Cook's lomatium (*Lomatium cookii*)

5-YEAR REVIEW
Updated 9/5/2024

Cook's lomatium has yellow flowers with feathery divided leaves (photo credit: Institute for Applied Ecology 2019)

GENERAL INFORMATION:

Species: Cook's lomatium (*Lomatium cookii*)
Date listed: November 7, 2002
FR citation(s): 67 FR 68004 listing; 75 FR 42490 critical habitat designation
Classification: Endangered Species

BACKGROUND:

Most recent status review: October 1, 2019. 5-Year Review Cook's desert parsley (Cook's lomatium) (*Lomatium cookii*), U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office. Available at https://ecos.fws.gov/ecp/species/1583#status and attached here as Appendix C.

FR Notice citation announcing this status review: 88 FR 17611. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status Reviews for 133 Species in Oregon, Washington, Idaho, Montana, California, Nevada, Hawaii, Guam, and the Commonwealth of the Northern Mariana Islands. March 23, 2023.

Critical Habitat: 75 FR 42490. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for *Limnanthes floccosa* ssp. *grandiflora* (Large-Flowered Woolly Meadowfoam) and *Lomatium cookii* (Cook's Lomatium). July 21, 2010.

Recovery Plan: Recovery Plan for Rogue and Illinois Valley Vernal Pool and Wet Meadow Ecosystems. November 6, 2012.

ASSESSMENT:

Information acquired since the last status review:
This 5-year review of Cook's lomatium, also known as Cook's desert parsley, was conducted by the U.S. Fish and Wildlife Service's (Service) Oregon Fish and Wildlife Office (OFWO). From April to October 2023, we solicited data for this review from interested parties following the Federal Register notice announcing this review on March 23, 2023. These entities include Rogue Valley International Airport, Medford District Bureau of Land Management (BLM), Bureau of Reclamation (BOR), State agencies (Oregon Department of Transportation [ODOT], Oregon Department of Agriculture Native Plant Conservation Program [ODA], Oregon Parks and Recreation Department [OPRD], Oregon Department of Fish and Wildlife [ODFW]), and Southern Oregon Land Conservancy (SOLC). This report was also informed by ODA's 2021 Cook's desert parsley species assessment (ODA 2021, entire), the Institute for Applied Ecology's (IAE) 2019 species monitoring report (IAE 2019, entire) and personal communication from Groundtruth Ecological LLC (Perchemlides 2024, entire). We also received updated vernal pool and mounded topography habitat information from Groundtruth Ecological LLC (Groundtruth Ecological LLC 2023, entire).

New information:
In this review, we provide updated information on Cook's lomatium in the form of habitat condition assessments, demography studies, and plant establishment data since the preceding 5-year review conducted in 2019 (USFWS 2019a, entire). As of 2024, a total of 23 populations are documented as extant and 13 are considered unknown. Since 2019, the number of populations has increased by 5 and unknown populations have decreased from 15 to 13 populations. We did not detect an overall improving or declining rangewide trend of abundance of Cook's lomatium populations in the Rogue and Illinois Valleys of Jackson and Josephine Counties, Oregon.

Potential new threats and changes in recovery initiatives, as described below, have changed some prospects of species conservation, yet no changes in the species' biological status warrant a change in the Federal listing status of Cook's lomatium.

Abundance. The most recent information available through the Cook's lomatium monitoring efforts assessed since the last 5-year review is provided in Tables 1 and 2. This includes updated status and habitat information for several populations. A plant population is a discreet biological unit consisting of a group of individuals of the same species that occupy an area small enough to permit interbreeding regularly. We consider all plant populations that are within one kilometer (0.62 miles) a single interbreeding population. Population information is informed by occurrence data collected in the field. Occurrence data is a detection of a group of plants, without *consideration* of its association with other groups of plants. This data can assist to inform the condition of a population, whether it is intact or fragmented, extirpated (no longer present), declining, or expanding. At this time, we have determined 36 Cook's lomatium populations occur throughout the range of the species, with 14 in the Rogue Valley of Jackson County and 22 in the Illinois Valley of Josephine County (Figures 1 and 2). It should be noted that Cook's lomatium populations fluctuate spatially and quantitively depending on seasonal precipitation, temperature, herbivory, and competition with vegetation; therefore, it is expected that the population size will fluctuate from year to year.

Population Updates. Geographically, the overall population is distributed into two areas, the Rogue and Illinois Valleys. In the Rogue Valley, the 14 known Cook's lomatium populations consist of 7 recently monitored (or extant) and 7 unknown populations (Table 1 and Figure 1). Of the 7 known populations, abundance in 6 populations is increasing or stable and 1 is in decline. In the Illinois Valley we have documented 16 extant populations and 6 unknown populations (Table 2 and Figure 2). Of the 16 extant populations, abundance in 11 populations is increasing or stable and 5 are in decline. Overall, both areas combined, a total of 23 populations are documented as extant and 13 are considered unknown (ORBIC 2023, entire; ODA 2021, p. 6, USFWS 2024, entire). Unknown populations have had no documentation in the last 10 years, mostly due to inaccessibility. An additional 5 population have been determined to be extirpated. The previous 5-year review in 2019, documented a total of 10 Rogue Valley and 25 Illinois Valley populations. Of these, 20 were documented as extant and 15 were considered unknown (USFWS 2019a). At that time, we only knew of a single extirpated population.

Table 1. Cook's lomatium Populations in the Rogue Valley, Jackson County, Oregon (ODA 2021, USFWS 2012, 2019b, 2024; BLM 2019). Data dates indicate the most recent population survey available.

Rogue Valley Recovery Zone populations					
Population	Population Name (EO ID*)	Extant	Extirpated	Plant count	Notes
1	Medford Airport (2024 data) (EOID 22822); Medco Haul Road (2024 data) (EOID 4336)	✓		10,300	S, P
2	Whetstone Preserve. (2024 data) (EOID 15161)	✓		10,070	S, P
3	ODFW Denman Wildlife Area Hall Tract (2021 data) (EOID 20913)	✓		3,467	S, P
4	SOLC Agate Desert Preserve (2024 data) (EOID 19357)	✓		1,782	S, P
5	JCURA and West Jackson Sports Park (2019 data) (EO ID 21162)	✓		1,171+	S, P
6	BOR Remote control airplane field (2024 data) (No EOID)	✓		15	S, P
7	East Jackson Sports Park (2021 data) (EOID 22407)	✓		5	D, P
8	Avenue H (1992 data) (EOID 14296)			500,000	U, I
9	Dry Creek (1992 data) (EOID 23018)			600+	U, I
10	Antelope Road (1992 data) (EOID 5030)			500	U, I, P
11	Kirtland Road (2000 data) (EOID 22012)			223	U
12	Highway 140/Highway 62 interchange (2013 data) (EOID 5813)			129	U, P
13	Corey Road (2001 data) (EOID 19273)			15	U, I
14	Highway 140 East (2021 data) (EOID 6820)			0	U, P
15	Raven Road (2008 data) (EOID 7711)		✓	0	

D = The population appears in decline; **I =** Inaccessible; **S =** The population appears stable; **U =** Unknown or undetermined denotes a population that has not been visited in over 10 years and not enough data is available; **P =** Protected under federal, state, municipal, county, or land trust ownership, or land under a conservation easement or restrictive covenant. A population is considered extirpated when the site has been developed via recent aerial imagery or plants have not been observed at the location after three seasons of surveys or a span of 10 years. EOID = Element Occurrence Identification number. SOLC, OPRD, BOR, and ODOT provided count information via e-mail either in the message or with a plant record attachment. USFWS observations were documented in a Service memo.

Table 2. Cook's lomatium Populations in the Illinois Valley, Josephine County, Oregon (ODA 2021, USFWS 2012, 2019b, 2024; BLM 2019). Date dates indicate the most recent population survey available.

Illinois Valley Recovery Zone populations					
Population	Description (EO ID*)	Extant	Extirpated	Plant count	Notes
1	French Flat Middle (2019) (EOID 5809)	✓		92,411	D, P
2	Indian Hill (2019) (EOID 16369)	✓		8,481	S, P
3	SOLC/West Side Road (2021) (EO ID 17733)	✓		5,742	S, P
4	Caves Highway SMA (2021) (EOID 5394)	✓		3,897	S, P
5	Rough and Ready Creek (2019) (EO ID 1204)	✓		2,444	S, P
6	Logan Cut North (2024) (EOID 8349)	✓		1,300	D, P
7	NW Esterly Lakes (2024) (EOID 14098)	✓		1,054	S, P
8	Reeves Creek North 1 (2017) (EOID 6533)	✓		905	S, P
9	Reeves Creek North 2 (2017) (EOIDs 7272 and 12466)	✓		550	S, P
10	Illinois River Forks State Park (2021) (EO ID 23791)	✓		403	D, P
11	Eight Dollar Mountain Linda Park (2023) (No EOID)	✓		297	S, P
12	ODOT West Fork (2021) (EOID 26317) (EO ID 26317)	✓		126	S, P
13	Logan Cut (2024) (EOID 16370)	✓		100	S, P
14	Reeves Creek South (NE Kerby) (2017) (EOID 21461)	✓		80	S, P
15	Waldo Road (2024) (No EOID)	✓		60	S
16	West Side Road (2021) (EOID 15445)	✓		15	S
17	Anderson Creek (2005) (no EOID)			1,135+	U, I
18	Draper Creek (2005) (no EOID)			400	U, I
19	Reeves Creek Middle (1994) (EOID 2352)			10	U, P
20	French Flat North (1992) (EOID 13983)			30-50	U, P
21	French Flat South (2010) (EOID 3833)			300	U, P
22	French Flat Carrol Slough (2010) (EOID 12297)			0	U, P
23	Laurel Road (2024) (EOIDs 9667, 11942)		✓	0	I
24	Waldo South (2018) (EOID 30928)		✓	0	P
25	ODOT Great Cats/Pinewood (2021) (EOID 38864)		✓	0	P
26	Woodcock Bog RNA (2018) (EOID 1906)		✓	0	

D = The population appears in decline; **I =** Inaccessible; **S =** The population appears stable; **U =** Unknown or undetermined denotes a population that has not been visited in over 10 years and not enough data is available; **P =** Protected under federal, state, municipal, county, or land trust ownership, or land under a conservation easement or restrictive covenant. A population is considered extirpated when the site has been developed via recent aerial imagery or plants have not been observed at the location after three seasons of surveys or a span of 10 years. EOID = Element Occurrence Identification number. SOLC, OPRD, BOR, and ODOT provided count information via e-mail either in the message or with a plant record attachment. USFWS observations were documented in a Service memo.

A population cannot be deemed extirpated unless Cook's lomatium plants have not been observed at a site for 2 or more years after three seasons of surveys over a span of 10 years or the habitat of a former population has been developed or significantly altered. In some cases, populations cannot be accessed; in these cases, aerial imagery can provide evidence if a population has been converted to agriculture or development. We have determined that 5 populations are extirpated based on imagery evaluation. We do not have sufficient documentation to determine if the 13 unknown populations have become extirpated. For example, we determined the Raven Road population had become extirpated due to no presence of plants after two site visits and evidence of habitat conversion. Tables 1 and 2 summarize the status of all known Cook's lomatium populations.

Population survey results indicate fluctuating Cook's lomatium numbers at all sites. Where we have consistent survey information, within population abundance data show gradual increasing, declining, or stable trends. Stable or increasing trends are evident at 19 populations while declining trends are evident at 4 of the consistently monitored populations in the last 10 years. The other 12 populations have no data to determine trends in any meaningful manner (ODA 2021, pp. 44-48; USFWS 2024, entire). The summaries are presented for each population in Appendix A.

Population Distribution. Based on representative population sampling at monitored locations, as well as assuming the other known populations are still occupied by Cook's lomatium, we conclude the overall distribution likely remains unchanged. Each of these populations remain concentrated within the Illinois and Rogue Valleys of southern Oregon and within the historical ranges. Even with the extirpation of a few populations and the addition of one population, range contraction or expansion of the species has not occurred. The populations occur on a mix of private and federal and state lands, with current distribution of 8 and 6 populations occurring on private lands in the Illinois and Rogue Valleys.

Threats. At the time of listing, the primary threat to Cook's lomatium included habitat or population loss due to development, through either present or foreseen destruction, modification or curtailment of habitat or range (Factor A) (U.S. Fish and Wildlife Service 2002, pp. 68009-68013). Today, these threats remain the primary stressors to the species, but two additional threats have emerged, a change in federal regulatory oversight of wetland permitting due to and new definition of Waters of the United States (WOTUS) and climate change (see discussion below).

