

## DEPARTMENT OF THE INTERIOR

## Fish and Wildlife Service

## 50 CFR Part 17

RIN 1018-AF84

**Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for *Lomatium cookii* (Cook's Lomatium) and *Limnanthes floccosa* ssp. *grandiflora* (Large-Flowered Woolly Meadowfoam) From Southern Oregon**

**AGENCY:** Fish and Wildlife Service, Interior.

**ACTION:** Final rule.

**SUMMARY:** We, the U.S. Fish and Wildlife Service (Service), determine endangered status for two plants, *Lomatium cookii* (Cook's lomatium) and *Limnanthes floccosa* ssp. *grandiflora* (large-flowered woolly meadowfoam), pursuant to the Endangered Species Act of 1973, as amended (Act). Both of these plants inhabit seasonally wet habitats known as vernal pools in the Agate Desert, an area north of the city of Medford (Jackson County), Oregon. *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* are known to occur at about 15 sites each, in the Agate Desert. This is based on the last observation of those sites, which vary year to year, depending on location and survey effort. *Lomatium cookii* is also known to occur on seasonally wet soils at about 21 sites in Josephine County, Oregon (referred to as the French Flat/Illinois Valley sites) which are immediately west of Jackson County. The continued existence of *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* is threatened primarily by destruction of their specialized habitat by industrial and residential development, including road and powerline construction and maintenance. Agricultural conversion, certain grazing practices, off-road vehicle use, and competition with non-native plants also contribute to population declines and local extirpations. *Lomatium cookii* sites in Josephine County are additionally threatened by habitat alteration associated with gold mining and woody species encroachment resulting from fire suppression. This rule implements Federal protection and recovery provisions of the Act to *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora*.

**DATES:** This rule is effective December 9, 2002.

**ADDRESSES:** The complete file for this rule is available for inspection, by appointment, during normal business hours at U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office, 2600 SE. 98th, Suite 100, Portland, OR 97266.

**FOR FURTHER INFORMATION CONTACT:** Kemper McMaster, Oregon Fish and Wildlife Office (see **ADDRESSES** section) (telephone 503/231-6179; facsimile 503/231-6195). Information regarding this designation is available in alternate formats upon request.

**SUPPLEMENTARY INFORMATION:****Background**

Vernal pools are seasonal wetlands that form only in regions where specialized soil and climatic conditions exist. During fall and winter rains, water collects in shallow depressions in areas where downward percolation of water is prevented by the presence of an impervious hard pan or clay pan layer below the soil surface (Keeley and Zedler 1998). Later in the spring when rains decrease and the weather warms, the water evaporates, and the pools generally disappear by May. These shallow depressions then remain relatively dry until late fall and early winter with the advent of greater precipitation and cooler temperatures. Vernal pools thus provide unusual "flood and drought" habitat conditions to which certain plants and animals have specifically adapted. *Lomatium cookii* (Cook's lomatium) and *Limnanthes floccosa* ssp. *grandiflora* (large-flowered woolly meadowfoam) are two such plant taxa which occur in vernal pool habitats in a small area of Jackson County, southwestern Oregon. *Lomatium cookii* also occurs in seasonally wet habitats at a few sites in Josephine County, the adjacent county to the west. The *Limnanthes floccosa* ssp. *grandiflora* is believed to be extant in only about 15 sites in Jackson County, while *Lomatium cookii* is known to occur at about 15 sites in Jackson and 21 sites in Josephine County (Oregon Natural Heritage Information Center (ONHIF) Database 2002; Mabel Jones, Bureau of Land Management, pers. comm., 2002).

**Lomatium cookii**

A perennial forb in the carrot family (Apiaceae), *Lomatium cookii* grows 1.5 to 5 decimeters (dm) (6 to 20 inches (in)) tall, from a slender, twisted taproot. Leaves are smooth, finely dissected, and strictly basal (growing directly above the taproot on the ground, not along the stems). One to four groups of clustered, pale yellow flowers produce boat-shaped fruits 8 to 13 millimeters (mm)

(0.3 to 0.5 in) long with thickened margins. The taproot can often branch at ground level to produce multiple stems. The branching taproot distinguishes *L. cookii* from *L. bradshawii* (Bradshaw's desert-parsley) that is indigenous to wet prairies from southern Willamette Valley, Oregon to southwest Washington, and *L. humile* (Caraway leaf lomatium) that is found in vernal pools in northern California (Kagan 1986). *Lomatium utriculatum* (Fine-leaved desert-parsley), found on mounds adjacent to pools in the Agate Desert, is distinguished from *L. cookii* by its more intensely yellow flowers, the different shape of its involucre bractlets (leaf-like structures below the flowers), and thin-winged fruits (Kagan 1986). *Lomatium tracyi* (Tracy's lomatium), occurring in California and the Illinois Valley, has a similar appearance to *L. cookii*, but *L. tracyi* has slender-margined fruits and can grow on dry sites. *Lomatium cookii* has boat or pumpkin-shaped fruits and grows on seasonally wet sites (Lincoln Constance, Prof. Emeritus, University of California, Berkeley, pers. comm., 1992). Recent genetic research has shown *L. cookii* to be most closely related to *L. bradshawii*. *Lomatium marginatum* (Butte desert-parsley) and probably *L. tracyi* are likely the next closely related species (M. Gitzendanner, University of Florida, pers. comm., 2002).

James Kagan first collected *Lomatium cookii* in 1981 from vernal pools in the Agate Desert, Jackson County, Oregon, and subsequently described the species (Kagan 1986). Additional populations were found at French Flat in the Illinois Valley, Josephine County, Oregon in 1988 (ONHIC database 2002). Plants in the French Flat/Illinois Valley sites grow on seasonally wet soils. Slight morphological differences exist between *L. cookii* populations in the Agate Desert and French Flat, but these differences are not considered significant enough to separate the species into subspecies. Recent genetic research found no evidence of significant genetic differences between the Agate Desert and French Flat *L. cookii* populations warranting the separation of the species into subspecies (M. Gitzendanner and P. Soltis, pers. comm., 2001).

**Limnanthes floccosa** ssp. *grandiflora*

A delicate annual in the meadowfoam, or false mermaid, family (Limnanthaceae), *Limnanthes floccosa* ssp. *grandiflora* grows 5 to 15 centimeters (cm) (2 to 6 in) tall, with 5-cm (2-in) leaves divided into five to nine segments. The stems and leaves are sparsely covered with short, fuzzy hairs. The flowers, and especially the sepals,

are densely covered with woolly hairs. Each of the five yellowish to white petals has two rows of hairs near their base.

In his monograph of the genus *Limnanthes*, Mason (1952) described three varieties of *Limnanthes floccosa*, but did not recognize the subspecies *grandiflora* as distinct. Based on her study of specimens grown under controlled conditions from field-collected seed, Arroyo (1973) elevated Mason's varieties to subspecies and described two additional subspecies, *californica* and *grandiflora*. Arroyo (1973) distinguished *grandiflora* from the other subspecies of *L. floccosa* by a combination of: petal length 7.5 to 9 mm (0.30 to 0.35 in); sepal length 8.5 to 9 mm (0.33 to 0.35 in); sepal pubescence (dense on inner surface and sparse to absent on outer surface); sparsely hairy stems and leaves; two lines of hairs at the petal base; relative flowering time; and, occurrence relative to soil moisture (Arroyo 1973). Over much of its range, the subspecies *grandiflora* is sympatric or closely related with *L. floccosa* ssp. *floccosa*; however, the subspecies *floccosa* grows on the slightly drier, outer fringes of the pools, whereas ssp. *grandiflora* grows on the relatively wetter, inner fringe of the pools (Arroyo 1973; D. Borgias, The Nature Conservancy (TNC), pers. comm., 1998).

#### Occurrences

*Limnanthes floccosa* ssp. *grandiflora* and *Lomatium cookii* both occur in and around vernal pools within an 83-square kilometer (km<sup>2</sup>) (32-square mile (mi<sup>2</sup>)) landform in southwestern Oregon known as the Agate Desert in Jackson County. Located on the floor of the Rogue River basin north of Medford, the Agate Desert is characterized by shallow, Agate-Winlow complex soils; a relative lack of trees; sparse prairie vegetation; and agates commonly found on the soil surface (Oregon Natural Heritage Program (ONHP) 1997).

*Lomatium cookii* also occurs in another area encompassing some 10-km<sup>2</sup> (4-mi<sup>2</sup>) in adjacent Josephine County. This area, referred to as French Flat, is located within the Illinois Valley near the Siskiyou Mountains. The 21 French Flat/Illinois Valley sites are located at: French Flat in south central Josephine County; Rough and Ready Creek Forest Wayside State Park, southwestern Josephine County; both east and west of Cave Junction, Oregon; east and southeast of Woodcock Mountain near Woodcock Creek; and a few scattered sites are northeast of Kerby, Oregon, near Reeves Creeks. These sites are collectively referred to as the French Flat/Illinois Valley sites.

