

TECHNICAL NOTES

U. S. DEPT. OF AGRICULTURE
Portland, Oregon

NATURAL RESOURCES CONSERVATION SERVICE
September 2010

PLANT MATERIALS No. 40 – Supplement B

Introduction to Bradshaw's lomatium, a Federally-listed Endangered Species, and a Key and Photo Guide to the *Lomatium* Species that Occur within its Range

- * Use of line drawing illustrations for all species courtesy of the University of Washington Press per C.L. Hitchcock and A. Cronquist. 1961. Vascular Plants of the Pacific Northwest. Part 3; Saxifragaceae to Ericaceae.
- * Most species descriptions and maps of Washington plant distributions provided by the Washington University Herbarium, Burke Museum:
<http://biology.burke.washington.edu/herbarium/imagecollection.php>
- * Maps of Oregon plant distributions courtesy of the Oregon Flora Project:
<http://oregonflora.org/atlas.php>
- *Prepared by Kathy Pendergrass; Plant Conservation Specialist with the Natural Resources Conservation Service, Portland, Oregon

The purpose of this technical note is to provide information about Bradshaw's lomatium, a federal and state-listed Endangered plant, and to provide information on how to identify the species from other co-occurring lomatium species within its range.

A special thanks to all who contributed use of photographs for this publication including: G.D. Carr, Steve Gisler, Jean Jancaitus, Ben Legler, Carolyn Menke, and Paul Slichter.

We welcome your comments for improving any of the content of this publication for future editions. Please contact kathy.pendergrass@or.usda.gov.

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Brief Introduction to Bradshaw's lomatium:

Family: Apiaceae – Carrot or Umbel family

Species Status: Bradshaw's lomatium (*Lomatium bradshawii*) was federally listed as Endangered, without critical habitat, on September 30, 1988 (U.S. Fish and Wildlife Service 1988). An initial Recovery Plan was completed in 1993 (U.S. Fish and Wildlife Service 1993). A newly revised Final Recovery Plan is currently available and supersedes the previous recovery plan (U.S. Fish and Wildlife Service 2010). The species is also State-listed as Endangered in both Oregon and Washington.

Threats: Continued urbanization and habitat loss has been determined to be the largest, and generally least reversible, of the causes of the species' decline (U.S. Fish and Wildlife Service 2010). Pesticide use, wildlife herbivory, livestock grazing and encroachment of woody and invasive species are also important threats to existing populations.

Range of the Species: In Oregon, Bradshaw's desert parsley occurs in the Willamette Valley Ecoregion and is known to occur in Benton, Lane, Linn, and Marion Counties in Oregon. The species was thought to be endemic (to only occur in) to Oregon until a large population was discovered in Clark County, Washington during 1994. This area in Washington is considered a geologic extension of the Willamette Valley ecoregion.

Habitat: The historical and current habitat of this species is seasonally-wet prairies of Willamette Valley and Southwest Washington. It now occurs in remnant prairie pieces that must be managed to forestall tree and shrub encroachment into these prairie habitats.

Bradshaw's desert parsley occurs predominantly on heavy, poorly draining alluvial clays with hydric characteristics. Heavy clay soils that typically harbor Bradshaw's lomatium include Dayton silt loams, Natroy silty clay loams or Bashaw clays. The species has also been reported on Amity, Awbrig, Coburg, Conser, Courtney, Cove, Hazclair, Linslaw, Oxley, Panther, Pengra, Salem, Willamette, and Witzel soils. Less typically, the species occurs on shallow soils underlain with basalt in Marion and Linn Counties. These soil types include Stayton Silt Loam and the Nekia-Jory complex. Typical microtopography is very hummocky, with plant clump mounds and lower interstitial spaces between clumps (see habitat figures on Page 12).

Bloom Timing and Surveys: This species blooms late March through May, with peak blooming generally occurring during May. This peak blooming period is the best timeframe to conduct field surveys to determine presence of this species – this small-stature plant is hard to locate without presence of the bright yellow flowers. For NRCS purposes, surveys for this species need only occur where soils with hydric characteristics occur.

Associated Species:

Tufted hairgrass (*Deschampsia cespitosa*)
Slender or poverty rush (*Juncus tenuis*)
Sedge species (*Carex* spp.)
Western panic grass (*Dichanthelium acuminatum* var. *fasciculatum*)
Self-heal (*Prunella vulgare*)
Birdbeak buttercup (*Ranunculus orthorhynchus*)
Willamette Valley gumweed (*Grindelia integrifolia*)
Hall's aster (*Aster hallii*)
Common camas (*Camassia quamash*)
Oregon sunshine (*Eriophyllum lanatum*)

