

TECHNICAL NOTES

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Portland, Oregon

NATURAL RESOURCES CONSERVATION SERVICE
September 2010

PLANT MATERIALS No. 40 – Supplement C

Introduction to Cook's *lomatum*, 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 most 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.
- * Use of line drawing illustration for Cook's *lomatum* courtesy of Daphne Stone, Botanist, Eugene, Oregon.
- * Most species descriptions 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 Materials Specialist with the Natural Resources Conservation Service

The purpose of this technical note is to provide information about Cook's *lomatum*, 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: Br. Alfred Brousseau, Ken Cannon, G.D. Carr, Norm Jensen, Ben Legler, Carolyn Menke, Keir Morse, Paul Slichter, Mark Turner and Oregon Department Agriculture Plant Conservation Program staff.

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 Cook's Lomatium:

Family: Apiaceae – Carrot or Umbel family

Species Status: Cook's Lomatium (*Lomatium cookii*) was federally listed as Endangered, without critical habitat, on November 7, 2002 (U.S. Fish and Wildlife Service 2002). A Draft Recovery Plan was completed in 2006 (U.S. Fish and Wildlife Service 2006). Final Critical Habitat was designated on July 21, 2010 (U.S. Fish and Wildlife Service 2010). The species is also State-listed as Endangered in Oregon.

Threats: Continued habitat conversion to agricultural and urban uses, with concomitant habitat loss, is the largest, and generally least reversible cause of the species' decline (U.S. Fish and Wildlife Service 2002). Additional threats include aggregate and mineral mining, road construction and maintenance, timber harvesting, off-road vehicle use, vandalism, incompatible grazing practices, encroachment by nonnative plants, and succession of native woody vegetation due to fire suppression.

Range of the Species: The species is endemic (only occurs) to Oregon and occurs only in Josephine and Jackson Counties.

Habitat: In Josephine County, the species occurs in seasonally-moist, lowland meadows in the Illinois Valley. In Jackson County, the species occurs within the Agate Desert Vernal Pool Complex of the Rogue River Valley. Within the Agate Desert vernal pools, the species typically occurs at the interface between the spring water-line and the upland plant community.

Cook's Lomatium occurs predominantly on Agate-Winlow complex soils, but may also be found on mapped Coker clay and Provig-Agate complex soils.

Bloom Timing and Surveys: This species blooms March to June. This period is the best timeframe to conduct field surveys to determine presence of this species – this small-stature plant it is hard to locate without presence of its pale yellow flowers. For NRCS purposes, surveys for this species need only occur in moist meadow areas of the Illinois Valley in Josephine County or where Agate Desert Vernal Pool habitat is found in Jackson County.

Associated Species:In the vernal pool mounded prairie complex of the Agate Desert:

- Pacific floxtail (*Alopecurus saccatus*)
- Slender hairgrass (*Deschampsia danthonioides*)
- Oregon coyote thistle (*Eryngium petiolatum*)
- Poverty clover (*Trifolium depauperatum*)
- Tiny mouse-tail (*Myosurus minimus*)
- White-head navarretia (*Navarretia leucocephala* ssp. *leucocephala*)
- California goldfields (*Lasthenia californica*)
- Slender phlox (*Phlox gracilis*)
- Bracted popcornflower (*Plagiobothrys bracteatus*)

In the Illinois Valley wet meadows:

- California oatgrass (*Danthonia californica*)
- Lemon's needlegrass (*Achnatherum lemmonii*)
- Klamath Roemer's fescue (*Festuca roemeri* var. *klamathensis*)
- rough bluegrass (*Poa secunda*)
- Camas (*Camassia* spp.)
- Western buttercup (*Ranunculus occidentalis*)
- Slender meadowfoam (*Limnanthes gracilis* var. *gracilis*)