The Agate Desert landscape consists of a gentle mound-swale topography with a characteristic appearance in aerial photographs that is sometimes referred to as "patterned ground." During the fall and winter rainy season, a striking pattern of shallow pools develops in the swales. These vary in size from 1 to 30 meters (m) (3 to 100 feet (ft)) across, and attain a maximum depth of about 30-cm (12-in) (ONHP 1997). Plants native to these pools, including *Limnanthes floccosa* ssp. *grandiflora* and *Lomatium cookii*, are specially adapted to grow, flower, and set seed during the short time that water is available in the spring, finishing their life cycle before the dry hot summers. Special assemblages of plants blooming in concentric rings toward the deepest part of the pools can be seen as soil moisture recedes throughout the spring (ONHP 1997). Native plants that occur with *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* in these vernal pools include: *Plagiobothrys bracteatus* (popcorn flower); *Juncus uncialis* (a rush); *Navaretia* spp. (Navaretia); *Limnanthes floccosa* ssp. *floccosa* (common woolly meadowfoam); *Deschampsia danthonides*; and *Tritelia hyacinthina* (Kagan 1987; D. Borgias, *in litt.* 2002).

The historical range for *Limnanthes floccosa* ssp. *grandiflora* and *Lomatium cookii* in the Agate Desert may have originally encompassed over 130 km<sup>2</sup> (50 mi<sup>2</sup>), within an 18-km (11-mi) radius of White City, Oregon (ONHP 1997). Vernal pool habitat, formerly widespread south of the Rogue River, is now almost completely eliminated (Brock 1987, ONHP 1997).

In the French Flat/Illinois Valley area, *Lomatium cookii* grows in wet meadow areas underlain with floodplain bench deposits that contain sufficient clay to form a clay pan at 60 to 90 cm (24 to 35 in) below the soil surface (U.S. Department of Agriculture 1983). The clay pan creates seasonally wet areas similar to the vernal pools of the Agate Desert, but mostly lacking the latter area's distinctive mound-swale topography. Common plants associated with *Lomatium cookii* in the French Flat/Illinois Valley sites include: *Danthonia californica* (oatgrass); *Plagiobothrys bracteatus*; *Horkelia congesta* (horkelia); *Calochortus uniflorus* (mariposa lily); and *Erythronium howellii* (trout lily). The surrounding forest contains *Pinus ponderosa* (Ponderosa pine) and *Pinus jeffreyi* (Jeffrey pine). Shrub species that grow on serpentine soils, such as *Ceanothus cuneatus* (buckbrush) and *Arctostaphylos* spp., are found within

the area of *Lomatium cookii* sites (Kaye 2001).

The historical range of *Lomatium cookii* in the French Flat/Illinois Valley area may have included seasonally wet meadows along the East Fork of the Illinois River. Fire suppression, grazing, residential development, and extensive gold mining (Shenon 1933) altered *Lomatium cookii* habitat in this area. However, some native perennial communities remain in wet meadows that were not affected by mining. Gold mining imminently threatens *Lomatium cookii* habitat at the French Flat site (Mark Mousseaux, BLM, pers. comm., 2002).

In the Agate Desert, there are believed to be about 15 sites containing *Lomatium cookii* and about 15 sites containing *Limnanthes floccosa* ssp. *grandiflora*. Mapped habitat compiled in 1998 for these species in the Agate Desert totals approximately 54 hectares (ha) (133 acres (ac)) for *Lomatium cookii* and 80 ha (198 ac) for *Limnanthes floccosa* ssp. *grandiflora* (ONHC database 2002). However, due to recent alteration and destruction of vernal pools in the Agate Desert (ONHP 1997), areas currently occupied by these plants is considerably less, an estimated 28 ha (69 ac) and 47 ha (116 ac) for *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora*, respectively (ONHC database 2002). The two plants occur in five of the same vernal pool systems constituting three different sites. At the French Flat/Illinois Valley sites, there are believed to be about 21 known locations of *Lomatium cookii*, occupying up to 61 ha (150 ac) of habitat, but many of these sites are very small (50 individuals or less), and their current status is not well known.

Two sites each of *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* occur entirely or partially within the Agate Desert Preserve (Preserve), owned by TNC. The Preserve contains the only large populations on private land specifically managed for the protection of these species.

Two known sites of each taxon are on State land, mainly in the Ken Denman Wildlife Area, where much of the habitat has been altered and planted to grasses. Two sites containing *Lomatium cookii* are located on land managed by Jackson County; one of these has been largely extirpated by construction of a baseball sports complex. Portions of two *Lomatium cookii* and three *Limnanthes floccosa* ssp. *grandiflora* sites are on lands owned by the City of Medford, within an area designated as the Whetstone Industrial Park. Portions of two *Limnanthes floccosa* ssp. *grandiflora* and four *Lomatium cookii*

sites are located in highway or powerline rights-of-way (ONHIC database 2002), where they are subject to herbicide spraying and other maintenance activities conducted by the State or counties. Fifteen sites containing *Lomatium cookii* in Josephine County are located partially or entirely on land managed by BLM. The remaining sites of *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* occur primarily on private land.

Each year, plant populations exhibit some natural variation in numbers, related primarily to temperature and rainfall conditions for that year. In general, numbers of annual plants, such as *Limnanthes floccosa* ssp. *grandiflora* may fluctuate more widely than those of perennial plants, such as *Lomatium cookii*. The year 2000 saw a large increase in the number of *Limnanthes floccosa* ssp. *grandiflora* plants due to the wet conditions, but in 2001, a dry year, the number of individuals plummeted in many areas. For example, on a protected site owned by TNC, one *Limnanthes floccosa* ssp. *grandiflora* occurrence declined from 68,000 in 2000 to 39,000 in 2001. However in 2002, even with average rainfall figures still below normal, the population increased back to about 63,000 plants. A site owned by the City of Medford, contained some 10,000 *Limnanthes floccosa* ssp. *grandiflora* individuals in the year 2000, while only 112 individuals were noted at this site in 2001 (D. Borgias, *in litt.* 2002). Year-to-year changes of this magnitude may be within the normal range of variation for this annual plant. However, it is possible that a number of consecutive drought years could eliminate some populations of *Limnanthes floccosa* ssp. *grandiflora*. In contrast, numbers of *Lomatium cookii* in the Agate Desert were generally stable or increased during 2000–2002 (D. Borgias, *in litt.* 2002).

Information regarding three status changes considered outside the natural range of year-to-year variation for these plants became available to the Service between May 15, 2000, when the proposed rule was published in the **Federal Register** (65 FR 30941) and January 14, 2002, when the comment period was reopened for these plants (67 FR 1712). Two of these involve increased population sizes at historical *Lomatium cookii* sites. One of these sites, on private land, was believed to contain some 6,000 plants historically. Surveys in 2000 and 2001 revealed an estimated 580,000 flowering individuals. Another population, located on City of Medford airport

property, that was previously estimated at some 1,000 plants, was found in 1999 to contain over 5,000 flowering *Lomatium cookii* plants. However, this larger population was bisected in 2001 by development of a new taxiway at this airport (K. O'Hara, David Evans & Associates, *in litt.* 2002). The third status change is that, in the year 2000, *Limnanthes floccosa* ssp. *grandiflora* was discovered at two new sites on private land. One comprises approximately 1,000 flowering individuals and the other about 170 individuals in three patches.

The 2000–2002 observations of these two vernal pool plant species must be considered within the context of the status and trends of their habitat overall. Recent studies of the Agate Desert vernal pool hydrology and vegetation indicate that no undisturbed vernal pool habitat remains (ONHP 1997, 1999). The latter study (ONHP 1999) indicates that the highest quality remaining Agate Desert vernal pool habitat, that with intact hydrology and altered vegetation, is now present on approximately 17.6 percent of the area that historically contained vernal pools. This is a decrease from the earlier study (ONHP 1997), cited in the May 15, 2000, proposed rule, which estimated that this highest quality remaining habitat occurred on 23.1 percent of the area. This reported decrease in the amount of best available habitat is partially due to better-refined mapping techniques, but there is evidence that additional land leveling also occurred between the two studies (ONHP 1999). Both reported and unreported fills of Agate Desert vernal pool wetlands are occurring continually (C. Tuss, Service biologist, pers. comm., 2001). ONHP (1999) reports that over 19 percent of Agate Desert vernal pool habitat has been leveled, and development (structures, roads, and other impermeable surfaces) has occurred on an additional 41 percent of this area (ONHP 1999). Thus, over 60 percent of the habitat of these plants in the Agate Desert has been destroyed, and none of the remaining habitat has escaped the invasion of weedy competitors. This compares with just under 60 percent habitat destruction reported in ONHP 1997 and in the proposed rule (65 FR 30941).

