis virginiana* Shrub Swamp: is an alluvial shrub swamp type with a prominent alder component.
- CEGL006571 *Spiraea tomentosa - Rubus* spp. / *Phalaris arundinacea* Ruderal Wet Shrubland: is a successional wet meadow that has shrub-dominated and herb-dominated expressions, but because the shrubs are usually only about 1 m tall, this gives the impression of a wet meadow type rather than a shrubland. *Cornus* can occur in both types but is not dominant in the *Spiraea - Rubus* type.

VEGETATION

Floristics: The structure of this association varies from abandoned wet fields with tall and short shrubs (>25% cover) with herbaceous vegetation in the interstices (<25% cover), to dense "closed-canopy" tall shrublands with sparse ground-layer vegetation. Vegetation can be highly variable, and no one species is dominant. *Cornus amomum, Cornus sericea, Viburnum dentatum, Spiraea alba var. latifolia, Rosa multiflora, Rubus allegheniensis*, and *Rubus hispidus* are all typically present and abundant. *Salix* spp. may also be present but are less common. Scattered individuals of *Acer rubrum* or *Fraxinus pennsylvanica* may also occur within the shrubland but form less than 25% cover. Herbaceous species are inversely proportional to shrub cover; they can be dense where the shrub canopy is open. Species can include *Solidago rugosa, Solidago gigantea, Eupatorium maculatum, Phragmites australis, Phalaris arundinacea, Apocynum cannabinum, Vernonia* sp., and *Onoclea sensibilis*.

ENVIRONMENT & DYNAMICS

Environmental Description: This tall, modified, wet successional shrubland occurs in low-lying areas of old fields or pastures, or the edges of beaver-impacted wetlands and impoundments. It typically floods early in the growing season and may be saturated to near the surface for some of the growing season, but it is generally dry for much of the year.

Dynamics: This community is in transition between a wet successional old field and a modified wet successional forest.

DISTRIBUTION

Geographic Range: This successional shrubland occurs throughout the northeastern United States.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: CT, MA, NJ, NY, PA, VT
TNC Ecoregions [optional]: 48:C, 49:C, 60:C, 61:C
USFS Ecoregions (1994/95): 221Ai:CCC, 221Bb:CCC, 221Fa:CCC, 222Ib:CCC, 222Ic:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Appalachian Trail [Central Appalachians], Appalachian Trail [Lower New England], Minute Man, Roosevelt-Vanderbilt); USFWS (E.B. Forsythe, Erie, Great Swamp?, Iroquois, Montezuma)

CONSERVATION STATUS

Grank (Review Date): GNA (ruderal) (2007/2/12)
Greasons: This association is a successional community occurring on abandoned old fields and pastures and, therefore, does not receive a conservation status rank.
Ranking Author (Version): E. Largay (2007/2/12)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low - Poorly Documented.

SYNONYMY

Synonymy:

AUTHORSHIP

Primary Concept Source: S. Gawler
Author of Description: E. Largay and S. Gawler
Acknowledgments:
Version Date: 2012/03/07

REFERENCES

References: Edinger et al. 2002, Gawler et al. 2005, NatureServe 2009

NYC NAC Association Description based on 3 plots (CEGL006576):

Overstory trees are sparse and include bitternut hickory (Carya cordiformis), swamp white oak (Quercus bicolor), and oak (Quercus sp.).

Midstory plants include silky dogwood (Cornus amomum), southern arrowwood (Viburnum dentatum), ash (Fraxinus sp.), bitternut hickory (Carya cordiformis), sweetgum (Liquidambar styraciflua), slippery elm (Ulmus rubra), red maple (Acer rubrum), winged sumac (Rhus copallinum), coastal sweetpepperbush (Clethra alnifolia), northern spicebush (Lindera benzoin), green ash (Fraxinus pennsylvanica), common winterberry (Ilex verticillata), wayfaringtree (Viburnum lantana), blackgum (Nyssa sylvatica), eastern cottonwood (Populus deltoides), staghorn sumac (Rhus typhina), and American hornbeam (Carpinus caroliniana).

Vines include Amur peppervine (Ampelopsis brevipedunculata), Virginia creeper (Parthenocissus quinquefolia), Japanese honeysuckle (Lonicera japonica), eastern poison ivy (Toxicodendron radicans), Chinese wisteria (Wisteria sinensis), devil's darning needles (Clematis virginiana), and trumpet creeper (Campsis radicans).

Understory plants include silky dogwood (Cornus amomum), southern arrowwood (Viburnum dentatum), jewelweed (Impatiens capensis), common rush (Juncus effusus), multiflora rose (Rosa multiflora), skunk cabbage (Symplocarpus foetidus), common reed (Phragmites australis), northern dewberry (Rubus flagellaris), Japanese knotweed (Polygonum cuspidatum), blackberry (Rubus), northern spicebush (Lindera benzoin), touch-me-not (Impatiens), smallspike false nettle (Boehmeria cylindrica), Oriental lady's thumb (Polygonum cespitosum), primrose-willow (Ludwigia sp.), oneseed bur cucumber (Sicyos angulatus), and slippery elm (Ulmus rubra).

CEGL002186. *Cornus sericea - Salix* spp. - (*Rosa palustris*) Shrub Swamp

Type Concept Sentence:

OVERVIEW

Scientific Name: *Cornus sericea - Salix* spp. - (*Rosa palustris*) Shrub Swamp
Common Name (Translated Scientific Name): Red-osier Dogwood - Willow species - (Swamp Rose) Shrub Swamp
Colloquial Name: Red-osier Dogwood - Willow Shrub Swamp

Type Concept: This dogwood - willow shrub swamp community is found in the upper midwestern region of the United States and Canada. Stands are found along streams and lakes, or in upland depressions. Hydrology is variable but is typically seasonally flooded. Soils are wet, organic, and minerotrophic, with either highly decomposed peat or fine mineral soils. The vegetation is dominated by tall shrubs between 1 and 3 m tall, with at least 25% cover, and often very dense (>60% cover). More open stands may have high graminoid cover. Trees may be scattered but cover less than 25%. Composition of the shrub layer is quite diverse, primarily due to the diversity of *Salix* spp., which collectively share dominance with *Cornus sericea*. Willow species include *Salix bebbiana, Salix discolor, Salix eriocephala, Salix interior, Salix fragilis*, and *Salix petiolaris*. Other shrub associates include *Cephalanthus occidentalis* (southeastward), *Cornus amomum, Ribes americanum, Rosa palustris* (more common eastward), *Rosa blanda* and *Rosa woodsii var. woodsii (= Rosa macounii)* (more common westward), *Rubus pubescens* (northward), *Rubus idaeus ssp. strigosus (= Rubus strigosus), Sambucus canadensis, Spiraea alba*, and *Viburnum lentago*. Woody vines present include *Clematis virginiana, Parthenocissus quinquefolia*, and *Toxicodendron radicans*. Characteristic herbs include *Asclepias incarnata, Symphyotrichum lanceolatum var. lanceolatum (= Aster simplex), Calamagrostis canadensis, Eupatorium maculatum, Glyceria striata (= Glyceria nervata), Impatiens capensis (= Impatiens biflora), Lycopus americanus, Lycopus uniflorus, Phalaris arundinacea, Solidago gigantea*, and *Thalictrum dasycarpum*. A variety of sedges may dominate more open stands, including *Carex lacustris* and *Carex stricta*. Tree species include *Acer rubrum, Fraxinus pennsylvanica*, and *Ulmus americana*.

Classification Comments: The closely related shrub meadow type is *Cornus sericea - Salix (bebbiana, discolor, petiolaris) / Calamagrostis stricta* Shrub Swamp (CEGL002187), with which this type intergrades, and which generally has a more open shrub cover (25-50% cover). It's conceivable that the two types could be combined. It is also possible that a number of different *Salix* and *Cornus* shrub swamp types could be recognized with further study. A boreal/sub-boreal type may also be needed (e.g., Harris et al. 1996). Rich shrub fens, typically on a more peaty substrate or with calcareous indicators overlap to some degree with this type, but are a separate group (e.g., *Cornus amomum - Salix* spp. - *Toxicodendron vernix - Rhamnus lanceolata* Fen (CEGL005087) and *Cornus sericea - Cornus amomum - Photinia melanocarpa - Viburnum lentago* Fen (CEGL005088)). In Ontario, a coarsely defined type, Mixed Deciduous Shrub Swamp (CEGL005086), covers a number of more locally dominant species recorded there, e.g., shrub swamps dominated by any of the following: *Acer spicatum, Lindera benzoin, Viburnum dentatum, Viburnum lentago* (Bakowsky and Lee 1996, Lee et al. 1998). In New York, this type may occur on the Great Lakes plain.

Similar NVC Types:

- CEGL005087 *Cornus amomum - Salix* spp. - *Toxicodendron vernix - Rhamnus lanceolata* Fen: is a tall shrub fen.
- CEGL005228 *Chamaedaphne calyculata - Myrica gale / Carex lasiocarpa* Fen
- CEGL005088 *Cornus sericea - Cornus amomum - Photinia melanocarpa - Viburnum lentago* Fen: is a tall shrub fen.
- CEGL006576 *Cornus (amomum, sericea) - Viburnum dentatum - Rosa multiflora* Ruderal Shrub Swamp
- CEGL002187 *Cornus sericea - Salix (bebbiana, discolor, petiolaris) / Calamagrostis stricta* Shrub Swamp: is somewhat drier, but grades into this type.
- CEGL002385 *Symplocarpus foetidus* - Mixed Forbs Seep
- CEGL005086 Mixed Deciduous Shrub Swamp: is a "collective" type, covering a number of different provincial types that contain dominant species that do not easily fit elsewhere.

VEGETATION

Floristics: The vegetation is dominated by tall shrubs between 1 and 3 m tall, with at least 25% cover, and often very dense (>60% cover). More open stands may have high graminoid cover. Trees may be scattered, but cover less than 25%. Composition of the shrub layer is quite diverse, primarily due to the diversity of *Salix* spp., which collectively share dominance with *Cornus sericea*. Willow species include *Salix bebbiana, Salix discolor, Salix eriocephala, Salix exigua (= Salix interior), Salix fragilis*, and *Salix petiolaris*. Other shrubs associates include *Cephalanthus occidentalis* (southeastward), *Cornus amomum, Ribes americanum, Rosa palustris* (more common eastward), *Rosa blanda* and *Rosa woodsii var. woodsii (= Rosa macounii)* (more common westward), *Rubus pubescens* (northward), *Rubus idaeus ssp. strigosus (= Rubus strigosus), Sambucus canadensis, Spiraea alba*, and *Viburnum lentago*. Woody vines present include *Clematis virginiana, Parthenocissus quinquefolia*, and *Toxicodendron radicans*. Characteristic herbs include *Asclepias incarnata, Symphyotrichum lanceolatum var. lanceolatum (= Aster simplex), Calamagrostis canadensis, Eupatorium maculatum, Glyceria striata (= Glyceria nervata), Impatiens capensis (= Impatiens biflora), Lycopus americanus, Lycopus uniflorus, Phalaris arundinacea, Solidago gigantea*, and *Thalictrum dasycarpum*. A variety of sedges may dominate more open stands,

including *Carex lacustris* and *Carex stricta*. Tree species include *Acer rubrum, Fraxinus pennsylvanica*, and *Ulmus americana* (Curtis 1959, White and Madany 1978, Chapman et al. 1989, Reschke 1990, MNNHP 1993, Harris et al. 1996).

ENVIRONMENT & DYNAMICS

Environmental Description: Stands are found along streams and lakes, or in upland depressions. Hydrology is variable, but is typically seasonally flooded. Soils are wet, organic, and minerotrophic, with either highly decomposed peat or fine mineral soils (Curtis 1959, Harris et al. 1996).

Dynamics: Shrub swamps may naturally succeed herbaceous wet meadows as part of successional series in lakes and ponds. They may also originate from clearing of forested swamps (Curtis 1959), or draining of wet meadows (MNNHP 1993). Such open herbaceous meadows may first succeed to a shrubby meadow before becoming a dense shrub swamp. Infrequent fires may have maintained shrub swamps in the western part of the range, preventing tree canopy closure (MNNHP 1993).

DISTRIBUTION

Geographic Range: This dogwood - willow shrubland swamp is found in the upper midwestern region of the United States and adjacent Canada, ranging from Minnesota east to western New York and Ontario, south to Illinois and Indiana.

Spatial Scale & Pattern [optional]: Large patch
Nations: CA, US
States/Provinces: IL, IN, MI, MN, NY, OH, ON, PA, QC, WI
TNC Ecoregions [optional]: 35:C, 36:C, 45:C, 46:C, 47:C, 48:C, 49:C, 64:P
USFS Ecoregions (1994/95): 212Hb:CCP, 212He:CC?, 212Hh:CC?, 212Hi:CCC, 212Hj:CC?, 212Hl:CC?, 212Hm:CC?, 212Ho:CCC, 212Hr:CC?, 212Hs:CC?, 212Ht:CCP, 212Hu:CCP, 212Hv:CC?, 212Hw:CCC, 212Hx:CC?, 212Ja:CPP, 212Jb:CPP, 212Jc:CPP, 212Je:CPP, 212Jf:CPP, 212Jj:CPP, 212Jl:CPP, 212Jm:CPP, 212Ka:CCP, 212Kb:CCC, 212La:CPP, 212Mb:CPP, 212Na:CCP, 212Nb:CCP, 212Nc:CCC, 221Ea:CCC, 221Fa:CCC, 222Ib:CCC, 222Ic:CCP, 222Id:CCP, 222Ja:CC?, 222Je:CCC, 222Ji:CCC, 222Jj:CCC, 222Ke:CCC, 222Kf:CCC, 222Lc:CCC, 222Mb:CCC, 222Mc:CCC, 222Md:CCC, 222Me:CCC, 222Na:CCC, 251Ba:CCC, 251Cf:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Indiana Dunes, Pictured Rocks, Saint Croix, Sleeping Bear Dunes, Voyageurs); USFS (Chequamegon, Chequamegon-Nicolet, Chippewa, Hiawatha, Nicolet, Ottawa?, Superior?); USFWS (Erie, Iroquois)

CONSERVATION STATUS

Grank (Review Date): G5 (1996/10/3)
Greasons:
Ranking Author (Version): (1996/10/3)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:
- **>** Gray Dogwood Mineral Thicket Swamp Type (Lee et al. 1998)
- **>** Gray Dogwood Organic Thicket Swamp Type (Lee et al. 1998)
- **>** Red-osier Mineral Thicket Swamp Type (Lee et al. 1998)
- **>** Red-osier Organic Thicket Swamp Type (Lee et al. 1998)
- **=** Shrub Carr (Curtis 1959)
- **=** Shrub Carr (Faber-Langendoen 2001)
- **<** Shrub Swamps (Anderson 1996)
- **>** Silky Dogwood Mineral Thicket Swamp Type (Lee et al. 1998)
- **=** Thicket swamp: tall willow (W36) (Harris et al. 1996)
- **>** Willow Mineral Thicket Swamp Type (Lee et al. 1998)
- **>** Willow Organic Thicket Swamp Type (Lee et al. 1998)
- **=** Willow Swamp (MNNHP 1993)

AUTHORSHIP

Primary Concept Source: D. Faber-Langendoen
Author of Description: D. Faber-Langendoen
Acknowledgments:
Version Date: 1998/12/08

REFERENCES

References: Anderson 1996, Bakowsky and Lee 1996, Borowitz and Stephenson 1985, CDPNQ unpubl. data, Chapman et al. 1989, Curtis 1959, Edinger et al. 2002, Faber-Langendoen 2001, Harris et al. 1996, Homoya et al. 1988, Hop et al. 1999, Hop et al. 2009,

Hop et al. 2010c, Kost et al. 2007, Lee et al. 1998, MNNHP 1993, Minnesota DNR 2003, Minnesota DNR 2005a, ONHD unpubl. data, Reschke 1990, WNHI 2011, WNHI unpubl. data, White and Madany 1978.

NYC NAC Association Description based on 2 plots (CEGL002186):

Midstory dominated or co-dominated by pussy willow (Salix discolor) and shrubby dogwood (Cornus spp.).

Understory plants include common reed (Phragmites australis), swamp smartweed (Polygonum hydropiperoides), American water horehound (Lycopus americanus), purple loosestrife (Lythrum salicaria), marsh seedbox (Ludwigia palustris), bedstraw (Galium sp.), jewelweed (Impatiens capensis), white snakeroot (Ageratina altissima),black nightshade (Solanum nigrum), small beggarticks (Bidens discoidea), American water plantain (Alisma subcordatum), common wormwood (Artemisia vulgaris), St. Johnswort (Hypericum sp.), green arrow arum (Peltandra virginica), Canadian clearweed (Pilea pumila), northern spicebush (Lindera benzoin), aster (Symphyotrichum sp.), and spikerush (Eleocharis sp.).

Vines include climbing hempvine (Mikania scandens), Amur peppervine (Ampelopsis brevipedunculata), hedge false bindweed (Calystegia sepium), and Virginia creeper (Parthenocissus quinquefolia),

M303. Eastern-Southeastern North American Ruderal Marsh, Wet Meadow & Shrubland

This macrogroup includes disturbed herbaceous or shrub marshes and wet meadows in the eastern and southeastern United States and southeastern Canada, which are dominated by native ruderal or exotic species.

G557. Southeastern Ruderal Marsh, Wet Meadow & Shrubland

These ruderal herbaceous and shrub wetlands tend to be dominated by *Andropogon glomeratus, Juncus effusus*, and exotic plant species, such as the exotic shrub *Ligustrum sinense* or exotic grasses *Pennisetum purpureum* or *Arundo donax*. Included here are wetlands disturbed by vehicles or equipment.

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2. Shrub & Herb Vegetation
2.C.4.Nd. Eastern North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland
2.C.4.Nd.90.a. G557 Southeastern Ruderal Marsh, Wet Meadow & Shrubland

A3413. *Arthraxon hispidus - Cyperus entrerianus - Pennisetum purpureum* Ruderal Marsh Alliance

Type Concept Sentence: These southern marshes are dominated by exotic plants, such as the exotic grasses *Pennisetum purpureum* or southern stands of the exotic *Phragmites australis ssp. australis* which are invasive in floodplains and marshes.

OVERVIEW

Scientific Name: *Arthraxon hispidus - Cyperus entrerianus - Pennisetum purpureum* Ruderal Marsh Alliance
Common Name (Translated Scientific Name): Small Carpgrass - Woodrush Flatsedge - Elephant Grass Ruderal Marsh Alliance
Colloquial Name: Southern Exotic Ruderal Graminoid Marsh

Type Concept: These southern marshes are dominated by exotic graminoid plants, such as *Arthraxon hispidus, Arundo donax, Cyperus sanguinolentus (= Cyperus sanguindentus), Cyperus entrerianus, Eleusine indica, Microstegium vimineum, Oxycaryum cubense, Panicum repens, Paspalum urvillei, Pennisetum purpureum*, or exotic *Phragmites australis ssp. australis* (chloroplast DNA haplotype M). *Pennisetum purpureum* is invasive in floodplain marshes in the Florida Peninsula.

Classification Comments: Included here is vegetation of exotic graminoid species. The identity and range of the exotic *Phragmites australis ssp. australis* (chloroplast DNA haplotype M) and the related native taxa need better documentation in the IVC; its distribution is not primarily in the southeastern U.S. region, but has been documented on the Atlantic Coast as far south as South Carolina and disjunct in Louisiana (Saltonstall 2002, Ward 2010). *Pennisetum purpureum* is invasive in floodplain marshes in the Florida Peninsula.

Similar NVC Types:
- A3409 *Ligustrum sinense - Tamarix* spp. Southern Ruderal Wet Shrubland Alliance
- A3412 *Juncus effusus - Andropogon glomeratus var. pumilus - Saccharum giganteum* Ruderal Marsh Alliance: is dominated by native wetland graminoid plants.
- A3411 *Rotala ramosior - Eleocharis obtusa - Fimbristylis autumnalis* Annual Ruderal Wet Meadow Alliance
- A3410 *Colocasia esculenta - Ludwigia grandiflora ssp. hexapetala* Ruderal Marsh Alliance

Diagnostic Characteristics: Southern marshes dominated by exotic graminoid plants.

VEGETATION

Physiognomy and Structure: These graminoid wetlands are open but may have scattered trees, such as abandoned farmland, old pastures, cutover bottomland forests, and other disturbed areas. Once established, this can be a long-persistent vegetation type, due to the competitive abilities of these invasive exotic graminoid plants.

Floristics: These southern marshes are dominated by exotic graminoid plants, such as *Arthraxon hispidus, Arundo donax, Cyperus sanguinolentus (= Cyperus sanguindentus), Cyperus entrerianus, Eleusine indica* (Carter and Bryson 1996, Rosen et al. 2006), *Microstegium vimineum, Oxycaryum cubense, Panicum repens, Paspalum urvillei, Pennisetum purpureum*, or exotic *Phragmites australis ssp. australis* (chloroplast DNA haplotype M) (Saltonstall 2002, Saltonstall et al. 2004, Lelong et al. 2007, Ward 2010, Lambertini et al. 2012). *Pennisetum purpureum* is invasive in floodplain marshes in the Florida Peninsula.

