



Billing Code 4310–55–P

## **DEPARTMENT OF THE INTERIOR**

### **Fish and Wildlife Service**

#### **50 CFR Part 17**

**[Docket No. FWS–R8–ES–2011–0055; 4500030113]**

### **Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to List Leona’s Little Blue Butterfly as Endangered or Threatened**

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

**ACTION:** Notice of 12-month petition finding.

**SUMMARY:** We, the U.S. Fish and Wildlife Service (Service), announce a 12-month finding on a petition to list Leona’s little blue butterfly (*Philotiella leona*) as an endangered or threatened species under the Endangered Species Act of 1973, as amended (Act). After a review of the best available scientific and commercial information, we find

that listing Leona's little blue butterfly is not warranted at this time. However, we ask the public to submit to us any new information that becomes available concerning threats to the species or its habitat at any time.

**DATES:** The finding announced in this document was made on [INSERT DATE OF FEDERAL REGISTER PUBLICATION].

**ADDRESSES:** This finding is available on the internet at <http://www.regulations.gov> under Docket No. FWS-R8-ES-2011-0055 and on the Klamath Falls Fish and Wildlife Office website at <http://www.fws.gov/klamathfallsfwo/>. Supporting documentation we used in preparing this finding is available for public inspection, by appointment, during normal business hours at: U.S. Fish and Wildlife Service; Klamath Falls Fish and Wildlife Office; 1936 California Ave; Klamath Falls, OR 97601; telephone: (541) 885-8481; facsimile (541) 885-7837. Please submit any new information, materials, or questions concerning this finding to the above street address.

**FOR FURTHER INFORMATION CONTACT:** Laurie Sada, Field Supervisor, U.S. Fish and Wildlife Service, Klamath Falls Fish and Wildlife Office; 1936 California Ave; Klamath Falls, OR 97601; telephone: (541) 885-8481; facsimile (541) 885-7837.

Persons who use a telecommunications device for the deaf (TDD) may call the Federal Information Relay Service (FIRS) at 800-877-8339.

**SUPPLEMENTARY INFORMATION:**

## Background

Section 4(b)(3)(B) of the Act (16 U.S.C. 1531 *et seq.*) requires that, for any petition to revise the Federal Lists of Endangered and Threatened Wildlife and Plants that contains substantial scientific or commercial information that listing the species may be warranted, we make a finding within 12 months of the date of receipt of the petition. As discussed above, in this finding, we have determined that adding Leona's little blue butterfly to the Federal Lists of Endangered or Threatened Wildlife is not warranted.

This finding is based upon the "Species Report for Leona's Little Blue Butterfly (*Philotiella leona*)," (Service 2015, entire) (Species Report) and the scientific analyses of available information prepared by Service biologists from the Service's Klamath Falls Fish and Wildlife Office, the Pacific Southwest Regional Office, and the Headquarters Office. The Species Report contains the best scientific and commercial data available concerning the status of Leona's little blue butterfly, including the past, present, and future stressors to the species. As such, the Species Report provides the scientific basis that informs our regulatory decision in this document, which involves the further application of standards within the Act and its implementing regulations and policies.

Below is a summary of the background information on Leona's little blue butterfly. For additional information and a detailed discussion of the species' description, taxonomy, life history, habitat, soils, distribution, and abundance, please see the Species Report for Leona's Little Blue Butterfly (*Philotiella leona*) (Service 2015, entire)

available under Docket No. FWS–R8–ES–2011–0055 at <http://www.regulations.gov>, or from the Klamath Falls Fish and Wildlife Office (see **ADDRESSES**).

### **Previous Federal Action**

On May 12, 2010, we received a petition from the Xerces Society, Dr. David McCorkle of Western Oregon University, and Oregon Wild (Petitioners), requesting that Leona’s little blue butterfly be listed as endangered (Matheson *et al.* 2010, entire). On August 17, 2011, we published in the **Federal Register** (76 FR 50971) a 90-day finding on the petition and found that the petition presented substantial scientific or commercial information indicating that listing Leona’s little blue butterfly may be warranted.

On July 1, 2013, the Petitioners filed an action with the U.S. District Court of Oregon challenging the Service for failure to issue the 12-month finding on the petition (*Xerces Society for Invertebrate Conservation, et al., Plaintiffs, v. S.M.R. Jewell, et al.*; Case No. 3:13-CV-01103-MO). On July 31, 2014, the parties entered into a stipulated settlement agreement and order in which the Court ordered the Service to make the required finding pursuant to 16 U.S.C. 1533(b)(3)(B) no later than June 30, 2015. This notice constitutes our compliance with the Court Order and completes our review and final action regarding the petition to list Leona’s little blue butterfly as endangered or threatened under the Act.

### **Species Description**

Leona's little blue butterfly is a member of the butterfly family Lycaenidae (gossamer-winged butterflies) and the tribe Polyommataini (Pyle 2002, p. 222). The species has a wingspan of less than 0.75 to 1.0 inches (in) (1.9 to 2.5 centimeters (cm)) (Pyle 2002, p. 236). The dorsal wing color for males is dark dusky blue with black submargins and is brown for the female. The ventral wing color for both sexes is white with black spots on fore- and hind-wings (Hammond and McCorkle 1999, p. 77). Leona's little blue butterfly may be confused with other co-occurring species of little blue butterflies such as the glaucous blue (*Euphilotes glaucus*) and the lupine blue (*Plebejus lupini*) (Ross 2010, pp. 10–12). Additional species description information can be found in the Species Report (Service 2015, pp. 4–7).

### **Biological Information**

The biology of Leona's little blue butterfly is very closely tied to its larval annual host plant, *Eriogonum spergulinum* (spurry buckwheat) (Hammond and McCorkle, 1999 p. 80; James 2012, pp. 93, 95; James *et al.* 2014, p. 269). Buckwheat species, such as spurry buckwheat, are known to be pioneer plants. Pioneer plants are plants that colonize disturbed sites and other open, less vegetated areas (Meyer 2008, pp. 499–503). Food sources for adult Leona's little blue butterfly include spurry buckwheat as well as other flowering plants that produce nectar (Ross 2009, p. 17; Johnson 2010, p. 5; Johnson 2011, p. 9; James 2012, p. 95; James *et al.* 2014, pp. 269–271). Adult Leona's little blue butterfly begin flying and mate in mid- to late-June, which coincides with the period when spurry buckwheat is beginning to flower and providing sources of nectar (Ross

2008, p. 5; James *et al.* 2014, p. 268). The lifespan of adults is thought to be 2 weeks (James *et al.* 2014, p. 272). The eggs of Leona's little blue butterfly are laid on the host plant in early July and hatch into larvae a few days later (James 2011, p. 19; James 2012, p. 94). The larvae appear to feed only on the bud and flower of spurry buckwheat (James 2011, p. 19; James 2012, p. 94). Larvae continue to mature and develop into pupa before the plants senesce (Holdren and Ehrlich 1981, p. 128; Ehrlich and Murphy 1987, p. 124). The pupa overwinter (some captive bred pupa remained dormant for 2 years) and emerge as adult butterflies to complete the cycle (James 2012, pp. 94–95). Additional biological information on the species can be found in the Species Report (Service 2015, pp. 7–15).

### **Population Size and Distribution**

Information provided in the petition stated that Leona's little blue butterfly was known from a single population (estimated at 1,000 to 2,000 individuals) and that its range was limited to a 6-square-mile (sq-mi) (15.5-square-kilometer (sq-km)) area in the rain shadow of the Cascades near Sand and Scott Creek of the Antelope Desert in Klamath County, Oregon (Matheson *et al.* 2010, pp. 7–8). Additional surveys conducted in 2011 used a predictive habitat model to search 18,654 acres (ac) (7,549 hectares (ha)) in Oregon adjacent to and more distant from the known population (Johnson 2011, p. 5). No other populations were located outside the Sand and Scott Creek area despite other areas seemingly having the appropriate habitat characteristics (Ross 2008, pp. 5–9; Ross 2009, pp. 4, 8–17; Johnson 2010, p. 2; Johnson 2011, p. 5; Chew 2013, p. 2; Johnson and Ross 2013, pp. 2–12). This indicates that new populations of Leona's little blue butterfly

are not likely to be discovered based on negative survey results from Oregon and California in habitat having appropriate characteristics and, therefore, a high potential for the species to be present (Johnson and Ross 2013, p. 2).

Based on a better understanding of habitat requirements, more focused survey efforts, and more rigorous sampling methods for the species between 2009 and 2013, the current known range of the species has doubled in size from 6 sq mi (15.5 sq km) to 12.8 sq mi (33.1 sq km) (James *et al.* 2014, p. 272; Service 2015, p. 16). Similarly, the population size estimates have increased to approximately 20,000 individuals as a result of the additional survey efforts (James *et al.* 2014, p. 272). Leona's little blue butterfly occupancy appears to be coincident with the northern edge of the Sand Creek and Scott Creek alluvial fans (fan-shaped deposits of volcanic material) deposited after the eruption of Mt. Mazama (present day Crater Lake, OR) 6,600 to 7,700 years ago (Tilden 1963, pp. 110–111; Hammond 1981, p. 180; Harris 1988, p. 105; U.S. Geological Survey (USGS) 2002, p. 1; Cummings 2007, p. 30; Johnson 2010, p. 4). Additional population size and distribution information can be found in the Species Report (Service 2015, pp. 5, 15–18).

### **Habitat Characteristics**

Habitat for Leona's little blue butterfly is influenced by the geology of the Sand and Scott Creek area, characteristics of vegetation and soil distribution and composition, and factors contributing to the area's disturbance regime (i.e., timber management and fire). Leona's little blue butterfly inhabits open and often disturbed areas associated with

the distribution of its host plant, spurry buckwheat (Ross 2009, p. 20; Service 2015, p. 11). The unique assemblage of plant species found in the vicinity of Sand and Scott Creeks is not likely to occur outside the ash and pumice fields deposited during the eruption of Mt. Mazama (Johnson 2011, p. 2). One reason for this may be the presence of subsurface moisture present from an alluvial fan (Johnson 2011, p. 2). Sand Creek and Scott Creek alluvial fans are thicker than other alluvial fans immediately to the north of the occupied habitat area (Johnson 2011, p. 7). Sand Creek and Scott Creek have removed most of the fine ash layer from the eruption of Mt. Mazama, improving porosity and permeability of the area (Johnson 2011, p. 2).

