**DEPARTMENT OF THE INTERIOR**

**Fish and Wildlife Service**

**50 CFR Part 17**

**[Docket No. FWS–R1–ES–2016–0145; FF09E21000 FXES11110900000 201]**

**RIN 1018–BB96**

# Endangered and Threatened Wildlife and Plants; Endangered Status for the Island Marble Butterfly and Designation of Critical Habitat

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

**ACTION:** Final rule.

**SUMMARY:** We, the U.S. Fish and Wildlife Service (Service), determine endangered species status under the Endangered Species Act of 1973 (Act), as amended, for the island marble butterfly (*Euchloe ausonides insulanus*) and designate critical habitat. In total, approximately 812 acres (329 hectares) on the south end of San Juan Island, San Juan County, Washington, fall within the boundaries of the critical habitat designation.

**DATES:** This rule is effective June 4, 2020.

**ADDRESSES:** This final rule is available on the internet at *http://www.regulations.gov.* Comments and materials we received, as well as supporting documentation we used in preparing this rule, are available for public inspection at *http://www.regulations.gov at* Docket No. FWS–R1–ES–2016–0145. Comments, materials, and documentation that we considered in this rulemaking will be available by appointment, during normal business hours at: U.S. Fish and Wildlife Service, Washington Fish and Wildlife Office, 510 Desmond Drive, Suite 102, Lacey, WA 98503; telephone 360–753–9440.

The coordinates or plot points or both from which the maps are generated are included in the administrative record for this critical habitat designation and are available at *http://www.regulations.gov* at Docket No. FWS–R1–ES–2016–0145, on the Service's website at *https://www.fws.gov/wafwo/,*and at the Washington Fish and Wildlife Office (address provided above). Any additional tools or supporting information that we developed for this critical habitat designation will also be available at the Fish and Wildlife Service website and Field Office set out above, and may also be included in the preamble and at *http://www.regulations.gov.*

**FOR FURTHER INFORMATION CONTACT:** Brad Thompson, Acting State Supervisor, Washington Fish and Wildlife Office, 510 Desmond Drive, Suite 102, Lacey, WA 98503; telephone 360–753–9440. Persons who use a telecommunications device for the deaf (TDD) may call the Federal Relay Service at 800–877–8339.

**SUPPLEMENTARY INFORMATION:**

## Executive Summary

*Why we need to publish a rule.* Under the Endangered Species Act, a species may warrant protection through listing if it is endangered or threatened throughout all or a significant portion of its range. Listing a species as an endangered or threatened species can only be completed by issuing a rule. Further, under the Endangered Species Act, any species that is determined to be an endangered or threatened species requires critical habitat to be designated, to the maximum extent prudent and determinable. Designations and revisions of critical habitat can only be completed by issuing a rule.

*What this document does.* This rule lists the island marble butterfly (*Euchloe ausonides insulanus*) as an endangered species and designates critical habitat for this species under the Endangered Species Act. We are designating critical habitat for the species in one unit, on public and private property totaling 812 acres (329 hectares) on San Juan Island, San Juan County, Washington.

*The basis for our action.* Under the Endangered Species Act, we can determine that a species is an endangered or threatened species based on any of 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. We have determined that the island marble butterfly faces the following threats:

- Habitat loss and degradation from plant succession and invasion by plants that displace larval host plants; browsing by black-tailed deer, European rabbits, and brown garden snails; and storm surges;
- Predation by native spiders and nonnative wasps, and incidental predation by black-tailed deer; and
- Vulnerabilities associated with small population size and environmental and demographic stochasticity, and other chance events that increase mortality or reduce reproductive success.

Existing regulatory mechanisms and conservation efforts do not address these threats to the island marble butterfly to the extent that listing is not warranted.

This rule also designates critical habitat for the island marble butterfly in accordance with the Endangered Species Act. The critical habitat areas we are designating in this rule constitute our current best assessment of the areas that meet the definition of critical habitat for the island marble butterfly.

*Economic analysis.* We prepared an economic analysis of the impacts of designating critical habitat. We made the draft economic analysis available for public comments on April 12, 2018 (83 FR 15900). The analysis found no significant economic impact of the designation of critical habitat.

*Peer review and public comment.* We sought comments from five independent specialists to ensure that our species determination and critical habitat designation are based on scientifically sound data, assumptions, and analyses. We obtained opinions from two knowledgeable individuals with scientific expertise to review our technical assumptions and analysis, and whether or not we had used the best scientific data available. These peer reviewers generally concurred with our methods and conclusions, and provided additional information, clarification, and suggestions to improve this final rule. Information we received from peer review is incorporated into this final rule. We also considered all comments and information we received from the public during the comment period for the proposed listing and the proposed designation of critical habitat.

## Previous Federal Actions

On April 12, 2018, we published in the **Federal Register** a proposed rule (83 FR 15900) to list the island marble butterfly as an endangered species and to designate critical habitat for the species under the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq.*). Please refer to that proposed rule for a detailed description of Federal actions concerning the island marble butterfly that occurred prior to the proposal's publication.

## Summary of Changes From the Proposed Rule

Based on information we received from peer reviewers and public commenters, in this rule, we make the following changes from our April 12, 2018, proposed rule (83 FR 15900):

(1) We describe habitat use by the island marble butterfly to better reflect

that the organism exhibits ''patchy'' population dynamics at the local scale rather than following a classic metapopulation dynamic model;

(2) We indicate that the island marble butterfly has been observed flying on lands immediately adjacent to the American Camp unit of San Juan Island National Historical Park (SJINHP);

(3) We update portions of the rule to reflect the most current information regarding captive rearing and monitoring;

(4) We indicate that while female island marble butterflies tend to use a single host plant species in each of three specific habitat types, there are instances (for example, when host plants are scarce) when they will use another of the three known host plant species in a specific habitat type;

(5) We revise the description of the time that island marble butterflies spend as winged adults from an estimated average of 6 to 9 days to include the potential to persist as winged adults for up to 16 days, based on documentation provided by two separate commenters;

(6) We include information regarding the aversion male island marble butterflies have demonstrated for flying over tall vegetation, including avoiding flying over fields of tall grasses; and

(7) We revise the critical habitat discussion and designation to address the limitations in the precision of mapped critical habitat, to clarify that the critical habitat designation includes road shoulders and road margins, and to clarify our intent to designate as critical habitat only the steep coastal bluffs on private lands near Eagle Cove.

**Summary of Comments and Recommendations**

In our April 12, 2018, proposed rule (83 FR 15900), we requested that all interested parties submit written comments on the proposal by June 11, 2018. We also contacted appropriate Federal and State agencies, scientific experts and organizations, and other interested parties and invited them to comment on the proposed determination, proposed designation of critical habitat, and draft economic analysis. Newspaper notices inviting general public comment were published in the Islands' Sounder, Journal of the San Juans, and the Seattle Times. We did not receive any requests for a public hearing. All substantive information provided during the comment period has either been incorporated directly into this final rule or is addressed below.

During the comment period, we received 23 comment letters addressing the proposed determination and/or the proposed critical habitat designation. We address all substantive comments either below or by making the requested changes to the rule, as described above, when we determined that they were correct. We did not receive comments from any Federal agencies or Tribes. We received a letter of support from the Washington Department of Fish and Wildlife; however, their letter did not contain any comments or requests for revision of the language.

*Peer Reviewer Comments*

In accordance with our peer review policy published on July 1, 1994 (59 FR 34270), we solicited expert opinion from five knowledgeable individuals with scientific expertise that included familiarity with the island marble butterfly and its habitat, biological needs, and threats; the geographic region in which the species occurs; and conservation biology principles. We received responses from two of the peer reviewers.

We reviewed all comments we received from the peer reviewers for substantive issues and new information regarding the island marble butterfly and its critical habitat. The peer reviewers generally concurred with our methods and conclusions, and provided additional information, clarifications, and suggestions to improve the final rule. Peer reviewer comments are addressed in the following summary and incorporated into the final rule as appropriate.

