include the information specified in § 64.1001(c) of this chapter. Such filings shall be made with the Commission, with a copy to the Chief, International Bureau. The transmittal letter accompanying the confidential filing shall clearly identify the filing as responsive to § 43.51(f).

* * * * *

Note 3 to § 43.51: Carriers shall rely on the Commission's list of foreign carriers that do not qualify for the presumption that they lack market power in particular foreign points for purposes of determining which of their foreign carrier contracts are subject to the contract filing requirements set forth in paragraphs (a) and (b)(3) of this section. The Commission's list of foreign carriers that do not qualify for the presumption that they lack market power in particular foreign points is available from the International Bureau's World Wide Web site at *http://www.fcc.gov/ib.* The Commission will include on the list of foreign carriers that do not qualify for the presumption that they lack market power in particular foreign points any foreign carrier that has 50 percent or more market share in the international transport or local access markets of a foreign point. A party that seeks to remove such a carrier from the Commission's list bears the burden of submitting information to the Commission sufficient to demonstrate that the foreign carrier lacks 50 percent market share in the international transport and local access markets on the foreign end of the route or that it nevertheless lacks sufficient market power on the foreign end of the route to affect competition adversely in the U.S. market. A party that seeks to add a carrier to the Commission's list bears the burden of submitting information to the Commission sufficient to demonstrate that the foreign carrier has 50 percent or more market share in the international transport or local access markets on the foreign end of the route or that it nevertheless has sufficient market power to affect competition adversely in the U.S. market.

PART 64—MISCELLANEOUS RULES RELATING TO COMMON CARRIERS

7. The authority citation for part 64 continues to read as follows:

Authority: 47 U.S.C. 154, 254(k); secs. 403(b)(2)(B), (c), Public Law 104–104, 110 Stat. 56. Interpret or apply 47 U.S.C. 201, 218, 225, 226, 228, and 254(k) unless otherwise noted.

8. Section 64.1001 is amended by revising paragraph (a) to read as follows:

§ 64.1001 Requests to modify international settlements arrangements.

(a) The procedures set forth in this rule apply to carrier requests to modify international settlement arrangements on any U.S. international route listed on the Commission's "Exclusion List." *See http://www.fcc.gov/ib/pd/exclusion_list.pdf.* Any operating agreement or amendment for which a modification request is required to be filed cannot become effective until the modification request has been granted under paragraph (e) of this section.

* * * * *

9. Section 64.1002 is amended by revising the introductory text of paragraph (a), removing and reserving paragraph (b) and revising paragraphs (c) and (d) to read as follows:

§ 64.1002 International settlements policy.

(a) A common carrier that is authorized pursuant to part 63 of this chapter to provide facilities-based switched voice service on a U.S. international route that is listed on the Commission's "Exclusion List" (*http://www.fcc.gov/ib/pd/exclusion_list.pdf*), and that enters into an operating or other agreement to provide any such service in correspondence with a foreign carrier that does not qualify for the presumption that it lacks market power on the foreign end of the route, must comply with the following requirements:

* * * * *

(b) [Reserved].

(c) A carrier that seeks to exempt from the international settlements policy an international route on the "Exclusion List" must make its request to the International Bureau, accompanied by a showing that a U.S. carrier has entered into a benchmark-compliant settlement rate agreement with a foreign carrier that possesses market power in the country at the foreign end of the U.S. international route that is the subject of the request. The required showing shall consist of an effective accounting rate modification, filed pursuant to § 64.1001, that includes a settlement rate that is at or below the Commission's benchmark settlement rate adopted for that country in IB Docket No. 96–261, Report and Order, 12 FCC Rcd 19,806, 62 FR 45758, Aug. 29, 1997, available on the International Bureau's World Wide Web site at *http://www.fcc.gov/ib.*

(d) A carrier or other party may request Commission intervention on any U.S. international route for which competitive problems are alleged by filing with the International Bureau a petition, pursuant to this section, demonstrating anticompetitive behavior that is harmful to U.S. customers. The Commission may also act on its own motion. Carriers and other parties filing complaints must support their petitions with evidence, including an affidavit and relevant commercial agreements. The International Bureau will review complaints on a case-by-case basis and take appropriate action on delegated authority pursuant to § 0.261 of this chapter. Interested parties will have 10 days from the date of issuance of a public notice of the petition to file comments or oppositions to such petitions and subsequently 7 days for replies. In the event significant, immediate harm to the public interest is likely to occur that cannot be addressed through post facto remedies, the International Bureau may impose temporary requirements on carriers authorized pursuant to § 63.18 of this chapter without prejudice to its findings on such petitions.

* * * * *

[FR Doc. 2011–17368 Filed 7–18–11; 8:45 am]

BILLING CODE 6712–01–P

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R6–ES–2010–0047; MO 92210–0–0008]

Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List Pinus albicaulis as Endangered or Threatened With Critical Habitat

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 *Pinus albicaulis* (whitebark pine) as threatened or endangered and to designate critical habitat under the Endangered Species Act of 1973, as amended (Act). After review of all available scientific and commercial information, we find that listing *P. albicaulis* as threatened or endangered is warranted. However, currently listing *P. albicaulis* is precluded by higher priority actions to amend the Lists of Endangered and Threatened Wildlife and Plants. Upon publication of this 12-month petition finding, we will add *P. albicaulis* to our candidate species list. We will develop a proposed rule to list *P. albicaulis* as our priorities and funding will allow. We will make any determination on critical habitat during development of the proposed listing rule. In any interim period, we will address the status of the candidate taxon through our annual Candidate Notice of Review.

DATES: The finding announced in this document was made on July 19, 2011.

ADDRESSES: This finding is available on the Internet at *http://www.regulations.gov* at Docket Number FWS–R6–ES–2010–0047. Supporting documentation we used in preparing this finding is available for public inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, Wyoming Ecological Services Field Office, 5353 Yellowstone Road, Suite 308A, Cheyenne, WY 82009. Please submit any new information, materials, comments, or questions concerning this finding to the above address.

FOR FURTHER INFORMATION CONTACT: R. Mark Sattelberg, Field Supervisor, Wyoming Ecological Services Field Office (see **ADDRESSES**); by telephone at 307–772–2374; or by facsimile at 307–772–2358. If you use a telecommunications device for the deaf (TDD), please call the Federal Information Relay Service (FIRS) at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Background

Section 4(b)(3)(A) 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 a species may be warranted, we make a finding within 12 months of the date of receipt of the petition. In this finding, we determine whether the petitioned action is: (a) Not warranted, (b) warranted, or (c) warranted, but immediate proposal of a regulation implementing the petitioned action is precluded by other pending proposals to determine whether species are threatened or endangered, and expeditious progress is being made to add or remove qualified species from the Federal Lists of Endangered and Threatened Wildlife and Plants. Section 4(b)(3)(C) of the Act requires that we treat a petition for which the requested action is found to be warranted but precluded as though resubmitted on the date of such finding, that is, requiring a subsequent finding to be made within 12 months. We must publish these 12-month findings in the **Federal Register.**

Previous Federal Actions

On February 5, 1991, the Great Bear Foundation of Missoula, Montana, petitioned the Service to list *Pinus albicaulis* under the Act, stating the species was rapidly declining due to impacts from mountain pine beetles, white pine blister rust, and fire suppression. After reviewing the petition, we found that the petitioner had not presented substantial information indicating that listing *P. albicaulis* may be warranted. We published this finding in the **Federal Register** on January 27, 1994 (59 FR 3824).

On December 9, 2008, we received a petition dated December 8, 2008, from the Natural Resources Defense Council (NRDC) requesting that we list *Pinus albicaulis* as endangered throughout its range and designate critical habitat under the Act. The petition clearly identified itself as such and included the requisite identification information for the petitioner, as required by 50 CFR 424.14(a). Included in this petition was supporting information regarding the species' natural history, biology, taxonomy, lifecycle, distribution, and reasons for decline. The NRDC reiterated the threats from the 1991 petition, and included climate change and successional replacement as additional threats to *P. albicaulis.* In a January 13, 2009, letter to NRDC, we responded that we had reviewed the information presented in the petition and determined that issuing an emergency regulation temporarily listing the species under section 4(b)(7) of the Act was not warranted. We also stated that we could not address the petition promptly because of staff and budget limitations. We indicated that we would process a 90-day petition finding as quickly as possible.

On December 23, 2009, we received NRDC's December 11, 2009, notice of intent to sue over our failure to respond to the petition to list *Pinus albicaulis* and designate critical habitat. We responded in a letter dated January 12, 2010, indicating that other preceding listing actions had priority, but that we expected to complete the 90-day finding during the 2010 Fiscal Year. On February 24, 2010, we received a formal complaint from NRDC for our failure to comply with issuing a 90-day finding on the petition. On May 7, 2010, we responded in writing to the formal complaint and provided answers to their claims and allegations.

We completed a 90-day finding on the petition, which was published in the **Federal Register** on July 20, 2010 (75 FR 42033). In that finding we determined that the petition presented substantial information such that listing *Pinus albicaulis* may be warranted, and announced that we would be conducting a status review of the species. We opened a 60-day information collection period to allow all interested parties an opportunity to provide information on the status of *Pinus albicaulis* (75 FR 42033), and received 20 letters from the public.

This 12-month finding is based on our consideration and evaluation of the best scientific and commercial information available. We reviewed the information provided in NRDC's petition, information available in our files, other available published and unpublished information, and information received from the public. Additionally, we consulted with recognized Federal and non-Federal *Pinus albicaulis* experts, plant pathologists, and plant geneticists. All information received has been carefully considered in this finding.

Funding was made available during the 2010 and 2011 Fiscal Years for work on the status review. This notice constitutes our 12-month finding on the December 9, 2008, petition to list *Pinus albicaulis* as endangered throughout its range and designate critical habitat under the Act.

Species Information

Taxonomy and Life History

Pinus albicaulis Engelm. (whitebark pine) is a 5-needled conifer species placed in the subgenus *Strobus,* which also includes other 5-needled white pines. This subgenus is further divided into two sections (*Strobus* and *Parrya*), and under section *Strobus,* into two subsections (*Cembrae* and *Strobi*). The traditional taxonomic classifications placed *P. albicaulis* in the subsection *Cembrae* with four other Eurasian stone pines (Critchfield and Little 1966, p. 5; Lanner 1990, p. 19). However, recent phylogenetic studies (Liston *et al.* 1999, 2007; Syring *et al.* 2005, 2007; as cited in Committee on the Status of Endangered Wildlife in Canada (COSEWIC) 2010, p. 4) showed no difference in monophyly (ancestry) between subsection *Cembrae* and subsection *Strobi* and merged them to form subsection *Strobus.* No taxonomic subspecies or varieties of *P. albicaulis* are recognized (COSEWIC 2010, p. 6). Based on this taxonomic classification information, we recognize *P. albicaulis* as a valid species and a listable entity.

Pinus albicaulis is typically 5 to 20 meters (m) (16 to 66 feet (ft)) tall with a rounded or irregularly spreading crown shape. On higher density conifer sites, *P. albicaulis* tends to grow as tall, single-stemmed trees, whereas on open, more exposed sites, it tends to have multiple stems (McCaughey and Tomback 2001, pp. 113–114). Above tree line, it grows in a krummholz form (stunted, shrub-like growth) (Arno and Hoff 1989, p. 6). This pine species is monoecious, (both male pollen and female seed cones are on the same tree). Its characteristic dark brown to purple seed cones are 5 to 8 centimeters (cm)

(2 to 3 inches (in.)) long and grow at the outer ends of upper branches (Hosie 1969, p. 42).

Stone pines (so-called for their stone-like seeds) include five species worldwide, and *Pinus albicaulis* is the only stone pine that occurs in North America (McCaughey and Schmidt 2001, p. 30). Characteristics of stone pines include five needles per cluster, indehiscent seed cones (scales remain essentially closed at maturity) that stay on the tree, and wingless seeds that remain fixed to the cone and cannot be dislodged by the wind. Because *P. albicaulis* seeds cannot be wind-disseminated, primary seed dispersal occurs almost exclusively by Clark's nutcrackers (*Nucifraga columbiana*) in the avian family Corvidae (whose members include ravens, crows, and jays) (Lanner 1996, p. 7; Schwandt 2006, p. 2). Consequently, Clark's nutcrackers facilitate *P. albicaulis* regeneration and influence its distribution and population structure through their seed caching activities (Tomback *et al.* 1990, p. 118).

Pinus albicaulis is a hardy conifer that tolerates poor soils, steep slopes, and windy exposures and is found at alpine tree line and subalpine elevations throughout its range (Tomback *et al.* 2001, pp. 6, 27). It grows under a wide range of precipitation amounts, from about 51 to over 254 cm (20 to 100 in.) per year (Farnes 1990, p. 303). *Pinus albicaulis* may occur as a climax species, early successional species, or seral (mid-successional stage) co-dominant associated with other tree species. Although it occurs in pure or nearly pure stands at high elevations, it typically occurs in stands of mixed species in a variety of forest community types.

Pinus albicaulis is a slow-growing, long-lived tree with a life span of up to 500 years and sometimes more than 1,000 years (Arno and Hoff 1989, pp. 5–6). It is considered a keystone, or foundation species in western North America where it increases biodiversity and contributes to critical ecosystem functions (Tomback *et al.* 2001, pp. 7–8). As a pioneer or early successional species, it may be the first conifer to become established after disturbance, subsequently stabilizing soils and regulating runoff (Tomback *et al.* 2001, pp. 10–11). At higher elevations, snow drifts around *P. albicaulis* trees, thereby increasing soil moisture, modifying soil temperatures, and holding soil moisture later into the season (Farnes 1990, p. 303). These higher elevation trees also shade, protect, and slow the progression of snowmelt, essentially reducing spring flooding at lower elevations. *Pinus albicaulis* also provides important, highly nutritious seeds for a number of birds and mammals (Tomback *et al.* 2001, pp. 8, 10).

Pinus albicaulis trees are capable of producing seed cones at 20–30 years of age, although large cone crops usually are not produced until 60–80 years (Krugman and Jenkinson 1974, as cited in McCaughey and Tomback 2001, p. 109). Therefore, the generation time of *P. albicaulis* is approximately 60 years (COSEWIC 2010, p. v). Like many other species of pines, *P. albicaulis* exhibits masting, in which populations synchronize their seed production and provide varying amounts from year to year. During years with high seed production, typically once every 3–5 years in *P. albicaulis* (McCaughey and Tomback 2001, p. 110), seed consumers are satiated, resulting in excess seeds that escape predation (Lorenz *et al.* 2008, pp. 3–4). *Pinus albicaulis* seed predators are numerous and include more than 20 species of vertebrates including Clark's nutcracker (*Nucifraga columbiana*), pine squirrels (*Tamiasciurus spp.*), grizzly bears (*Ursus arctos*), black bears (*Ursus americanus*), Steller's Jay (*Cyanocitta stelleri*), and Pine Grosbeak (*Pinicola enucleator*) (Lorenz *et al.* 2008, p. 3). Seed predation plays a major role in *P. albicaulis* population dynamics, as seed predators largely determine the fate of seeds. However, *P. albicaulis* has co-evolved with seed predators and has several adaptations, like masting, that has allowed the species to persist despite heavy seed predation (Lorenz *et al.* 2008, p. 3–4).

Seeds not retrieved by Clark's nutcrackers or other seed predators are subsequently available for germination when conditions are favorable (McCaughey and Tomback 2001, p. 111). In years with low seed production, most seeds are predated and, therefore, unavailable for germination (Lorenz *et al.* 2008, p. 4). A single nutcracker can cache up to an estimated 98,000 *P. albicaulis* seeds during good seed crop years (Hutchins and Lanner 1982, p. 196). They may bury seeds near parent trees or travel up to 22 kilometers (km) (14 miles (mi)) away at varying elevations. Cache sites have been found to occur on forest floors, above treeline, in rocky outcrops, meadow edges, clearcuts, and burned areas (Tomback *et al.* 1990, p. 120). *Pinus albicaulis* seedlings have highly variable survival rates; seedlings originating from nutcracker caches ranged from 56 percent survival over the first year to 25 percent survival by the fourth year (Tomback 1982, p. 451).