Recent evidence also indicates that non-native annual grasses, particularly medusahead (*Taeniatherum medusae*), are a greater problem than previously believed for *Lomatium cookii*, particularly in the Agate Desert (D. Borgias, *in litt.* 2002). Unlike native perennial bunchgrasses that originally occupied the area, annual grasses die back each year, creating a buildup of

thatch from the dead leaves that interferes with germination of *Lomatium cookii* seeds. Current observations indicate that, without control of annual grasses through mowing, grazing, or prescribed burns, *Lomatium cookii* populations tend to decrease over time, and could be extirpated within a relatively short timeframe due to this competition with non-native grasses (D. Borgias, *in litt.* 2002). In many cases, non-native plants have been purposefully planted for livestock and other reasons in the Agate Desert. For example, the Ken Denman Wildlife Reserve, encompassing some 720 ha (1,780 ac) of Agate Desert land, is managed by the State primarily for waterfowl production. Much of this Reserve has been covered with log deck debris, plowed in strips and planted with non-native wildlife food plants (Brock 1987).

Populations of *Lomatium cookii* in Josephine County are becoming even more highly threatened by off-road vehicle (ORV) use than they were at the time of the proposal. Over the past few years, gates erected by the BLM to direct ORV traffic away from *Lomatium cookii* habitat have been repeatedly vandalized, and the intrusion into these areas continues. Particularly in the springtime, when the ground is wet and muddy (and *Lomatium cookii* plants are flowering), ORVs cause major rutting and disruption of *Lomatium cookii* habitat (L. Mazzu, BLM botanist, pers. comm., 2001).

#### Previous Federal Action

Federal action on *Limnanthes floccosa* ssp. *grandiflora* began with section 12 of the Endangered Species Act (Act) of 1973 as amended (16 U.S.C. 1531 *et seq.*), which directed the Secretary of the Smithsonian Institution to prepare a report on plants considered to be endangered, threatened, or extinct. That report, designated as House Document No. 94–51, was presented to Congress on January 9, 1975. On July 1, 1975, we published a notice (40 FR 27823) accepting the Smithsonian Institution report as a petition within the context of section 4(c)(2) (now section 4(b)(3)(A)) of the Act. The notice further indicated our intention to review the status of plant species, which included *Limnanthes floccosa* ssp. *grandiflora*. On June 16, 1976, we published a proposed rule, pursuant to section 4 of the Act, proposing endangered status for approximately 1,700 vascular plant species, including *Limnanthes floccosa* ssp. *grandiflora* (41 FR 24523).

In 1978, amendments to the Act required that all proposals over two

years old be withdrawn. A 1 year grace period was given to proposals already over 2 years old. On December 10, 1979, we published a notice in the **Federal Register** (44 FR 70796) withdrawing that portion of the June 16, 1976, proposal that had not been made final, including the proposal to list *Limnanthes floccosa* ssp. *grandiflora*. We published an updated notice of review (NOR) for plants on December 15, 1980 (50 FR 82480), including *Limnanthes floccosa* ssp. *grandiflora* as a category 1 candidate species. At the time, category 1 species were defined as we presently define candidates, *i.e.*, those species for which we have on file substantial information on biological vulnerability and threats to support the preparation of proposals to list as threatened or endangered. Category 1 status was maintained for *Limnanthes floccosa* ssp. *grandiflora* in the November 28, 1983, supplement to the notice (48 FR 53657). However, in the September 27, 1985, NOR (50 FR 39526), the status of this taxon was changed to category 2. Category 2 was defined at the time to include taxa for which data in our possession indicated that listing was possibly appropriate, but for which substantial information on biological vulnerability and threats was not currently known or on file to support proposed rules. Category 2 status was maintained for *Limnanthes floccosa* ssp. *grandiflora* in the NOR published on February 21, 1990 (55 FR 6184). *Lomatium cookii* was first included in that 1990 NOR as a category 1 candidate species. In the September 30, 1993, NOR (58 FR 51144), the status of both taxa remained unchanged.

Upon publication of the February 28, 1996, NOR (61 FR 7596), we ceased using category designations and included as candidates only those taxa previously designated as category 1, *i.e.*, those for which we had on file sufficient information to support listing proposals. Accordingly, *Lomatium cookii* was maintained as a candidate species, but *Limnanthes floccosa* ssp. *grandiflora* was not. The plant NOR, published on September 19, 1997 (62 FR 49398), includes both *Limnanthes floccosa* ssp. *grandiflora* and *Lomatium cookii* as candidate species. The October 25, 1999, (64 FR 57534) and June 13, 2002 (67 FR 40657) NORs list both species as candidates.

Section 4(b)(3)(B) of the Act requires the Secretary to make certain findings on pending petitions within 12 months of their receipt. Section 2(b)(1) of the 1982 amendments further requires that all petitions pending on October 13, 1982, be treated as having been newly submitted on that date. This was the

case for *Limnanthes floccosa* ssp. *grandiflora* because of our acceptance of the 1975 Smithsonian Report as a petition. On October 13, 1983, we found that the petitioned listing of this species was warranted, but precluded by other pending listing actions, in accordance with section 4(b)(3)(B)(iii) of the Act. Notice of this finding was published on January 20, 1984 (49 FR 2485). Such a finding requires the petition to be reviewed annually pursuant to section 4(b)(3)(C)(i) of the Act. For the purpose of making these annual petition findings, we made an administrative decision to treat all candidate plants as if their listings had been petitioned prior to 1982. Therefore, the "warranted but precluded" finding also applies to *Lomatium cookii*, which first appeared on the February 21, 1990, NOR. The warranted but precluded finding for both species has been reviewed annually through 1997. Publication of the proposed listing rule for these two species constituted the final finding for the petitioned action.

On May 15, 2000, the Service published a proposed rule to list *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* as endangered species and requested public comment for 60 days (65 FR 30941). On August 28, 2001, Siskiyou Regional Educational Project filed a citizen suit alleging that the Service had failed to make a timely final determination on the listing of these two plants, consistent with the timeframes set forth in section 4 of the Act (*Siskiyou Regional Educational Project v. Norton*, Civil No. 01-1208-KI (D. Ore)). We entered into a settlement agreement with the plaintiff and agreed to submit a final listing decision for publication in the **Federal Register** on or before October 31, 2002. On January 14, 2002, the Service reopened the comment period on the proposed endangered status of the two plant species to seek updated information on the status, abundance, and distribution of these plants, as well as to provide updated information acquired by the Service since the proposed rule was published. This comment period closed on March 15, 2002 (67 FR 1712). This final rule is made in accordance with the judicially approved settlement agreement.

#### Summary of Comments and Recommendations

We contacted Federal and State agencies, county governments, scientific organizations, and other interested parties and asked that they comment. We requested that all interested parties submit factual reports or information that might contribute to the

development of this final rule. We received a total of 19 comment letters over two comment periods. Four letters were received during the first comment period and fifteen letters were received during the second comment period. Of the nineteen total responses, sixteen were in support and three opposed the listing action. Two responses were from groups that commented during both comment periods, expressing the same or similar viewpoints in both letters. No comments were received from Federal, State, or community government agencies. All responses were submitted by individuals or groups.

This final rule reflects the comments and information we received during the comment period. We addressed opposing comments and other substantive comments concerning the rule below. Comments of a similar nature or point are grouped together (referred to as issues for the purpose of this summary) below, along with our response to each.

*Issue 1:* The proposed listing rule was not based on the best scientific information available and was not from independent sources.

*Our Response:* We thoroughly reviewed all available scientific data. We sought and reviewed historic and recent publications and unpublished reports concerning *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* and other related species, as well as literature documenting the decline of the vernal pool ecosystem in general. This included reliable unpublished reports, non-literature documentation, and personal communications with experts. The public reviewed the proposed rule and an update on the species' status when the comment period was reopened. The proposed rule was peer reviewed according to our policy (see "Peer Review" section). In the process of updating the proposed rule, some citations may have changed due to publication, in peer reviewed journals, of some data originally cited as personal communications, unpublished manuscripts, or thesis. We used our best professional judgment and based our decision on the best scientific and commercial data available, as required by section 4(b)(1) of the Act.

*Issue 2:* The effects of cattle grazing are not based on research demonstrating the positive and negative effects of cattle grazing and seem to be contradictory.

*Our Response:* Research conducted by TNC included monitored plots of *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* populations on the Agate Desert. The results indicated that both *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora*

populations increased in the plots where livestock grazing was excluded. Ungrazed plots containing *Limnanthes floccosa* ssp. *grandiflora* continued to have population increases over time. However, *Lomatium cookii* population gains of the first year were lost by the third year when thatch build-up impeded plant growth and seedling abundance (D. Borgias, *in litt.* 2002).