BRADSHAW'S LOMATIUM TERMINOLOGY

Figure 1: Lomatium Flower Terminology

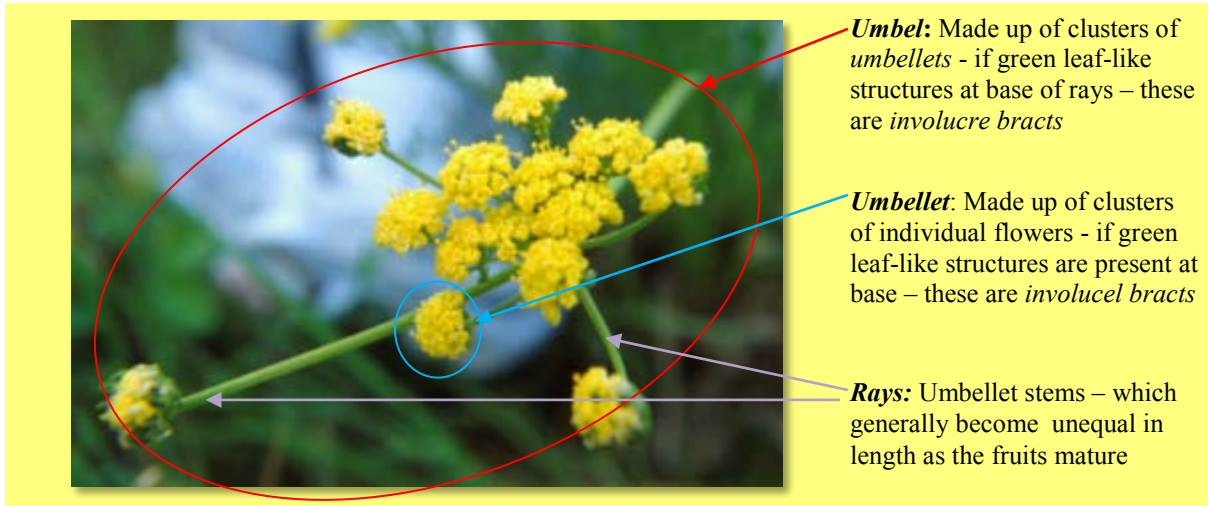
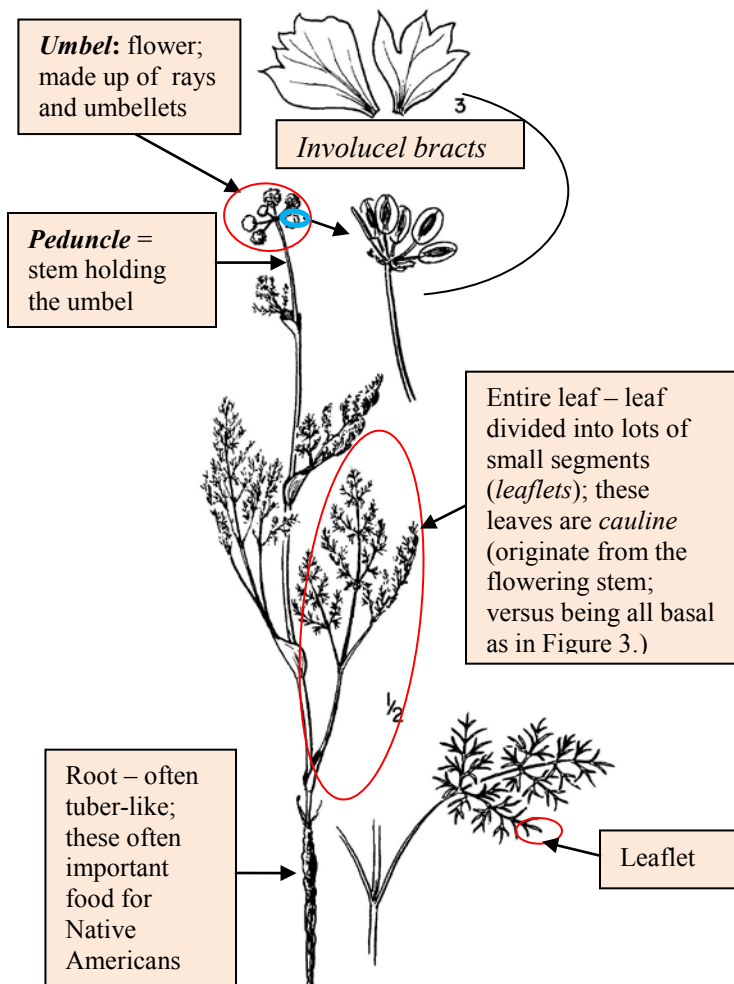


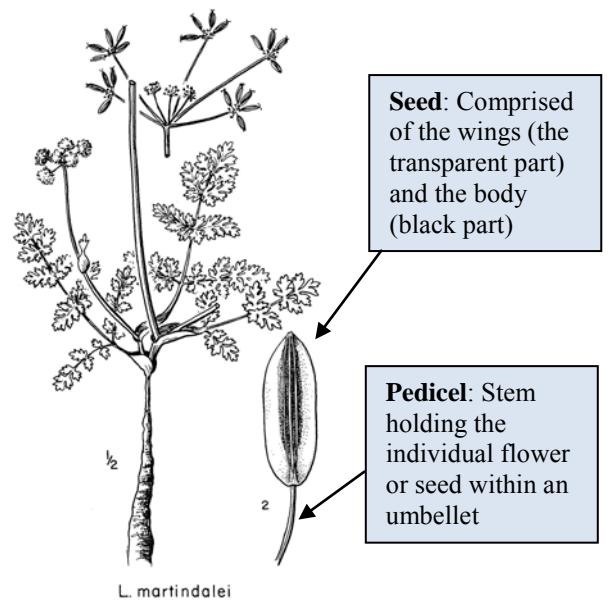
Figure 2: Lomatium Plant Terminology



Lomatium utriculatum

Bradshaw's Lomatium, Pendergrass, September 2010

Figure 3: Example of a plant with *basal leaves* – Leaves originate from the plant base, leaves not found along the flowering stalk