While *Pinus albicaulis* is almost exclusively dependent upon Clark's nutcracker for seed dispersal, the reverse is not true as Clark's nutcracker forage on seeds from numerous species of pine. The frequency of nutcracker occurrence and probability of seed dispersal from a *P. albicaulis* forest is strongly associated with the number of available cones. A threshold of 1,000 cones per hectare (ha) (2.47 acres (ac)) is needed for a high likelihood of seed dispersal by nutcrackers, and this level of cone production occurs in forests with a live basal area (the volume of wood occurring in a given area) greater than 5 square meters (m) per ha (McKinney *et al.* 2009, p. 603). For an adult Clark's nutcracker to survive a subalpine winter (accounting for those seeds consumed by rodents and those fed to juvenile nutcrackers), it would need to cache seeds from 767 to 2,130 cones (McKinney *et al.* 2009, p. 605). Clark's nutcrackers are able to assess cone crops, and if there are insufficient seeds to cache, they will emigrate in order to survive (McKinney *et al.* 2009, p. 599).

Distribution

Pinus albicaulis occurs in scattered areas of the warm and dry Great Basin but it typically occurs on cold and windy high-elevation or high-latitude sites in western North America. As a result, many stands are geographically isolated (Arno and Hoff 1989, p. 1; Keane *et al.* 2010, p. 13). Its range extends longitudinally between 107 and 128 degrees west and latitudinally between 27 and 55 degrees north (McCaughey and Schmidt 2001, p. 33). The distribution of *P. albicaulis* includes coastal and Rocky Mountain ranges that are connected by scattered populations in northeastern Washington and southeastern British Columbia (Arno and Hoff 1990, p. 268; Keane *et al.* 2010, p. 13). The coastal distribution of *P. albicaulis* extends from the Bulkley Mountains in British Columbia to the northeastern Olympic Mountains and Cascade Range of Washington and Oregon, to the Kern River of the Sierra Nevada Range of east-central California (Arno and Hoff 1990, p. 268). Isolated stands of *P. albicaulis* are known from the Blue and Wallowa Mountains in northeastern Oregon and the subalpine and montane zones of mountains in northeastern California, south-central Oregon, and northern Nevada (Arno and Hoff 1990, p. 268; Keane *et al.* 2010, p. 13). The Rocky Mountain distribution of *P. albicaulis* ranges from northern British Columbia and Alberta to Idaho, Montana, Wyoming, and Nevada (Arno and Hoff 1990, p. 268; Keane *et al.* 2010,

p. 13), with extensive stands occurring in the Yellowstone ecosystem (McCaughey and Schmidt 2001, p. 33). The Wind River Range in Wyoming is the eastern most distribution of the species (Arno and Hoff 1990, p. 268; McCaughey and Schmidt 2001, p. 33) (Figure 1).

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Figure 1.—Estimated *Pinus albicaulis* range distribution (Little, 1971).

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In general, the upper elevational limits of *Pinus albicaulis* decrease with increasing latitude throughout its range (McCaughey and Schmidt 2001, p. 33). The elevational limit of the species ranges from approximately 900 m (2,950 ft) at its northern limit in British Columbia up to 3,660 m (12,000 ft) in the Sierra Nevada (McCaughey and Schmidt 2001, p. 33). *Pinus albicaulis* is typically found growing at alpine timberline or with other high-mountain conifers just below the timberline and upper montane zone (Arno and Hoff 1990, p. 270; McCaughey and Schmidt 2001, p. 33). In the Rocky Mountains, common associated tree species include *P. contorta* var. *latifolia* (lodgepole pine), *Picea engelmannii* (Engelmann spruce), *Abies lasiocarpa* (subalpine fir), and *Tsuga mertensiana* (mountain hemlock). Common associated tree species are similar in the Sierra Nevada and Blue and Cascade Mountains, except lodgepole pine is present as *P. contorta var. murrayana* (Sierra-Cascade lodgepole pine) and mountain hemlock is absent from the Blue Mountains (Arno and Hoff 1990, p. 270; McCaughey and Schmidt 2001, pp. 33–34).

Roughly 44 percent of the species' range occurs in the United States, with the remaining 56 percent of its range occurring in British Columbia and Alberta, Canada (COSEWIC 2010, p. iv). In Canada, the majority of the species' distribution occurs on private lands (Achuff 2010, pers. comm.). In the United States, approximately 96 percent of land where the species occurs is federally owned or managed. The majority is located on U.S. Forest Service (USFS) lands (approximately 81 percent, or 4,698,388 ha (11,609,969 ac)). The bulk of the remaining acreage is located on National Park Service (NPS) lands (approximately 13 percent, or 740,391 ha (1,829,547 ac)). Small amounts of *P. albicaulis* also can be found on Bureau of Land Management lands (approximately 2 percent, or 119,598 ha (295,534 ac)). The remaining 4 percent is under non-Federal ownership.

Trends

Mortality data collected in multiple studies throughout the range of *Pinus albicaulis* strongly suggests that the species is in range-wide decline (Table 1). Although the majority of available data was collected in the last several decades, the decline in *P. albicaulis* populations likely began sometime following the 1910 introduction of the exotic disease white pine blister rust. Although we do not have a study that quantifies the rate of decline across the entire range, we conclude that the preponderance of data from the studies listed below and elsewhere in this status review provides evidence of a substantial and pervasive decline throughout almost the entire range of the species.

TABLE 1—SUMMARY OF RESULTS FROM STUDIES DOCUMENTING THE DECLINE OF PINUS ALBICAULIS IN THE UNITED STATES AND CANADA

[Adapted from Keane *et al.* 2010, p. 127]

Study year	Geographic area	Percent decline	Source
	United States		
1992	Southern Bitterroot National Forest	14	Arno *et al.* (1993).
1992	Western Montana	51	Keane and Arno (1993).
1993	Bob Marshall Wilderness	44	Keane *et al.* (1994).
1995	Eastern Cascades	2	Hadfield *et al.* (1996).
1996	Bitterroot National Forest	29	Hartwell and Alaback (1997).
1997	Intermountain Region	1	Smith and Hoffman (1998, 2000).
2000	Selkirk Mountains	34	Kegley *et al.* (2001).
2001	Umpqua National Forest	10	Goheen *et al.* (2002).
2003	Western Cascades, Washington	41	Shoal and Aubry (2004).
2003	Eastern Cascades	16	Shoal and Aubry (2004).
2005	Washington, Oregon	35	Summary of multiple studies in Ward *et al.* (2006).
2007	Oregon, Washington	21	Shoal (2007).
2008	Mt. Rainier, North Cascades	31	Rochefort (2008).
2008	Greater Yellowstone	70	Bockino (2008).
2008	Glacier National Park	60	Smith *et al.* (2008).
2008	Central Idaho	31	Hicke and Logan (2009).
	Canada		
1997	British Columbia	21	Campbell (1998); Campbell and Antos (2003).
2001	British Columbia	19	Zeglen (2002, 2007).
2007	Canadian Rocky Mountains	57	Smith *et al.* (2008).

In Canada, based on current mortality rates, it is anticipated that *Pinus albicaulis* will decline by 57 percent by 2100 (COSEWIC 2010, p. 19). The value for this anticipated decline is likely an underestimate, as it assumes current mortality rates remain constant into the foreseeable future. Past trends have shown that mortality rates have been increasing over the last several decades (this is discussed in more detail under Factor C, Disease or Predation). The range of mortality rates for *P. albicaulis* in the United States are similar to those in Canada, which suggests that the anticipated rates of decline will be similar.

Summary of Information Pertaining to the Five Factors

Section 4 of the Act (16 U.S.C. 1533) and implementing regulations (50 CFR part 424) set forth procedures for adding species to 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 this finding, information pertaining to *Pinus albicaulis* in relation to the five factors provided in section 4(a)(1) of the Act is discussed below.

In considering what factors might constitute threats to a species, we must look beyond the exposure of the species to a particular factor to evaluate whether the species may respond to that factor in a way that causes actual impacts to the species. If there is exposure to a factor and the species responds negatively, the factor may be a threat, and, during the status review, we attempt to determine how significant a threat it is. The threat is significant if it drives, or contributes to, the risk of extinction of the species such that the species warrants listing as endangered or threatened as those terms are defined in the Act. However, the identification of factors that could impact a species negatively may not be sufficient to compel a finding that the species warrants listing. The information must include evidence sufficient to suggest that these factors are operative threats that act on the species to the point that the species may meet the definition of endangered or threatened under the Act.

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

Fire and Fire Suppression

Fire is one of the most important landscape-level disturbance processes within high-elevation *Pinus albicaulis* forests (Agee 1993, p. 259; Morgan and Murray 2001, p. 238; Spurr and Barnes 1980, p. 422), and has been important to perpetuating early seral (successional stage) *P. albicaulis* communities (Arno 2001, p. 82; Shoal *et al.* 2008, p. 20). Without regular disturbance, primarily from fire, these forest communities follow successional pathways that eventually lead to dominance by shade-tolerant conifers such as *Abies lasiocarpa, Picea engelmannii,* and *Tsuga mertensiana,* to the exclusion of *P. albicaulis* (Keane and Parsons 2010, p. 57). When fire is present on the landscape, *P. albicaulis* has an advantage over its competitors for several reasons (Keane and Parsons 2010, p. 57). The Clark's nutcracker serves as the main dispersal agent for *P. albicaulis* by caching seeds in disturbed sites, such as burns. Fire creates sites that are suitable for this seed caching behavior and that most importantly contain optimal growing conditions for *P. albicaulis* (Tomback *et al.* 2001, p. 13). In addition, Clark's nutcrackers can disperse seeds farther than the wind-dispersed seeds of other conifers, thereby facilitating *P. albicaulis* succession in burned sites over a broad geographic area (McCaughey *et al.* 1985, Tomback *et al.* 1990, 1993 in Keane and Parsons 2010, p. 58). Additionally, *P. albicaulis* has thicker bark, a thinner crown, and a deeper root system, which allow it to withstand low-intensity fires better than many of its competitors (Arno and Hoff 1990 in Keane and Parsons 2010, p. 58). Historically, fire has been an important factor in maintaining healthy stands of *P. albicaulis* on the landscape.

Fires in the high-elevation ecosystem of *Pinus albicaulis* can be of low intensity, high intensity, or mixed intensity. These varying intensity levels result in very different impacts to *P. albicaulis* communities. Low-intensity, surface-level ground fires occur frequently under low-fuel conditions. These fires remove small-diameter, thin-barked seedlings and allow large, mature trees to thrive (Arno 2001, p. 82). Low-intensity fires also reduce fuel loads and competition from fire-susceptible conifers, shrubs, and grasses, thereby opening up spaces necessary for the shade-intolerant *P. albicaulis* to regenerate and thus maintain prominence in seral communities (Arno 1986 in Keane *et al.* 1994, p. 215). High-intensity fires occur where high fuel loads, ladder fuels (vegetation below the crown level of forest trees, which allows fire to move from the forest floor to tree crowns), and other compounding conditions result in increased flammability (Agee 1993, p. 258). High-intensity fires, often referred to as stand replacement fires, or crown fires (Agee 1993, p. 16), produce intensive heat, resulting in the removal of all or most of the vegetation from the ground. High-intensity fires begin the process of vegetative succession by opening seed beds that become available for the establishment and development of shade-intolerant species like *P. albicaulis.* High-intensity fires are generally less frequent because it takes longer time intervals to build the large fuel accumulations necessary to promote these types of fires (Agee 1993, p. 258). Mixed-intensity fires are most common and result in a mosaic of dead trees, live trees, and open sites for regeneration (Arno 1980, p. 460; Keane 2001a, p. 17). In general, historical fire return intervals in *P. albicaulis* communities have been estimated at between 50 and 300 years (Arno 1980, p. 461).

Beginning in the 1930s, a policy of fire suppression was effectively implemented by the USFS (Arno 1980, p. 460; USFS 2000, p. 1). During the 1970s, in recognition of the importance of wildfire to maintenance of healthy forests, the USFS began a policy shift away from total fire suppression (Cohen 2008, p. 21; USFS 2000, p. 1). However, despite this shift, fire suppression is still carried out, most frequently in areas where a threat to human health and safety are anticipated, and we expect this trend of fire suppression to continue into the future (Arno 1980, p. 460; Cohen 2008, p. 21; Keane 2011a, pers. comm.).

Fire suppression has had unintended negative impacts on *Pinus albicaulis* populations (Keane 2001a, entire), due to this shift from a natural fire regime to a managed fire regime. Stands once dominated by *P. albicaulis* have undergone succession to more shade-tolerant conifers (Arno *et al.* 1993 in Keane *et al.* 1994, p. 225; Flanagan *et al.* 1998, p. 307). Once shade-tolerant conifer species become firmly established, the habitat is effectively lost to *P. albicaulis* until a disturbance like fire once again opens the area for *P. albicaulis* regeneration. Determining the total amount of *P. albicaulis* habitat lost to succession rangewide is difficult, as there is seldom a historic baseline for comparison, and the degree of succession is very specific to local conditions (Keane 2011a, pers. comm.). Shade-tolerant conifer species grow more densely than shade-intolerant conifer species like *P. albicaulis* (Minore 1979, p. 3). Denser stands eliminate the open sites that are often used by Clark's nutcracker for seed caching and which are also the sites required to facilitate the regeneration of the shade-intolerant *P. albicaulis.* Additionally, the growth of more homogeneously structured stands with continuous crowns and increased surface fuels has resulted in fires that are larger and more intense (Keane 2001b, p. 175).

Pinus albicaulis cannot withstand high-intensity fires; during such fires, all age and size classes can be killed. However, newly burned areas provide a seedbed for *P. albicaulis,* and if stands of unburned cone-producing *P. albicaulis* are nearby (i.e., within the range of Clark's nutcracker caching behavior), Clark's nutcrackers will cache those seeds on the burned site, and regeneration is very likely. However, the introduction of the disease white pine blister rust and the current epidemic of the predatory mountain pine beetle (*Dendroctonus ponderosae*) have reduced or effectively eliminated *P. albicaulis* seed sources on a landscape scale (see Factor C, Disease or Predation). Although there is variation in the degree to which specific stands have been impacted, over the range of *P. albicaulis* the widespread incidence of poor stand health from disease and predation, coupled with changes in fire regimes, means that regeneration of *P. albicaulis* following fire is unlikely in many cases (Tomback *et al.* 2008, p. 20).

Fire and Fire Suppression and the Interaction of Other Factors

Environmental changes resulting from climate change are expected to exacerbate the already observed negative effects of fire suppression (i.e., forest succession, increased fire intensity) (see the Climate Change section below). These environmental changes are predicted to increase the number, intensity, and extent of wildfires (Aubry *et al.* 2008, p. 6; Keane 2001b, p. 175). Already, large increases in wildfire have been documented and are particularly pronounced in Northern Rockies forests, which account for 60 percent of documented increases in large fires (Westerling *et al.* 2006, p. 941, 943). Some of the increase has been independent of past management activities and, thus, appears to be a direct result of warming trends in the last several decades (Westerling *et al.* 2006, p. 943).

Fire suppression is also expected to negatively interact with white pine blister rust and mountain pine beetle predation. As forests become more dense, individual *Pinus albicaulis* are more vulnerable to white pine blister rust and infestation by mountain pine beetle (see Factor C, Disease and Predation). As mortality from white pine blister rust and mountain pine beetle increase, forest succession to more dense stands of shade-tolerant conifers is accelerated (Keane 2011a, pers. comm.).

Summary of Impacts of Fire and Fire Suppression

Fire suppression results in conditions that favor the dominance of shade-tolerant species such as *Abies lasiocarpa, Picea engelmannii,* and *Tsuga mertensiana,* which form dense stands that eventually exclude *Pinus albicaulis* (Agee 1993, p. 252; Arno 2001, p. 83). We assume that fire suppression efforts that create these impacts will continue to occur into the future. Where *P. albicaulis* persists, dense forest structure crowds and stresses individual trees, making them more susceptible to white pine blister rust, infestation by mountain pine beetle, and mortality. Succession to more shade-tolerant species also results in less *P. albicaulis* regeneration because *P. albicaulis* is shade-intolerant, and seeds will not survive if cached in heavily shaded forest stands. The interaction between fire suppression and environmental effects from climate change exacerbates the impacts to *P. albicaulis,* and in the future will be particularly devastating to *P. albicaulis* populations as *P. albicaulis* seed sources are expected to become increasingly limited by continued impacts from white pine blister rust and mountain pine beetle.

The balance of a natural fire regime with related vegetative successive processes has been disrupted across the *Pinus albicaulis* ecosystem. As a result, *Pinus albicaulis* has lost its competitive advantage and trends indicate its presence has been reduced on the landscape. Because there is seldom a historic baseline for comparison and the degree of succession is very locally specific, we are not able to quantify what portion of the species decline can be attributed to fire management and changes in fire regimes. However, we consider the current fire regime and fire management practices to be threats that limit the abundance of the species and weaken *P. albicaulis* communities, such that other factors create additional negative impacts to the species.