The perceived ambiguity between the positive and negative effects of grazing on these species may lie in how the effects differ depending on the time of year, intensity, and duration of grazing within vernal pools. Prevailing livestock practices on the Agate Desert are considered "moderate" grazing. In Jackson County, 37,000 head of cattle and 3,000 head of sheep were pastured in 2000. The Natural Resources Conservation Service, U.S. Department of Agriculture, soil survey for Jackson County (Soil Conservation Service 1993) determined that the winter production on the Agate Desert soils amounts to 362 kilograms (kg) (800 pounds (lbs.)) of forage per acre, annually. This amount of forage is just above the estimated requirements of a cow/calf pair for a month (or 353 kg "animal unit month" or 12 kg per day) (780 lbs. "animal unit month" or 26 lbs. per day). Stocking rates in the Agate Desert are about one cow/calf pair for each 2.5 to 4 or more acres and typically grazing occurs in the late fall, winter and early spring (D. Borgias, *in litt.* 2002). These are averages and can be affected by changes in weather (e.g., above or below normal rainfall). However, even moderate grazing can affect *Limnanthes floccosa* ssp. *grandiflora* and *Lomatium cookii* populations either positively and/or negatively since time of year and duration must be considered.

Preliminary survey results indicate early fall grazing may be beneficial to *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* species through reductions in the populations of non-native competitors. Spring grazing may be detrimental to these species' populations from the direct effects of herbivory and trampling (D. Borgias, *in litt.* 2002; Kagan *in litt.* 2002). Precise management recommendations to benefit these species are in development while research continues.

*Issue 3:* The proposed rule ignores protections already in place.

*Our Response:* *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* are listed by the State of Oregon as State endangered species under the Oregon Endangered Species Act. Despite the State listing, population losses of *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* continue to

occur. The inadequacy of existing Federal laws and regulations to protect these species are addressed in greater detail in the section titled, "Summary of Factors Affecting the Species."

*Issue 4:* The proposed rule does not address the economic impacts to the surrounding communities, especially the agricultural communities.

*Our Response:* The Act requires us to base our listing decisions on the best scientific and commercial information available, without regard to the effects, including economic effects, of listing a species. (See the section titled "Summary of Factors Affecting the Species"). However, the range of these species overlaps considerably with the range of the federally-listed vernal pool fairy shrimp, *Branchinecta lynchi*, in southwest Oregon. Actions on Federal property or proposed actions that have a Federal nexus are already required to conduct section 7 consultations if their actions may affect listed species. The listing of *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* should not lead to greater restrictions on privately owned property as the Endangered Species Act controls take of endangered plants on private land only when it involves knowing violation of state law. Economic impacts will be analyzed in detail during the process of designating critical habitat.

*Issue 5:* Rainfall and weather conditions were not discussed to explain population declines.

*Our Response:* When the proposed rule was published, May 15, 2000, (65 FR 30941) it contained the best available information to us on the status of the species at that time. Additional information on the species was solicited from experts, and public comments were sought to update information on the status, abundance, and distribution of these plants. The proposed rule to reopen the comment period was published in the **Federal Register** on January 14, 2002 (67 FR 1712). It contained updated population numbers and addressed the year to year changes in population size from the effects of annually fluctuating environmental factors such as rainfall and weather conditions.

*Issue 6:* Critical habitat was not designated.

*Our Response:* The Northwest Environmental Defense Center wrote in support of the listing of *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* and recommended that critical habitat be designated for these two species. Due to funding constraints we are unable to designate critical habitat at this time. We will prepare a critical habitat determination in the

future as resources allow. (See Critical Habitat section).

*Issue 7:* Fire, used as an alternative to grazing to remove thatch, would kill plants or overly stress the plants, damaging crown and roots.

*Our Response:* Research results on the effects of prescribed burning on the Agate Desert have shown that early summer fire is neutral to *Limnanthes floccosa* ssp. *grandiflora* and beneficial toward *Lomatium cookii*. Seedling recruitment in the second year post burn, and juvenile recruitment in the third year post burn far surpassed that in unburned units. The crowns are dry at the time when fire can carry through such stands, and the roots are insulated from the heat generated by the short lasting fuels of a grassland fire (D. Borgias, *in litt.* 2002).

*Issue 8:* Land that is totally protected could result in decreased population numbers. Because *Lomatium cookii* repopulated an area that was leveled in the 1940's, this indicates that this species is an "early invader."

*Our Response:* Populations of *Lomatium cookii* have not been shown to increase with disturbance. Habitat modification has been shown to be a leading contributor to population declines. One explanation for the "repopulation" of the Antelope Road site may be that the seeds lying dormant in the soil were stimulated to grow by the immediate hydrological conditions. Vernal pool species have very specialized conditions in which they have evolved and often have physical structures on the parent plant to hold the seed onto the plant. Almost a fifth of vernal pool species have mechanisms or structures that restrict dispersal (Zedler 1990). This insures the seed will be deposited in the same area where the parent plant successfully reproduced. Dispersal outside the vernal pool environment is not an advantage to highly specialized vernal pool plants because dispersal would increase the chance of landing in inhospitable habitat.

*Issue 9:* The species range may be wider than acknowledged and is not being looked at on a broad enough scale or on other soils.

*Our Response:* Many amateur and professional botanists, trained in plant taxonomy and the geographic distribution of plant species, devote large amounts of their time collecting and identifying plants. These experts look specifically for range extensions of known species and species new to science (F. Lang, Prof. Emeritus, Southern Oregon University, pers. comm., 2000). Factors controlling the distribution of *Lomatium cookii* and the

*Limnanthes floccosa* ssp. *grandiflora* include the local geological and hydrological conditions. The seasonal wetland habitat inhibits plant species not specifically adapted to the wet/dry habitat (D. Borgias, pers. comm., 2000).

#### Peer Review

In accordance with our July 1, 1994 (59 FR 34270), Interagency Cooperative Policy on Peer Review, we requested the expert opinion of at least three independent specialists regarding pertinent scientific or commercial data and assumptions relating to supportive biological and ecological information in the proposed rule. The purpose of such a review is to ensure that the listing decision is based on scientifically sound data, assumptions and analyses, including input of appropriate experts and specialists.

We requested peer review from six individuals who possess expertise on *Lomatium cookii* or *Limnanthes floccosa* ssp. *grandiflora* natural history and ecology to review the proposed rule and provide any relevant scientific data relating to taxonomy, distribution, or to the supporting biological data used in our analyses of the listing factors. We received responses from four peer reviewers. All expressed their belief that the data supported the protection of the two plant species under the protection of the Act. We have incorporated their comments into the final rule, as appropriate, and briefly summarized their observations below.

All four peer reviewers agreed with our conclusion to list these species as endangered. Each supported the scientific basis for our decision and addressed the urgency of the threats to the species. The peer reviewers' comments included suggestions to correct technical errors, clarify differences between *Limnanthes* subspecies, and a correction regarding an absent referenced citation. The peer reviewers' suggested changes are noted below and/or have been incorporated into this final rule document as appropriate.

#### Summary of Changes from the Proposed Rule and Reopening of Comment Period

An error was found in our taxonomic description of *Limnanthes floccosa* ssp. *grandiflora* published in the proposed rule which distinguishes it from other *Limnanthes* subspecies. The corrected description and the proper literature citation have been incorporated in this final rule.

Population data regarding the status of both taxa was supplied to us by the ONHP which transferred their data to

Oregon State University Institute for Natural Resources. As of June 28, 2002, the organization name was changed to Oregon Natural Heritage Information Center. The change in citation has been noted in this final rule.

A peer reviewer suggested a name change to differentiate three *Lomatium cookii* occurrence sites collectively referred to as the French Flat occurrence located in the Illinois Valley. The peer reviewer believes there is the potential for confusion because the southernmost site is located in an area known as French Flat, while the other populations are further north, some adjacent to Cave Junction and others located at the westernmost edge of the Illinois Valley or further north. Additional descriptors have been added where appropriate to define the specific area being addressed or are referred to as French Flat/Illinois Valley sites in this final rule.

Special concern was expressed regarding the population of *Lomatium cookii* located on the west side of the Illinois Valley. Due to a large wildfire just west of the Illinois Valley, in the Kalmiopsis Wilderness Area, fire suppression related activities, such as fireline construction or the use of heavy equipment, may be a new additional threat to *Lomatium cookii*. Because the effects of the suppression action will not be known until after the publication of the final rule, these potential threats are not likely to reduce the need to list the species as endangered and will not be addressed in the final rule.