**PLANT KEY: SPECIES OCCURRING WITHIN THE RANGE OF
BRADSHAW'S LOMATIUM**

This key is provided to help identify *Lomatiums* occurring within the range of where Bradshaw's populations are known to occur. This is a dichotomous (two-way) key where you have a choice between two options (a couplet) at each entry of the key. You pick the best choice of each couplet (e.g. 1a versus 1b) that most accurately describes the unknown *Lomatium* that you are trying to identify, then follow the next couplet and make your next best choice until you arrive at a species. For example, if 1a. describes your species best, (between 1a and 1b), read couplets 2a and 2b to determine which one best fits your unknown *Lomatium* and go to the next couplet below that choice (3a and 3b) until you arrive at a determined species. Refer to the following identification pages to see if your unknown plant actually matches (photos, descriptions, distribution) the species that you arrive at in this key.

dm = decimeter (1 dm = 10 centimeters)

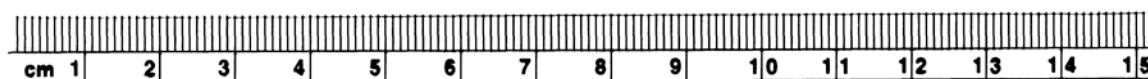
cm = centimeter (1 cm = 10 millimeters)

mm = millimeter

1 inch = approximately 2.5 cm

- 1a Leaves decompose, dissected into numerous small segments ("ferny")
 - 2a Plants gray from fine, thick and short hair...
.....**Gray-colored leaf desert parsley/biscuit root or Large-fruit lomatium (*Lomatium macrocarpum*)**
 - 2b Plants glabrous (without hairs) or sparingly pubescent (very small hairs), but not gray-colored
 - 3a Involucels of filiform (narrow, linear) bracts; plants 4-18 dm (1.3-5.9 feet) tall
.....**Purple parsley or fernleaf biscuitroot (*L. dissectum* var. *dissectum*)** (also see lead 7b; Hall's lomatium may also appear "ferny" with filiform bracts)
 - 3b Involucels usually of short, broad dissected or toothed, small leaf-like "bractlets"; plants 6.5 dm (2.1 feet) or usually much shorter
 - 4a Involucel bracts broad, obovate to elliptic; leaves chiefly cauline; wings of the fruit thin, the tip often shallowly cleft; common species
.....**Spring Gold or Fine-leaved desert-parsley (*Lomatium utriculatum*)**
 - 4b Involucel bracts ternately or bi-ternately divided (divided into three parts one or two times); leaves chiefly basal; wings of the fruit corky-thickened; uncommon species
.....**Bradshaw's lomatium/desertparsley (*Lomatium bradshawii*)**
- 1b Leaves with several large divisions forming more or less definite leaflets
 - 5a Leaves comprised of large, ovate "pea-like" leaflets ... **Bare-stemmed lomatium, Naked-stemmed hogfennel, Indian parsley or Pestle parsnip (*Lomatium nudicaule*)**
 - 5b Leaves not comprised of large, ovate "pea-like" leaflets
 - 6a Leaflets narrowly linear, entire or shallowly toothed
..... **Nine-leaf desert-parsley or Hog fennel (*Lomatium triternatum*)**
 - 6b Leaflets rounded to oblong in outline, variously cleft or parted
 - 7a Fruit 8-15 mm long; involucels absent or inconspicuous
..... **Martindale's desert-parsley (*Lomatium martindalei* var. *martindalei*)**
 - 7b Fruit 5-9 mm long; filiform involucel bracts.... **Hall's lomatium (*Lomatium hallii*)**

Below is a millimeter ruler to measure your unknown plant



Gray-leaf desert parsley/biscuit root or Large-fruit Lomatium
(*Lomatium macrocarpum*)

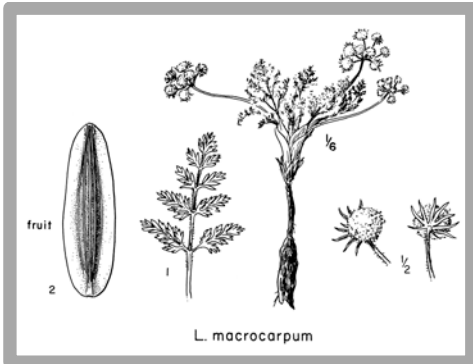


Figure 4: *Lomatium macrocarpum* illustration



Figure 5: Fruit, photo courtesy of Ben Legler



Figure 6: Underside of flower umbel, note large involucel bracts, photo courtesy of Ben Legler

IDENTIFYING CHARACTERISTICS
 (* indicates key character)

1. GENERAL

- a. **Puberulent* (very short hairs)
perennial from a taproot and simple, subterranean crown
- b. 1-3 dm (0.3-1.0 feet) tall
- c. Taproot strongly thickened throughout, or slender above, elongate-tuberous below

2. LEAVES

- a. Gray-green, basal
- b. Ternate-pinnately or merely pinnately dissected into segments up to 9 mm long and 2 mm wide

3. FLOWERS

- a. Inflorescence a compound umbel
- b. Rays 2-6 cm long at maturity
- c. Peduncles usually several from the base
- d. Stem ascending in flower and upright in fruit, 10-25 cm long
- e. Involucre none
- f. **Involucel* of narrow, conspicuous, green bractlets, often surpassing the flowers
- g. Flowers grayish-white or purplish-white, or yellowish
- h. Pedicels 1-11 mm long
- h. Blooms: Late March – May

4. FRUIT

- a. **Narrow, oblong*, 10-20 mm long (*Figure 5*)
- b. *Glabrous* (without hairs) to *puberulent* (tiny hairs)
- c. Marginal wings narrow to fairly broad