ENVIRONMENT & DYNAMICS

Environmental Description: These communities occur along floodplains and in disturbed wetland and coastal situations, including cutover areas, open fields which are not cultivated, and on dredge spoil such as occurs along the Intracoastal Waterway.

Dynamics: These are wetland sites dominated by exotic graminoids. They are prone to flooding from rivers or in coastal areas from storm surge and heavy rains. Some of these exotic plants are rapidly spreading in disturbed coastal, floodplain, and wetland areas, excluding native vegetation.

DISTRIBUTION

Geographic Range: This alliance is found on the Southeastern Coastal Plain from Delaware to Florida and west to Texas, as well as in Puerto Rico, Cuba, and the West Indies.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: AL, DE, FL, LA, MD, MS, NC, SC, TX, VA
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

LOWER LEVEL UNITS

Associations:
- CEGL004019 *Phragmites australis ssp. australis* Temperate Upland Ruderal Marsh

AUTHORSHIP

Primary Concept Source: C. Nordman
Author of Description: C.W. Nordman
Acknowledgments:
Version Date: 02/17/2016
Classif Resp Region: Southeast

REFERENCES

References: Alexander and Crook 1984, Borhidi 1991, Carter and Bryson 1996, Faber-Langendoen et al. 2016b, Lambertini et al. 2012, Lelong et al. 2007, Rosen et al. 2006, Saltonstall 2002, Saltonstall et al. 2004, Ward 2010

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2. Shrub & Herb Vegetation
2.C.4.Nd. Eastern North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland
A3413. *Arthraxon hispidus - Cyperus entrerianus - Pennisetum purpureum* Ruderal Marsh Alliance

CEGL004019. *Phragmites australis ssp. australis* Temperate Upland Ruderal Marsh

Type Concept Sentence: This vegetation is dominated by the exotic *Phragmites australis ssp. australis* which is invasive on (upland) dredge spoil.

OVERVIEW

Scientific Name: *Phragmites australis ssp. australis* Temperate Upland Ruderal Marsh
Common Name (Translated Scientific Name): European Common Reed Temperate Upland Ruderal Marsh
Colloquial Name: Temperate Upland Ruderal Common Reed Marsh

Type Concept: These communities occur in disturbed upland situations, most notably on dredge spoil such as occurs along the Intracoastal Waterway, and cover many thousands of hectares.

Classification Comments:

Similar NVC Types:

VEGETATION

Floristics:

ENVIRONMENT & DYNAMICS

Environmental Description:

Dynamics:

DISTRIBUTION

Geographic Range:

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: AL, FL, LA, MS, NC, SC, TX
TNC Ecoregions [optional]: 53:C, 55:C, 56:C, 57:C
USFS Ecoregions (1994/95): 232A:CC, 232C:CC, 232Dc:CCC
Omernik Ecoregions:
Federal Lands [optional]:

CONSERVATION STATUS

Grank (Review Date): GNA (invasive) (1997/12/1)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low - Poorly Documented.

SYNONYMY

Synonymy:

AUTHORSHIP

Primary Concept Source: A.S. Weakley
Author of Description: A.S. Weakley
Acknowledgments:
Version Date: 1994/08/01

REFERENCES

References: Schotz pers. comm.

NYC NAC Association Description based on 1 plot (CEGL004019):

Midstory plants are sparse and include winged sumac (Rhus copallinum) and tree of heaven (Ailanthus altissima).

Common reed (Phragmites australis) is dominant in the understory. Other understory plants include common wormwood (Artemisia vulgaris), winged sumac (Rhus copallinum), goldenrod (Solidago sp.), white snakeroot (Ageratina altissima), bentgrass (Agrostis sp.), early goldenrod (Solidago juncea), knotweed (Polygonum sp.), Queen Anne's lace (Daucus carota), and annual ragweed (Ambrosia artemisiifolia).

Vines include climbing false buckwheat (Polygonum scandens) and Oriental bittersweet (Celastrus orbiculatus).

G556. Eastern Ruderal Wet Meadow & Marsh

This group is found in the eastern half of cool-temperate North America where heavily disturbed emergent wetlands are dominated by exotic or weedy native species such as *Lythrum salicaria, Phalaris arundinacea, Phragmites australis ssp. australis, Polygonum cuspidatum*, and *Typha* spp.

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2. Shrub & Herb Vegetation
2.C.4.Nd. Eastern North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland
2.C.4.Nd.90.b. G556 Eastern Ruderal Wet Meadow & Marsh

A1431. *Phragmites australis ssp. australis* Ruderal Marsh Alliance

Type Concept Sentence: This alliance consists of non-tidal *Phragmites australis ssp. australis* marshes with semipermanently or, rarely, seasonally flooded hydrology, occurring either in depressions or along rivers with seasonal fluctuation in water level throughout the United States and adjacent Canada.

OVERVIEW

Scientific Name: *Phragmites australis ssp. australis* Ruderal Marsh Alliance
Common Name (Translated Scientific Name): European Common Reed Ruderal Marsh Alliance
Colloquial Name: Ruderal Non-tidal Common Reed Marsh

Type Concept: This alliance consists of non-tidal *Phragmites australis ssp. australis* marshes with semipermanently or, rarely, seasonally flooded hydrology, occurring either in depressions or along rivers with seasonal fluctuation in water level throughout the United States and adjacent Canada. This includes semipermanently flooded marshes, ditches, impoundments, etc., which are strongly dominated by essentially monospecific stands of *Phragmites australis*, which is rapidly spreading in disturbed areas and excluding native vegetation. Stands may be composed entirely of *Phragmites australis*, with few or no other vascular plants present.

Classification Comments: This is not a native community but is the result of the invasion of alien *Phragmites australis ssp. australis* into natural vegetation. Marks et al. (1994) present a rangewide assessment of the naturalness of this species. The vegetation has variable hydrology and, unless *Phragmites* is clearly dominant, is often treated as part of other marsh and meadow types. The geographic distribution of the type is arbitrarily limited to Bailey's Humid Temperate Domain in eastern North America (Bailey 1997, 1998). Stands in northern Minnesota and farther north in Canada may represent native stands. If so, they should be tracked as a different type. Tidal vegetation of the Gulf Coast of Louisiana and Texas dominated by *Phragmites australis* (presumably *ssp. berlandieri*) is classified in a separate *Phragmites australis* tidal alliance.

Similar NVC Types:
- A3666 *Schoenoplectus tabernaemontani - Schoenoplectus fluviatilis - Typha* spp. Shallow Marsh Alliance: *Phragmites australis* is <75% cover and dominants are typically *Schoenoplectus tabernaemontani, Schoenoplectus fluviatilis, Schoenoplectus acutus, Typha angustifolia*, and *Typha latifolia*.
- A4106 *Spiraea tomentosa - Rubus* spp. Ruderal Wet Shrubland Alliance
- A3030 *Lythrum salicaria* Ruderal Marsh Alliance

Diagnostic Characteristics: Herbaceous marshes strongly dominated by *Phragmites australis*.

VEGETATION

Physiognomy and Structure: This alliance is dominated by herbaceous vegetation 2-3 m tall. Vegetation cover tends to be moderately dense to very dense, unless recent severe disturbance has reduced it. Shrubs are absent or rare.

Floristics: This alliance, which ranges widely across the United States, is characterized by dense stands of *Phragmites australis ssp. australis*, which tends to grow in colonies of tall, stout, leafy plants often to the exclusion of all other vascular plant species. Associated species can be quite variable because *Phragmites* can invade many types of wetlands, including saturated, semipermanently, seasonally, and temporarily flooded types, ranging from fens to shoreline meadows. It can also establish in some upland situations.

ENVIRONMENT & DYNAMICS

Environmental Description: This alliance is found in non-tidal marshes with semipermanently or, rarely, seasonally flooded hydrology, either in depressions or along rivers with seasonal fluctuation in water level throughout the United States and adjacent Canada. This includes semipermanently flooded marshes, ditches, impoundments, etc.

Dynamics: The presence of this alliance in wetlands today generally indicates human-induced disturbance, either through direct habitat manipulation or through passive introduction of reproductive material to naturally disturbed substrates (Marks et al. 1994).

Although *Phragmites australis* is apparently a native component of salt marshes (rhizomes have been noted in salt marsh sediments exceeding 3000 years in age) (Niering and Warren 1977), the expression of the species in its purely native condition was likely to have been significantly different from the dense monotypic stands that characterize most present expressions of *Phragmites australis*-dominated vegetation.

DISTRIBUTION

Geographic Range: This alliance occurs throughout the eastern half of the United States and southern Canada in non-tidal settings.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: AL, AR, CT, DE, FL, GA, IA, IN, LA, MA, MD, ME, MI, MN, MS, NC, NH, NJ, NY, OH, ON, PA, QC, RI, SC, TX, VA, VT, WI, WV
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

- **><** Interdune Pond (Nelson 1986)
- **><** Interdune Pond (Schafale and Weakley 1990)
- **><** Intermediate Marsh (Wieland 1994a)

LOWER LEVEL UNITS

Associations:
- CEGL004141 *Phragmites australis ssp. australis* Eastern Ruderal Marsh
- CEGL004187 *Phragmites australis ssp. australis* Tidal Ruderal Marsh

AUTHORSHIP

Primary Concept Source: D.J. Allard
Author of Description: J. Drake
Acknowledgments:
Version Date: 10/21/2015
Classif Resp Region: Midwest

REFERENCES

References: Bailey 1997, Bailey 1998, Faber-Langendoen et al. 1996, Faber-Langendoen et al. 2016b, Hoagland 1998c, Hoagland 2000, Marks et al. 1994, Nelson 1986, Niering and Warren 1977, Schafale and Weakley 1990, Swearingen and Saltonstall 2012, Wieland 1994a

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2. Shrub & Herb Vegetation
2.C.4.Nd. Eastern North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland
A1431. *Phragmites australis ssp. australis* Ruderal Marsh Alliance

CEGL004141. *Phragmites australis ssp. australis* Eastern Ruderal Marsh

Type Concept Sentence: This reed marsh, usually strongly dominated by *Phragmites australis ssp. australis*, with few or no other vascular plants present, is found across the east-temperate regions of the United States and Canada.

OVERVIEW

Scientific Name: *Phragmites australis ssp. australis* Eastern Ruderal Marsh
Common Name (Translated Scientific Name): European Common Reed Eastern Ruderal Marsh
Colloquial Name: Eastern North America Temperate Ruderal Common Reed Marsh

Type Concept: This reed marsh type is found across the east-temperate regions of the United States and Canada. Stands occur in semipermanently flooded marshes, ditches, impoundments, etc., that have often been disturbed by human activity. The vegetation is variable, as *Phragmites australis* will often invade into existing natural or semi-natural communities present on the site. Once firmly established, this community is usually strongly dominated by *Phragmites australis ssp. australis*, with few or no other vascular plants present.

Classification Comments: This is not a native community but is the result of the invasion of alien *Phragmites australis ssp. australis* into natural or semi-natural vegetation. The vegetation has variable hydrology and, unless *Phragmites* is clearly dominant, is often treated as part of other marsh and meadow types. The geographic distribution of the type is arbitrarily limited to Bailey's Humid Temperate Domain in eastern North America (Bailey 1997, 1998). Stands in northern Minnesota and farther north in Canada may represent native stands. If so, they should be tracked as a different type. Tidal vegetation of the Gulf Coast of Louisiana and Texas dominated by *Phragmites australis* is classified in *Sagittaria lancifolia* Gulf Coast Tidal Freshwater Marsh Alliance (A1987).

Similar NVC Types:
- CEGL001475 *Phragmites australis* Western Ruderal Wet Meadow
- CEGL002541 *Typha* spp. - *(Phragmites australis)* - *Carex* spp. Floating Marshy Fen: from Canada, is perhaps dominated by the native *Phragmites australis ssp. americanus*.
- CEGL004187 *Phragmites australis ssp. australis* Tidal Ruderal Marsh

VEGETATION

Floristics: The vegetation is often variable, as *Phragmites australis ssp. australis* will often invade into existing natural or semi-natural communities present on the site. Once firmly established, this community is usually strongly dominated by *Phragmites australis*, with few or no other vascular plants present.

ENVIRONMENT & DYNAMICS

Environmental Description: Stands occur in semipermanently flooded marshes, ditches, impoundments, etc. that have often been disturbed by human activity.

Dynamics:

DISTRIBUTION

Geographic Range: This reed marsh type is found across the east-temperate regions of the United States and Canada, ranging from Maine west to the eastern Dakotas and Manitoba, south to Texas and east to Florida.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: AL, AR, CT, DE, FL, GA, IA, IN, LA, MA, MD, ME, MI, MN, MS, NC, NH, NJ, NY, OH, ON, PA, QC, RI, SC, TX, VA, VT, WI, WV?
TNC Ecoregions [optional]: 31:C, 39:P, 40:C, 41:C, 42:C, 47:C, 48:C, 52:P, 53:C, 55:C, 56:C, 57:C, 59:C, 60:C, 61:C, 62:C
USFS Ecoregions (1994/95): 212C:CP, 212Fc:CCC, 212Ho:CCC, 212Hw:CCC, 221Aa:CCP, 221Ab:CCC, 221Ae:CCC, 221Ai:CCC, 221Bc:CCC, 221Da:CCC, 222Ic:CCC, 222Jj:CCC, 231Fb:CCC, 232Ab:CCC, 232Ac:CCC, 232Ch:CCC, 232Dc:CCC, 232E:CC, 232G:CC, 234A:PP, 255Dc:CCC, M212:C, M221:P
Omernik Ecoregions: 9.5.1.34:C, 9.5.1.34i:C
Federal Lands [optional]: NPS (Appalachian Trail [Central Appalachians], Appalachian Trail [Lower New England], Assateague Island, Boston Harbor Islands, Cape Cod, Cuyahoga Valley, Indiana Dunes, Minute Man, Mississippi, Padre Island, Saint Croix, Saratoga, Sleeping Bear Dunes, Upper Delaware, Voyageurs); USFWS (Alligator River, Aransas, Bon Secour, Brazoria, Cape May, E.B. Forsythe, Great Dismal Swamp, Great Meadows, Great Swamp, Matagorda Island, Monomoy, Montezuma, Oxbow, Parker River, Prime Hook, Supawna Meadows)

CONSERVATION STATUS

Grank (Review Date): GNA (invasive) (1997/11/23)
Greasons: Although almost always occurring as a naturalized type that arises from human disturbance, some stands in northern Minnesota and further north in Canada may be native. If so, they should be tracked as a separate type, dominated instead by *Phragmites australis ssp. americanus*.
Ranking Author (Version): M. Pyne (2015/10/21)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate. Type is compositionally relatively simple and easy to distinguish but rarely discussed in literature.

SYNONYMY

Synonymy:
- **?** *Phragmites australis* community (Metzler and Barrett 1992) [Connecticut.]
- **<** *Phragmites australis* temporarily flooded grasslands (Metzler and Barrett 2001)
- **?** *Phragmites australis* tidal marsh association (Clancy 1993b) [Delaware.]
- **<** Inland Emergent Marsh (Chapman et al. 1989)

- **<** Semi-Natural (MNNHP 1993)
- **<** Semi-Natural (Faber-Langendoen 2001)
- **?** Southern New England nutrient-poor streamside/lakeside marsh (Rawinski 1984a)
- **?** Southern New England nutrient-rich streamside/lakeside marsh (Rawinski 1984a)

AUTHORSHIP

Primary Concept Source: Great Plains Program, mod. D. Faber-Langendoen
Author of Description: D. Faber-Langendoen, mod. M. Pyne
Acknowledgments:
Version Date: 2015/10/21

REFERENCES

References: Bailey 1997, Bailey 1998, Bell et al. 2002, Brock et al. 2007, CDPNQ unpubl. data, Chapman et al. 1989, Clancy 1993b, Coxe 2009, Edinger et al. 2002, Edinger et al. 2007, Eichelberger 2011f, Faber-Langendoen 2001, Gawler et al. 2005, Harris et al. 1996, Homoya et al. 1988, Hop et al. 1999, Hop et al. 2009, INAI n.d., Largay and Sneddon 2010, MNNHP 1993, Metzler and Barrett 1992, Metzler and Barrett 2001, Metzler and Barrett 2006, NRCS 2004a, NatureServe 2009, Nelson 1986, ONHD unpubl. data, Perles et al. 2008, Rawinski 1984a, Schafale and Weakley 1990, Schotz pers. comm., Sneddon et al. 2010, Swain and Kearsley 2001, TNC 1995c, Zimmerman et al. 2012.

NYC NAC Association Description based on 10 plots (CEGL004141):

Overstory trees are sparse and may include American elm (Ulmus americana).

Midstory plants are sparse and may include beach plum (Prunus maritima), black elderberry (Sambucus nigra), willow (Salix sp.), redosier dogwood (Cornus sericea), and silky dogwood (Cornus amomum).

Vines include Amur peppervine (Ampelopsis brevipedunculata), climbing nightshade (Solanum dulcamara), eastern poison ivy (Toxicodendron radicans), hedge false bindweed (Calystegia sepium), grape (Vitis sp.), Japanese honeysuckle (Lonicera japonica), wild cucumber (Echinocystis lobata), groundnut (Apios americana), field bindweed (Convolvulus arvensis), Oriental bittersweet (Celastrus orbiculatus), and Virginia creeper (Parthenocissus quinquefolia).

The understory is dominated by common reed (Phragmites australis). Other understory plants include jewelweed (Impatiens capensis), common wormwood (Artemisia vulgaris), sensitive fern (Onoclea sensibilis), purple loosestrife (Lythrum salicaria), Indianhemp (Apocynum cannabinum), false indigo bush (Amorpha fruticosa), switchgrass (Panicum virgatum), multiflora rose (Rosa multiflora), Jack in the pulpit (Arisaema triphyllum), common marsh bedstraw (Galium palustre), garlic mustard (Alliaria petiolata), marsh seedbox (Ludwigia palustris), American water horehound (Lycopus americanus), Japanese knotweed (Polygonum cuspidatum), swamp smartweed (Polygonum hydropiperoides), spotted ladysthumb (Polygonum persicaria), blackberry (Rubus sp.), common threesquare (Schoenoplectus pungens), common rush (Juncus effusus), sedge (Carex sp.), and seaside goldenrod (Solidago sempervirens).

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2. Shrub & Herb Vegetation
2.C.4.Nd. Eastern North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland
A1431. *Phragmites australis ssp. australis* Ruderal Marsh Alliance

CEGL004187. *Phragmites australis ssp. australis* Tidal Ruderal Marsh

Type Concept Sentence: This community is a dense tall grassland indicative of disturbance, characterized by dense stands of *Phragmites australis ssp. australis*, an exotic taxon which tends to grow in colonies of tall, stout, leafy plants often to the exclusion of all other vascular plant species.

OVERVIEW

Scientific Name: *Phragmites australis ssp. australis* Tidal Ruderal Marsh
Common Name (Translated Scientific Name): European Common Reed Tidal Ruderal Marsh
Colloquial Name: Ruderal Tidal Common Reed Marsh

Type Concept: This community is a dense tall grassland indicative of disturbance. It occurs in a range of tidal wetland habitats from fresh to brackish in salinity. It is characterized by dense stands of *Phragmites australis ssp. australis*, an exotic taxon which tends to grow in colonies of tall, stout, leafy plants often to the exclusion of all other vascular plant species. Associated species are highly variable, depending on the community that has been invaded. Spreading in large colonies, *Phragmites* eventually dominates disturbed areas at coverage up to 100%. More typically, though, scattered individuals of other species may occur, such as sparse *Morella cerifera (= Myrica cerifera)* shrubs, *Kosteletzkya virginica, Calystegia sepium, Boehmeria cylindrica, Typha angustifolia,*

Apocynum cannabinum, Rosa palustris, Polygonum sp., and *Mikania scandens*. Vines of *Toxicodendron radicans* are also frequent, but typically occur at low cover. This community has a broad geographic range, including coastal areas of the eastern and southeastern United States and Canada.

Classification Comments: Although *Phragmites australis* rhizomes have been noted in salt marsh sediments exceeding three thousand years in age (Niering and Warren 1977) and is thus a native component of salt marshes in some areas in North America, the growth of the species in its native condition was likely to have been significantly different than the dense monotypic stands that characterize this community in parts of its range today. The invasive, non-native strain has been labeled haplotype M (Saltonstall 2002). The presence of the *Phragmites australis* community in wetlands today generally indicates human-induced disturbance, either through direct habitat manipulation or through passive introduction of reproductive material to naturally disturbed substrates. Historically, without alteration, these sites would generally be more saline. In New England, *Phragmites* tends to invade behind artificial/man-made levees where regular salt input is blocked, making the sites more brackish and less saline than prior to levee construction and anthropogenic modification. In cases where *Phragmites australis* is a significant component of the vegetation but the vegetation retains sufficient species composition to retain its identity, the site is considered an unhealthy or degraded example of that original community. Where *Phragmites australis* cover is so high that native species have been excluded and the original community is no longer recognizable, the occurrence is treated as an example of *Phragmites australis ssp. australis* Tidal Ruderal Marsh (CEGL004187).