Other stressors to Cook's lomatium include the encroachment of nonnative plants (Factor E). Nonnative plants that can outcompete Cook's lomatium include annual grasses and herbs. Nonnative grasses, namely *Hordeum marinum* ssp. *gussoneanum* (Mediterranean barley), *Lolium* spp. (perennial and annual rye), and *Taeniantherum caput-medusae* (medusahead) can build up a dense thatch layer that inhibits plant growth (USFWS 2012, p. 60). The introduced species *Alyssum murale* (yellowtuft) and *A. corsicum* (Corsicum yellowtuft) were introduced to the Illinois Valley in 1995, across 50 acres of property to explore a phytomining (plant mining) opportunity. The effort was not successful and was abandoned, but the two plants became established and spread up and down the Illinois River valley. While these plants are highly

invasive and could spread to Cook's lomatium populations, ODA and the local community have conducted strong measures to control and monitor these two invasive plants that have resulted in holding these invasives at current levels and distribution for the time being (Oregon State University).

Herbicide spraying, mowing, grading, and other road maintenance activities may threaten small Cook's lomatium sites adjacent to roads on private lands in the range of the species. However, this threat is unknown but considered relatively insignificant because the species is not prevalent on roadsides. ODOT carefully maintains their roadside shoulders where Cook's lomatium occurs without herbicide and is able to maintain populations.

As was discussed in the 2019 5-year review, the Environmental Protection Agency (EPA) proposed redefining the Waters of the United States (WOTUS) to no longer include isolated wetlands. In 2023, the new WOTUS definition became final under the EPA vs Sackett Supreme Court case (EPA 2023). At this time, the U.S. Army Corps of Engineers (USACE) interpretation of WOTUS suggests that many wetlands not physically connected to streams and lakes will no longer be regulated (i.e., Section 404 of the Clean Water Act 33USC 1344). This may result in the USACE no longer having jurisdiction over the wet areas Cook lomatium currently occupies and therefore, no connection to ESA Section 7 coverage for impacts to wetlands. We are awaiting the USACE interpretation of the revised WOTUS regulations and determine how it may impact conservation and/or limit negative activities resulting in adverse impacts to large-flowered woolly meadowfoam.

The Rogue Valley in Jackson County would likely be more affected under this new ruling than the Illinois Valley in Josephine County due to a higher human population density living in the White City area. For example, Jackson County experienced a 0.7 percent annual growth rate and a 5.3 percent population growth rate in 2023, while Josephine County experienced a 0.4 percent annual growth rate and a 2.1 percent population growth rate (IBISWorld 2024, entire). Also, development and growth are more concentrated in the Rogue Valley, with the larger population centers (e.g. Eagle Point, Medford, White City, Central Point – areas concurrent with Cook's lomatium) than the Illinois Valley, with a much more sparsely populated area around Cave Junction, Takilma, and Kerby. As a result, the development pressures for housing and industry that overlap Cook's lomatium habitat are more pronounced in the more urban Jackson County.

We are not aware of any new diseases, predation, illegal or excessive collecting for scientific or commercial uses, significant plant loss due to development, chemical spills, or widespread land erosion occurring that could be negatively affecting the species. In addition, we have determined that development has not taken place on the frequently monitored sites on public lands. We do not know the status of unmonitored populations on private lands unless a property can be visually observed from a roadside. In cases where field surveys cannot be accomplished, we have used recent aerial data interpretation (within the most recent year) to determine if a population may have been impacted or disturbed. As described above use of aerial imagery on inaccessible sites has led to determining sites have not become extirpated.

Illicit recreational cannabis (*Cannabis sativa*) production has had a long history in Josephine County (Parker-Shames et al. 2021, p. 2). Until 2015, when Oregon enacted legislation to

legalize growing, purchasing, using, and transporting cannabis, illicit production primarily occurred on public lands. The legalization of recreational cannabis has resulted in an increase in recreational cannabis crop production on private lands across southwest Oregon (Parker-Shames et al. 2021, p. 2). Cave Junction has been a center for illegal cannabis production for many years and this trend is likely to continue (Willamette Week 2023, website). The expansion of cannabis growing has converted at least one known population of Cook's lomatium into a cannabis crop (ODA 2021, p. 32). The crop was established within a larger Cook's lomatium population near West Side Road. Although some of these private lands are not easily accessed, agricultural crops will appear on aerial imagery, and we will infer that a population has been compromised if replaced by a crop. The majority, 67 percent, of Cook's lomatium populations occur on public lands. Private lands include 32 percent of populations (13 of 41). For this reason, it is uncertain if cannabis crops will become an increased threat for Cook's lomatium in the future on either public or private lands.

From June 25 to June 28, 2021, Oregon experienced a severe heat dome which could have affected Cook's lomatium seeding results at French Flat, Reeves Creek, and some of the SOLC preserves in the Agate Desert (ODA 2021, p. 6). Additional heat domes could make augmentation and introduction efforts more difficult. Maximum spring temperatures in Medford and Cave Junction had an increase of 3°C and 3.2°C (estimated) between the 2000-2004 and the 2017-2021 periods, respectively. Surveys detected decreased population numbers at many locations following the temperature increases (ODA 2021, pp. 6-7). If similar increases become more common, this will deter propagation efforts across the range of the species. According to the Rogue Basin Climate predictions (ClimateWise 2008, website), annual average temperatures are likely to increase from 0.5 to 1.6°C (1 to 3°F) by around 2040, and 2.2 to 4.4°C (4 to 8°F) by around 2080. Additionally, summer temperatures may increase dramatically reaching 3.8 to 8.3°C (7 to 15°F) above baseline by 2080, while precipitation will remain roughly similar. Climate change as expressed by increased temperature in the next 15-50 years could affect Cook's lomatium populations by directly stressing plants so that they produce fewer flowers and a lower seed set. This could also facilitate the spread of invasive non-native plants which have adaptation advantages due to extremely high seed output. Efforts to control invasive grasses and shrubs from encroachment or fuels reduction may need to be increased. If phenology of the species shifts, a similar shift to more early season monitoring may be needed to better account for population changes.

Conservation. The aim of conservation is to protect and monitor habitat where listed species occur to restore natural habitat conditions and reduce population stressors. The establishment of systematic vegetation management can maintain population health. Protected habitat can greatly help offset development pressure, but this is not guaranteed. Land management beneficial to the species is not always possible if agencies or landowners lack funding.

The Service is encouraging the conservation of Cook's lomatium in the Rogue Valley through community efforts as guided by the 2012 recovery plan and complimented by a region-wide vernal pool conservation strategy as referenced and implemented under the 2011 Biological Opinion (Opinion) (U.S. Fish and Wildlife Service 2011, entire). The Opinion provides Endangered Species Act (ESA) Section 7 coverage for a wide suite of developmental and conservation activities with the expressed purpose implementing the vernal pool conservation

strategy. The Opinion encourages the prioritized use of credits available from conservation banks, mitigation banks, or equivalent conservation or mitigation projects (in conjunction with on-site best management practices and performance standards). It is still considered the most credible method to minimize the effects of unavoidable impacts to listed vernal pool species that might result from otherwise lawful development activities in vernal pool complexes.

The Opinion also streamlines regulatory review and approval of certain conservation and development activities within vernal pool complexes via use of a single suite of standards and processes adopted by the U.S. Army Corps of Engineers (USACE), Oregon Division of State Lands (ODSL), and the Service. This streamlined approach has resulted in regulatory certainty to developers as well contribution to conservation. However, the revised Waters of the United States (WOTUS) regulations may result in the USACE's ability to limit negative impacts to listed species, such as Cook's lomatium.

The ability to salvage and bulk seed, propagate, transplant Cook's lomatium plants, and sow seed has proven to be successful for advancing recovery. For example, ODOT began bulking seed at the J. Herbert Stone Nursery located in Central Point, Oregon in 2013 and by 2017, 13.6 kilograms (30 pounds) of seed had been produced (ODOT 2017, p. 10). The motivation for seed bulking was to compensate for vernal pool habitat impacts in conjunction with the 2016 Oregon Highway 62 Corridor Solutions Project. Efforts to bulk Cook's lomatium seed have continued, with the Service and ODA providing the J. Herbert Stone Nursery funding to continue seed bulking to use for new introduction and augmentation efforts as well as experimental seed trials (Davenport, pers. comm. 2022).

Beginning in 2009, ODOT began sowing wild collected seed into the ODOT Vernal Pool Mitigation and Conservation Bank and later in 2014 into the adjoining Kincaid Property Mound Site. The Cook's lomatium population has since expanded from approximately 6.07 to 12.1 hectares (15 to 30 acres) and from about 50 individual plants to over 10,000 plants at the ODOT properties (ODOT 2022, pp. 8,19, Mancillas, pers. comm. 2024). The propagation beds at J. Herbert Stone Nursery are currently in production under Service direction with seed going toward future reintroduction and augmentation projects for various public and private properties (Davenport, pers. comm. 2022). Additional nursery grown seed is managed by the BLM with plans to augment existing populations and establish new populations on BLM lands in the Illinois Valley. These continued initiatives will likely bolster recovery efforts in the next five years.

Many Federal, State, and private landowners are engaged in conservation efforts for the benefit of Cook's lomatium. Between 2002 and 2023 protected Cook's lomatium habitat has increased by 73 percent from 603.8 to 1,042.6 hectares (1,492 to 2,576 acres) (Table 3). While protected habitat has increased by approximately 404.7 hectares (1,000 acres) during the past 15 years, we have not yet reached the point that a change in the Federal status of the species is warranted. Currently, 26 of the 36 known Cook's lomatium populations are considered protected, a similar proportion to the previous 5-year review.

In the Rogue Valley, the Service is guiding the conservation of Cook's lomatium through education and outreach efforts by engaging private landowners and other interested parties. This

conservation effort was described in the Recovery Plan as a prioritized action to achieve species recovery. The updated vernal pool mapping effort provides information that helps direct Service outreach efforts targeting key biological areas for conservation, consistent with the Recovery Plan. The new vernal pool mapping assessment (Groundtruth Ecological LLC 2023, entire) completed in 2023 provides a means to strategically target landowners with relatively higher quality vernal pool habitat in the Rogue Valley, and who may be willing to engage in voluntary conservation. In the near future, the Service plans to initiate an outreach program in partnership with the Southern Oregon Land Conservancy for private landowner engagement.

Table 3. *Lomatium cookii* protected habitat (USFWS 2024, entire).

Listing	Recovery core areas with protected habitat	Hectares (Acres) protected
2002 (listing)	15/17	603.8 (1,492)
2006 draft Recovery Plan	15/17	672.6 (1,662)
2010 (critical habitat/5- year review)	15/17	723.2 (1,787)
2012 Recovery Plan	15/17	1,013.3 (2,504)
2019 2nd 5-year review	15/17	1,041.6 (2,574)
2024 3rd 5-year review	15/17	1,042.6 (2,576)

Recovery Criteria. Appendix B provides a summary of the status of the species relative to the downlisting and delisting criteria established for Cook's lomatium in the Recovery Plan for Rogue and Illinois Valley Vernal Pool and Wet Meadow Ecosystems (U.S. Fish and Wildlife Service 2012, pp. IV-26 to IV-27). Some of the criteria have been partially met for some of the frequently monitored populations at several core areas, but none of the criteria have yet been fully achieved.

We determine that 28 of the 36 populations (77 percent) are considered protected and of this we estimate 45 percent of priority 1 core areas and 50 percent of priority 2 core areas are protected.

To advance recovery for Cook's lomatium, additional partnerships, conservation agreements, and easements will need to be established. Monitoring should continue at all accessible Cook's lomatium populations at least biennially to track the status.

Recommendations for Future Actions:

- Cook's lomatium habitat occurs on a mix of public and private lands. Because successful conservation of Cook's lomatium will need to include voluntary contributions from private lands, an enhanced and targeted outreach effort to private landowners is needed for conservation partnerships in key areas leading to protected areas contributing to recovery.
- Develop conservation easements or conservation programs for existing populations on unprotected private lands. This would directly increase protection status for Cook's

lomatium. We are targeting partnerships for the protection of 10 populations on private lands in the next 5 years.

- Determine locations to establish Cook's lomatium in the Illinois and Rogue Valleys. If a population is declining, we recommend careful and strategic augmentation. If plants are not present, we recommend sowing seed to reestablish plants as appropriate for the conditions.
- Conduct research on the best management practices for Cook's lomatium. For example, high priority research would include best grazing, mowing, herbicide, or fire practices to address seral vegetation succession, encroachment of weedy vegetation and climate change stressors. The best management practices could promote suitable habitat conditions to increase population size and refine plant establishment techniques.

Conclusion:
Primary stressors to Cook's lomatium continue to be urban development pressures reducing habitat, although this threat has subsided in the past few years (absent the WOTUS rules). Where the species exists, competition from invasive non-native plants needs to be addressed to a greater extent. Newer threats to the species include a potential decrease in wetland regulatory oversight because of the WOTUS rule and effects from climate change. Information regarding significant increases or decreases in the species' biological status that would warrant a change in the Cook's lomatium Federal listing status were not substantial enough to recommend a status change under this review.