The transition zone between the Bitterbrush/Needlegrass-Sedge and Lodgepole Pine/Bitterbrush/Fescue plant communities coincides with the boundary of Leona's little blue butterfly occupancy (Volland 1988, pp. 29, 39; Johnson 2010, p. 2). Annual and perennial plants occurring within the occupied habitat include, but are not limited to: spurry buckwheat, *Eriogonum umbellatum* (sulphur-flower buckwheat), *Hemizonella minima* (least tarweed), *Cistanthe umbellata* (Mt. Hood pussypaws), *Plagiobothrys hispidus* (Cascade popcorn flower), *Machaeranthera canescens* var. *shastensis* (hoary aster), *Packera cana* (woolly groundsel), *Gayophytum diffusum* (spreading groundsmoke), *Phacelia hastata* (silverleaf phacelia), *Agoseris glauca* (pale agoseris), *Antennaria rosea* (rosy pussytoes), *Epilobium* spp., *Pinus contorta* (lodgepole pine), *Pinus ponderosa* (ponderosa pine), and *Populus tremuloides* (quaking aspen).

The habitat is a dry, high desert with a limited ability of the ash-pumice fields to retain moisture (Hammond 1981, pp. 180, 190). Topography of the area occupied by Leona's little blue butterfly is relatively flat, with elevations ranging from 4,530 ft (1,381 m) on the west to 4,660 ft (1,420 m) on the east (Ross 2009, p. 19; Esri, Inc. ArcMap 10.2.2 1999–2014). Most precipitation in the Sand and Scott Creek area falls in non-summer months with annual rain and snowfall totals ranging from 15–30 in (38–76 cm) (Youngberg and Dyrness 1959, p. 111; Dyrness and Youngberg 1966, p. 123). The porous ash-pumice fields fail to retain moisture during the short summer growing season, with the exception of some areas where ground water does come to the surface (Hammond 1981, p. 180; Hammond and Dornfeld 1983, p. 120). However, subsurface moisture in the Sand and Scott Creeks area may be greater than the surrounding area because Sand and Scott Creeks flow year-round (Cummings 2007, pp. 49, 72, 105). Additional information on habitat characteristics can be found in the Species Report (Service 2015, pp. 11–15).

### **Land Ownership and Management**

Land ownership in the range of Leona's little blue butterfly includes Federal and private land. The majority of the land is held by a single private landowner and their lands have been managed for commercial timber operations. This property has recently (2015) been sold to another private timber company, and management of the area is expected to continue as commercial timber land. The Federal land is part of the Fremont-Winema National Forest and is managed for conservation of resources, per their Land

and Resource Management Plan (USFS 1990, entire). The remaining private lands are made up of many small parcels with multiple land owners. Additional land ownership information can be found in the Species Report (2015, Figure 1). Table 1 identifies the land ownership, approximate amount of land, and percentage of habitat area.

Table 1. Land ownership, area of land, and percentage of Leona’s little blue butterfly habitat within the species’ range.

Population Name	Land Ownership	Approximate Area (acres (hectares))	Approximate Area of Habitat (percent)
Sand Creek <sup>1</sup>	Private Timber Lands <sup>2</sup>	7,654 (3,097)	93.7
	Fremont-Winema National Forest	120 (48)	1.5
	Other Private Lands	396 (160) from a total of 48 parcels.	4.8

<sup>1</sup> The species was first described in the vicinity of Sand Creek, and is the name that has been adopted to identify the population. Further surveys expanded the range, and the species is now known from the vicinity of both Sand and Scott Creeks.

<sup>2</sup>Private timber lands previously owned by Fidelity National Financial, the property has recently been sold to Whitefish Cascade Forest Resources of Salem, Oregon and Singapore.

### Summary of Factors Affecting the Species

In development of the Species Report for Leona’s little blue butterfly and conducting our status review, we identified those stressors that may potentially impact Leona’s little blue butterfly individuals or their habitat. The following sections provide a summary of the current stressors impacting Leona’s little blue butterfly. Table 2 below summarizes the stressors identified for the species over time since the species was first petitioned for listing and compares these with the current situation. The stressors are not listed in order of magnitude or level of severity. The level of impact of each stressor on

Leona's little blue butterfly or its habitat is provided in the summary for the stressor in both the Species Report and this 12-month finding. Low-level impacts are those that are considered baseline for a species under natural conditions that may cause a minor amount of loss of individuals and/or habitat currently or in the future, but which do not affect the species as a whole. Moderate-level impacts are those that are causing a more than minor but not widespread loss of individuals and/or habitat currently or that may do so in the future. High-level impacts are those that are causing widespread loss of individuals and/or habitat currently or that may do so in the future. In our evaluation, we did not find any high-level impacts affecting the species or its habitat.

In this document, we discuss those stressors currently identified as potentially impacting Leona's little blue butterfly or its habitat including those stressors that have changed since our August 17, 2011, 90-day finding (76 FR 50971) published in the **Federal Register**. A complete discussion of stressors can be found in the Species Report (Service 2015, pp. 19–70).

Table 2. Stressors identified for Leona's little blue butterfly over time

Stressor	Assessment of the stressor's impact to Leona's little blue butterfly or its habitat		
	2010 Petition	2011 90-day Finding <sup>1</sup>	2015 Species Report
Timber Management	-/+	Not substantial	Low-level
Lodgepole Pine Encroachment	–	Substantial	Moderate-level
Fire	–	Substantial (catastrophic fire)	Low-level
Fire Retardant	n/a	n/a	Low-level
Fire Suppression	n/a <sup>2</sup>	n/a <sup>2</sup>	Low-level
Right-of-Way Maintenance	n/a	n/a	Low-level

Cinder Mining	–	Not substantial	Not Present
Livestock Grazing	–	Not substantial	Not Present
Herbivory from Native Animals	n/a	n/a	Low-level
Herbicides	–	Not substantial	Low-level
Invasive Plants	n/a	n/a	Low- to moderate-level
Insect Collection	-/+	Not substantial	Low-level
Competition with Other Invertebrates	n/a	n/a	Low-level
Predation	–	Not substantial	Low-level
Disease	–	Not substantial	Low-level
Pesticides	–	Not substantial	Low-level
Isolated Population (drought, fire, disease, inbreeding)	–	Substantial (catastrophic fire)	Low-level
Effects of Climate Change	n/a	n/a	Low- to moderate-level
Potential Change in Land Ownership	–	Not substantial	Not applicable

n/a = not addressed; “–” = negative impact; “+” = positive impact; “-/+” positive and negative impact.

<sup>1</sup>Service’s determination that the petition presented either “Substantial” or “Not substantial” information indicating that listing may be warranted. Substantial stressors are those stressors that necessitated further review in this 12-month finding

<sup>2</sup>Discussed in reference to lodgepole pine encroachment in petition and 90-day finding

Section 4 of the Act (16 U.S.C. 1533) and implementing regulations (50 CFR 424) set forth procedures for adding species to, removing species from, or reclassifying species on the Federal Lists of Endangered and Threatened Wildlife and Plants. Under section 4(a)(1) of the Act, a species may be determined to be endangered or threatened based on any of the following five factors:

(A) The present or threatened destruction, modification, or curtailment of its habitat or range;

(B) Overutilization for commercial, recreational, scientific, or educational purposes;

(C) Disease or predation;

(D) The inadequacy of existing regulatory mechanisms; or

(E) Other natural or manmade factors affecting its continued existence.

In making our 12-month finding on the petition, we considered and evaluated the best available scientific and commercial information pertaining to Leona's little blue butterfly in relation to the five factors provided in section 4(a)(1) of the Act. In considering what factors (stressors) might constitute threats, we must look beyond the mere exposure of the species to the factor to determine whether the species responds to the factor in a way that causes actual impacts to the species. If there is exposure to a factor, but no response, or only a positive response, that factor is not a threat. If there is exposure and the species responds negatively, the factor may be a threat and we then attempt to determine if that factor rises to the level of a threat, meaning that it may drive or contribute to the risk of extinction of the species such that the species warrants listing as an endangered or threatened species as those terms are defined by the Act. This does not necessarily require empirical proof of a threat. The combination of exposure and some corroborating evidence of how the species is likely impacted could suffice. The mere identification of factors that could impact a species negatively is not sufficient to compel a finding that listing is appropriate; we require evidence that these factors are operative threats that act on the species to the point that the species meets the definition of an endangered or threatened species under the Act.

Listing actions may be warranted based on any of the above factors, singly or in combination. The information pertaining to the five factors found under section 4(a)(1) of the Act is discussed for the species below. In this notice, we focused our discussion of threats to those stressors currently found to be potentially impacting Leona's little blue

butterfly or its habitat (see Table 2 above). A complete discussion of all the stressors identified in Table 2 including how and to what extent they may impact Leona's little blue butterfly or its habitat can be found in the Species Report (Service 2015, pp. 19–70).

#### Factor A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range

The stressors that may impact the habitat or range of Leona's little blue butterfly include: timber management, lodgepole pine encroachment, fire, fire suppression, right-of-way maintenance, herbivory from native animals, herbicide application, invasive plants, and the effects of climate change. Some of the same potential activities that affect the habitat of Leona's little blue butterfly can also affect individuals. While these impacts to Leona's little blue butterfly may better be characterized under Factor E (Other Natural or Manmade Factors Affecting Its Continued Existence), they are included here in the Factor A discussion for ease of discussion and analysis.

##### *Timber Management*

The majority (93.7 percent) of land occupied by Leona's little blue butterfly is managed for timber production (commercial timber lands). Timber management is a broad term that encompasses many activities associated with the removal of trees for commercial or noncommercial purposes. Activities may include creation of temporary or permanent roads, use of existing roads, creation of new landings for log or equipment staging, use of existing landings, heavy equipment traveling on and off roads, felling of

trees, limbing trees, skidding of trees to landings, piling of logging slash by machine or hand, and burning slash piles. Ground disturbance from all of these activities can impact Leona's little blue butterfly habitat through trampling of host and nectar plants thus making them a less viable resource for Leona's little blue butterfly. Similarly, timber management activities that utilize heavy machinery can affect all life stages of individual Leona's little blue butterfly through crushing of eggs, larvae, pupae, and adults. Activities that result in clearing of suitable habitat (e.g., creation of new roads and landings) have a greater potential impact since host and nectar plants are no longer available for use by Leona's little blue butterfly until plants regenerate during the following growing season. However, timber management activities can also be beneficial to Leona's little blue butterfly and its habitat. The removal of trees and ground disturbance provides conditions suitable to colonization by spurry buckwheat.