The effects of changing fire regimes and fire suppression on *Pinus albicaulis,* combined with the interaction of white pine blister rust and mountain pine beetles, have created more homogenous forest stands with reduced numbers of *P. albicaulis* compared to historic subalpine landscapes. These effects are becoming more pronounced with climate change (Morgan and Murray 2001, p. 300), creating a trajectory toward forest stands without *P. albicaulis.* The species appears likely to be in danger of extinction, or likely to become so within the foreseeable future, because of habitat losses due to changes to the fire regime, particularly when viewed in combination with climate change, disease, and predation.

Climate Change

The Intergovernmental Panel on Climate Change (IPCC) was established in 1988 by the World Meteorological Organization and the United Nations Environment Program in response to growing concerns about climate change and, in particular, the effects of global warming. Although the extent of warming likely to occur is not known with certainty at this time, the IPCC has concluded that warming of the climate is unequivocal, and that continued greenhouse gas emissions at or above current rates will cause further warming (IPCC 2007, p. 30). Climate change scenarios estimate that the mean air temperature could increase by over 3 °C (5.4 °F) by 2100 (IPCC 2007, p. 46). The IPCC also projects that there will very likely be regional increases in the frequency of hot extremes, heat waves, and heavy precipitation (IPCC 2007, p. 46), as well as increases in atmospheric carbon dioxide (IPCC 2007, p. 36).

We recognize that there are scientific differences of opinion on many aspects of climate change, including the role of natural variability in climate. In our analysis, we rely primarily on synthesis documents (e.g., IPCC 2007; Global Climate Change Impacts in the United States 2009) that present the consensus view of a very large number of experts on climate change from around the world. We have found that these synthesis reports, as well as the scientific papers used in those reports or resulting from those reports, represent the best available scientific information we can use to inform our decision and have relied upon them and provided citations within our analysis.

Direct habitat loss from climate change is anticipated to occur with current habitats becoming unsuitable for *P. albicaulis* as temperatures increase and soil moisture availability decreases (Hamman and Wang 2006, p. 2783; Schrag *et al.* 2007, p. 8; Aitken *et al.* 2008, p. 103). Habitat loss is expected because (1) temperatures become so warm that they exceed the thermal tolerance of *P. albicaulis* and the species is unable to survive or (2) warmer temperatures favor other species of conifer that currently cannot compete with *P. albicaulis* in cold high-elevation habitats. *Pinus albicaulis* is widely distributed and thus likely has a wide range of tolerance to varying temperatures (Keane 2011c, pers.comm.). Therefore, increasing competition from other species that can not normally persist in current *P. albicaulis* habitats is possibly the more probable climate-driven mechanism for habitat loss.

Given the anticipated loss of suitable habitat, *P. albicaulis* persistence will likely be dependent on the species' ability to either migrate to new suitable habitats, or adapt to changing conditions (Aitken *et al.* 2008, p. 95). Historical (paleoecological) evidence indicates that plant species have generally responded to past climate change through migration, and that adaptation to changing climate conditions is less likely to occur (Bradshaw and McNeilly 1991, p. 12; Huntley 1991, p. 19). Adaptation to a change in habitat conditions as a result of a changing climate is even more unlikely for *P. albicaulis,* given its very long generation time of approximately 60 years (Bradshaw and McNeilly 1991, p. 10). The rate of latitudinal plant migration during past warming and cooling events is estimated to have been on the order of 100 m (328 ft) per year (Aitken *et al.* 2008, p. 96). Given the current and anticipated rates of global climate change, migration rates will potentially need to be substantially higher than those measured in historic pollen records to sustain the species over time. A migration rate of at least a magnitude higher (1,000 m (3,280 ft)) per year is estimated to be necessary in order for tree species to be capable of tracking suitable habitats under projected warming trends (Malcolm *et* *al.* 2002, entire). Latitudinal migration rates on this scale may significantly exceed the migration abilities of many plant species, including *P. albicaulis* (Malcolm *et al.* 2002, p. 844–845; McKenney *et al.* 2007, p. 941).

Pinus albicaulis may have an advantage in its ability to migrate given that its seeds are dispersed by Clark's nutcracker. As mentioned above, Clark's nutcrackers can disperse seeds farther than the wind-dispersed seeds of other conifers (McCaughey *et al.* 1985, Tomback *et al.* 1990, 1993 in Keane and Parsons 2010, p. 58). However, migration of *P. albicaulis* to the north may be impeded by the disease white pine blister rust, which is currently present at the northern range limits of *P. albicaulis* (Smith *et al.* 2008, Figure 1, p. 984; Resler and Tomback 2008, p. 165).

Pinus albicaulis already is typically the first species to establish on cold, exposed high-elevation sites, thus the species could potentially migrate higher in elevation to more suitable habitats. Shifts in the optimum elevation for many high-elevation plant species have already been documented under current warming trends (Lenoir *et al.* 2008, p. 1770). However, elevational migration as a refuge from temperature increase has limits, because eventually, suitable habitat may not be present even on mountaintops due to continuing temperature increases.

Climate change is expected to significantly decrease the probability of rangewide persistence of *Pinus albicaulis.* Projections from an empirically based bioclimatic model for *P. albicaulis* showed a rangewide distribution decline of 70 percent and an average elevation loss of 333 m (1,093 ft) for the decade beginning in 2030 (Warwell *et al.* 2007, p. 2). At the end of the century, less than 3 percent of currently suitable habitat is expected to remain (Warwell *et al.* 2007, p. 2). Similarly, climate envelope modeling on *P. albicaulis* distribution in British Columbia estimated a potential decrease of 70 percent of currently suitable habitat by the year 2055 (Hamman and Wang 2006, p. 2783). The area occupied by *P. albicaulis* in the Greater Yellowstone Ecosystem also is predicted to be significantly reduced with increasing temperature under various climate change scenarios (Schrag *et al.* 2007, p. 6). *Pinus albicaulis* is predicted to be nearly extirpated under a scenario of warming only and warming with a concomitant increase in precipitation (Schrag *et al.* 2007, p. 7).

The above studies all suggest that the area currently occupied by *P. albicaulis* will be severely reduced in the foreseeable future. We recognize, however, that there are many limitations to such modeling techniques, specifically for *P. albicaulis.* For example, climate envelope models use current environmental conditions in the distribution of the species' range to determine whether similar environmental conditions will be available in the future given predicted climate change. *Pinus albicaulis,* however, is a very long-lived species, and current environmental conditions may not closely resemble environmental conditions present when the trees currently on the landscape were established (Keane 2001c, pers. comm.). Additionally, these models also describe current environmental variables in averages taken over large areas. *Pinus albicaulis* may experience very different environmental conditions even over a small range as individuals can be separated by thousands of meters (Keane 2011c, pers. comm.).

Climate Change and the Interaction of Other Factors

In addition to direct habitat loss, *Pinus albicaulis* is expected to experience decrease in population size from synergistic interactions between habitat changes as a result of climate change and other threat factors including altered fire regimes, disease, and predation. *Pinus albicaulis* has evolved with fire, and under many conditions, fire is beneficial to the species (see Fire and Fire Suppression above). However, environmental changes resulting from climate change are expected to alter fire regimes resulting in increased fire intervals, increased fire severity, and habitat loss (Westerling *et al.* 2006, p. 943).

Pinus albicaulis also evolved with the predatory native mountain pine beetle (*Dendroctonus ponderosae*). However, the life cycle of the mountain pine beetle is temperature dependent, and warming trends have resulted in unprecedented mountain pine beetle epidemics throughout the range of *P. albicaulis* (the interaction of mountain pine beetle and *P. albicaulis* is discussed further below under Factor C, Predation) (Logan *et al.* 2003, p. 130; Logan *et al.* 2010, p. 896). At epidemic levels, mountain pine beetle outbreaks become stand-replacing events killing 80 to 95 percent of suitable host trees, and in many parts of the *P. albicaulis* range, those levels of mortality have already been reached (Gibson *et al.* 2008, p. 10). Even populations of *P. albicaulis* once considered mostly immune to mountain pine beetle epidemics are now being severely impacted; mountain pine beetles have now moved into areas previously climatically inhospitable for epidemic-level mountain pine beetle population growth (Carroll *et al.* 2003 in Gibson *et al.* 2008, p. 4; Raffa *et al.* 2008, p. 503; Logan *et al.* 2010, p. 895). Given ongoing and predicted environmental changes resulting from global climate change, we expect the expansion of habitat favorable to mountain pine beetle (and mountain pine epidemics) to continue into the foreseeable future.

Summary of Impacts of Climate Change

Given projected increases in temperature, a significant loss of the cool high-elevation habitats of *Pinus albicaulis* is expected. Rapid warming is likely to outpace the ability of *P. albicaulis* to migrate to suitable habitats. Additionally, adaptation to warming conditions for this long-lived species seems unlikely. Synergistic interactions between environmental changes resulting from climate change, wildfire, disease, and mountain pine beetle also are negatively impacting *P. albicaulis* rangewide. In particular, mountain pine beetle epidemics brought about by increasing temperatures are currently having significant negative impacts on *P. albicaulis* rangewide. The species appears likely to be in danger of extinction, or likely to become so within the foreseeable future, because of environmental changes resulting from climate change that are exacerbating other threats, particularly when viewed in combination with fire suppression, disease, and predation, that appear to be beyond the natural adaptive capabilities and tolerances of *P. albicaulis.*

Summary of Factor A

We analyzed the effects of fire and fire suppression and climate change as related to the present or threatened destruction, modification, or curtailment of the habitat or range of *Pinus albicaulis.* As identified in our analysis above, fire historically played an integral role in maintaining healthy stands of *P. albicaulis* on the landscape. As a result of past and present fire suppression, forest stands where *P. albicaulis* were once prominent have become dense stands of shade-tolerant conifers. This change in forest composition and structure combined with the exacerbating environmental effects resulting from climate change, has resulted in an increase in the severity, intensity, and frequency of wildfires. We expect that changing fire regimes and fire suppression efforts that create these impacts will continue to affect the species into the foreseeable future. *Pinus albicaulis* can regenerate, even following stand-replacing burns, if a seed source is available. However, widespread predation and disease currently impacting *P. albicaulis* are limiting available seed sources, reducing the probability of regeneration following increasing wildfire episodes, and increasing the rate of forest succession.

The pace of predicted effect of climate change will outpace many plant species' ability to respond to the concomitant habitat changes. *Pinus albicaulis* is potentially particularly vulnerable to warming temperatures because it is adapted to cool, high-elevation habitats. Therefore, current and anticipated warming is expected to make its current habitat unsuitable for *P. albicaulis.* The rate of migration needed to respond to predicted environmental effects of climate change will be significant (Malcolm *et al.* 2002, p. 844–845; McKenney *et al.* 2007, p. 941). Whether *P. albicaulis* is capable of migrating at a pace sufficient to move to areas that may be more favorable to survival under future habitat conditions is not known. Moreover, the degree to which Clark's nutcracker could facilitate this migration is also not known. In addition, the presence of significant white pine blister rust infection in the northern range of *P. albicaulis* could serve as a barrier to effective northward migration. *P. albicaulis* survives at high altitudes already, so there is little remaining habitat for the species to migrate to higher elevations in response to warmer temperatures. Adaptation in response to a rapidly warming climate also is unlikely as *P. albicaulis* is a long-lived species. Climate models suggest that climate change is expected to act directly to significantly decrease the probability of rangewide persistence in *P. albicaulis* within the next 100 years. This time interval is less than two generations for this long-lived species. In addition, projected environmental changes resulting from climate change are a significant threat to *P. albicaulis,* because the impacts of these environmental effects interact with other stressors such as mountain pine beetle epidemics and wildfire, resulting in habitat loss and population decline.

On the basis of a review of the best scientific and commercial information available concerning present threats to *Pinus albicaulis* habitat, their synergistic effects, and their likely continuation in the future, we conclude that the present or threatened destruction, modification, or curtailment of its habitat or range is a threat to *P. albicaulis.*

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

Commercial Harvest

Pinus albicaulis is not targeted for commercial timber production in any part of its range (Arno and Hoff 1989, p. 5; COSEWIC 2010, p. 12; Keane *et al.* 2010, p. 30). At lower elevations where *P. albicaulis* occurs with species of commercial interest, some incidental harvest of *P. albicaulis* does take place. The average yearly estimated harvest of *P. albicaulis* in the United States is less than 405 ha (1,000 ac) (Losensky 1990 in Keane *et al.* 2010, p. 30). We have no information to indicate that harvest is a significant threat to the species or is contributing to the rangewide decline, or decline in any portion of the range of *P. albicaulis.*

Recreational Use

Pinus albicaulis stands are subject to a variety of nonconsumptive recreational activities including hiking and camping. These activities have the potential to cause negative impacts in localized areas through degradation of habitat in areas experiencing overuse. However, we have no information to indicate that recreational use is a threat to *P. albicaulis.*

Scientific and Educational Use

Pinus albicaulis is the subject of many scientific research studies. Currently, there is significant interest in collecting seed cones from individuals identified as being resistant to white pine blister rust. Given the relatively low number of seeds being collected, it is highly unlikely that seed removal is contributing to *P. albicaulis* declines. We have no information to indicate that *P. albicaulis* is being used consumptively for educational purposes. Therefore, the best available scientific information does not indicate that scientific and educational uses are a significant threat to *P. albicaulis.*

Summary of Factor B

We conclude that the best scientific and commercial information available indicates that overutilization for commercial, recreational, scientific, or educational purposes is not a threat to *Pinus albicaulis.*

Factor C. Disease or Predation

Disease

White Pine Blister Rust

White pine blister rust is a disease of 5-needled pines caused by a nonnative fungus, *Cronartium ribicola* (Geils *et al.* 2010, p. 153). It was introduced into western North America in 1910 near Vancouver, British Columbia (McDonald and Hoff 2001, p. 198). White pine blister rust initially spread rapidly through maritime and montane environments, which have environmental conditions more conducive to spread of infection, but over several decades, it spread through continental and alpine environments throughout western North America (Geils *et al.* 2010, p. 163). White pine blister rust's rate and intensity of spread is influenced by microclimate and other factors (described below). Therefore, the incidence of white pine blister rust at stand, landscape, and regional scales varies due to time since introduction and environmental suitability for its development. It continues to spread into areas originally considered less suitable for persistence, and it has become a serious threat, causing severe population losses to several species of western pines, including *Pinus albicaulis, P. monticola* (western white pine), and *P. lambertiana* Dougl. (sugar pine) (Schwandt *et al.* 2010, pp. 226–230). Its current known geographic distribution in western North America includes all U.S. States (except Utah, as well as the Great Basin Desert) and British Columbia and Alberta, Canada (Tomback and Achuff 2010, pp. 187, 206).

The white pine blister rust fungus has a complex life cycle: It does not spread directly from one tree to another, but alternates between living primary hosts (i.e., 5-needle pines) and alternate hosts. Alternate hosts in western North America are typically woody shrubs in the genus *Ribes* (gooseberries and currants) but also may include herbaceous species of the genus *Pedicularis* (lousewort) and the genus *Castilleja* (paintbrush) (McDonald and Hoff 2001, p. 193; McDonald *et al.* 2006, p. 73). *Ribes* is widespread in North America and, while most species are susceptible to white pine blister rust infection, they vary in their susceptibility and capability to support innoculum (spores) that are infective to white pines, depending on factors such as habitat, topographic location, timing, and environment (Zambino 2010, pp. 265–268). A wide-scale Federal program to eradicate *Ribes* from the landscape was conducted from the 1920s to the 1960s. However, due to the abundance of *Ribes* shrubs, longevity of *Ribes* seed in the soil, and other factors, white pine blister rust continued to spread, and pathologists realized that eradication was ineffective in controlling white pine blister rust. White pine blister rust is now pervasive in high-altitude 5-

needled pines within most of the western United States (McDonald and Hoff 2001, p. 201).

White pine blister rust progresses through five spore stages to complete each generation: Two spore stages occur on white pine (*Pinus* spp.), and three stages occur on an alternate host. The five fungal spore stages require specific temperature and moisture conditions for production, germination, and dissemination. The spreading of spores depends on the distribution of hosts, the microclimate, and the different genotypes of white pine blister rust and hosts (McDonald and Hoff 2001, pp. 193, 202). Local meteorological conditions also may be important factors in infection success, infection periodicity, and disease intensity (Jacobi *et al.* 2010, p. 41).