Figure 7: Entire plant, photo courtesy of Paul Slichter

5. HABITAT AND DISTRIBUTION:
Open, dry, rocky areas at low elevations

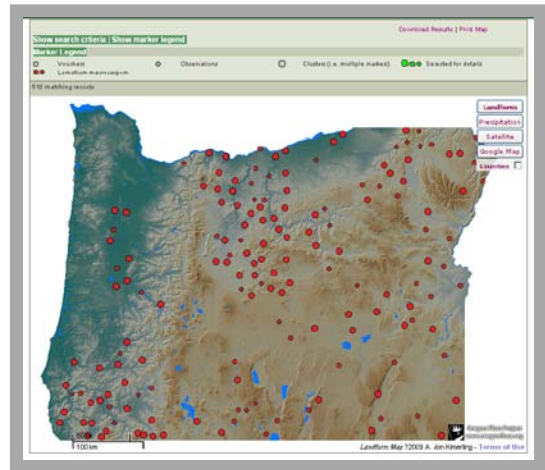


Figure 8: Population distribution map for Oregon

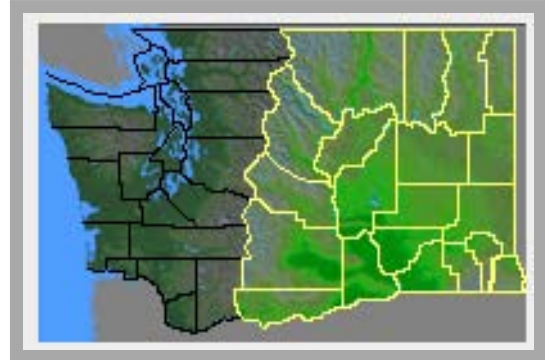


Figure 9: Population distribution map for Washington.

Purple Parsley or fernleaf biscuitroot
(*Lomatium dissectum* var. *dissectum*)

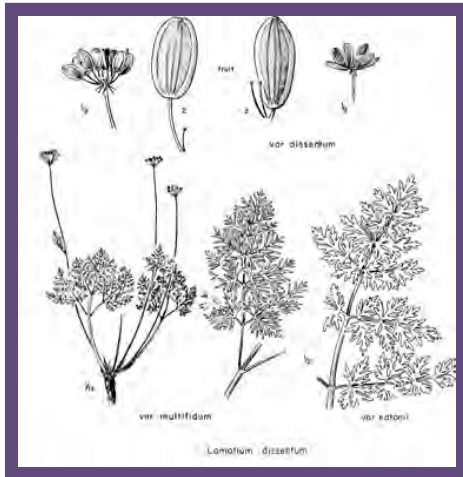


Figure 10: *Lomatium dissectum* - illustration

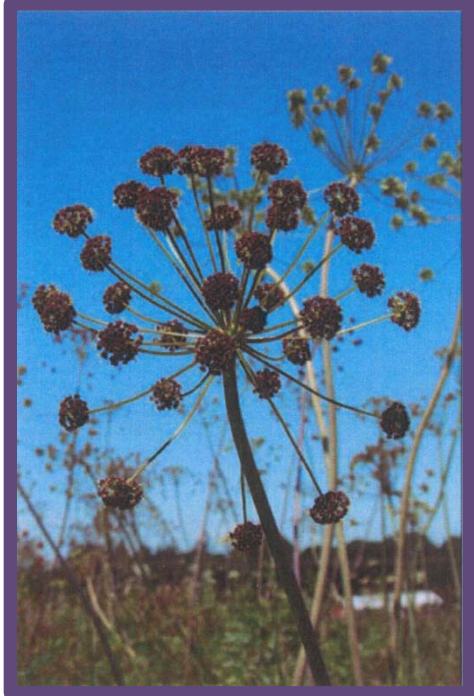


Figure 11: Flower/ Umbel, photo by K. Pendergrass

IDENTIFYING CHARACTERISTICS

(* indicates key character)

1. GENERAL

- a. Robust perennial from a very large, woody taproot
- b. *Several ascending, glabrous stems 5-15 dm (1.6-5.0 feet) tall

2. LEAVES

- a. Both basal and cauline leaves large and somewhat roughened
- b. Ternate-pinnately dissected into small, narrow ultimate segments up to 1 cm long

3. FLOWERS

- a. Inflorescence a compound umbel
- b. *Rays 10-30, usually about equal, 4-10 cm long at maturity
- c. Involucre none
- d. *Involucel of well-developed narrow bractlets
- e. Flowers brownish-purple or yellow (the two color forms rarely found together), some of them always sterile
- e. Blooms: April-June

4. FRUIT

- a. Elliptic
- b. 8-17 mm long and 4.5-10 mm wide
- c. The lateral wings narrow and thickened, up to 1 mm wide; dorsal ribs inconspicuous