Spurry buckwheat is a colonizer plant species and is capable of rapidly inhabiting open areas resulting from timber management that may not have been previously available to Leona's little blue butterfly. As spurry buckwheat and nectar plants become abundant in the open areas, the habitat becomes suitable for Leona's little blue butterfly. Additionally, the removal of trees and logging slash reduces the overall potential risk of wildfire and limits the potential intensity, severity, and rate of spread of wildfire (see *Fire* discussion below). This stressor has occurred in the past and will occur in the near- and long-term future. See Timber Management section in the Species Report (Service 2015, pp. 20–23) for additional discussion of this stressor.

As a result, we have determined that timber management acts as a low-level stressor on Leona's little blue butterfly and its habitat because impacts are more likely to affect forested areas that are not suitable habitat and are not occupied by Leona's little blue butterfly. Impacts to existing open areas containing butterflies would be localized and affect few individuals. Beneficial effects from timber management promote the development of new habitat and maintenance of existing habitat. The limited scope and low severity of the stressor suggest that this is not a considerable source of loss of individuals or habitat. Rather, the longer term benefits from timber management promote continued occupancy and habitat for Leona's little blue butterfly. As a result, we have determined that the impacts from timber management do not rise to the level of a threat.

#### *Lodgepole Pine (Pinus contorta) Encroachment*

Leona's little blue butterflies occupy open habitat areas that are treeless or sparsely treed. In some cases, natural openings are being encroached by lodgepole pine. Encroachment is different from the natural regeneration of previously forested areas. Encroachment occurs when lodgepole pine, for example, gradually expands into open areas where it was previously absent. Natural regeneration occurs when areas that were harvested become forested again through the gradual sprouting of seeds and growth of seedlings over time. Encroachment and natural regeneration may result in the gradual conversion of these open habitat areas to forested habitats.

Lodgepole pine encroachment is believed to have reduced the extent of openings in areas occupied by Leona's little blue butterfly (Johnson 2010, p. 6). However, other researchers note that "only a small number of trees" have become established in meadows (Hatcher 2014a, p. 3). Despite the documented presence of lodgepole pine and its encroachment or natural regeneration into occupied Leona's little blue butterfly habitat, there are large openings that appear to have never supported lodgepole pine (Ross and Johnson 2012, p. 2; Johnson 2014e, pers. comm.). This may be due to the deep soils that are present within the Sand Creek Basin. Tilden (1963, p. 111) suggests that the recovery of vegetation since the eruption of Mt. Mazama appears to be inversely related to the depth of the pumice. See Lodgepole Pine (*Pinus contorta*) Encroachment section in the Species Report (Service 2015, pp. 23–26) for additional discussion of this stressor.

Lodgepole pine encroachment and natural regeneration is an ongoing stressor affecting the area occupied by Leona's little blue butterfly. The rate of encroachment and regeneration within the range of the butterfly is not known; however, other areas near Sand Creek have shown that the overall amount of encroachment and regeneration of lodgepole pine is increasing (Horn 2009, pp. 200–204). For example, in the Pumice Desert, (a broad flat area north of Crater Lake, Oregon, that is somewhat similar to the Sand Creek area), lodgepole pine encroachment increased threefold over a period of 40 years and was greater near the forest edge (Horn 2009, pp. 200–204). In the Sand Creek area, lodgepole pine encroachment is believed to have reduced the extent of openings in areas occupied by Leona's little blue butterfly (Johnson 2010, p. 6). However, encroachment is absent in areas that appear to lack suitable conditions for lodgepole pine

establishment (Cochran 1973, pp. 3–5; Lotan and Critchfield 1990, pp. 307–309), and based on aerial imagery, our review has found openings that were present in 1995 were still present in 2012. Past and current actions on private timber lands and on the Fremont-Winema National Forest are limiting the encroachment and natural regeneration of lodgepole pine in some areas occupied by Leona’s little blue butterfly (USFS 2014, p. 2). Land management practices that result in the removal of lodgepole pine by private timber companies and the U.S. Forest Service are expected to maintain and enhance some open patches through expansion of their perimeters.

Based on this information, we have determined that the effects from lodgepole pine encroachment and natural regeneration are moderate in areas where this is occurring because lodgepole pine has the ability to render as unsuitable the open habitats used by Leona’s little blue butterfly. However, large open areas are present that do not show signs of lodgepole pine encroachment; this may be related to the depth of the pumice, which may act as a natural inhibitor to encroachment by lodgepole pine. In addition, only a small number of trees have become established in meadows. Despite the documented presence of lodgepole pine and its encroachment or natural regeneration into occupied Leona’s little blue butterfly habitat, there are large openings that appear to have never supported lodgepole pine. As a result, we have determined that the level of encroachment of lodgepole pine into Leona’s little blue butterfly habitat under current natural and managed conditions is not a significant concern and does not rise to the level of a threat now or into the future.

*Fire*

There are two types of fires that may impact Leona's little blue butterfly: wildfire and prescribed fire. Wildfires are unplanned and started by natural events (i.e., lightning) or non-natural sources (e.g., arson, machinery, power lines, etc.). Prescribed fires are burn operations that follow a prescription dictating proper fuel and weather conditions that allow for control of fire severity, intensity, and rate of spread per stated management objectives. Prescribed fire can occur in many forms, ranging from burning material piled after timber harvest to broadcast burning in which large areas are burned over a series of days.

Both types of fire can result in the loss of Leona's little blue butterfly host and nectar plants, but can also create new openings if a fire burns through dense brush or at high severity through dense forest-stands. Fire may completely consume stands of trees or it may creep around in the understory; fire behavior is dependent upon weather conditions and fuel loading. Extreme weather conditions including high temperature, high wind-speed, and low relative-humidity can result in rapid rates of fire spread at higher intensity and severity than would be expected under more normal weather conditions. Areas with light fuel loads are not expected to burn at the same intensity or severity as those with higher fuel loads. Soils within the range of Leona's little blue butterfly are pumice-based and have low productivity for sustaining fire (Dunn 2011a, p. 9). Because of the low productivity, the types of vegetation that grow in the Sand Creek and Scott Creek area (Volland 1988, p. 38) are not the kinds that will carry fire very far

(low leaf litter, very little if any duff layer, no or very few ladder fuels) (Simpson 2007, p. 9-5; Dunn 2011a, p. 9). See Fire section in the Species Report (Service 2015, pp. 26–30) for additional discussion of this stressor.

The forested stands within Leona’s little blue butterfly habitat area are at greater risk of high-intensity and severe fires than the more open areas occupied by Leona’s little blue butterfly (Blackwell 2006, p. 236; Dunn 2011b p. 12). However, past fires have been small in size, and the presence of fire suppression crews at nearby Sand Creek Guard Station suggest that, while there is risk of fire in Leona’s little blue butterfly habitat, the impacts of fire are not expected to encompass large areas or be widespread. The condition of the standing and ground fuels are mixed, and some areas would not be able to carry fire, further increasing the likelihood that if a large fire were to occur, it would burn in a mosaic pattern and open areas could continue to support Leona’s little blue butterfly and its habitat. Beneficial effects from wildfire and prescribed fire promote the development of new habitat and maintenance of existing habitat for Leona’s little blue butterfly. For example, Dunn (2011a, p. 9) found that fires occurring during the spurry buckwheat growing season (June through August) could result in an initial reduction in plants immediately following fire, but 2 to 3 years later, spurry buckwheat is likely to increase in the fire-affected areas. Fire can result in brush clearing that reduces competition for Leona’s little blue butterfly host and nectar plants (Dunn 2011a, p. 9). James *et al.* (2014, p. 270) provided an anecdotal observation that spurry buckwheat thrives in the footprints of burned slash piles, and Huntzinger (2003, p. 9) found that

Leona's little blue butterflies were more frequent in areas that were prescribe-burned, possibly due to increased sunlight.

Based on this information, we have determined that fire acts as a low-level stressor on Leona's little blue butterfly and its habitat. The low severity of the stressor suggests that, even though this stressor may occur range-wide, this stressor is not a considerable source of loss of individuals or habitat. Additionally, fire benefits the butterfly by creating and maintaining habitat. As a result, we have determined that the impacts from controlled and wildfire on Leona's little blue butterfly habitat under current natural and managed conditions and in the future are not a significant concern individually or in combination and do not rise to the level of a threat.

### *Fire Suppression*

The intent of fire suppression is to extinguish fires quickly. Fire suppression, in turn, interrupts historic fire return intervals by not allowing fires to burn to the extent and degree as they may have in the past and changes the habitat from its expected, natural condition (Crawford 2011, p. 3). Suppression allows for vegetation to become denser and more susceptible to disease, and conifer encroachment to occur over time. Fire suppression, consequently, can lead to loss of open areas and also to larger fires. Ground disturbing activities arising from fire suppression efforts have the ability to impact Leona's little blue butterfly habitat and individuals. These activities may include creation of fire lines (areas cleared of vegetation intended to prevent spread of fire) by hand or

machinery and vehicle travel on and off roads. Creation of fire lines involves digging down to mineral soil, which may remove host and nectar plants and disrupt the life cycle of Leona's little blue butterfly. Other actions associated with the creation of fire lines include the felling of trees and/or limbing of trees to reduce ladder fuels (e.g. tall shrubs, small-sized trees, dead branches that provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs). Felling and limbing of trees are likely to result in more open areas and more open forest canopy, which can provide new areas for host and nectar plants to colonize. In addition, when machinery is moved from one area to another, there is the potential for the spread of invasive plants. The stressor of *Invasive Plants* to Leona's little blue butterfly is discussed below.

The use of fire retardant to suppress fire is also a concern for Leona's little blue butterfly and its habitat. Fire retardant coats and adheres to vegetation, which slows the progression of fires. Any fire retardant exposure is likely to be lethal to Leona's little blue butterfly life forms that are above ground due to its inherent stickiness, which would severely restrict movement and could also result in suffocation (USFS 2011, p. 179). No data are available regarding the toxicity of fire retardant to larvae of invertebrates (USFS 2011, p. 179). Leona's little blue butterfly in the pupa stage may or may not be exposed to fire retardant dependent upon whether they are at or below ground level. Fire retardant would also potentially result in the killing of host and nectar plants if photosynthesis were inhibited; similarly, flowers coated in retardant would not be available for nectaring. Fire retardant may also act as a fertilizer, increasing plant growth of both native and non-

native species. The U.S. Forest Service (USFS) uses mapped buffers to avoid the aerial application of fire retardant in waterways and habitats occupied by some, but not all, threatened or endangered species or those proposed for listing under the Act (USFS 2011, p. 3). These mapped avoidance area buffers occur only on National Forest lands. There are no mapped avoidance buffer areas within the range of Leona's little blue butterfly.