Similar NVC Types:
- CEGL004141 *Phragmites australis ssp. australis* Eastern Ruderal Marsh
- CEGL007891 *Phragmites australis ssp. berlandieri - (Sagittaria platyphylla, Vigna luteola)* Tidal Marsh

VEGETATION

Floristics: This community is a broadly defined reed grass marsh. It is characterized by dense stands of *Phragmites australis ssp. australis*, an exotic taxon which tends to grow in colonies of tall, stout, leafy plants often to the exclusion of all other vascular plant species. Associated species are highly variable, depending on the community that has been invaded. Spreading in large colonies, *Phragmites* eventually dominates disturbed areas at coverage up to 100%. More typically, though, scattered individuals of other species may occur, such as sparse *Morella cerifera (= Myrica cerifera)* shrubs, *Kosteletzkya virginica, Calystegia sepium, Boehmeria cylindrica, Typha angustifolia, Apocynum cannabinum, Rosa palustris, Polygonum* sp., and *Mikania scandens*. Vines of *Toxicodendron radicans* are also frequent but typically occur at low cover.

ENVIRONMENT & DYNAMICS

Environmental Description: This community is a dense tall grassland indicative of disturbance. It occurs in a range of tidal wetland habitats from fresh to brackish in salinity.

Dynamics:

DISTRIBUTION

Geographic Range: This community has a broad geographic range, including coastal areas of the eastern and southeastern United States and Canada.

Spatial Scale & Pattern [optional]: Large patch
Nations: CA?, US
States/Provinces: AL, CT, DC?, DE, FL, GA, LA, LB?, MA, MD, ME, MS, NC, NF?, NH, NJ, NS?, NY, PA, PE?, QC, RI, SC, TX, VA
TNC Ecoregions [optional]: 31:C, 53:C, 56:C, 57:C, 58:C, 62:C
USFS Ecoregions (1994/95): 221Ab:CCC, 232Aa:CCC, 232Ab:CCC, 232Ac:CCC, 232Ad:CCC, 232Bz:CCC, 232Ch:CCC, 232Ci:CCC, 232Dc:CCC, 232Eb:CPP
Omernik Ecoregions:
Federal Lands [optional]: NPS (Assateague Island, Boston Harbor Islands, Cape Cod, Cape Hatteras, Cape Lookout, Colonial, Fire Island, Gateway, George Washington Birthplace, George Washington Parkway, National Capital-East, Saugus Iron Works); USFWS (Back Bay, Bon Secour, Cape May, Chesapeake Marshlands, E.B. Forsythe, Monomoy, Rachel Carson, Supawna Meadows)

CONSERVATION STATUS

Grank (Review Date): GNA (invasive) (1997/11/22)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:

- **?** *Phragmites australis* Association (Fleming 1998)
- **=** *Phragmites australis* Herbaceous Wetland (Fleming and Moorhead 1998)
- **=** *Phragmites australis* Tidal Herbaceous Vegetation (Bowman 2000)
- **?** *Phragmites australis* community (Metzler and Barrett 1992)
- **<** *Phragmites australis* temporarily flooded grasslands (Metzler and Barrett 2001)
- **=** *Phragmites australis* tidal marsh association (Clancy 1993b)
- **?** Brackish Tidal Marsh (Rawinski 1984a) [formerly Southern New England and Gulf of Maine.]
- **<** Salt Marsh Complex (Breden 1989)
- **?** Successional / Modified Estuarine Herbaceous Vegetation (Fleming et al. 2006)

AUTHORSHIP

Primary Concept Source: Eastern Ecology Group
Author of Description: R.E. Zaremba, mod. M. Pyne
Acknowledgments:
Version Date: 2015/10/21

REFERENCES

References: Bell et al. 2002, Bowman 2000, Breden 1989, CDPNQ unpubl. data, Clancy 1993b, Coulling 2002, Coxe 2009, Edinger et al. 2002, Edinger et al. 2008a, Enser and Lundgren 2006, Fleming 1998, Fleming and Moorhead 1998, Fleming and Patterson 2011a, Fleming et al. 2006, Harrison 2001, Harrison 2011, Klopfer et al. 2002, Largay and Sneddon 2008, Largay and Sneddon 2010, Metzler and Barrett 1992, Metzler and Barrett 1996, Metzler and Barrett 2001, Metzler and Barrett 2006, NRCS 2001b, NatureServe 2009, Nelson 1986, Niering and Warren 1977, Odum et al. 1984, Overholt et al. 2014, Patterson 2008c, Patterson 2008d, Rawinski 1984a, Saltonstall 2002, Schafale and Weakley 1990, Schotz pers. comm., Sneddon et al. 2010, Swain and Kearsley 2001, Swearingen and Saltonstall 2012, TNC 1995c, Walz et al. 2008.

NYC NAC Association Description based on 3 plots (CEGL004187):

Overstory trees are very sparse and may include swamp white oak (Quercus bicolor), white mulberry (Morus alba), Norway maple (Acer platanoides), northern red oak (Quercus rubra), and black walnut (Juglans nigra).

Midstory plants are sparse and include smooth sumac (Rhus glabra), winged sumac (Rhus copallinum), black walnut (Juglans nigra), common hackberry (Celtis occidentalis), multiflora rose (Rosa multiflora), and tree of heaven (Ailanthus altissima).

Vines include Japanese honeysuckle (Lonicera japonica), Oriental bittersweet (Celastrus orbiculatus), Amur peppervine (Ampelopsis brevipedunculata), eastern poison ivy (Toxicodendron radicans), climbing false buckwheat (Polygonum scandens), climbing hempvine (Mikania scandens), riverbank grape (Vitis riparia), and Virginia creeper (Parthenocissus quinquefolia).

The understory is dominated by common reed (Phragmites australis). Other understory plants include wine raspberry (Rubus phoenicolasius), garlic mustard (Alliaria petiolata), American pokeweed (Phytolacca americana), skunk cabbage (Symplocarpus foetidus), Kalm's hawkweed (Hieracium kalmii), common milkweed (Asclepias syriaca), common wormwood (Artemisia vulgaris), pin oak (Quercus palustris), and violet (Viola sp.).

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2. Shrub & Herb Vegetation
2.C.4.Nd. Eastern North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland
2.C.4.Nd.90.b. G556 Eastern Ruderal Wet Meadow & Marsh

A2005. *Polygonum cuspidatum* Ruderal Wet Meadow Alliance

Type Concept Sentence: This alliance covers significant (near-monocultural) stands of the exotic forb *Polygonum cuspidatum* found in temporarily flooded habitats in the eastern United States.

OVERVIEW

Scientific Name: *Polygonum cuspidatum* Ruderal Wet Meadow Alliance
Common Name (Translated Scientific Name): Japanese Knotweed Ruderal Wet Meadow Alliance
Colloquial Name: Ruderal Japanese Knotweed Wet Meadow

Type Concept: This alliance covers significant (near-monocultural) stands of the exotic forb *Polygonum cuspidatum* found in temporarily flooded habitats in the eastern United States. Stands of this vegetation may be dense and shrubby, or more open. Other disturbance-oriented forbs may be present, such as *Boehmeria cylindrica, Impatiens* spp., *Leersia virginica, Phalaris arundinacea,*

Polygonum hydropiper, Polygonum hydropiperoides, and *Polygonum persicaria*, along with seedlings of some woody plants (e.g., *Platanus occidentalis, Salix nigra*, and *Acer saccharinum*). The invasive exotic herbs *Alliaria petiolata* and *Microstegium vimineum* may be present. The patches of *Polygonum* grow over and shade out other plant species, so diversity is not high. Stands are primarily found along disturbed riverbanks and bars that may flood but are not inundated for the majority of the growing season. These disturbed habitats flood very frequently and have lots of light and rocky or sandy soil.

Classification Comments: This species has also been treated as *Reynoutria japonica*.

Similar NVC Types:

Diagnostic Characteristics: Stands in this alliance are characterized by strong dominance (>70%) by *Polygonum cuspidatum*.

VEGETATION

Physiognomy and Structure: Stands of this vegetation may be dense and shrubby or more open. The patches of *Polygonum* shade out other plant species.

Floristics: These are primarily monospecific stands of *Polygonum cuspidatum* with few other plant species.

ENVIRONMENT & DYNAMICS

Environmental Description: Stands of this alliance are found in temporarily flooded habitats such as scour bars. These disturbed areas flood very frequently and have lots of light and rocky or sandy soil. In North Carolina, it is found on scour bars and low rocky banks of the Nolichucky and French Broad rivers (B. Brown pers. comm. 2001). In Kentucky, *Polygonum cuspidatum* is found primarily along disturbed riverbanks and bars mostly in the Cumberland Plateau and Mountains where it can be in pure, dense stands (M. Evans pers. comm. 2001).

Dynamics: This alliance occurs on sites that flood frequently.

DISTRIBUTION

Geographic Range: This alliance is found in the eastern United States from New York south to Georgia and east to Ohio and Alabama.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: AL, GA, KY, NC, NJ, NY, OH, PA, SC, TN, VA?
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

LOWER LEVEL UNITS

Associations:
- CEGL008472 *Polygonum cuspidatum* Ruderal Wet Meadow

AUTHORSHIP

Primary Concept Source: M. Pyne
Author of Description: J. Drake and M. Pyne
Acknowledgments:
Version Date: 12/18/2014
Classif Resp Region: Southeast

REFERENCES

References: Brown, B. pers. comm., Evans, M. pers. comm., Faber-Langendoen et al. 2016b

CEGL008472. *Polygonum cuspidatum* Ruderal Wet Meadow

Type Concept Sentence:

OVERVIEW

Scientific Name: *Polygonum cuspidatum* Ruderal Wet Meadow
Common Name (Translated Scientific Name): Japanese Knotweed Ruderal Wet Meadow
Colloquial Name: Ruderal Japanese Knotweed Gravelbar

Type Concept: Examples of this vegetation type are significant (monocultural) stands of the exotic forb *Polygonum cuspidatum*, which are found in temporarily flooded habitats such as scour bars. These disturbed habitats flood very frequently and have lots of light and rocky or sandy soil. Stands of this vegetation may be dense and shrubby, or somewhat more open. Species diversity is low, as the patches of *Polygonum* shade out other plant species. This vegetation ranges across the Southeast north at least to Pennsylvania and New Jersey. In North Carolina, this vegetation is found on scour bars and low rocky banks of the Nolichucky and French Broad rivers. In Kentucky, *Polygonum cuspidatum* is found primarily along disturbed riverbanks and bars mostly in the Cumberland Plateau and Cumberland Mountains where it can form pure, dense stands.

Classification Comments: This species has also been treated as *Reynoutria japonica*.

Similar NVC Types:

VEGETATION

Floristics: These are primarily monospecific stands of *Polygonum cuspidatum* with few other plant species. Some disturbance-oriented forbs may be present, such as *Impatiens* spp., *Phalaris arundinacea, Leersia virginica, Polygonum hydropiper, Polygonum hydropiperoides, Polygonum persicaria*, and *Boehmeria cylindrica*, along with seedlings of some woody plants (e.g., *Platanus occidentalis, Salix nigra*). The invasive exotic herbs *Alliaria petiolata* and *Microstegium vimineum* may be present.

ENVIRONMENT & DYNAMICS

Environmental Description: Stands of this type are found in temporarily flooded habitats such as scour bars. These disturbed areas flood very frequently and have lots of light and rocky or sandy soil. In North Carolina, it is found on scour bars and low rocky banks of the Nolichucky and French Broad rivers (B. Brown pers. comm. 2001). In Kentucky, *Polygonum cuspidatum* is found primarily along disturbed riverbanks and bars mostly in the Cumberland Plateau and Cumberland Mountains where it can form pure, dense stands (M. Evans pers. comm. 2001).

Dynamics: Stands of this vegetation may be dense and shrubby, or more open. The patches of *Polygonum* shade out other plant species.

DISTRIBUTION

Geographic Range: This vegetation is potentially found anywhere in the southeastern and mid-Atlantic United States where the exotic rhizomatous forb *Polygonum cuspidatum* has formed significant (monocultural) stands. This includes at least Alabama, Georgia, Kentucky, Maryland, New Jersey, North Carolina, Pennsylvania, South Carolina, Tennessee, and Virginia.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: AL, GA, KY, NC, NJ, NY, OH, PA, SC, TN, VA?
TNC Ecoregions [optional]: 42:P, 43:P, 44:P, 49:C, 50:C, 51:C, 52:P, 56:P, 57:P, 59:C, 60:C, 61:C, 62:C
USFS Ecoregions (1994/95): 212Fc:CCC, 221Bd:CCC, 232Aa:CCC, 232Ac:CCC, M221Ac:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Allegheny Portage Railroad, Cuyahoga Valley, Delaware Water Gap, Gateway, Upper Delaware); USFS (Cherokee?, Daniel Boone, Pisgah)

CONSERVATION STATUS

Grank (Review Date): GNA (invasive) (2001/5/31)
Greasons: This vegetation is composed of and dominated by a species which is not native to North America.
Ranking Author (Version): M. Pyne (2001/5/31)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate. Type is compositionally relatively simple and easy to distinguish but rarely discussed in literature.

SYNONYMY

Synonymy:

AUTHORSHIP

Primary Concept Source: M. Pyne
Author of Description: M. Pyne, mod. S.C. Gawler
Acknowledgments:
Version Date: 2006/06/22

REFERENCES

References: Brown, B. pers. comm., Edinger et al. 2002, Edinger et al. 2008a, Evans, M. pers. comm., NRCS 2001b, Perles et al. 2006d, Perles et al. 2007, Perles et al. 2008, Schafale pers. comm., Schotz pers. comm., TDNH unpubl. data, TNC and WPC 2004, WPC and TNC 2002, Walz et al. 2008, Zimmerman 2011s, Zimmerman et al. 2012.

NYC NAC Association Description based on 3 plots (CEGL008472):

Overstory trees are sparse and may include boxelder (Acer negundo).

Vines include Amur peppervine (Ampelopsis brevipedunculata), bindweed (Convolvulus sp.), and hedge false bindweed (Calystegia sepium).

The understory is dominated by Japanese knotweed (Polygonum cuspidatum). Other understory plants include common reed (Phragmites australis), seaside sandmat (Chamaesyce polygonifolia), and Russian thistle (Salsola kali).

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2. Shrub & Herb Vegetation
2.C.4.Nd. Eastern North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland
2.C.4.Nd.90.b. G556 Eastern Ruderal Wet Meadow & Marsh

A4106. *Spiraea tomentosa - Rubus* spp. Ruderal Wet Shrubland Alliance

Type Concept Sentence: This wet meadow vegetation of the northeastern states is complex and variable, ranging from shrub thicket to herbaceous meadow with scattered shrubs. Shrub species usually include *Spiraea tomentosa, Spiraea alba var. alba, Cornus amomum, Rubus allegheniensis, Rubus hispidus, Salix* spp., and others. The alliance occurs in a variety of settings, most frequently in low-lying areas of old fields or pastures, headwater basins, or beaver-impacted wetlands.

OVERVIEW

Scientific Name: *Spiraea tomentosa - Rubus* spp. Ruderal Wet Shrubland Alliance
Common Name (Translated Scientific Name): Steeplebush - Blackberry species Ruderal Wet Shrubland Alliance
Colloquial Name: Ruderal Steeplebush - Blackberry Wet Shrubland

Type Concept: This wet meadow vegetation of the northeastern states is complex and variable, ranging from shrub thicket to herbaceous meadow with scattered shrubs. Shrub species usually include *Spiraea tomentosa, Spiraea alba var. alba, Cornus amomum, Rubus allegheniensis, Rubus hispidus, Salix* spp., and others. *Hypericum densiflorum* often occurs in the Central Appalachians. The invasive exotic shrubs *Lonicera morrowii* and *Rosa multiflora* may be locally abundant. Associated herbaceous species are also variable in composition, depending on land-use history. Commonly seen are *Calamagrostis canadensis, Carex folliculata, Carex lupulina, Carex lurida, Carex scoparia, Carex trichocarpa, Carex vulpinoidea, Eleocharis* spp., *Eupatorium maculatum, Impatiens capensis, Juncus effusus, Leersia oryzoides, Lycopus uniflorus, Onoclea sensibilis, Phalaris arundinacea, Polygonum sagittatum, Scirpus cyperinus, Scirpus expansus, Solidago canadensis, Solidago gigantea, Solidago rugosa, Thelypteris palustris, Triadenum virginicum, Vernonia noveboracensis*, and others. The invasive species *Microstegium vimineum, Lythrum salicaria*, and *Phragmites australis* can be abundant or form monocultures in these wetlands. Successional wet meadows in the Atlantic Coastal Plain of New Jersey can include scattered patches of *Liquidambar styraciflua* and *Morella pensylvanica*, and more predominantly grassy patches of *Andropogon virginicus, Panicum rigidulum, Panicum virgatum*, and *Spiraea tomentosa*. The alliance occurs in a variety of settings, most frequently in low-lying areas of old fields or pastures, headwater basins, or beaver-impacted wetlands.

Classification Comments: This alliance is poorly described and physiognomically variable and shares several common species with other natural and ruderal alliances. It appears that some stands of this alliance are similar to shrubby versions of *Lythrum salicaria* Ruderal Marsh Alliance (A3030), *Phalaris arundinacea* Eastern Ruderal Marsh Alliance (A1381), or *Phragmites australis ssp. australis* Ruderal Marsh Alliance (A1431). Better differential species, physiognomic parameters, or environmental conditions are needed in comparison to other ruderal wet meadow alliances, in particular.

Similar NVC Types:
- A3030 *Lythrum salicaria* Ruderal Marsh Alliance: is strongly dominated (>75%) by *Lythrum salicaria* with <25% cover of shrubs.
- A1431 *Phragmites australis ssp. australis* Ruderal Marsh Alliance: is strongly dominated (>75%) by *Phragmites australis* with <25% cover of shrubs.
- A1381 *Phalaris arundinacea* Eastern Ruderal Marsh Alliance: is strongly dominated (>75%) by *Phalaris arundinacea* with <25% cover of shrubs.

Diagnostic Characteristics: Disturbed, wet meadow sites with >25% cover by *Spiraea tomentosa, Spiraea alba, Cornus amomum, Rubus* spp., and *Salix* spp., and with a herbaceous layer strongly dominated by exotic or invasive native species.

VEGETATION

Physiognomy and Structure: The physiognomy is complex and variable, ranging from shrub thicket to herbaceous meadow with scattered shrubs. Shrubs average 1-2 m and herbaceous species approximately 1 m.

Floristics: Shrub species usually include *Spiraea tomentosa, Spiraea alba var. alba, Cornus amomum, Rubus allegheniensis, Rubus hispidus, Salix* spp., and others. *Hypericum densiflorum* often occurs in the Central Appalachians. The invasive exotic shrubs *Lonicera morrowii* and *Rosa multiflora* may be locally abundant. Associated herbaceous species are also variable in composition, depending on land-use history. Commonly seen are *Calamagrostis canadensis, Carex folliculata, Carex lupulina, Carex lurida, Carex scoparia, Carex trichocarpa, Carex vulpinoidea, Eleocharis* spp., *Eupatorium maculatum, Impatiens capensis, Juncus effusus, Leersia oryzoides, Lycopus uniflorus, Onoclea sensibilis, Phalaris arundinacea, Polygonum sagittatum, Scirpus cyperinus, Scirpus expansus, Solidago canadensis, Solidago gigantea, Solidago rugosa, Thelypteris palustris, Triadenum virginicum, Vernonia noveboracensis*, and others. The invasive species *Microstegium vimineum, Lythrum salicaria*, and *Phragmites australis* can be abundant or form monocultures in these wetlands. Successional wet meadows in the Atlantic Coastal Plain of New Jersey can include scattered patches of *Liquidambar styraciflua* and *Morella pensylvanica*, and more predominantly grassy patches of *Andropogon virginicus, Panicum rigidulum, Panicum virgatum*, and *Spiraea tomentosa*.

ENVIRONMENT & DYNAMICS

Environmental Description: This wet meadow vegetation of the northeastern states occurs in a variety of settings, most frequently in low-lying areas of old fields or pastures, headwater basins, or beaver-impacted wetlands.

Dynamics: This alliance occurs on sites that have had significant disturbance.