*(1) Comment:* One peer reviewer highlighted the lack of clarity surrounding what constitutes a ''site,'' both within American Camp and outside of the park.

*Our Response:* Due to the way data were collected and submitted to the Service, we were limited in the way we could reference and analyze detection or nondetection of the island marble butterfly in any given year. We assign the term ''site'' to each location that has a name and survey information associated with it.

*(2) Comment:* One peer reviewer indicated that describing the island marble butterfly as having a ''low dispersal capacity'' was inaccurate and suggested revising the narrative to reflect that the island marble butterfly exhibits ''patchy population dynamics.''

*Our Response:* We revised the narrative in this rule to reflect that the island marble butterfly generally exhibits weak site fidelity and low to intermediate dispersal capacity, which are key behavioral components of patchy population dynamics.

*(3) Comment:* One peer reviewer and one commenter identified potential suitable habitat for the island marble butterfly in areas known to be previously occupied and stated that these areas should be included in critical habitat.

*Our Response:* We considered all previously occupied areas in the analysis of proposed critical habitat. For the reasons stated below under *Areas Occupied at the Time of Listing,* we are designating critical habitat only on and around American Camp. We are unable, at this time, to delineate any specific unoccupied areas that are essential to the conservation of the island marble butterfly due to the ephemeral and patchy nature of the species' habitat and our limited understanding regarding the ideal configuration of habitat, the ideal size and number of habitat patches, and how these habitat patches may naturally evolve on the landscape. This does not mean that other areas are not important or valuable to the recovery of the island marble butterfly, or that we only need one occupied unit to recover the species.

*Public Comments*

*(4) Comment:* One commenter posited that the decline and disappearance of the island marble butterfly was caused, in part, by the decline in traditional harvest of food resources by pre-European peoples who inhabited the Gulf Islands and the San Juan archipelago followed by the introduction and establishment of nonnative weedy plant species.

*Our Response:* While these factors may have contributed to the decline of the island marble butterfly and other disturbance-dependent native butterfly species, we were unable to locate any substantiating evidence that would support this claim.

**Background**

*Species Information*

Taxonomy and Species Description

The island marble butterfly (*Euchloe ausonides insulanus*) is a subspecies of the large marble butterfly (*E. ausonides*) in the Pieridae family, subfamily Pierinae, which primarily consists of yellow and white butterflies. The island marble butterfly was formally described in 2001, by Guppy and Shepard (p. 160) based on 14 specimens collected between 1859 and 1908 on or near Vancouver Island, British Columbia, Canada, and is geographically isolated from all other *E. ausonides* subspecies. The taxonomic status of the island marble butterfly is not in dispute. *Euchloe ausonides insulanus* is recognized as a valid subspecies by the Integrated Taxonomic Information

System (ITIS 2015a, entire) based on the phenotypic differences documented in Guppy and Shepard (2001). In this rule, we use shorthand for simplicity in referring to the island marble butterfly as a species because subspecies are treated as species for the purposes of evaluating taxa for listing under the Act.

Island marble butterflies have a wingspan of approximately 1.75 inches (in) (4.5 centimeters (cm)) (Pyle 2002, p. 142) and are differentiated from other subspecies of the large marble butterfly by their larger size and the expanded marbling pattern of yellow and green on the underside of the hindwings and forewings (Guppy and Shepard 2001, p. 159). Immature stages of the island marble butterfly have distinctly different coloration and markings from *Euchloe ausonides;* specifically, the third and fourth larval instars (instars are the larval stages between molting events) have a white spiracular stripe (a stripe that runs along the side of a caterpillar) subtended (bordered below) by a yellow-green subspiracular stripe and a green-yellow ventral area, which is different from the stripe colors and patterns described for *E. ausonides* (James and Nunnallee 2011, pp. 102–103; Lambert 2011, p. 15). The island marble butterfly is also behaviorally distinct; large marble butterflies pupate (enter the final stage of larval development before transforming into a butterfly) directly on their larval host plants, whereas the island marble butterflies leave their host plants to find a suitable pupation site up to 13 feet (ft) (4 meters (m)) away from their larval host plants (Lambert 2011, p. 19).

Distribution

The island marble butterfly was historically known from just two areas along the southeastern coast of Vancouver Island, British Columbia, Canada, based on 14 museum records: The Greater Victoria area at the southern end of Vancouver Island; and near Nanaimo and on adjacent Gabriola Island, approximately 56 miles (mi) (90 kilometers (km)) north of Victoria. The last known specimen of the island marble butterfly from Canada was collected in 1908 on Gabriola Island, and the species is now considered extirpated from the province (COSEWIC 2010, p. 6). Reasons for its disappearance from Canada are unknown. Hypotheses include increased parasitoid loads (the number of individual deadly parasites within an individual caterpillar) associated with the introduction of the cabbage white butterfly (Guppy and Shepard 2001, p. 38) or heavy grazing of natural meadows by cattle and sheep, which severely depressed its presumed larval food plant (SARA 2015).

After 90 years without a documented occurrence, the island marble butterfly was rediscovered in 1998 on San Juan Island, San Juan County, Washington, at least 9 mi (15 km) east of Victoria across the Haro Strait. Subsequent surveys in suitable habitat across southeastern Vancouver Island and the Gulf Islands in Canada (see COSEWIC 2010, p. 5), as well as the San Juan Islands and six adjacent counties in the United States (Whatcom, Skagit, Snohomish, Jefferson, Clallam, and Island Counties), revealed only two other occupied areas. One of these occupied areas was centered on San Juan Island and the other on Lopez Island, which is separated from San Juan Island by just over 0.5 mi (1 km) at its closest point. These occupied areas were eventually determined to comprise five populations, as described in detail in our 2006 12-month finding (71 FR 66292; November 14, 2006). Since 2006, the number and distribution of populations has declined. Four of the five populations that once spanned San Juan and Lopez Islands have not been detected in recent years, and the species is now observed only in a single area centered on American Camp, a part of San Juan Island National Historical Park that is managed by the National Park Service (NPS). The island marble butterfly has also been sighted using the lands adjoining or near American Camp; there were observations of island marble butterflies flying beyond the boundaries of these adjoining lands in 2015 and 2017 (Potter 2015a, *in litt.;* Lambert 2018, *in litt.*).

No current records exist of any life-history stage of the island marble butterfly except at or near American Camp at San Juan Island National Historical Park. Therefore, we consider only American Camp and the immediately adjacent areas to be occupied at the time of this final listing.

Survey Effort

Extensive surveys have been conducted in British Columbia, Canada, since 2001, with an estimated 500 survey hours conducted by professional surveyors and 2,000 survey hours by volunteer butterfly enthusiasts (COSEWIC 2010, p. v). During these surveys, neither the island marble butterfly nor suitable habitat was detected (COSEWIC 2010, p. vi). The species has been considered extirpated in British Columbia since 1910, and was formally designated extirpated in 1999 by the Canadian government (COSEWIC 2000, p. iii).

In the United States, surveys for the island marble butterfly have also been extensive. In 2005 and 2006, we partnered with NPS, Washington Department of Fish and Wildlife (WDFW), Washington Department of Natural Resources (WDNR), the University of Washington, and the Xerces Society to survey for the presence of the island marble butterfly during the adult flight period (when eggs are laid and larvae are active; early April–late June). Qualified surveyors conducted approximately 335 individual surveys at more than 160 sites in potentially suitable habitat across 6 counties (Clallam, Jefferson, Island, San Juan, Skagit, and Whatcom Counties) and on 16 islands (Miskelly and Potter 2005, pp. 5, 7–16; Miskelly and Fleckenstein 2007, pp. 4, 10–19). Outside of American Camp, sites were defined primarily by ownership, although some exceptionally large sites were subdivided and received unique site names. All surveys followed a set of standardized protocols to ensure they were conducted when butterflies had the highest likelihood of being detected (see Miskelly and Potter 2005, p. 4). Island marble butterflies were considered present at sites where eggs, larvae, or adults of the species were detected. These surveys documented five populations distributed across San Juan and Lopez Islands, including the single population persisting today centered on American Camp (Miskelly and Fleckenstein 2007, pp. 4–5).