On white pines, spores enter through openings in the needle surface, or stomates, and move into the twigs, branches, and tree trunk, causing swelling and cankers to form. White pine blister rust attacks seedlings and mature trees, initially damaging upper canopy and cone-bearing branches and restricting nutrient flows; it eventually girdles branches and trunks, leading to the death of branches or the entire tree (Tomback *et al.* 2001, p. 15, McDonald and Hoff 2001, p. 195). White pine blister rust can kill small trees within 3 years, and even one canker can be lethal. While some infected mature trees can continue to live for decades, their cone-bearing branches typically die, thereby eliminating the seed source required for reproduction (Geils *et al.* 2010, p. 156). In addition, the inner sapwood moisture decreases, making trees prone to desiccation and secondary attacks by insects (Six and Adams 2007, p. 351). Death to upper branches results in lower or no cone production and a reduced likelihood that seed will be dispersed by Clark's nutcrackers (McKinney and Tomback 2007, p. 1049). Similar to a total loss of cone production, even when cone production is low there could be a loss of regeneration for two reasons: (1) Clark's nutcrackers abandon sites with low seed production; and (2) the proportion of seeds taken by predators becomes so high that no seeds remain for regeneration (COSEWIC 2010, p. 25).

Each year that an infected tree lives, the white pine blister rust infecting it continues to produce spores, thereby perpetuating and intensifying the disease. A wave, or massive spreading, of new blister rust infections into new areas or intensification from a cumulative buildup in already-infected stands occurs where *Ribes* shrubs are abundant and when summer weather is favorable to spore production and dispersal. Spores can be produced on pines for many years, and appropriate conditions need to occur only occasionally for white pine blister rust to spread and intensify (Zambino 2010, p. 265). The frequency of wave years depends on various factors, including elevation, geographical region, topography, wind patterns, temperature, and genetic variation in the rust (Kendall and Keane 2001, pp. 222–223).

Because its abundance is influenced by weather and host populations, white pine blister rust also is affected by climate change. If conditions become moister, white pine blister rust will likely increase; conversely, where conditions become both warmer and drier, it may decrease. Because infection is usually through stomates, whatever affects the stomates affects infection rates (Kliejunas *et al.* 2009, pp. 19–20). Stomates close in drought conditions and open more readily in moist conditions.

In general, weather conditions favorable to the intensification of white pine blister rust occur more often in climates with coastal influences than in dry continental climates (Kendall and Keane 2001, p. 223). Due to current climate conditions in western North America, white pine blister rust now infects *Pinus albicaulis* populations throughout all of its range except for the interior Great Basin (Nevada and adjacent areas) (Tomback and Achuff 2010, Figure 1a, p. 187). However, the small uninfected area in the Great Basin accounts for only 0.4 percent of *P. albicaulis* distribution in the United States. The incidence of white pine blister rust is highest in the Rocky Mountains of northwestern Montana and northern Idaho, the Olympic and western Cascade Ranges of the United States, the southern Canadian Rocky Mountains, and British Columbia's Coastal Mountains (Schwandt *et al.* 2010, p. 228; Tomback *et al.* 2001, p. 15).

White Pine Blister Rust Infection Rates

Researchers have used various sampling methods to assess the effects of white pine blister rust on *Pinus albicaulis* and the amounts of infection present; therefore, exact comparisons between studies are not possible. While white pine blister rust occurs throughout almost all of *P. albicaulis'* range, not all trees are infected and infection rates vary widely. Furthermore, it can be difficult to detect white pine blister rust, especially if cankers occur on gnarled canopy branches where infections may remain undetected (Rochefort 2008, p. 294). However, despite slight differences in sampling methods general trends can be identified from the published literature (Schwandt *et al.* 2010, p. 228). Trends strongly indicate that white pine blister rust infections have increased in intensity over time and are now prevalent even in trees living in cold, dry areas originally considered less susceptible (Tomback and Resler 2007, p. 399), such as the Greater Yellowstone Ecosystem (Table 2).

TABLE 2—PERCENTAGE OF LIVE TREES WITH BLISTER RUST INFECTION ON PLOTS/TRANSECTS FROM RECENT SURVEYS

[Adapted from Schwandt 2006, Table 1, p. 5]

Geographic region—number of reports [reference]	Range of infection (%)	Mean (%)
British Columbia (rangewide) [Campbell and Antos 2000]	0–100	50.0
British Columbia (rangewide) [Zeglen 2002]	11–52.5	38.0
Northern Rocky Mountains (United States and Canada) [Smith *et al.* 2006]	0–100	43.6
Selkirk Mountains, northern Idaho—5 stands [Kegley *et al.* 2004]	57–81	70.0
Colville National Forest, northeast Washington—2 reports [Ward *et al.* 2006]	23–44	41.4
Greater Yellowstone Ecosystem [2005]	0–100	25.0
Intermountain West (Idaho, Nevada, Wyoming, California) [Smith and Hoffman 2000]	0–100	35.0
Blue Mountains, northeast Oregon [Ward *et al.* 2006]	0–100	64.0
Coast Range, Olympic Mountains, Washington—2 reports [Ward *et al.* 2006)	4–49	19.0
Western Cascades, Washington and Oregon—6 reports (Ward *et al.* 2006]	0–100	32.3
Eastern Cascades, Washington and Oregon—13 reports [Ward *et al.* 2006]	0–90	32.3
Coastal Mountains, southwest Oregon [Goheen *et al.* 2002]	0–100	52.0

TABLE 2—PERCENTAGE OF LIVE TREES WITH BLISTER RUST INFECTION ON PLOTS/TRANSECTS FROM RECENT SURVEYS—Continued

[Adapted from Schwandt 2006, Table 1, p. 5]

Geographic region—number of reports [reference]	Range of infection (%)	Mean (%)
California, Statewide [Maloney and Dunlap 2006]	0–71	11.7

While numerous studies have reported the incidence of white pine blister rust on *Pinus albicaulis* and subsequent mortality, few have reported on rates of change. The Greater Yellowstone Whitebark Pine Monitoring Working Group's monitoring results from resurveys conducted in 2008–2009 indicated an average of 32.4 percent of live trees had blister rust, a 12.4 percent increase from their overall 2007 baseline estimate of 20 percent (Greater Yellowstone Whitebark Pine Monitoring Working Group 2010, p. 67).

Additional information on trends has been reported for Canada. In the Canadian Rockies, stands surveyed in 2003 and 2004 had an overall infection level of 42 percent and 18 percent mortality. These were remeasured in 2009 and found to have increased to 52 percent infection and 28 percent mortality (Smith *et al.* 2010, p. 67). Infection and mortality from white pine blister rust were present in all stands, with the highest levels occurring in the southern portions of the study area. The high mortality and infection levels, high crown kill, and reduced regeneration potential in the southern portion of their study area suggests that long-term persistence of *P. albicaulis* is unlikely (Smith *et al.* 2008, p. 982).

Pinus albicaulis infected with white pine blister rust has increased in all regions of the Canadian Rockies, where it ranged from 7 to 70 percent in 2003–2004 to 13 to 83 percent in 2009. Further, based on current mortality rates, the estimated *P. albicaulis* population decline within 100 years is 78 percent in the Canadian Rockies, 97 percent in Waterton Lakes National Park, and 57 percent for all of Canada (COSEWIC 2010, p. viii and Table 4, p. 19). *Pinus albicaulis* was designated in April 2010 as endangered in Canada due to the high risk of extirpation. Based on these studies showing rates of change in the United States and Canada as well as the plethora of infection percentage data, we conclude that the trend of white pine blister rust infection is increasing rangewide.

Genetic Investigations of White Pine Blister Rust Resistance and Virulence

Genetic research and development on white pine blister rust resistance may offer the best long-term prospect for control (Kinloch, Jr. 2003, p. 1045); however, understanding the dynamics of resistance to white pine blister rust, as well as its virulence and evolution, is incomplete (Schwandt *et al.* 2010, p. 241; Richardson *et al.* 2010, p. 321). In *Pinus albicaulis,* some rust resistance has been documented on the landscape and in seeds, suggesting some level of heritable resistance (Hoff *et al.* 2001, p. 350; Mahalovich *et al.* 2006, p. 95). A limited number of *P. albicaulis* rust-resistance trials, in which seedlings are grown from rust-resistant seeds under varying conditions, have produced progeny seedlings with a range of resistance levels from 0 percent resistance in some areas to more than 40 percent resistance in other areas (Sniezko 2011, pers. comm.). In the northwestern United States, where white pine blister rust has infected trees for as long as 60 years or more, *P. albicaulis* rust-resistance trial results have indicated a trend of increasing resistance levels from southern Oregon north to Mount Rainier in Washington (Sniezko 2011, pers. comm.). Despite some encouraging results in limited trials, efforts are in early stages. Further, effective rust-resistance breeding programs to develop *P. albicaulis* trees for planting will likely take decades (Hoff *et al.* 2001, p. 359), and their outcomes are uncertain.

Even if genetic resistance is identified in *Pinus albicaulis,* hybridization between different white pine blister rust populations or mutations within populations could result in genetic variation in virulence, creating a new assortment of genes and behaviors (McDonald and Hoff 2001, p. 210). The potential for development of new white pine blister rust strains between eastern and western North America with greater virulence, fitness, and aggressiveness is currently unknown (Schwandt *et al.* 2010, p. 241). While North American populations of white pine blister rust have low genetic diversity and differentiation overall (Richardson *et al.* 2010, p. 316), rust genotypes with specific virulence to major resistance genes currently exist in some local populations at high frequencies (Kinloch, Jr. 2003, p. 1044). The reintroduction of white pine blister rust from goods imported from abroad also poses a serious danger to genetic selection and breeding programs. In Asia, white pine blister rust exists with different alternate host affinities and also may contain additional genes with wider virulence (Kinloch, Jr. 2003, pp. 1044, 1046).

Management and Restoration Efforts

Most current management and research focuses on producing white pines with inherited resistance to white pine blister rust, but also includes natural regeneration and silvicultural treatments, such as appropriate site selection and preparation, pruning, and thinning (Zeglen *et al.* 2010, p. 347). While genetic management of white pine blister rust is actively conducted for several 5-needled white pine species breeding programs, including the USFS' resistance screening programs for *P. albicaulis,* these investigations are only preliminary (King *et al.* 2010, p. 293).

High-elevation pines such as *P. albicaulis* also present management challenges to restoration due to remoteness, difficulty of access, and conflicting wilderness values (wilderness values are discussed in more detail under Factor D) (Schwandt *et al.* 2010, p. 242). Furthermore, the vast scale at which planting rust-resistant trees would need to occur will make it challenging to restore *P. albicaulis* throughout its range. For example, approximately 5 percent of the historical distribution of the commercial species *Pinus monticola* (western white pine) was planted with resistance-improved stock between 1976 and 1996; however, the rates of planting have declined since then, and given current rates of planting, 60 years would now be required to plant an additional 5 percent (Schwandt *et al.* 2010, pp. 241–242). Therefore, current planting efforts appear to be insufficient to restore *P. albicaulis* throughout its range.

Model Predictions

Several models have been developed to predict residence times of white pine blister rust infection and long-term persistence of *Pinus albicaulis.* Ettl and Cottone (2004, pp. 36–47) developed a spatial stage-based model to examine *P. albicaulis* persistence in the presence of heavy white pine blister rust infections in Mt. Rainier National Park. They predicted median time to quasi extinction (population of less than 100 individuals) is 148 years, which represents approximately two to three generations of *P. albicaulis.* The most recent modeling effort by Hatala *et al.* (*in press*) is the first known study of the rate of blister rust progression and residence time in *P. albicaulis.* Their analysis compares four possible white pine blister rust dynamic infection models in *P. albicaulis* at the ecosystem scale (Greater Yellowstone Ecosystem) and predicts that on average, *P. albicaulis* trees live with white pine blister rust infection for approximately 20 years before succumbing to the disease. Their model also predicts that, within all their study sites, an average of 90 percent of the trees will be infected with white pine blister rust by the year 2013, while two other models calculated a 90 percent infection level within sites by the years 2026 and 2033. These results predict white pine blister rust will continue to spread within *P. albicaulis* in 10–20 years to a level where almost all trees will be impacted. Based on these modeling results, we conclude that, in addition to white pine blister rust occurring across almost the entire range of *P. albicaulis,* individual sites with white pine blister rust infection will continue to increase and intensify, ultimately resulting in stands that are no longer viable and potentially facing extirpation.

Summary of White Pine Blister Rust

Despite white pine blister rust's complex life cycle and the exacting environmental conditions required for reproduction and transmission, it has successfully spread across almost the entire range of *Pinus albicaulis,* and its frequency of occurrence and intensity of infection are increasing. Although some *P. albicaulis* regeneration has been documented in portions of its range, the change in overall *P. albicaulis* population structure will reduce the number of large trees, expose surviving trees to higher white pine blister rust infection levels, and reduce the number of mature, cone-producing trees. The likelihood of sustaining *P. albicaulis* in suitable habitats is further diminished in locations where populations are small (Schwandt *et al.* 2010, p. 235). While *P. albicaulis* trees will continue to persist on the landscape, *P. albicaulis* forests may become functionally extinct (Keane 2011b, pers. comm.). Where additional threats occur, the pattern of forest renewal may be disrupted, leading to severe declines and potential extirpation of *P. albicaulis* (Larson 2009, pp. 45–46). Therefore, we believe that white pine blister rust is a significant threat to *P. albicaulis.*

Predation (Herbivory)

Insect Predation

Pinus albicaulis trees are fed upon by a variety of insects; however, none has had a more widespread impact than the native mountain pine beetle (*Dendroctonus ponderosae* Hopkins). The mountain pine beetle is recognized as one of the principal sources of *P. albicaulis* mortality (Raffa and Berryman 1987, p. 234; Arno and Hoff 1989, p. 7). Mountain pine beetles are true predators on *P. albicaulis* and other western conifers because, to successfully reproduce, the beetles must kill host trees (Logan and Powell 2001, p. 162; Logan *et al.* 2010, p. 895). Upon locating a suitable host (i.e., large-diameter tree with greater resources for brood production success), adult female mountain pine beetles emit pheromones that attract adult males and other adult females to the host tree. This attractant pheromone initiates a synchronized mass attack for the purpose of overcoming the host tree's defenses to mountain pine beetle predation. Once a tree has been fully colonized, the beetles produce an anti-aggregation pheromone that signals to incoming beetles to pass on to nearby unoccupied trees. Almost all host trees, even stressed individuals, will mount a chemical defense against these mass attacks. However, given a sufficient number of beetles, even a healthy tree's defensive mechanisms can be exhausted (Raffa and Berryman 1987, p. 239). Following the pheromone-mediated mass attack, male and female mountain pine beetles mate in the phloem (living vascular tissue) under the bark of the host tree. Females subsequently excavate vertical galleries where they lay eggs. Larvae hatched from these eggs feed on the phloem, pupate, and emerge as adults to initiate new mass attacks of nearby suitable trees (Gibson *et al.* 2008, p. 3). Mountain pine beetle development is directly controlled by temperature. The entire mountain pine beetle life cycle (from egg to adult) can take between 1 and 2 years depending on ambient temperatures. Warmer temperatures promote a more rapid development that facilitates a 1-year life cycle (Amman *et al.* 1997, p. 4; Gibson *et al.* 2008, p. 3).

Beetle activity in the phloem mechanically girdles the host tree, disrupting nutrient and water transport and ultimately killing the host tree. Additionally, mountain pine beetles carry on their mouthparts symbiotic blue-stain fungi, which are introduced into the host tree. These fungi also inhibit water transport and further assist in killing the host tree (Raffa and Berryman 1987, p. 239; Keane *et al.* 2010, p. 34).

Mountain pine beetles are considered an important component of natural forest disturbance (Raffa *et al.* 2008, p. 502; Bentz *et al.* 2010, p. 602). At endemic or 'natural' levels, mountain pine beetle remove relatively small areas of trees, changing stand structure and species composition in localized areas. However, when conditions are favorable, mountain pine beetle populations can erupt to epidemic levels and create stand-replacing events that kill 80 to 95 percent of suitable host trees (Keane *et al.* 2010, p. 34). Such outbreaks are episodic, can have a magnitude of impact on the structure of western forests greater than wildfire (the other major component of natural forest disturbance), and are often the primary renewal source for mature stands of western pines (Hicke *et al.* 2006, p. 1). Mountain pine beetle outbreaks typically subside only when suitable host trees are exhausted or temperatures are sufficiently low to kill larvae and adults (Gibson *et al.* 2008, p. 2).