BRADSHAW'S LOMATIUM TERMINOLOGY

Figure 1: Lomatium Flower Terminology

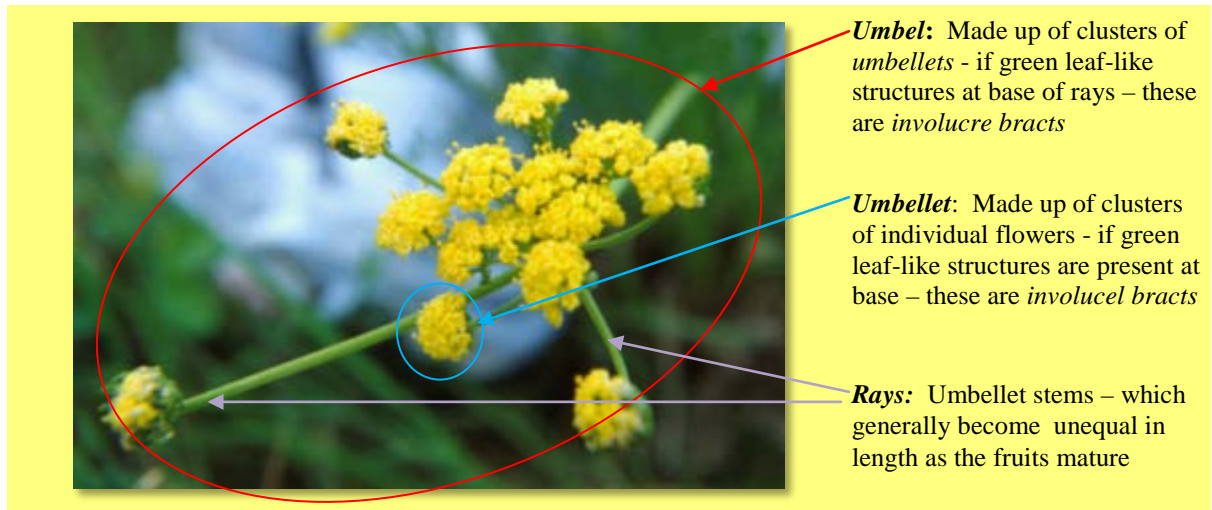


Figure 2: Lomatium Plant Terminology

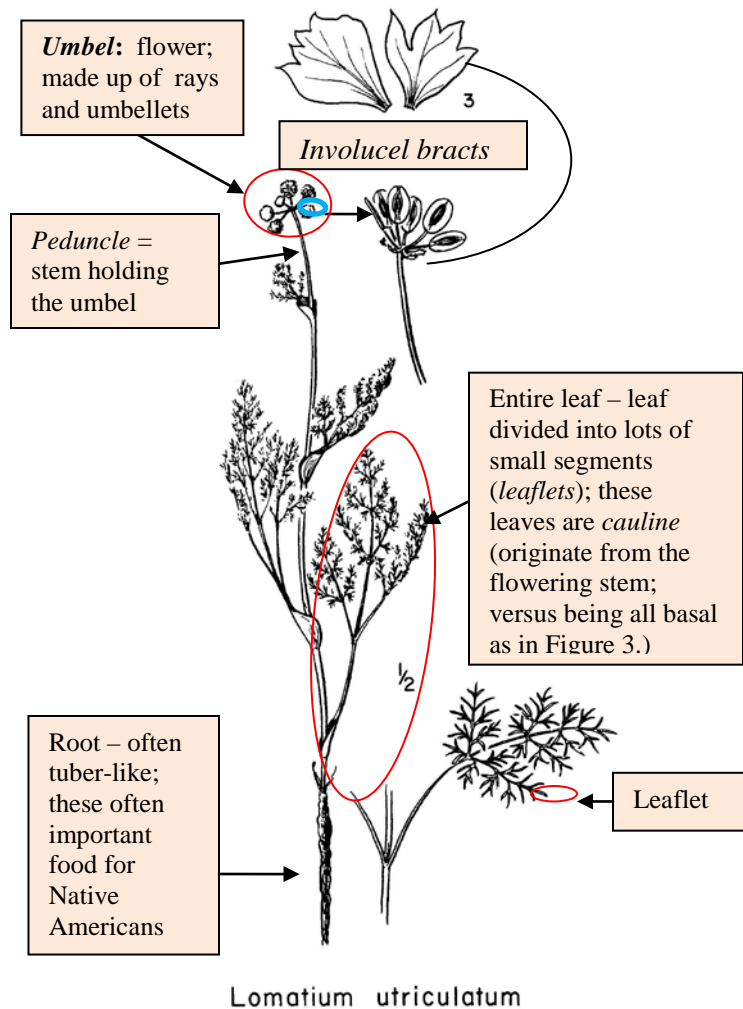
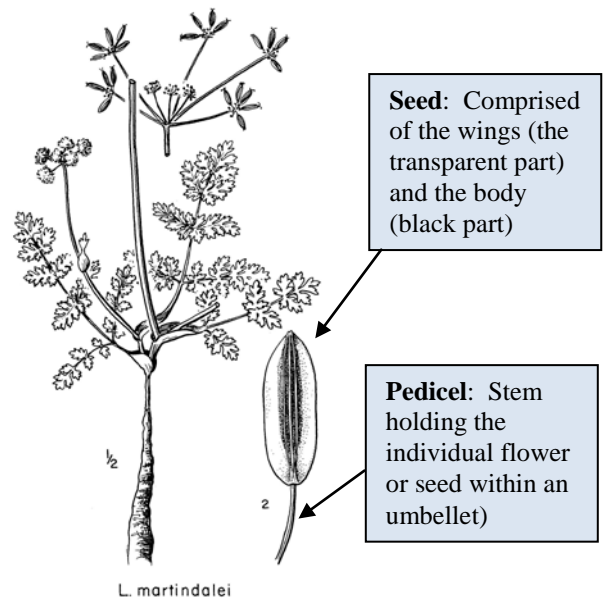