See Fire Suppression in the Species Report (Service 2015, pp. 32–33) for additional discussion of this stressor.

Fire suppression activities can have positive and negative impacts to Leona's little blue butterfly and its habitat. Habitat and individuals can be destroyed by suppression that removes habitat. Ground disturbance and tree felling can improve habitat for Leona's little blue butterfly. Suppression can result in densely stocked forests, accumulation of fuels, and conifer encroachment in open areas, which can result in impacts to Leona's little blue butterfly from encroachment and fire that are described above. Fire suppression may act as a low-level stressor on Leona's little blue butterfly and its habitat. The low severity of the stressor suggests that, even though this stressor may occur range-wide, it is not a considerable source of loss of individuals or habitat. Beneficial effects from ground disturbance and tree felling will promote colonization of spurry buckwheat, which will create or enhance habitat for Leona's little blue butterfly. As a result, we have determined that the impacts from fire suppression on Leona's little blue butterfly habitat under current natural and managed conditions and in the future is not a significant concern and does not rise to the level of a threat.

### *Right-of-Way Maintenance*

Several rights-of-way occur within the range of Leona's little blue butterfly. The rights-of-way are maintained by Bonneville Power Administration (BPA), TransCanada (Pacific Gas Transmission Company), Oregon Department of Transportation (ODOT), Klamath County, and American Tower Corporation (Johnson 2014e, pers. comm.).

Maintenance of power line and roadway rights-of-way results in the reduction of woody plants and encourages early successional plants (Forrester *et al.* 2005, p. 489). As a result, the maintenance of rights-of-way may also be beneficial to Leona's little blue butterfly and its habitat because it maintains open areas that are preferred by host and nectar plants. Power line rights-of-way can also be important butterfly habitat and have been correlated with higher butterfly abundance when compared to semi-natural grasslands (pastures) (Berg *et al.* 2013, pp. 644, 646).

Habitat loss and potential direct impacts on Leona's little blue butterfly can also be a concern. Vehicles and equipment traveling off roads are assumed to trample host and nectar plants used by Leona's little blue butterfly. Trampling results in loss of habitat for eggs and larvae and a loss of potential nectar sources for Leona's little blue butterfly. Similar effects are expected from the removal or cutting of vegetation. If activities occur during the flight period, adult Leona's little blue butterfly may be killed by vehicles directly.

The use of biological control agents is not expected to occur within the range of Leona's little blue butterfly. Biological control agents are used only to treat noxious weeds (BPA 2000, p. 3) and are regulated by the Oregon Department of Agriculture (ODOT 2013, pp. 7–8). Noxious weeds have not been documented within the range of Leona's little blue butterfly (Johnson 2011, p. 9).

Herbicide application may result in changes to plant distribution and abundance. Information is not available to determine the frequency or area impacted by herbicide application within the rights-of-way. ODOT does recommend herbicide application during certain periods. Please see the *Herbicide* section below for more information on how herbicides may act as a stressor on Leona's little blue butterfly. See Right-of-Way Maintenance section in the Species Report (Service 2015, pp. 34–36) for additional discussion of this stressor.

Right-of-way maintenance may act as a low-level stressor on Leona's little blue butterfly and its habitat. The limited scope and low severity of the stressor indicate that this is not a considerable source of loss of individuals or habitat, because this stressor is limited to rights-of-way that occur within the Leona's little blue butterfly range and the maintenance of rights-of-way retains open areas beneficial for the species' habitat. As a result, we have determined that the impacts from maintenance of rights-of-way on Leona's little blue butterfly habitat under current natural and managed conditions are not a significant concern and this activity does not rise to the level of a threat.

*Cinder Mining*

Cinder mining activities including exploration, drilling, and expansion of existing sites could remove habitat for Leona's little blue butterfly and may result in mortality of individuals. Mortality of individuals may result from trampling by vehicles or equipment. See Cinder Mining section in the Species Report (Service 2015, p. 37) for additional discussion of this stressor.

Cinder mines are not currently present within areas occupied by Leona's little blue butterfly. If cinder mining were to occur, it could impact habitat and individuals. The potential for future cinder mines to impact habitat and individuals would be on small, localized scales. Information other than that provided by the petitioner is not available to assess the potential area of impact. Future cinder mining is not planned by the Fremont-Winema National Forest, and no information about plans for future cinder mines is available for private lands. Cinder mining is not currently a stressor acting on Leona's little blue butterfly and its habitat. Cinder mining is not presently affecting the species, and the small, potential scope and low potential severity of the stressor suggest that cinder mining is not expected to be a significant cause of loss of individuals or habitat in the future. As a result, we have determined that the impacts from cinder mining activities on Leona's little blue butterfly habitat under current natural and managed conditions is not a significant concern and does not rise to the level of a threat now or into the future.

*Livestock Grazing*

Livestock grazing can impact both Leona's little blue butterfly habitat and individuals. Habitat effects are through potential shifts in vegetation community (i.e., selective preference of livestock for some plant species over others), consumption of host and nectar plants, and trampling of vegetation (which reduces the potential for flowers to provide nectar). Eggs and larvae may be consumed if spurry buckwheat is consumed. Spurry buckwheat grows in a very open, small-stemmed shape, giving it a very wispy look (Blackwell 2006, p. 236) that is not likely to be favored as a food source for livestock. Other plants in the occupied habitat area have more robust growth forms with dense foliage that could provide better nutritive value, if only based on the sheer volume of material to eat. Adult Leona's little blue butterfly are expected to fly away if livestock approach and, therefore, are not expected to be consumed by livestock. Nectar plants are likely to be eaten by livestock and could result in a reduction of food for adult Leona's little blue butterfly. Grazing, were it to occur, may also result in beneficial effects to the extent that grazing may result in reduced competition for host and nectar plants by creating or maintaining openings.

There are no grazing allotments on the Fremont-Winema National Forest portion of the occupied habitat; therefore, Leona's little blue butterfly are not affected by livestock grazing in that area. Information is not available on whether livestock grazing is permitted on private lands in the remainder of the occupied habitat area. Livestock use of lands now owned by Whitefish was not observed during fieldwork conducted in 2010

and 2011 (Johnson 2014b, pers. comm.) See Livestock Grazing section in the Species Report (Service 2015, pp. 37–39) for additional discussion of this stressor.

Livestock grazing of vegetation may benefit Leona's little blue butterfly by reducing competition for host and nectar plants, thus providing more abundant host and nectar plants for the species. Although livestock grazing could have moderately severe impacts on habitat for Leona's little blue butterfly, it does not appear to be a stressor that is acting on the species or its habitat presently. Because this activity is not occurring and is not expected to occur (based on past land use) within the range of Leona's little blue butterfly, this is not a considerable source of loss of individuals or habitat despite a potential moderate severity should land use activities change in the future. As a result, we have determined that the impacts from livestock grazing on Leona's little blue butterfly habitat under current natural and managed conditions is not a significant concern now or in the future and does not rise to the level of a threat.

#### *Herbivory from Native Animals*

The entire range of Leona's little blue butterfly habitat has the potential to be impacted by herbivory from native animals with few exceptions. Native animals, such as deer and rabbits, may forage on plants that are used by Leona's little blue butterfly as a larval host plant or for nectar. Deer are known to favor bitterbrush, which occurs in Leona's little blue butterfly habitat. Bitterbrush has not been documented as a known nectar plant for Leona's little blue butterfly (Johnson 2011, p. 9). Spurry buckwheat

grows in a very open, small-stemmed shape giving it a very wispy shape that is not likely to be a favored food source for herbivores (Blackwell 2006, p. 236). Other plants in the occupied habitat have more robust growth forms with dense foliage that could provide better nutritive value, if only based on the sheer volume of material to eat. Leona's little blue butterfly eggs and larvae are not expected to be consumed by native animals unless spurry buckwheat is consumed incidentally with other vegetation. Adult Leona's little blue butterfly are likely to flee approaching animals and are not expected to be eaten by herbivores.

Herbivory is a natural condition in which animals and Leona's little blue butterfly have evolved. Herbivory from native animals is most likely to impact Leona's little blue butterfly nectar plants, with a very small potential for impacts to Leona's little blue butterfly eggs, larvae, and host plants. There is no information available that indicates herbivory is adversely impacting Leona's little blue butterfly or its habitat and to what degree. However, if herbivory is occurring, it is occurring at very low levels that are not expected to reduce adult Leona's little blue butterfly fitness because the butterflies are able to utilize a variety of plants for nectaring and because herbivory would likely not focus on the species' host plant. In addition, Leona's little blue butterfly has evolved with this stressor and there is no information to suggest that the pressure from herbivory has changed. See Herbivory from Native Animals section in the Species Report (Service 2015, pp. 39–40) for additional discussion of this stressor.

The low severity and natural condition of the stressor indicates that, even though this stressor may occur range-wide, it is not a considerable source of loss of individuals or habitat. As a result, we have determined that the impacts from herbivory from native animals on Leona's little blue butterfly habitat under current and future conditions is not a significant concern and does not rise to the level of a threat.

### *Invasive Plants*

Within the range of Leona's little blue butterfly, *Bromus tectorum* (cheatgrass) is the only known invasive species. Cheatgrass germinates in the fall in arid portions of the Great Basin (Young et al. 1987, p. 266), but may germinate in the spring if fall moisture is not sufficient (Stewart and Hull 1949, p. 58). Invasive or nonnative plants, such as cheatgrass can outcompete native plants for resources. Competition with nonnative plants can result in reduced native plant vigor and distribution. This, in turn, can reduce growth and abundance of host and nectar plants used by Leona's little blue butterfly. Over time, the distribution and abundance of invasive plants may alter the species composition within Leona's little blue butterfly habitat. Changes to species composition may result in starvation of larvae and adults if they are not able to find adequate sources for oviposition and nectar.

Invasive plants are not known to occur in the Fremont-Winema National Forest portion of the Leona's little blue butterfly range (USFS 2014, p. 4). Surveys of the vegetation community of Sand and Scott Creeks were conducted to determine plant

species presence (Johnson 2011, p. 9). Cheatgrass, an invasive plant, is known to occur within the Whitefish portion of the Leona's little blue butterfly range (Johnson 2012, pers. comm.). Cheatgrass occurrences within the range of Leona's little blue butterfly have not been mapped, but these occurrences are not widespread (Johnson 2014c, pers. comm.).