The range of mountain pine beetle completely overlaps with the range of *Pinus albicaulis,* and mountain pine beetle epidemics affecting *P. albicaulis* have occurred throughout recorded history (Keane *et al.* 2010, p. 34). Recent outbreaks occurred in the 1930s, 1940s, and 1970s, and numerous 'ghost forests' of dead *P. albicaulis* still dot the landscape as a result (Arno and Hoff 1989, p. 7; Ward *et al.* 2006, p. 8).

Despite recorded historical impacts to the species, *Pinus albicaulis* has not been considered an important host of mountain pine beetle in the past. Unlike the lower elevation sites occupied by mountain pine beetle's primary hosts *P. contorta* Douglas (lodgepole pine) and *P. ponderosae* (ponderosa pine), the high-elevation sites occupied by *P. albicaulis* typically have been climatically inhospitable to mountain pine beetle (Logan and Powell 2001, p. 161). At the low temperatures typical of high-elevation sites, mountain pine beetle mostly experience a 2-year life cycle, which is not favorable to epidemic outbreaks (i.e., eruptive population growth). Warmer temperatures promote a 1-year life cycle, which facilitates the synchronized mass attacks important in overcoming host tree defenses (Logan and Powell 2001, p. 167).

However, unlike previous epidemics, the current mountain pine beetle outbreak is having an increasingly significant impact on *Pinus albicaulis* (Logan *et al.* 2003, p. 130; Logan *et al.* 2010, p. 896). The reported mortality rates of mostly mature trees (i.e., large-diameter trees) can be as high as 96 percent (Gibson *et al.* 2008, p. 9). In 2007 alone, *P. albicaulis* trees on almost 202,342 ha (500,000 ac) were killed. At the time this was the highest recorded mountain pine beetle mortality ever reported for *P. albicaulis* (Gibson *et al.* 2008, p. 2). The number of acres with mountain pine beetle-killed *P. albicaulis* trees continues to increase significantly rangewide, and in 2009 *P. albicaulis* trees on an estimated 809,371 ha (2,000,000 ac) were killed (Service 2010).

Trends of environmental effects from climate change have provided the favorable conditions necessary for the current, unprecedented mountain pine beetle epidemic in high-elevation communities across the western United States and Canada (Logan and Powell 2001, p. 167; Logan *et al.* 2003, p. 130; Raffa *et al.* 2008, p. 511). Warming trends have resulted in not only intensified mountain pine beetle activity in high-elevation *Pinus albicaulis* forests, but have resulted in mountain pine beetle range expansion into more northern latitudes and higher elevations (Logan and Powell 2003, p. 131; Carroll *et al.* 2003 in Gibson *et al.* 2008, p. 4; Raffa *et al.* 2008, p. 503; Logan *et al.* 2010, p. 895). Winter temperatures are now warm enough for winter survival for all mountain pine beetle life stages and for maintenance of the 1-year life cycle that promotes epidemic mountain pine beetle population levels (Bentz and Schen-Langenheim 2007, p. 47; Logan *et al.* 2010, p. 896). Along with warmer winter conditions, summers have been drier, with droughts occurring through much of the range of *P. albicaulis* (Bentz *et al.* 2010, p. 605). Mountain pine beetles frequently target drought-stressed trees, which are more vulnerable to attack as they are less able to mount an effective defense against even less dense mass attacks by mountain pine beetles (Bentz *et al.* 2010, p. 605). Given ongoing and predicted environmental effects from climate change, we expect the expansion of habitat favorable to mountain pine beetle (and mountain pine epidemics) to continue into the foreseeable future.

Current management and research continue to explore methods to control mountain pine beetle mainly with the use of the pesticide Carbaryl and the anti-aggregation pheromone called Verbenone. Both methods can be effective for limited time periods (Progar 2007, p. 108). However, use of either control method may be prohibitively expensive and challenging given the scale of mountain pine beetle outbreaks (i.e., millions of acres) and the inaccessibility of much of *P. albicaulis* habitat. Currently these methods are mostly being suggested for use in targeted protection of high-value trees (e.g. individuals resistant to white pine blister rust, stands in recreational areas) rather than as a large-scale restoration tool (Keane *et al.* 2010, p. 94). Therefore, these control methods are not currently sufficient to protect the species as a whole from mountain pine beetle predation.

Summary of Predation

Mountain pine beetle outbreaks are becoming more common throughout the range of the whitebark pine and are having increasingly significant impacts on *Pinus albicaulis.* In some locations, mortality rates are as high as 96 percent. There are no known ways to stop a mountain pine beetle epidemic once it has started (Raffa *et al.* 2008, p. 514). Mountain pine beetle epidemics typically subside when the availability of suitable hosts is exhausted. In a worst-case scenario, there could be 95 percent mortality of mostly cone-bearing (i.e., reproductive) adults by the time the current epidemic collapses (Keane *et al.* 2010, p. 35). Therefore, we expect the ongoing epidemic to continue to intensify and expand in the future. Additionally, we expect ongoing and predicted environmental effects from climate change (see Factor A, Climate Change) to create more favorable conditions for mountain pine beetle outbreaks to persist in *P. albicaulis* habitats into the foreseeable future.

Synergistic Interactions Between Disease and Predation

White pine blister rust and mountain pine beetle act both individually and synergistically to threaten *Pinus albicaulis* rangewide. Mountain pine beetle will preferentially attack *P. albicaulis* infected with, and weakened by, white pine blister rust (Six and Adams 2007, p. 351). This preference results in increased susceptibility of *P. albicaulis* to mountain pine beetle-caused mortality. Mountain pine beetles and white pine blister rust also interact in other ways that threaten *P. albicaulis* regeneration and persistence. Mountain pine beetles preferentially target large mature trees. As a result, large trees are removed from populations, leaving smaller trees for regeneration in a less competitive environment. Unfortunately, white pine blister rust is not selective and infects all age and size classes of *P. albicaulis.* Thus, in the current environment that contains epidemic levels of mountain pine beetle and a nearly ubiquitous presence of white pine blister rust, *P. albicaulis* that have escaped mountain pine beetle mortality are still susceptible to white pine blister rust, and the possibility of regeneration following mountain pine beetle epidemics is jeopardized. Conversely, the small percentage of *P. albicaulis* individuals that are genetically resistant to white pine blister rust, and thus critical to species persistence, are still vulnerable to mountain pine beetle attack.

White pine blister rust and mountain pine beetle further impact the probability of *P. albicaulis* regeneration because both act to severely decrease seed cone production. White pine blister rust does this by killing cone-bearing branches, such that even if the tree itself remains alive for some time, seed production is compromised. Mountain pine beetles decrease seed production by targeting and killing larger trees, which are the main trees that bear cones. A severe reduction in seed production has the potential to limit the effectiveness of the masting strategy employed by *P. albicaulis* (see Taxonomy and Life History), such that the proportion of seeds taken by seed predators will eventually become too high to allow regeneration. Additionally, severe seed reduction disrupts the relationship between *P. albicaulis* and Clark's nutcracker. Clark's nutcrackers eventually abandon *P. albicaulis* stands when seed production is too low (McKinney *et al.* 2009, p. 599).

Limited research has focused on detecting amounts of *Pinus albicaulis* regeneration. Most remaining high-elevation *P. albicaulis* stands in the U.S. Intermountain West that are climax communities have little regeneration (Kendall and Keane 2001b, p. 228). In contrast, new and advanced *P. albicaulis* regeneration was documented on the majority of plots in southwestern Montana and eastern Oregon, indicating that the Wallowa and Pioneer Mountains sites seem to be more vigorous and to be regenerating better than sites farther north in the Rockies (Larson 2007, pp. 16–18). However, there is much *P. albicaulis* site variability and the regeneration on some of these sites was preceded by a particularly large cone crop in 2006. In addition, as seedlings grow, their increased foliage surface area becomes a larger target for infection by white pine blister rust spores (Tomback *et al.* 1995, p. 662). Therefore, despite observed regeneration, the level of effective regeneration (i.e., seedlings that actually reach a reproductive age) is questionable given the high incidence of white pine blister rust currently on the landscape. We conclude that *P. albicaulis* regeneration will generally be less successful in the future than it has been in the past.

Summary of Factor C

Disease in the form of white pine blister rust and predation from mountain pine beetle are contributing, individually and in combination, to the decline of *Pinus albicaulis* rangewide. White pine blister rust is now ubiquitous on the landscape; millions of acres (hectares) of *P. albicaulis* have been infected, and that number is increasing yearly. Due to the warmer temperatures and drier conditions brought on by climate change within the range of *P. albicaulis,* mountain pine beetle epidemics now occur at unprecedented levels, causing mortality in millions of acres (hectares) of *P. albicaulis,* much of which was previously thought to be mostly climatically immune from large-scale mountain pine beetle attacks. Additionally, the interaction between white pine blister rust and the mountain pine beetle further intensifies the impact of both threats. White pine blister rust and mountain pine beetle are impacting *P. albicaulis* equally in both Canada and the U.S. portion of the range. In other words, there is currently no refuge from these threats (COSEWIC 2010, p. viii).

There is no known way to control or reduce or eliminate either threat at this time, particularly at the landscape scale needed to effectively conserve this species. Thus, we expect both disease and predation to continue to heavily impact *Pinus albicaulis.* On the basis of a review of the best scientific and commercial information available concerning present threats to *P. albicaulis* from white pine blister rust and mountain pine beetle, their synergistic effects, and their likely continuation in the future, we conclude that disease and predation is a threat to *P. albicaulis.*

Factor D. The Inadequacy of Existing Regulatory Mechanisms

In determining whether the inadequacy of existing regulatory mechanisms constitutes a threat to *Pinus albicaulis,* we focused our analysis on existing Federal, State, and Canadian laws and regulations that apply to *P. albicaulis* habitats and could potentially address the four main threats to the species—the loss of habitat from fire suppression and the environmental effects of climate change under Factor A and mortality from white pine blister rust and mountain pine beetle under Factor C. Regulatory mechanisms may preclude the need for listing if such mechanisms are judged to adequately address the threat(s) to the species such that listing is not warranted. Conversely, threats on the landscape are exacerbated when not addressed by existing regulatory mechanisms, or when the existing mechanisms are inadequate (or not adequately implemented or enforced).

Federal Laws and Regulations

More than 96 percent of the distribution of *Pinus albicaulis* in the contiguous United States is federally owned or managed (Service 2011, p. 1), 34 percent of which is designated as wilderness.

The Wilderness Act of 1964

The USFS and other Federal agencies manage lands designated as wilderness areas under the Wilderness Act of 1964 (16 U.S.C. 1131–1136). Within these areas, the Wilderness Act states the following: (1) New or temporary roads cannot be built; (2) there can be no use of motor vehicles, motorized equipment, or motorboats; (3) there can be no landing of aircrafts; (4) there can be no form of mechanical transport; and (5) no structure or installation may be built. Considerable amounts of *Pinus albicaulis* occur within wilderness areas managed by the USFS and NPS (31 percent and 2.5 percent of the total United States distribution, respectively) (Service 2011, p. 1) and, therefore, are afforded protection from direct loss or degradation by some human activities (e.g., commercial timber harvest, road construction, some fire management actions).

Conversely, the regulations covering wilderness areas on Federal lands also may impede or restrict potential activities necessary for restoring *P. albicaulis* (Aubry 2011, pers. comm.; Reinhart 2010, pers. comm.). Currently, there are inconsistent policy interpretations across wilderness areas (Schwandt 2011, pers. comm.). Consequently, Federal agencies are engaged in ongoing discussions regarding whether restoration of *P. albicaulis* in wilderness areas is appropriate, and if so, what types of actions would be allowed. Taking action on *P. albicaulis* restoration in wilderness areas could compromise the ''untrammeled'' value of wilderness, but not taking action may compromise the ''naturalness'' value of wilderness by allowing the extirpation of a keystone species. If restoration actions are not restricted under the Wilderness Act, they would likely be limited (Reinhart 2011, pers. comm.). To date, limited surveys and monitoring of *P. albicaulis* trees and cone collecting for seeds have occurred in wilderness areas (Schwandt 2011, pers. comm.). While the Wilderness Act may allow for some restoration actions, it does not directly address or alleviate the threats of environmental effects resulting from climate change, white pine blister rust, mountain pine beetle, or fire suppression. The Wilderness Act does influence some fire management actions, which are described under Federal Wildland Fire Management Policies, Plans, and Guides below.

National Environmental Policy Act of 1970

All Federal agencies are required to adhere to the National Environmental Policy Act (NEPA) of 1970 (42 U.S.C. 4321 *et seq.*) for projects they fund, authorize, or carry out. The Council on Environmental Quality's regulations for implementing NEPA (40 CFR 1500–1518) state that agencies shall include a discussion on the environmental impacts of the various project alternatives (including the proposed action), any adverse environmental effects that cannot be avoided, and any irreversible or irretrievable commitments of resources involved (40 CFR 1502). Additionally, activities on non-Federal lands are subject to NEPA if there is a Federal nexus. Since NEPA is a disclosure law, it does not require subsequent minimization or mitigation measures by the Federal agency involved. Although Federal agencies may include conservation measures for *Pinus albicaulis* as a result of the NEPA process, any such measures are typically voluntary in nature and are not required by the statute. As NEPA does not provide any regulatory mechanisms, it does not directly address or alleviate the threats of the environmental effects resulting from climate change, white pine blister rust, mountain pine beetle, or fire suppression.

National Forest Management Act of 1976

Under the National Forest Management Act (NFMA) of 1976, as amended, (16 U.S.C. 1600–1614), the USFS manages National Forest lands based on multiple-use, sustained-yield principles, and implement resource management plans to provide for a diversity of plant and animal communities. As such, individual forests may identify species of concern that are significant to each forest's biodiversity. The USFS recognizes the decline of *Pinus albicaulis* and is developing various strategies that focus on restoration, including the Pacific Northwest Region's Restoration Strategy, individual forest action strategies (Aubry *et al.* 2008, entire), and the Rocky Mountain Research Station's draft General Technical Report, ''A Range-wide Restoration Strategy for Whitebark Pine *(Pinus albicaulis)*'' (Keane *et al.* 2010, entire). The latter report may provide the most effective rangewide restoration strategy available because it integrates the genetics, pathology, and ecology of *P. albicaulis.*

The USFS also implements *P. albicaulis* restoration and management activities (stand thinning, pruning, fire management) on non-wilderness lands, although *P. albicaulis* forests are generally not accessed for commercial forestry commodity extraction and, therefore, tend to be excluded from most stand improvement actions. The USFS has, along with university researchers and others, made important strides in understanding the white pine blister rust pathosystem and mountain pine beetle life history, researching and propagating rust-resistant *P. albicaulis* seeds and seedlings, and developing strategic plans. Their efforts are encouraging and may provide some benefit to the species at local scales, but these efforts under the NFMA do not directly address or alleviate the threats from the environmental effects resulting from climate change, white pine blister rust, mountain pine beetle, or fire suppression at the rangewide level of the species.

National Park Service Organic Act of 1916

The NPS Organic Act of 1916 (16 U.S.C. 1 *et seq.*) as amended, states that the NPS ''shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations to conserve the scenery and national and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.'' Where *Pinus albicaulis* occurs in National Parks, the NPS Organic Act directs the NPS to address *P. albicaulis* and its health. As such, the NPS has made considerable efforts to survey and monitor *P. albicaulis* stands and identify white pine blister rust infection levels. While the NPS makes certain that natural processes will occur, such as natural *P. albicaulis* regeneration, they may actively intervene when natural ecological processes are not adequately functioning. In the case of *P. albicaulis,* intervention could include restoration actions, and these actions would likely mimic criteria provided under the Wilderness Act (D. Reinhart 2011, pers. comm.). While the NPS Organic Act directs the NPS to address *P. albicaulis* health, it does not provide mechanisms that directly address or alleviate the threats from the environmental effects associated with climate change, white pine blister rust, mountain pine beetle, or fire suppression.

Clean Air Act of 1970

As explained under Factor A, warming temperatures are expected to result in direct habitat loss and are also currently causing an increase in populations of the predatory mountain pine beetle resulting in significant mortality rangewide. The Clean Air Act of 1970 (42 U.S.C. 7401 *et seq.*), as amended, requires the Environmental Protection Agency (EPA) to develop and enforce regulations to protect the general public from exposure to airborne contaminants that are known to be hazardous to human health. In 2007, the Supreme Court ruled that gases that cause global warming are pollutants under the Clean Air Act and that the EPA has the authority to regulate carbon dioxide and other heat-trapping gases (*Massachusetts et al.* v. *EPA 2007* [Case No. 05–1120]).