Annual surveys conducted outside of American Camp from 2007–2012 focused on areas with suitable habitat on San Juan and Lopez Islands. These surveys generally included previously occupied sites, when accessible, in order to document whether or not island marble butterflies persisted at the sites where they were detected in 2005 and 2006. After years of observing a rangewide decline in available island marble butterfly habitat and dwindling island marble butterfly detections, WDFW determined that there was not enough suitable habitat remaining outside of American Camp to warrant continued widespread survey efforts on San Juan and Lopez Islands. Therefore, surveys in 2013 and 2014 focused solely on assisting with monitoring at American Camp and surveying lands directly adjacent to the park (Potter 2015a *in litt.*). Surveys to monitor the status of the population centered on American Camp have been conducted annually from 2004 to 2015, although the effort has varied through time (see ''Abundance,'' below, for additional information).

In 2015, in addition to annual population monitoring at American Camp, the Service funded an extensive survey of sites on San Juan Island outside of American Camp. Areas surveyed included those sites where island marble butterflies had previously been detected, as well as areas with suitable habitat with no prior detections. Researchers conducted 134 individual surveys at a total of 48 sites, including 24 sites where the island marble butterfly had been documented previously. The survey yielded no detections of the island marble butterfly outside of American Camp.

Multiple years of extensive surveys conducted across formerly occupied sites have failed to detect the species. However, it is possible that the island marble butterfly continues to exist at a handful of small isolated sites where surveyors were not granted access or were unable to survey during suitable conditions (Miskelly and Potter 2005, entire; Miskelly and Fleckenstein 2007, entire; Miskelly and Potter 2009, entire; Hanson *et al.* 2009, entire; Hanson *et al.* 2010, entire; Potter *et al.* 2011, entire; Vernon and Weaver 2012, entire; Weaver and Vernon 2014, entire; Potter 2015a *in litt.;* Vernon 2015a, entire).

Abundance

In our 2006 12-month finding, we estimated the abundance of island marble butterflies to be ''probably less than 500 butterflies, and possibly as low as 300 individuals'' (71 FR 66292, November 14, 2006, p. 66295). These numbers were based on limited data, and their accuracy is uncertain. Since 2006, there have been several efforts to either directly estimate population size or evaluate changes in relative abundance through time (described below). In addition, captive-rearing and release of butterflies was initiated in 2013, and as of the spring of 2018, over 500 captive-raised butterflies have been released at American Camp to supplement the population (SJINHP 2018, *in litt.*) (see the discussions of conservation efforts under Factors A and C, below, for more details).

*Site Occupancy*—The number of sites where the island marble butterfly is detected each year is a useful indicator of coarse-scale changes in abundance. The island marble butterfly has been recorded at a total of 63 individual sites since rangewide surveys began in 2005: The species was found at 37 sites in and around American Camp and 26 sites outside of American Camp (Miskelly and Potter 2005, pp. 7–14; Miskelly and Fleckenstein 2007, pp. 14–19; Miskelly and Potter 2009, pp. 7–8, 10–11; Hanson *et al.* 2009, pp. 10–11, 24–28; Hanson *et al.* 2010, pp. 12–13, 26–30; Potter *et al.* 2011, pp. 10–23, 15–23; Potter 2012, unpublished; Potter 2013, unpublished; Vernon and Weaver 2012, pp. 4–7; Weaver and Vernon 2014, pp. 5–8). The number of occupied sites recorded at American Camp is somewhat confounded by changes in survey methods and effort through time (see ''Survey Effort,'' above). We recognize this as a potential source of uncertainty, but note that both transect data and anecdotal observations suggest a population decline at American Camp since monitoring began in 2004 (see *Transect Counts,* below).

The largest number of concurrently occupied sites reported was 25 in 2007, 10 of which were outside of American Camp (Miskelly and Potter 2009, pp. 7–8, 10–11; Potter *et al.* 2011, pp. 15–16). The number of occupied sites declined every year from 2007 to 2011, with the species detected at only seven sites in 2011, only one of which was outside of American Camp. In 2015, adult island marble butterflies were detected at only four of the regularly monitored sites at American Camp, the fewest occupied sites ever recorded, and no adults, eggs, or larvae were detected outside of the greater American Camp area (Potter 2015a *in litt.;* NPS 2015, entire; Vernon 2015b, entire), although there were two observations of single adult butterflies flying just beyond the boundary of the park that were not recorded in formal surveys by NPS (Potter 2015a, *in litt.*). Island marble butterflies were detected as eggs in six additional research plots at American Camp (Lambert 2015d, p. 4), but none of the eggs tracked in the research plots survived to the fifth larval instar (Lambert 2015d, p. 13). In 2016 and 2017, larval habitat for the island marble butterfly at American Camp increased substantially, and survivorship of individuals tracked from eggs through fifth instar larvae increased from zero in 2015 to 3 percent in 2016 (Lambert 2016a, pp. 10, 21), but decreased to 1 percent in 2017, the last year for which survivorship data were collected (Lambert 2017, pp. 3, 12).

The reasons for the precipitous decline in the number of occupied sites since 2005 are not known with certainty, but the near-complete loss of habitat outside of American Camp in some years is likely a principal cause. Habitat loss has been caused by road maintenance, mowing, cultivation of land, intentional removal of host plants, improperly timed restoration activities, development, landscaping, deer browse, and livestock grazing (Miskelly and Potter 2005, p. 6; Miskelly and Fleckenstein 2007, p. 6; Miskelly and Potter 2009, p. 9; Hanson *et al.* 2009, p. 18; Hanson *et al.* 2010, p. 21; Potter *et al.* 2011, p. 13).

*Transect Counts*—Counts along transects can provide a measure of relative abundance, which can be useful in assessing changes in the population among sites and through time (Peterson 2010, pp. 12–13). From 2004 to 2008, Lambert (2009) counted adult island marble butterflies along transects at American Camp (14 established in 2004, and an additional 2 (for a total of 16) established in 2005), finding a consistent and significant decline in the number of adults observed: They counted 270 in 2004, 194 in 2005, 125 in 2006, 71 in 2007, and 63 in 2008 (Lambert 2009, p. 5). These raw counts were also translated to relative encounter rates that account for differences in survey effort across years, and these encounter rates also showed a marked decline until 2016 (USFWS 2016). Four of these transects were monitored by NPS almost continuously from 2004 to 2016 (one transect was not monitored from 2009 to 2011), and relative encounter rates were calculated that accounted for transect length and the number of times the transect was surveyed each year. The relative encounter rate on these transects declined substantially between 2004 and 2015, from almost 2 butterflies per 100 meters surveyed in 2004, to approximately 0.3 butterflies per 100 meters in 2015 (USFWS 2016). Survey results for 2016 improved across the three transects consistently monitored at American Camp, with approximately 0.6 butterflies per 100 meters. While an observation of 0.6 butterflies per 100 meters reflects an improvement from recent years, this improvement does not reverse the overall decline observed since monitoring began in 2004. The Service has not received updated transect data for the flight seasons of 2017 or 2018.

*Mark-Release-Recapture*—Mark-release-recapture (MRR) studies were conducted at American Camp in 2008 and 2009 (and at one additional site on San Juan Island—the Pear Point Gravel Quarry, which is no longer occupied) (Peterson 2009, 2010, entire). These studies sought to address several demographic questions and to assess whether transect counts were a reliable method to estimate changes in the population through time (Peterson 2009, p. 3). MRR population estimates were generated for three focal areas at American Camp in 2009: The western end of American Camp (an estimated 50 individuals), American Camp below the Redoubt (an estimated 39 individuals), and the dunes at American Camp (an estimated 24 individuals). However,

because American Camp was not surveyed in its entirety, these areas represent an unquantified fraction of the occupied habitat at American Camp; therefore, we cannot extrapolate from this information to estimate the rangewide population.