After reviewing the best available scientific information, we conclude that Cook's lomatium remains an endangered species. The evaluation of stressors affecting the species under the factors in 4(a)(1) of the ESA and analysis of the status of the species in our 2019 status review (Appendix C) remains an accurate reflection of the species current status.

State Supervisor, Fish and Wildlife Service, Oregon Fish and Wildlife Service

Approve BRIDGET MORAN Digitally signed by BRIDGET MORAN Date: 2024.09.25 16:54:11 -07'00' Date _____

Figure 1. Cook's lomatium populations in the Rogue Valley, Jackson County, Oregon (USFWS 2024).

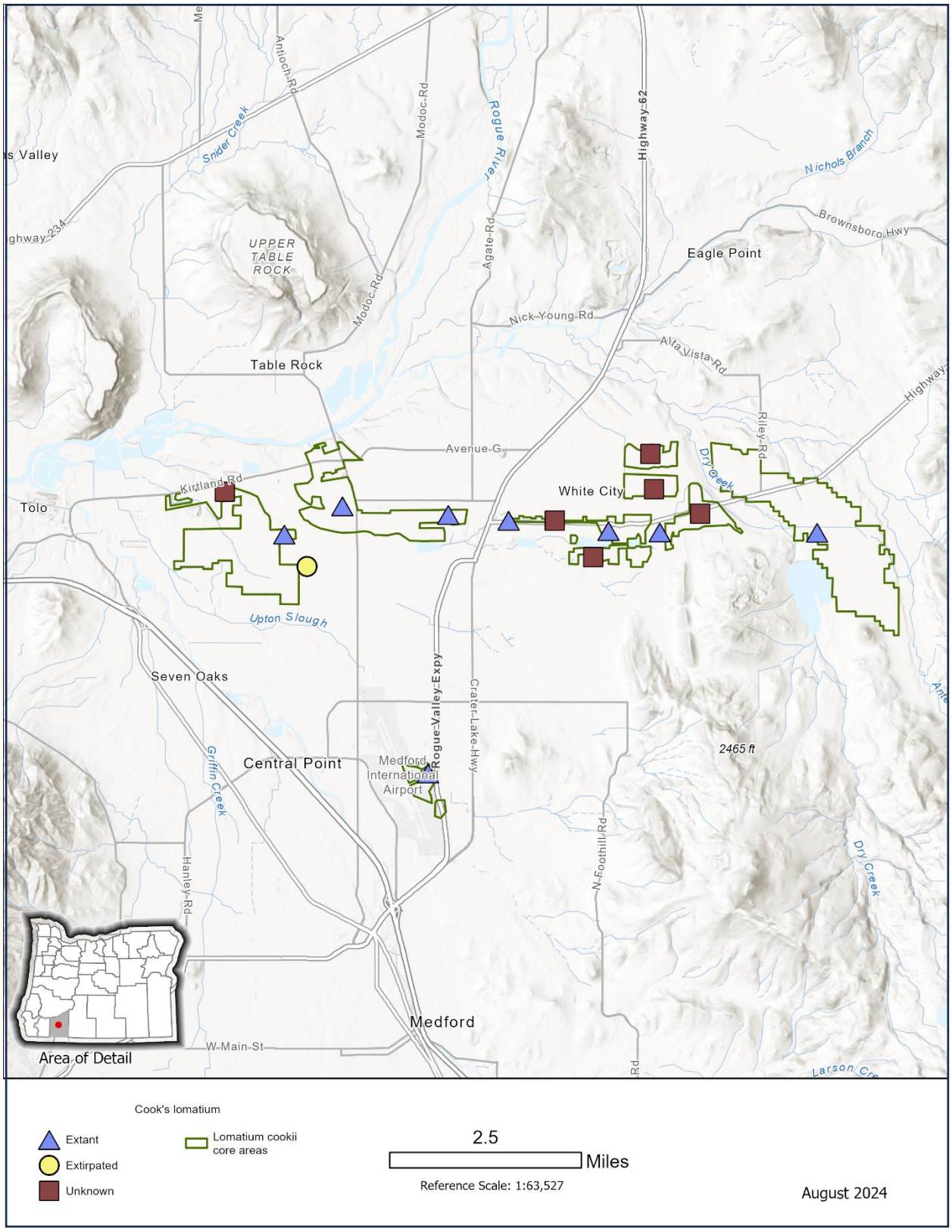
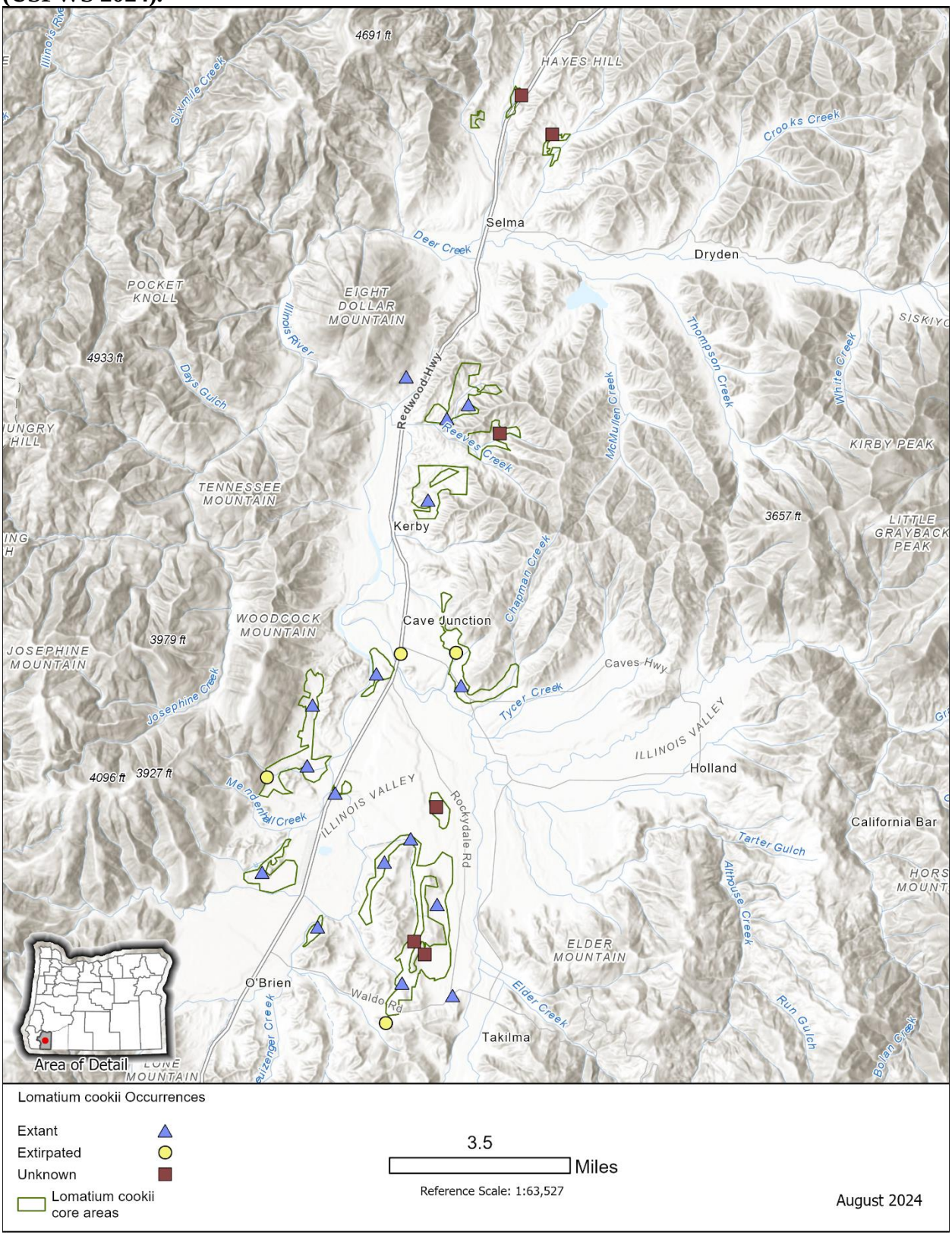


Figure 2. Cook's lomatium populations in the Illinois Valley, Josephine County, Oregon (USFWS 2024).



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APPENDIX A. Narrative of population records of Cook's Lomatium in the Rogue Valley and Illinois Valley of Oregon.

Rogue Valley (15 populations: 7 with current records (1 in decline), 7 with unknown status, 1 extirpated). The Rogue Valley has 9 protected Cook's lomatium populations.

1. Medford Airport (EOID 22822). Stable. The Rogue Valley International Airport (airport) Cook's lomatium population is considered one of the largest in the Rogue Valley. The population includes portions within the airport runway complex that extends to private and ODOT right-of-way land outside of the airport. The subpopulation, which was largely impacted by the Highway 62 Corridor project in 2013, was documented with 3,004 flowering plants prior to the construction. ODOT surveyed the 3.4-acre private land patch in 2013 and found a few remaining plants. In 2018, a census documented 440 Cook's lomatium within an estimated 3.6-hectare (9-acre) area within the airport (Stantec 2018, pp. 24, 27). On April 10, 2024, service staff mapped approximately 10,000 Cook's lomatium at the airport and another 300 plants on ODOT right-of-way and private lands (USFWS 2024, entire, ODA 2021, p. 42).

   The airport Cook's lomatium population occurs in several patches, estimated to occupy 26 acres total. Based on several recent site visits conducted by Service, airport, and ODA staff in 2020 and 2024, the population appears robust and unchanged since previous visits. Over time, the airport has expanded and developed while taking steps to avoid or mitigate for impacts to the habitat. Since a taxiway was installed in 2000, the Cook's lomatium population now occupies a smaller area but receives regular maintenance by mowing, and this appears to control competing vegetation, allowing the plant to flourish. The Service is aware of several airport development projects scheduled within the next 10 years, which are anticipated to affect several Cook's lomatium patches. The airport proposes to compensate for these impacts with on-site mitigation involving new plant establishment (USFWS 2024).

2. Whetstone Preserve. (EOID 15161). Increasing. Cook's lomatium was identified at this site in 1990 after it was purchased by TNC. SOLC took over the TNC property in 2019. The population occurs in the Whetstone Savannah Recovery Zone and includes a 15.78-hectare (39-acre) private property, the 26.3-hectare (65-acre) SOLC Whetstone Savannah Preserve (Preserve), acquired by TNC in 1990, the 91-hetare (225-acre) ODOT Vernal Pool Mitigation and Conservation Bank (ODOT VPMCB Bank), and the 47-hectare (116-acre) ODOT Kincaid's Property Mound Site (ODOT KPMS). The contiguous 180-hectare (447-acre) properties are all currently occupied by approximately 10,070 Cook's lomatium plants (Mancillas, pers. comm. 2024).

   Soon after the Preserve was purchased by TNC in 1990, 300 flowering Cook's lomatium plants were documented. In the following years, cattle were removed and by 1999 the flowering plant population reached over 350 individual plants. In the ensuing years, no grazing and little vegetation management were conducted at the property. The Cook's lomatium population has fluctuated but has steadily declined and plants have been replaced by both native and nonnative plant species. At the 2023 census, only 6 flowering

plants remain, and these had been grazed down to the crown by deer (K. Mergenthaler, pers. comm. 2023). The Rice property has been consistently grazed and the flowering *L. cookii* plant count has fluctuated. The most recent *L. cookii* plant census in 2002, documented 900 flowering plants.

ODOT established *L. cookii* at the ODOT VPMCB and KPMS banks in 2009, 2012, 2014 and 2015 into 76 plots and several restoration zones (ODOT 2019, p. 4). Excess seed is now stored at the Herbert Stone Nursery and the Rae Selling Seed Bank and is managed by the Understory Initiative.

The 116-acre ODOT KPMS is an individual mitigation bank with advance credits. The property lies adjacent to the ODOT VPMCB bank and has been restored from poor quality vernal pool to a highly functioning vernal pool habitat. The *L. cookii* population at the site, established in 2012, has been successful, expanding the range of Cook's lomatium. During the 2021 surveys, over 3,400 flowering plants were observed in the North restoration zone and 1,391 plants in the South restoration zone (ODA 2021, p 42). Together the ODOT banks have expanded area occupied by Cook's lomatium by 12.1 hectares (30 acres).