Figure 3: *Example of a plant with basal leaves – Leaves originate from the plant base, leaves not found along the flowering stalk*



PLANT KEY: SPECIES OCCURRING WITHIN THE RANGE AND HABITAT OF COOK'S LOMATIUM

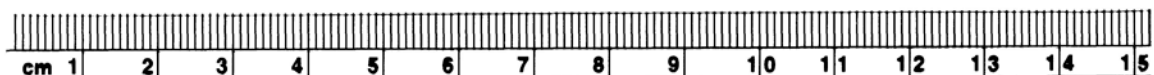
This key is provided to help identify *Lomatiums* in the range of where Cook's lomatium is known to occur in Josephine and Jackson Counties. Because there are so many species of *Lomatiums* in these two counties, **this key only covers those YELLOW-FLOWERED species of *Lomatium* that may occur where Cook's lomatium is known to occur – in moist meadows of Josephine County and in the Agate Desert Vernal Pool plant communities of Jackson County.**

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 decomposed, dissected into numerous small segments (“fernny”)
 - 2a Plants gray-colored from fine, thick and short hair... **Gray-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 (also see lead 7b; Hall’s lomatium may also appear “fernny” with filiform bracts)
 - 4a Plants 4-18 dm (1.3-5.9 feet) tall; wings of the fruit thin.....
Purple parsley or fernleaf biscuitroot (*L. dissectum* var. *dissectum*)
 - 4b Plants 6.5 dm (2.1 feet) or usually much shorter; wings of the fruit corky-thickened **Cook’s lomatium/desertparsley (*Lomatium cookii*)**
 - 3b Involucels usually of short, broad, dissected or toothed, small leaf-like “bractlets” **Spring Gold or Fine-leaved desert-parsley (*Lomatium utriculatum*)**
- 1b Leaves with several large divisions forming more or less definite leaf-like divisions
 - 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 Leaves shiny green-colored; fruits 5-9 mm long; involucel bracts present **Hall’s lomatium (*Lomatium hallii*)**
 - 7b Leaves not shiny, glaucous (blue-green colored); fruits larger than 9 mm long; involucel bracts absent or inconspicuous
 - 8a Plants shorter, 1-3 dm tall..... **Martindale’s desert-parsley (*Lomatium martindalei* var. *martindalei*)**
 - 8b Plants taller, 3-12 dm tall..... **California lomatium (*Lomatium californicum*)**

Below is a millimeter ruler to measure your unknown plant



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

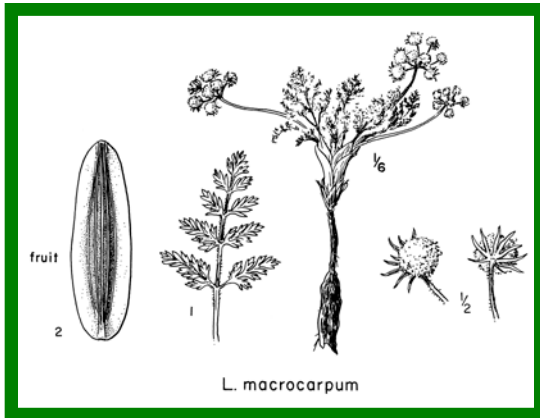


Figure 4: *Lomatium macrocarpum* illustration



Figure 5: Fruits, 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. Rays 2-6 cm long at maturity
- b. Peduncles usually several from the
base
- c. Stem ascending in flower and
upright in fruit
- d. Involucre none
- e. *Involucel of narrow, conspicuous,
green bractlets, often surpassing the
flowers
- f. Flowers grayish-white or purplish-
white, or yellowish
- g. 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