In summary, monitoring efforts have varied since 2008, but reports from NPS indicate an ongoing decrease in the relative abundance of the island marble butterfly at American Camp, suggesting that total numbers continue to decline (Vernon and Weaver 2012, pp. 5–6; Weaver and Vernon 2014, p. 6). While reliable and precise rangewide population estimates have not been produced for this species, the available evidence suggests that the species has a very small population that has declined substantially since monitoring began in 2004.

Habitat

The island marble butterfly has three known host plants, all in the mustard family (Brassicaceae). One is native, *Lepidium virginicum* var. *menziesii* (Menzies' pepperweed), and two are nonnative: *Brassica rapa* (no agreed-upon common name, but sometimes called field mustard; hereafter referred to as field mustard for the purposes of this document) (ITIS 2015b, entire), and *Sisymbrium altissimum* L. (tumble mustard) (Miskelly 2004, pp. 33, 38; Lambert 2011, p. 2).

All three larval host plants occur in open grass- and forb-dominated vegetation systems, but each species is most robust in one of three specific habitat types: Menzies' pepperweed at the edge of low-lying coastal lagoon habitat; field mustard in upland prairie habitat, disturbed fields, and disturbed soils, including soil piles from construction; and tumble mustard in sand dune habitat (Miskelly 2004, p. 33; Lambert 2011, pp. 24, 121–123). While each larval host plant can occur in the other habitat types, female island marble butterflies tend to select specific host plants in each of the three habitat types referenced above, likely because certain host plants are more robust in each habitat type during the flight season (Miskelly 2004, p. 33; Lambert 2011, pp. 24, 41, 50, 54–57, 121–123; Shrum 2018, *in litt.*). Host plants that establish and grow outside of their primary habitat type typically are less robust, and female butterflies do not appear to choose them preferentially but may use them when other larval habitat is limited (Lambert 2011, pp. 24, 41, 50, 54–57, 121–123; Shrum 2018, *in litt.*).

Adults primarily nectar (forage) on their larval host plants (Potter 2015e, pers. comm.), but use a variety of other nectar plants including:

- *Abronia latifolia* (yellow sand verbena),
- *Achillea millefolium* (yarrow),
- *Amsinckia menziesii* (small-flowered fiddleneck),
- *Cakile edentula* (American sea rocket),
- *Cerastium arvense* (field chickweed),
- *Erodium cicutarium* (common stork's bill),
- *Geranium molle* (dovefoot geranium),
- *Hypochaeris radicata* (hairy cat's ear),
- *Lomatium utriculatum* (common lomatium),
- *Lupinus littoralis* (seashore lupine),
- *Myosotis discolor* (common forget-me-not),
- *Ranunculus californicus* (California buttercup),
- *Rubus ursinus* (trailing blackberry),
- *Taraxacum officinale* (dandelion),
- *Toxicoscordion venenosum* (death camas, formerly known as *Zigadenus venenosus*), and
- *Triteleia grandiflora* (Howell's brodiaea, formerly *Brodiaea howellii*)

(Miskelly 2004, p. 33; Pyle 2004, pp. 23–26, 33; Miskelly and Potter 2005, p. 6; Lambert 2011, p. 120; Vernon and Weaver 2012, appendix 12; Lambert 2015a, p. 2, Lambert 2015b, *in litt.*). Of these additional nectar resources, island marble butterflies are most frequently observed feeding on yellow sand verbena, small-flowered fiddleneck, and field chickweed (Potter 2015e, pers. comm.). Adults primarily use low-statured, white flowering plants such as field chickweed as mating sites (Lambert 2014b, p. 17).

Biology

The island marble butterfly life cycle comprises four distinct developmental phases: Egg, larva, chrysalis, and butterfly. Development from egg to chrysalis takes approximately 38 days and includes five instars (phases of larval development between molts) (Lambert 2011, p. 7). Female island marble butterflies produce a single brood per year, and prefer to lay their eggs individually on the unopened terminal flower buds of their larval host plants (Lambert 2011, pp. 9, 48, 51). Gravid female butterflies appear to select plants with many tightly grouped flower buds over host plants with fewer buds, and they tend to avoid laying eggs on inflorescences (flower heads) where other island marble butterflies already have deposited eggs (Lambert 2011, p. 51). However, the number of eggs laid on a single host plant has been observed to vary with the density and distribution of host plants and may also be affected by host plant robustness as well as the age of the individual female butterfly (Parker and Courtney 1984, entire; Lambert 2011, pp. 9, 53, 54).

First instar larvae are able to feed only on tender portions of the host plant, such as developing flower buds and new growth, and initially move no more than a few centimeters from where they hatch before they must feed; thus, larvae that hatch from eggs located more than a few centimeters from a host plant's flower heads often starve before reaching a suitable food source (Lambert 2011, pp. 12–13). The limited locomotion of newly hatched larvae and their reliance on tender flower buds as a food resource leads to a concentration of early-instar larvae near the tips of their larval host plants (Lambert 2011, p. 13). Larvae become more mobile in later instars, and their better developed mouthparts allow them to consume older, tougher plant material. Eventually, they may move to stems of other nearby host plants to forage (Lambert 2011, pp. 15–17).

The fifth (last) instar larvae ''wander'' through standing vegetation, never touching the ground, as they search for a suitable site on which to pupate (form a chrysalis) (Lambert 2011, p. 20). The greatest distance a fifth instar larva has been observed to move from its final larval host plant was 4 meters, but few observations exist (Lambert 2011, p. 19). Fifth instar larvae select slender dry stems in the lower canopy of moderately dense vegetation as sites for pupation and entering diapause, a state of suspended development (Lambert 2011, p. 21).

Island marble butterflies spend the largest portion of their annual life cycle in diapause as chrysalids. They enter diapause in midsummer and emerge as butterflies in the spring of the following year. One island marble chrysalis remained in diapause for 334 days (11 months) (Lambert 2011, p. 22). Extremely low survivorship at early life-history stages has been found in recent years (*e.g.,* of 136 and 226 individual eggs tracked in 2014 and 2015, respectively, zero survived to pupation; Lambert 2015d, p. 13).

Adult island marble butterflies emerge from early April to mid-June and live as winged adults for up to 16 days (Peterson 2009, p. 7; Peterson 2018, *in litt.;* Vernon 2018, *in litt.*), with most persisting for a much shorter period; estimates range from 2 to 9 days (Lambert 2011, pp. 50, 180; Peterson 2009, p. 7).

Males emerge 4 to 7 days before females and patrol hillsides in search of

mates (Lambert 2011, p. 47). Male island marble butterflies have been observed to prefer low-statured vegetation, generally avoiding flight over expanses of tall grasses (Miskelly 2018, *in litt.*). Male island marble butterflies are attracted to white (ultraviolet-reflecting) objects that may resemble females and have been observed to investigate white flowers (*e.g.,* field chickweed and yarrow), white picket fences, and white lines painted on the surface of roads (Lambert 2011, p. 47). When a male locates a receptive female, mating may occur hundreds of meters from the nearest larval host plant, increasing the potential extent of adult habitat to include a varied array of plants and vegetative structure (Lambert 2011, p. 48). Individual adult island marble butterflies seldom disperse distances greater than 0.4 mi (0.6 km), with the greatest documented dispersal distance being 1.2 mi (1.9 km) (Peterson 2010, pp. 3, 12).

Island marble butterflies generally exhibit weak site fidelity and low to intermediate dispersal capacity. When considered rangewide, the island marble butterfly exists as a group of spatially separated populations that interact when individual members move from one occupied location to another (Miskelly and Potter 2009, p. 14; Lambert 2011, p. 147). For the island marble butterfly, a population is defined as a group of occupied sites close enough for routine genetic exchange between individuals. Thus, occupied areas separated by distances greater than 3 mi (4.8 km) with no intervening suitable habitat and a low likelihood of genetic exchange are considered to be separate populations (Miskelly and Potter 2009, p. 12). Five potential populations of island marble butterflies were identified and described in detail in the 2006 12-month finding (71 FR 66292, November 14, 2006, p. 66294): American Camp and vicinity, San Juan Valley, Northwest San Juan Island, Central Lopez Island, and West Central Lopez Island. As described previously, only the population at American Camp has been detected since 2012.