3. Denman Wildlife Area Hall Tract (EOID 20913). Stable. The ODFW Denman Wildlife Area Cook's lomatium population occurs on ODFW property and receives little management. The 2021 ODA survey recorded over 3,467 Cook's lomatium in two small patches (spanning ~ 0.1 mile). This population count may be a slight undercount due to late season survey while many plants were already beginning to senesce (ODA 2021, p. 16). In 2012, 1,839 plants were documented in the Hall Tract, down from 3,481 plants in 2008. Most of the flowering plants were found in the path of the Pacific Power transmission line access route, an area regularly disturbed by light vehicle traffic that limits competing vegetation growth and thatch accumulation (K. Perchemlides, pers. comm. 2012).

   The main threats to the population include competition from invasive grass and disturbance from trail use and powerline routine maintenance. The conservation value of this site was determined by ODA to be high based on the presence of many L. cookii plants, extensive potential habitat, protection on public ownership, and potential for site improvements. ODA is seeking to perform Cook's lomatium trial augmentation at the site to determine the best techniques for plant establishment.

4. SOLC Agate Desert Preserve (EOID 19357). Stable. The Cook's lomatium population has been managed with prescribed burns, planting of native grass and forbs and augmentation. The population has been monitored almost every year and recently has expanded in size and quantity. In 1994, surveys documented approximately 2,600 flowering adults (from 44,000 plants total). After three years, following cattle removal, the population increased to 5,100 flowering adults (with a drop of 12,000 in total plants). In 2002, after several years of burning and habitat improvement the population dropped to 2,600 adults (with an increase to 42,000 overall). Following more years of prescribed burns, Cook's lomatium and native plant seeding, the total adult flowering plant count

reached 3,600 in 2022 and dropped to 1,782 plants in 2023 (Borgias 2004, pp 88-89; Mergenthaler, pers. comm 2023). A burn in June of 2023, will likely result in an increased plant count (Mergenthaler, pers. comm 2023).

5. JCURA and West Jackson County Sports Park. (EOID 21162). Stable. This Cook's lomatium population contains several patches south of Highway 140, east and west of the Foothills Road bypass, west of Hoover Ponds County Park baseball fields, and onto private property. The habitat includes weak to high functioning vernal pool habitat. The Jackson County Urban Renewal Agency (JCURA) mitigation bank was established within the park in 2005 to offset losses to vernal pool habitat by the County. Plants were augmented at the site by the county in 2019 to offset loss from the construction of the Foothills Road extension project and have continued to be monitored. The entire mitigation area is mowed by the county annually and provides suitable restored vernal pool habitat, with many native plant species.

   Outside the JCURA mitigation bank, Cook's lomatium occurs sporadically in the park, north of the Hoover Ponds, on either side of the Foothills Road bypass area, a heavily used recreational bike area and various gravel roads. The northern portion of the historic Jackson Sports Park subpopulation, occurring west of Kershaw Road, has been developed into a sports park with mowed lawn, baseball fields, gravel roads, and parking areas. The southern portion is highly altered, and mostly on private property. Although no natural vernal pool habitat remains in this area dominated by non-native vegetation, a few plants were detected in the disturbed ground of a small, unsanctioned walking path. ODOT detected several small patches elsewhere in the park in 2019. The entire park faces competition with invasive plants.

   In 2021, ODA staff documented over 700 Cook's lomatium plants in the JCURA mitigation site. The mitigation area includes man-made vernal pool areas, and *L. cookii* were found growing around the pool margins. Several caged seed plots (each approximately 1 by 1 meter) at the west end of the mitigation area contained more 600 *L. cookii*, though plants showed signs of browsing. Within the Jackson Sport Park subpopulation ODA documented 4 Cook's lomatium plants and within the Hoover Ponds patches ODA documented 473 plants (ODA 2021, pp 11-12, 14-15).

6. BOR Agate Lake (no EOID). Stable. Cook's lomatium was identified at BOR's Agate Lake Reservoir property in 2024. The population occurs in the remote-control airplane field, located just north of the reservoir. The habitat has been strongly manipulated in the past to the extent that no vernal pool complex is visible. Currently no management occurs at the property to our knowledge. However, 15 Cook's lomatium plants were recently documented at this site. We do not have information on past management of this population since it was detected in March 2024 (Perchemlides 2024, pers. comm).

7. East Jackson Sport Park (EOID 22407). Declining. This Cook's lomatium population occurs on county managed land yet receives no vegetation management. The population does not receive regular monitoring and numbers appear to be in decline. This site has been thoroughly developed and little to no historic habitat remains. The 5 plants that were observed at this site in 2021 were not within the historical boundary and were growing up a

somewhat steep and rocky slope, uncharacteristic of natural Cook's lomatium habitat (ODA 2021, p. 14).

8. Avenue H. (EOID 14296). Unknown. The Avenue H population could be the largest population within the range of the species and is located on only 2 hectares (5 acres) that had been leveled. The population was first observed in 1982 with 14,000 plants documented within 3 small subpopulations. In 1992, the population had decreased to about 6,000 plants. By 2001, surveyors estimated 500,000 plants, with the majority of them juveniles. The population has not been visited since. We will attempt to access the property over the next few years, as time and funding allow.

9. Dry Creek. (EOID 23018). Unknown. This Cook's lomatium population is located on private property adjacent to Highway 140. The plants occur four miles east of Highway 140 from Highway 62 on both sides of the road. When the population was documented in 1986, just 25 plants were observed. In 1987, 600 plants were observed partially within a grazing allotment. Cattle were observed grazing on the south side of the road, but not the north. Plants were taller and more robust on the ungrazed side of the road. The area was not grazed in 1991, and by 1992 the population was well over 5,000 plants and spread out over 10 acres. No observations of Cook's lomatium have been made at the site since then.

10. Antelope Road. (EOID 5030). Unknown. This population occurs on City of Medford property just south of Antelope Road, near the Agate Desert Preserve. The site is currently grazed. It consisted of 4 small to moderate sized patches that totaled 1,000 plants and included a large number of seedlings and immature plants in 1987. The site had been levelled 10-40 years previously. The population had decreased by about 50 percent to less than 500 plants in 1992. A few Cook's lomatium were observed on the south side of Antelope Road in 2006, that were salvaged before the road was aligned. No observations of Cook's lomatium have made within the site since then.

11. Kirtland Road. (EOID 22012). Unknown. The Kirtland Road population was documented in 1992, with 3,100 plants occurring in one large patch and two small patches. The vernal pools appeared intact, but the mounds were dominated by yellow starthistle (*Centaurea solstitialis*). By 2000, only 231 Cook's lomatium plants were seen concentrated in one large and several smaller patches. The large patch documented to the west on this tract was absent. The population was last visited in 2002 and documented with 1,403 plants occurring within 3 patches.

12. Highway 140/Highway 62 intersection. (EOID 5813). Unknown. This population occurs on four corners of the intersection of the highways and was first observed in 1992. Originally 200 plants were documented in two small patches on the north side of 140, and one on the south side of 140 near the powerlines. Later, by 2000, the population was mapped on both sides on Highway 62, north of Leigh Way and south of Antelope Road. six patches of 290 plants were also mapped on the west side of highway 62, in the East Denman Wildlife Area, behind a MacDonalds, next to a Castlemart, a Subway restaurant, and the remainder were in partially undeveloped residential lots. In 2008, 10 plants were documented behind the McDonalds and the residential lots were developed. The Highway 62 population consists of four small patches that occur near the intersection of

Highways 140 and 62, The three of the patches have been developed and are considered extirpated the remaining patch occurs behind a fence. The site receives no mowing or management and appears to be solid pasture grass.In 2013, ODOT documented 129 Cook's lomatium plants in the patches close to the Highway 62 junction.

13. Corey Road. (EOID 19273). Unknown. This population was documented on private land in 1987, with two small Cook's lomatium patches of 20 and10 plants. By 1992, only one patch of 15 plants was observed. No observations have been made since. This population is quite possibly extirpated due to the vulnerability of the small population size.

14. Hoover Ponds/Highway 140 East. (EOID 6820). Unknown. The population occurs north and south of Highway 140 in an ODOT SMA. It includes both Cook's lomatium and large flowered woolly meadowfoam. The site is degraded vernal pool habitat and is characterized by many ruts and dominated by invasive grass. In addition, roadside garbage tends to accumulate on portions of the habitat from a neighboring residential development. A portion of the ODOT SMA along Hwy 140 was surveyed by ODA in 2021 but no Cook's lomatium plants were located (ODA 2021, p. 9). ODOT has discontinued monitoring this population, as it falls outside the roadside maintenance area (ODOT 2009).

15. Raven Road. (EOID 7711). The Raven Road population was documented in 1987 with 400 Cook's lomatium plants growing in relatively undisturbed vernal pool habitat. In 1992 about 250 plants were observed. The property was visited in 2008 and no plants or vernal pool habitat were observed.

In 2003, Cook's lomatium was seeded at the ODFW Denman Wildlife Area Military Slough Tract as mitigation for construction of an airport taxiway construction by the Rogue Valley Internation Airport. This mitigation created several dozen pools and seeded with native vernal pool plant species. For several years Cook's lomatium persisted at the mitigation site. By 2022, plants were no longer present and have not been seen since.

Illinois Valley (25 populations; 15 extant with recent observation or census [1 in decline], 6 presumably extant, with no obvious development or discernable disturbance from recent aerial imagery, but unknown or indeterminate status, and 4 presumably extirpated populations). The following populations correspond to the Oregon Biodiversity Information Center's plant database records and are referenced with the unique element occurrence identification (EOID) number. A total of 17 Illinois Valley Cook's lomatium populations (not including extirpated populations) are protected by Federal or State ownership, or by having a conservation easement.

1. French Flat Middle. (EOID 5809). Declining. The largest population of Cook's lomatium was documented in 1992 at the French Flat Area of Critical Environmental Concern (ACEC) on the BLM Medford District. This population, known as French Flat Middle (FFM), has been carefully monitored for over 30 years. The main subpopulations of this population are the upper and the lower subpopulations. The lower one is known as Piney Woods.

The upper FFM patches occur in open meadow habitat adjacent to the man-made Logan cut ditch. The meadow is facing plant competition from seral succession to conifer forest. Although the population occurred on property that had been placer-mined for many years, it is intact. The meadows are slowly becoming encroached by conifers and annual grasses. Off-road vehicles have periodically entered the meadows, which have left ruts and displaced soil. The established long-term monitoring plots have faced vandalism and garbage dumping over the course of the monitoring effort. The upper FFM subpopulation reached a patch size high of 137,560 plants in 2010 and decreased by 63 percent in 2019 to 50,811 plants. The FFM patch had an estimated high of 195,057 plants in 1998 and had decreased by 76 percent to 41,600 plants in 2019. The Piney Woods area was estimated to have over 800 plants in 2010. BLM plans to continue monitoring this population annually apart from the lapse in monitoring in 2020 (Pfingsten *et. al*. 2019, p. 30). The 2021- 2023 results will be available in late 2024 (Giles pers. comm 2023).

In stochastic simulations incorporating environmental variability performed by IAE from 1994-2011 and 2012-19, the Piney Woods patch was projected to decline at an overall rate of 0.856. This reflects the overall poor growth rates at this site since monitoring began in 1994. At the upper patch, the stochastic growth rate was lower, at 0.840, representing observations from 1994-99 and 2008-19. The risk of sharp decline in 20 years was 99.9 percent at Piney Woods and 99.7 percent at upper FFM. The risk of a 99 percent decline in 20 years was 1.9 percent at the patch and 13.5 percent at the upper FFM patch (Pfingsten *et. al*. 2019, p. 30). Offsetting these declines will take active restoration practices such as thinning encroaching trees and shrubs, mowing the site periodically, and augmenting the site with Cook's lomatium. Hydrologic monitoring would be advisable to detect loss of moisture. The site may be slowly drying out due the meadow becoming drained by the Logan Cut (F. Linton, pers. comm. 2021).

The population growth rates and probabilities of decline reported for FFM are best interpreted as comparisons of the performance of these two subpopulations and measures of their recent processes, rather than accurate predictions of future trends.

BLM's monitoring of the lower portion in 2018, documented 2,400 flowering plants, a 242 percent increase from the 700 plants reported in 2010 (BLM 2019). Although the area receives less management than the upper Middle and South patches, it is also located further away from mine tailings and disturbance from ORV activity and may allow Cook's lomatium to face less competition.

BLM has also been augmenting the population to offset loss. Several seeding and planting efforts have been installed around the French Flat ACEC and results have been promising so far. BLM is also performing vegetation management at the site to control succession and the density of annual grasses by removing conifers and performing prescribed burns.

2. Indian Hill. (EOID 16369). Stable. The Indian Hill Cook's lomatium population occurs on BLM land and occurs within a narrow open band bordered by forest on all sides. BLM with the assistance of the Service, has pursued vegetation management at the property for

several years by thinning the encroaching forest borders to widen the clearing occupied by the species. The population has been stable or gradually increasing. The population was estimated to have approximately 8,225 plants in 2019, which is above average. The highest count for plants was 12,898 (+/- 11,874) in 2005 and the lowest was 5,704 (+/- 3,904) in 2000 (Pfingsten *et al*. 2019, pp 37).