Figure 11: Flower/ Umbel, photo by K. Pendergrass

5. HABITAT AND DISTRIBUTION:
Common species of open areas from the foothills to moderate elevations in the mountains

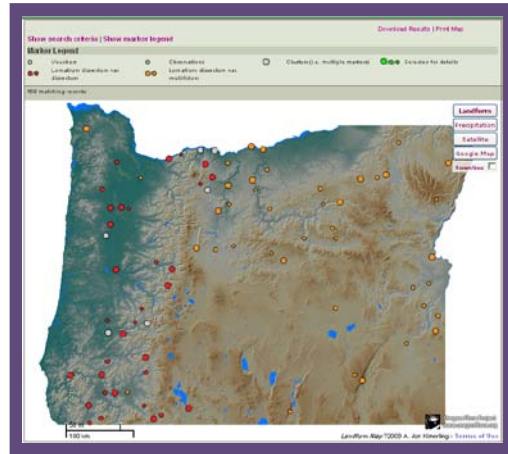


Figure 13: Population distribution map for Oregon

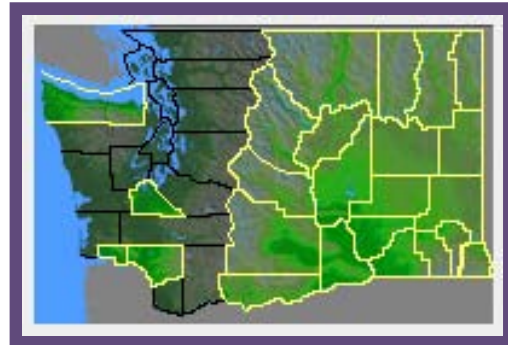


Figure 14: Population distribution map for Washington

Spring Gold or Fine-leaved desert-parsley (*Lomatium utriculatum*)

Note: This is the most likely species to be confused with Bradshaw's *Lomatium* and can occur in the same meadows as Bradshaw's, however this species has large leafy involucre bracts, cauline leaves, papery-thin wings on fruit, and occurs in drier microsites.



Figure 15: *Lomatium utriculatum* - illustration



Figure 16: Entire plant, photo courtesy of Ben Legler

IDENTIFYING CHARACTERISTICS

(* indicates key character)

1. GENERAL

- Perennial from a slender taproot
- 1-6 dm (0.3-2.0 feet) tall

2. LEAVES

- *Chiefly cauline
- *Ternate-pinnately dissected
- Ultimate segments crowded
- *Leaflets up to 5 mm long and less than 1 mm wide

3. FLOWERS

- Bright yellow
- Pedicels 2-8 mm long
- Rays as many as 15, unequal, 2-7 mm long at maturity
- Involucre none
- *Bractlets of the involucre well developed, 2-5 mm long (*Figure 17 and 18*)
- Blooms: April – June

4. FRUIT

- Obovate to elliptic, the tip often shallowly cleft; glabrous at maturity (*Figure 19*)
- *5-11 mm long and 3-6 mm wide, lateral wings about the same width as the body and papery thin at maturity (*Figure 19*)
- *Dorsal ribs slightly raised (*Figure 19*)



Figure 17: Involucel bracts, photo courtesy of Ben Legler



Figure 18: Involucel bracts, photo courtesy of Carolyn Menke



Figure 19: Fruits, photo courtesy of Ben Legler

5. **HABITAT AND DISTRIBUTION:** Low elevations; somewhat moist, open, often rocky areas.

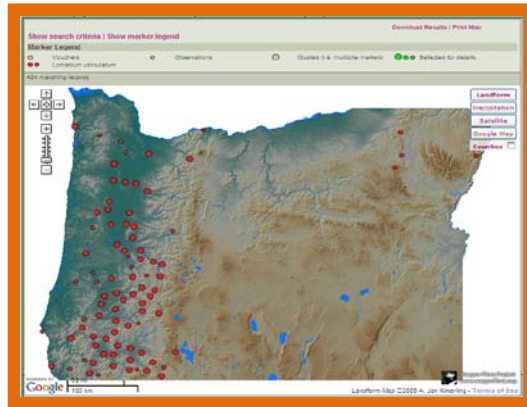


Figure 20: Population distribution map for Oregon

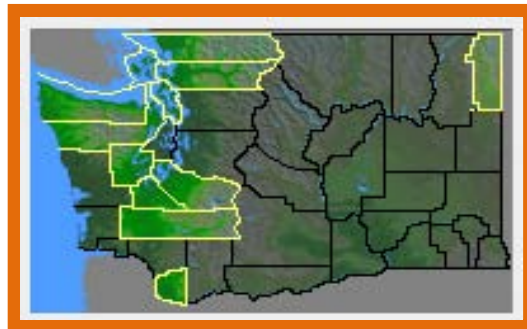


Figure 21: Population distribution map for Washington

Bradshaw's Lomatium (*Lomatium bradshawii*)

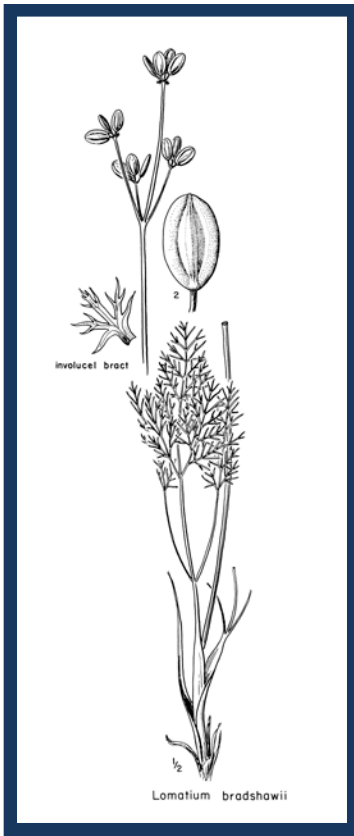


Figure 22: *Lomatium brashawii* - illustration



Figure 23: Entire plant, photo by K. Pendergrass

IDENTIFYING CHARACTERISTICS

(* indicates key character)

1. GENERAL

- Glabrous perennial from a long, slender taproot
- 2-6.5 dm (0.6-2.1 feet) tall

2. LEAVES

- *Chiefly basal
- *Ternate-pinnately dissected into linear or filiform segments 3-10 mm long and up to 1 mm wide