DISTRIBUTION

Geographic Range: This alliance is found in the northeastern United States.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: CT, MA, ME?, NJ, NY, PA, WV
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

LOWER LEVEL UNITS

Associations:
- CEGL006571 *Spiraea tomentosa - Rubus* spp. / *Phalaris arundinacea* Ruderal Wet Shrubland

AUTHORSHIP

Primary Concept Source: J. Drake
Author of Description: J. Drake
Acknowledgments:
Version Date: 12/18/2014
Classif Resp Region: East

REFERENCES

References: Faber-Langendoen et al. 2016b

2. Shrub & Herb Vegetation
2.C.4.Nd. Eastern North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland
A4106. *Spiraea tomentosa - Rubus* spp. Ruderal Wet Shrubland Alliance

CEGL006571. *Spiraea tomentosa - Rubus* spp. / *Phalaris arundinacea* Ruderal Wet Shrubland

Type Concept Sentence:

OVERVIEW

Scientific Name: *Spiraea tomentosa - Rubus* spp. / *Phalaris arundinacea* Ruderal Wet Shrubland
Common Name (Translated Scientific Name): Steeplebush - Blackberry species / Reed Canarygrass Ruderal Wet Shrubland
Colloquial Name: Ruderal Steeplebush / Reed Canarygrass Wet Shrubland

Type Concept: This wet meadow vegetation of the northeastern states occurs in a variety of settings, most frequently in low-lying areas of old fields or pastures, headwater basins, or beaver-impacted wetlands. The physiognomy is complex and variable, ranging from shrub thicket to herbaceous meadow with scattered shrubs. Shrub species usually include *Spiraea tomentosa, Spiraea alba var. alba, Cornus amomum, Rubus allegheniensis, Rubus hispidus, Salix* spp., and others. *Hypericum densiflorum* often occurs in the Central Appalachians. The invasive exotic shrubs *Lonicera morrowii* and *Rosa multiflora* may be locally abundant. Associated herbaceous species are also variable in composition, depending on land-use history. Commonly seen are *Phalaris arundinacea, Solidago rugosa, Solidago gigantea, Solidago canadensis, Juncus effusus, Scirpus cyperinus, Scirpus expansus, Leersia oryzoides, Calamagrostis canadensis, Carex scoparia, Carex folliculata, Carex lurida, Carex lupulina, Carex vulpinoidea, Carex trichocarpa, Vernonia noveboracensis, Triadenum virginicum, Lycopus uniflorus, Impatiens capensis, Eupatorium maculatum, Polygonum sagittatum, Thelypteris palustris, Onoclea sensibilis, Eleocharis* spp., and others. The invasive species *Microstegium vimineum, Lythrum salicaria*, and *Phragmites australis* can be abundant or form monocultures in these wetlands. Successional wet meadows in the Coastal Plain of New Jersey can include scattered patches of *Liquidambar styraciflua* and *Morella pensylvanica*, and more predominantly grassy patches of *Andropogon virginicus, Panicum rigidulum, Panicum virgatum*, and *Spiraea tomentosa*.

Classification Comments:

Similar NVC Types:
- CEGL006576 *Cornus (amomum, sericea) - Viburnum dentatum - Rosa multiflora* Ruderal Shrub Swamp

VEGETATION

Floristics: The physiognomy is complex and variable, ranging from shrub thicket to herbaceous meadow with scattered shrubs. Within each wetland, species may be locally abundant and often have patchy distribution. Shrub species usually include *Spiraea tomentosa, Spiraea alba var. alba, Cornus amomum, Rubus allegheniensis, Rubus hispidus, Salix* spp., and others. *Hypericum densiflorum* often occurs in the Central Appalachians. The invasive exotic shrubs *Lonicera morrowii* and *Rosa multiflora* may be locally abundant. Associated herbaceous species are also variable in composition, depending on land-use history. Commonly seen are *Phalaris arundinacea, Solidago rugosa, Solidago gigantea, Solidago canadensis, Juncus effusus, Scirpus cyperinus, Scirpus expansus, Leersia oryzoides, Calamagrostis canadensis, Carex scoparia, Carex folliculata, Carex lurida, Carex lupulina, Carex vulpinoidea, Carex trichocarpa, Vernonia noveboracensis, Triadenum virginicum, Lycopus uniflorus, Impatiens capensis, Eupatorium maculatum, Polygonum sagittatum, Thelypteris palustris, Onoclea sensibilis, Eleocharis* spp., and others. *Sphagnum* spp. are often abundant along with lesser amounts of other nonvascular species. The invasive species *Microstegium vimineum, Lythrum salicaria*, and *Phragmites australis* can be abundant or form monocultures in these wetlands. Successional wet meadows in the Coastal Plain of New Jersey can include scattered patches of *Liquidambar styraciflua* and *Morella pensylvanica*, and more predominantly grassy patches of *Andropogon virginicus, Panicum rigidulum, Panicum virgatum*, and *Spiraea tomentosa*.

ENVIRONMENT & DYNAMICS

Environmental Description: This wet meadow vegetation of the northeastern states occurs in a variety of settings, most frequently in low-lying areas of old fields or pastures, headwater basins, or beaver-impacted wetlands. These wetlands typically flood early in the growing season and may be saturated to near the surface for some of the growing season, but they are generally dry for much of the year. The substrate is typically mineral soil with a layer of muck at the surface.

Dynamics:

DISTRIBUTION

Geographic Range: Although this vegetation is widespread, its range has not been evaluated. It is known from the Central Appalachian ecoregion, the High Alleghany Plateau, Western Alleghany Plateau, North Atlantic Coast, and the Lower New England / Northern Piedmont ecoregions, and is likely in others.

Spatial Scale & Pattern [optional]:
Nations: US
States/Provinces: CT, MA, ME?, NJ, NY, PA, WV
TNC Ecoregions [optional]: 48:C, 49:C, 59:C, 60:C, 61:C, 62:C
USFS Ecoregions (1994/95): 212Fc:CCC, 221Ae:CCC, 221Bc:CCC, 221Bd:CCC, 221Da:CCC, 221Fa:CCC, 222Ib:CCC, 222Ic:CCC, 232Ac:CCC, M221Ac:CCC, M221Bc:CCC
Omernik Ecoregions:
Federal Lands [optional]: NPS (Allegheny Portage Railroad, Appalachian Trail [Central Appalachians], Appalachian Trail [Lower New England], Appalachian Trail [Northern Appalachians], Boston Harbor Islands, Cape Cod, Delaware Water Gap, Johnstown Flood, Saratoga, Upper Delaware, Weir Farm); USFS (Monongahela); USFWS (Assabet River?, Erie, Great Meadows?, Great Swamp, Iroquois, Montezuma, Parker River?, Rachel Carson?, Supawna Meadows)

CONSERVATION STATUS

Grank (Review Date): GNA (ruderal) (2013/7/15)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

Synonymy:
- **><** Wet Meadow (Fike 1999)

AUTHORSHIP

Primary Concept Source: Central Appalachian Ecology Group
Author of Description: L.A. Sneddon, mod. S.C. Gawler and E.F. Largay
Acknowledgments:
Version Date: 2009/02/19

REFERENCES

References: Byers et al. 2007, Decker 1955, Edinger et al. 2002, Edinger et al. 2007, Fike 1999, Largay and Sneddon 2010, Metzler et al. 2009, NRCS 2004a, NatureServe and Russell 2003, Perles et al. 2006d, Perles et al. 2006e, Perles et al. 2007, Perles et al. 2008, Sneddon et al. 2010.

NYC NAC Association Description (CEGL0066571):

This association was not selected as a first choice for any NYC NAC plots.

2.C.5. Salt Marsh

Salt Marsh is a wetland that has shallow water and levels that usually fluctuate due primarily to tides along the coast or changes in water depth in depressions. Coastal salt marshes are primarily intertidal; that is, they are found in areas at least occasionally inundated by high tide but not flooded during low tide, including estuaries, lagoons, and the lee side of barrier islands. The vegetation comprises emergent shrubs and herbs with at least 10% cover, especially saline or halophytic species. They occur at all latitudes around the globe, but are concentrated in the temperate mid-latitudes (23-70°N and S).

2.C.5.Nb. North American Atlantic & Gulf Coastal Salt Marsh

This division comprises all regularly and irregularly flooded tidal marshes of the North Atlantic and Gulf coasts in North America, ranging from polyhaline (salt) marshes to mesohaline (brackish) marshes, dominated or characterized by an abundance of halophytic species, including *Distichlis spicata, Spartina alterniflora, Spartina patens*, and species of *Salicornia* and *Sarcocornia*.

M079. North American Atlantic & Gulf Coastal Salt Marsh

This macrogroup comprises all regularly and irregularly flooded tidal marshes of the North Atlantic and Gulf coasts in North America, ranging from polyhaline (salt) marshes to mesohaline (brackish) marshes, dominated or characterized by an abundance of halophytic species, including *Distichlis spicata, Spartina alterniflora, Spartina patens*, and species of *Salicornia* and *Sarcocornia*.

G121. Atlantic & Gulf Coastal High Salt Marsh

These are upper herbaceous or herb-shrub zones of salt marshes found along the North American Atlantic and Gulf of Mexico coasts from the Bay of Fundy to Texas, dominated by species such as *Distichlis spicata, Iva frutescens, Salicornia* spp., and *Spartina patens*.

2. Shrub & Herb Vegetation
2.C.5.Nb. North American Atlantic & Gulf Coastal Salt Marsh
2.C.5.Nb.1.c. G121 Atlantic & Gulf Coastal High Salt Marsh

A1481. *Spartina patens* High Salt Marsh Alliance

Type Concept Sentence: This alliance comprises "high salt marsh" vegetation dominated or codominated by *Spartina patens* along the Gulf and Atlantic coasts from Maine to Texas.

OVERVIEW

Scientific Name: *Spartina patens* High Salt Marsh Alliance
Common Name (Translated Scientific Name): Saltmeadow Cordgrass High Salt Marsh Alliance
Colloquial Name: Eastern Saltmeadow Cordgrass High Salt Marsh

Type Concept: This alliance comprises "high salt marsh" vegetation dominated or codominated by *Spartina patens* along the Gulf and Atlantic coasts from Maine to Texas. The high salt marsh is irregularly flooded by tides and forms at slightly higher elevations than regularly flooded low marshes; they establish where peat accumulation raises the marsh surface above mean high tide. Landward the vegetation can transition to brackish marsh or upland vegetation. Variation in codominant species occurs across the geographic range. From the Canadian maritime provinces south to Delaware (discontinuously south to Virginia), this alliance is characterized by the dominance of *Spartina patens, Distichlis spicata*, and *Juncus gerardii* and the presence of more northerly distributed marsh species such as *Puccinellia fasciculata, Plantago maritima*, and *Triglochin maritima*.

From Delaware south to Florida, this high salt marsh coastal community is dominated by *Spartina patens*, forming meadows at slightly higher elevations in relation to the adjacent *Spartina alterniflora* marsh. Diagnostic species for this community are *Spartina patens, Distichlis spicata, Borrichia frutescens, Kosteletzkya virginica, Juncus roemerianus*, and *Pluchea odorata*. Shrub seedlings such as *Baccharis halimifolia* and *Morella cerifera (= Myrica cerifera)* may also be present.

This alliance also includes mesohaline to oligohaline marshes of the Gulf Coast of Texas and Louisiana. In these associations, *Spartina patens* may strongly dominate, *Distichlis spicata, Spartina alterniflora*, and *Spartina patens* may codominate, *Distichlis spicata* may form pure stands, *Paspalum vaginatum* may strongly dominate, or *Spartina patens* and *Vigna luteola* may codominate. Other characteristic species include *Juncus roemerianus, Spartina spartinae, Spartina cynosuroides* (within its range), *Schoenoplectus robustus, Schoenoplectus americanus, Sagittaria lancifolia, Phragmites australis*, and *Eragrostis* spp. Here, this alliance forms mosaics with *Spartina spartinae* and *Spartina alterniflora* marshes and saline herbaceous vegetation.

Classification Comments: This alliance does not include brackish marshes occurring on tidal rivers.

Similar NVC Types:

Diagnostic Characteristics: High salt marsh characterized by irregular tidal flooding and dominance or abundance of *Spartina patens*.

VEGETATION

Physiognomy and Structure: This alliance comprises graminoid-dominated vegetation.

Floristics: Variation in codominant species occurs across the geographic range. From the Canadian maritime provinces south to Delaware (discontinuously south to Virginia), this alliance is characterized by the dominance of *Spartina patens, Distichlis spicata*, and *Juncus gerardii* and the presence of more northerly distributed marsh species such as *Puccinellia fasciculata, Plantago maritima*, and *Triglochin maritima*. In brackish reaches of tidal rivers, this alliance includes *Spartina patens*-dominated vegetation that may also be characterized by the presence of *Agrostis stolonifera, Festuca rubra, Symphyotrichum novi-belgii (= Aster novi-belgii), Hierochloe odorata, Carex paleacea*, or *Spartina pectinata*. From Delaware south to Florida, this high salt marsh coastal community is dominated by *Spartina patens*, forming meadows at slightly higher elevations in relation to the adjacent *Spartina alterniflora* Low Tidal Marsh Alliance (A1471). *Agalinis maritima, Atriplex prostrata (= Atriplex patula var. hastata), Borrichia frutescens, Distichlis spicata, Eleocharis rostellata, Fimbristylis castanea, Hibiscus moscheutos (= Hibiscus palustris, Limonium carolinianum, Lythrum lineare, Pluchea odorata (= Pluchea purpurascens), Sabatia stellaris, Salicornia virginica, Schoenoplectus pungens (= Scirpus pungens)*, and *Solidago sempervirens* are characteristic associates. Diagnostic species are *Spartina patens, Distichlis spicata, Borrichia frutescens, Kosteletzkya virginica*, and *Pluchea odorata*. This alliance also includes mesohaline to oligohaline marshes of the Gulf Coast of Texas and Louisiana. In these associations, *Spartina patens* may strongly dominate, *Distichlis spicata, Spartina alterniflora*, and *Spartina patens* may codominate, *Distichlis spicata* may form pure stands, *Paspalum vaginatum* may strongly dominate, or *Spartina patens* and *Vigna luteola* may codominate. Other characteristic species include *Juncus roemerianus, Spartina spartinae, Spartina cynosuroides* (within its range), *Schoenoplectus robustus, Schoenoplectus americanus, Sagittaria lancifolia, Phragmites australis*, and *Eragrostis* spp. Here, this alliance forms mosaics with *Spartina spartinae* and *Spartina alterniflora* marshes and saline herbaceous vegetation.

ENVIRONMENT & DYNAMICS

Environmental Description: The high salt marsh is irregularly flooded by tides and forms at slightly higher elevations than regularly flooded low marshes; they establish where peat accumulation raises the marsh surface above mean high tide. Landward the vegetation can transition to brackish marsh or upland vegetation. Vegetation of this alliance also occurs in mesohaline zones along lower reaches of tidal rivers. The substrate is peat of variable depths overlying sand.

Dynamics: Dominance patterns are likely related to gradients in salinity and hydrology.

DISTRIBUTION

Geographic Range: This alliance is found along the Atlantic and Gulf coasts from Maine south to Florida and west to Texas.

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces: AL, CT, DE, FL, GA, LA, MA, MD, ME, MS, NC, NH, NJ, NY, QC, RI, SC, TX, VA
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low.

SYNONYMY

- **><** Brackish Marsh (Nelson 1986)
- **><** Brackish Marsh (Wieland 1994b)
- **?** Estuarine Intertidal: Brackish Tidal Marsh (Swain and Kearsley 2011)
- **?** Estuarine Intertidal: Salt Marsh (Swain and Kearsley 2001)
- **?** Intermediate Marsh (Smith 1996a)
- **><** Marshhay Cordgrass Series (Diamond 1993)
- **><** Salt Marsh (Wieland 1994b)
- **><** Salt Marsh (Smith 1996a)
- **><** Salt Marsh (Nelson 1986)
- **><** Salt Marsh (Schafale and Weakley 1990)
- **?** Saltgrass-Cordgrass Series (Diamond 1993)

LOWER LEVEL UNITS

Associations:
- CEGL006150 *Panicum virgatum - Spartina patens - Carex silicea* Salt Marsh
- CEGL006398 *Schoenoplectus pungens - Eleocharis parvula* Salt Marsh
- CEGL002230 *Spartina alterniflora - Distichlis spicata - Spartina patens* Mesohaline Salt Marsh
- CEGL004254 *Spartina patens - Panicum* spp. Brackish Salt Marsh
- CEGL004197 *Spartina patens - Distichlis spicata - (Juncus roemerianus)* Salt Marsh
- CEGL006006 *Spartina patens - Distichlis spicata - (Juncus gerardii)* Salt Marsh
- CEGL006368 *Spartina patens - Festuca rubra - (Spartina pectinata)* Salt Marsh
- CEGL006611 *Eleocharis rostellata - Spartina patens* Salt Marsh
- CEGL006365 *Spartina patens - Agrostis stolonifera* Salt Marsh
- CEGL006612 *Schoenoplectus americanus - Spartina patens* Salt Marsh
- CEGL004755 *Spartina patens - Schoenoplectus (americanus, pungens) - (Distichlis spicata)* Salt Marsh

AUTHORSHIP

Primary Concept Source: A.S. Weakley, mod. J. Teague and S.L. Neid
Author of Description: L. Sneddon
Acknowledgments:
Version Date: 12/18/2014
Classif Resp Region: East

REFERENCES

References: Adams 1963, Berdine 1998, Bowman 2000, Clancy 1993b, Cooper and Waits 1973, Diamond 1993, Faber-Langendoen et al. 2016b, Gawler 2001, Higgins et al. 1971, Hill 1986, Metzler and Barrett 2001, Montague and Wiegert 1990, Nelson 1986, Odum 1988, Odum and Smith 1981, Penfound 1952, Schafale and Weakley 1990, Smith 1996a, Sperduto 2000b, Swain and Kearsley 2001, Swain and Kearsley 2011, Tiner 1977, Wieland 1994a, Wieland 1994b

2. Shrub & Herb Vegetation
2.C.5.Nb. North American Atlantic & Gulf Coastal Salt Marsh
A1481. *Spartina patens* High Salt Marsh Alliance

CEGL006006. *Spartina patens - Distichlis spicata - (Juncus gerardii)* Salt Marsh

Type Concept Sentence:

OVERVIEW

Scientific Name: *Spartina patens - Distichlis spicata - (Juncus gerardii)* Salt Marsh
Common Name (Translated Scientific Name): Saltmeadow Cordgrass - Saltgrass - (Saltmeadow Rush) Salt Marsh
Colloquial Name: North Atlantic High Salt Marsh

Type Concept: This high salt marsh vegetation dominated by *Spartina patens* or codominated by *Distichlis spicata* forms distinct "cowlicked" meadows above low salt marsh communities. This high marsh association generally occurs behind barrier beaches along the north Atlantic Coast from the Canadian maritime provinces south to New Jersey. It occupies the irregularly flooded zone extending from mean high tide landward to the limit of spring tides. The substrate is peat overlying sand, silt, or bedrock. Vegetation of this marsh community occurs in mosaics of patches generally dominated by a single graminoid species, *Spartina patens, Distichlis spicata*, or *Juncus gerardii*. Other characteristic associates that occur in low abundance include *Symphyotrichum tenuifolium (= Aster tenuifolius), Limonium carolinianum, Solidago sempervirens, Symphyotrichum subulatum (= Aster subulatus), Polygonum ramosissimum, Argentina anserina (= Potentilla anserina), Atriplex patula, Lythrum lineare*, and *Panicum virgatum*. Salt pannes are often a prominent feature within this association.

Classification Comments: This community is differentiated from *Spartina patens - Distichlis spicata - (Juncus roemerianus)* Salt Marsh (CEGL004197) to the south by the importance of *Juncus gerardii, Plantago maritima*, and *Triglochin maritima* and absence or relatively infrequent occurrence of species of southern distribution such as *Borrichia frutescens, Kosteletzkya virginica, Fimbristylis castanea*, and *Lythrum lineare*.

Similar NVC Types:
- CEGL006365 *Spartina patens - Agrostis stolonifera* Salt Marsh
- CEGL004197 *Spartina patens - Distichlis spicata - (Juncus roemerianus)* Salt Marsh

VEGETATION

Floristics: Vegetation of this marsh community occurs in mosaics of patches generally dominated by a single graminoid species, *Spartina patens, Distichlis spicata*, or *Juncus gerardii*. Other characteristic associates that occur in low abundance include *Symphyotrichum tenuifolium (= Aster tenuifolius), Limonium carolinianum, Solidago sempervirens, Symphyotrichum subulatum (= Aster subulatus), Polygonum ramosissimum, Argentina anserina (= Potentilla anserina), Atriplex patula, Lythrum lineare*, and *Panicum virgatum*.

ENVIRONMENT & DYNAMICS

Environmental Description: This high salt marsh association generally occurs behind barrier beaches, but also in the outer reaches of estuaries, occupying the zone extending from mean high tide landward approximately to the limit of spring tides. They are often adjacent to low salt marshes dominated by *Spartina alterniflora* (tall form), which are regularly flooded by diurnal tides. *Spartina patens*-dominated high marshes form very dense peat with high organic matter content. Peat forms over sand, silt or bedrock.

Dynamics: Vegetation of this association occurs as a shifting mosaic of patches dominated by a single graminoid species. Species composition at a particular site results from the interaction of hydroperiod, nutrient availability, salinity gradients, soil oxygen, concentrations of growth inhibitors in the soil, and interspecific competition. As sedimentation increases marsh elevation, vegetation may shift to upland border communities dominated by *Panicum virgatum* and *Juncus gerardii*. Local disturbance, i.e., from ice scouring, can cause invasion by *Spartina alterniflora*, or can lead to the formation of salt pannes.

DISTRIBUTION

Geographic Range: This high salt marsh association occurs from the Canadian maritime provinces south to Delaware.