#### Summary of Factors Affecting the Species

Section 4 of the Act and its implementing regulations (50 CFR part 424) set forth the procedures for adding species to the Federal lists. A species may be determined to be endangered or threatened due to one or more of the five factors described in section 4(a)(1). These factors and their application to *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* are as follows:

A. *The present or threatened destruction, modification, or curtailment of its habitat or range.* The vernal pools and other seasonally wet soils where *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* grow are susceptible to various land-use disturbances. The primary threats to the vernal pool habitat of *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* in the Agate Desert are industrial, commercial, and residential development and related road and utilities construction and maintenance, including mowing, herbicide spraying, firebreak construction, and hydrologic alteration, particularly the conversion of

non-irrigated land to irrigated agricultural use (D. Borgias, *in litt.* 2002). Competition, particularly from introduced annual grass species (*see* Factor E), and grazing, especially during the fall and winter months, can also reduce or eliminate populations of these species (Kagan 1987; James Kagan, ONHP, pers. comm., 1998; D. Borgias, *in litt.* 2002). Josephine County populations of *Lomatium cookii* are additionally threatened by proposed gold mining operations, the uncontrolled use of ORVs in the areas occupied by this plant, timber sale activities, and tree encroachment into open areas associated with fire suppression.

Human-related impacts to vernal pool habitat in the Agate Desert began in the mid-1800s, when the area was grazed by cattle and sheep (ONHP 1997). In 1905, a land speculation company acquired a large part of the area and attempted to establish pear orchards by constructing an extensive system of shallow irrigation ditches and in some cases, blasting through the hardpan layer. This failed, and grazing continued as the dominant use until 1942, when the U.S. military purchased a large segment of the Agate Desert for a training center. When this center was decommissioned in 1946, a 158-ha (390-ac) portion of the area west of Highway 62 was purchased by a timber industry consortium, and a timber mill industrial center began to grow (ONHP 1997). Other industries were drawn to the area, and around 1980, the City of Medford established the 290-ha (720-ac) Whetstone Industrial Park. Much of this area has been leveled and compacted, destroying any vernal pools, although some potential vernal pool habitat remains in the area (ONHP 1997). Another area west of Highway 62, encompassing some 728-ha (1,800-ac), is State land, managed by the Oregon Department of Fish and Wildlife, as the Ken Denman Wildlife Area (ONHP 1997). Devoted to waterfowl production, much of this area has been covered with log deck debris, plowed in strips, and planted with non-native wildlife food plants (Brock 1987; J. Kagan, pers. comm., 1997).

East of Highway 62, much of the Agate Desert landform was subdivided into 2-ha (5-ac) homesites in the 1950s, many of which were leveled. This area harbors some intact vernal pool habitat (Brock 1987, ONHP 1997).

The southernmost section of the historical Agate Desert has been largely modified by cultivation for pasture. The Medford-Jackson County Airport occupies some 374 ha (925 ac) at the southern limit of the landform. A Foreign Trade Zone at this airport has

been under development (Bern Case, Director, Medford Jackson County Airport, pers. comm., 2002). However, construction associated with this facility has not directly impacted *Lomatium cookii* plants at the site to date.

Jackson County is experiencing a rapid human population increase. Between 1990 and 2000 the population of Jackson County increased 23.8 percent (U.S. Department of Commerce, Census Bureau 2000). It is the seventh fastest growing county in Oregon, and the majority of this growth is centered in the Medford area (Portland State University, Population Research Center, 2000). Much development has occurred in and around *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* habitat near the City of Medford and White City.

A habitat assessment map and report (ONHP 1997) indicated that residential, commercial and industrial development, along with land leveling, have claimed nearly 60 percent of the historic Agate Desert vernal pool landscape. According to this assessment, no pristine vernal pool habitat remains due to the presence of introduced plants throughout the Agate Desert. The highest quality remaining vernal pool habitat occurs on 23 percent of the landform. By overlaying ONHIC plant occurrence polygons on the habitat assessment base map, one can determine that over 50 percent of *Lomatium cookii* sites and nearly 50 percent of *Limnanthes floccosa* ssp. *grandiflora* sites originally mapped in the Agate Desert during the 1980's have been severely altered. Habitat alterations in the Agate Desert are continuing as indicated by numerous examples below.

In 1992, a sewage line was built by the City of Medford across the southwest corner of the Cardinal Avenue site in the Agate Desert. A large department store was built on land adjacent to this site. The Cardinal Avenue site, with a population of approximately 140 *Lomatium cookii* individuals, was graded in January 1993 (J. Kagan, pers. comm., 1998). The landowner was contacted by TNC to request permission to remove some plants for experimental transplantation. The landowner agreed to allow removal of the plants, but TNC was only able to obtain one individual prior to completion of grading, and was unable to successfully transplant the individual (D. Borgias, pers. comm., 1999).

In 1986, private lands with 4 ha (10 ac) of *Lomatium cookii* habitat and some 500 individual plants were developed into a sports park complex by Jackson County with Federal Land and Water Conservation Funds. The area was

leveled and playing fields and parking lots were constructed. Approximately 80 percent of the available habitat was removed at this site. Inventory of this site in 1992 documented 150 plants at this location (Kagan 1992). Based on preliminary surveys in 1997, these plants may have since become extirpated (J. Kagan, pers. comm., 1998).

Another project related to development in the Agate Desert area that adversely affected *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* habitat is a 500-kilovolt powerline that Pacific Power and Light constructed in June 1992 (Gerald Nielsen, Pacific Power Co., pers. comm., 1992). The powerline directly affected 7.5 ha (18.5 ac) out of a total of 80 ha (198 ac), or 9.3 percent, of the existing *Limnanthes floccosa* ssp. *grandiflora* habitat in the Agate Desert. About 2.6 ha (6.4 ac), out of a total of 54 ha (133 ac), or 4.8 percent, of the existing *Lomatium cookii* habitat was affected in the Agate Desert. Maintenance activities along the powerline corridor may continue to adversely impact *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* habitat.

Two sites where *Limnanthes floccosa* ssp. *grandiflora* was collected in 1969 have been destroyed, one by construction of a mill, and another 1.6 ha (4.0 ac) occurrence by construction of a large industrial plant (J. Kagan, pers. comm., 1997). A number of additional sites with *Limnanthes floccosa* ssp. *grandiflora* occurrences (50 percent of the total extant) have been severely degraded, as follows (J. Kagan, pers. comm., 1998): (1) One site, at the intersection of three major roads, has been reduced to a few fragmented patches. The site is ringed with development with two fast-food restaurants on one side, a powerline on another, and residential development to the east. The isolation of this site may eventually result in the loss of these plants especially if the number of individual plants is too small to be self-sustaining; (2) another site occurs at the corner of a building adjacent to railroad tracks and has been reduced to approximately 5 square meters (54-square feet), again, leaving no avenue for site conservation; (3) a sewer plant for the City of Medford has reduced the type locality for this taxon to two small pools; (4) the two sites on Denman Wildlife Area have been leveled and scraped for planting tall wheatgrass as wildlife food. In 1985, *Limnanthes floccosa* ssp. *grandiflora* was estimated to cover some 16 ha (40 ac) at one of these sites, but by 1993, coverage had been reduced to 1.2 ha (3 ac), a 92 percent reduction; and (5) more

recently, over two-thirds of another site (29.5 ha (73 ac) in size) has been leveled, grazed, and piped for irrigation.

In the early 1990's, a proposed highway connector between Interstate 5 and Highway 140 across the Agate Desert would have impacted a number of sites of both *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora*. Although that specific project is no longer under consideration, the Oregon Department of Transportation (ODOT) is currently considering a number of alternatives for moving traffic through the area, some of which could impact vernal pools. An additional potential impact to vernal pool habitat from the highway project is future industrial and residential development that may result from increased access to the area from Interstate 5.

The only *Lomatium cookii* and/or *Limnanthes floccosa* ssp. *grandiflora* habitat currently protected from industrial, residential, or commercial development in the Agate Desert area is the habitat located on the Agate Desert, Whetstone Savanna, and Rogue River Plains Preserves and managed by TNC. These three areas encompass approximately 21 ha, 20 ha, and 53 ha (53, 50, and 132 acres), respectively. The Rogue River Plains Preserve only contains *Limnanthes floccosa* ssp. *grandiflora*, while the other two properties also contain *Lomatium cookii*.

The Agate Desert Preserve, supporting the largest populations of *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora*, is located in an area that may soon be surrounded by commercial and industrial developed land. Although the Preserve land is protected, the alteration of land adjacent to the Preserve could disrupt the hydrologic processes within the Preserve. For example, a road was built along the southern edge of the Preserve in 1988. Water runs off the road into a ditch after rainstorms, where it would have normally remained in pools in the Preserve. This ditch drained several of the vernal pools on the southern portion of the Preserve, further reducing approximately 0.2 ha (0.5 ac) of vernal pools available to *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* in the Preserve (J. Kagan, pers. comm., 1998). In addition, potential habitat that borders the west side of the Preserve was partitioned and developed into industrial property in January 1993 (J. Kagan, pers. comm., 1998). Hydrology and available management (e.g., prescribed burning) were also altered by the development.