3. FLOWERS

- Flowers yellow (*Figure 19*)
- Rays unequal, 4-13 mm long; with usually only 2-5 fertile flowers
- Involucre wanting
- *Bractlets of the involucre ternately (divided into three's) or bi-ternately divided (split into three's two-times)
- Blooms/best survey timing: April-May

4. FRUIT

- Fruit glabrous (*Figure 21*)
- 8-13 mm long and 5-7 mm wide
- *Corky-thickened lateral wings half as wide and the same color as the body



Figure 24: Fruits, photo by K. Pendergrass



Figure 25: Showing involucel bracts, photo courtesy of Steve Gisler



Figure 26: Showing leaf dissection, photo courtesy Jean Jancaitus



Figure 27: Showing involucel bract, photo courtesy of Carolyn Menke

5. **HABITAT AND DISTRIBUTION:** Uncommon in wet prairies in the Willamette Valley and SW Washington; found on hydric soils, and often with hummocky microtopography



Figure 28: Habitat photo by K. Pendergrass



Figure 29: Habitat photo by K. Pendergrass

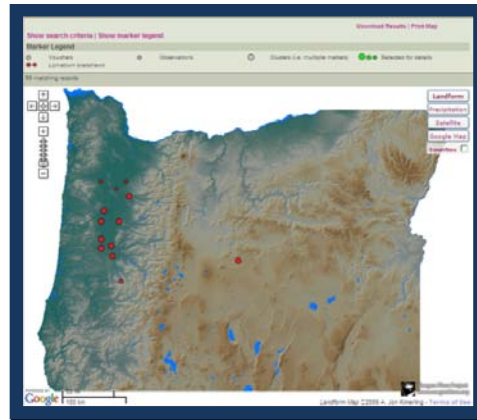


Figure 30: Population distribution map for Oregon

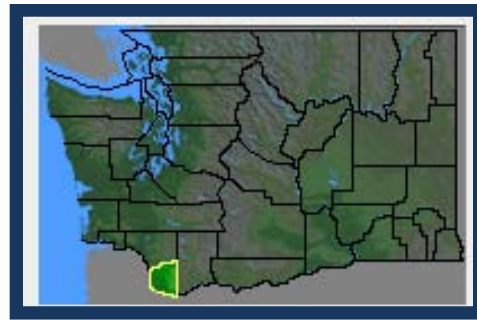


Figure 31: Population distribution map for Washington

Bare-stemmed Lomatium, Indian Parsley, Naked-stemmed hogfennel, or Pestle parsnip (*Lomatium nudicaule*)



Figure 32: *Lomatium nudicaule* - illustration



Figure 33: Entire plant, photo by Paul Slichter

IDENTIFYING CHARACTERISTICS

(* indicates key character)

1. GENERAL

- a. *Glabrous, glaucous (bluish-color) perennial from a stout taproot and simple crown
- b. Solitary or several stems 2-9 dm (0.6-3.0 feet) tall

2. LEAVES

- a. Mostly basal
- b. Firm
- c. *Ternately or ternate-pinnately 1-3 times compound, with 3-30 well-defined, veiny ultimate leaflets, these lanceolate or ovate to sub-rotund (“pea-like”), 2-9 cm long and 1-6 cm wide, entire or somewhat toothed or lobed

3. FLOWERS

- a. Inflorescence of compound umbels
- b. Rays unequal, 6-20 cm long at maturity
- c. Peduncle often swollen and hollow below the umbel
- d. *Involucre and involucrel none
- e. Flowers pale yellow
- f. Pedicels 3-15 mm long

4. FRUIT

- a. Oblong
- b. 7-15 mm long, sometimes narrowed to a short, beaklike tip
- c. Wings about ½ as wide as the body



Figure 34: Individual umbellet, photo courtesy of Ben Legler

5. HABITAT AND DISTRIBUTION:
Dry, open areas; common in shrub-steppe, but found in mountain meadows

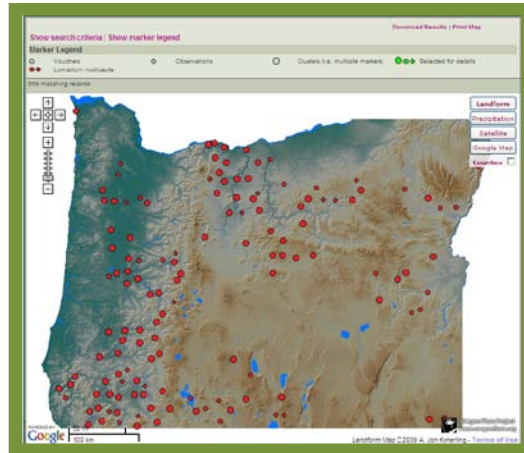


Figure 35: Population distribution map for Oregon

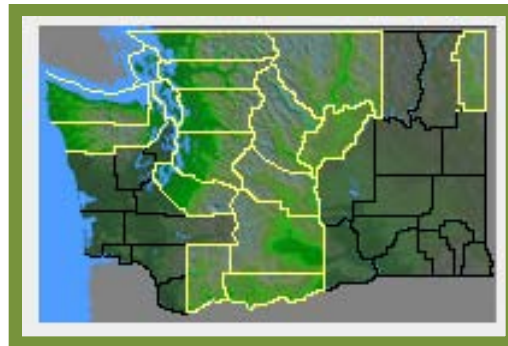


Figure 36: Population distribution map for Washington

Nine-leaf desert-parsley or Hog fennel (*Lomatium triternatum*)