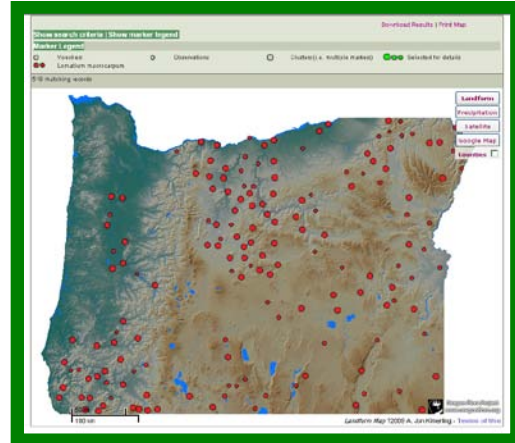


Figure 8: Population distribution map for Oregon

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

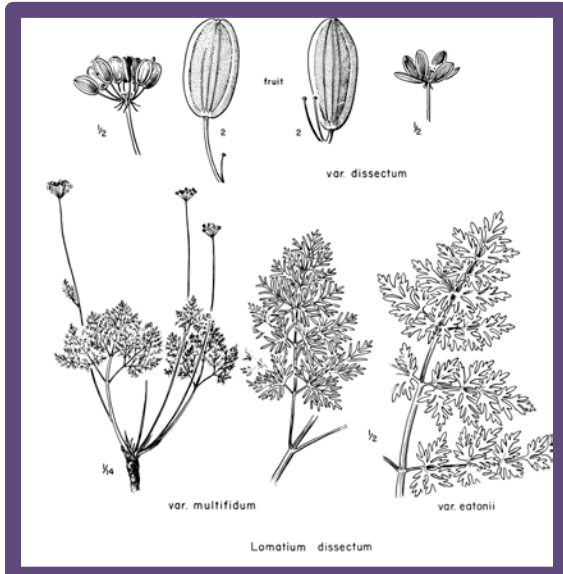


Figure 9: *Lomatium dissectum* - illustration

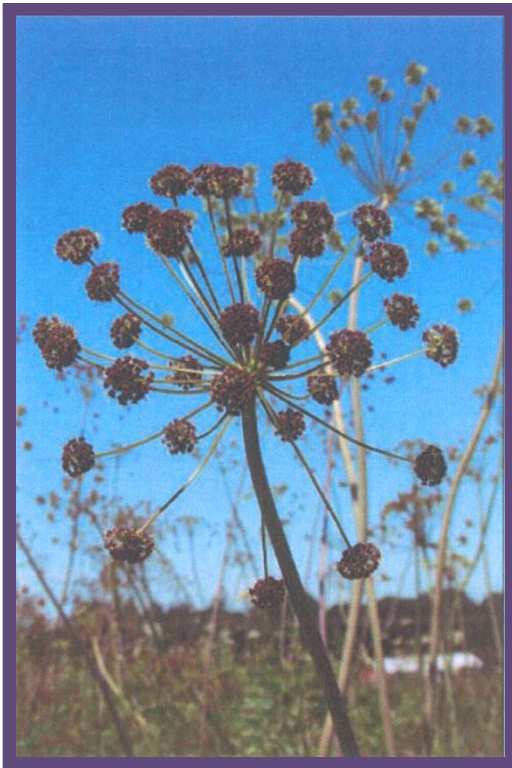


Figure 10: Flower/Umbel, photo by K. Pendergrass

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. *Rays 10-30, usually about equal, 4-10 cm long at maturity
- b. Involucre none
- c. *Involucel of well-developed narrow bractlets
- d. 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, the *lateral wings narrow and thickened, up to 1 mm wide
- c. Dorsal ribs inconspicuous



Figure 11: Entire plant and environment, photo courtesy of Ben Legler

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

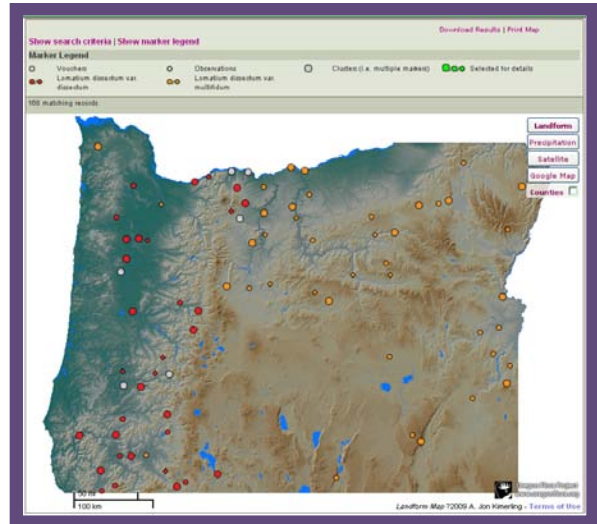


Figure 12: Population distribution map for Oregon

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

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



Figure 13: *Lomatium utriculatum* – illustration



Figure 14: Entire plant, photo courtesy of Ben Legler

IDENTIFYING CHARACTERISTICS

(* indicates key character)