**Summary of Factors Affecting the Species**

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations in title 50 of the Code of Federal Regulations (50 CFR part 424) set forth the procedures for determining whether a species is an endangered species or threatened species. The Act defines an endangered species as ''in danger of extinction throughout all or a significant portion of its range,'' and a threatened species as ''likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.'' Section 4(a)(1) requires the Secretary to determine whether a species is an endangered species or threatened species because of 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.

To inform the determination, we complete a status assessment in relation to the five factors using the best available scientific and commercial data. The status assessment provides a thorough description and analysis of the stressors, regulatory mechanisms, and conservation efforts affecting individuals, populations, and the species. We use the terms ''stressor'' and ''threat'' interchangeably, along with other similar terms, to describe anything that may have a negative effect on the island marble butterfly. 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. The mere identification of threats that could affect the island marble butterfly is not sufficient to compel a finding that listing is appropriate. Rather, we evaluate the effects of the threats in light of the exposure, timing, and scale of the threats, both individually and cumulatively, and any existing regulatory mechanisms or conservation efforts that may ameliorate or exacerbate the threats in order to determine if the species meets the definition of an endangered species or threatened species.

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

Since we first analyzed stressors to the island marble butterfly's habitat on San Juan and Lopez Islands in 2006, the species' distribution has contracted, and it is now known only from American Camp and the immediate vicinity on San Juan (see ''Distribution,'' above). Island marble butterfly larval habitat in natural landscapes, such as that found at American Camp, is patchy at best, making it difficult to estimate the acreage of larval host plants. Additionally, larval host plants are early successional species that thrive in disturbed habitats. This can result in larval habitat patches that may be present one year and gone the next, depending on the level of disturbance present on the landscape.

Development

Residential development occurs on both San Juan and Lopez Islands, primarily on private lands. Habitat loss from development affects the island marble butterfly by reducing the availability of secure habitat that will persist long enough for the island marble butterfly to complete its life cycle. Development may also affect the known occupied range of the island marble butterfly by constraining the amount of stepping-stone habitat (patches of habitat too small to maintain an established population, but large enough to allow for connectivity between larger suitable patches) for dispersal. In addition, mowing or removal of host plants (*e.g.,* for landscaping around developments) may also remove island marble butterfly habitat or prevent its establishment. Because female island marble butterflies selectively lay their eggs on the inflorescences (flowering head) of tall, robust plants (Lambert 2011, p. 55), mowing host plants reduces the availability of suitable oviposition (egg laying) sites for the island marble butterfly.

Within American Camp, which is protected by NPS regulations (see Factor D discussion, below), development is not a threat to the island marble butterfly. However, residential development was a threat to island marble butterfly habitat in the Cattle Point Estate and Eagle Cove developments adjacent to American Camp. These areas accounted for 199 ac (81 ha) of island marble butterfly habitat, or 18 percent of occupied habitat in 2006, which are now unoccupied due to habitat loss (Potter 2015a, *in litt.*) associated with development (*e.g.,* mowing, landscaping, or removal of host plants) (Miskelly and Potter 2005, p. 6; Miskelly and Fleckenstein 2007, p. 6; Hanson *et al.* 2009, p. 9).

In 2006, we noted that development was occurring less rapidly in the areas to the north and west of American Camp and on Lopez Island where lands comprised small, rural farms with pastures and low-density residential properties. We concluded that these areas, containing about 361 ac (146 ha), or 32 percent of the occupied habitat as of 2006, would be managed in a way

that was compatible with island marble butterfly habitat. Since that time, the amount of farmland in San Juan County has decreased, with the greatest loss of farmland in San Juan County attributed to the subdivision of larger farms into smaller parcels, which have then been developed (San Juan County Agricultural Resources Committee 2011, p. 23). While there are no estimates of the amount of potential habitat for the island marble butterfly lost specifically to development, habitat loss outside of American Camp from a variety of sources has been substantial (Miskelly and Potter 2005, p. 6; Miskelly and Fleckenstein 2007, p. 6; Miskelly and Potter 2009, p. 9; Hanson *et al.* 2009, pp. 18–19; Potter *et al.* 2011, pp. 13–14; Potter 2015a, *in litt.*). In addition to development of former agricultural lands, perhaps more significant are the management practices on these lands that effectively preclude recolonization by island marble butterflies or create population sinks (habitat patches that attract dispersing individuals, but do not allow them to complete their life cycle and reproduce) (see ''Agricultural Practices,'' below). We conclude that development has substantively contributed to the extirpation of the island marble butterfly outside of American Camp and remains one of several factors impeding successful recolonization of previously occupied habitats; however, because American Camp is protected from development by NPS regulations and is where the species solely occurs, development is not a threat currently acting on the remaining extant population of the species.

Road Construction

In our 2006 12-month finding (71 FR 66292; November 14, 2006), we evaluated the impact of a planned road relocation project (Cattle Point Road relocation project) through American Camp. Cattle Point Road is the only point of access for residents at the southeastern tip of San Juan Island and traverses the slope of Mount Finlayson, effectively bisecting occupied island marble butterfly habitat at the park. We estimated that the relocation would cause temporary loss of as much as 13 ac (5 ha) of island marble butterfly habitat due to clearing and removal of larval host plants, although there was no known breeding habitat along the highway at that time. We concluded that the road realignment was likely to proceed with little mortality to the island marble butterfly.

Since 2006, we have worked closely with NPS and the Federal Highway Administration (FHA) to ensure that project impacts were avoided or minimized. Once the project began, in 2015, the Service, NPS, and WDFW actively surveyed the road alignment to remove host plants before they could attract oviposition by female island marble butterflies and to rescue island marble butterfly eggs and larva from any larval host plants that might have been overlooked. Island marble butterfly larval habitat in natural landscapes, such as that found at American Camp, is patchy at best, making it difficult to estimate the acreage of larval host plants. While the area affected by road construction was estimated to be 13 ac (5 ha), larval host plants did not occur in dense patches across the construction site. As a result of these efforts, far less suitable habitat for island marble butterflies was temporarily lost than we anticipated in 2006, and impacts to the island marble butterfly population were significantly reduced and potentially completely avoided.

Habitat restoration will continue for several years; once it is completed, we anticipate that the project will be a net benefit to the quantity and quality of island marble butterfly habitat in the project area due to early coordination with the FHA and the proactive conservation measures they implemented throughout the process. These conservation measures included the proactive removal of all larval host plants from the footprint of the project described above (so that butterflies do not lay eggs on plants bound to be destroyed) and the reseeding of larval and nectar host plant species in the disturbed areas. These measures will both increase the quantity and improve the quality of the habitat surrounding the finished project. In conclusion, road construction is not currently a threat to the island marble butterfly.

Road Maintenance

Road maintenance that destroys or negatively affects island marble butterfly larval host plants has been a concern since 2005, when it was documented as destroying occupied larval habitat on both San Juan and Lopez Islands (Miskelly and Potter 2005, p. 6). For example, in 2005, at Fisherman's Bay tombolo (a narrow beach landform that connects the mainland to an island) on Lopez Island, road maintenance crews deposited a quantity of sand on occupied larval host plants in an effort to reduce the fire hazard of the vegetation in preparation for a Fourth of July fireworks display. In addition to the deposition of sand on occupied habitat, the remainder of the site was mowed by road maintenance crews, removing all remaining larval host plants. There were no detections of the island marble butterfly in 2006, a single detection at the tombolo in 2007, and none through 2015 (Miskelly and Potter 2009, p. 21; Potter *et al.* 2011, p. 16; Potter 2015a, *in litt.*).