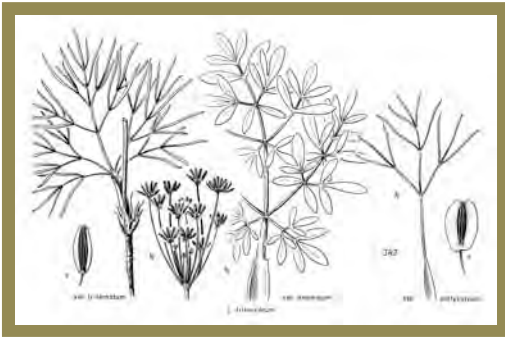


Figure 37: *Lomatium triternatum* - illustration



Figure 38: Entire plant, photo courtesy of Paul Slichter

IDENTIFYING CHARACTERISTICS

(* indicates key character)

1. GENERAL

- a. Perennial from an elongate and slightly thickened taproot
- b. 2-8 dm (0.6-2.6 feet) tall, the stems solitary or few, erect
- c. Covered with fine but stiff hairs or leaves without hairs

2. LEAVES

- a. Chiefly basal or low-cauline, but usually one or more reduced leaves on the middle or upper stem
- b. *Leaves ternately or ternate-pinnately 2-3 times cleft into long, narrow or broader segments, 1-10 cm long, highly variable in this feature (*Figure 37*)

3. FLOWERS

- a. Inflorescence of compound umbels
- b. *Rays unequal, 2-10 cm long at maturity
- c. *Involucre none, involucre bractlets inconspicuous
- d. Flowers yellow
- e. Blooms/survey time: May - July

4. FRUIT

- a. Oblong and narrow
- b. Glabrous, 7-15 mm long and 2-4 mm wide
- c. Lateral wings less than half the width of the body

Martindale's desert-parsley or Few-flowered Lomatium
(*Lomatium martindalei* var. *martindalei*)

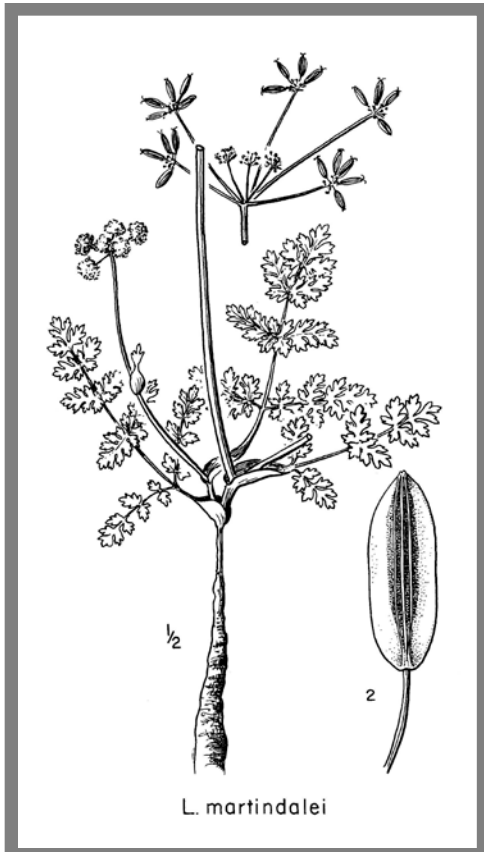


Figure 41: *Lomatium martindalei* var. *martindalei* - illustration



Figure 42: Entire plant, photo courtesy Paul Slichter

IDENTIFYING CHARACTERISTICS
(* indicates key character)

1. GENERAL

- a. *Glabrous and glaucous (bluish) perennial from an elongate taproot and usually simple, subterranean crown
- b. 1-3 dm (0.1-1.0 foot) tall
- c. Taproot often thickened well below the surface

2. LEAVES

- a. *Chiefly basal
- b. *Pinnately once or twice compound, the ultimate segments leaf-like, toothed or cleft

3. FLOWERS

- a. Inflorescence a compound umbel
- b. Rays equal or unequal, 1.5-6 cm long at maturity
- c. Involucre wanting; involucrel inconspicuous or wanting
- d. Flowers white, ochroleucous or pale yellow
- e. Pedicels 2-15 mm long
- f. Blooms: May - September

4. FRUIT

- a. Oblong to broadly elliptic
- b. *8-16 mm long, the wings equaling or narrower than the body

5. **HABITAT AND DISTRIBUTION:** Dry mountain meadows, often rocky areas

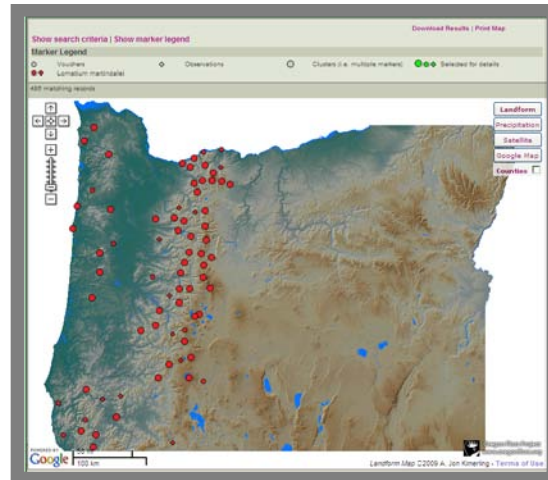


Figure 43: Population distribution maps for Oregon

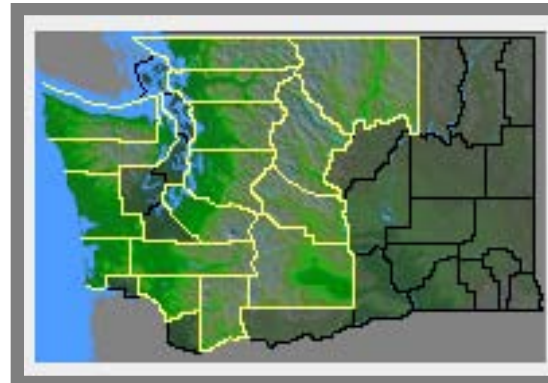


Figure 44: Population distribution map for Washington

Hall's Lomatium (*Lomatium hallii*)