1. GENERAL

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

2. LEAVES

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

3. FLOWERS

- a. Bright yellow
- b. Pedicels 2-8 mm long
- c. Rays as many as 15, unequal, 2-7 mm long at maturity
- d. Involucre none
- e. *Bractlets of the involucl well developed, 2-5 mm long (*Figures 15 and 16*)
- f. Blooms: April – June

4. FRUIT

- a. Obovate to elliptic, the tip often shallowly cleft, glabrous at maturity (*Figure 17*)
- b. *5-11 mm long and 3-6 mm wide, lateral wings about the same width as the body and papery thin at maturity
- c. Dorsal ribs slightly raised



Figure 15: Involucre bracts, photo courtesy of Ben Legler



Figure 16: Involucre bracts, photo courtesy of Carolyn Menke



Figure 17: Fruits, photo courtesy of Ben Legler

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

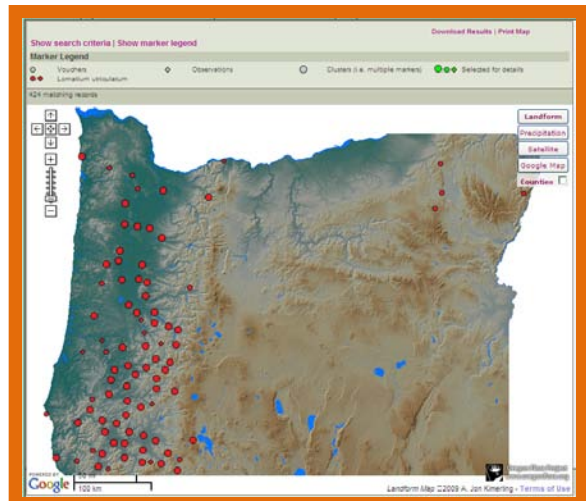


Figure 18: Population distribution map for Oregon

Cook's Lomatium (*Lomatium cookii*)

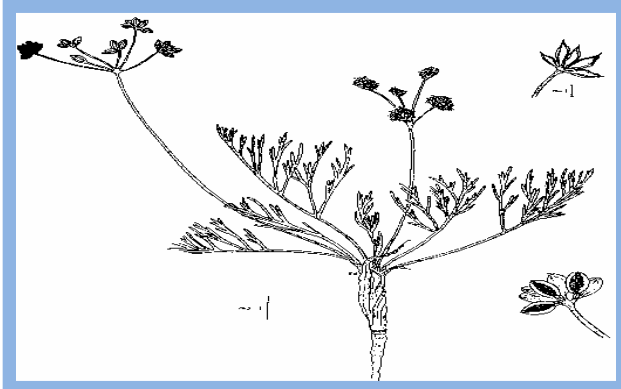


Figure 19: Line drawing of *Lomatium cookii* courtesy of Daphne Stone.



Figure 20: Entire plant, photo courtesy of Oregon Department of Agriculture, Plant Conservation Program staff



Figure 21: Umbel and leaves, photo by Ken Cannon

IDENTIFYING CHARACTERISTICS

(* indicates key character)

1. GENERAL

- Glabrous perennial from a long, slender taproot
- 1.5-5 dm (0.5-1.6 feet) tall

2. LEAVES

- *Chiefly basal
- *Ternate-pinnately dissected into linear or filiform segments 6-12 mm long and up to 1 mm wide

3. FLOWERS

- Flowers pale yellow
- Rays unequal, 1-9 cm long; with usually only 2-5 fertile flowers
- Involucre wanting
- *Bractlets of the involucre linear (not toothed or lobed)
- Blooms/best survey timing: March-June

4. FRUIT

- Fruit glabrous
- 8-13 mm long and 4-6 mm wide
- *Corky-thickened lateral wings almost as wide and the same color as the body



Figure 22: Umbellet showing linear involucel bracts below immature seeds, photo courtesy of Norm Jensen



Figure 23: Jackson County – Vernal pool habitat, photo courtesy of Mark Turner



Figure 24: Jackson County – Roadside remnant vernal pool habitat, photo courtesy of Ken Cannon

5. HABITAT AND DISTRIBUTION:

*Uncommon in moist meadows of the Illinois Valley in Josephine County and in the Agate Desert vernal pool-mounded habitat of Jackson County.