Based on the information above, we have determined that the severity of invasive plants acting as a stressor on Leona's little blue butterfly and its habitat is low. The severity is low because, while cheatgrass is present, there is no information to suggest that cheatgrass has overrun suitable habitat for Leona's little blue butterfly, nor has it contributed to spread of fire. As a result, the impact of invasive plants is low and does not rise to the level of a threat.

Combination of Stressors Under Factor A: As discussed above, we have determined that the above identified stressors individually are not acting on Leona's little blue butterfly or its habitat to the extent that they would be considered threats. We now also determine that these stressors collectively or cumulatively do not rise to the level of a threat. See the *Cumulative, Synergistic, and Beneficial Effects* section below for additional discussion.

Factor B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Based on the best available scientific and commercial information, insect collection for commercial, recreational, scientific, or educational purposes is the only known stressor under Factor B and is discussed below.

### *Insect Collection*

There is potential for insect collection within the range of Leona's little blue butterfly. The Sand Creek area has been a popular location for insect collection over the last half-century (Ross and Johnson 2012, p. 9). The area is popular because it supports a unique assemblage of rare invertebrate species. However, there is no information regarding which species may be favored by collectors, and there is no available information regarding unauthorized insect collection within the range of Leona's little blue butterfly. Leona's little blue butterfly is similar in appearance to two other species in the Sand Creek area—the glaucous blue butterfly (*Euphilotes glaucus*) and the lupine blue butterfly (*Plebejus lupini*). It is not known if these similar-appearing species are sought for collection in the range of Leona's little blue butterfly. Some collection for scientific research on Leona's little blue butterfly has been conducted within the range of the species in the past and at least 579 adult Leona's little blue butterflies, seven eggs, and one fourth instar larva have been collected since 1996. See Insect Collection section in the Species Report (Service 2015, pp. 43–45) for additional discussion of this stressor.

However, permission is needed to collect butterflies for non-recreational or commercial purposes on lands owned by Fremont-Winema National Forest. Ongoing

collection is currently limited by a lack of accessibility to the private timber lands (Lidell 2012, pers. comm.) and permissions required by the Fremont-Winema National Forest (Callaghan 2014, pers. comm.). We are not aware of unauthorized insect collection within the range of Leona's little blue butterfly. We have no information to indicate that collection of insects on other small private lands (likely associated with residences) is allowed, but even if such collection occurs, it is unlikely it would result in collections of large numbers of individuals. All known collections for Leona's little blue butterfly have been limited in scope and associated with a specific purpose (description of species, life history study, mark-release-capture study), and we would not expect two of the studies (description of species, life-history study) to be repeated (Hammond and McCorkle 1999, p. 77; Ross 2009, p. 1; James 2012, p. 93; James *et al.* 2014, pp. 264, 269). The lack of public access to lands in the majority of the species' range will most likely continue into the future. The lack of access to private lands and permitting requirements by the USFS limits the impact of collection on the species.

Even though collection may occur range-wide, this stressor has not been shown to be a great source of loss of individuals. This is based on the limited extent of collection for research purposes, no known commercial or recreational collection, and lack of permitted access to a majority of the species' range. As a result, the best available scientific and commercial information indicates that this level of collection is not a current or expected future threat to Leona's little blue butterfly.

Because collection is the only known commercial, recreational, scientific, or educational use of Leona's little blue butterfly, we have determined, based on the information above that there are no stressors under Factor B that are now or are likely in the near future to rise to the level of a threat.

#### Factor C. Disease or Predation

##### *Disease*

Butterflies are susceptible to infections from parasites, viruses, bacteria, and fungi as part of the natural conditions in which they have evolved (Davis and Lawrence 2006, p. 1; Altizer and de Roode 2010, p. 18). Viruses and bacteria can be common in butterfly larvae, which ingest capsules or spores incidentally (Davis and Lawrence 2006, p. 1; Altizer and de Roode 2010, p. 20). Fungi can grow on the outside or inside of infected caterpillars, ultimately killing the caterpillar (Altizer and de Roode 2010, p. 21). Symptoms of disease include changes in color, size, shape, and movement (Davis and Lawrence 2006, p. 2). Specific investigations into disease have not been conducted for Leona's little blue butterfly; however, exposure to disease and disease vectors is part of the natural conditions in which Leona's little blue butterfly likely evolved. There is no information on diseases affecting Leona's little blue butterfly from wild or captive-reared individuals (Ross and Johnson 2012, pp. 27, 42–46. See Disease section in the Species Report (Service 2015, pp. 47–48) for additional discussion of this stressor.

The low severity and natural condition of the stressor suggests that even though disease may occur range-wide, we have no information that indicates losses of individuals are occurring from this potential stressor. As a result, the best available scientific and commercial information indicates that this level of disease is not a current or expected future threat to Leona's little blue butterfly.

### *Predation*

We assume that Leona's little blue butterfly and its predators evolved together. Limited information exists on actual predation events of Leona's little blue butterfly. If it occurs, predation on Leona's little blue butterfly could result in reduced numbers of eggs, larvae, and adults. A study conducted in 2011 identified hornets (Vespidae), dragonflies (Odanata), damselflies (Odanata), robberflies (Asilidae), stiltbugs (Berytidae), and spiders (Arachnid) as potential predators of Leona's little blue butterfly (Ross and Johnson 2012, pp. 16–17). The authors of the study concluded that predators are relatively rare within the range of Leona's little blue butterfly. The Asian lady beetle (*Harmonia axyridis*), suggested as a predator of Leona's little blue butterfly by the Xerces Society for Invertebrate Conservation (Matheson *et al.* 2010, p. 16), is not known to occur within the range of Leona's little blue butterfly (Ross and Johnson 2012, pp. 33–48). Leona's little blue butterfly lay eggs on or very near flower buds and do not attempt to hide them (e.g., laying on underside of leaves). This behavior suggests that there may be a low relative risk of predation on eggs (Henry and Schultz 2013, p. 190). However, Leona's little blue butterfly larva are typically pink and white, which blends in with the

colors of the host plant and may provide camouflage from predators. James *et al.* (2014, pp. 271–272) suggest that Leona’s little blue butterfly mortality from predation is likely very low, as this was not observed during a 3-year study. See Predation section in the Species Report (Service 2015, pp. 46–47) for additional discussion of this stressor.

Predation can reduce overall abundance of Leona’s little blue butterfly. While potential predators are present when Leona’s little blue butterfly are active, predation has not been observed. Similarly, pressure from predation is likely one that Leona’s little blue butterfly evolved with and to which it has adapted. Predation may be a low-level stressor acting on Leona’s little blue butterfly. The low severity and natural condition of the stressor suggests that, even though predation may occur range-wide, this stressor is unlikely to be a considerable source of loss of individuals. As a result, the best available scientific and commercial information indicates that this level of predation is not a current or expected future threat to Leona’s little blue butterfly.

Combination of Stressors Under Factor C: As discussed above, we have determined that disease and predation individually are not acting on Leona’s little blue butterfly to the extent that they would be considered threats. Based on the limited known instances of disease or predation, we also determine that disease or predation collectively or cumulatively do not rise to the level of a threat. See the *Cumulative, Synergistic, and Beneficial Effects* section below for additional discussion.

Factor D. The Inadequacy of Existing Regulatory Mechanisms

The Act requires that the Secretary assess available regulatory mechanisms in order to determine whether existing regulatory mechanisms may be inadequate as designed to address threats to the species being evaluated (Factor D). Under this factor, we examine whether existing regulatory mechanisms are inadequate to address the potential threats to Leona's little blue butterfly discussed under other factors. We consider relevant Federal, State, and tribal laws and regulations when evaluating the status of a species. Regulatory mechanisms, if they exist, may preclude the need for listing if we determine that such mechanisms adequately address the threats to the species such that listing is not warranted. Only existing ordinances, regulations, and laws that have a direct connection to a stressor are applicable. Under this factor, we analyze statutes and their implementing regulations, and management direction that stems from those laws and regulations. Such laws and regulations are nondiscretionary and enforceable, and are considered a regulatory mechanism under this analysis. Examples include State government actions enforced under a State statute or constitution, or Federal action under statute. We do not consider the lack of any regulatory mechanisms addressing a specific threat that we identified under one of the other factors as a rationale to conclude that the existing regulatory mechanisms are inadequate for a species under Factor D.

The Species Report includes a discussion of regulatory mechanisms applicable to Leona's little blue butterfly. In the Species Report (Service 2015, pp. 71–72), we examine the applicable Federal, State, and other statutory and regulatory mechanisms to

determine whether these mechanisms are operating as designed to provide conservation for Leona's little blue butterfly or its habitat.

*Federal Regulatory Mechanisms:* There are no Federal regulatory mechanisms in place that are specifically designed to ameliorate or reduce stressors on Leona's little blue butterfly or its habitat. However, Leona's little blue butterfly was added to the USFS Region 6 list of Sensitive Species on December 1, 2011 (USFS 2014, p. 1). With this status, Leona's little blue butterfly is required to be considered in USFS Region 6 biological evaluations when proposed projects have the potential to affect the species or its habitat. The objective of this status is to avoid project impacts that result in a loss of viability or contribute toward trends for listing under the Act (USFS and Bureau of Land Management (BLM) 2002, pp. 2, 4). According to USFS Forest Service Manual (FSM) 2670, "[t]here must be no impacts to sensitive species without an analysis of the significance of adverse effects on the populations, its habitat, and on the viability of the species as a whole. It is essential to establish population viability objectives when making decisions that would significantly reduce sensitive species numbers." The loss of population viability is a concern, when evidenced by either a significant current or predicted downward trend in population numbers or density; or a significant current or predicted downward trend in habitat capability that would reduce a species' existing distribution. Proposed activities that occur within the Fremont-Winema National Forest portion of Leona's little blue butterfly range will include measures to avoid or minimize project-related impacts to Leona's little blue butterfly and its habitat. This status as a sensitive species will continue regardless of Federal listing status under the Act.

*State Regulatory Mechanisms:* Oregon State agencies do not have responsibilities for the conservation of invertebrates. The Oregon State Endangered Species Act also does not include protections for invertebrates. Scientific taking permits are required only for birds, mammals, amphibians, and reptiles in the State of Oregon.