3. SOLC West Side Road and BLM Road 39-8-29. (EOID 17733). Declining. The Cook's lomatium population occurs near West Side Road and overlaps several privately owned parcels and BLM land. One of the parcels is under a conservation easement with SOLC. The private property owner removes invasive plants and as a result the vegetation appears predominantly native. In 2021, ODA, BLM and Service staff documented over 5,742 plants on the east side of West Side Road. The population is relatively robust and stable. At a site visit in 2010, Service staff estimated the entire site to have 81,000 plants, but this figure included an estimate of new seedlings and juvenile plants. There has been no evidence of any habitat disturbance that could have resulted in a decline, although Jeffrey pine (*Pinus jeffreyi*) and buckbrush (*Ceanothus cuneatus*) may have increased since the previous visit in 2010.

   In 2021, ODA staff also surveyed parcels on the opposite side of West Side Road for *L. cookii*. At this parcel that more than half of the historic population area on the western side of the road had been replaced by a cannabis agricultural plot. North of the parcel on BLM land, the habitat was in good shape and occupied by many native plant species with sparse weedy grasses around the periphery. The BLM portion of the site still provided excellent habitat. Just over 256 plants were observed at the site, which was down from 4,000 plants observed in 1993 (ODA 2021, p. 26).

4. Caves Highway SMA. Increasing. (EOID ID 5394). Increasing. This site is a ODOT Special Management Area that has been on an increasing trend for many years. Documented in 1988 with only 800 plants, the population has increased in size. In 2021, ODA documented 3,897 plants at the ODOT portion of the population, a 26 percent increase from the 2019 census (ODA 2021, p. 20). The population occurs on roadside gravel and extends into unmaintained open forest habitat and private property to the north and east. Since 2003, ODOT has stopped using herbicide at the site and has restricted roadside mowing to outside of the plant's growing window. ODOT has also performed small roadside maintenance activities at the site over the years extending the paved shoulder area to improve roadside safety and have replaced gravel from time to time (Sharp, pers. comm. 2019). The north subpopulation was visited by Service, BLM and FS staff on 4/5/2024. Plants were detected east of Laurel Road on the flanks of a large hill in two small subpopulations which numbered approximately 550 individuals. The population extends further east across a private property into an open meadow and up a small hill. It could include several hundred to thousands of plants, but it has not been accessed. This adjacent property would be an excellent candidate for conservation.

5. Rough and Ready Creek. (EOID 1204). Stable. The Cook's lomatium population occurs in a BLM ACEC (Area of Critically Environmental Concern) and has been stable but fluctuating since 1994, when BLM documented 278 plants initially. Although an all-time

high count of 2,830 plants was documented in 2011, most recently, in 2019, 2,444 plants were documented, a 50 percent increase from 2018. On the BLM portion of the population, numbers have fluctuated over the last 14 years, and have been averaging around 2,000 plants for the last 8 years, with no detectable long-term declining or increasing trends. However, on the private portion of the population there have been no surveys, and the population receives no management (Pfingsten *et al*. 2019, p. 34).

6. Logan Cut North (EOID 8349). Declining. The Logan Cut North population occurs on BLM land, north of the main French Flat ACEC. Surveyors documented 4,000 *L. cookii* plants in 2010. On April 5, 2024, Service, BLM, and FS staff revisited the population and observed approximately 1,300 plants. No signs of disturbance or dense influx of non-native invasive plants were apparent, but the population could have decreased due to natural succession pressure.

7. Waldo Takilma ACEC/NW of Esterly Lakes. (EOID 14098). Increasing. This population includes several subpopulations on the Waldo Takilma ACEC on BLM managed land, about 0.25 mi north of Waldo Road, along Logan Cut Rd. Surveyors documented 600-700 *L. cookii* plants in 2010. In 2024, Service, BLM, and FS staff documented 1,054 plants located in one large and two smaller subpopulations. The habitat appeared to have influence from ultra mafic soils due to the presence of exposed areas of soil, low stature shrubs, and more widely spaced vegetation. The population appeared healthy with no signs of non-native invasive plant infestations nor ongoing natural succession pressure.

8. Reeves Creek North 1. (EOID 6533). Stable. The Cook's lomatium population occurs in small openings within forested areas on BLM lands. The subpopulations (upper and lower) were detected in 1994, censused in 2009 and 2010 and checked on briefly in 2019. The plants have appeared stable and increased in numbers since the population was first counted. The population appeared in good shape in 2019 (Johnson 2019, pers. comm). A threat to the Reeves Creek North population is ORVs and encroachment from seral succession. BLM has been augmenting the population with seed and minimizing ORV use in the area. BLM documented a population of 905 plants in 2010. The population fluctuates from year to year but remains stable.

9. Reeves Creek North 2. (EOID 7272 and 12466). Stable. The two subpopulations are located in small openings within forested areas on BLM lands. In 1994, 350 plants were detected and by 2010, surveyors counted 550 plants. The upper subpopulation appeared stable and were still extant in 2019, but no census was taken (BLM 2019). The threat to the Reeves Creek North 2 population is ORVs and encroachment from seral succession. BLM has been augmenting the population with seed and minimizing ORV use in the area. BLM considers this population stable.

10. Illinois River Forks State Park. (EOID 23791). Declining. This property is owned and managed by the Oregon Parks and Recreation Department. First observed in 1996, the Cook's lomatium population has an upper and lower subpopulation. Portions of the population have since been monitored regularly since 2009. The upper portion is

monitored with a complete census and the lower portion is monitored with transects and quadrats. The highest plant count at the property was 575 in 2009. This may have been due to the nitrogen availability after a recent fire. The population has been declining in the lower portion but is stable in the upper portion. ODA visited the property in 2021 and documented 406 plants overall. The 10-year average of the upper portion is 150 plants while the data from transect monitoring indicates a steady decline, from a peak of 50 adults and 210 juveniles in 2014 to no adults and 25 juvenile plants in 2023. Management of brush will be necessary in the near future to prevent encroachment and may also deter rodent activity, as rodent presence is often noted in the underbrush. In 2017, herbicide trials were conducted at Illinois River Forks State Park using glyphosate, imazapic, fluaziufop, and a control treatment. Unfortunately, no significant differences between the control plots and treatment plots were observed (ODA 2019, pp. 23, 24, 36, 37; Bacheller, pers. comm. 2019).

11. Eight Dollar Mountain. (No EOID). Stable. A Cook's lomatium population was documented in 2023 at the Eight Dollar Mountain Linda Park (no EO ID) owned by SOLC. SOLC documented 297 Cook's lomatium plants clustered on old 2-track roadbed that supports moist meadow vegetation but also extends into buckbrush shrubland and into Jeffrey pine woodland. The road is used on occasion by neighbors who are maintaining their water right (K. Mergenthaler, pers. comm. 2023).

12. ODOT West Fork of Illinois River/Danna Lytjen site. (EOID 26317). Increasing. This Cook's lomatium population occurs in a shady roadside area adjacent to Hwy 199 on ODOT right-of-way. First documented in 2003, the location is less than 0.1 hectare (0.25 acre) and has very limited suitable habitat available for expansion. The site is bounded by a ditch and forest but is occupied by several native plant species. Private property is located on the other side of the woodland to the south. Prior to roadside improvement activities conducted in 2017, the population included 70 individuals but declined to a single plant in 2017 (D. Sharp, pers. comm. 2019). ODA visited the site in 2021 and documented 126 plants (ODA 2021, p. 27).

13. Logan Cut (EOID 16370). Stable. The Logan Cut population occurs on BLM land, west-northwest of the main French Flat ACEC. Surveyors documented 62 Cook's lomatium plants in 2010. On 4/5/2024, Service, BLM, and FS staff located only 1 of the 3 subpopulation patches and documented approximately 100 plants. No signs of disturbance or dense influx of non-native invasive plants were apparent, but the population may have decreased due to natural succession pressure.

14. The Reeves Creek South population (NE Kerby) (EOID 21461). Stable. This population is located about 1.20 kilometers (0.75 miles) northeast of Kerby, Oregon in a small wet area, on BLM land and occupies less than 0.1 hectare (0.25 acre). BLM botanists characterized this population as stable in 2019 and documented 80 flowering plants in 2010, up from 75 flowering plants in 2008.

15. Waldo Road (no EOID). Increasing. This population is located in a grassy and shrubby area on the south side of Waldo Rd, east of Rockydale Road. It was identified by Service

staff in 2010. At the time, 53 plants were observed at this location. On April 5, 2024, Service, BLM, and FS staff observed approximately 60 plants. The population was found to cover a larger occupied area, extending 24 – 30 meters (80 to 100 feet) west from its original mapped area, during the recent site visit.

16. West Side Road (EOID 15445). Declining. The Cook's lomatium population occurs in two patches on private land adjacent to West Side Road off of BLM road 39-8-29. The population occurs within a wet meadow and is north of a residential driveway with very restricted habitat. The wet meadow habitat on the private property side of the fence appears to have many native plant species. ODA staff were only able to document 15 plants and unable to access the meadow further into the property so the population could be larger (ODA 2021, p. 25). Arrangements with the property owner would be necessary to access the property and perform a complete plant survey.

17. Anderson Creek (2005). Unknown. This population was documented on private land by a botanical consultant during Wildland Urban Interface surveys. The consultant estimated 1,135 Cook's lomatium plants were present. The property has not been accessed since then, but no evidence of disturbance can be detected from recent aerial imagery.

18. Draper Creek (2005). Unknown. This population was documented on private land by a botanical consultant during Wildland Urban Interface surveys. The consultant counted 400 Cook's lomatium plants. The property has not been accessed since then, but no evidence of disturbance can be detected from recent aerial imagery.

19. Reeves Creek Middle (BLM Road 39-8-35). (EOID 2352). Unknown. The population is located east of Reeves Creek and included 10 individual plants in 1995. The site has not been relocated since then and could be extirpated. Efforts to relocate the population may prove difficult due to uncertain mapping.

20. French Flat North. (EOID 13983). Unknown. This population is located on BLM land and was surveyed in 1992 but has not been accessed since due to private land blocking accessible entry. The original documentation recorded 50 flowering plants.

21. French Flat South. (EOID 3833). Unknown. The Cook's lomatium population occurs on BLM land in the southern portion of the French Flat ACEC. First reported in 1991, with 20 plants, by 1999, 500 plants were observed. In 2010, the most recent visit, 200-300 plants were documented in excellent habitat condition. Aerial imagery from 2023 indicates no disturbance or habitat alteration has recently occurred in this location.

22. French Flat Carrol Slough (EOID 12297). Unknown. The Cook's lomatium population is located in the Southern portion of French Flat on BLM land. Botanists detected 50 plants at this location in 1991. In 2003, 20 flowering and 80 juvenile plants were reported. In 2010 no plants were seen by BLM staff. The population could yield plants in the future with careful surveys. Threats to all the French Flat area populations include off road vehicle disturbance and forest succession (BLM 2019).

23. Laurel Road. (EOID 11942). Extirpated. The population occurs on the edges of Laurel Road and on private driveways off of Laurel Road north of Highway 46 in Cave Junction. The population consists of two patches that were reported having approximately 150 plants in 1988. In 2021, ODA visited the Laurel Road shoulder right-of-way in the vicinity of the mapped location and observed no plants. The habitat is threatened by residential development and road-related management. ODA recommended the site be considered extirpated due to no sign of native intact habitat (ODA 2021, p. 28). On April 5, 2024, Service, BLM and FS staff attempted to locate the Laurel Road population. Although plants may possibly occur in back of the homes near open grassland, the staff could not observe any sign of the population from along the roads. Aerial imagery indicates much disturbance has occurred in the open areas where Cook's lomatium might have occurred previously.

24. BLM Waldo South. (EOID 30928). Extirpated. This population has not been locatable since 1998 and is believed to be extirpated or mis-mapped. The habitat does not appear suitable for Cook's lomatium, so a mapping error is a possibility.

25. ODOT Great Cats/Pinewood site (EOID 38864). Extirpated. This population occurred along Highway 199 on ODOT right-of-way. The population was documented with 82 plants in 2009. ODA visited the site in 2021 and found no plants. The site is very small and is dominated by thatch-forming grasses that were over 5 inches deep throughout the clearing. Invasive plants such as knapweed (*Centaurea* sp.), and moth mullein (*Verbascum* sp.) were also present. The property occurs along the roadside ditch that has a limited public right-of-way, indicating the original population was likely on private land. ODA recommended this site be considered extirpated (ODA 2021, p. 22).