Figure 25: Josephine County – wet meadow habitat, photo Oregon Department of Agriculture, Plant Conservation Program staff

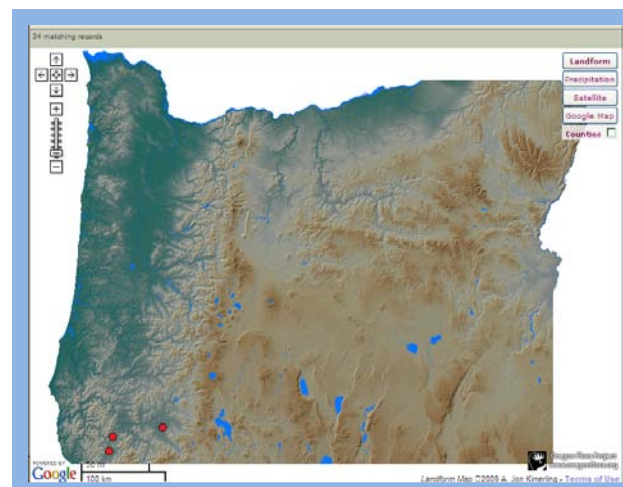


Figure 26: Population distribution map for Oregon

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

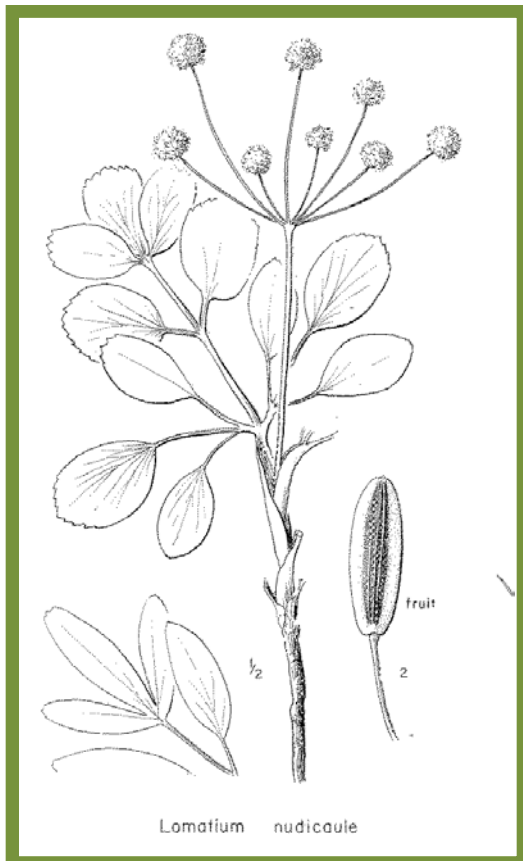


Figure 27: *Lomatium nudicaule* – illustration



Figure 28: 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. Rays unequal, 6-20 cm long at maturity
- b. Peduncle often swollen and hollow below the umbel
- c. *Involucre and involucrel none
- d. Flowers pale yellow
- e. Pedicels 3-15 mm long

4. FRUIT

- a. Oblong
- b. 7-15 mm long, sometimes narrowed to a short, beaklike tip
- c. Wings about 1/2 as wide as the body



Figure 29: Individual umbellet showing underside with no involucre bracts present, photo by Ben Legler

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

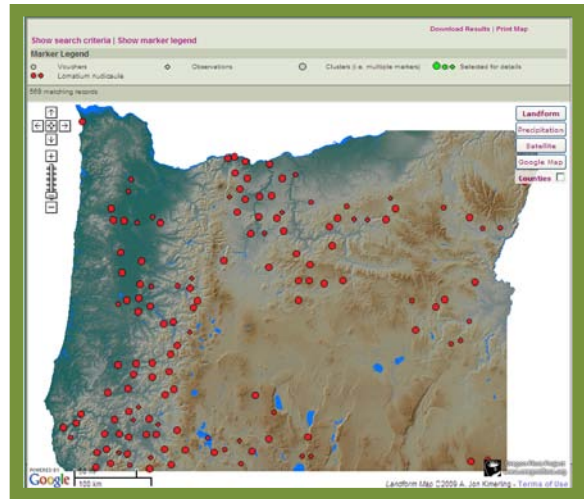


Figure 30: Population distribution map for Oregon

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

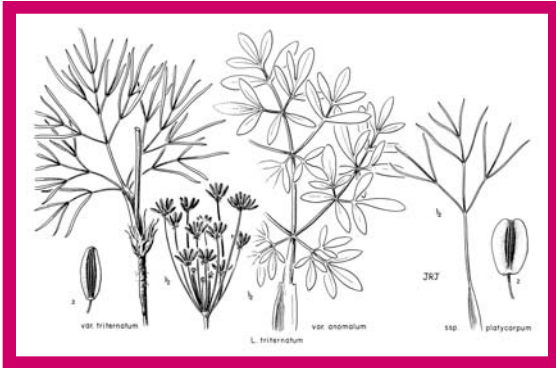


Figure 31: *Lomatium triternatum* – illustration



Figure 32: 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

3. FLOWERS

- a. *Rays unequal, 2-10 cm long at maturity
- b. *Involucre none, involucre bractlets inconspicuous
- c. Flowers bright yellow
- d. 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