The State of Oregon through the Oregon Department of Agriculture is responsible for pesticide use and application. The Oregon Department of Agriculture helps protect endangered and threatened species in a number of ways including helping educate pesticide users on current application standards and pesticide label language designed to protect waterways, endangered fish and aquatic organisms, plants, insects, and animal species, and critical habitats and makes referrals to wildlife agencies or other agencies in the case of an incident. These standards for application and use of pesticides would benefit Leona's little blue butterfly and its habitat as they are designed to limit impacts to nontarget species and curtail drift of pesticide during application. See *Pesticides* discussion below or Pesticides section in the Species Report (Service 2015, pp. 48–50) for additional discussion of this stressor.

The Oregon Biodiversity Information Center (ORBIC) is the State agency responsible for tracking rare invertebrates in Oregon. The Oregon Natural Areas Program has limited authority to assist in the conservation of Oregon's invertebrate species, and via Section 6 of the Endangered Species Act they can receive funding from the U.S. Fish and Wildlife Service to help conserve listed and candidate species. This

cooperation between the Oregon Natural Areas Program and the U.S. Fish and Wildlife Service provides opportunities to gather information that can be used to help understand and conserve invertebrates in Oregon (Oregon Biodiversity Information Center 2013, p. 6). The 2013 book of Rare, Threatened, and Endangered Species of Oregon identifies and categorizes species (including Leona's little blue butterfly) into several levels of regulatory or conservation status based on various factors (e.g., Federal or State listed, NatureServe/Natural Heritage ranking, ORBIC list) (Oregon Biodiversity Information Center 2013, entire).

The ORBIC list identifies species on a scale of 1 to 4 with 1 having the most conservation concern (Oregon Biodiversity Information Center 2013, p. 4). Leona's little blue butterfly has an ORBIC list value of 1. ORBIC list 1 species are defined as those "taxa that are threatened with extinction or presumed to be extinct throughout their entire range" (Oregon Biodiversity Information Center 2013, pp. 4, 32). The NatureServe/Natural Heritage ranking is divided into five categories (identified as 1 again having the most conservation concern) on both a Statewide (S) and global (G) scale. Leona's little blue butterfly is considered an S1, G1 species with "1" defined as species that are "[c]ritically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation, typically with 5 or fewer occurrences" (Oregon Biodiversity Information Center 2013, pp. 5, 32). However, the document further explains that the compilation of information on invertebrates has been difficult due to the acknowledgement that "[l]ittle is known about the status and distribution of most invertebrate taxa found in Oregon, especially those which appear to be rare,

threatened or otherwise vulnerable.” The document then further qualifies its rankings by stating that “[a]s a result state ranks may not accurately reflect the true population status for some species” (Oregon Biodiversity Information Center 2013, p. 6).

*Summary of the Inadequacy of Existing Regulatory Mechanisms:* We have assessed the available regulatory mechanisms in order to determine whether any are inadequate as designed to address threats to Leona’s little blue butterfly. The only mechanism in place is the designation of Leona’s little blue butterfly as sensitive species by the USFS which requires that USFS consider any impacts to the species or its habitat in their biological evaluations of potential projects. The objective of this status is to avoid project impacts that result in a loss of viability or contribute toward trends for listing under the Act. In the only project currently proposed for the area occupied by Leona’s little blue butterfly on the Fremont-Winema National Forest, the USFS has initiated a habitat improvement project for the species that will implement conservation measures specific to the butterfly. No other Federal regulatory mechanisms specifically apply to the management and/or protection of Leona’s little blue butterfly or its habitat. There are no State or private regulatory mechanisms that specifically apply to the management and/or protection of Leona’s little blue butterfly or its habitat. Based on the information contained within the Species Report and outlined above on the existing regulatory mechanisms for Leona’s little blue butterfly, we conclude that the best available scientific and commercial information does not indicate that the existing regulatory mechanisms are inadequate as designed to address impacts to the species or its habitat.

#### Factor E. Other Natural or Manmade Factors Affecting Its Continued Existence

For ease of discussion, the impacts to individual Leona's little blue butterfly from habitat disturbance activities are discussed under Factor A. For a complete discussion of potential impacts to both habitat and individuals from these activities, see our Factor A discussion, above.

##### *Competition with Other Invertebrates*

Limited information exists on potential competitive interactions between Leona's little blue butterfly and other species that occur within its range. A study conducted in 2011 identified 37 species of butterflies and 159 species of moths as potential competitors for nectar (Ross and Johnson 2012, p. 8). Competition between species is considered to be a natural condition under which Leona's little blue butterfly evolved. Competitors are relatively abundant in the Leona's little blue butterfly range (Ross and Johnson 2012, p. 24). There is no information to suggest that populations of competitors have increased. The only insect identified using spurry buckwheat as an herbivore is the stiltbug, which uses piercing mouthparts to suck nutrients from plants (Ross and Johnson 2012, pp. 17, 41).

Competition with other invertebrates may be a low-level stressor acting on Leona's little blue butterfly. The severity is low because Leona's little blue butterfly evolved with competitors, utilizes a wide variety of nectar plants, and is reasonably

expected to be able to find food resources when competitors are present. Similarly, the host plant is not known to be used as a larval host plant by other species within the range of the Leona's little blue butterfly. See Competition with Other Invertebrates section in the Species Report (Service 2015, pp. 45–46) for additional discussion of this stressor.

The low severity and the natural condition of the stressor indicate that, even though competition may occur range-wide, this stressor is not a considerable source of loss of individuals. As a result, the best available scientific and commercial information does not indicate that competition with other invertebrates is now, or will be in the future, a threat to Leona's little blue butterfly.

### *Pesticides*

Pesticides may be acting as a low-level stressor on Leona's little blue butterfly. Pesticides are a potential stressor to Leona's little blue butterfly and its habitat, but exposure to pesticides is only likely from sources outside the range of the species; further, the forested habitat surrounding Leona's little blue butterfly habitat forms a barrier to wind and potential pesticide drift into these areas. In addition, the Oregon Department of Agriculture oversees the implementation of the Oregon State Pesticide Control Act for the proper application and use of pesticides (Legislative Counsel Committee 2014, Chapter 634). The Oregon Department of Agriculture is also responsible for ensuring that sensitive species and their environments are protected from improper pesticide use and application through education and reporting (Oregon Department of Agriculture 2015, entire). The proper application and use of pesticides

according to the Oregon Department of Agriculture guidelines will limit potential exposure of pesticides to nontarget species and their habitat, including Leona's little blue butterfly. The Fremont-Winema National Forest does not use pesticides in the area occupied by Leona's little blue butterfly and the Animal and Plant Health Inspection Service (APHIS) is not expected to implement grasshopper control on rangelands in the range of the species. The Service's Klamath Marsh National Wildlife Refuge, located 3 mi (4.8 km) east of occupied Leona's little blue butterfly habitat, has used pesticides for grasshopper control (Service 2010b, p. 68). However, drift is unlikely due to the prevailing winds occurring from west to east, and Service personnel follow standard application and use restrictions for drift. See Pesticides section in the Species Report (Service 2015, pp. 48–50) for additional discussion of this stressor.

As a result, the best available scientific and commercial information does not indicate that pesticide use and application is a threat to Leona's little blue butterfly or its habitat now or in the future.

#### *Stressors on Isolated Populations*

Leona's little blue butterfly is an endemic species known from one geographic area. Because Leona's little blue butterfly is known from only this one location, the population is confined, or isolated, by the elements that compose suitable habitat. Isolated populations of species with specific habitat requirements may be more vulnerable to effects from disease, inbreeding, and habitat loss because individuals are not replaced through immigration from other populations and are not always able to

occupy new areas. Thus isolated populations may be less able to recover from widespread loss of individuals and habitat. Because Leona's little blue butterfly is known from only one population, it may be more susceptible to events related to inbreeding or stochastic events such as drought or catastrophic fire. See Stressors on Isolated Populations in the Species Report (Service 2015, pp. 50–55) for additional discussion of this stressor.

Stochastic events. Stochastic events (e.g., drought and catastrophic fire) as identified by the petitioner (Matheson *et al.* 2010, p. 17), may act as a stressor on Leona's little blue butterfly. Leona's little blue butterfly is currently known from one population. Random events in small populations may have a large impact on population dynamics and persistence for a species. If the rate of population growth varies from one generation to the next, random stochastic events in successive generations can lead to population declines even if the population is growing, on average (Holsinger 2000, pp. 55–74; Holsinger 2013, pp. 1–8).

*Drought.* Drought over a prolonged period can alter the species composition, relative abundance, and growing season of plants. Drought may result in indirect impacts to individuals using these plants if they are less abundant or have reduced vigor due to competition for resources (Ehrlich *et al.* 1980, p. 101). Drought may shorten the period of growth for plants due to diminished water availability resulting in early senescence. Early plant senescence can limit the amount of time butterfly larvae have to reach pupa diapause (the period during which growth or development is suspended preceding

development into a butterfly) (Holdren and Ehrlich 1981, p. 128; Ehrlich and Murphy 1987, p. 124). However, there is no information on drought relating directly to Leona's little blue butterfly population size or apparent geographic isolation. The available literature does contain information on drought response from other butterfly species. In two species of checkerspot butterflies (*Euphydryas editha* and *Euphydryas chalcedona*) from California, drought effects were observed in relationships with the host plant and competition for food (Ehrlich *et al.* 1980, p. 101). While the life-history traits and habitats of these two species are dissimilar from Leona's little blue butterfly, the study suggests that drought-resistant host plants and the use of a variety of food plants provide protection from the harmful effects of drought (Ehrlich *et al.* 1980, p. 105). Spurry buckwheat is a desert-restricted annual (James 2012, p. 93) that grows in dry conditions (Hickman 1993, p. 879) and is locally abundant within the range of Leona's little blue butterfly and are very likely to be adapted to drought conditions. Similarly, nectar plants used by Leona's little blue butterfly occurring in this area likely also are adapted to dry conditions.

Drought has the potential for widespread impacts to many plant species.

However, Leona's little blue butterfly occupies a desert ecosystem that is composed of drought-tolerant plants. Because the plants are drought tolerant, they are expected to survive drought years and continue to provide resources for Leona's little blue butterfly. Droughts follow cyclic patterns and are not a persistent stressor for Leona's little blue butterfly habitat, and, therefore, we find that drought does not rise to the level of a threat.

*Catastrophic Fire.* The area within the range of Leona's little blue butterfly is a fire-adapted ecosystem with a mixed-severity fire regime (Dunn 2011a, pp. 1, 4). The potential for catastrophic fire events is limited by the mix of forested, recently logged, and non-forested areas contained within the range of Leona's little blue butterfly. There is no information to suggest that catastrophic fires have occurred within the range of Leona's little blue butterfly. Catastrophic fires could result in the widespread loss of forested habitats adjacent to areas occupied by Leona's little blue butterfly. However, given the mixed-severity fire regime of Leona's little blue butterfly range, catastrophic fire is not expected to occur in the near-term. If forest management practices change so that there is an increase in forest cover or fewer open areas between forested patches, the potential for catastrophic fire could increase.

