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

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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.

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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, Hazelair, 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 vulgar)
Birdbeak buttercup (Ranunculus orthorynchus)
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

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Umbel</td>
<td>Made up of clusters of umbellets - if green leaf-like structures at base of rays – these are involucel bracts</td>
</tr>
<tr>
<td>Umbellet</td>
<td>Made up of clusters of individual flowers - if green leaf-like structures are present at base – these are involucel bracts</td>
</tr>
<tr>
<td>Rays</td>
<td>Umbellet stems – which generally become unequal in length as the fruits mature</td>
</tr>
</tbody>
</table>

Figure 2: Lomatium Plant Terminology

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peduncle</td>
<td>Stem holding the umbel</td>
</tr>
<tr>
<td>Involucre bracts</td>
<td></td>
</tr>
<tr>
<td>Root</td>
<td>Often tuber-like; these often important food for Native Americans</td>
</tr>
<tr>
<td>Seed</td>
<td>Comprised of the wings (the transparent part) and the body (black part)</td>
</tr>
<tr>
<td>Pedicel</td>
<td>Stem holding the individual flower or seed within an umbellet</td>
</tr>
<tr>
<td>Entire leaf</td>
<td>Leaf divided into lots of small segments (leaflets); these leaves are cauline (originate from the flowering stem; versus being all basal as in Figure 3.)</td>
</tr>
</tbody>
</table>

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 decompound, 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

<table>
<thead>
<tr>
<th>cm</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<th>7</th>
<th>8</th>
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<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
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</thead>
</table>
Gray-leaf desert parsley/biscuit root or Large-fruit lomatium
(*Lomatium macrocarpum*)

**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

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*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*
5. **HABITAT AND DISTRIBUTION:**

Open, dry, rocky areas at low elevations

*Figure 7: Entire plant, photo courtesy of Paul Slichter*

*Figure 8: Population distribution map for Oregon*

*Figure 9: Population distribution map for Washington.*
Purple Parsley or fernleaf biscuitroot
(*Lomatium dissectum var. dissectum*)

**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
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 involucel bracts, cauline leaves, papery-thin wings on fruit, and occurs in drier microsites.

![Involucel bracts](image1.png)

**Figure 15:** *Lomatium utriculatum* - illustration

![Entire plant](image2.png)

**Figure 16:** Entire plant, photo courtesy of Ben Legler

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**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 involucel well developed, 2-5 mm long* *(Figure 17 and 18)*
   g. Blooms: April – June

4. **FRUIT**
   a. Obovate to elliptic, the tip often shallowly cleft; glabrous at maturity *(Figure 19)*
   b. *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)*
   c. *Dorsal ribs slightly raised* *(Figure 19)*
5. **HABITAT AND DISTRIBUTION**: Low elevations; somewhat moist, open, often rocky areas.

![Figure 20: Population distribution map for Oregon](image)

![Figure 21: Population distribution map for Washington](image)

*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
Bradshaw’s lomatium (Lomatium bradshawii)

IDENTIFYING CHARACTERISTICS
(* indicates key character)

1. **GENERAL**
   a. Glabrous perennial from a long, slender taproot
   b. 2-6.5 dm (0.6-2.1 feet) tall

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

3. **FLOWERS**
   a. Flowers yellow (*Figure 19*)
   b. Rays unequal, 4-13 mm long; with usually only 2-5 fertile flowers
   c. Involucre wanting
   d. *Bractlets of the involucel ternately (divided into three’s) or bi-ternately divided (split into three’s two-times)*
   e. Blooms/best survey timing: April-May

4. **FRUIT**
   a. Fruit glabrous (*Figure 21*)
   b. 8-13 mm long and 5-7 mm wide
   c. *Corky-thickened lateral wings half as wide and the same color as the body
5. **HABITAT AND DISTRIBUTION**: Uncommon in wet prairies in the Willamette Valley and SW Washington; found on hydric soils, and often with hummocky microtopography.
Bare-stemmed lomatium, Indian Parsley, Naked-stemmed hogfennel, or Pestle parsnip (*Lomatium nudicaule*)

**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 involucel 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

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*Figure 32: Lomatium nudicaule - illustration*

*Figure 33: Entire plant, photo by Paul Slichter*
5. **HABITAT AND DISTRIBUTION:**
   Dry, open areas; common in shrub-steppe, but found in mountain meadows

*Figure 34: Individual umbellet, photo courtesy of Ben Legler*

*Figure 35: Population distribution map for Oregon*

*Figure 36: Population distribution map for Washington*
Nine-leaf desert-parsley or Hog fennel (*Lomatium triternatum*)

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

*Figure 39:* Population distribution map for Oregon

*Figure 40:* Population distribution map for Washington
Martindale’s desert-parsley or Few-flowered lomatium
\( (Lomatium martindalei \text{ var. } martindalei) \)

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; involucel 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*)

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

4. **FRUIT**
   a. Glabrous
   b. *Elliptic 5-9 mm long*
   c. *Wings about ½ as broad as the body*

*Figure 45: Lomatium hallii- illustration*

*Figure 46: Whole plant, photos 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 47:* umbel, photo courtesy of G.D. Carr

*Figure 48:* Population distribution map for Oregon
References and for further information:

- 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/lombre.pdf](http://www.oregonflora.org/rarepdfs/lombre.pdf)
- Oregon Natural Heritage website – specific information on individual plant species: [http://oregonstate.edu/ornhic/plants/view_plants2.php](http://oregonstate.edu/ornhic/plants/view_plants2.php)
- Some beautiful photos: [http://www.botany.hawaii.edu/faculty/carr/ofp/lom_bra.htm](http://www.botany.hawaii.edu/faculty/carr/ofp/lom_bra.htm)