Roadside maintenance has resulted in the destruction of suitable habitat on Lopez Island and outside of American Camp on San Juan Island (Miskelly and Potter 2005, p. 6). Despite changes in roadside maintenance practices to address habitat loss, these protections were not implemented uniformly throughout San Juan County, nor were they implemented with the immediacy necessary to allow for widespread persistence of island marble habitat along roadsides (Potter 2016, pers. comm.). However, because roadside maintenance at American Camp will be conducted in close coordination with the Service, we conclude that whereas habitat loss associated with road maintenance activities could be one of several factors impeding successful recolonization of previously occupied habitats, it likely will have only minor impacts on the island marble butterfly, given its current distribution. We do not expect these impacts to change within American Camp in the future.

Vegetation Management

The island marble butterfly is present year round and largely stationary while in its early developmental phases, becoming most visible when it becomes a winged adult. The cryptic egg, larval, and chrysalis forms make island marble butterflies vulnerable to land management and restoration practices when those practices overlap occupied areas. For example, in 2005, NPS conducted a prescribed fire intended to restore native prairie, and this fire burned through the occupied habitat during the butterfly's developmental stage and likely killed all eggs and larvae within the affected area. Similarly, the use of herbicides for the purpose of vegetation restoration in occupied island marble butterfly habitat has been documented (Potter *et al.* 2011, p. 14). Although the direct effects of herbicides on island marble butterflies have not been studied, indiscriminate application of herbicides in areas occupied by eggs or larvae is likely to result in mortality through elimination of larval host plants and primary food resources.

Since 2010, the Service, NPS, WDFW, and other partners have cooperated closely to achieve vegetation management and restoration goals while also conserving the island marble butterfly and its habitat, including nonnative larval host plants. As a result,

vegetation management has not resulted in significant harm to island marble butterflies since 2010. The island marble butterfly is vulnerable to vegetation management or restoration practices that are improperly timed or poorly sited. However, this vulnerability does not, by itself, result in impacts to the species. Currently, vegetation management does not have a significant impact on the species because the ongoing collaboration between cooperating partners has adequately minimized the impacts of vegetation management actions at American Camp.

Agricultural Practices

Agricultural activities that include tilling of the soil have been identified as a stressor for the island marble butterfly (Potter *et al.* 2011, p. 14). Removal or destruction of habitat by conversion from an agricultural condition that provides suitable habitat (*e.g.,* old field pasture) for island marble butterfly to an agricultural condition that does not allow the island marble butterfly to complete its life cycle (*e.g.,* active cropping) has likely led to the decline of occupied island marble butterfly habitat outside of American Camp and continues to contribute to the curtailment of the former range of the species. The species has not been detected since 2012 at any previously occupied agricultural sites that have been surveyed (Potter *et al.* 2011, pp. 15–16; Potter 2012, unpublished data; Potter 2013, unpublished data; Vernon 2015b *in litt.,* entire). In addition, no new occupied sites in agricultural areas have been detected during surveys conducted in 2015 (Vernon 2015a, entire).

Practices on San Juan and Lopez Islands that require tilling the soil, such as grain farming, can promote growth of field mustard (a host plant) during the island marble butterfly's flight period if tilling takes place during fall and winter months (*e.g.,* December through February), allowing field mustard seeds in the seed bank to germinate and mature in synchrony with the needs of the island marble butterfly. Because cereal crops compete with field mustard, the array of established plants can result in a diffuse number of larval host plants at a density attractive to female island marble butterflies searching for an oviposition site. When actively cropped agricultural areas with larval host plants occur near occupied habitat, they can create an ''ecological trap'' if dispersing females lay eggs where the larvae do not have adequate time to complete their life cycle before the crop is harvested and the site is tilled for replanting the following spring (Hanson *et al.* 2009, pp. 18–19; Miskelly and Potter 2009, p. 14).

Similarly, grazing can produce an ecological trap if females lay eggs in suitable habitat that is then consumed by livestock (see *Herbivory by livestock,* below). However, since the 1980s, farming on San Juan Island has trended toward small market gardens, and large, livestock-based farms have been reduced in number (San Juan County Agricultural Resources Committee 2011, p. 16). Livestock grazing does not currently overlap any areas known to be occupied by the island marble butterfly; thus, livestock grazing is not currently a threat to the island marble butterfly, although it could become a threat in the future if the island marble butterfly were to become reestablished in areas where grazing takes place. The best available scientific and commercial information does not indicate that agricultural practices currently affect the island marble butterfly because the known population occurs on NPS lands that are not managed for agricultural use.

Plant Succession and Competition With Invasive Species

All of the known larval host plants for the island marble butterfly are annual mustard species that are dependent on open, early-successional conditions for germination (Lambert 2011, p. 149). Disturbance or active management maintains these conditions; otherwise, plant succession and invasion by weedy native and nonnative plants greatly inhibit germination and growth of larval host plants. These processes of vegetation change thus degrade and reduce the availability of habitat required by the island marble butterfly to complete its life cycle.

Succession of open, low-statured vegetation to woody plants is a natural process in the absence of anthropogenic burning or other forms of disturbance. The cessation of Native American burning in the mid-1800s resulted in the loss of prairie habitat in western Washington, including the San Juan archipelago, due to tree and shrub encroachment (Hamman *et al.* 2011, p. 317). Prairies were repeatedly burned during historical times by Native Americans for a variety of reasons, and areas used for cultivation of food plants, such as *Camassia leichtlinii* or *C. quamash* (great camas and common camas, respectively), may have been burned on an annual basis (Beckwith 2004, pp. 54–55; Boyd 1999, entire; Chappell and Kagan 2001, p. 42).

Early estimates of the size of the prairie at American Camp suggest it may have been as large as 1,500 acres (ac) (607 hectares (ha)) when the first Europeans arrived (Douglas 1853, entire). Today, the prairie is estimated to be 695 ac (281 ha) due, in part, to succession and encroachment of Douglas-fir trees (*Pseudotsuga menziesii*) and other woody vegetation (Rochefort *et al.* 2012, p. 9). Reclaiming and maintaining open prairie habitat at American Camp requires active management to control Douglas fir trees and other woody species (Rochefort *et al.* 2012, p. 4).

Two of the three known larval hosts for the island marble butterfly are introduced species that self-propagate into open, disturbed areas: Field mustard and tumble mustard. In the absence of active restoration or disturbance, other weedy plant species, as well as woody plants and trees, are likely to colonize the site, eventually outcompeting the early-successional host plants. At American Camp, where remnant prairie habitat persists, weedy species such as *Elymus repens* (quack grass), *Holcus lanatus* (velvet grass), *Cirsium arvense* (Canada thistle), and *Vicia sativa* (common vetch), among others, outcompete the larval host plants in the absence of disturbance.

Competition with nonnative species also affects host plants in sand dune habitat. The sand dunes represent a unique habitat type for the island marble butterfly that includes open, shifting sands easily colonized by the larval host plant, tumble mustard (Lambert 2011, p. 42). While Menzies' pepperweed and field mustard also occasionally occur in dune habitat, tumble mustard is the host plant that occurs there most commonly, is most robust in this habitat type, and can create continuous stands of larval host plants under optimal conditions (Lambert 2011, pp. 42, 65). When nonnative species such as Canada thistle, hairy cat's ear, and *Rumex acetosella* (sheep sorrel) colonize the sandy dune habitat, the dunes become increasingly stable and the effect is a reduction in the available germination sites for tumble mustard (Weaver and Vernon 2014, pp. 5, 9). Canada thistle has the greatest potential to negatively affect dune habitat where it is stabilizing the sand and facilitating establishment of grasses, which, in turn, displace tumble mustard (Rochefort 2010, p. 28; Weaver and Vernon 2014, p. 9).