The potential rates of fire spread and intensity vary widely based on fuel loading. Open areas occupied by Leona's little blue butterfly are not as likely to be subject to catastrophic fire, and Leona's little blue butterfly are expected to persist in these areas after fire (Dunn 2011b p. 12). Therefore, based on current habitat conditions and the use of open areas less susceptible to catastrophic fire by Leona's little blue butterfly, we conclude that catastrophic fire is not a threat to the species now or into the future.

Inbreeding. Inbreeding is most common in small or isolated populations where immigration and emigration are not occurring regularly enough to maintain genetic variability. Inbreeding can result in changes to morphology, survival, lifespan, and sterility in invertebrates (Frankham and Ralls 1998, p. 441; Lande 1988, p. 1456).

Inbreeding in small populations of butterflies has not been a sole factor associated with butterfly extinction; rather, extinction is more likely from other sources such as demographic effects from habitat loss or environmental factors. There is no available information to indicate that inbreeding is a threat to Leona's little blue butterfly, and if it is occurring, the literature suggest that demography and environmental factors are more likely to contribute to a species' extinction than inbreeding alone (Lande 1988, p. 1457). As a result, we have determined that inbreeding is not a concern and does not rise to the level of a threat.

*Summary of Isolated Populations Stressors:*

Drought may be acting as a low-level stressor on Leona's little blue butterfly and its habitat, but no information is available to indicate that catastrophic fire or inbreeding are occurring or likely to occur. Recent population estimates by James *et al.* (2014, p. 272) indicate that there may be 20,000 Leona's little blue butterflies, which is larger than the original population estimates of 1,000 to 2,000 (Ross 2008, p. 4) known at the time of receipt of the petition. The difference in population estimates is a result of a more thorough search of potential habitat and more rigorous sampling methods. The severity of the stressors is low because, even though these stressors may occur across the species' range, they are not a considerable source of loss of individuals or habitat individually or in combination. As a result, the best available scientific and commercial information does not indicate that stressors on isolated populations pose a significant impact to Leona's little blue butterfly or its habitat and do not rise to the level of a threat.

*The Effects of Climate Change*

The effects of climate change may be affecting both Leona's little blue butterfly habitat (Factor A) and individuals (Factor E) through several means. For the ease of analysis, the discussion of the effects of climate change on both individuals and habitat is discussed below.

Various changes in climate may have direct or indirect effects on species. These effects may be positive, neutral, or negative, and they may change over time, depending on the species and other relevant considerations, such as interactions of climate with other phenomena (for example, habitat fragmentation) (IPCC 2014, pp. 4–11). Global climate projections are informative, and, in some cases, the only or the best scientific information available for us to use. However, projected changes in climate and related impacts can vary substantially across and within different regions of the world (IPCC 2013b, pp. 15–16). Therefore, we use “downscaled” projections when they are available and have been developed through appropriate scientific procedures, because such projections provide higher resolution information that is more relevant to spatial scales used for analyses of a given species (see Glick et al. 2011, pp. 58–61, for a discussion of downscaling). With regard to our analysis for Leona's little blue butterfly, downscaled projections are available for the Klamath Basin. See [The Effects of Climate Change in the Species Report](#) (Service 2015, pp. 55–59) for additional discussion of this stressor.

Climate change is an ongoing stressor with projections into the future indicating trends towards warmer temperatures, highly variable precipitation alternating between drier and wetter conditions than had been previously experienced, and less precipitation as snowfall in the Klamath Basin. The entire Leona's little blue butterfly range is subject to impacts from climate change. Negative impacts to Leona's little blue butterfly habitat arise from shifts in plant growing season, diversity, distribution, and abundance (Kittel 1998, p. 79). In turn, Leona's little blue butterfly larvae and adults may have a reduced ability to complete lifecycle events relating to development and egg laying. However, it is expected that the butterfly will continue to follow external cues of temperature and humidity for emergence from pupa such that nectar resources will be available when they emerge (Caldas 2011, p. 80). Potential increases in wildfires as a result of drier conditions may benefit Leona's little blue butterfly by maintaining open habitat areas used by the species. Because of the variable precipitation patterns associated with the effects of climate change, we cannot determine the likely effects of a potential change in precipitation patterns in either the near- or long-term future.

Because of the uncertainty of information related to the effects of climate change, we cannot conclude it is a threat to Leona's little blue butterfly or its habitat.

### *Fire Retardant*

Fire retardant is a substance or chemical agent that reduces the flammability of combustibles and is typically applied by aircraft (National Wildfire Coordinating Group

2014, p. 150). Fire retardant used by the USFS is approximately 85 percent water mixed with inorganic fertilizers (ammonia polyphosphate makes up 60–90 percent of the remaining 15 percent), thickeners, suspending agents, dyes, and corrosion inhibitors (USFS 2011, pp. 15–16). Fire retardant coats and adheres to vegetation, which slows the progression of fires. Fire retardant can be applied during direct attack or indirect attack fire suppression activities. Fire retardant is not used on every fire event; its use is dependent upon the values at risk (human safety, natural resources, and commercial or private property) and the potential for rapid fire growth (USFS 2011, p. 8). Fire retardant exposure is likely to be lethal to Leona's little blue butterfly life forms that are above ground due to its inherent stickiness, which would severely restrict movement and could also result in suffocation (USFS 2011, p. 179). No data are available regarding the toxicity of fire retardant to larvae of invertebrates (USFS 2011, p. 179). Leona's little blue butterfly in the pupa stage may or may not be exposed to fire retardant dependent upon whether they are at or below ground level. Fire retardant would also potentially result in the killing of host and nectar plants if photosynthesis was inhibited; similarly, flowers coated in retardant would not be available for nectaring. Fire retardant may also act as a fertilizer, increasing plant growth of both native and nonnative species.

The USFS uses mapped buffers to avoid the aerial application of fire retardant in waterways and habitats occupied by some, but not all, threatened and endangered species, or those proposed for listing under the Act. These mapped avoidance area buffers occur only on USFS lands. There are no mapped avoidance buffer areas within the range of Leona's little blue butterfly.

Exposure to fire retardant can result in lethal impacts to Leona's little blue butterfly and the plants it depends upon to complete its lifecycle. Aerial application of fire retardant generally has a relatively small footprint and would not result in widespread loss of Leona's little blue butterfly or its habitat. Further, fires in the area have historically been small in size and few in number, indicating that this stressor has low potential for widespread impacts to Leona's little blue butterfly or its habitat. Fire retardant may act as a low-level stressor on Leona's little blue butterfly and its habitat currently or in the future. The low severity of the stressor indicates that even though this stressor may occur range-wide, it is not a considerable source of loss of individuals or habitat. Use of fire retardant can slow or inhibit the progression of fire spread in areas occupied by Leona's little blue butterfly. As a result, the best available scientific and commercial information does not indicate that use of fire retardant is a threat to Leona's little blue butterfly or its habitat.

#### *Change in Land Ownership*

The Mazama Forest has recently been sold by Fidelity National Financial to the Whitefish Cascade Forest Resources of Salem, Oregon, and Singapore. The lands that have been sold overlap the range of Leona's little blue butterfly. There is uncertainty about how the area may be managed into the future; however, we have no information to suggest that the management of the area would change. We would expect the operations to manage timber are likely to continue much as they have in the past. A rotation of

harvest and non-harvest would probably be followed to allow for tree growth to sizes desirable for the timber products the company produces. As a result, the best available scientific and commercial information does not indicate that the change in ownership is a threat currently or in the future to Leona's little blue butterfly or its habitat. See Potential Change in Land Ownership in the Species Report (Service 2015, pp. 59–60) for additional discussion of this stressor.

#### *Cumulative, Synergistic, and Beneficial Effects*

Stressors may combine and interact, resulting in impacts to species not accounted for when stressors are analyzed individually. Stressors that appear minor when viewed individually may have greater impacts when analyzed cumulatively with other stressors. Furthermore, some stressors may act synergistically to cause impacts greater than the sum of the individual stressors. Beneficial effects from stressors (for example, the beneficial effect of wildfire maintaining open areas used by Leona's little blue butterfly) may outweigh the potential negative effects from that stressor or others. When conducting our analysis about the potential threats affecting Leona's little blue butterfly, we also assessed whether the species may be affected by a combination of factors. In the Species Report, we identified multiple potential stressors that may have interrelated impacts on the species or its habitat.

*Cumulative Effects:* Potential cumulative effects to Leona's little blue butterfly habitat may occur when lodgepole pine encroachment and invasive plant stressors are

viewed together. The larval host plant, spurry buckwheat, grows in open areas, making openings an essential component to the survival of Leona's little blue butterfly.

Lodgepole pine encroachment gradually converts open areas with forested habitats. One invasive plant, cheatgrass, is known to occur in a portion of the area occupied by Leona's little blue butterfly. This plant has the ability to rapidly colonize open areas and outcompete native plant species. The combination of lodgepole pine encroachment and invasion by cheatgrass has the potential to create unsuitable habitat conditions for Leona's little blue butterfly.

*Synergistic Effects:* When stressors occur together, one stressor may exacerbate the effects of another stressor, causing effects not accounted for when stressors are analyzed individually. Synergistic effects can be observed in a short amount of time. If stressors hinder Leona's little blue butterfly ability to lay eggs in one year, the number of adult butterflies that emerge the following year will be reduced. Stressors that act on the ability of larvae to reach the diapause stage successfully will also reduce the number of adult butterflies that emerge the following year. Stressors that could contribute to synergistic effects for Leona's little blue butterfly are insect collection, pesticides, predation, disease, competition, drought, and climate change. Even when considered together, the severity of these stressors is low or uncertain. The severity is low because even though these stressors may be acting on the population, the observed impact has been very low in the past and under current conditions. In the long term, synergistic effects may increase if the models for climate change are correct. For example, it is conceivable that Leona's little blue butterfly will not be able to adapt its life cycle to

changes in plant growing seasons if growing seasons are altered too much. However, the information available at this time is not sufficient to determine if change in growing seasons would be of such magnitude that Leona's little blue butterfly would not be able to adapt.