Figure 45: *Lomatium hallii*- illustration



Figure 46: Whole plant, photos courtesy of G.D Carr

IDENTIFYING CHARACTERISTICS

(* indicates key character)

1. GENERAL

- Glabrous perennial from a stout taproot
- Stems 2-4 dm (0.6-1.3 feet) tall

2. LEAVES

- *Leaves shiny green
- *Mostly basal, pinnately to ternately-pinnately dissected, the segments deeply pinnatifid or toothed
- Ultimate segments 1-6 mm long

3. FLOWERS

- Inflorescence a compound umbel
- Rays unequal when mature; involucre wanting; *involucre of narrow bractlets; flowers bright yellow
- Blooms: April

4. FRUIT

- Glabrous
- *Elliptic 5-9 mm long
- *Wings about $\frac{1}{2}$ as broad as the body

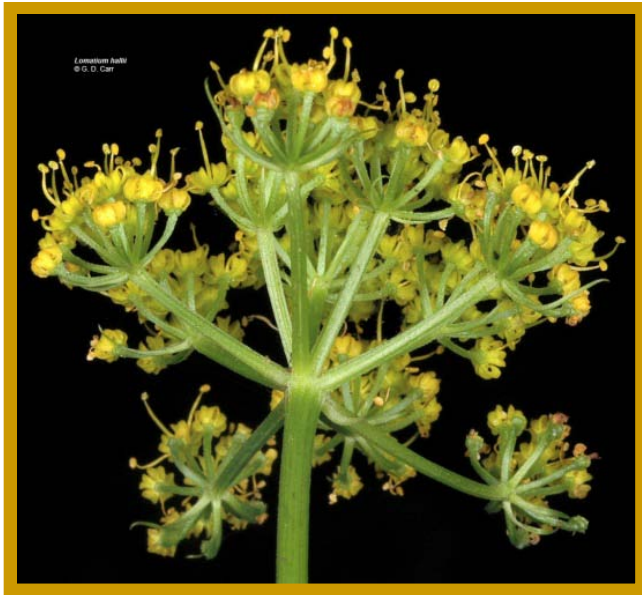


Figure 47: umbel, photo courtesy of G.D. Carr

5. **HABITAT AND DISTRIBUTION:**
Rocky crevices and bluffs in the foothills and valleys extending along the western slopes of the Cascades

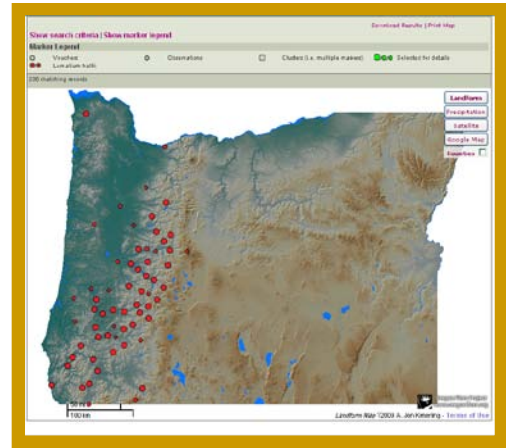


Figure 48: Population distribution map for Oregon

References and for further information:

- U.S. Fish and Wildlife Service. Final Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington. U.S. Fish and Wildlife Service, Portland, Oregon.
<http://www.fws.gov/oregonfwo/Species/PrairieSpecies/Documents/PrairieSpeciesFinalRecoveryPlan.pdf>
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- U.S. Fish and Wildlife Service. 1988. Endangered and threatened wildlife and plants: Final endangered status for *Lomatium bradshawii* (Bradshaw's lomatium). Federal Register 53:38448-38451. September 30, 1988. <https://ecos.fws.gov/docs/frdocs/1988/88-22327.pdf>
- T&E Plant Survey Form – use this to document Endangered Species compliance during conservation planning in Oregon (go to [eFOTG](#) click on Oregon map, then any county, go to Section II., then Threatened & Endangered Spp folder; then in 2. Conservation Planning Guidance)
- Flora Project – Rare Plant sheet on Bradshaw's lomatium:
<http://www.oregonflora.org/rarepdfs/lombra.pdf>
- Oregon Natural Heritage website – specific information on individual plant species:
http://oregonstate.edu/ornhic/plants/view_plants2.php
- Oregon Field Office of U.S. Fish and Wildlife Service information:
<http://www.fws.gov/oregonfwo/Species/Data/BradshawsLomatium/>
- Center for Plant Conservation information:
http://www.centerforplantconservation.org/collection/CPC_ViewProfile.asp?CPCNum=2658
- State of Oregon Listed Plants: <http://oregon.gov/ODA/PLANT/CONSERVATION/statelist.shtml>
- Field Guide to Selected Rare Plants of Washington
<http://www1.dnr.wa.gov/nhp/refdesk/fguide/pdf/lobr.pdf>
- Photos and distribution in Washington
<http://biology.burke.washington.edu/herbarium/imagecollection.php?Genus=Lomatium&Species=bradshawii>
- Some beautiful photos: http://www.botany.hawaii.edu/faculty/carr/ofp/lom_bra.htm