During development of land west of the Preserve, land-moving equipment

trespassed onto a portion of the Preserve. At the time, vernal pools on the Preserve had no fences or physical barriers to prevent trespass by ORVs or earth-moving equipment (D. Borgias, pers. comm., 1998).

To summarize these plants' current status in the Agate Desert, existing *Limnanthes floccosa* ssp. *grandiflora* plant numbers are relatively stable. However, they do vary considerably from year to year, likely being influenced by seasonal precipitation levels. Two new sites were recorded in 2000, with one site containing about 1,000 plants and the other about 170 in that year. Numbers of *Lomatium cookii* plants over the past few years are stable to increasing in the Agate Desert. One site exhibited a dramatic increase from an average of about 5,500 plants to over 500,000 plants in 2001 in a 6 ha (15 acre) area on private land. Habitat originally mapped for these species and believed to be occupied in the Agate Desert totaled some 54 ha (133 ac) for *Lomatium cookii* and 80 ha (198 ac) for *Limnanthes floccosa* ssp. *grandiflora* (ONHP Database 1998). However, habitat currently occupied by these plants is considerably less, an estimated 28 ha (69 ac) and 47 ha (116 ac) for *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora*, respectively (ONHIC database 2002). Thus, while some populations show local increases in abundance, overall the ranges of both plants have declined by roughly 50 percent in the Agate Desert, and habitat loss or degradation continues to be a significant threat to these species.

Sites containing *Lomatium cookii* in Josephine County in the French Flat and Illinois Valley regions are also subject to numerous threats. The only habitat for this plant on federally-owned land is located near French Flat and managed by BLM. Gold mining operations threaten approximately 10 percent of the federally-owned portion of this habitat. Approximately 600 plants occur in the area threatened by mining. Mining activities could result in direct habitat loss for the species and limit recovery at this site. If existing mining claims on BLM lands are pursued, habitat destruction would be substantially increased beyond 20 percent.

Indirect effects from mining operations in French Flat could also occur due to off-site activities such as road construction, which are likely to alter hydrologic cycles at *Lomatium cookii* habitat sites. These changes could cause seasonally saturated soils to drain and could impede seed germination or lead to death of seedlings and mature plants. Currently, no safeguards exist to

protect habitat in the French Flat area from mining operations.

ORV use damages other *Lomatium cookii* habitat on BLM-managed lands at French Flat. In 1992, ORV use damaged a large wet meadow in this area, creating ruts that punctured the clay pan layer and allowed soil moisture to drain from the wet meadow habitat (Linda Knight, pers. comm., 1992). Heavy ORV use of *Lomatium cookii* habitat in the area is continuing. To date, ORV use has caused puncturing and draining of at least 6 ha (15 ac) of meadow habitat in the French Flat population. As a result, at least 20 percent of the remaining *Lomatium cookii* habitat on federally managed land has been destroyed. BLM has gated part of the area and closed access roads to discourage ORV trespass, but restricting access to this large open area is difficult (Linda Mazzu, BLM, pers. comm., 1998; Joan Seevers, Medford District BLM, pers. comm., 1998; Mark Mousseaux, Medford District BLM, pers. comm., 2002).

The Oregon Parks & Recreation Department has undertaken protective measures for *Lomatium cookii* in Illinois River Forks State Park. Their entrance road was recently fenced to exclude ORV use from areas near the road where this plant occurs.

Several sites containing *Lomatium cookii* at Indian Hill and Rough and Ready Creek are threatened by encroachment of woody species from the surrounding forest. The invasion of these trees and shrubs, which could shade out *Lomatium cookii* plants and decrease available water, is likely associated with fire suppression activities (L. Mazzu, pers. comm., 1998).

Residential development and road building in the Illinois Valley also threaten populations of *Lomatium cookii*. For example, construction of a residential driveway and roto-tilling on private ground extirpated a Josephine County population of this species in 1991 (J. Kagan, pers. comm., 1998).

Therefore, the on-going and future threats associated with mining, ORV use, and development may lead to continued loss of individual plants and/or habitat throughout the Illinois Valley.

B. *Overutilization for commercial, recreational, scientific, or educational purposes.* *Lomatium cookii* has no known commercial, recreational, or scientific use at this time. There is no evidence of overcollection by botanists and/or horticulturists at this time. However, *Limnanthes floccosa* ssp. *grandiflora* may be of interest to collectors and researchers since some members of the genus have the potential to become important new crop plants

because they possess a seed oil which exhibits stability at high temperature and pressure. This oil could be used as a lubricant for various industrial uses (Savonen, *in litt.* 1998). *Limnanthes alba*, a wildflower found in California, is now poised to become a multi-million dollar crop in the Willamette Valley of Oregon for its oil (Savonen *in litt.* 1998). To domesticate the species and improve strains, seeds have been, and continue to be, collected from wild *Limnanthes alba*, as well as other *Limnanthes* species, including *Limnanthes floccosa* ssp. *grandiflora* to cross with the domesticated plants. *Limnanthes floccosa* ssp. *grandiflora* was crossed with *Limnanthes alba* to develop a self-pollinating *Limnanthes* variety (Jolliff *et al.* 1984). This species may continue to be sought for collection, if its rarity and population locations become well known. The relatively few remaining populations of the species are easily accessed and so small that even limited collecting pressure could have significant adverse impacts.

About 80 percent of the *Lomatium cookii* sites and 40 percent of the *Limnanthes floccosa* ssp. *grandiflora* sites consist of 2 ha (5 ac) of land or less. Easy access exists to these plants in the Agate Desert, and to *Lomatium cookii* sites near Cave Junction, since they occur near heavily traveled roads. Most sites for these species lack fences or other measures to discourage collectors or others from accessing the sites.

C. *Disease or predation.* No data exists to substantiate whether disease threatens *Lomatium cookii* or *Limnanthes floccosa* ssp. *grandiflora*. An unidentified *Ascomycete* fungus was responsible for the mortality of four *Lomatium cookii* plants in a single population (Kagan 1987). Since this fungus has not been observed at other sites, no conclusions can be drawn regarding the threat of the fungus to the species as a whole. Predation has been observed on *Lomatium cookii* from gophers, other rodents, and black-tailed jackrabbits (*Lepus californicus*) feeding on vegetative portions, wireworms and other insect larvae eating the roots of plants, and insects preying on *Lomatium cookii* seeds (Kagan 1987).

Cattle grazing can cause substantial impacts to *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora*. Tracts heavily grazed from October to April are less likely to support these taxa. The majority of the seasonal growth occurs during the winter. If the plants are grazed during fall and winter and spring, they are less likely to survive to produce seed in the spring or early summer (Brock 1987).



The effects of cattle grazing on *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* are exemplified by the history of land use on what is now TNC's Agate Desert Preserve. Prior to TNC's acquisition of this tract, the area was grazed for a number of years. An estimated 480 individuals of *Limnanthes floccosa* ssp. *grandiflora* were noted at this site between 1984–1987. Cattle were removed in 1987, and in 1988, the *Limnanthes floccosa* ssp. *grandiflora* population had soared to over 7,000 individuals. By 1991, the population had grown to an estimated 17,600 plants, and in 2002 was at over 63,000 and is stable or increasing (D. Borgias, *in litt.* 2002). Despite the potential deleterious effects of fall to spring cattle grazing, carefully managed and timed grazing may actually reduce competition with introduced grass species (see Factor E).

D. *The inadequacy of existing regulatory mechanisms.* The majority of *Lomatium cookii* and all *Limnanthes floccosa* ssp. *grandiflora* plants grow in association with vernal pools that can contain water from November to March (Brock 1987). In accordance with the Clean Water Act of 1977 (91 Stat. 1566), these vernal pools are classified as wetlands, since they meet the requirement of containing water for at least two weeks during the growing season. Under section 404 of the Clean Water Act, the U.S. Army Corps of Engineers (Corps) regulates discharge of fill into waters of the United States, including wetlands (33 CFR parts 320–330). To be in compliance with the Clean Water Act, parties are generally required to notify the Corps prior to undertaking any activity that would result in the discharge of fill, including soil, into wetlands under the Corps' jurisdiction. An individual permit is required in many cases.

A ruling by the Supreme Court (*Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*, 148 L. Ed. 2d. 576 (2001)) on January 9, 2001, involved statutory challenges to the assertion of Clean Water Act jurisdiction over isolated, non-navigable, intrastate waters used as habitat by migratory birds. This Supreme Court ruling provided some limitations to regulatory jurisdiction of isolated, non-navigable waters under the Clean Water Act. Based on our experience with the Portland District's jurisdictional determinations since the SWANCC ruling, we anticipate that the majority of the vernal pools occupied by these species will still be regulated under the jurisdiction of the Corps pursuant to section 404 of the Clean Water Act.