Conditions for larval host plants continue to be degraded through plant succession and invasion throughout the range of the island marble butterfly. Loss of habitat conditions favorable for larval host plants, and thus habitat loss for the island marble butterfly, occurs in

at least two of three habitat types at American Camp, the only area where the island marble butterfly is currently known to persist (Weaver and Vernon 2014, pp. 5, 9). Loss of potentially suitable but not currently occupied habitat resulting from succession also occurs in any areas outside of American Camp where these processes take place. Due to the extremely limited numbers and range of the island marble butterfly, any further loss of habitat may lead to further decline of the species and preclude its establishment in new areas.

Herbivory

*Herbivory by deer:* Black-tailed deer (*Odocoileus hemionus columbianus*) are common in the San Juan Island archipelago. At the single occupied site where island marble butterfly is currently known to exist, black-tailed deer numbers appear to be increasing (Lambert 2014a, p. 3). Browsing deer prefer flowering plants when available, and tend to select stems on the tops or sides of plants over the stems that emerge lower on the stalk (Anderson 1994; p. 107; Lambert 2015c, *in litt.,* Thomas 2015, pers. obs.). Specifically, at study sites where island marble butterflies exist, deer browse selectively on robust larval host plants with several inflorescences of compact flower buds—the same plant characteristics preferred by female island marble butterflies as egg-laying sites (Lambert 2011, p. 103). The effect of deer browsing on larval host plants is three-fold. First, it destroys suitable egg-laying habitat; second, it stimulates rapid growth of lateral (side) stems on the plant, rendering the plant less likely to support an individual butterfly from egg to late-instar larva; and third, continual browsing of the flowering portion of the plant reduces seed production, resulting in fewer larval host plants over time (Lambert 2011, p. 10; Lambert 2014a, p. 10; Lambert 2015d, p. 17). Deer browsing, which stimulates rapid lateral stem growth, results in increased mortality when eggs are laid on the flowers of lateral stems on the larval host plants (Lambert 2011, p. 10). Immobile, early-instar larvae of island marble butterfly present on these stems are left behind as the stems grow away from them. When the larvae can no longer access the tender tissues at the developing tips of the plant that they require for survival, they die from starvation (Lambert 2011, p. 10, Lambert 2015e, *in litt.*).

The destructive effects of deer browsing on larval habitat are common where surveys have taken place throughout the known range of the island marble butterfly (Miskelly and Fleckenstein 2007, p. 6; Miskelly and Potter 2009, pp. 11, 15; Hanson *et al.* 2009, pp. 4, 13, 19–20; Hanson *et al.* 2010, pp. 21–22; Potter *et al.* 2011, pp. 5, 13; Lambert 2011, p. 104; Lambert 2014a, entire; Weaver and Vernon 2014, p. 10; Vernon and Weaver 2012, p. 9; Lambert 2015d, pp. 17–18). At American Camp, herbivory by deer has affected 95 percent of field mustard plants in some years (Lambert 2011, p. 127). Deer exclusion fencing has been erected to protect suitable habitat at American Camp to counteract the impacts of deer browsing, but the fencing has not been fully effective at excluding deer, and deer have continued to consume occupied larval host plants (see ''Habitat Conservation and Restoration,'' below).

Habitat loss attributable to herbivory by deer is ongoing and extensive throughout the current and former range of the island marble butterfly, and may be increasing, with substantial impacts to the species (Lambert 2011, pp. 85–104; Lambert 2014a, p. 3; Lambert 2015d, pp. 14–18). The effect of habitat loss due to deer herbivory is compounded by the effect of inadvertent predation when the larval host plants are occupied by eggs or larvae (see ''Incidental Predation'' under the Factor C discussion, below).

*Herbivory by livestock:* Livestock readily consume field mustard, which is often cultivated in pastures as a way to improve forage for cows and sheep (Smart *et al.* 2004, p. 1; McCartney *et al.* 2009, p. 436). There is no livestock grazing at American Camp, but livestock pastures are present on San Juan and Lopez Islands in areas that may contain suitable habitat for dispersing island marble butterflies. When cattle or sheep are present on lands where field mustard is grown, they readily consume the flower heads, stems, and stalk of the plant, destroying suitable island marble butterfly habitat (Miskelly and Potter 2009, p. 15; Hanson *et al.* 2009, p. 20; Hanson *et al.* 2010, p. 21). Like conversion of old field pastures to active cropping, cultivation of field mustard as a forage species for livestock potentially creates an ecological trap for the island marble butterfly when cultivation takes place within dispersal distance of an occupied site, and female island marble butterflies lay eggs in a patch of field mustard that is later consumed or trampled by livestock before any larvae can complete their life cycle (see ''Incidental Predation'' under Factor C, below, for further discussion). In conclusion, loss of potential habitat to livestock grazing can prevent reestablishment and persistence of suitable habitat for the species outside of American Camp. However, because livestock grazing is not allowed on American Camp where the species occurs, herbivory by livestock is not a threat currently acting on the remaining population of the species.

*Herbivory by rabbits:* The European rabbit, *Oryctolagus cuniculus,* is a common invasive species in the San Juan Islands (Hall 1977, entire; Burke Museum 2015). At American Camp, European rabbits have been established for more than a century, following their introduction to San Juan Island during the late 1800s (Couch 1929, p. 336). Grazing by European rabbits, when they proliferate, affects both vegetative structure and composition, reducing both the number and kind of plant species near their warrens (network of burrows) (Eldridge and Myers 2001, pp. 329, 335). Herbivory by European rabbits negatively affects the recruitment and establishment of larval host plants; where rabbits occur at American Camp, few larval host plants for the island marble butterfly persist due to the intense grazing pressure (Radmer 2015, *in litt.*). When larval host plants do germinate near European rabbit warrens, they are consumed before the plants are large enough for female island marble butterflies to recognize and use them.

Population monitoring of European rabbits has been conducted at American Camp from 1985 to 2015, documenting an estimated population high of approximately 1,750 rabbits in 2006, and a low of fewer than 100 in 2012. From 2009 through 2012, the population was estimated to be 100 animals or fewer, and the condition of vegetation in the affected area had ''changed dramatically'' with the reduction in rabbit grazing pressure (West 2013, pp. 2, 4). The most recent population estimate, in 2015, was approximately 500 animals, indicating that the rabbit population at American Camp is currently on the rise (West 2015, *in litt.*). If European rabbits remain uncontrolled at American Camp, their population is likely to fluctuate but continue expanding overall in the next decade, similar to the patterns documented in the past 30 years of monitoring data. The majority of the European rabbit population has been, and may continue to be, centered on a single large field near the middle of American Camp, surrounded by areas that include island marble butterfly habitat. As their population grows, we expect the impacts of European rabbits to expand, encroaching upon and destroying additional island marble butterfly habitat.

*Herbivory by brown garden snails:* The nonnative brown garden snail (*Cornu aspersum,* formerly *Helix aspersa*) is a generalist herbivore that has been reported to occur in great numbers in some areas where island marble butterfly previously occurred (*e.g.,* Pear Point Gravel Pit or 'La Farge' and San Juan Valley), where it feeds on field mustard and tumble mustard, the two most common larval host plants for the island marble butterfly (Hanson *et al.* 2010, p. 18; Potter *et al.* 2011, p. 13). State biologists removed hundreds of snails that were feeding on larval host plants at Pear Point in 2010, when the island marble butterfly still occupied this site (Potter *et al.* 2011, p. 13). The brown garden snail has extremely high reproductive potential; it matures within 2 years and can produce more than 100 eggs five or six times each year (Vernon 2015c, p. 1). The number of brown garden snails observed on San Juan Island has increased substantially between the years of 2009 and 2015 (Potter *et al.* 2011, p. 13; Vernon 2015c *in litt.,* entire).