The EPA published a regulation to require reporting of greenhouse gas emissions from fossil fuel suppliers and industrial gas suppliers, direct greenhouse gas emitters, and manufacturers of heavy-duty and off-road vehicles and engines (74 FR 56260; October 30, 2009). The rule, effective December 29, 2009, does not require control of greenhouse gases; rather it requires only that sources above certain threshold levels monitor and report emissions. On December 7, 2009, the EPA found under section 202(a) of the Clean Air Act that the current and projected concentrations of six greenhouse gases in the atmosphere threaten public health and welfare. EPA's finding itself does not impose requirements on any industry or other entities, but is a prerequisite for any future regulations developed by the EPA. At this time, it is not known what regulatory mechanisms will be developed in the future as an outgrowth of EPA's finding or how effective they would be in addressing climate change. Therefore, the Clean Air Act and its existing implementing regulations do not currently provide regulatory mechanisms relevant to threats from the environmental effects associated with climate change, and the synergistic interactions with white pine blister rust, mountain pine beetle, or fire suppression.

Federal Wildland Fire Management Policies, Plans, and Guides

A variety of Federal fire management policies, plans, and implementation guides have been developed to both standardize interagency procedures and provide for a full spectrum of fire management options, including suppression and allowing some fires to function in their natural ecological role. Federal Land and Resource Management Plans also incorporate fire management, including use of prescribed fire, and typically provide more detailed guidance for individual agency units, such as a National Forest. These planning and implementation documents have the potential to benefit the species. However, these documents are typically broad in scope allowing a wide degree of latitude in potential fire management actions. We do not have information to indicate that fire management policies are currently being used in a way that alleviates the threat of fire suppression rangewide or contain fire use prescriptions that could protect *Pinus albicaulis.* Therefore, at this time we conclude that current fire management policies are inadequate to reduce or eliminate the threat of fire suppression across the entire range of *P. albicaulis.*

State Laws and Regulations

Pinus albicaulis generally has not been tracked by State wildlife or natural heritage programs in States where the species occurs. NatureServe's last status review revision of *P. albicaulis* (October 2008) ranked it as a G3 species, which means the species is vulnerable across its entire range (NatureServe 2010, p. 1; NatureServe 2011, p. 2). State rankings include Idaho (S4, apparently secure), Montana (S4, apparently secure), Oregon (S4, apparently secure), and Wyoming (S3, vulnerable), and Washington, which recently elevated *P. albicaulis* to S3 (vulnerable) (Arnett 2011, pers. comm.). California and

Nevada have not ranked the species. However, these rankings do not grant *P. albicaulis* any special status under any State legislation (NatureServe 2010, p. 1; NatureServe 2011, p. 2). The individual State rankings of S4 (apparently secure) are contrary to what the most current data suggest, that is, that *P. albicaulis* is declining rangewide. A very minimal amount of the whitebark pine range is known to occur on State lands. We do not know of any existing State laws or regulations that address or alleviate impacts from white pine blister rust, mountain pine beetle, or fire suppression. Additionally, we are not aware of any State laws or regulations that address the environmental effects resulting from climate change.

Canadian Federal and Provincial Laws and Regulations

The Committee on the Status of endangered Wildlife in Canada recently designated *Pinus albicaulis* as Endangered due to the high risk of extirpation and recommended the species be protected under Canada's Species at Risk Act (SARA) (COSEWIC 2010, p. iii). While listing a species under SARA may provide some benefits, such as providing official recognition, it provides no legal protection. In addition, it applies only to Federal lands, and most of *P. albicaulis'* distribution in Canada occurs on non-Federal lands (most public lands, or Crown lands, are under provincial jurisdiction). At the provincial level, in Alberta, *P. albicaulis* is currently ranked as S2 (imperiled) and assessed as Endangered under the Alberta Wildlife Act, and in British Columbia, it's ranked as S3 (special concern/vulnerable) and blue-listed (species of special concern) (Wilson 2007, p. 1; Environment Canada 2010, p. 71; COSEWIC 2010, p. 30). However, these rankings and assessments do not provide legal protections and only suggest voluntary conservation measures. Parks Canada has initiated conservation efforts including monitoring, prescribed fire, white pine blister rust-resistant tree identification, seed collection, and use of pheromones to protect apparent blister rust-resistant trees from mountain pine beetle attack (Wilson 2007, pp. 12–13). The provincial designations likely benefit the species and raise public awareness; however, they provide no legal protections, as conservation measures are largely voluntary.

Summary of Factor D

We examined a number of existing regulatory mechanisms that have the potential to address current and projected threats to *Pinus albicaulis* populations. The majority of *P. albicaulis* habitat in the United States occurs on Federal lands, where Federal agencies have broad regulatory authority to plan and manage land use activities, including timber harvest, recreation, and a variety of other actions. Some management activities have the potential to benefit *P. albicaulis* and its habitat. However, in our review of existing regulatory mechanisms, only the policies related to Federal Wildland Fire Management Policies, Plans, and Guides directly address any of the four main threats to the species identified in this document. Specifically, these policies have the potential to reduce or eliminate threats to *P. albicaulis* from fire suppression. However, at this time we find that these policies are inadequate to address this threat.

In summary, the existing regulatory mechanisms currently in place throughout the range of *P. albicaulis* are inadequate to reduce or eliminate any of the four main threats to the species identified above—the loss of habitat from fire suppression and the exacerbating environmental effects of climate change under Factor A, and mortality from white pine blister rust and mountain pine beetle under Factor C. Therefore, based on our review of the best scientific and commercial information available, we conclude that existing regulatory mechanisms are inadequate to protect *P. albicaulis* or its habitat.

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

We did not identify any other natural or manmade factors that are likely to significantly threaten the existence of the species. Therefore, we conclude that the best scientific and commercial information available indicates that *P. albicaulis* is not threatened by other natural or manmade factors affecting its continued existence.

Finding

As required by the Act, we conducted a review of the status of the species and considered the five factors in assessing whether *Pinus albicaulis* is threatened or endangered throughout all or a significant portion of its range or likely to become so within the foreseeable future. We examined the best scientific and commercial information available regarding the past, present, and future threats faced by *P. albicaulis.* We reviewed the petition, information available in our files, other available published and unpublished information, and we consulted with *P. albicaulis* experts and other Federal, State, and tribal agencies. In considering what factors 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 how significant a threat it is. If the threat is significant, it may drive or contribute to the risk of extinction of the species such that the species warrants listing as threatened or endangered 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 threatened or endangered under the Act.

This status review identified threats to *Pinus albicaulis* attributable to Factors A, C, and D. The primary threat to the species is from disease (Factor C) in the form of the nonnative white pine blister rust and its interaction with other threats. We found that white pine blister rust is now nearly ubiquitous throughout the range of *P. albicaulis.* White pine blister rust results in the mortality of an overwhelming majority of infected individuals, and all age classes of trees are susceptible. Seedlings are killed rapidly, and while some mature individuals may persist on the landscape for decades following infection, white pine blister rust typically kills seedcone-bearing branches. White pine blister rust has impacted millions of acres (hectares) of *P. albicaulis.* Currently, colder, drier areas of the range that were originally thought to be less susceptible to the disease are now showing considerable rates of infection. Based on current mortality rates, the estimated population decline for the northern 56 percent of the range (i.e., Canada), is expected to be 57 percent within 100 years, which is less than two generations for this species (COSEWIC 2010, pp. viii, 19). However, that is likely an underestimate, as it assumes current mortality rates remain constant.

After examining information collected on the incidence of white pine blister rust, we conclude that white pine blister rust will continue to intensify and kill *Pinus albicaulis* throughout its entire range. The remainder of the range (i.e., United States) is experiencing similar rates of mortality, and thus we anticipate a decline similar to that estimated for the northern portion of the range (Canada). A small percentage of genetic resistance to white pine blister rust is present in *P. albicaulis* on the landscape, and research is currently being conducted to identify and propagate resistant individuals. However, these programs are still in the early stages and an effective breeding program will take decades, if it can be achieved at all.

Pinus albicaulis also is currently experiencing significant mortality from predation (Factor C) by the native mountain pine beetle. Millions of acres (hectares) of *P. albicaulis* have been lost in this decade (i.e., late 1990's to 2011), and we expect that number to continue to increase. For the last decade in particular, warming temperatures have facilitated large mountain pine beetle outbreaks even in areas of *P. albicaulis* habitat that were previously thought to inhibit epidemic levels of mountain pine beetle. Given projected warming trends, we conclude that conditions will remain favorable for epidemic levels of mountain pine beetle to continue into the foreseeable future.

We also anticipate that continuing environmental effects resulting from climate change will result in direct habitat loss (Factor A) for *Pinus albicaulis,* a high-elevation species occurring only in cool mountaintop habitats. Bioclimatic models predict that suitable habitat for *P. albicaulis* will decline precipitously within the next 100 years. Research indicates that northern migration of *P. albicaulis* is a possible, but unlikely, response to the projected rate of warming climatic conditions. Additionally, the presence of white pine blister rust on the northern portions of the range could potentially impede effective migration. Adaptation to a rapidly warming climate also seems unlikely for a species that has an estimated generation time of 60 years.

Past and ongoing fire suppression is also negatively impacting populations of *Pinus albicaulis* through direct habitat loss (Factor A). Many stands of trees once dominated by *P. albicaulis* are now dense stands of shade-tolerant conifers. This change in forest structure and composition facilitates an increased frequency and intensity of wildfire and an increased susceptibility to predation and disease. Additionally, environmental changes resulting from changing climatic conditions are acting alone and in combination with the effects of fire suppression to increase the frequency and severity of wildfires. *P. albicaulis* could potentially regenerate following even stand-replacing wildfires, if an available seed source is available. However, widespread predation and disease currently impacting *P. albicaulis* are limiting available seed sources, making the probability of regeneration following wildfire less likely.

In our analysis of Factor D, we examined several Federal mechanisms that could potentially address the threats to *Pinus albicaulis.* These mechanisms may be useful in minimizing the adverse effects to *P. albicaulis* from potential stressors such as commercial harvest or habitat destruction and degradation from road construction; however, none of these potential stressors rises to the level of a threat to *P. albicaulis.* None of the existing regulatory mechanisms we examined provide adequate protection to *P. albicaulis* from stressors that rise to the level of a threat, including white pine blister rust, mountain pine beetles, the exacerbating effects of environmental change resulting from changing climatic conditions, and fire suppression. Thus, we concluded that the existing regulatory mechanisms are inadequate to address the threats presented above.

In summary, the primary threat to the species is from disease (Factor C) in the form of the nonnative white pine blister rust and its interaction with other threats. *Pinus albicaulis* is also threatened by significant mortality from predation (Factor C) by the native mountain pine beetle. Past and ongoing fire suppression is also negatively impacting populations of *P. albicaulis* through direct habitat loss (Factor A). Environmental effects resulting from climate change also threaten the species through direct habitat loss (Factor A) and by exacerbating the effects of some of the other threats. Also, the existing regulatory mechanisms (Factor D) are inadequate to protect *P. albicaulis* or its habitat. Therefore, based on the threats described above attributable to Factors A, C, and D, we believe *P. albicaulis* is in danger of extinction, or likely to become so in the foreseeable future, throughout all or a significant portion of its range.

On the basis of the best scientific and commercial information available, we find that the petitioned action to list *Pinus albicaulis* rangewide is warranted. We will make a determination on the status of the species as threatened or endangered when we do a proposed listing determination. However, as explained in more detail below, an immediate proposal of a regulation implementing this action is precluded by higher priority listing actions, and progress is being made to add or remove qualified species from the Lists of Endangered and Threatened Wildlife and Plants.

We reviewed the available information to determine if the existing and foreseeable threats render the species at risk of extinction now such that issuing an emergency regulation temporarily listing the species under section 4(b)(7) of the Act is warranted. We determined that issuing an emergency regulation temporarily listing the species is not warranted for this species at this time, because the threats acting on the species are not impacting the entire species across its range to the point where the species will be immediately lost. However, if at any time we determine that issuing an emergency regulation temporarily listing *Pinus albicaulis* is warranted, we will initiate this action at that time.

Listing Priority Number

The Service adopted guidelines on September 21, 1983 (48 FR 43098) to establish a rational system for utilizing available resources for the highest priority species when adding species to the Lists of Endangered or Threatened Wildlife and Plants or reclassifying species listed as threatened to endangered status. These guidelines, titled ''Endangered and Threatened Species Listing and Recovery Priority Guidelines'' address the immediacy and magnitude of threats, and the level of taxonomic distinctiveness by assigning priority in descending order to monotypic genera (genus with one species), full species, and subspecies (or equivalently, distinct population segments of vertebrates). We assigned *Pinus albicaulis* a Listing Priority Number (LPN) of 2 based on our finding that the species faces threats that are of high magnitude and are imminent. The main threats to *P. albicaulis* include disease and predation, and the present or threatened destruction, modification, or curtailment of its habitat due to environmental changes and exacerbating effects of climate change and fire and fire suppression. A secondary threat is caused by the inadequacy of existing regulatory mechanisms. This is the highest priority that can be provided to a species under our guidance. Our rationale for assigning *P. albicaulis* an LPN of 2 is outlined below.

Under the Service's LPN Guidance, the magnitude of threat is the first criterion we look at when establishing a listing priority. The guidance indicates that species with the highest magnitude of threat are those species facing the greatest threats to their continued existence. These species receive the highest listing priority. The threats that face *Pinus albicaulis* are high in magnitude because the major threats (disease, predation, environmental changes and exacerbating effects of climate change, fire and fire suppression) occur throughout all of the species' range and are having a demonstrable effect on the species. The primary threat, white pine blister rust, currently occurs throughout all of the range of *P. albicaulis* except for the interior Great Basin, which accounts for only 0.4 percent of *P. albicaulis* distribution in the United States. The incidence of white pine blister rust is highest in the Rocky Mountains of northwestern Montana and northern Idaho, the Olympic and western Cascade Ranges of the United States, the southern Canadian Rocky Mountains, and British Columbia's Coastal Mountains. Trends strongly indicate that white pine blister rust infections have increased in intensity over time and are now prevalent in even drier and colder areas originally considered less susceptible to infection. The other major threats, predation, fire and fire suppression, and environmental effects of climate change, which exacerbate some of the threats, also occur throughout the entire range and have resulted in significant loss of whitebark pine. We anticipate these threats to continue to impact *P. albicaulis* into the foreseeable future.

Under our LPN Guidance, the second criterion we consider in assigning a listing priority is the immediacy of threats. This criterion is intended to ensure that the species that face actual, identifiable threats are given priority over those for which threats are only potential or that are intrinsically vulnerable but are not known to be presently facing such threats. The threats are imminent because rangewide disease, predation, fire and fire suppression, and environmental effects of climate change are affecting *Pinus albicaulis* currently and are expected to continue and likely intensify in the foreseeable future. These actual, identifiable threats are covered in detail under the discussion of Factors A and C of this finding and currently include mortality from white pine blister rust, predation by mountain pine beetle, fire and fire suppression, and environmental effects of climate change. Trends indicate that these threats are currently having a significant negative impact on *P. albicaulis.* Attempts to control white pine blister rust and mountain pine beetle have been ineffective, and we believe both threats will have increasingly negative impacts on *P. albicaulis* into the foreseeable future.

The third criterion in our LPN guidance is intended to devote resources to those species representing highly distinctive or isolated gene pools as reflected by taxonomy. *Pinus albicaulis* is a valid taxon at the species level and, therefore, receives a higher priority than a subspecies, but a lower priority than species in a monotypic genus. *P. albicaulis* faces high-magnitude, imminent threats, and is a valid taxon at the species level. Thus, in accordance with our LPN guidance, we have assigned *P. albicaulis* an LPN of 2.

We will continue to monitor the threats to *Pinus albicaulis,* and the species' status on an annual basis, and should the magnitude or the imminence of the threats change, we will revisit our assessment of the LPN.

Work on a proposed listing determination for the *Pinus albicaulis* is precluded by work on higher priority listing actions with absolute statutory, court-ordered, or court-approved deadlines and final listing determinations for those species that were proposed for listing with funds from Fiscal Year 2010. This work includes all the actions listed in the tables below under expeditious progress.

Preclusion and Expeditious Progress

Preclusion is a function of the listing priority of a species in relation to the resources that are available and the cost and relative priority of competing demands for those resources. Thus, in any given fiscal year (FY), multiple factors dictate whether it will be possible to undertake work on a listing proposal regulation or whether promulgation of such a proposal is precluded by higher-priority listing actions.