The Nationwide Permit Program (33 CFR Part 330) was recently revised in January 2002 (67 FR 2020) and became effective March 18, 2002. The Nationwide Permit Program was designed to eliminate the need for individual permits, requiring agency review and public comment, for some activities involving relatively small amounts of discharge or fill into waters of the U.S. Nationwide Permit (NWP) number 14, addressing liner transportation projects; NWP 39, addressing residential, commercial, and institutional developments; NWP 40, addressing agricultural activities; NWP 42, addressing recreational activities; and NWP 44, addressing mining activities allow the discharge of fill affecting up to only 0.2 ha (0.5 ac) of non-tidal wetlands. For NWPs 14, 39, 40, and 42 the permittee must notify the Corps prior to discharge if the discharge causes the loss of greater than 0.04-ha (0.10-ac) of non-tidal wetland and must generally provide a compensatory mitigation proposal to offset the permanent loss of wetlands. Under NWP 44, the permittee must avoid and minimize discharges into wetlands to the maximum extent practicable, and the Corps must be notified in a written statement detailing compliance with this provision.

The Clean Water Act does not regulate drainage of wetlands unless that action results in the discharge of dredged or fill material into a wetland. In addition, normal farming, silviculture, and ranching activities do not require permits for discharge or fill activities (see 33 CFR 323.4).

Most *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* sites occupy wetlands less than a few hectares in size. Therefore, activities resulting in the filling of even less than 0.2 ha (0.5 ac) of vernal pools can have a measurable effect on their habitats. While compensatory mitigation may be required, vernal pools are location specific and cannot likely be created, but only restored. Currently, the Corps is not required to request consultation on fill activities which may affect *Lomatium cookii*, *Limnanthes floccosa* ssp. *grandiflora*, or other unlisted species. When *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* are listed, section 7 consultation under the Act would be required by the Nationwide Permit conditions prior to the Corps' authorization of an activity that would affect the species. The Portland District of the Corps has issued General Regulatory Conditions that accompany all nationwide permits. One of these conditions indicates that if at any time the permittee becomes aware

of the presence of a listed species within the authorized project area, all work activity must cease immediately, the Corps must be notified, and work must not resume until approved by the Corps. When *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* are listed, these regulatory conditions will offer some Federal protection for them in the ephemeral wetlands they occupy.

State of Oregon wetland laws do not protect many *Lomatium cookii* or *Limnanthes floccosa* ssp. *grandiflora* sites due to their small size and their susceptibility to small fills. The Removal-Fill Law of 1989 (ORS 196.800–196.990), administered by the Oregon Division of State Lands, does not regulate activities that involve less than 38 cubic meters (50 cubic yards) of fill. Such an amount of fill could seriously impact many smaller vernal pool wetlands in which *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* occur.

*Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* are listed as endangered species under the State of Oregon threatened or endangered plant law (OAR 603–073–0070). In general, State-listed plant populations on private lands are afforded very little protection by this law. The law prohibits the “take” of State-listed plants only on State, county, and city-owned or leased lands. On these lands, the State law does not guarantee the protection of State-listed plants because it allows for the loss of populations if a proposed project or activity is considered to be a public benefit. State-listed plants may be “taken” on private lands, provided the land owner provides their written permission.

With the listing of *Lomatium cookii*, BLM generally will provide a protection buffer when a plant population may be impacted by a project (L. Mazzu, pers. comm., 1999).

E. *Other natural or manmade factors affecting its continued existence.* Herbicide spraying, mowing, grading, and other road maintenance activities threaten small *Lomatium cookii* sites adjacent to roads, on private lands near Cave Junction in the Illinois Valley. In the Agate Desert, *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* individuals in road or powerline rights-of-way could be accidentally destroyed by local public works departments, highway districts, fire departments, or private citizens when carrying out maintenance activities (Rose Hayden-Owens, ODOT, pers. comm., 1998).

Invasion of non-native annual plants in the Agate Desert has altered native perennial plant communities (Brock 1987) where *Lomatium cookii* and

*Limnanthes floccosa* ssp. *grandiflora* grow. Native bunch grasses on mounds between vernal pools have been replaced by introduced European grasses such as *Bromus mollis* (brome grass), *Taeniatherum caput-medusae* (medusahead), *Cynosurus echinatus* (dogtail), and *Poa bulbosa* (bluegrass). *Taeniatherum caput-medusae* competes with *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* on seasonally wet mounds between the pools. Seeds of both the native taxa are not able to germinate under the dense thatch produced by introduced annual species. Competition with introduced plant species is exacerbated on the Denman Wildlife Area, where game bird food plots are seeded with non-native plant species. Brock (1987) supports the contention that the main cause of the reduction of *Lomatium cookii* populations has been intensive cattle grazing accompanied by the negative competitive effects of introduced grasses, specifically *Taeniatherum caput-medusae*.

Mowing, burning, light grazing, or even raking of vernal pool habitat after *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* seeds have matured, but before the fall growth period, may help reduce plant cover from exotic annual plants (Brock 1987). In a small experiment conducted on the Preserve, germination and seedling survivorship of the rare plants was increased on plots that were raked, as compared with untreated, or raked and scarified plots (D. Borgias, pers. comm., 1998).

Catastrophic events, such as severe fire, could eliminate the large areas of *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora*, located on the Preserve (J. Kagan, pers. comm., 1998). Demographic extinction is possible for nine other sites of *Lomatium cookii*, mostly in the French Flat area, because of their small size (fewer than 100 plants). Many of the known French Flat sites are found directly adjacent to roads, increasing the possibility of extirpation, due to road and road right-of-way maintenance activities, human-caused wildfire, and other activities or effects commonly associated with roads.

#### Summary of Five Listing Factors

We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* in determining to publish this final rule. In the Agate Desert, these species occupy an extremely restricted geographic range, with an estimated 28 ha (69 ac) and 47 ha (116 ac) of known

occupied habitat for *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora*, respectively. *Lomatium cookii* is found in an additional approximately 61 ha (150 ac) in the French Flat/Illinois Valley area. The majority of the known sites are small in area and/or contain relatively few individuals which makes them susceptible to extirpation. Individual sites can have widely fluctuating plant numbers from year to year, which is likely at least in part based upon annual weather variation. Even with increased population numbers, their range is limited by specific habitat requirements. Vernal pool habitats are a unique feature in the Agate Desert and they likely cannot be recreated. Past and on-going leveling and drainage activities in both the Agate Desert and Illinois Valley have permanently changed the hydrology in many instances such that restoration is not feasible. The majority of these plants' remaining occupied habitat is threatened by commercial, industrial, and residential development, road and utilities construction and maintenance, including herbicide spraying, leveling for agriculture or pasture, grazing or mowing at the inappropriate time of year, competition with introduced plants, mining, ORV use, certain timber sale activities, encroachment of trees and shrubs associated with fire suppression, and random natural events. In view of the limited, historically available habitat for these plants, the past and present habitat alteration and destruction, and numerous threats cited above, both plants are in danger of extinction throughout all or a significant portion of their range, fitting the definition of endangered under the Act. Based on this evaluation, listing *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* as endangered is warranted.

#### Critical Habitat

Critical habitat is defined in section 3(5)(A) of the Act as—(i) the specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of the Act, upon a determination by the Secretary that such areas are essential for the conservation of the species. "Conservation" means the use of all methods and procedures needed to

bring the species to the point at which listing under the Act is no longer necessary.

Critical habitat designation, by definition, affects Federal agency actions including actions involving private lands, through consultation under section 7(a)(2) of the Act. Section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species or destroy or adversely modify its critical habitat.

Section 4(a)(3) of the Act, as amended, and implementing regulations (50 CFR 424.12) require that, to the maximum extent prudent and determinable, we designate critical habitat at the time the species is determined to be endangered or threatened. Our regulations (50 CFR 424.12(a)) further state that the designation of critical habitat is not prudent when one or both of the following situations exist—(1) the species is threatened by taking or other human activity, and identification of critical habitat can be expected to increase the degree of threat to the species, or (2) such designation of critical habitat would not be beneficial to the species.

The Final Listing Priority Guidance for FY 1999/2000 (64 FR 57114) states that the processing of critical habitat determinations (prudence and determinability decisions) and proposed or final designations of critical habitat will be funded separately from other section 4 listing actions and will no longer be subject to prioritization under the Listing Priority Guidance. Critical habitat determinations, which were previously included in final listing rules published in the **Federal Register**, may now be processed separately, in which case stand-alone critical habitat determinations will be published as notices in the **Federal Register**. We will undertake critical habitat designations as funding and priorities allow. As explained in detail in the Listing Priority Guidance, our listing budget is currently insufficient to allow us to immediately complete all of the listing actions required by the Act.