5. **HABITAT AND DISTRIBUTION:**
Dry to somewhat moist open areas, low
to mid-elevations

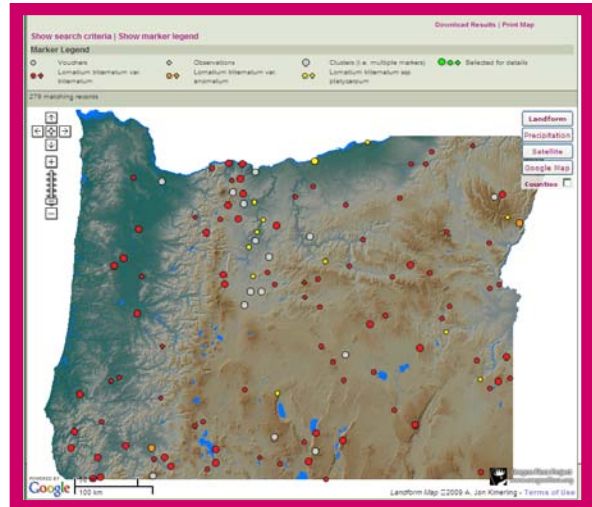


Figure 33: Population distribution map for Oregon

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

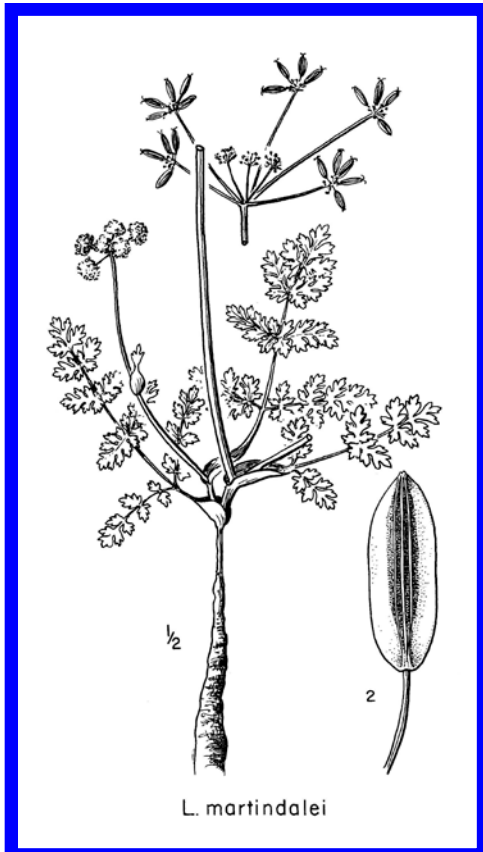


Figure 34: *Lomatium martindalei* var. *martindalei* - illustration



Figure 35: Entire plant, photo courtesy of 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. Rays equal or unequal, 1.5-6 cm long at maturity
- b. Involucre wanting; involucrel inconspicuous or wanting
- c. Flowers white, ochroleucous or pale yellow
- d. Pedicels 2-15 mm long
- e. Blooms: May - September

4. FRUIT

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

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

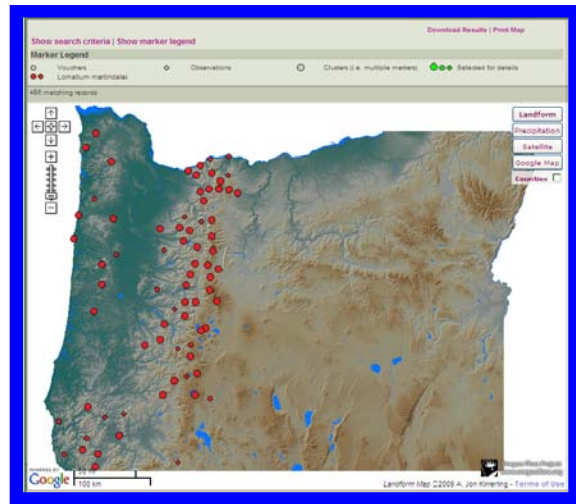


Figure 36: Population distribution map for Oregon

Hall's lomatium (*Lomatium hallii*)



Figure 37: *Lomatium hallii*- illustration



Figure 38: Whole plant, photos courtesy of G.D Carr

IDENTIFYING CHARACTERISTICS

(* indicates key character)

1. GENERAL

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

2. LEAVES

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

3. FLOWERS

- a. Rays unequal when mature
- b. Involucre wanting; *involucel of narrow bractlets;
- c. Flowers bright yellow
- d. Blooms: April

4. FRUIT

- a. Glabrous
- b. *Elliptic 5-9 mm long
- c. *Wings about 1/2 as broad as the body