The resources available for listing actions are determined through the annual Congressional appropriations process. The appropriation for the Listing Program is available to support work involving the following listing actions: Proposed and final listing rules; 90-day and 12-month findings on petitions to add species to the Lists of Endangered and Threatened Wildlife and Plants (Lists) or to change the status of a species from threatened to endangered; annual ''resubmitted'' petition findings on prior warranted-but-precluded petition findings as required under section 4(b)(3)(C)(i) of the Act; critical habitat petition findings; proposed and final rules designating critical habitat; and litigation-related, administrative, and program-management functions (including preparing and allocating budgets, responding to Congressional and public inquiries, and conducting public outreach regarding listing and critical habitat). The work involved in preparing various listing documents can be extensive and may include, but is not limited to: Gathering and assessing the best scientific and commercial data available and conducting analyses used as the basis for our decisions; writing and publishing documents; and obtaining, reviewing, and evaluating public comments and peer review comments on proposed rules and incorporating relevant information into final rules. The number of listing actions that we can undertake in a given year also is influenced by the complexity of those listing actions; that is, more complex actions generally are more costly. The median cost for preparing and publishing a 90-day finding is $39,276; for a 12-month finding, $100,690; for a proposed rule with critical habitat, $345,000; and for a final listing rule with critical habitat, $305,000.

We cannot spend more than is appropriated for the Listing Program without violating the Anti-Deficiency Act (see 31 U.S.C. 1341(a)(1)(A)). In addition, in FY 1998 and for each fiscal year since then, Congress has placed a statutory cap on funds that may be expended for the Listing Program, equal to the amount expressly appropriated for that purpose in that fiscal year. This cap was designed to prevent funds appropriated for other functions under the Act (for example, recovery funds for removing species from the Lists), or for other Service programs, from being used for Listing Program actions (see House Report 105–163, 105th Congress, 1st Session, July 1, 1997).

Since FY 2002, the Service's budget has included a critical habitat subcap to ensure that some funds are available for other work in the Listing Program (''The critical habitat designation subcap will ensure that some funding is available to address other listing activities'' (House Report No. 107–103, 107th Congress, 1st Session, June 19, 2001)). In FY 2002 and each year until FY 2006, the Service has had to use virtually the entire critical habitat subcap to address court-mandated designations of critical habitat, and consequently none of the critical habitat subcap funds have been available for other listing activities. In some FYs since 2006, we have been able to use some of the critical habitat subcap funds to fund proposed listing determinations for high-priority candidate species. In other FYs, while we were unable to use any of the critical habitat subcap funds to fund proposed listing determinations, we did use some of this money to fund the critical habitat portion of some proposed listing determinations so that the proposed listing determination and proposed critical habitat designation could be combined into one rule, thereby being more efficient in our work. At this time, for FY 2011, we plan to use some of the critical habitat subcap funds to fund proposed listing determinations.

We make our determinations of preclusion on a nationwide basis to ensure that the species most in need of listing will be addressed first and also because we allocate our listing budget on a nationwide basis. Through the listing cap, the critical habitat subcap, and the amount of funds needed to address court-mandated critical habitat designations, Congress and the courts have in effect determined the amount of money available for other listing activities nationwide. Therefore, the funds in the listing cap, other than those needed to address court-mandated critical habitat for already listed species, set the limits on our determinations of preclusion and expeditious progress.

Congress identified the availability of resources as the only basis for deferring the initiation of a rulemaking that is warranted. The Conference Report accompanying Public Law 97–304 (Endangered Species Act Amendments of 1982), which established the current statutory deadlines and the warranted-but-precluded finding, states that the amendments were ''not intended to allow the Secretary to delay commencing the rulemaking process for any reason other than that the existence of pending or imminent proposals to list species subject to a greater degree of threat would make allocation of resources to such a petition [that is, for a lower-ranking species] unwise.'' Although that statement appeared to refer specifically to the ''to the maximum extent practicable'' limitation on the 90-day deadline for making a ''substantial information'' finding, that finding is made at the point when the Service is deciding whether or not to commence a status review that will determine the degree of threats facing the species, and therefore the analysis underlying the statement is more relevant to the use of the warranted-but-precluded finding, which is made when the Service has already determined the degree of threats facing the species and is deciding whether or not to commence a rulemaking.

In FY 2011, on April 15, 2011, Congress passed the Full-Year Continuing Appropriations Act (Pub. L. 112–10) which provides funding through September 30, 2011. The Service has $20,902,000 for the listing program. Of that, $9,472,000 is being used for determinations of critical habitat for already listed species. Also $500,000 is appropriated for foreign species listings under the Act. The Service thus has $10,930,000 available to fund work in the following categories: compliance with court orders and court-approved settlement agreements requiring that petition findings or listing determinations be completed by a specific date; section 4 (of the Act) listing actions with absolute statutory deadlines; essential litigation-related, administrative, and listing program-management functions; and high-priority listing actions for some of our candidate species. In FY 2010, the Service received many new petitions and a single petition to list 404 species. The receipt of petitions for a large number of species is consuming the Service's listing funding that is not dedicated to meeting court-ordered commitments. Absent some ability to balance effort among listing duties under existing funding levels, it is unlikely that the Service will be able to initiate any new listing determination for candidate species in FY 2011.

In 2009, the responsibility for listing foreign species under the Act was transferred from the Division of Scientific Authority, International Affairs Program, to the Endangered Species Program. Therefore, starting in FY 2010, we used a portion of our funding to work on the actions described above for listing actions related to foreign species. In FY 2011, we anticipate using $1,500,000 for work on listing actions for foreign species which reduces funding available for domestic listing actions; however, currently only $500,000 has been allocated for this function. Although there are no foreign species issues included in our high-priority listing actions at this time, many actions have statutory or court-approved settlement deadlines, thus increasing their priority. The budget allocations for each specific listing action are identified in the Service's FY 2011 Allocation Table (part of our record).

For the above reasons, funding a proposed listing determination for the *Pinus albicaulis* is precluded by court-ordered and court-approved settlement agreements, and listing actions with absolute statutory deadlines, and work on proposed listing determinations for those candidate species with a higher listing priority (i.e., candidate species with LPNs of 1–2).

Based on the LPN guidance, we have a significant number of species with a LPN of 2. Using these guidelines, we assign each candidate an LPN of 1 to 12, depending on the magnitude of threats (high or moderate to low), immediacy of threats (imminent or nonimminent), and taxonomic status of the species (in order of priority: monotypic genus (a species that is the sole member of a genus); species; or part of a species (subspecies, or distinct population segment)). The lower the listing priority number, the higher the listing priority (that is, a species with an LPN of 1 would have the highest listing priority).

Because of the large number of high-priority species, we have further ranked the candidate species with an LPN of 2 by using the following extinction-risk type criteria: International Union for the Conservation of Nature and Natural Resources (IUCN) Red list status/rank, Heritage rank (provided by NatureServe), Heritage threat rank (provided by NatureServe), and species currently with fewer than 50 individuals, or 4 or fewer populations. Those species with the highest IUCN rank (critically endangered), the highest Heritage rank (G1), the highest Heritage threat rank (substantial, imminent threats), and currently with fewer than 50 individuals, or fewer than 4 populations, originally comprised a group of approximately 40 candidate species (''Top 40''). These 40 candidate species have had the highest priority to receive funding to work on a proposed listing determination. As we work on proposed and final listing rules for those 40 candidates, we apply the ranking criteria to the next group of candidates with an LPN of 2 and 3 to determine the next set of highest priority candidate species. Finally, proposed rules for reclassification of threatened species to endangered are lower priority, because as listed species, they are already afforded the protection of the Act and implementing regulations. However, for efficiency reasons, we may choose to work on a proposed rule to reclassify a species to endangered if we can combine this with work that is subject to a court-determined deadline.

With our workload so much bigger than the amount of funds we have to accomplish it, it is important that we be as efficient as possible in our listing process. Therefore, as we work on proposed rules for the highest priority species in the next several years, we are preparing multi-species proposals when appropriate, and these may include species with lower priority if they overlap geographically or have the same threats as a species with an LPN of 2. In addition, we take into consideration the availability of staff resources when we determine which high-priority species will receive funding to minimize the amount of time and resources required to complete each listing action.

As explained above, a determination that listing is warranted but precluded must also demonstrate that expeditious progress is being made to add and remove qualified species to and from the Lists of Endangered and Threatened Wildlife and Plants. As with our ''precluded'' finding, the evaluation of whether progress in adding qualified species to the Lists has been expeditious is a function of the resources available for listing and the competing demands for those funds. (Although we do not discuss it in detail here, we are also making expeditious progress in removing species from the list under the Recovery program in light of the resource available for delisting, which is funded by a separate line item in the budget of the Endangered Species Program. So far during FY 2011, we have completed one delisting rule.) Given the limited resources available for listing, we find that we are making expeditious progress in FY 2011 in the Listing Program. This progress included preparing and publishing the following determinations:

FY 2011 COMPLETED LISTING ACTIONS

Publication date	Title	Actions	FR pages
10/6/2010	Endangered Status for the Altamaha Spinymussel and Designation of Critical Habitat.	Proposed Listing Endangered	75 FR 61664–61690
10/7/2010	12-Month Finding on a Petition to List the Sacramento Splittail as Endangered or Threatened.	Notice of 12-Month petition finding, Not warranted.	75 FR 62070–62095
10/28/2010	Endangered Status and Designation of Critical Habitat for Spikedace and Loach Minnow.	Proposed Listing Endangered (uplisting)	75 FR 66481–66552
11/2/2010	90-Day Finding on a Petition to List the Bay Springs Salamander as Endangered.	Notice of 90-day Petition Finding, Not substantial	75 FR 67341–67343
11/2/2010	Determination of Endangered Status for the Georgia Pigtoe Mussel, Interrupted Rocksnail, and Rough Hornsnail and Designation of Critical Habitat.	Final Listing Endangered	75 FR 67511–67550
11/2/2010	Listing the Rayed Bean and Snuffbox as Endangered.	Proposed Listing Endangered	75 FR 67551–67583
11/4/2010	12-Month Finding on a Petition to List Cirsium wrightii (Wright's Marsh Thistle) as Endangered or Threatened.	Notice of 12-month petition finding, Warranted but precluded.	75 FR 67925–67944
12/14/2010	Endangered Status for Dunes Sagebrush Lizard	Proposed Listing Endangered	75 FR77801–77817
12/14/2010	12-month Finding on a Petition to List the North American Wolverine as Endangered or Threatened.	Notice of 12-month petition finding, Warranted but precluded.	75 FR 78029–78061
12/14/2010	12-Month Finding on a Petition to List the Sonoran Population of the Desert Tortoise as Endangered or Threatened.	Notice of 12-month petition finding, Warranted but precluded.	75 FR 78093–78146
12/15/2010	12-Month Finding on a Petition to List *Astragalus microcymbus* and *Astragalus schmolliae* as Endangered or Threatened.	Notice of 12-month petition finding, Warranted but precluded.	75 FR 78513–78556
12/28/2010	Listing Seven Brazilian Bird Species as Endangered Throughout Their Range.	Final Listing Endangered	75 FR 81793–81815
1/4/2011	90-Day Finding on a Petition to List the Red Knot subspecies *Calidris canutus roselaari* as Endangered.	Notice of 90-day Petition Finding, Not substantial	76 FR 304–311
1/19/2011	Endangered Status for the Sheepnose and Spectaclecase Mussels.	Proposed Listing Endangered	76 FR 3392–3420
2/10/2011	12-Month Finding on a Petition to List the Pacific Walrus as Endangered or Threatened.	Notice of 12-month petition finding, Warranted but precluded.	76 FR 7634–7679
2/17/2011	90-Day Finding on a Petition To List the Sand Verbena Moth as Endangered or Threatened.	Notice of 90-day Petition Finding, Substantial	76 FR 9309–9318
2/22/2011	Determination of Threatened Status for the New Zealand-Australia Distinct Population Segment of the Southern Rockhopper Penguin.	Final Listing Threatened	76 FR 9681–9692
2/22/2011	12-Month Finding on a Petition to List *Solanum conocarpum* (marron bacora) as Endangered.	Notice of 12-month petition finding, Warranted but precluded.	76 FR 9722–9733
2/23/2011	12-Month Finding on a Petition to List Thorne's Hairstreak Butterfly as Endangered.	Notice of 12-month petition finding, Not warranted.	76 FR 991–10003
2/23/2011	12-Month Finding on a Petition to List *Astragalus hamiltonii, Penstemon flowersii, Eriogonum soredium, Lepidium ostleri,* and *Trifolium friscanum* as Endangered or Threatened.	Notice of 12-month petition finding, Warranted but precluded & Not Warraned.	76 FR 10166–10203
2/24/2011	90-Day Finding on a Petition to List the Wild Plains Bison or Each of Four Distinct Population Segments as Threatened.	Notice of 90-day Petition Finding, Not substantial	76 FR 10299–10310

FY 2011 COMPLETED LISTING ACTIONS—Continued

Publication date	Title	Actions	FR pages
2/24/2011	90-Day Finding on a Petition to List the Unsilvered Fritillary Butterfly as Threatened or Endangered.	Notice of 90-day Petition Finding, Not substantial	76 FR 10310–10319
3/8/2011	12-Month Finding on a Petition to List the Mt. Charleston Blue Butterfly as Endangered or Threatened.	Notice of 12-month petition finding, Warranted but precluded.	76 FR 12667–12683
3/8/2011	90-Day Finding on a Petition to List the Texas Kangaroo Rat as Endangered or Threatened.	Notice of 90-day Petition Finding, Substantial	76 FR 12683–12690
3/10/2011	Initiation of Status Review for Longfin Smelt	Notice of Status Review	76 FR 13121–31322
3/15/2011	Withdrawal of Proposed Rule to List the Flat-tailed Horned Lizard as Threatened.	Proposed rule withdrawal	76 FR 14210–14268
3/22/2011	12-Month Finding on a Petition to List the Berry Cave Salamander as Endangered.	Notice of 12-month petition finding, Warranted but precluded.	76 FR 15919–15932
4/1/2011	90-Day Finding on a Petition to List the Spring Pygmy Sunfish as Endangered.	Notice of 90-day Petition Finding, Substantial	76 FR 18138–18143
4/5/2011	12-Month Finding on a Petition to List the Bearmouth Mountainsnail, Byrne Resort Mountainsnail, and Meltwater Lednian Stonefly as Endangered or Threatened.	Notice of 12-month petition finding, Not Warranted and Warranted but precluded.	76 FR 18684–18701
4/5/2011	90-Day Finding on a Petition To List the Peary Caribou and Dolphin and Union Population of the Barren-ground Caribou as Endangered or Threatened.	Notice of 90-day Petition Finding, Substantial	76 FR 18701–18706
4/12/2011	Proposed Endangered Status for the Three Forks Springsnail and San Bernardino Springsnail, and Proposed Designation of Critical Habitat.	Proposed Listing Endangered	76 FR 20464–20488
4/13/2011	90-Day Finding on a Petition To List Spring Mountains Acastus Checkerspot Butterfly as Endangered.	Notice of 90-day Petition Finding, Substantial	76 FR 20613–20622
4/14/2011	90-Day Finding on a Petition to List the Prairie Chub as Threatened or Endangered.	Notice of 90-day Petition Finding, Substantial	76 FR 20911–20918
4/14/2011	12-Month Finding on a Petition to List Hermes Copper Butterfly as Endangered or Threatened.	Notice of 12-month petition finding, Warranted but precluded.	76 FR 20918–20939
4/26/2011	90-Day Finding on a Petition to List the Arapahoe Snowfly as Endangered or Threatened.	Notice of 90-day Petition Finding, Substantial	76 FR 23256–23265
4/26/2011	90-Day Finding on a Petition to List the Smooth-Billed Ani as Threatened or Endangered.	Notice of 90-day Petition Finding, Not substantial	76 FR 23265–23271
5/12/2011	Withdrawal of the Proposed Rule to List the Mountain Plover as Threatened.	Proposed Rule, Withdrawal	76 FR 27756–27799
5/25/2011	90-Day Finding on a Petition To List the Spot-tailed Earless Lizard as Endangered or Threatened.	Notice of 90-day Petition Finding, Substantial	76 FR 30082–30087
5/26/2011	Listing the Salmon-Crested Cockatoo as Threatened Throughout its Range with Special Rule.	Final Listing Threatened	76 FR 30758–30780
5/31/2011	12-Month Finding on a Petition to List Puerto Rican Harlequin Butterfly as Endangered.	Notice of 12-month petition finding, Warranted but precluded.	76 FR 31282–31294
6/2/2011	90-Day Finding on a Petition to Reclassify the Straight-Horned Markhor (*Capra falconeri jerdoni*) of Torghar Hills as Threatened.	Notice of 90-day Petition Finding, Substantial	76 FR 31903–31906
6/2/2011	90-Day Finding on a Petition to List the Golden-winged Warbler as Endangered or Threatened.	Notice of 90-day Petition Finding, Substantial	76 FR 31920–31926
6/7/2011	12-Month Finding on a Petition to List the Striped Newt as Threatened.	Notice of 12-month petition finding, Warranted but precluded.	76 FR 33924–33965
6/9/2011	12-Month Finding on a Petition to List *Abronia ammophila, Agrostis rossiae, Astragalus proimanthus, Boechera Arabis pusilla,* and *Penstemon gibbensii* as Threatened or Endangered.	Notice of 12-month petition finding, Not Warranted and Warranted but precluded.	76 FR 32911–32929
6/21/2011	90-Day Finding on a Petition to List the Utah Population of the Gila Monster as an Endangered or a Threatened Distinct Population Segment.	Notice of 90-day Petition Finding, Not substantial	76 FR 36049–36053
6/21/2011	Revised 90-Day Finding on a Petition To Reclassify the Utah Prairie Dog From Threatened to Endangered.	Notice of 90-day Petition Finding, Not substantial	76 FR 36053–36068
6/28/2011	12-Month Finding on a Petition to List *Castanea pumila* var. *ozarkensis* as Threatened or Endangered.	Notice of 12-month petition finding, Not warranted.	76 FR 37706–37716