Spatial Scale & Pattern [optional]: Large patch
Nations: US
States/Provinces: CT, DE, MA, ME, NH, NJ, NY, RI
TNC Ecoregions [optional]: 62:C, 63:C
USFS Ecoregions (1994/95): 212Cb:CCC, 212Db:CCC, 212Dc:CCC, 221Ab:CCC, 221Ac:CCC, 221Ad:CCC, 221Ae:CCC, 221Ak:CCC, 221Dc:CCC, 232Aa:CCC, 232Ab:CCC, 232Ac:CCC

Omernik Ecoregions:

Federal Lands [optional]: NPS (Acadia, Boston Harbor Islands, Cape Cod, Fire Island, Gateway, Sagamore Hill); USFWS (Cape May, E.B. Forsythe, Monomoy, Moosehorn, Muskeget Island?, Parker River?, Prime Hook, Rachel Carson)

CONSERVATION STATUS

Grank (Review Date): G5 (1997/12/1)
Greasons:
Ranking Author (Version): ()

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Moderate.

SYNONYMY

Synonymy:

- **><** *Spartina patens - Distichlis spicata* Herbaceous Vegetation (Harrison 2001)
- **=** *Spartina patens - Distichlis spicata* community (Metzler and Barrett 2001)
- **=** *Spartina patens* lower slope (Miller and Egler 1950)
- **?** Salt Marsh (Rawinski 1984a) [formerly Southern New England and Gulf of Maine Salt Marshes.]
- **?** Salt marsh complex, high marsh (Breden 1989)
- **<** Spartina Saltmarsh (Gawler 2002)

AUTHORSHIP

Primary Concept Source: Eastern Ecology Group 8-96,mod. S.L. Neid
Author of Description: S.L. Neid
Acknowledgments:
Version Date: 2002/05/13

REFERENCES

References: Bell et al. 2002, Bertness et al. 1992, Breden 1989, Breden et al. 2001, Coulling pers. comm., Coxe 2009, Dowhan and Rozsa 1989, Edinger et al. 2002, Edinger et al. 2008a, Edinger et al. 2008b, Enser 1999, Enser and Lundgren 2006, Fleming 2001a, Gawler 2001, Gawler 2002, Gawler and Cutko 2010, Harrison 2001, Hill 1923, Klopfer et al. 2002, Largay and Sneddon 2010, Lubinski et al. 2003, Metzler and Barrett 2001, Metzler and Barrett 2006, Miller and Egler 1950, NatureServe 2009, Nixon 1982, Rawinski 1984a, Reschke 1990, Sneddon et al. 2010, Soil Conservation Service 1987, Sperduto 2000a, Sperduto 2000b, Sperduto and Nichols 2004, Swain and Kearsley 2001.

NYC NAC Association Description based on 1 plot (CEGL006006):

Overstory plants are very sparse and may include blackjack oak (Quercus marilandica).

Vines include eastern poison ivy (Toxicodendron radicans).

The understory is dominated by saltmeadow cordgrass (Spartina patens). Other understory plants include Jesuit's bark (Iva frutescens) and goldenrod (Solidago sp.).

7. AGRICULTURAL & DEVELOPED VEGETATION

7.A. Woody Agricultural Vegetation

7.A.2. Forest Plantation & Agroforestry

7.A.2.1. Forest Plantation

7.A.2.1.2. Temperate & Boreal Plantation

7.A.2.1.2.a. Eastern North American Temperate Forest Plantation

7. Agricultural & Developed Vegetation

CTY009. Native Northern Pine Plantation

Type Concept Sentence:

OVERVIEW

Scientific Name: Native Northern Pine Plantation Cultural Type
Common Name (Translated Scientific Name): Native Northern Pine Plantation Cultural Type

Type Concept:

Classification Comments:

Similar NVC Types:

VEGETATION

Floristics:

ENVIRONMENT & DYNAMICS

Environmental Description:

Dynamics:

DISTRIBUTION

Geographic Range:

Spatial Scale & Pattern [optional]:
Nations: CA, US
States/Provinces:
TNC Ecoregions [optional]:
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]:

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low - Poorly Documented.

SYNONYMY

LOWER LEVEL UNITS

Cultural Subtypes:

AUTHORSHIP

Primary Concept Source:
Author of Description:
Acknowledgments:
Version Date:
Classif Resp Region: East
Internal Author: DFL 1-15

REFERENCES

References: Faber-Langendoen et al. 2013

CST007178. Eastern White Pine Plantation

Type Concept Sentence:

OVERVIEW

Scientific Name: *Pinus strobus* Forest Plantation
Common Name (Translated Scientific Name): Eastern White Pine Forest Plantation

Type Concept: This eastern white pine plantation type is found throughout the northeastern and midwestern United States and adjacent Canada. Stands contain plantations of *Pinus strobus* that are maintained for the extraction of forest products. Some have been planted as reclamation projects (e.g., following strip-mining). At maturity, the tree canopy is usually dense and contains a monospecific layer of *Pinus strobus*. *Pinus resinosa* or *Pinus virginiana* is occasionally present in small amounts. In older stands or gaps, regenerating trees may include *Fagus grandifolia, Acer saccharum, Acer rubrum*, and *Prunus serotina*; *Robinia pseudoacacia* and *Betula lenta* are occasionally present. *Acer pensylvanicum* and *Ostrya virginiana* are common small trees. The shrub layer is

typically sparse and mostly consists of smaller individuals of the tree species. The field layer varies from sparse to absent; it may be locally well-developed in small openings, with variable composition. In some stands, mosses may be abundant. Susceptibility to a variety of pests or diseases, including white pine blister rust (*Cronartium ribicola*) and southern pine beetle (*Dendroctonus frontalis*), has had some impact on its commercial use.

Classification Comments: There was a lot of planting of eastern white pine from the 1930s into the 1950s, but there has been very little planting since then (P. Manion pers. comm. 2001). On the Daniel Boone National Forest of Kentucky, *Pinus strobus* plantings are of limited extent and are related to wildlife plantings. In the southern part of this type's range, there has been some damage from southern pine beetle (*Dendroctonus frontalis*). These plantations have been observed in the Peters Mountain area (James River Ranger District) and various other sites in the George Washington and Jefferson national forests.

Similar NVC Types:
- CEGL007944 *Pinus strobus* Ruderal Forest
- CST006313 Mixed Pine Conifer Plantation

VEGETATION

Floristics: The tree canopy at maturity is usually dense and contains a monospecific layer of *Pinus strobus*. *Pinus resinosa* or *Pinus virginiana* is occasionally present in small amounts. In older stands or gaps, regenerating trees may include *Fagus grandifolia, Acer saccharum, Acer rubrum*, and *Prunus serotina*; *Robinia pseudoacacia* and *Betula lenta* are occasionally present. *Acer pensylvanicum* and *Ostrya virginiana* are common small trees. The shrub layer is typically sparse and mostly consists of smaller individuals of the tree species. The field layer varies from sparse to absent; it may be locally well-developed in small openings, with variable composition. In some stands, mosses may be abundant.

ENVIRONMENT & DYNAMICS

Environmental Description: Stands contain plantations of *Pinus strobus* that are maintained for the extraction of forest products. The type does well on a variety of soils. Some have been planted on strip-mine reclamation sites.

Dynamics: *Pinus strobus* is susceptible to a variety of pests and diseases, including white pine blister rust (*Cronartium ribicola*) and southern pine beetle (*Dendroctonus frontalis*), which have had some impact on its commercial use. Blister rust was a problem on young plantations but is not much of a problem in larger trees in the east (P. Manion pers. comm. 2001).

DISTRIBUTION

Geographic Range: This white pine plantation is found throughout the northeastern and midwestern United States and adjacent Canada.

Nations: CA, US
States/Provinces: CT, DE, GA, IN, KY, MD, NC, NH, NJ, NY, OH, PA, SC, TN, VA, VT, WV
TNC Ecoregions [optional]: 47:C, 48:C, 51:C, 52:C, 59:C, 61:C, 62:C, 63:C
USFS Ecoregions (2007):
Omernik Ecoregions:
Federal Lands [optional]: BIA (Eastern Band of Cherokee); NPS (Antietam, Appalachian Trail [Central Appalachians], Appalachian Trail [Lower New England], Appalachian Trail [Northern Appalachians], Appalachian Trail [Southern Blue Ridge], Blue Ridge Parkway, Booker T. Washington, C&O Canal, Catoctin Mountain, Chattahoochee River, Chickamauga-Chattanooga, Cuyahoga Valley, Indiana Dunes, Marsh-Billings-Rockefeller, Mississippi, Monocacy, New River Gorge, Saratoga, Valley Forge); USFS (Chattahoochee, Chattahoochee (Southern Blue Ridge), Cherokee, Daniel Boone, George Washington, Jefferson, Monongahela, Nantahala, Pisgah, Sumter, Sumter (Mountains)); USFWS (Chesapeake Marshlands, E.B. Forsythe, Supawna Meadows)

CONFIDENCE LEVEL

USNVC Confidence Level with Comments: Low - Poorly Documented.

SYNONYMY

- **=** *Pinus strobus* Planted Forest (Fleming and Coulling 2001)
- **<** IF3b. Plantation (Hardwood or Conifer) (Allard 1990)
- **=** Pine Plantation (Vanderhorst 2001b)
- **?** Unclassified Clearcut Regeneration (Fleming and Moorhead 2000) [*pro parte*]
- **=** White Pine Plantation (Edinger et al. 2007)

LOWER LEVEL UNITS

s:

AUTHORSHIP

Primary Concept Source: A.S. Weakley, mod. D. Faber-Langendoen
Author of Description: D. Faber-Langendoen, mod. S.C. Gawler
Acknowledgments:
Version Date: 2007/07/23

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APPENDIX A. Proposed New Associations

NYC NAC Association Description based on 11 plots (CEGL009001):

The overstory is dominated by sycamore maple (Acer pseudoplatanus). Other overstory trees include black cherry (Prunus serotina), ash (Fraxinus sp.), Norway maple (Acer platanoides), northern red oak (Quercus rubra), sassafras (Sassafras albidum), elm (Ulmus), bitternut hickory (Carya cordiformis), Kentucky yellowwood (Cladrastis kentukea), white mulberry (Morus alba), sweetgum (Liquidambar styraciflua), sweet birch (Betula lenta), red maple (Acer rubrum), black locust (Robinia pseudoacacia), eastern cottonwood (Populus deltoides), sugar maple (Acer saccharum), American hornbeam (Carpinus caroliniana), and hedge maple (Acer campestre).

The midstory is dominated by sycamore maple (Acer pseudoplatanus). Other midstory plants include Norway maple (Acer platanoides), ash (Fraxinus sp.), black cherry (Prunus serotina), red maple (Acer rubrum), boxelder (Acer negundo), hawthorn (Crataegus sp.), northern red oak (Quercus rubra), bitternut hickory (Carya cordiformis), Amur honeysuckle (Lonicera maackii), American hornbeam (Carpinus caroliniana), sassafras (Sassafras albidum), sweetgum (Liquidambar styraciflua), northern spicebush (Lindera benzoin), elm (Ulmus sp.), hedge maple (Acer campestre), chokecherry (Prunus virginiana), black elderberry (Sambucus nigra), Kentucky yellowwood (Cladrastis kentukea), Siberian elm (Ulmus pumila), silver maple (Acer saccharinum), sugar maple (Acer saccharum), common hackberry (Celtis occidentalis), and black locust (Robinia pseudoacacia).

Vines include Virginia creeper (Parthenocissus quinquefolia), Amur peppervine (Ampelopsis brevipedunculata), Oriental bittersweet (Celastrus orbiculatus), Japanese honeysuckle (Lonicera japonica), eastern poison ivy (Toxicodendron radicans), Chinese wisteria (Wisteria sinensis), fox grape (Vitis labrusca), and English ivy (Hedera helix).

Understory plants include garlic mustard (Alliaria petiolata), jumpseed (Polygonum virginianum), American pokeweed (Phytolacca americana), multiflora rose (Rosa multiflora), white wood aster (Eurybia divaricata), avens (Geum sp.), sycamore maple (Acer pseudoplatanus), broadleaf enchanter's nightshade (Circaea lutetiana), Oriental lady's thumb (Polygonum cespitosum), white snakeroot (Ageratina altissima), jewelweed (Impatiens capensis), blackberry (Rubus sp.), black raspberry (Rubus occidentalis), poverty rush (Juncus tenuis), Canadian horseweed (Conyza canadensis), goldenrod (Solidago sp.), devil's beggartick (Bidens frondosa), lambsquarters (Chenopodium album), black cherry (Prunus serotina), bishop's goutweed (Aegopodium podagraria), Asiatic dayflower (Commelina communis), northern dewberry (Rubus flagellaris), sassafras (Sassafras albidum), Amur honeysuckle (Lonicera maackii), silky dogwood (Cornus amomum), climbing nightshade (Solanum dulcamara), Asiatic tearthumb (Polygonum perfoliatum), white mulberry (Morus alba), paper mulberry (Broussonetia papyrifera), feathery false lily of the valley (Maianthemum racemosum), Indian strawberry (Duchesnea indica), northern red oak (Quercus rubra), bitternut hickory (Carya cordiformis), woodsorrel (Oxalis sp.), Norway maple (Acer platanoides), tree of heaven (Ailanthus altissima), purpleflowering raspberry (Rubus odoratus), sweetgum (Liquidambar styraciflua), eastern cottonwood (Populus deltoides), and common hackberry (Celtis occidentalis).

NYC NAC Association Description based on 14 plots (CEGL009002):

The overstory is dominated by white mulberry (Morus alba). Other overstory trees include black cherry (Prunus serotina), London planetree (Platanus × hispanica), pin oak (Quercus palustris), Norway maple (Acer platanoides), black locust (Robinia pseudoacacia), eastern cottonwood (Populus deltoides), ash (Fraxinus sp.), black walnut (Juglans nigra), tree of heaven (Ailanthus altissima), American hornbeam (Carpinus caroliniana), boxelder (Acer negundo), sycamore maple (Acer pseudoplatanus), pignut hickory (Carya glabra), and common hackberry (Celtis occidentalis).

The midstory is dominated by white mulberry (Morus alba). Other midstory plants include black cherry (Prunus serotina), common hackberry (Celtis occidentalis), tree of heaven (Ailanthus altissima), Amur honeysuckle (Lonicera maackii), glossy buckthorn (Frangula alnus), boxelder (Acer negundo), Japanese corktree (Phellodendron japonicum), black locust (Robinia pseudoacacia), Morrow's honeysuckle (Lonicera morrowii), common lilac (Syringa vulgaris), honeysuckle (Lonicera), northern bayberry (Morella pensylvanica), blackhaw (Viburnum prunifolium), flowering dogwood (Cornus florida), winged sumac (Rhus copallinum), black oak (Quercus velutina), American hornbeam (Carpinus caroliniana), autumn olive (Elaeagnus umbellata), pin oak (Quercus palustris), Tatarian honeysuckle (Lonicera tatarica), gray dogwood (Cornus racemosa), northern catalpa (Catalpa speciosa), sweet cherry (Prunus avium), honeylocust (Gleditsia triacanthos), tuliptree (Liriodendron tulipifera), sweetgum (Liquidambar styraciflua), sycamore (Platanus), white oak (Quercus alba), silver maple (Acer saccharinum), and Norway maple (Acer platanoides).

Vines include Virginia creeper (Parthenocissus quinquefolia), Oriental bittersweet (Celastrus orbiculatus), Amur peppervine (Ampelopsis brevipedunculata), eastern poison ivy (Toxicodendron radicans), English ivy (Hedera helix), Japanese honeysuckle (Lonicera japonica), riverbank grape (Vitis riparia), common moonseed (Menispermum canadense), fox grape (Vitis labrusca), and American hogpeanut (Amphicarpaea bracteata).

Understory plants include common wormwood (Artemisia vulgaris), garlic mustard (Alliaria petiolata), Amur peppervine (Ampelopsis brevipedunculata), wine raspberry (Rubus phoenicolasius), multiflora rose (Rosa multiflora), white snakeroot (Ageratina altissima), black cherry (Prunus serotina), common reed (Phragmites australis), Japanese knotweed (Polygonum cuspidatum), American pokeweed (Phytolacca americana), stickywilly (Galium aparine), winged sumac (Rhus copallinum), woodsorrel (Oxalis sp.), black raspberry (Rubus occidentalis), broadleaf enchanter's nightshade (Circaea lutetiana), violet (Viola sp.), common yarrow (Achillea millefolium), annual ragweed (Ambrosia artemisiifolia), flowering dogwood (Cornus florida), burningbush (Euonymus alatus), cutleaf blackberry (Rubus laciniatus), evening primrose (Oenothera sp.), hairy crabgrass (Digitaria sanguinalis), narrowleaf plantain (Plantago lanceolata), northern bayberry (Morella pensylvanica), Amur honeysuckle (Lonicera maackii), sweetclover (Melilotus officinalis), blackhaw (Viburnum prunifolium), sycamore maple (Acer pseudoplatanus), boxelder (Acer negundo), chokecherry (Prunus virginiana), blackberry (Rubus sp.), Norway maple (Acer platanoides), switchgrass (Panicum virgatum), Tatarian honeysuckle (Lonicera tatarica), spotted sandmat (Chamaesyce maculata), mayapple (Podophyllum peltatum), bitter dock (Rumex obtusifolius), black locust (Robinia pseudoacacia), Indian strawberry (Duchesnea indica), Virginia pepperweed (Lepidium virginicum), lambsquarters (Chenopodium album), avens (Geum sp.), bitternut hickory (Carya cordiformis), slender goldentop (Euthamia caroliniana), common hackberry (Celtis occidentalis), wrinkleleaf goldenrod (Solidago rugosa), Queen Anne's lace (Daucus carota), and early goldenrod (Solidago juncea).

NYC NAC Association Description based on 4 plots (CEGL009003):

The overstory is dominated by European alder (Alnus glutinosa). Other overstory trees include bitternut hickory (Carya cordiformis) and boxelder (Acer negundo).

The midstory is dominated by European alder (Alnus glutinosa). Other midstory plants include ash (Fraxinus sp.), apple (Malus sp.), southern arrowwood (Viburnum dentatum), Tatarian honeysuckle (Lonicera tatarica), silver buffaloberry (Shepherdia argentea), Russian olive (Elaeagnus angustifolia), hawthorn (Crataegus sp.), and sycamore maple (Acer pseudoplatanus).

Vines include eastern poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), Amur peppervine (Ampelopsis brevipedunculata), Japanese honeysuckle (Lonicera japonica), climbing nightshade (Solanum dulcamara), Oriental bittersweet (Celastrus orbiculatus), and grape (Vitis sp.).

Understory plants include eastern multiflora rose (Rosa multiflora), goldenrod (Solidago sp.), avens (Geum sp.), common reed (Phragmites australis), jumpseed (Polygonum virginianum), aster (Symphyotrichum lanceolatum), blackberry (Rubus sp.), European alder (Alnus glutinosa), gray dogwood (Cornus racemosa), violet (Viola sp.), jewelweed (Impatiens capensis), wrinkleleaf goldenrod (Solidago rugosa), Pennsylvania blackberry (Rubus pensilvanicus), lettuce (Lactuca sp.), southern arrowwood (Viburnum dentatum), strawberry (Fragaria), common boneset (Eupatorium perfoliatum), common wormwood (Artemisia vulgaris), Asiatic dayflower (Commelina communis), smallspike false nettle (Boehmeria cylindrica), devil's beggartick (Bidens frondosa), American burnweed (Erechtites hieraciifolius), American water horehound (Lycopus americanus), goosefoot (Chenopodium sp.), garlic mustard (Alliaria petiolata), and onion (Allium sp.).

NYC NAC Association Description based on 15 plots (CEGL009004):

The overstory is dominated by eastern cottonwood (Populus deltoides). Other overstory trees include pin oak (Quercus palustris), sweetgum (Liquidambar styraciflua), black cherry (Prunus serotina), sycamore maple (Acer pseudoplatanus), green ash (Fraxinus pennsylvanica), black walnut (Juglans nigra), white mulberry (Morus alba), Norway maple (Acer platanoides), tuliptree (Liriodendron tulipifera), black willow (Salix nigra), white poplar (Populus alba), black locust (Robinia pseudoacacia), hawthorn (Crataegus sp.), quaking aspen (Populus tremuloides), London planetree (Platanus × hispanica), shagbark hickory (Carya ovata), bitternut hickory (Carya cordiformis), boxelder (Acer negundo), northern red oak (Quercus rubra), apple (Malus sp.), pussy willow (Salix discolor), sassafras (Sassafras albidum), gray birch (Betula populifolia), and red maple (Acer rubrum).

The midstory is dominated by eastern cottonwood (Populus deltoides). Other midstory plants include black cherry (Prunus serotina), red maple (Acer rubrum), apple (Malus sp.), bitternut hickory (Carya cordiformis), sweetgum (Liquidambar styraciflua), northern bayberry (Morella pensylvanica), Amur honeysuckle (Lonicera maackii), black locust (Robinia pseudoacacia), white mulberry (Morus alba), boxelder (Acer negundo), silver maple (Acer saccharinum), northern red oak (Quercus rubra), pussy willow (Salix discolor), Siberian elm (Ulmus pumila), autumn olive (Elaeagnus umbellata), American basswood (Tilia americana), glossy buckthorn (Frangula alnus), Amur maple (Acer ginnala), green ash (Fraxinus pennsylvanica), European cranberrybush (Viburnum opulus), hawthorn (Crataegus sp.), Callery pear (Pyrus calleryana), false indigo bush (Amorpha fruticosa), American elm (Ulmus americana), mockernut hickory (Carya tomentosa), southern arrowwood (Viburnum dentatum), slippery elm (Ulmus rubra), American hornbeam (Carpinus caroliniana), sweet birch (Betula lenta), tree of heaven (Ailanthus altissima), eastern redcedar (Juniperus virginiana), sycamore maple (Acer pseudoplatanus), Norway maple (Acer platanoides), shagbark hickory (Carya ovata), common hackberry (Celtis occidentalis), gray dogwood (Cornus racemosa), black walnut (Juglans nigra), northern spicebush (Lindera benzoin), American sycamore (Platanus occidentalis), scarlet oak (Quercus coccinea), chestnut oak (Quercus montana), and pin oak (Quercus palustris).