Figure 39: 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

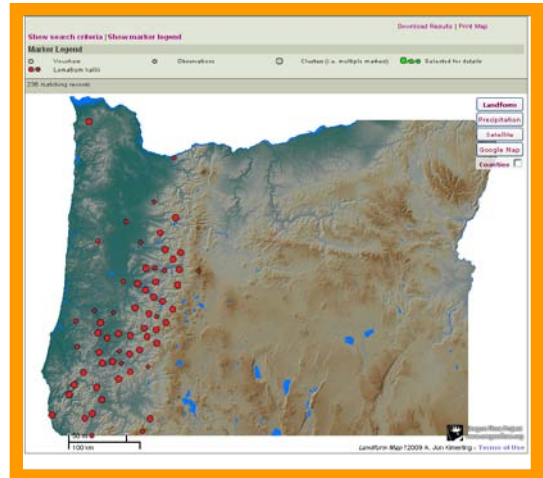


Figure 40: Population distribution map for Oregon

California Lomatium (*Lomatium californicum*)



Figure 41: *Lomatium californicum*- entire plant, photo courtesy of © Br. Alfred Brousseau, Saint Mary's College



Figure 42. California Lomatium leaf, photo courtesy of Keir Morse



Figure 43. California Lomatium Fruits, photo courtesy of Keir Morse

IDENTIFYING CHARACTERISTICS

(* indicates key character)

1. GENERAL

- a. Glabrous perennial from a stout taproot
- b. Stems 3-12 dm (1-4 feet) tall.

2. LEAVES

- a. *Leaves glaucous (blue-green color)
- b. Mostly basal with few cauline leaves
- c. *Leaves with 3 major lobes, these coarsely toothed or lobed; “celery-like” leaves; ultimate segments 2–5 cm, wedge-shaped to obovate

3. FLOWERS

- a. Bright yellow
- b. Rays 8–20, unequal when mature; rays 8–15 cm long
- c. Involucre and involucre bracts absent or inconspicuous
- d. Blooms: March-April

4. FRUIT

- a. 10–15 mm, oblong-ovate to elliptic
- b. Glabrous, very compressed front-to-back
- c. Wings thickened and less than ½ the body in width

5. HABITAT AND DISTRIBUTION:
Woodland and brushy slopes.

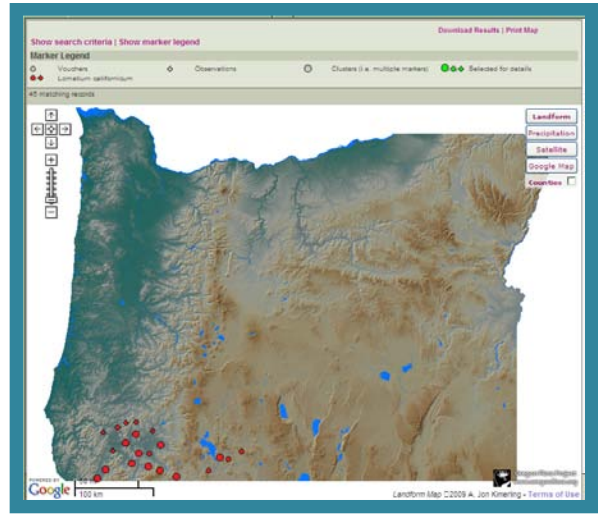


Figure 44. Population distribution map for Oregon

References and for further information:

- U.S. Fish and Wildlife Service. July 21, 2010. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for *Limnanthes floccosa* ssp. *grandiflora* (Large-Flowered Woolly Meadowfoam) and *Lomatium cookii* (Cook's Lomatium); Final Rule. Federal Register 75, No. 139. <http://www.fws.gov/policy/library/2010/2010-17324.pdf>
- U.S. Fish and Wildlife Service. 2006. Draft Recovery Plan for Listed Species of the Rogue Valley Vernal Pool and Illinois Valley Wet Meadow Ecosystems. U.S. Fish and Wildlife Service, Portland, Oregon. http://ecos.fws.gov/docs/recovery_plans/2006/060922.pdf
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- 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)
- State of Oregon Listed Plants: http://www.oregon.gov/ODA/PLANT/CONSERVATION/profile_loco.shtml
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- Flora Project – Rare Plant sheet on Cook's lomatium: <http://www.oregonflora.org/rarepdfs/lomcoo.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/CooksLomatium/>
- Center for Plant Conservation information: http://www.centerforplantconservation.org/collection/CPC_ViewProfile.asp?CPCNum=7022
- Some beautiful photos: http://www.botany.hawaii.edu/faculty/carr/ofp/lom_coo.htm