*Recent Interior appropriations bills have included language limiting the amount of funds that could be expended on listing actions to only the amount specifically appropriated for that purpose. The Fiscal Year 2002 appropriations bill also placed a cap on the amount that could be spent on designation of critical habitat for already listed species.*

*Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* are potentially

vulnerable to unrestricted over-collection, vandalism, or disturbance due to their small number of known sites and mostly small populations. We are concerned that these threats might be exacerbated by the publication of critical habitat maps and further dissemination of locational information. However, at this time we do not have specific evidence of over-collection or intentional vandalism of these species.

The deferral of the critical habitat designation for these species will allow us to concentrate our limited resources on higher priority listing actions, while allowing us to put in place protections needed for the conservation of *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* without further delay. This is consistent with section 4(b)(6)(C)(i) of the Act, which states that final listing decisions may be issued without concurrent designation of critical habitat if it is essential to the conservation of the species that such determinations be promptly published. We will prepare a critical habitat determination for this species in the future at such time as resources allow.

We plan to employ a priority system for deciding which outstanding critical habitat designations should be addressed first. We will focus our efforts on those designations that will provide the most conservation benefit, taking into consideration the efficacy of critical habitat designation in addressing the threats to the species and the magnitude and immediacy of those threats. Currently, and for the immediate future, most of the Service's listing budget must be directed to complying with numerous court orders and settlement agreements, as well as due and overdue final listing determinations.

#### Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Endangered Species Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain activities. Recognition through listing results in public awareness and conservation actions by Federal, State, and local agencies, private organizations, and individuals. The Act provides for possible land acquisition and cooperation with the States and requires that recovery plans be developed for all listed species. The protection required of Federal agencies and the prohibitions against certain activities involving listed plants are discussed below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species

that is proposed or listed as endangered or threatened, and with respect to its critical habitat if any is being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(2) of the Act requires Federal agencies to confer with us on any action that is likely to jeopardize the continued existence of a species proposed for listing, or result in destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of the species or destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into consultation with us.

Several Federal agencies are expected to have involvement under section 7 of the Act regarding these species. BLM currently has about 15 sites containing *Lomatium cookii* on its property. The association of *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* with vernal pools and/or areas of wet soil conditions can result in the Corps becoming involved through its responsibilities and permitting authority under section 404 of the Clean Water Act. The Federal Highway Administration may be affected through potential funding of future highway construction or maintenance affecting these species. The Department of Housing and Urban Development may become involved through the granting of loans for housing. The Federal Aviation Administration may become involved through their oversight of the City of Medford Airport. The Natural Resources Conservation Service and the Farm Services Agency of the U.S. Department of Agriculture may become involved through administering their programs and services directed towards farming, ranching, and general land management.

Listing *Lomatium cookii* and *Limnanthes floccosa* ssp. *grandiflora* provides for the development and implementation of recovery plans for these species. Recovery plans bring together Federal, State, local agency, and private efforts for conservation of the species. A recovery plan establishes a framework for interested parties to coordinate their recovery efforts. Recovery plans set recovery priorities, assign responsibilities, and estimate the costs of the tasks necessary to accomplish the priorities. They also describe the site specific management actions necessary to achieve

conservation and recovery of the species. Additionally, pursuant to section 6 of the Act, we will be able to grant funds to the state of Oregon for the management actions promoting the protection and recovery of these species. Based on the biology and current status of these species, attention should be given to preservation of as many different sites as possible, and protecting the sites from direct effects of habitat destruction or degradation and the indirect effects of encroachment by invasive non-native species.

The Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to all endangered plants. All prohibitions of section 9(a)(2) of the Act, implemented by 50 CFR 17.61, apply. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to import or export, transport in interstate or foreign commerce in the course of a commercial activity, sell or offer for sale in interstate or foreign commerce, or remove and reduce the species to possession from areas under Federal jurisdiction. In addition, for plants listed as endangered, the Act prohibits malicious damage or destruction on areas under Federal jurisdiction and the removal, cutting, digging up, or damaging or destroying of such plants in knowing violation of any State law or regulation, including State criminal trespass law. Certain exceptions to the prohibitions apply to our agents and State conservation agencies.

The Act and 50 CFR 17.62 and 17.63 also provide for the issuance of permits to carry out otherwise prohibited activities involving endangered plants under certain circumstances. Such permits are available for scientific purposes and to enhance the propagation or survival of the species. We anticipate that few trade permits would ever be sought or issued for *Lomatium cookii* because this plant is not in cultivation or common in the wild. Since *Limnanthes* ssp. are being cultivated to produce oil and there continues to be research into developing strains suitable for wide-scale commercial propagation, there may be a greater demand for permits to collect or cultivate *Limnanthes floccosa* ssp. *grandiflora*.

It is our policy, published in the **Federal Register** on July 1, 1994 (59 FR 34272), to identify to the maximum extent practicable at the time a species is listed those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of this listing on proposed and

ongoing activities within the species' range. *Limnanthes floccosa* ssp. *grandiflora* is not presently known to occur on Federal land, although two sites are known from the vicinity of Table Rock, near where BLM manages some land. *Lomatium cookii* is known to occur on lands under the jurisdiction of the BLM. Collection, damage, or destruction of endangered plants on public lands is prohibited, although in appropriate cases a Federal endangered species permit may be issued to allow collection. Removal, cutting, digging up, damaging or destroying endangered plants on non-Federal lands also constitutes a violation of section 9 of the Act if conducted in knowing violation of State law or regulations, including State criminal trespass law. We are not aware of any otherwise lawful activities being conducted or proposed by the public that will be affected by application the section 9 to this listing.

Questions regarding whether specific activities will constitute a violation of section 9 should be directed to the State Supervisor of our Oregon Fish and Wildlife Office (see ADDRESSES). Requests for copies of the regulations concerning listed plants and general inquiries regarding prohibitions and issuance of permits under the Act may be addressed to the U.S. Fish and Wildlife Service, Ecological Services, Endangered Species Permits, 911 NE. 11th Avenue, Portland, OR, 97232-4181 (telephone 503/231-2063; facsimile 503/231-6243).

**National Environmental Policy Act**

We have determined that Environmental Assessments and Environmental Impact Statements, as

defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act of 1973, as amended. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244).

**Paperwork Reduction Act**

This rule does not contain any new collections of information that require approval by Office of Management and Budget (OMB) under the Paperwork Reduction Act (44 U.S.C. 3501 *et seq.*). This rule will not impose record keeping or reporting requirements on State or local governments, individuals, businesses, or organizations. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Information collections associated with endangered species permits are covered by an existing OMB approval and are assigned control number 1018-0093, which expires March 31, 2004.

**Executive Order 13211**

On May 18, 2001, the President issued an Executive Order on regulations that significantly affect energy supply, distribution, and use. Executive Order 13211 requires agencies to prepare Statements of Energy Effects when undertaking certain actions. This rule is not expected to significantly affect energy supplies, distribution, or use. Therefore, this action is not a significant

energy action and no Statement of Energy Effects is required.

**References Cited**

A complete list of all references cited herein is available upon request from the State Supervisor, Oregon Fish and Wildlife Office (see ADDRESSES).

**Author(s)**

The authors of this final rule are Richard Szlemp, Anne Walker, and Judy Jacobs, U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office (see ADDRESSES).

**List of Subjects in 50 CFR Part 17**

Endangered and threatened species, Exports, Imports, Reporting and record keeping requirements, and Transportation.

**Regulation Promulgation**

Accordingly, we hereby amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

**PART 17—[AMENDED]**

1. The authority citation for part 17 continues to read as follows:

**Authority:** 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500, unless otherwise noted.

2. Section 17.12(h) is amended by adding the following, in alphabetical order under Flowering Plants, to the List of Endangered and Threatened Plants to read as follows:

**§ 17.12 Endangered and threatened plants.**

\* \* \* \* \*  
(h) \* \* \*

Species		Historic range	Family	Status	When listed	Critical habitat	Special rules
Scientific name	Common name						
FLOWERING PLANTS							
* <i>Limnanthes floccosa</i> ssp. <i>grandiflora</i> .	* large-flowered woolly meadowfoam.	* U.S.A. (OR) ...	* Limnanthaceae.	E	* 733	NA	* NA
* <i>Lomatium cookii</i> .....	* Cook's lomatium .....	* U.S.A. (OR) ...	* Apiaceae .....	E	* 733	NA	* NA
* .....	* .....	* .....	* .....		* .....		* .....

Dated: October 30, 2002.  
**Steve Williams,**  
 Director, Fish and Wildlife Service.  
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