FY 2011 COMPLETED LISTING ACTIONS—Continued

Publication date	Title	Actions	FR pages
6/29/2011	90-Day Finding on a Petition to List the Eastern Small-Footed Bat and the Northern Long-Eared Bat as Threatened or Endangered.	Notice of 90-day Petition Finding, Substantial	76 FR 38095–38106
6/30/2011	12-Month Finding on a Petition to List a Distinct Population Segment of the Fisher in Its United States Northern Rocky Mountain Range as Endangered or Threatened with Critical Habitat.	Notice of 12-month petition finding, Not warranted.	76 FR 38504–38532

Our expeditious progress also includes work on listing actions that we funded in FY 2010 and FY 2011 but have not yet been completed to date. These actions are listed below. Actions in the top section of the table are being conducted under a deadline set by a court. Actions in the middle section of the table are being conducted to meet statutory timelines, that is, timelines required under the Act. Actions in the bottom section of the table are high-priority listing actions. These actions include work primarily on species with an LPN of 2, and, as discussed above, selection of these species is partially based on available staff resources, and when appropriate, include species with a lower priority if they overlap geographically or have the same threats as the species with the high priority. Including these species together in the same proposed rule results in considerable savings in time and funding, when compared to preparing separate proposed rules for each of them in the future.

ACTIONS FUNDED IN FY 2010 AND FY 2011 BUT NOT YET COMPLETED

Species	Action
Actions Subject to Court Order/Settlement Agreement	
4 parrot species (military macaw, yellow-billed parrot, red-crowned parrot, scarlet macaw) [5]	12-month petition finding.
4 parrot species (blue-headed macaw, great green macaw, grey-cheeked parakeet, hyacinth macaw) [5]	12-month petition finding.
4 parrot species (crimson shining parrot, white cockatoo, Philippine cockatoo, yellow-crested cockatoo) [5]	12-month petition finding.
Longfin smelt	12-month petition finding.
Actions With Statutory Deadlines	
Casey's june beetle	Final listing determination.
6 Birds from Eurasia	Final listing determination.
5 Bird species from Colombia and Ecuador	Final listing determination.
Queen Charlotte goshawk	Final listing determination.
5 species southeast fish (Cumberland darter, rush darter, yellowcheek darter, chucky madtom, and laurel dace) [4].	Final listing determination.
Ozark hellbender [4]	Final listing determination.
Altamaha spinymussel [3]	Final listing determination.
3 Colorado plants (*Ipomopsis polyantha* (Pagosa Skyrocket), *Penstemon debilis* (Parachute Beardtongue), and *Phacelia submutica* (DeBeque Phacelia)) [4].	Final listing determination.
6 Birds from Peru & Bolivia	Final listing determination.
Loggerhead sea turtle (assist National Marine Fisheries Service) [5]	Final listing determination.
2 mussels (rayed bean (LPN = 2), snuffbox No LPN) [5]	Final listing determination.
CA golden trout [4]	12-month petition finding.
Black-footed albatross	12-month petition finding.
Mojave fringe-toed lizard [1]	12-month petition finding.
Kokanee—Lake Sammamish population [1]	12-month petition finding.
Cactus ferruginous pygmy-owl [1]	12-month petition finding.
Northern leopard frog	12-month petition finding.
Tehachapi slender salamander	12-month petition finding.
Coqui Llanero	12-month petition finding/ Proposed listing.
Dusky tree vole	12-month petition finding.
Leatherside chub (from 206 species petition)	12-month petition finding.
Frigid ambersnail (from 206 species petition) [3]	12-month petition finding.
Platte River caddisfly (from 206 species petition) [5]	12-month petition finding.
Gopher tortoise—eastern population	12-month petition finding.
Grand Canyon scorpion (from 475 species petition)	12-month petition finding.
Anacroneuria wipukupa (a stonefly from 475 species petition) [4]	12-month petition finding.
3 Texas moths (*Ursia furtiva, Sphingicampa blanchardi, Agapema galbina*) (from 475 species petition)	12-month petition finding.
2 Texas shiners (*Cyprinella* sp., *Cyprinella lepida*) (from 475 species petition)	12-month petition finding.
3 South Arizona plants (*Erigeron piscaticus, Astragalus hypoxylus, Amoreuxia gonzalezii*) (from 475 species petition).	12-month petition finding.
5 Central Texas mussel species (3 from 475 species petition)	12-month petition finding.
14 parrots (foreign species)	12-month petition finding.
Fisher—Northern Rocky Mountain Range [1]	12-month petition finding.
Mohave ground squirrel [1]	12-month petition finding.

ACTIONS FUNDED IN FY 2010 AND FY 2011 BUT NOT YET COMPLETED—Continued

Species	Action
Western gull-billed tern	12-month petition finding.
Ozark chinquapin (*Castanea pumila* var. *ozarkensis*) [4]	12-month petition finding.
HI yellow-faced bees	12-month petition finding.
Giant Palouse earthworm	12-month petition finding.
Whitebark pine	12-month petition finding.
OK grass pink (*Calopogon oklahomensis*) [1]	12-month petition finding.
Ashy storm-petrel [5]	12-month petition finding.
Honduran emerald	12-month petition finding.
Southeastern pop. snowy plover & wintering pop. of piping plover [1]	90-day petition finding.
Eagle Lake trout [1]	90-day petition finding.
32 Pacific Northwest mollusk species (snails and slugs) [1]	90-day petition finding.
42 snail species (Nevada & Utah)	90-day petition finding.
Spring Mountains checkerspot butterfly	90-day petition finding.
Bay skipper	90-day petition finding.
Eastern small-footed bat	90-day petition finding.
Northern long-eared bat	90-day petition finding.
10 species of Great Basin butterfly	90-day petition finding.
6 sand dune (scarab) beetles	90-day petition finding.
404 Southeast species	90-day petition finding.
Franklin's bumble bee [4]	90-day petition finding.
2 Idaho snowflies (straight snowfly & Idaho snowfly) [4]	90-day petition finding.
American eel [4]	90-day petition finding.
Gila monster (Utah population) [4]	90-day petition finding.
Leona's little blue [4]	90-day petition finding.
Aztec gilia [5]	90-day petition finding.
White-tailed ptarmigan [5]	90-day petition finding.
San Bernardino flying squirrel [5]	90-day petition finding.
Bicknell's thrush [5]	90-day petition finding.
Chimpanzee	90-day petition finding.
Sonoran talussnail [5]	90-day petition finding.
2 AZ Sky Island plants (*Graptopetalum bartrami* & *Pectis imberbis*) [5]	90-day petition finding.
I'iwi [5]	90-day petition finding.
Humboldt marten	90-day petition finding.
Desert massasauga	90-day petition finding.
Western glacier stonefly (*Zapada glacier*)	90-day petition finding.
Thermophilic ostracod (*Potamocypris hunteri*)	90-day petition finding.
Sierra Nevada red fox [5]	90-day petition finding.
Boreal toad (eastern or southern Rocky Mtn population) [5]	90-day petition finding.
High-Priority Listing Actions	
19 Oahu candidate species [2] (16 plants, 3 damselflies) (15 with LPN = 2, 3 with LPN = 3, 1 with LPN = 9)	Proposed listing.
19 Maui-Nui candidate species [2] (16 plants, 3 tree snails) (14 with LPN = 2, 2 with LPN = 3, 3 with LPN = 8)	Proposed listing.
Chupadera springsnail [2] (*Pyrgulopsis chupaderae* (LPN = 2)	Proposed listing.
8 Gulf Coast mussels (southern kidneyshell (LPN = 2), round ebonyshell (LPN = 2), Alabama pearlshell (LPN = 2), southern sandshell (LPN = 5), fuzzy pigtoe (LPN = 5), Choctaw bean (LPN = 5), narrow pigtoe (LPN = 5), and tapered pigtoe (LPN = 11)) [4].	Proposed listing.
Umtanum buckwheat (LPN = 2) and white bluffs bladderpod (LPN = 9) [4]	Proposed listing.
Grotto sculpin (LPN = 2) [4]	Proposed listing.
2 Arkansas mussels (Neosho mucket (LPN = 2) & Rabbitsfoot (LPN = 9)) [4]	Proposed listing.
Diamond darter (LPN = 2) [4]	Proposed listing.
Gunnison sage-grouse (LPN = 2) [4]	Proposed listing.
Coral Pink Sand Dunes tiger beetle (LPN = 2) [5]	Proposed listing.
Miami blue butterfly (LPN = 3) [3]	Proposed listing.
Lesser prairie chicken (LPN = 2)	Proposed listing.
4 Texas salamanders (Austin blind salamander (LPN = 2), Salado salamander (LPN = 2), Georgetown salamander (LPN = 8), Jollyville Plateau (LPN = 8)) [3].	Proposed listing.
5 SW aquatics (Gonzales Spring Snail (LPN = 2), Diamond Y springsnail (LPN = 2), Phantom springsnail (LPN = 2), Phantom Cave snail (LPN = 2), Diminutive amphipod (LPN = 2)) [3].	Proposed listing.
2 Texas plants (Texas golden gladecress (*Leavenworthia texana*) (LPN = 2), Neches River rose-mallow (*Hibiscus dasycalyx*) (LPN = 2)) [3].	Proposed listing.
4 AZ plants (Acuna cactus (*Echinomastus erectocentrus* var. *acunensis*) (LPN = 3), Fickeisen plains cactus (*Pediocactus peeblesianus fickeiseniae*) (LPN = 3), Lemmon fleabane (*Erigeron lemmonii*) (LPN = 8), Gierisch mallow (*Sphaeralcea gierischii*) (LPN = 2)) [5].	Proposed listing.
FL bonneted bat (LPN = 2) [3]	Proposed listing.
3 Southern FL plants (Florida semaphore cactus (*Consolea corallicola*) (LPN = 2), shellmound applecactus (*Harrisia* (= *Cereus*) *aboriginum* (= *gracilis*)) (LPN = 2), Cape Sable thoroughwort (*Chromolaena frustrata*) (LPN = 2)) [5].	Proposed listing.
21 Big Island (HI) species [5] (includes 8 candidate species—6 plants & 2 animals; 4 with LPN = 2, 1 with LPN = 3, 1 with LPN = 4, 2 with LPN = 8).	Proposed listing.
12 Puget Sound prairie species (9 subspecies of pocket gopher (*Thomomys mazama* ssp.) (LPN = 3), streaked horned lark (LPN = 3), Taylor's checkerspot (LPN = 3), Mardon skipper (LPN = 8)) [3].	Proposed listing.

ACTIONS FUNDED IN FY 2010 AND FY 2011 BUT NOT YET COMPLETED—Continued

Species	Action
2 TN River mussels (fluted kidneyshell (LPN = 2), slabside pearlymussel (LPN = 2) [5]	Proposed listing.
Jemez Mountain salamander (LPN = 2) [5]	Proposed listing.

[1] Funds for listing actions for these species were provided in previous FYs.
[2] Although funds for these high-priority listing actions were provided in FY 2008 or 2009, due to the complexity of these actions and competing priorities, these actions are still being developed.
[3] Partially funded with FY 2010 funds and FY 2011 funds.
[4] Funded with FY 2010 funds.
[5] Funded with FY 2011 funds.

We have endeavored to make our listing actions as efficient and timely as possible, given the requirements of the relevant law and regulations, and constraints relating to workload and personnel. We are continually considering ways to streamline processes or achieve economies of scale, such as by batching related actions together. Given our limited budget for implementing section 4 of the Act, these actions described above collectively constitute expeditious progress.

Pinus albicaulis will be added to the list of candidate species upon publication of this 12-month finding. We will continue to evaluate this species as new information becomes available. Continuing review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures.

We intend that any proposed listing determination for *Pinus albicaulis* will be as accurate as possible. Therefore, we will continue to accept additional information and comments from all concerned governmental agencies, the scientific community, industry, or any other interested party concerning this finding.

References Cited

A complete list of references cited is available on the Internet at *http://www.regulations.gov* and upon request from the Wyoming Ecological Services Field Office (see **ADDRESSES** section).

Author(s)

The primary authors of this notice are the staff members of the Wyoming Ecological Services Field Office.

Authority

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

Dated: July 1, 2011.

Daniel M. Ashe,

Director, Fish and Wildlife Service.

[FR Doc. 2011–17943 Filed 7–18–11; 8:45 am]

BILLING CODE 4310–55–P

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R2–ES–2011–0044; MO 92210–0–0008–B2]

Endangered and Threatened Wildlife and Plants; Petition To List Grand Canyon Cave Pseudoscorpion

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 the Grand Canyon cave pseudoscorpion (*Archeolarca cavicola*) as threatened or endangered with critical habitat under the Endangered Species Act of 1973, as amended (Act). After review of the best scientific and commercial information available, we find that listing the Grand Canyon cave pseudoscorpion is not warranted at this time. However, we ask the public to submit to us any new information that becomes available concerning the threats to the Grand Canyon cave pseudoscorpion or its habitat at any time.

DATES: The finding announced in this document was made on July 19, 2011.

ADDRESSES: This finding is available on the Internet at *http://www.regulations.gov* at Docket Number FWS–R2–ES–2011–0044. Supporting documentation we used in preparing this finding is available for public inspection, by appointment, during normal business hours by contacting the U.S. Fish and Wildlife Service, Arizona Ecological Services Field Office, 2321 W. Royal Palm Road, Suite 103, Phoenix, AZ 85021; telephone (602) 242–0210; facsimile (602) 242–2513. If you use a telecommunications device for the deaf (TDD), please call the Federal Information Relay Service (FIRS) at (800) 877–8339. Please submit any new information, comments, or questions concerning this finding to the above address.

FOR FURTHER INFORMATION CONTACT: Steve Spangle, Field Supervisor, U.S. Fish and Wildlife Service, Arizona Ecological Services Field Office, 2321 W. Royal Palm Road, Suite 103, Phoenix, AZ 85021; telephone (602) 242–0210; facsimile (602) 242–2513. If you use a telecommunications device for the deaf (TDD), please call the Federal Information Relay Service (FIRS) at (800) 877–8339.

SUPPLEMENTARY INFORMATION:

Background

Section 4(b)(3)(B) of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*), requires that, for any petition containing substantial scientific or commercial information indicating that listing the species may be warranted, we make a finding within 12 months of the date of receipt of the petition. In this finding we determine that the petitioned action is: (a) Not warranted, (b) warranted, or (c) warranted, but immediate proposal of a regulation implementing the petitioned action is precluded by other pending proposals to determine whether species are threatened or endangered, and expeditious progress is being made to add or remove qualified species from the Lists of Endangered and Threatened Wildlife and Plants. Section 4(b)(3)(C) of the Act requires that we treat a petition for which the requested action is found to be warranted but precluded as though resubmitted on the date of such finding, that is, requiring a subsequent finding to be made within 12 months. We must publish these 12-month findings in the **Federal Register**.

Previous Federal Actions

The Grand Canyon cave pseudoscorpion was formerly a candidate 2 species, a taxon for which information in our possession indicated that proposing to list was possibly appropriate, but for which persuasive data on biological vulnerability and threats were not available to support a proposed listing rule (54 FR 554; January 6, 1989). The designation of candidate 2 species was discontinued in