Vines include eastern poison ivy (Toxicodendron radicans), Amur peppervine (Ampelopsis brevipedunculata), Japanese honeysuckle (Lonicera japonica), Oriental bittersweet (Celastrus orbiculatus), Virginia creeper (Parthenocissus quinquefolia), English ivy (Hedera helix), Chinese wisteria (Wisteria sinensis), summer grape (Vitis aestivalis), roundleaf greenbrier (Smilax rotundifolia), riverbank grape (Vitis riparia), and amberique-bean (Strophostyles helvola).

Understory plants include multiflora rose (Rosa multiflora), goldenrod (Solidago sp.), common reed (Phragmites australis), common wormwood (Artemisia vulgaris), blackberry (Rubus sp.), garlic mustard (Alliaria petiolata), wine raspberry (Rubus phoenicolasius), jumpseed (Polygonum virginianum), avens (Geum sp.), Japanese knotweed (Polygonum cuspidatum), eastern baccharis (Baccharis halimifolia), black cherry (Prunus serotina), milkweed (Asclepias sp.), lettuce (Lactuca sp.), eastern cottonwood (Populus deltoides), knotweed (Polygonum sp.), lambsquarters (Chenopodium album), onion (Allium sp.), red maple (Acer rubrum), northern red oak (Quercus rubra), moth mullein (Verbascum blattaria), northern dewberry (Rubus flagellaris), Nepalese browntop (Microstegium vimineum), and American burnweed (Erechtites hieraciifolius).

NYC NAC Association Description based on 19 plots (CEGL009005):

Overstory trees are sparse and may include crack willow (Salix fragilis), white mulberry (Morus alba), tree of heaven (Ailanthus altissima), black willow (Salix nigra), and red mulberry (Morus rubra).

Midstory plants are sparse and may include include apple (Malus sp.), black locust (Robinia pseudoacacia), tree of heaven (Ailanthus altissima), smooth sumac (Rhus glabra), and staghorn sumac (Rhus typhina).

Vines include Amur peppervine (Ampelopsis brevipedunculata), Virginia creeper (Parthenocissus quinquefolia), Japanese honeysuckle (Lonicera japonica), Asiatic tearthumb (Polygonum perfoliatum), hedge false bindweed (Calystegia sepium), climbing false buckwheat (Polygonum scandens), eastern poison ivy (Toxicodendron radicans).

The understory is dominated by common wormwood (Artemisia vulgaris). Other understory plants include common reed (Phragmites australis), goldenrod (Solidago sp.), multiflora rose (Rosa multiflora), American pokeweed (Phytolacca americana), garlic mustard (Alliaria petiolata), lambsquarters (Chenopodium album), annual ragweed (Ambrosia artemisiifolia), sweetclover (Melilotus officinalis), narrowleaf plantain (Plantago lanceolata), lesser burdock (Arctium minus), common evening primrose (Oenothera biennis), plantain (Plantago sp.), Canadian horseweed (Conyza canadensis), white mulberry (Morus alba), horseflyweed (Baptisia tinctoria), Allegheny blackberry (Rubus allegheniensis), and stickywilly (Galium aparine).

NYC NAC Association Description based on 1 plot (CEGL009006):

Overstory trees include sassafras (Sassafras albidum), mockernut hickory (Carya tomentosa), and Amur corktree (Phellodendron amurense).

The midstory is domated by Japanese corktree (Phellodendron japonicum). Other midstory plants include viburnum (Viburnum sp.), mockernut hickory (Carya tomentosa), and sweet cherry (Prunus avium).

Vines include Oriental bittersweet (Celastrus orbiculatus) and eastern poison ivy (Toxicodendron radicans).

Understory plants include pignut hickory (Carya glabra), northern dewberry (Rubus flagellaris), Asiatic dayflower (Commelina communis), mapleleaf viburnum (Viburnum acerifolium), sassafras (Sassafras albidum), jewelweed (Impatiens capensis), garlic mustard (Alliaria petiolata), and multiflora rose (Rosa multiflora).

NYC NAC Association Description based on 8 plots (CEGL009007):

The overstory is dominated by elms, such as slippery elm (Ulmus rubra), American elm (Ulmus americana), and Siberian elm (Ulmus pumila). Other overstory trees include sweetgum (Liquidambar styraciflua), northern red oak (Quercus rubra), black cherry (Prunus serotina), mockernut hickory (Carya tomentosa), red mulberry (Morus rubra), sassafras (Sassafras albidum), red maple (Acer rubrum), sweet cherry (Prunus avium), green ash (Fraxinus pennsylvanica), common hackberry (Celtis occidentalis), and Norway maple (Acer platanoides).

The midstory is dominated by elms, such as slippery elm (Ulmus rubra), American elm (Ulmus americana), and Siberian elm (Ulmus pumila). Other overstory trees include black cherry (Prunus serotina), red maple (Acer rubrum), southern arrowwood (Viburnum dentatum), sugar maple (Acer saccharum), green ash (Fraxinus pennsylvanica), northern spicebush (Lindera benzoin), American witchhazel (Hamamelis virginiana), boxelder (Acer negundo), hawthorn (Crataegus sp.), sassafras (Sassafras albidum), sycamore maple (Acer pseudoplatanus), American hornbeam (Carpinus caroliniana), tuliptree (Liriodendron tulipifera), common buckthorn (Rhamnus cathartica), Norway maple (Acer platanoides), silktree (Albizia julibrissin), mockernut hickory (Carya tomentosa), apple (Malus sp.), blackhaw (Viburnum prunifolium), and Japanese angelica tree (Aralia elata).

Vines include Japanese honeysuckle (Lonicera japonica), eastern poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), Oriental bittersweet (Celastrus orbiculatus), Amur peppervine (Ampelopsis brevipedunculata), English ivy (Hedera helix), roundleaf greenbrier (Smilax rotundifolia), and common moonseed (Menispermum canadense).

Understory plants include multiflora rose (Rosa multiflora), broadleaf enchanter's nightshade (Circaea lutetiana), garlic mustard (Alliaria petiolata), common wormwood (Artemisia vulgaris), Japanese knotweed (Polygonum cuspidatum), northern spicebush (Lindera benzoin), slippery elm (Ulmus rubra), common yarrow (Achillea millefolium), Norway maple (Acer platanoides), black cherry (Prunus serotina), sassafras (Sassafras albidum), annual ragweed (Ambrosia artemisiifolia), Canada goldenrod (Solidago altissima), blackberry (Rubus sp.), white snakeroot (Ageratina altissima), green ash (Fraxinus pennsylvanica), jewelweed (Impatiens capensis), privet (Ligustrum sp.), common evening primrose (Oenothera biennis), common moonseed (Menispermum canadense), sweetclover (Melilotus officinalis), jumpseed (Polygonum virginianum), field bindweed (Convolvulus arvensis), sycamore maple (Acer pseudoplatanus), wine raspberry (Rubus phoenicolasius), winged sumac (Rhus copallinum), white wood aster (Eurybia divaricata), black raspberry (Rubus occidentalis), Siberian elm (Ulmus pumila), white avens (Geum canadense), stickywilly (Galium aparine), Canada mayflower (Maianthemum canadense), white mulberry (Morus alba), common yellow oxalis (Oxalis stricta), boxelder (Acer negundo), yellow nutsedge (Cyperus esculentus), black elderberry (Sambucus nigra), and wild chives (Allium schoenoprasum).

NYC NAC Association Description based on 3 plots (CEGL009008):

The overstory is dominated by ash trees (Fraxinus spp.). Other overstory trees include pin oak (Quercus palustris), northern red oak (Quercus rubra), American elm (Ulmus americana), black cherry (Prunus serotina), slippery elm (Ulmus rubra), white mulberry (Morus alba), sweetgum (Liquidambar styraciflua), hawthorn (Crataegus sp.), and sweet cherry (Prunus avium).

The midstory is dominated by ash trees (Fraxinus spp.). Other midstory plants include apple (Malus sp.), glossy buckthorn (Frangula alnus), black cherry (Prunus serotina), northern spicebush (Lindera benzoin), hawthorn (Crataegus sp.), sweetgum (Liquidambar styraciflua), Norway maple (Acer platanoides), and sweet cherry (Prunus avium).

Vines include eastern poison ivy (Toxicodendron radicans), Oriental bittersweet (Celastrus orbiculatus), Japanese honeysuckle (Lonicera japonica), English ivy (Hedera helix), grape (Vitis sp.), and Virginia creeper (Parthenocissus quinquefolia).

Understory plants include multiflora rose (Rosa multiflora), jumpseed (Polygonum virginianum), garlic mustard (Alliaria petiolata), avens (Geum sp.), jewelweed (Impatiens capensis), goldenrod (Solidago sp.), blackberry (Rubus), white snakeroot (Ageratina altissima), woodsorrel (Oxalis sp.), butter and eggs (Linaria vulgaris), common cinquefoil (Potentilla simplex), northern dewberry (Rubus flagellaris), broadleaf enchanter's nightshade (Circaea lutetiana), white mulberry (Morus alba), bitternut hickory (Carya cordiformis), Christmas fern (Polystichum acrostichoides), northern spicebush (Lindera benzoin), Oriental lady's thumb (Polygonum cespitosum), feathery false lily of the valley (Maianthemum racemosum), American elm (Ulmus americana), northern red oak (Quercus rubra), Queen Anne's lace (Daucus carota), American burnweed (Erechtites hieraciifolius), common selfheal (Prunella vulgaris), touch-me-not (Impatiens), and purple loosestrife (Lythrum salicaria).

NYC NAC Association Description based on 13 plots (CEGL009009):

The overstory is dominated by pin oak (Quercus palustris). Other overstory trees include northern red oak (Quercus rubra), black cherry (Prunus serotina), blackgum (Nyssa sylvatica), sassafras (Sassafras albidum), American basswood (Tilia americana), black locust (Robinia pseudoacacia), hybrid hickory (Carya), common linden (Tilia ×europaea), sweetgum (Liquidambar styraciflua), swamp white oak (Quercus bicolor), eastern white pine (Pinus strobus), white oak (Quercus alba), white mulberry (Morus alba), slippery elm (Ulmus rubra), American witchhazel (Hamamelis virginiana), and green ash (Fraxinus pennsylvanica).

The midstory is dominated by pin oak (Quercus palustris). Other midstory plants include black cherry (Prunus serotina), pin oak (Quercus palustris), blackgum (Nyssa sylvatica), northern spicebush (Lindera benzoin), sweetgum (Liquidambar styraciflua), ash (Fraxinus sp.), white oak (Quercus alba), black locust (Robinia pseudoacacia), common hackberry (Celtis occidentalis), Japanese angelica tree (Aralia elata), American witchhazel (Hamamelis virginiana), common buckthorn (Rhamnus cathartica), Norway maple (Acer platanoides), blackhaw (Viburnum prunifolium), tree of heaven (Ailanthus altissima), Callery pear (Pyrus calleryana), glossy buckthorn (Frangula alnus), red maple (Acer rubrum), American hornbeam (Carpinus caroliniana), bitternut hickory (Carya cordiformis), chestnut oak (Quercus montana), hawthorn (Crataegus sp.), black walnut (Juglans nigra), northern red oak (Quercus rubra), American basswood (Tilia americana), and sassafras (Sassafras albidum).

Vines include eastern poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), Japanese honeysuckle (Lonicera japonica), roundleaf greenbrier (Smilax rotundifolia), Oriental bittersweet (Celastrus orbiculatus), Amur peppervine (Ampelopsis brevipedunculata), climbing false buckwheat (Polygonum scandens), common moonseed (Menispermum canadense), Chinese wisteria (Wisteria sinensis), riverbank grape (Vitis riparia), Asiatic tearthumb (Polygonum perfoliatum), honeysuckle (Lonicera), and devil's darning needles (Clematis virginiana).

Understory plants include eastern multiflora rose (Rosa multiflora), southern arrowwood (Viburnum dentatum), black cherry (Prunus serotina), blackberry (Rubus sp.), garlic mustard (Alliaria petiolata), common reed (Phragmites australis), common wormwood (Artemisia vulgaris), sassafras (Sassafras albidum), goldenrod (Solidago sp.), Canada mayflower (Maianthemum canadense), sweetgum (Liquidambar styraciflua), avens (Geum sp.), black locust (Robinia pseudoacacia), white snakeroot (Ageratina altissima), northern spicebush (Lindera benzoin), woodsorrel (Oxalis sp.), pin oak (Quercus palustris), lettuce (Lactuca sp.), eastern baccharis (Baccharis halimifolia), lambsquarters (Chenopodium album), small enchanter's nightshade (Circaea alpina), Japanese angelica tree (Aralia elata), smallspike false nettle (Boehmeria cylindrica), and annual ragweed (Ambrosia artemisiifolia).

NYC NAC Association Description based on 2 plots (CEGL009010):

Overstory trees include swamp white oak (Quercus bicolor), red maple (Acer rubrum), tuliptree (Liriodendron tulipifera), tree of heaven (Ailanthus altissima), and Japanese angelica tree (Aralia elata).

The midstory is dominated by Japanese angelica tree (Aralia elata). Other midstory plants include northern spicebush (Lindera benzoin), southern arrowwood (Viburnum dentatum), devil's walkingstick (Aralia spinosa), white mulberry (Morus alba), and sweetgum (Liquidambar styraciflua).

Vines include Japanese honeysuckle (Lonicera japonica), Oriental bittersweet (Celastrus orbiculatus), Virginia creeper (Parthenocissus quinquefolia), eastern poison ivy (Toxicodendron radicans), roundleaf greenbrier (Smilax rotundifolia), Amur peppervine (Ampelopsis brevipedunculata), and fox grape (Vitis labrusca).

Understory plants include blackberry (Rubus sp.), spotted ladysthumb (Polygonum persicaria), devil's walkingstick (Aralia spinosa), multiflora rose (Rosa multiflora), wild yam (Dioscorea villosa), groundnut (Apios americana), common reed (Phragmites australis), Japanese angelica tree (Aralia elata), American pokeweed (Phytolacca americana), common yellow oxalis (Oxalis stricta), small enchanter's nightshade (Circaea alpina), wine raspberry (Rubus phoenicolasius), Canada mayflower (Maianthemum canadense), and sweetgum (Liquidambar styraciflua).

NYC NAC Association Description based on 4 plots (CEGL009011):

The overstory is dominated by apple (Malus sp.). Other overstory trees include London planetree (Platanus × hispanica), northern red oak (Quercus rubra), black cherry (Prunus serotina), pin oak (Quercus palustris), and white mulberry (Morus alba).

The midstory is dominated by apple (Malus sp.). Other midstory plants include boxelder (Acer negundo), sassafras (Sassafras albidum), black locust (Robinia pseudoacacia), bitternut hickory (Carya cordiformis), southern arrowwood (Viburnum dentatum), sweet birch (Betula lenta), American elm (Ulmus americana), black elderberry (Sambucus nigra), northern red oak (Quercus rubra), chestnut oak (Quercus montana), black cherry (Prunus serotina), pin cherry (Prunus pensylvanica), ash (Fraxinus sp.), and flowering dogwood (Cornus florida).

Vines include Oriental bittersweet (Celastrus orbiculatus), Japanese honeysuckle (Lonicera japonica), Amur peppervine (Ampelopsis brevipedunculata), eastern poison ivy (Toxicodendron radicans), grape (Vitis sp.), and Virginia creeper (Parthenocissus quinquefolia).

Understory plants include common wormwood (Artemisia vulgaris), multiflora rose (Rosa multiflora), goldenrod (Solidago sp.), common reed (Phragmites australis), black oak (Quercus velutina), touch-me-not (Impatiens), garlic mustard (Alliaria petiolata), Asiatic tearthumb (Polygonum perfoliatum), avens (Geum sp.), bitter dock (Rumex obtusifolius), blackberry (Rubus sp.), jewelweed (Impatiens capensis), Canadian honewort (Cryptotaenia canadensis), bedstraw (Galium sp.), and apple (Malus sp.).

NYC NAC Association Description based on 31 plots (CEGL009012):

The overstory is dominated by black cherry (Prunus serotina). Other overstory trees include ash (Fraxinus sp.), black locust (Robinia pseudoacacia), northern red oak (Quercus rubra), Norway maple (Acer platanoides), red maple (Acer rubrum), common hackberry (Celtis occidentalis), pin oak (Quercus palustris), American hornbeam (Carpinus caroliniana), sweet birch (Betula lenta), eastern white pine (Pinus strobus), slippery elm (Ulmus rubra), sweetgum (Liquidambar styraciflua), black oak (Quercus velutina), scarlet oak (Quercus coccinea), sycamore maple (Acer pseudoplatanus), black walnut (Juglans nigra), sassafras (Sassafras albidum), bitternut hickory (Carya cordiformis), and apple (Malus sp.).

The midstory is dominated by black cherry (Prunus serotina). Other midstory plants include ash (Fraxinus sp.), Norway maple (Acer platanoides), northern red oak (Quercus rubra), northern spicebush (Lindera benzoin), apple (Malus sp.), sycamore maple (Acer pseudoplatanus), sassafras (Sassafras albidum), southern arrowwood (Viburnum dentatum), bitternut hickory (Carya cordiformis), red maple (Acer rubrum), common hackberry (Celtis occidentalis), blackhaw (Viburnum prunifolium), American witchhazel (Hamamelis virginiana), flowering dogwood (Cornus florida), black locust (Robinia pseudoacacia), slippery elm (Ulmus rubra), black oak (Quercus velutina), sugar maple (Acer saccharum), hawthorn (Crataegus sp.), mockernut hickory (Carya tomentosa), sweet cherry (Prunus avium), redosier dogwood (Cornus sericea), sweetgum (Liquidambar styraciflua), privet (Ligustrum), black elderberry (Sambucus nigra), sweet birch (Betula lenta), serviceberry (Amelanchier), white mulberry (Morus alba), pin oak (Quercus palustris), and American basswood (Tilia americana).

Vines include eastern poison ivy (Toxicodendron radicans), Oriental bittersweet (Celastrus orbiculatus), Virginia creeper (Parthenocissus quinquefolia), Japanese honeysuckle (Lonicera japonica), Amur peppervine (Ampelopsis brevipedunculata), English ivy (Hedera helix), fox grape (Vitis labrusca), roundleaf greenbrier (Smilax rotundifolia), common moonseed (Menispermum canadense), mayapple (Podophyllum peltatum), winter creeper (Euonymus fortunei), climbing nightshade (Solanum dulcamara), wild cucumber (Echinocystis lobata), American bittersweet (Celastrus scandens), and summer grape (Vitis aestivalis).

Understory plants include garlic mustard (Alliaria petiolata), white wood aster (Eurybia divaricata), jumpseed (Polygonum virginianum), multiflora rose (Rosa multiflora), blackberry (Rubus sp.), common wormwood (Artemisia vulgaris), white snakeroot (Ageratina altissima), American pokeweed (Phytolacca americana), broadleaf enchanter's nightshade (Circaea lutetiana), goldenrod (Solidago sp.), black cherry (Prunus serotina), wine raspberry (Rubus phoenicolasius), Japanese knotweed (Polygonum cuspidatum), bitternut hickory (Carya cordiformis), Asiatic dayflower (Commelina communis), sycamore maple (Acer pseudoplatanus), northern dewberry (Rubus flagellaris), southern arrowwood (Viburnum dentatum), Oriental lady's thumb (Polygonum cespitosum), poverty rush (Juncus tenuis), jewelweed (Impatiens capensis), smooth Solomon's seal (Polygonatum biflorum), black elderberry (Sambucus nigra), climbing nightshade (Solanum dulcamara), black raspberry (Rubus occidentalis), red maple (Acer rubrum), common periwinkle (Vinca minor), Norway maple (Acer platanoides), northern spicebush (Lindera benzoin), wreath goldenrod (Solidago caesia), lambsquarters (Chenopodium album), and spotted ladysthumb (Polygonum persicaria).

NYC NAC Association Description based on 5 plots (CEGL00XXXX):

Overstory trees are sparse and may include black cherry (Prunus serotina), oak (Quercus sp.), white mulberry (Morus alba), Norway maple (Acer platanoides), eastern white pine (Pinus strobus), ash (Fraxinus sp.), sweetgum (Liquidambar styraciflua), and hawthorn (Crataegus sp.).

Midstory plants are sparse and may include black cherry (Prunus serotina), apple (Malus sp.), eastern white pine (Pinus strobus), ash (Fraxinus sp.), white mulberry (Morus alba), sweetgum (Liquidambar styraciflua), glossy buckthorn (Frangula alnus), pin oak (Quercus palustris), blackgum (Nyssa sylvatica), common hackberry (Celtis occidentalis), and sycamore maple (Acer pseudoplatanus).