26. Woodcock Bog Research Natural Area. (EOID 1906). Extirpated. This Cook's lomatium population occurs along a roadside leading to Woodcock Bog, just outside the BLM boundary on private land. A 50-individual Cook's lomatium subpopulation was first observed in 1992 in open dry serpentine habitat atypical for this species. The observer noted the population occurred in a discrete open area without any plants detected in nearby suitable habitat. BLM botanists last located the population in 2010 and observed 225 plants. Since then, BLM staff have not been able to locate the population and thus the population is likely extirpated (S. Johnson, pers. comm. 2019).

    In the Illinois Valley, several properties with Cook's lomatium have been available for purchase. In 2004, a "For Sale" sign was displayed along the Laurel Road property with a known Cook's lomatium population. In 2023, the Service was notified of a property for sale in the southern portion of French Flat area that was occupied by the species.

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APPENDIX B. Recovery Criteria Status for Cook's Lomatium, Oregon

The guidelines to downlist Cook's lomatium from endangered to threatened status, as included in the Recovery Plan for Rogue and Illinois Valley Vernal Pool and Wet Meadow Ecosystems (U.S. Fish and Wildlife Service 2012, pp. IV-26 to IV-27), are followed by the current status. We will equate the use of "occurrences" from the actual wording in the plan with "populations". The recovery plan includes the following criteria:

a. At least 30 of 34 documented/extant Cook's lomatium occurrences (approximately 90 percent) have been protected from development. If extant populations become extirpated, protection of reintroduced or introduced populations may be substituted. Introduced or newly discovered populations outside of currently known core areas may be substituted if deemed equivalent in their contribution to recovery.

At this time, 77 percent or 28 of the known 36 populations, are protected by BLM, City of Medford, Jackson County, ODOT, OPRD, or SOLC ownership or in a conservation easement. This criterion is not met.

b. At least 90 percent of suitable habitat acreage within each Priority 1 core area (one core area in the Rogue Valley and seven core areas in the Illinois Valley) has been protected from development. At least 85 percent of suitable habitat acreage within Priority 2 core areas (three core areas in the Rogue Valley and six core areas in the Illinois Valley) has been protected from development.

At this time, 45 percent of Priority 1 core areas and 50 percent of Priority 2 core areas are protected. This criterion is not met.

c. Management plans for each protected core area are developed and implemented as soon as feasible for Cook's lomatium protection and conservation. The management plans should address vegetation control, including thatch buildup and noxious weeds; monitoring of threats and population levels in detail sufficient to quantitatively assess population trends; maintaining hydrological functions; and outreach to neighboring landowners. Management plans should take an ecosystem approach to management by ensuring the long-term maintenance of wetland and adjacent upland plant associates.

Management plans are developed and have been implemented for the majority of the protected core areas including BLM, OPRD, SOLC, BOR, ODOT owned lands and lands under a conservation easement. This criterion is mostly met.

d. Additional Cook's lomatium occurrences identified through future site assessments, GIS analyses, and status surveys that are determined essential to recovery are protected.

Several new Cook's lomatium populations have become identified in the Illinois Valley and Rogue Valley and are protected. It is not certain if any populations *detected on private lands will be protected. This criterion is partially met.*

e. Achievement of self-sustaining Cook's lomatium populations will be determined through species monitoring and status surveys in each protected population. Population trends must be shown to be stable, increasing or showing only minor declines from high population levels for 10 years prior to consideration for reclassification.

This criterion has been met for the majority of the frequently monitored populations but has not been met overall (Appendix A, Table 1). This criterion is mostly met.

f. Seed collection is accomplished at each core area as insurance against the risk of stochastic extirpations and to ensure that genetic variation can be restored if extirpations occur. Seed banking may also be necessary in order to complete the reintroductions or introductions required to meet recovery criteria.

This criterion has been met for the majority of the secured and larger populations but has not been met overall, especially the small populations. This criterion is mostly met.

g. Reintroductions and introductions must be carried out (as described in the recovery plan). Introductions may replace extirpated populations that cannot be restored to the same site as the original population.

The Service, SOLC, and ODOT have funded Cook's lomatium reintroduction efforts in various areas. This criterion has been partially met.

Delisting may be considered for Cook's lomatium when all downlisting criteria plus the following criteria are met:

a. Status surveys, status reviews, and population monitoring show the populations are self-sustaining. Population trends must be shown to be stable, increasing or exhibiting only slight declines from high population levels during a 10-year period prior to consideration following downlisting) (*e.g.*, evidence of reproduction and recruitment) and have been determined to be stable, increasing or showing only minor declines from high population levels, and implementation of management plans is effectively managing or eliminating threats.

b. At least 32 of 33 Cook's lomatium occurrences (approximately 95 percent of documented/extant populations) have been protected. If extant populations become extirpated, protection of reintroduced or introduced populations may be substituted. Introduced or newly discovered populations outside of currently known core areas may be substituted if deemed equivalent in their contribution to recovery.

At this time, 77 percent or 28 of the known 36 populations, are protected by BLM, City of Medford, Jackson County, ODOT, OPRD, or SOLC ownership or in a conservation easement.

c. At least 95 percent of vernal pool habitat acreage within each Priority 1 core area and 90 percent of vernal pool habitat acreage within Priority 2 core areas has been protected. All vernal pool and wet meadow habitat must include soils and hydrology that supports

Cook's lomatium, as appropriate. Reintroductions and introductions are accomplished, as necessary and applicable, to replace populations where status surveys indicate the species has been extirpated (Table IV-4, Recovery plan).

At this time, 45 percent of Priority 1 core areas and 50 percent of Priority 2 core areas are protected.

d. A post-delisting monitoring plan has been developed for these plant species.

Currently a post delisting monitoring plan has not been developed because of its listing status.

APPENDIX C. Previous 5-Year Review (2019)

5-YEAR REVIEW
Cook's desert parsley (Cook's lomatium) (*Lomatium cookii*)

GENERAL INFORMATION:

Species: *Lomatium cookii*
Date listed: November 7, 2002
FR citation(s): 67 FR 68004 listing; 75 FR 42490 critical habitat designation
Classification: Endangered Species

BACKGROUND:

Most recent status review: September 27, 2011. 5-Year Review for *Lomatium cookii* (Cook's lomatium), U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office. Available at https://ecos.fws.gov/docs/five_year_review/doc3856.pdf and attached here as Appendix B.

FR Notice citation announcing this status review: 82 FR 18665. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status Reviews for 138 Species in Hawaii, Oregon, Washington, and California. April 20, 2017.

Critical Habitat: 75 FR 42490. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for *Limnanthes floccosa* ssp. *grandiflora* (Large-Flowered Woolly Meadowfoam) and *Lomatium cookii* (Cook's Lomatium). July 21, 2010.

Recovery Plan: Recovery Plan for Rogue and Illinois Valley Vernal Pool and Wet Meadow Ecosystems. November 6, 2012.

Lomatium cookii is a perennial forb in the carrot family (Apiaceae) found only in southwestern Oregon. *Lomatium cookii* inhabits seasonally wet habitats known as vernal pools in the Agate Desert, just north of the City of Medford in Jackson County's Rogue Valley. Occurrences of the species are also known from an area with a subsurface clay pan and seasonally wet soils in Josephine County (referred to as the French Flat or Illinois Valley sites), immediately west of Jackson County. At the time of listing, there were believed to be about 15 sites of *L. cookii* in the Rogue Valley and 21 sites in the Illinois Valley (U.S. Fish and Wildlife Service 2002, p. 68005).

ASSESSMENT:

Information acquired since the last status review:

This 5-year review was conducted by the U.S. Fish and Wildlife Service's (Service) Roseburg Field Office. We solicited data for this review from interested parties through a Federal Register notice announcing this review on April 20, 2017. More recently, we also contacted private landowners, agencies and organizations conducting recovery efforts for *Lomatium cookii* on their managed lands. These entities include the Medford Water Commission, Rogue Valley International Airport, Medford District Bureau of Land Management (BLM), State agencies [Oregon Department of Transportation (ODOT), Oregon Department of Agriculture Native Plant

Conservation Program (ODA), Oregon Parks and Recreation Department (OPRD), Oregon Department of Fish and Wildlife (ODFW)], and The Nature Conservancy (TNC). Additionally, we conducted a literature search and a review of information in our files. A final recovery plan for the species was adopted by the Service in 2012 (U.S. Fish and Wildlife Service 2012) and has informed this review.

New information:
No significant new data regarding the species' biological status or threats are known to warrant a change in the Federal listing status of *Lomatium cookii* since the previous 5-year review conducted in 2011 (U.S. Fish and Wildlife Service 2011a, entire) (Appendix B). As detailed below, although we have some limited new data available to us in the form of recent population counts and even discovery of a new population, this information does not significantly alter our understanding of the overall abundance and distribution of the species as last evaluated in 2011. At this time, we cannot document an overall improving or declining rangewide population trend of *L. cookii* populations in the Rogue and Illinois Valleys of Jackson and Josephine Counties, Oregon. Similarly, there is no information suggesting either an expanding or contracting distribution of *L. cookii*.

Threats to the species have changed little since the last 5-year review. At the time of listing, the primary threat to *Lomatium cookii* was habitat or population loss due to development, through either present or foreseen destruction, modification or curtailment of its habitat or range (U.S. Fish and Wildlife Service 2002, pp. 68009-68013). As of this current review, development pressures on suitable habitat remain in the Rogue and Illinois Valleys, though the pressures have been slightly alleviated due to the establishment of a mitigation bank and the purchase of lands that provide protection and conservation of the species by land conservancies. Encroachment by woody species, impacts from ORV use, and the indirect effects of mining operations continue as ongoing stressors at several sites, and incompatible grazing practices remain a potential threat. On balance, although we are beginning to make progress on the recovery of the species thanks to the efforts of conservation partners, the status of *L. cookii* has not yet changed significantly since our last assessment completed in 2011.

In sum, no new threats and no significant new information regarding the species' biological status are known to warrant a change in the Federal listing status of *Lomatium cookii*.

Abundance. We now know of a total of 36 populations of *Lomatium cookii*, 11 in the Rogue Valley and 25 in the Illinois Valley. Here we present the most recent information available through the individual monitoring programs for most of the 36 sites that have been assessed since the last census. This includes information for one new population record of *Lomatium cookii* (Waldo Road in the Illinois Valley). Information is not available for 15 known occurrences of the species (Table 1). It should be noted that *L. cookii* population parameters fluctuate annually depending on seasonal precipitation and temperature; therefore, it is not unexpected that the species population size estimate will vary from year to year.

Population Updates
Table 1 summarizes the status of all known populations of *Lomatium cookii*. The summaries below present further details for each population with relatively current records available to us.

The single extirpated population formerly occurred on private property (Raven Road population) in the Rogue River Valley, but the habitat no longer supports the plant. "Unknown" populations are populations that have not been observed or visited in over 10 years. Also included in that definition are populations which have been visited but no plants were present after two visits. After three visits over multiple years, with no plants observed, the population is considered extirpated.

Illinois Valley (25 populations; 14* with current records, 11 with unknown status. Figure 1.)

1. The *Lomatium cookii* Middle and South patches of the Logan Cut population, at the BLM's French Flat Area of Critical Environmental Concern (ACEC), occur within seasonally wet meadows that are adjacent to historic mining operations and tailings piles. These patches have been monitored annually since 1988. The meadows are slowly becoming encroached by conifers and annual grasses. Off-road vehicles (ORVs) have periodically entered the meadows, which has left ruts and displaced soil. The 2017 set of data records indicate that two sample areas within this *L. cookii* population have steadily declined from a high in 1998 of 462,000 plants to a low in 2017 of 80,000 plants, an 82 percent decrease (Pfingsten *et al.* 2017, pp. 15-23). BLM has been performing vegetation management at the site to control succession and the density of annual grasses by removing conifers and performing prescribed burns.

2. BLM's monitoring of the French Flat Piney Woods population in 2018 documented 2,400 flowering plants, a 242 percent increase from the 700 plants reported in 2010 (BLM 2019). Although the Piney Woods area receives less management than the Middle and South patches, it is also located further away from mine tailings and disturbance from ORV activity, and may allow *L. cookii* to face less competition.

3. In 2018, 50 plants were located at the Esterly Mine population, down from 250 in 2010. Threats to this population are ORV disturbance and forest succession (BLM 2019).

4. In 2010, only 2 plants were located at the Illinois River Woodland population, down from 13 plants observed in 1999 (BLM 2019).

5. The two Reeves Creek North *Lomatium cookii* populations occur in small openings within forested areas. The populations appeared stable and were still extant in 2016, but only receive sporadic monitoring (BLM 2019). A threat to the Reeves Creek North population is ORVs and encroachment from seral succession. BLM has been minimizing ORV use in the area, but has not yet performed vegetation management in the area.