*Beneficial Effects:* A number of the stressors discussed above have the potential to reduce habitat for Leona's little blue butterfly. In particular, timber management activities can remove habitat when new roads or landings are constructed in suitable habitat; vegetation may also be trampled, resulting in damage to host and nectar plants. However, these activities can also create or maintain more habitat for Leona's little blue butterfly than remove or damage it. Based on past timber harvest practices in the range of Leona's little blue butterfly, the amount of forested area that is harvested does not include all of the butterfly's habitat within the area, but is selective. These newly open areas have the potential to become the next area of suitable habitat for Leona's little blue butterfly and may be much greater than the amount of habitat damaged or removed. The creation of new habitat through timber management can occur over large areas in short periods of time and be very effective at offsetting the potential loss of habitat from lodgepole pine encroachment and timber harvest. See Stressors on Isolated Populations and Cumulative, Synergistic, and Beneficial Effects section of the Species Report (Service 2015, pp. 50–55, pp. 61–62) for further discussion.

*Summary of Cumulative, Synergistic, and Beneficial Effects:* All or some of the potential stressors could also act in concert as a cumulative threat to Leona's little blue

butterfly. Of the stressors reviewed, lodgepole pine encroachment and invasive plants can result in considerable loss of habitat and ultimately individuals of Leona's little blue butterfly. The impacts of climate change are less certain, but, if models are correct, this factor could also interfere with the ability of Leona's little blue butterfly to reproduce. However, the best available scientific and commercial information currently does not indicate that these stressors singularly or cumulatively are causing now or will cause in the future a substantial decline of the total extant population of the species or have large impacts to Leona's little blue butterfly at the species level. Therefore, we do not consider the cumulative or synergistic impacts of these stressors to Leona's little blue butterfly to be a threat at this time, nor into the future.

#### *Available Conservation Measures*

The only example of conservation measures specific to Leona's little blue butterfly are included in a USFS proposal to improve habitat for the butterfly. The Fremont-Winema National Forest has initiated a habitat improvement project for Leona's little blue butterfly that will implement conservation measures specific to the butterfly. Because Leona's little blue butterflies are known to occupy the project area, project operations will occur over frozen ground or snow in winter to minimize the potential for crushing pupae. Logging slash is to be piled at least 50 feet (ft) (15 meters (m)) from occupied habitat and, to the extent possible, where timber operations just occurred to avoid piling and burning of this material in areas with a high likelihood of occupancy by

Leona's little blue butterfly. Similarly, staging areas for equipment will be coordinated to minimize the potential for impacts to Leona's little blue butterfly or its habitat.

The Oregon Biodiversity Information Center identifies and categorizes Leona's little blue butterfly as a level 1 species. The level 1 value indicates "taxa that are threatened with extinction or presumed to be extinct throughout their entire range" (Oregon Biodiversity Information Center 2013, pp. 4, 32). Occurring on this list does not necessitate the use of any conservation measures for actions that may impact species identified on this list, but may provide educational information or lead to voluntary conservation for or management of the species or its habitat.

### **Finding**

The Act defines an endangered species as any species that is "in danger of extinction throughout all or a significant portion of its range" and a threatened species as any species "that is likely to become endangered throughout all or a significant portion of its range within the foreseeable future." After review of the best available scientific and commercial information pertaining to Leona's little blue butterfly and its habitat, we have determined that the ongoing stressors (identified in Table 2 above) are not of sufficient imminence, intensity, or magnitude to manifest as threats to Leona's little blue butterfly such that it would be presently in danger of extinction throughout all of the species' range, or likely to become so in the foreseeable future. As stated in the Species Report (Service 2015, pp. 15–17), the location, distribution, and abundance of Leona's little blue butterfly populations have been shown to be greater than at the time of the petition. We

have determined that the risk and severity of stressors acting on the population are minimal. For Leona's little blue butterfly, we evaluated the potential past, ongoing, and future stressors that may be acting on Leona's little blue butterfly and its habitat and defined the time periods and the foreseeable future of each stressor in the Species Report (Service 2015, pp. 19–20). The time periods identified for each stressor are based on the timeframes associated with known impacts for the stressor on which we can reasonably rely for predictions regarding the future populations, status, trends, and impacts to the species and its habitat. Some stressors may be affecting the species currently, but they have not had measureable effects on the species. In addition, available information does not support a conclusion that potential future stressors are likely to significantly affect Leona's little blue butterfly to an extent that they would have population-level impacts.

### **Significant Portion of the Range Determination**

Under the Act and our implementing regulations, a species may warrant listing if it is an endangered or a threatened species throughout all or a significant portion of its range. The Act defines “endangered species” as any species which is “in danger of extinction throughout all or a significant portion of its range,” and “threatened species” as any species which is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” The term “species” includes “any subspecies of fish or wildlife or plants, and any distinct population segment [DPS] of any species of vertebrate fish or wildlife which interbreeds when mature.” We published a final policy interpreting the phrase “significant portion of its range” (SPR)

(79 FR 37578; July 1, 2014). The final policy states that (1) if a species is found to be an endangered or a threatened species throughout a significant portion of its range, the entire species is listed as an endangered or a threatened species, respectively, and the Act's protections apply to all individuals of the species wherever found; (2) a portion of the range of a species is "significant" if the species is not currently an endangered or a threatened species throughout all of its range, but the portion's contribution to the viability of the species is so important that, without the members in that portion, the species would be in danger of extinction, or likely to become so in the foreseeable future, throughout all of its range; (3) the range of a species is considered to be the general geographical area within which that species can be found at the time the Service or the National Marine Fisheries Service makes any particular status determination; and (4) if a vertebrate species is an endangered or a threatened species throughout an SPR, and the population in that significant portion is a valid DPS, we will list the DPS rather than the entire taxonomic species or subspecies.

The SPR policy is applied to all status determinations, including analyses for the purposes of making listing, delisting, and reclassification determinations. The procedure for analyzing whether any portion is an SPR is similar, regardless of the type of status determination we are making. The first step in our analysis of the status of a species is to determine its status throughout all of its range. If we determine that the species is in danger of extinction, or likely to become so in the foreseeable future, throughout all of its range, we list the species as an endangered (or threatened) species, and no SPR analysis will be required. If the species is neither an endangered nor a threatened species

throughout all of its range, we determine whether the species is an endangered or a threatened species throughout a significant portion of its range. If it is, we list the species as an endangered or a threatened species, respectively; if it is not, we conclude that listing the species is not warranted.

When we conduct an SPR analysis, we first identify any portions of the species' range that warrant further consideration. The range of a species can theoretically be divided into portions in an infinite number of ways. However, there is no purpose to analyzing portions of the range that are not reasonably likely to be significant for either an endangered or a threatened species. To identify only those portions that warrant further consideration, we determine whether there is substantial information indicating that (1) the portions may be significant and (2) the species may be in danger of extinction in those portions or likely to become so within the foreseeable future. We emphasize that answering these questions in the affirmative is not a determination that the species is an endangered or a threatened species throughout a significant portion of its range—rather, it is a step in determining whether a more detailed analysis of the issue is required. In practice, a key part of this analysis is whether the threats are geographically concentrated in some way. If the threats to the species are affecting it uniformly throughout its range, no portion is likely to warrant further consideration. Moreover, if any concentration of threats apply only to portions of the range that clearly do not meet the biologically based definition of “significant” (i.e., the loss of that portion clearly would not be expected to increase the vulnerability to extinction of the entire species), those portions will not warrant further consideration.

If we identify any portions that may be both (1) significant and (2) endangered or threatened, we engage in a more detailed analysis to determine whether these standards are indeed met. The identification of an SPR does not create a presumption, prejudgment, or other determination as to whether the species in that identified SPR is an endangered or a threatened species. We must go through a separate analysis to determine whether the species is an endangered or a threatened species in the SPR. To determine whether a species is an endangered or a threatened species throughout an SPR, we will use the same standards and methodology that we use to determine if a species is an endangered or a threatened species throughout its range.

Depending on the biology of the species, its range, and the threats it faces, it may be more efficient to address the “significant” question first, or the status question first. Thus, if we determine that a portion of the range is not “significant,” we do not need to determine whether the species is an endangered or a threatened species there; if we determine that the species is not an endangered or a threatened species in a portion of its range, we do not need to determine if that portion is “significant.”

We consider the “range” of Leona’s little blue butterfly to include the entire population within the Sand and Scott Creek area in South Eastern Oregon. This is the only known population for the current and known historical distribution of the species.

In considering any significant portion of the range of this species, we evaluated whether the stressors facing Leona's little blue butterfly might be geographically concentrated in any one portion of its range and whether these stressors manifest as threats to Leona's little blue butterfly such that it would be presently in danger of extinction throughout all of the species' range. We examined stressors from timber management, lodgepole pine encroachment, fire, fire retardant, fire suppression, right-of-way maintenance, cinder mining, livestock grazing, herbivory from native animals, herbicides, invasive plants, insect collection, competition with other invertebrates, predation, disease, pesticides, isolated population effects, effects of climate change, change in land ownership, and the inadequacy of existing regulatory mechanisms. We found no concentration of stressors that suggests that Leona's little blue butterfly may be in danger of extinction in a portion of its range. We also found no portion of its range where the stressors are significantly concentrated or substantially greater than in any other portion of its range (Service 2015, pp. 19–70). Therefore, we find that factors affecting Leona's little blue butterfly are essentially uniform throughout its range, indicating no portion of the range warrants further consideration of possible endangered or threatened status under the Act.

Our review of the best available scientific and commercial information indicates that Leona's little blue butterfly is not in danger of extinction (an endangered species) nor likely to become endangered within the foreseeable future (a threatened species), throughout all or a significant portion of its range. Therefore, we find that listing Leona's

little blue butterfly as an endangered or threatened species under the Act is not warranted at this time.

We request that you submit any new information concerning the status of, or threats to, Leona's little blue butterfly to our Klamath Falls Fish and Wildlife Office (see **ADDRESSES**) whenever it becomes available. New information will help us monitor the species and encourage its conservation. If an emergency situation develops for the species, we will act to provide immediate protection as required under the Act.

### **References Cited**

A complete list of all references cited in this finding is available on the Internet at <http://www.regulations.gov> under Docket No. FWS-R8-ES-2011-0055 or upon request from the Field Supervisor, Klamath Falls Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

### **Authors**

The primary authors of this finding are staff from the Pacific Southwest Regional Office in Sacramento, California, in coordination with staff from the Klamath Falls Fish and Wildlife Office in Klamath Falls, Oregon.

**Authority**

The authority for this action is section 4 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Dated: June 11, 2015

Signed: Stephen Guertin

Acting Director, U.S. Fish and Wildlife Service

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