Vines include Amur peppervine (Ampelopsis brevipedunculata), Virginia creeper (Parthenocissus quinquefolia), eastern poison ivy (Toxicodendron radicans), Oriental bittersweet (Celastrus orbiculatus), English ivy (Hedera helix), and climbing nightshade (Solanum dulcamara).

The understory is dominated by mowed grasses. Other understory plants include garlic mustard (Alliaria petiolata), common wormwood (Artemisia vulgaris), Oriental lady's thumb (Polygonum cespitosum), woodsorrel (Oxalis sp.), multiflora rose (Rosa multiflora), goldenrod (Solidago sp.), lettuce (Lactuca sp.), Asiatic dayflower (Commelina communis), common blue violet (Viola sororia), white snakeroot (Ageratina altissima), common milkweed (Asclepias syriaca), white wood aster (Eurybia divaricata), red clover (Trifolium pratense), Carolina horsenettle (Solanum carolinense), curly dock (Rumex crispus), common selfheal (Prunella vulgaris), shaggy soldier (Galinsoga quadriradiata), eastern daisy fleabane (Erigeron annuus), blackseed plantain (Plantago rugelii), common dandelion (Taraxacum officinale), Queen Anne's lace (Daucus carota), common plantain (Plantago major), touch-me-not (Impatiens), common yellow oxalis (Oxalis stricta), and white clover (Trifolium repens).

NYC NAC Association Description based on 1 plot (CST007178):

Overstory trees include planted red spruce (Picea rubens) and eastern white pine (Pinus strobus).

Midstory plants include black cherry (Prunus serotina), sweet cherry (Prunus avium), and white mulberry (Morus alba).

Vines include Virginia creeper (Parthenocissus quinquefolia), Oriental bittersweet (Celastrus orbiculatus), and eastern poison ivy (Toxicodendron radicans).

Understory plants include northern dewberry (Rubus flagellaris), black cherry (Prunus serotina), feathery false lily of the valley (Maianthemum racemosum), white wood aster (Eurybia divaricata), spotted ladysthumb (Polygonum persicaria), and jumpseed (Polygonum virginianum).

Appendix D. Key to the New York City Natural Areas Conservancy Vegetation Plots

his dichotomous key is designed to work with the NAC Plots Classification database developed by NYNHP (Nov. 2015), but should work in the field as well. This is a "top-down" classification key. Look at the dominant and co-dominant species in the overstory, midstory, understory, and additional species tables in the database to classify the plot. The key uses the U.S. National Vegetation Classification (USNVC) Association as the basic unit of classification. USNVC CEGL codes are included with the scientific name and common name for each Association. CEGL codes in the 9000 series (e.g., CEGL009001 – CEGL009012) were created for potentially new USNVC Associations that currently are not described by NatureServe. For successional forests and forests dominated by non-native trees, the native, natural type may be able to be classified by excluding the dominant tree species and re-keying the plot on the remaining trees and indicator species if present.

1a. Estuarine (tidal) plots. Wetland communities with access to open ocean waters, with water salinity usually less than 18.0 ppt ocean-derived salts. Including estuarine communities of the intertidal zone, located between the highest tide level and the lowest tide level where the substrate is periodically exposed and flooded by semidiurnal tides (two high tides and two low tides per tidal day) 2

- 2a. Tidal marshes dominated by *Phragmites australis* ssp. *australis. Phragmites australis* ssp. *australis* Tidal Ruderal Herbaceous Vegetation (Ruderal Tidal Common Reed Marsh) CEGL004187
- 2b. Tidal marshes dominated by *Spartina patens. Spartina patens - Distichlis spicata* - (*Juncus gerardii*) Herbaceous Vegetation (North Atlantic High Salt Marsh) CEGL006006

1b. Terrestrial (upland) or freshwater non-tidal wetland (Palustrine) plots 3

- 3a. Terrestrial (upland) plots. Upland communities: communities on soils that are well-drained and never regularly flooded; or on soils that are usually well-drained and not hydric, lack predominantly hydrophytic vegetation (obligate wetland plants absent), but may be regularly flooded for a short time each year. Plot usually not within or adjacent to a DEC and/or NWI wetland polygon or unmapped wetland signature on air photo. Late season drawn-down wetlands and altered floodplain forests that may appear as uplands are included here for convenience 4
  - 4a. Forests and Woodlands: Tree stem tally (excluding shrubs) in overstory and midstory +/- 12 for forests or +/- 7 for woodlands OR trees in overstory and midstory >60% cover for forests or >25% cover for woodlands 5
    - 5a. Deciduous Forests and Woodlands. Deciduous trees dominant with conifers absent or negligible (e.g., 1 conifer stem in overstory or midstory) 6
      - 6a. Successional or Non-native forests often lacking oak. If oak is present, then non-native trees common in overstory or

17a. *Populus* (*tremuloides, grandidentata,* or *deltoides*) common in overstory 18

18a. *Populus* (*tremuloides, grandidentata*) and/or *Betula* (*populifolia, papyrifera*) dominant in overstory and/or midstory. See 22a, below, for *Betula lenta* forests. See 32a for forest or woodland occurring on serpentine (on Staten Island). *Populus* (*tremuloides, grandidentata*) - *Betula* (*populifolia, papyrifera*) Ruderal Woodland (Early-Successional Aspen - Birch Woodland) CEGL006303

18b. *Populus deltoides* dominant in overstory and/or midstory. See 76b below for *Populus deltoides* floodplain forests. *Populus deltoides* Ruderal Forest (Successional Eastern Cottonwood Forest) CEGL009004

17b. *Quercus palustris, Liquidambar styraciflua,* or *Fraxinus americana* common in the overstory 19

19a. *Fraxinus* or *Ulmus* 20

20a. *Fraxinus americana* or *Fraxinus* spp. dominant in overstory and/or midstory. *Fraxinus americana* (or *Fraxinus* spp.) Ruderal Forest (Sucessional White Ash Forest or Successional Ash Forest) CEGL009008

20b. *Ulmus* spp. dominant in overstory and/or midstory. *Ulmus* spp. Ruderal Forest (Successional Elm Forest) CEGL009007

19b. *Liquidambar* or *Quercus palustris* 21

21a. *Liquidambar styraciflua* dominant in overstory and/or midstory. *Liquidambar styraciflua* Ruderal Forest (Successional Sweetgum Forest) CEGL007216

21b. *Quercus palustris* dominant in overstory and/or midstory in upland setting. *Prunus serotina* is a characteristic associate. Acer rubrum absent. See 42a below for *Quercus palustris* floodplain forests. *Quercus palustris* Ruderal Forest (Successional Pin Oak Forest) CEGL009009

16b. otherwise 22

22a. *Betula lenta* dominant in overstory and/or midstory. *Acer rubrum* is an indicator when present. *Betula lenta - Acer rubrum / Lycopodium annotinum - Dennstaedtia punctilobula* Ruderal Forest (Central Appalachian Ruderal Sweet Birch - Red Maple Forest) CEGL008503

22b. *Liriodendron tulipifera* dominant in overstory and/or midstory. *Quercus* spp. may be present. *Liriodendron tulipifera - Quercus* spp. Ruderal Forest (Successional Tuliptree Forest) CEGL007221

6b. Native upland forests 23

23a. *Quercus* in overstory 24

24a. Upland oak forests and woodlands: At least 1 stem of *Quercus* (*alba, coccinea, rubra, velutina*) in overstory and/or midstory. Ideally these oaks are dominant or co-dominant with other tree species and have 2-3 stems >30 cm dbh. See 7b, above, for forests dominated by native trees <30 cm dbh 25

25a. *Carya, Liriodendron,* or *Fagus* in overstory, midstory, understory, and/or in additional species list 26

26a. *Carya* or *Liriodendron* or *Fagus* in overstory and/or midstory (Ideally 2-3 stems of these species are >30 cm dbh) 27

27a. *Liriodendron* in overstory and/or midstory..... 28

28a. *Acer saccharum, Nyssa sylvatica, Betula lenta, Tilia americana,* and/or *Lindera benzoin* found in the plot. *Quercus rubra - Acer saccharum - Liriodendron tulipifera* Forest (Oak-Tulip Tree Forest) CEGL006125

28b. *Fagus grandifolia, Liquidambar styraciflua, Sassafras albidum, Ilex opaca,* and/or *Vaccinium corymbosum* more common than the species noted above. *Fagus grandifolia - Quercus* (*alba, rubra*) - *Liriodendron tulipifera* / (*Ilex opaca* var. *opaca*) Forest CEGL006075

27b. *Liriodendron* absent or negligible in plot..... 29

29a. *Carya* in overstory and/or midstory and > *Fagus*. *Liriodendron* absent or negligible in plot (e.g., 1 stem in midstory). Ideally *Carya* is dominant or co-dominant in overstory and/or midstory. *Viburnum acerifolium* and *Cornus florida* are indicators when present. *Liquidambar styraciflua* often present. *Quercus* (*alba, rubra, velutina*) - *Carya* spp. / *Viburnum acerifolium* Forest (Coastal Oak-Hickory Forest).....CEGL006336

29b. *Fagus* in overstory and/or midstory and > *Carya*. *Liriodendron* absent or negligible in plot. Ideally *Fagus* is dominant or co-dominant in overstory and/or midstory. *Fagus grandifolia - Quercus alba - Quercus rubra* Forest (Coastal Oak-Beech Forest) CEGL006377

26b. *Carya, Liriodendron*, and *Fagus* absent from overstory and midstory, but present in understory and/or in additional spp. list..... 30

30a. *Liriodendron* in understory and/or in additional spp. list. *Carya* and *Fagus* may be present. *Lindera benzoin, Tilia americana, Carya cordiformis,* and *Acer saccharum* are indicators when present. *Quercus rubra - Acer saccharum - Liriodendron tulipifera* Forest (Oak-Tulip Tree Forest) CEGL006125

30b. *Liriodendron* absent or negligible in plot..... 31

31a. *Carya* in understory and/or in additional spp. list and > *Fagus*. Liriodendron absent or negligible in plot (e.g., 1 stem in midstory). *Viburnum acerifolium* and *Cornus florida* are indicators when present. *Liquidambar styraciflua* often present. *Quercus* (*alba, rubra, velutina*) - *Carya* spp. / *Viburnum acerifolium* Forest (Coastal Oak-Hickory Forest) CEGL006336

31b. *Fagus* in understory and/or in additional spp. list and > *Carya. Liriodendron* absent or negligible in plot (e.g., 1 stem in midstory). *Fagus grandifolia - Quercus alba - Quercus rubra* Forest (Coastal Oak-Beech Forest).....CEGL006377

25b. Oak forests with *Carya, Liriodendron,* and *Fagus* absent in plot..... 32

32a. Forest or woodland occurring on serpentine (on Staten Island). *Betula populifolia* or *Populus* (*tremuloides,*

grandidentata) are indicators, if present, along with *Sassafras albidum* and *Quercus rubra* or *Q. velutina. Acer rubrum* - *Quercus* spp. / *Smilax* spp. Serpentine Forest CEGL006438

32b. Forest not growing on serpentine bedrock or site with enough other environmental influence (thick soil or till, moist site) to support other forest types 33

33a. Associations of extreme habitats: rocky summits, other open rocky areas or maritime conditions exposed to salt spray 34

34a. Associations of extreme habitats: rocky summits, other open rocky areas: *Quercus montana* present in overstory and/or midstory and/or understory. Often found on rocky hilltops. *Quercus rubra* - (*Quercus montana*) / *Vaccinium* spp. / *Deschampsia flexuosa* Woodland (Chestnut Oak Forest) CEGL006134

34b. Associations of maritime conditions exposed to salt spray. 35

35a. Trees stunted and gnarly due to salt spray and forming an open woodland (usually < 20 stems in plot) 36

36a. *Prunus serotina* dominant in overstory and/or midstory with or without *Sassafras albidum.* Maritime shrubs and vines are also indicators when present, including *Rhus glabra, Rhus copallinum, Morella pensylvanica, Viburnum dentatum,* and *Smilax rotundifolia. Prunus serotina - Sassafras albidum - Amelanchier canadensis - Quercus velutina / Smilax rotundifolia* Forest (Successional Maritime Forest) CEGL006145

36b. Post oak (*Quercus stellata*) present in either the overstory or midstory. *Quercus stellata - Quercus velutina / Morella pensylvanica / Deschampsia flexuosa* Forest (Maritime Post Oak Forest) . CEGL006373

35b. Trees of normal stature and very rarely influenced by salt spray. *Prunus serotina* and/or *Sassafras albidum* present in overstory or midstory. Maritime shrubs absent or negligible 37

37a. *Prunus serotina* dominant in overstory and/or midstory, forming a forest canopy. *Sassafras albidum* and maritime shrubs absent or negligible. Successional black cherry forest CEGL009012

37b. *Sassafras albidum* dominant in the overstory and/or midstory, forming a forest canopy. *Prunus serotina* and maritime shrubs absent or negligible. *Sassafras albidum - Quercus* spp. Ruderal Forest CEGL004096

33b. Associations found in more common environmental conditions 38

38a. Maples (*Acer rubrum* or *A. saccharum*) with *Prunus serotina* and/or *Betula lenta* common in the overstory or midstory 39

39a. *Acer saccharum* dominant or co-dominant in overstory and/or midstory with *Quercus rubra. Quercus rubra - Acer saccharum / Viburnum acerifolium - Lindera benzoin* Forest (Red Oak - Transitional Northern Hardwood Forest) CEGL006635

39b. *Acer rubrum* and/or *Prunus serotina* dominant or co-dominant in overstory and/or midstory with *Quercus rubra. Betula lenta* may be present in low numbers. *Quercus rubra - Acer rubrum - Betula* spp. - *Pinus strobus* Ruderal Forest (Northeastern Successional Oak - Red Maple Forest).....CEGL006506

38b. *Quercus* and sometimes *Prunus* common in the overstory.....40

40a. *Quercus palustris* dominant or co-dominant in overstory and/or midstory in upland setting. *Prunus serotina* is a characteristic associate*. Acer rubrum* absent. See 42a below for *Quercus palustris* floodplain forests. *Quercus palustris* Upland Forest (New Association).....CEGL009009

40b. Heaths (*Vaccinium* spp., *Gaylussacia* spp.) in midstory and/or understory and/or in additional spp. list. Ideally heaths are abundant/dominant and *Quercus coccinea* and/or *Quercus velutina* > *Quercus rubra.* See (Maritime Post Oak Forest) CEGL006373, 36b above, for plots with *Quercus stellata. Quercus coccinea - Quercus velutina / Sassafras albidum / Vaccinium pallidum* Forest (Coastal Oak-Heath Forest).....CEGL006375

24b. Drawn-down forested wetlands or floodplain forests (possibly altered) with *Quercus* (*palustris, bicolor, phellos*) in overstory and/or midstory. Usually lacking "upland" oaks: *Quercus* (*alba, coccinea, rubra, velutina*). Also see 65a below for forested wetlands.....41

41a. *Quercus palustris* with *Acer rubrum.* See 40a, above, for *Quercus palustris* forests without *Acer rubrum*.....42

42a. Floodplain forests; on alluvial deposits in the floodplain of small rivers. *Quercus palustris* dominant or co-dominant with *Acer rubrum* on alluvial deposits in the floodplain of small rivers. Other floodplain trees, such as *Juglans nigra, Ulmus rubra, Acer negundo,* etc. are indicators if present. *Liquidambar* and *Nyssa* usually absent or negligible. *Quercus palustris - Acer rubrum / Carex grayi - Geum canadense* Forest (Pin Oak Small River Floodplain Forest).....CEGL006185

42b. Swamps.....43

43a. *Fraxinus* absent or in very low numbers in the overstory or midstory.....44

44a. *Liquidambar* > *Nyssa sylvatica* in plot. *Liquidambar styraciflua - Acer rubrum - Quercus phellos / Leucothoe racemosa* Forest (Red Maple-Sweetgum Swamp).....CEGL006110

44b. *Nyssa sylvatica* present (*Liquidambar absent*). *Acer rubrum / Rhododendron viscosum - Clethra alnifolia* Forest (Red Maple-Blackgum Swamp).....CEGL006156

43b. *Fraxinus pennsylvanica* dominant or co-dominant. *Liquidambar* usually absent or negligible. *Acer rubrum - Fraxinus* (*pennsylvanica, americana*) */ Lindera benzoin / Symplocarpus foetidus* Forest (Red Maple-Hardwood Swamp).....CEGL006406

41b. *Quercus bicolor* or *Quercus phellos* with *Acer rubrum.* In rare cases *Acer rubrum* may be absent from plot.....45

45a. *Fraxinus* and *Quercus bicolor* absent or in very low numbers in the overstory or midstory.....46

46a. *Liquidambar* > *Nyssa sylvatica. Quercus phellos* is an indicator when present. *Liquidambar styraciflua - Acer rubrum - Quercus phellos / Leucothoe racemosa* Forest (Red Maple-Sweetgum Swamp) CEGL006110

46b. *Nyssa sylvatica* present (*Liquidambar* absent). Ideally *Nyssa* is co-dominant with *Acer rubrum. Acer rubrum / Rhododendron viscosum - Clethra alnifolia* Forest (Red Maple-Blackgum Swamp).....CEGL006156

45b. *Fraxinus pennsylvanica* and/or *Quercus bicolor* dominant and/or co-dominant with *Acer rubrum* in overstory and/or midstory and *Fraxinus* > *Nyssa. Liquidambar* usually absent. *Acer rubrum - Fraxinus* (*pennsylvanica, americana*) / *Lindera benzoin / Symplocarpus foetidus* Forest (Red Maple-Hardwood Swamp) CEGL006406

23b. *Quercus* absent in overstory and midstory, but may be present in understory or in additional spp. list..... 47

47a. *Quercus* (*alba, coccinea, rubra, velutina*) absent or negligible in overstory and midstory. Stem tally of *Prunus serotina* + *Sassafras albidum* in overstory and midstory > *Quercus* spp. in overstory and midstory. *Liriodendron, Carya,* and *Fagus* absent 48

48a. *Prunus serotina* dominant in overstory and/or midstory.....49

49a. *Prunus serotina* dominant in overstory and/or midstory. *Sassafras* may be co-dominant. Trees stunted, gnarly due to salt spray influence forming an open woodland (usually <20 tree stems in plot). Maritime shrubs usually present (*Rhus glabra, Rhus copallinum, Morella pensylvanica,* and *Viburnum dentatum*). *Smilax rotundifolia* is an indicator when present. *Prunus serotina - Sassafras albidum - Amelanchier canadensis - Quercus velutina / Smilax rotundifolia* Forest (Successional Maritime Forest).....CEGL006145

49b. *Prunus serotina* and/or *Prunus avium* dominant in overstory and/or midstory forming a forest canopy (usually >20 tree stems in plot. Trees of normal stature and very rarely influenced by salt spray. *Sassafras* and maritime shrubs absent or negligible. See 39b, above, for *Prunus serotina* forests with *Acer rubrum* and/or *Betual lenta.* See 77a, below, for *Prunus serotina* with *Carya cordiformis. Prunus serotina* Forest (Successional Black Cherry Forest).....CEGL009012

48b. *Sassafras albidum* dominant in overstory and/or midstory forming a forest canopy (usually >20 tree stems in plot). Trees of normal stature and very rarely influenced by salt spray. *Prunus serotina* and maritime shrubs absent or negligible. *Sassafras albidum* Forest (Successional Sassafras Forest) CEGL004096

47b. *Quercus* absent in overstory and midstory, but may be present in understory or in additional spp. list. In rare cases *Quercus* may be absent in plot. *Carya* or *Liriodendron* or *Fagus* or *Acer saccharum* in overstory and/or midstory. Ideally these trees are dominant or co-dominant and have 2-3 stems >30 cm dbh..... 50

50a. *Liriodendron* or *Acer saccharum* common in overstory and midstory..... 51

51a. *Liriodendron* in overstory and/or midstory. *Carya* and *Fagus* may be present. *Lindera benzoin, Tilia americana, Carya cordiformis,* and *Acer saccharum* are indicators when present. *Quercus rubra - Acer saccharum - Liriodendron tulipifera* Forest (Oak-Tulip Tree Forest).....CEGL006125

51b. *Acer saccharum* domininant or co-dominant in overstory and/or midstory. *Quercus rubra - Acer saccharum / Viburnum acerifolium - Lindera benzoin* Forest (Red Oak - Transitional Northern Hardwood Forest).....CEGL006635

50b. *Carya* and/or *Fagus* common in overstory and/or midstory..... 52

52a. *Carya* in overstory and/or midstory and > *Fagus. Liriodendron* absent or negligible in plot (e.g., 1 stem in midstory). Ideally *Carya* is dominant or co-dominant in overstory and/or midstory. *Viburnum acerifolium* and *Cornus florida* are indicators when present. *Liquidambar styraciflua* often present. *Quercus* (*alba, rubra, velutina*) - *Carya* spp. / *Viburnum acerifolium* Forest (Coastal Oak-Hickory Forest).....CEGL006336