6. No *Lomatium cookii* plants were located at the Woodcock Bog Research Natural Area in 2018. BLM botanists have not located any *L. cookii* within the past 5 years at this site (S. Johnson, pers. comm. 2019). If *L. cookii* plants are not located within or near these patches after two more attempts to locate them, the populations would be considered extirpated.

*Fewer than 14 are listed here due to combining some of the adjacent populations in these descriptions

Table 1. Status of known *Lomatium cookii* populations (USFWS 2012, 2019; BLM 2019). Data dates indicate the most recent population census available.

Illinois Valley Recovery Zone				
Population	Description	Extant	Extirpated	Status
1	Anderson Creek (2005 data)			U
2	Draper Creek (2005 data)			U
3	French Flat Carrol Slough (2017 data)			U
4	French Flat Logan Cut (2018 data)	✓		
5	French Flat Esterly Mine (2018 data)	✓		
6	French Flat Middle (2017 data)	✓		
7	French Flat North (1999 data)			U
8	French Flat Piney Woods (2017 data)	✓		
9	French Flat South (2017 data)			U
10	Illinois River Forks State Park	✓		
11	Illinois River Woodland (2017 data)			U
12	Indian Hill (2017 data)	✓		
13	ODOT Highway 46 SMA (2018 data)	✓		
14	Laurel Road (2017 data)	✓		
15	Reeves Creek Middle (BLM) (1991 data)			U
16	Reeves Creek North 1 (2015 data)	✓		
17	Reeves Creek North 2 (2015 data)	✓		
18	Reeves Creek South (1991 data)			U
19	Riverwash (2017 data)	✓		
20	Rough and Ready Creek (2019 data)	✓		
21	Waldo Road (2010 data) *New population*	✓		
22	Waldo South (2010 data)			U
23	Woodcock Mountain Westside Road (2019 data)	✓		
24	Woodcock Mountain (1991 data)			U
25	Woodcock Bog RNA (2018 data)			U
Rogue Valley Recovery Zone				
26	Agate Desert Preserve The Nature Conservancy/MWC property (2019 data)	✓		
27	Corey Road (2001 data)			U
28	Highway 140 East (2001 data)			U
29	JCURA and Jackson Sports Park (2019 data)	✓		
30	ODFW Denman Wildlife Area Hall Tract (2015 data)	✓		
31	ODOT Highway 140 SMA (2009 data)	✓		
32	ODOT Vernal Pool Conservation/Mitigation Bank/ KPMS/Whetstone Preserve (2019 data)	✓		
33	Raven Road (2008 data)		✓	
34	Rogue Airport (2018 data)	✓		
35	White City 1 (1987 data)			U
36	White City 2 (1987 data)			U

U = Unknown denotes a population that has not been visited in over 10 years or plants have not been detected after a site visit. A population is considered extirpated when the site has obviously been developed or plants have not been observed at the location after three visits. The BLM uses a Geographic Biotic Observations (GeoBOB) database to document population status. We utilized an ArcGIS shapefile to access the most recent GeoBOB records from BLM lands in the Illinois Valley (Josephine County) (BLM 2019). TNC, OPRD, BOR, and ODOT provided count information via e-mail either in the message or with a plant record attachment. USFWS observations were documented in a Service memo (USFWS 2019).

7. The Woodcock Mountain Westside Road population occurs on privately held lands, is relatively robust and stable, and exceeds 4,000 plants as of 2019 (G. Bennett, pers. comm. 2019). The plants occur within open meadow with scattered conifers and thickets of wedge-leaf buckbrush (*Ceanothus cuneatus*).

8. ODOT reported that the *Lomatium cookii* at the Highway 46 Special Management Area have been on an increasing trend. In 2018, 2,900 plants were documented in all age-classes, which represents a 483 percent increase since 1988, when only 600 plants were observed. The population occurs on roadside gravel and extends into unmaintained open forest habitat. Since 2003, ODOT has stopped using herbicide at the site and has restricted roadside mowing to outside of the plant's growing window. Likewise ODOT has performed small roadside maintenance activities at the site over the years extending the paved shoulder area to improve roadside safety and have replaced gravel from time to time (D. Sharp, pers. comm. 2019).

9. The *Lomatium cookii* occurring at Rough and Ready Creek has been stable in portions of the population, which extends across both public (BLM) and private lands (Pfingsten *et al*. 2017, pp. 15-23). BLM initiated the Rough and Ready Creek ACEC monitoring in 1994, documenting 278 plants within the ACEC. In 2011, an all-time high count of 2,830 plants was documented, but most recently, in 2017, 1,642 plants were documented, a 10 percent decline from 2016. On the BLM portion of the population, numbers have fluctuated over the last 14 years, and have been averaging around 2,000 plants for the last 8 years, with no detectable long-term declining or increasing trends. However, on the private lands there have been no surveys and the population is unmanaged.

10. The Indian Hill *Lomatium cookii* population occurs on BLM land and occurs within a narrow open band bordered by forest on all sides. BLM, with the assistance of the Service, has funded vegetation management at the property for several years, and has widened the clearing significantly. The population was estimated to have approximately 7,213 (+/- 4,298) plants in 2017, which is average. The highest count for plants was 12,898 (+/- 11,874) in 2005 and the lowest was 5,704 (+/- 3,904) in 2000 (Pfingsten *et al*. 2017, p. 37).

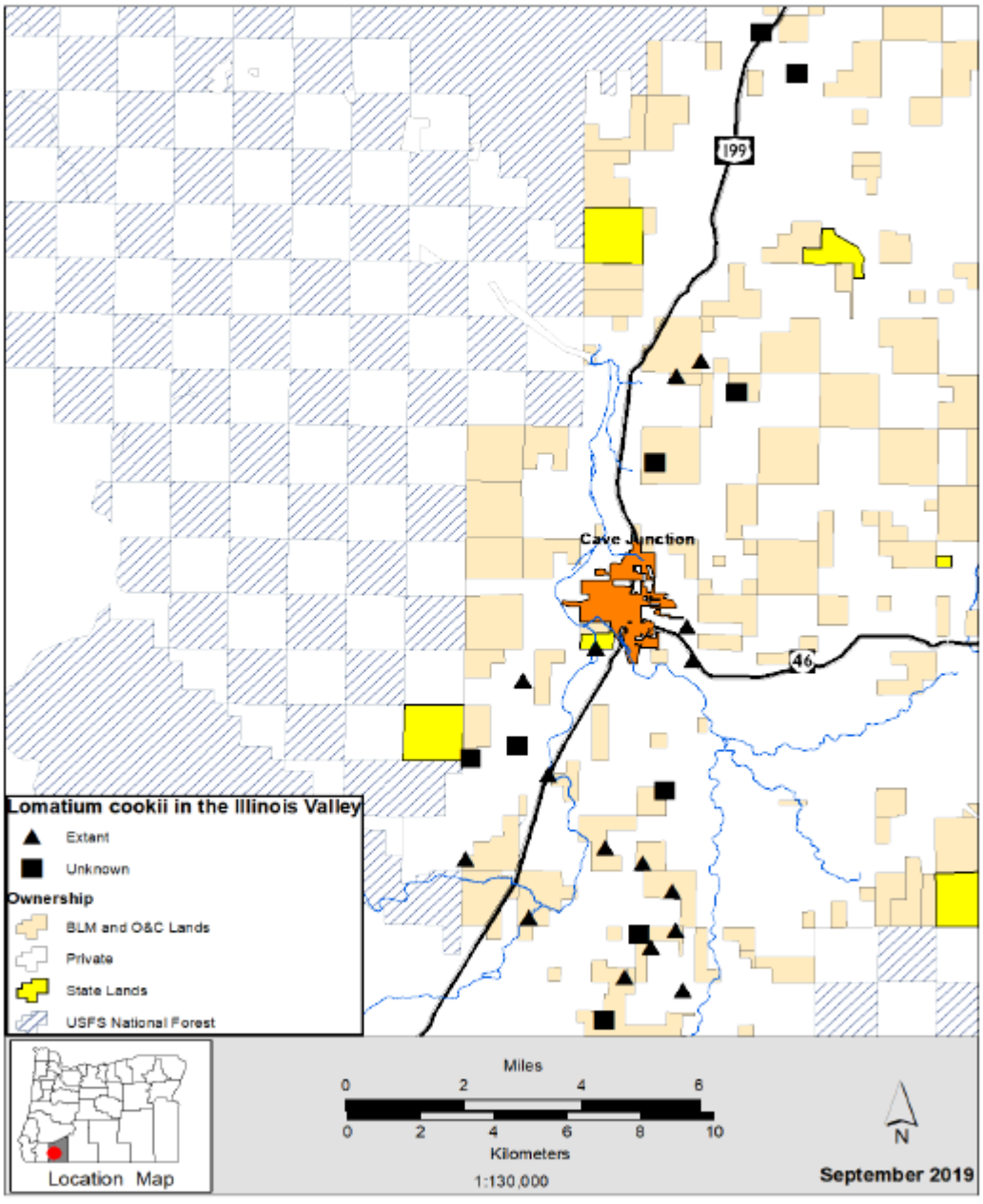
11. The Waldo Road population occurs on an open roadside area, and is newly documented since the last 5-year review for *Lomatium cookii*. It was last observed in 2010 with 53 plants documented (USFWS 2019).

12. *Lomatium cookii* at the ODOT Danna Lytjen Special Management Area (referred to in Table 1 as the "Riverwash" site) was first documented in 2004. The population at one time documented 70 plants. Since roadside improvement activities were conducted in 2017, the population has declined to a single plant in 2017 (D. Sharp, pers. comm. 2019).

13. The Illinois River Forks State Park is owned and managed by OPRD. Two portions of the population are monitored. The upper portion is monitored with transects and the lower portion is monitored with quadrats. The 2019 monitoring documented the lower portion has declined 56 percent from the previous year, from 160 to 70 plants, likely due

to early year flooding. The upper portion declined about 47 percent, to approximately 145 plants, but this was very close to the 10-year average of 150 plants. The property has been fenced-off from the road and picnic areas to deter traffic (N. Bacheller, pers. comm. 2019).

Figure 1. ***Lomatium cookii*** **populations in the Illinois Valley, Josephine County (USFWS 2019)**



6

Rogue River Valley (11 populations: 6 with current records, 4 with unknown status, 1 extirpated. Figure 2.)

1. The ODOT Vernal Pool Conservation and Mitigation Bank (ODOT Bank) in Central Point Oregon, has introduced and expanded the range of *Lomatium cookii* within the Whetstone Recovery Core Area. ODOT collected *Lomatium cookii* seed from a road construction work area, which was successfully bulked at the J. Herbert Stone Nursery and subsequently used to establish a population of *L. cookii* at the ODOT Bank (P. Benton, pers. comm. 2015). *Lomatium cookii* seed was planted in 2009, 2012, 2014, and 2015 into 76 macroplots and several restoration zones. Excess seed will be stored at the Herbert Stone Nursery and the Rae Selling Seed Bank. Since 2009, when the initial planting took place, the *L. cookii* population has grown within the ODOT Bank, from no plants in 2009 to over 813 plants within 30 acres (ac) (12.14 hectares (ha)) in 2018 (ODOT 2019, p. 3).

2. In 2013, the Jackson County Urban Renewal Agency (JCURA) introduced *Lomatium cookii* to a new mitigation area on Jackson County property (Sports Park) to compensate for impacts to vernal pool habitat in White City. The Agency had established approximately five patches of plants ranging from 15 to 200 individuals (270 plants total) within an 11-ac (4.5 ha) mitigation area to augment the population on the 70-ac (28-ha) property (Terra Science 2016, p. 4). A new road is planned to be constructed in 2020-2021, which will bisect the Park and impact one to two existing *L. cookii* patches that occur within several feet of the proposed road. To offset impacts, compensation is proposed to establish additional plants on-site.