52b. *Fagus* in overstory and/or midstory and > *Carya. Liriodendron* absent or negligible in plot. Ideally *Fagus* is dominant or co-dominant in overstory and/or midstory. *Fagus grandifolia - Quercus alba - Quercus rubra* Forest (Coastal Oak-Beech Forest).....CEGL006377

5b. Evergreen and mixed forests/woodlands dominated or co-dominated by conifers (at least 25% cover of conifers in overstory and midstory combined)..... 53

53a. *Tsuga canadensis* dominant or co-dominant in overstory and/or midstory..... 54

54a. *Tsuga canadensis* dominant or co-dominant in overstory and/or midstory with northern hardwoods. Lacking *Carya* and *Liriodendron. Fagus* is an indicator when present. *Tsuga canadensis - Fagus grandifolia - Quercus rubra* Forest (Hemlock - Beech - Oak Forest).....CEGL006088

54b. *Tsuga canadensis* dominant or co-dominant in overstory and/or midstory with *Pinus strobus. Acer rubrum, Arisaema triphyllum,* and *Osmunda cinnamomea* are indicators when present. *Betula alleghaniensis - Acer rubrum* - (*Tsuga canadensis, Abies balsamea*) / *Osmunda cinnamomea* Forest (Hardwood - Conifer Seepage Forest).....CEGL006380

53b. *Pinus strobus* dominant or co-dominant in overstory and/or midstory..... 55

55a. *Pinus strobus* usually planted in rows and of similar size and age. Lacking other early successional trees. *Pinus strobus* Planted Forest (Eastern White Pine Planted Forest).....CEGL007187

55b. *Pinus strobus* appearing naturally grown with other native species mixed in..... 56

56a. *Pinus strobus* dominant or co-dominant and/or midstory with *Prunus serotina* and other early successional trees. Ideally *Pinus strobus* dominant in both overstory and midstory. *Pinus strobus* Ruderal Forest (Successional Eastern White Pine Forest)..... CEGL007944

56b. *Pinus strobus* dominant or co-dominant in overstory and/or midstory with *Tsuga canadensis. Acer rubrum, Arisaema triphyllum,* and *Osmunda cinnamomea* are indicators when present. *Betula alleghaniensis - Acer rubrum* - (*Tsuga canadensis, Abies balsamea*) / *Osmunda cinnamomea* Forest (Hardwood - Conifer Seepage Forest)..... CEGL006380

4b. Open uplands (shrublands, fields, grasslands, lawns, etc.). Trees absent from overstory and midstory OR tree stem tally (excluding shrubs) in overstory and midstory usually <7 OR trees in overstory and midstory <25% cover..... 57

57a. Shrublands: Shrubs dominant in overstory and/or midstory and/or understory. Plot dominated by shrubs (shrubs >50% cover) 58

58a. Shrublands with non-maritime shrubs most abundant, including *Cornus* spp, *Rhus typhina, Rubus* spp..... 59

59a. Shrublands dominated by one or more of the following shrubs: *Rhus typhina, Cornus racemosa, Viburnum dentatum, Rubus* spp., and *Rosa multiflora. Elaeagnus umbellata - Cornus racemosa - Rosa multiflora - Juniperus virginiana* Ruderal Shrubland (Northeastern Successional Shrubland) CEGL006451

59b. Shrublands dominated by *Cornus amomum* or co-dominated by *Cornus amomum* and *Viburnum dentatum. Cornus* (*amomum, sericea*) - *Viburnum dentatum - Rosa multiflora* Ruderal Shrubland (Successional Dogwood - Arrow-wood Wet Shrubland) CEGL006576

58b. Shrublands dominated by maritime shrubs, such as *Rhus glabra, Rhus copallinum, Morella pensylvanica,* and *Viburnum dentatum. Amelanchier* spp. and *Smilax rotundifolia* are indicators when present. *Cornus* spp. typically absent. *Amelanchier canadensis - Viburnum* spp. - *Morella pensylvanica* Scrub Forest (Northern Tall Maritime Scrub Forest) CEGL006379

57b. Successional old fields, maritime dunes, cleared areas, and mowed lawns: Understory dominated by forbs and/or grasses (shrubs <50% cover)..... 60

60a. Fields with mowing, either infrequently (such as annually) or more regularly. Tall perennial species and woody species usually absent..... 61

61a. Fields dominated by a mixture of grasses (Poaceae), asters (*Symphyotrichum* spp.), goldenrods (*Solidago* spp.), clovers (*Trifolium* spp.), and other old field species. Infrequently mowed (e.g., once per year or less). *Dactylis glomerata - Phleum pratense - Festuca* spp. - *Solidago* spp. Ruderal Herbaceous Vegetation (Northeastern Old Field)..... CEGL006107

61b. Mowed lawn with trees. Dominated by regularly mowed (e.g., several times per year) grasses (Poaceae) including *Poa* spp. No USNVC CEGL code (CEGL00XXXX used in database).

60b. Human disturbances may be evident (e.g., bulldozing, filling) but evidence of mowing on any regularity absent..... 62

62a. Dominant herbaceous vegetation greater than 1.5 m high 63

63a. Disturbed upland areas dominated by *Polygonum cuspidatum. Polygonum cuspidatum* Ruderal Herbaceous Vegetation (Ruderal Japanese Knotweed Herbaceous Vegetation)..... CEGL008472

63b. Disturbed upland areas dominated by *Phragmites australis. Phragmites australis* Temperate Upland Ruderal Herbaceous Vegetation (Ruderal Temperate Upland Common Reed Herbaceous Vegetation)..... CEGL004019

62b. Dominant herbaceous vegetation shorter statured, generally less than 1.5 m high..... 64

64a. Fields dominated by *Artemisia vulgaris. Artemisia vulgaris* Ruderal Herbaceous Vegetation (Ruderal Mugwort Herbaceous Vegetation)..... CEGL009005

64b. Stable backdune or altered former maritime dune areas dominated by *Spartina patens* in non-tidal setting. *Spartina patens - Schoenoplectus pungens - Solidago sempervirens* Herbaceous Vegetation (Overwash Dune Grassland)..... CEGL004097

3b. Palustrine (wetland) plots. Wetland communities that are characterized by persistent emergent vegetation, including wetlands that are permanently saturated by seepage, permanently flooded wetlands, and wetlands that are seasonally or intermittently flooded (these may be seasonally dry) if the vegetative cover is predominantly hydrophytic and soils are hydric. Ideally wetland plots have the following features: 1) include obligate wetland species, such as *Symplocarpus foetidus, Sauruus cernuus, Cephalanthus occidentalis, Decodon verticillatus, Lemna* sp., *Osmunda regalis, Leersia oryzoides, Ludwigia palustris, Carex crinita, Hibiscus moscheutos, Lycopus virginicus, Polygonum hydropiper,* etc.; 2) plot is within or adjacent to a DEC and/or NWI wetland polygon; 3) plot is within or adjacent to an identifiable unmapped wetland signature on air photo (e.g., area appears flooded on leaf-off CIR air photos)..... 65

65a. Forested swamps and floodplain forests. Tree stem tally (excluding shrubs) in overstory and midstory +/- 12 for forests or +/- 7 for woodlands OR trees in overstory and midstory >50% cover..... 66

66a. Basin or lowland swamps, sometimes adjacent water bodies but not a forested wetland resulting from current or historical river floodplain dynamics. *Acer rubrum* usually common or at least present in the plot..... 67

67a. *Acer rubrum* swamps: *Acer rubrum* dominant and/or co-dominant in overstory and/or midstory..... 68

68a. *Liquidambar* or *Nyssa* dominant or at least common in the overstory or midstory..... 69

69a. *Liquidambar* dominant and/or co-dominant in overstory and/or midstory and > *Nyssa. Quercus phellos* is an indicator when present. *Liquidambar styraciflua - Acer rubrum - Quercus phellos / Leucothoe racemosa* Forest (Red Maple-Sweetgum Swamp)..... CEGL006110

69b. *Nyssa sylvatica* dominant and/or co-dominant in overstory and/or midstory with *Acer rubrum. Liquidambar* usually absent. *Acer rubrum / Rhododendron viscosum - Clethra alnifolia* Forest (Red Maple-Blackgum swamp)..... CEGL006156

68b. *Fraxinus, Quercus bicolor, Quercus palustris,* or *Acer rubrum* more common than *Liquidambar* or *Nyssa*..... 70

70a. *Fraxinus pennsylvanica* and/or *Quercus bicolor* dominant and/or co-dominant in overstory and/or midstory and *Fraxinus* > *Nyssa. Liquidambar* usually absent. *Acer rubrum - Fraxinus* (*pennsylvanica, americana) / Lindera benzoin / Symplocarpus foetidus* Forest (Red Maple-Hardwood Swamp)..... CEGL006406

70b. *Quercus palustris* dominant or co-dominant with *Acer rubrum* on alluvial deposits in the floodplain of small rivers. Other floodplain trees, such as *Juglans nigra, Ulmus rubra, Acer negundo,* etc. are indicators if present. *Liquidambar* and *Nyssa* usually absent or negligible. *Quercus palustris - Acer rubrum / Carex grayi - Geum canadense* Forest (Pin Oak Small River Floodplain Forest) CEGL006185

67b. *Acer rubrum* absent in overstory and midstory, but may be present in understory or in additional spp. list. In rare cases *Acer rubrum* may be absent from plot 71

71a. *Liquidambar* or *Nyssa* dominant or at least common in the overstory or midstory 72

72a. *Liquidambar* dominant and/or co-dominant in overstory and/or midstory and > *Nyssa. Quercus phellos* is an indicator when present. *Liquidambar styraciflua - Acer rubrum - Quercus phellos / Leucothoe racemosa* Forest (Red Maple-Sweetgum Swamp)..... CEGL006110

72b. *Nyssa sylvatica* dominant and/or co-dominant in overstory and/or midstory. *Liquidambar* usually absent. *Acer rubrum / Rhododendron viscosum - Clethra alnifolia* Forest (Red Maple-Blackgum swamp) CEGL006156

71b. *Fraxinus pennsylvanica* and/or *Quercus bicolor* dominant and/or co-dominant in overstory and/or midstory and > *Nyssa. Liquidambar* usually absent. *Acer rubrum - Fraxinus* (*pennsylvanica, americana*) */ Lindera benzoin / Symplocarpus foetidus* Forest (Red Maple-Hardwood Swamp) CEGL006406

66b. Floodplain Forests (natural and altered): These forests may have an intact natural flood regime and be proximate to a large river or small stream. More often the flood regime has been altered or blocked, but floodplain forest species persist. This classification is based on the dominant trees in the overstory and midstory, rather than the plot's position in the landscape and its proximity to various sized rivers and streams. Some plots in this category may no longer classify as wetlands following state and federal definitions. Floodplain Forests (natural and altered) dominated by the following species 73

73a. Maples and Ashes: *Acer saccharum, negundo, saccharinum; Fraxinus americana* or *pennsylvanica*; *Populus deltoides* leads here too 74

74a. *Acer saccharum, Fraxinus* common in overstory or midstory 75

75a. *Acer saccharum* dominant or co-dominant with *Fraxinus americana* or *Fraxinus* spp. *Tilia americana* is an indicator when present. Typically occurs on slightly elevated alluvial terraces and active floodplains of larger rivers. *Acer saccharum - Fraxinus* spp. *- Tilia americana / Matteuccia struthiopteris - Ageratina altissima* Forest (Terrace Hardwood Floodplain Forest) CEGL006114

75b. *Fraxinus pennsylvanica* dominant forest. *Fraxinus pennsylvanica* - (*Juglans nigra, Platanus occidentalis*) Forest (Green Ash - Mixed Hardwood Floodplain Forest) CEGL006575

74b. *Acer saccharinum, A. negundo, P. deltoides* present in overstory or midstory 76

76a. *Acer negundo* dominant forest. *Acer saccharinum* is an indicator when present. Typically occurs on large river floodplains on banks immediately adjacent to the river. *Acer saccharinum - Acer negundo / Ageratina altissima - Laportea canadensis* - (*Elymus virginicus*) Forest (Successional Boxelder Forest).....CEGL006217

76b. *Populus deltoides* dominant in overstory and/or midstory. *Acer saccharinum* is an indicator when present. See 18b above for successional *Populus deltoides* forests. *Acer saccharinum* - (*Populus deltoides*) / *Matteuccia struthiopteris - Laportea canadensis* Forest (Silver Maple Floodplain Levee Forest) CEGL006147

73b. *Carya, Quercus, Prunus, Juglans,* or *Celtis* in overstory..... 77

77a. High floodplain terraces of mid- to large-sized rivers. *Carya cordiformis* dominant or co-dominant with *Prunus serotina.* Usually lacking "upland" oaks: *Quercus* (*alba, coccinea, rubra, velutina*). Typically occurs on mid to high floodplain terraces of mid- to large-sized rivers. *Carya cordiformis - Prunus serotina / Ageratina altissima* Forest (Mid-Atlantic Terrace Floodplain Forest).....CEGL006445

77b. Alluvial deposits in the floodplain of small rivers or on low terraces that are flooded for short durations 78

78a. *Quercus palustris* dominant or co-dominant with *Acer rubrum* on alluvial deposits in the floodplain of small rivers. Other floodplain trees, such as *Juglans nigra, Ulmus rubra, Acer negundo,* etc. are indicators if present. *Liquidambar* and *Nyssa* usually absent or negligible. *Quercus palustris - Acer rubrum / Carex grayi - Geum canadense* Forest (Pin Oak Small River Floodplain Forest) CEGL006185

78b. *Juglans nigra* and/or *Celtis occidentalis* in overstory and/or midstory. *Prunus serotina* may be present in low numbers. Typically occurs behind levees and on low terraces or mid terraces that are flooded annually for short durations (less than one week per year). *Juglans nigra / Verbesina alternifolia* Ruderal Forest (Successional Black Walnut - Hackberry Forest) .....CEGL007879.

65b. Open wetlands. Trees absent from overstory and midstory OR tree stem tally (excluding shrubs) in overstory and midstory usually <7 OR trees in overstory and midstory have <50% cover 79

79a. Shrub swamps: Wetland shrubs are dominant in overstory and/or midstory and/or understory OR shrubs >50% cover in plot and overtop herbaceous plants 80

80a. Shrub swamps dominated by *Cornus sericea* or *Salix discolor*. *Cornus sericea* - *Salix* spp. - (*Rosa palustris*) Shrubland. (Dogwood - Willow Swamp) CEGL002186

80b. Shrub swamps dominated by *Cornus amomum* or co-dominated by *Cornus amomum* and *Viburnum dentatum. Cornus* (*amomum, sericea*) - *Viburnum dentatum* - *Rosa multiflora* Ruderal Shrubland (Successional Dogwood - Arrow-wood Wet Shrubland) CEGL006576

79b. Marshes: Wetland herbaceous plants are dominant in understory and > shrubs in plot. Shrubs <50% cover in plot 81

81a. Marshes dominated by one or more of the following: *Impatiens capensis, Polygonum hydropiper, Alisma subcordatum, Ludwigia palustris,* and *Hibiscus moscheutos. Bidens cernua* - *Verbena hastata* - *Polygonum* spp. Herbaceous Vegetation (Mixed Forb Marsh) CEGL006446

81b. Tall non-natives present, such as *Phragmites* and *Polygonum cuspidatum* 82

82a. Marshes dominated by *Phragmites australis* ssp. *australis. Phragmites australis* ssp. *australis.* Eastern North America Temperate Ruderal Herbaceous Vegetation (Eastern North America Temperate Ruderal Common Reed Marsh) .. CEGL004141

82b. Marshes dominated by *Polygonum cuspidatum. Polygonum cuspidatum* Temporarily Flooded Ruderal Herbaceous Vegetation (Ruderal Japanese Knotweed Herbaceous Vegetation) CEGL008472

Additional National Vegetation Classification References

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Species Used in Key

Scientific Name	Common Name
Abies balsamea	Balsam Fir
Acer	Maple
Acer negundo	Boxelder, Ashleaf Maple
Acer platanoides	Norway Maple
Acer pseudoplatanus	Sycamore Maple
Acer rubrum	Red Maple
Acer saccharinum	Silver Maple
Acer saccharum	Sugar Maple
Ailanthus altissima	Tree of Heaven
Alisma subcordatum	Southern Water-plantain
Alnus glutinosa	Black Alder, European Alder
Amelanchier canadensis	Shadbush
Arisaema triphyllum	Jack-in-the-pulpit
Artemisia vulgaris	Mugwort
Betula alleghaniensis	Yellow Birch
Betula lenta	Sweet Birch, Black Birch
Betula papyrifera	Paper Birch
Betula populifolia	Gray Birch
Bidens cernua	Nodding Beggar-ticks
Carex crinita	Fringed Sedge
Carex grayi	Gray's Sedge
Carya	Hickory
Carya cordiformis	Bitternut Hickory
Celtis occidentalis	Hackberry
Cephalanthus occidentalis	Buttonbush
Clethra alnifolia	Sweet Pepperbush
Cornus	Dogwood
Cornus amomum	Silky Dogwood
Cornus florida	Flowering Dogwood
Cornus racemosa	Gray Dogwood
Cornus sericea	Red-osier Dogwood
Dactylis glomerata	Orchard Grass
Decodon verticillatus	Water-willow

Scientific Name	Common Name
Dennstaedtia punctilobula	Hay-scented Fern
Deschampsia flexuosa	Common Hair Grass
Distichlis spicata	Salt Grass
Elaeagnus umbellata	Autumn-olive
Elymus virginicus	Virginia Wild-rye
Fagus	Beech
Fagus grandifolia	American Beech
Festuca	Fescue Grass
Fraxinus americana	American Ash
Fraxinus pennsylvanica	Green Ash
Gaylussacia	Huckleberry
Geum canadense	White Avens
Hibiscus moscheutos	Swamp Rose-mallow
Ilex opaca	American Holly
Impatiens capensis	Spotted Jewelweed, Spotted Touch-me-not
Juglans nigra	Black Walnut
Juncus gerardii	lack-grass
Juniperus virginiana	Red Cedar
Laportea canadensis	Wood Nettle
Leersia oryzoides	Rice Cut Grass
Lemna	Duckweed
Leucothoe racemosa	Swamp Fetterbush
Lindera benzoin	Spicebush
Liquidambar	Sweetgum
Liquidambar styraciflua	Sweetgum
Liriodendron	Tulip Tree, Tulip Poplar, Yellow Poplar
Liriodendron tulipifera	Tulip Tree, Tulip Poplar, Yellow Poplar
Ludwigia palustris	Water-purslane
Lycopodium annotinum	Common Bristly Clubmoss
Lycopus virginicus	Virginia bugleweed, Virginia water-horehound
Matteuccia struthiopteris	Ostrich Fern

Scientific Name	Common Name
Morella pensylvanica	Bayberry
Morus alba	White Mulberry
Nyssa	Black-gum, Sour-gum
Nyssa sylvatica	Black-gum, Sour-gum
Osmunda cinnamomea	Cinnamon Fern
Osmunda regalis	Royal Fern
Phellodendron amurense	Amur Cork-tree
Phleum pratense	Common Timothy Grass
Phragmites australis	European Common Reed
Phragmites australis ssp. australis	European Common Reed
Pinus strobus	White Pine
Platanus occidentalis	Eastern Sycamore
Poaceae	Grass Family
Polygonum	Knotweed
Polygonum cuspidatum	Japanese Knotweed
Polygonum hydropiper	Water-pepper
Populus alba	Eurasian White Poplar
Populus deltoides	Eastern Cottonwood
Populus grandidentata	Big-toothed Aspen
Populus tremuloides	Quaking Aspen
Prunus serotina	Black Cherry
Quercus	Oak
Quercus alba	White Oak
Quercus bicolor	Swamp White Oak
Quercus coccinea	Scarlet Oak
Quercus montana	Chestnut Oak
Quercus palustris	Pin Oak
Quercus phellos	Willow Oak
Quercus rubra	Red Oak
Quercus stellata	Post Oak
Quercus velutina	Black Oak
Rhododendron viscosum	Swamp Azalea
Rhus copallinum	Winged Sumac
Rhus glabra	Smooth Sumac
Rhus typhina	Staghorn Sumac
Robinia pseudoacadia	Black Locust
Rosa multiflora	Multiflora Rose
Rosa palustris	Swamp Rose
Rubus	Blackberry, Raspberry
Salix discolor	Pussy Willow
Sassafras albidum	Sassafras
Saururus cernuus	Lizard's-tail
Schoenoplectus pungens	Three-square Bulrush
Smilax rotundifolia	Common Greenbrier
Solidago	Goldenrod
Solidago sempervirens	Seaside Goldenrod
Spartina patens	Salt-meadow Cord Grass
Symphyotrichum	Aster
Symplocarpus foetidus	Skunk Cabbage
Tilia americana	Basswood
Trifolium	Clover
Tsuga canadensis	Eastern Hemlock
Ulmus	Elm
Ulmus americana	American Elm
Ulmus pumila	Siberian Elm
Ulmus rubra	Slippery Elm
Vaccinium	Blueberry
Vaccinium corymbosum	Highbush Blueberry
Vaccinium pallidum	Lowbush Blueberry
Verbena hastata	Blue Vervain
Verbesina alternifolia	Wingstem
Viburnum acerifolium	Maple-leaved Viburnum
Viburnum dentatum	Smooth Arrowwood