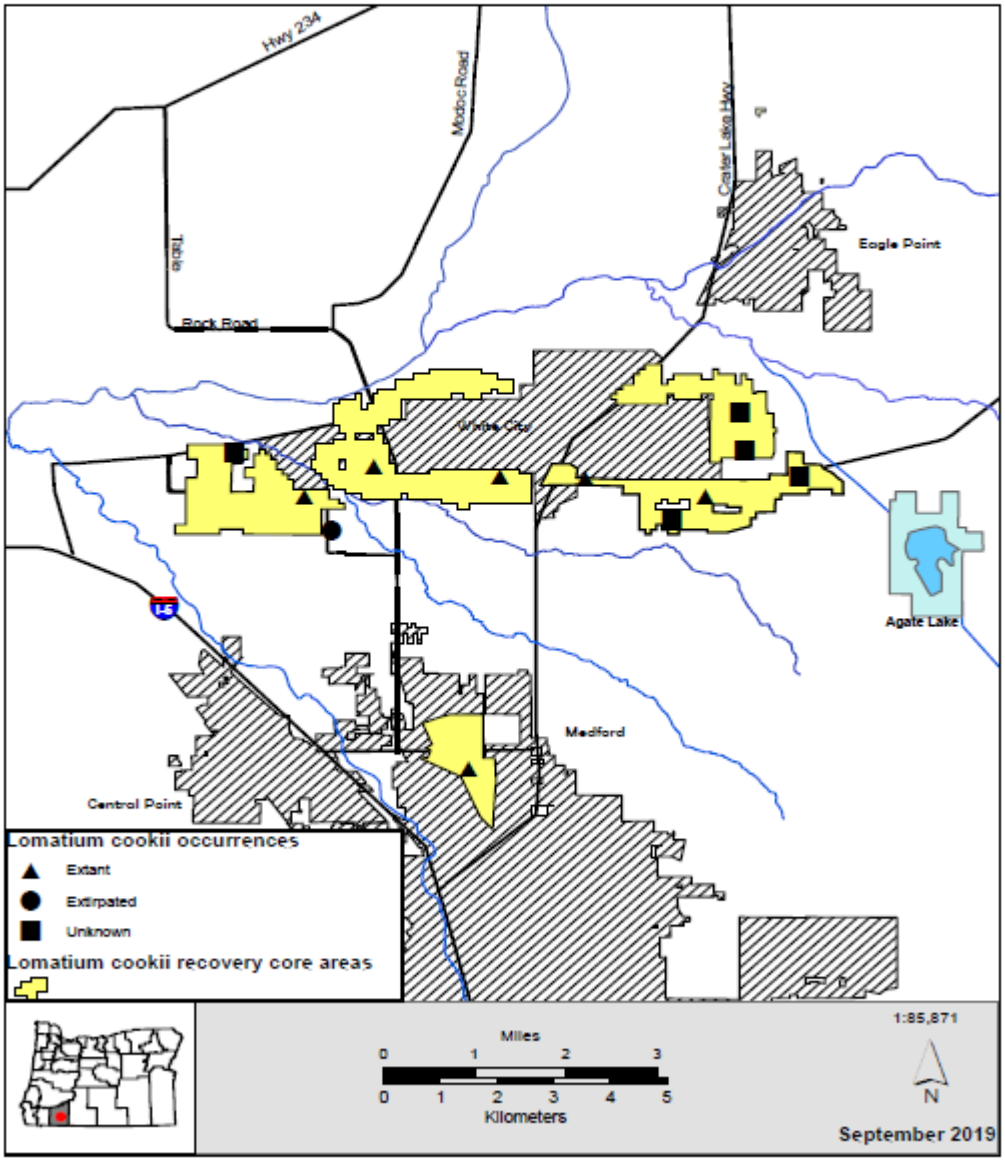
3. The ODOT Special Management Area along Hwy 140 has not been monitored since 2009. In 2009, the most recent monitoring visit, 54 *Lomatium cookii* plants of all age classes were observed, indicating successful reproduction and recruitment at this site. ODOT has discontinued monitoring this population, as it falls outside the roadside maintenance area (ODOT 2009).

4. The Rogue Valley International Airport population is not monitored annually, but based on several recent site visits conducted by Service staff in 2019, the *Lomatium cookii* population appears robust and unchanged since previous visits. Over time, the airport is anticipated to expand. The Rogue Airport *L. cookii* population receives consistent maintenance by mowing, and this appears to control competing vegetation, allowing the plant to flourish. The Service is aware of several airport development projects scheduled within the next 10 years, which are anticipated to affect several small *L. cookii* patches. The airport proposes to compensate these impacts with on-site mitigation involving new plant establishment (USFWS 2019).

5. The TNC Agate Desert Preserve's *Lomatium cookii* population has expanded in size and quantity. TNC conducted a prescribed burn on the property in 2017 and seeded *L. cookii* in appropriate habitat across the property. *Lomatium cookii* has responded with vigorous growth, increased germination, and has become established in new areas within the property (M. Morison, pers. comm. 2019).

6. The Denman Hall Tract *Lomatium cookii* population occurs on ODFW property and receives no management. In 2012, the population reportedly had 1,839 plants, down from 3,481 plants in 2008. Most of the flowering plants were found in the path of the Pacific Power transmission line access route, an area regularly disturbed by light vehicle traffic that has kept down competing vegetation growth and thatch accumulation (K. Perchemlides, pers. comm. 2012).

Figure 2. *Lomatium cookii* populations in the Rogue Valley, Jackson County (USFWS 2019)



Since the adoption of the 2012 recovery plan, *Lomatium cookii* remains at 36 known populations (or occurrences), with 1 new population (Waldo Road) documented and the Raven Road population lost (Table 1; Figure 2). The new population of 53 plants at the Waldo Road population was discovered in 2010 by Service biologist Sam Friedman on a roadside right-of-way on Jackson County. At the 20 some locations with consistent monitoring (provided above), the data suggests mostly stable to increasing numbers of *L. cookii* currently. Monitoring of the 15 remaining populations is either not currently occurring or there is difficulty relocating known populations, therefore the status of those populations is unknown, but we have no reason to expect that they have become extirpated. We cannot rule out the possibility, however, that they may be declining due to either uncontrolled grazing or management not well suited for *L. cookii*. Some of the sites may not have active vegetation management and, as a result, competition could be negatively affecting the populations. However, apart from the loss of the Raven Road population, we are not aware of any new diseases, predation, illegal or excessive collecting for scientific or commercial uses, significant plant loss due to development, chemical spills, or widespread land erosion occurring that could be negatively affecting the species. In addition, we know that development has not taken place on these sites, which would result in the extirpation of the known populations. For these reasons, we conclude it is reasonable to assume for the purposes of this review that these populations remain extant.

Distribution. Based on representative population assessments at the monitored locations provided above, as well as assuming the other known populations are still occupied by *Lomatium cookii*, we conclude the overall distribution remains unchanged. *Lomatium cookii* remains concentrated within the Illinois and Rogue River Valleys of southwestern Oregon and within its known historical range. Even with the extirpation of one population and the addition of one populations, range contraction or expansion of the species has not occurred.

Threats. Since the 2011 *Lomatium cookii* 5-year review, the threats remain the same or similar and no new significant threats and no significant new information regarding the species' biological status are known to warrant a change in the Federal listing status of this species. However, recently the Environmental Protection Agency proposed a change in the legal definitions of "wetlands of the United States" as defined by the Clean Water Act, which has the potential to affect *L. cookii* since it occurs in vernal pools and other seasonally wet habitats (February 14, 2019; 84 FR 4154). Although southern Oregon's vernal pools were formerly considered "jurisdictional wetlands" under section 404 of the Clean Water Act (33 USC 1344), such that the U.S. Army Corps of Engineers (Corps) would require a permit for the alteration of those wetlands, under the proposed new rules vernal pools would be considered isolated wetlands. This could terminate Corps oversight of southern Oregon vernal pools as jurisdictional wetlands, but often Corps Managers will consider the vernal pools as "preliminary jurisdictional wetlands" based on assumed subsurface connectivity to streams (N. Edwards, pers. comm. 2019). Applicants pursuing development within vernal pool habitat may still be required to obtain a wetland permit with the Oregon Department of State Lands (DSL) and be held to wetland mitigation requirements similar to those in place before the recent regulatory changes. The Service will continue to utilize the 2011 Vernal Pool Conservation Strategy Biological Opinion to address development in the Rogue River Valley. This document will assist in the preservation of *Lomatium cookii* and facilitate the conservation of the largest intact parcels of

vernal pool habitat (See **Conservation**, below). This strategy includes continuing to facilitate acquisition and protection of highest quality habitat.

Conservation. In the Rogue River Valley, the Service is directing the conservation of *Lomatium cookii* through community efforts and a region-wide vernal pool conservation strategy as referenced in the 2011 Vernal Pool Conservation Strategy Biological Opinion (U.S. Fish and Wildlife Service 2011b, entire). In galvanizing public support and in implementing the conservation strategy, the Vernal Pool Information Network (VPIN) has played a prominent role in gathering key landowners, local and State agency staff, municipal staff, conservation organizations, land trusts, the scientific community, and any interested parties involved together in vernal pool management discussions and site tours. This network has been effective in sharing common vernal pool management knowledge between the agencies, organizations, and the local landowners.

In 2011, the Service signed a Vernal Pool Biological Opinion that provides Endangered Species Act (ESA) Section 7 consultation coverage over a wide suite of both developmental or conservation activities with the express purpose of implementing a vernal pool conservation strategy. The consultation provides ESA coverage to the Corps and other Federal agencies, and provides guidance to various non-federal entities working within vernal pool habitat in the Rogue Valley (U.S. Fish and Wildlife Service 2011b, pp. 4-5, 16).

The Conservation Strategy includes the following:

- Targets for vernal pool complex habitat protection, restoration and enhancement; Guidance, best management practices, and performance standards for vernal pool complex and vernal pool species restoration and management;

- Prioritized use of credits available from conservation banks, mitigation banks, or equivalent conservation or mitigation projects (in conjunction with on-site best management practices and performance standards) as the most credible method to minimize the effects and significance of unavoidable impacts to listed vernal pool species that might result from otherwise lawful development activities in vernal pool complexes;

- Thresholds, criteria, ratios, and other factors that will determine establishment of appropriate credits and credit allocation to banks or equivalent conservation or mitigation projects and appropriate and effective use of these credits to address the adverse impacts of development projects, enabling Corps, and/or DSL-approved wetland banks and credits established consistent with the above factors to also serve as species conservation banks and credits under the ESA;

- Streamlined regulatory review and approval of certain conservation and development activities within vernal pool complexes via use of a single suite of standards and processes by the Corps, DSL, and the Service; and

- Common expectations and reasonable certainty about the standards and requirements for engaging in vernal pool complex development and conservation activities for landowners, developers, habitat managers, and others.

The ability to salvage, propagate and successfully transplant *Lomatium cookii* seed shows promise in advancing restoration of suitable sites. For example, ODOT has successfully salvaged and bulked seed of *L. cookii* at the J. Herbert Stone Nursery in Central Point, Oregon. The motivation for seed bulking is for ODOT to compensate for vernal pool habitat impacts experienced in the 2016 construction of the Oregon Highway 62 Corridor Solutions Project. The bulking resulted in the production of approximately 30 pounds of seed (P. Benton, pers. comm. 2015) and a portion of the seed was sowed into the ODOT Vernal Pool Mitigation and Conservation Bank and the adjoining Kincaid Property Mound Site. The *L. cookii* population has since expanded from approximately 6.07 to 12.1 hectares (15 to 30 acres) and from about 50 individual plants to over 813 plants at the ODOT properties (ODOT 2019).

Many Federal, State, and local partners, including private landowners, are actively engaged in conservation efforts for the benefit of *Lomatium cookii*. Since 2002, the amount of hectares (acres) of protected *L. cookii* habitat has increased from 603.8 hectares (1,492 acres) to 1,041.6 hectares (2,574 acres) (Appendix A, Table A-1). Although recovery efforts are progressing, we have not yet reached the point that a change in the Federal status of the species is suggested.

Recovery Criteria. Appendix A provides a summary of the status of the species relative to the downlisting and delisting criteria established for *Lomatium cookii* in the Recovery Plan for Rogue and Illinois Valley Vernal Pool and Wet Meadow Ecosystems (U.S. Fish and Wildlife Service 2012, pp. IV-26 to IV-27). Some of the criteria have been partially met for some of the frequently monitored populations at several core areas, but none of the criteria have yet been fully achieved.

Recommendations for Future Actions:

- Develop conservation easements or conservation programs for existing occurrences of *Lomatium cookii* on private lands.
- Make visits to historical *Lomatium cookii* occurrences in the Illinois and Rogue Valleys to determine whether the plants are still present or have become extirpated.
- Augment *Lomatium cookii* on protected habitat in appropriate locations in the Illinois and Rogue Valley areas.
- Conduct best management practices studies for *Lomatium cookii*.

Conclusion:
No new threats and no significant new information regarding the species' biological status are known to warrant a change in the Federal listing status of *Lomatium cookii*.

After reviewing the best available scientific information, we conclude that *Lomatium cookii* remains an endangered species. The evaluation of threats affecting the species under the factors in 4(a)(1) of the ESA and analysis of the status of the species in our 2011 status review remains an accurate reflection of the species current status.

Lead Field Supervisor, Fish and Wildlife Service

Approve _____ Date 10/1/19

Appendix A. Status of the Species Relative to Recovery Criteria
Appendix B. 5-Year Review conducted in 2011