In 2015, the brown garden snail was observed in San Juan Valley, a site formerly occupied by the island marble butterfly, and in 2016, the brown garden snail was documented in the South Beach area at American Camp by a Service biologist (Vernon 2015c *in litt.,* entire; Vernon 2015a p. 4; Reagan 2016, pers. obs.). High numbers of brown garden snails have been documented in highly disturbed sites previously occupied by island marble butterfly, and since our 2016 12-month finding (81 FR 19527; April 5, 2016) was published, they have been found invading the natural areas in American Camp currently occupied by the island marble butterfly and its host plants (Shrum 2017, *in litt.*). This most recent development indicates that brown garden snail is now well established within American Camp and the habitat currently used by the island marble butterfly, raising the likelihood that herbivory by the brown garden snail will result in habitat loss or degradation to an extent that can affect the butterfly's survival and reproductive success. While there are no documented accounts of snails directly consuming island marble butterfly eggs or larvae, the brown garden snail poses a threat to the island marble butterfly by consuming larval host plants, whether those plants are occupied or not. Therefore, herbivory by brown garden snails is detrimental to the butterfly's overall survival and reproductive success because it can both reduce the quantity of suitable host plants available and cause incidental mortality of individuals.

Storm Surges

The nearshore lagoon habitat for island marble butterfly is close to sea level. Three intermittently occupied sites are in lagoons along the northeastern edge of American Camp, where they are partially protected from tidal surges that arrive from the west. One of these lagoons had the highest relative encounter rate of all monitored transects at American Camp in 2015, and raw counts at this site represented roughly 50 percent of the adult island marble butterflies recorded during annual monitoring for that year. Storm surges, attributable to the combined forces of high tides and high-wind storm events, inundate these low-lying lagoon areas intermittently, as evidenced by the deposition of driftwood logs along the shoreline. These events have occurred with some regularity through time, but the most recent episodes of inundation have been particularly destructive of nearshore island marble butterfly habitat. A storm surge event in the winter of 2006 resulted in the deposition of gravel substrate and driftwood over an island marble butterfly research plot where the one native larval host plant, Menzies' pepperweed, had been established, reducing the number of plants by more than 50 percent (Lambert 2011, pp. 145–146). This same storm surge likely destroyed any butterflies that were overwintering in nearshore habitat as chrysalids and had a local population-level impact; low numbers of individual island marble butterflies, eggs, and larvae were detected at the site for several years following the event (Lambert 2011, p. 99; Lambert 2015f, *in litt.*).

The frequency of storm surges large enough to inundate the lagoons and destroy island marble butterfly habitat has previously been relatively low, but since 2006, at least one storm surge event (in 2009) was strong enough to inundate the low-lying habitat (Whitman and MacLennan 2015, *in litt.*). The frequency of these events is expected to increase with sea-level rise associated with climate change (see Factor E discussion, below). In turn, we anticipate a concomitant increase in the potential for destruction of low-lying habitat for the island marble butterfly—approximately 15 to 20 percent of the species' habitat in American Camp (Lambert 2011, p. 145; Adeslman *et al.* 2012, pp. 79–86; Whitman and MacLennan 2015, *in litt.;* NOAA 2015a, entire; NOAA 2015b, entire).

The Menzies' pepperweed (the native host plant) occurs almost exclusively in the low-lying nearshore habitat, and female island marble butterflies have been observed to deposit eggs on only a single species of larval host plant at any one site. (Despite close observations of ovipositing females, researchers have not observed females depositing eggs on more than one type of larval host plant at any one site.) Therefore, if this habitat type is lost, an unknown proportion of diversity—in habitat use or adaptive potential—in the island marble butterfly could be lost as well. Furthermore, low-lying habitat comprises an estimated 15 to 20 percent of habitat for the species at American Camp, a considerable proportion of the restricted range of the species. Due to the small size of the remaining known population of the island marble butterfly and the importance of this low-lying habitat demonstrated by high encounter rates during surveys, loss or degradation of this habitat will likely lead to a further decline of the species.

Habitat Conservation and Restoration

San Juan Island National Historical Park has been implementing conservation measures for the island marble butterfly since shortly after its rediscovery in 1998. From 2003 through 2006, NPS created experimental prairie disturbances and vegetation plots to better understand how to manage the prairie and create island marble butterfly habitat. This work resulted in recommendations for the best method of reducing the cover of invasive grasses by using prescribed fire followed by herbicide treatment (Lambert 2006, p. 110). However, the work was not reproduced at larger scales, nor was it continued in ways sufficient to maintain adequate habitat on the landscape over time.

In 2018, we renewed a conservation agreement with NPS for the island marble butterfly that contained several conservation actions that will be applied to manage habitat for the species into the future. The renewed agreement, which was signed in December 2018, committed NPS to: (1) Restore, where needed, habitat for island marble butterfly, as jointly agreed; and (2) avoid impacts to island marble butterflies, eggs, larvae, and host plants during the implementation of all NPS management actions by working in habitat that was not occupied by island marble butterflies. All vegetation treatment will be conducted in the fall after the island marble butterfly has entered diapause. We expect the history of collaborative conservation of the island marble butterfly by NPS and the

Service to continue for the foreseeable future.

From 2007 through 2011, NPS managed encroaching plant species using multiple methods to open up areas where larval host plants could naturally germinate from the seed bank (NPS 2013, pp. 7–11). NPS also planted more than 100,000 native grass plugs in mechanically treated areas (NPS 2013, p. 7), which improved the native composition of the prairie grassland features but did not result in increased cover of the larval host plants needed to support the island marble butterfly. The Service continued to work collaboratively with NPS to develop annual work plans each year from 2013 through 2016; these work plans are addenda to the 2006 conservation agreement for the island marble butterfly. The goals and actions identified in the work plans have changed, sometimes annually, in response to new information, adaptive management needs, available funding, and other concerns. The 2013–2016 work plans identified and enacted several conservation actions to address threats related to the destruction, modification, and curtailment of island marble butterfly habitat at American Camp. Prescribed fire, deer fencing of essential habitat, management of invasive species, and experimental habitat restoration were all implemented per annual work plans during this period.

These work plans initially included the use of prescribed fire in small blocks (up to one acre) to disturb grassland habitat in an effort to encourage larval host plant patches to establish from the seed bank. These prescribed fire events resulted in very low germination of the larval host plants, leading NPS to conclude that few larval host plant seeds persist in the seed bank. In response, later annual work plans recommended seeding the larval host plant species after a prescribed burn. The 2016 annual work plan also included recommendations for the development of novel methods for creating island marble butterfly habitat.

In 2013, the Service funded the installation of deer exclusion fencing at American Camp in an effort to reduce deer herbivory on larval host plants (and the incidental consumption of eggs and larvae; see discussion under Factor E, below) and to increase suitable oviposition sites. Deer fencing was included in each year's annual work plan since 2013, and continues to be employed as an exclusion technique. Approximately 23 acres have been fenced since deer exclusion efforts began in 2013 (Shrum 2015a, *in litt.*).

The various forms of deer exclusion fencing that have been used have resulted in mixed success in preventing deer from consuming larval host plants. For example, in 2015, electrified fencing alone proved ineffective at excluding deer at three of five research sites at American Camp (Lambert 2015d, p. 17). However, electric and wire-mesh fencing combined have reduced deer herbivory on larval host plants when compared to years when exclusion fencing was not employed (Lambert 2015d, p. 17). In one large expanse of habitat at American Camp, the distribution of field mustard was essentially limited to the fenced areas in 2015, although environmental conditions shifted substantively in 2016, allowing for a large flush of persistent field mustard beyond the fenced areas (Lambert 2014a, p. 23; Lambert 2015a, p. 5; Lambert 2015d, p. 17; Lambert 2016a, p. 35). Despite these challenges, deer exclusion fencing remains an important tool for protecting island marble butterfly habitat, especially early in the flight season when we expect survivorship to be the highest (Lambert 2015d, p. 19). For example, in 2016 (after the publication of our 12-month finding on April 5, 2016 (81 FR 19527)), deer were completely excluded from research sites at American Camp for the first time, resulting in one-quarter acre of restored habitat for host plants, and increased survival in island marble butterflies on field mustard than in previous years (Lambert 2016a, p. 11).

The annual work plans have also included efforts to control weedy native and nonnative species and encroaching woody plants. Specifically, NPS has removed hundreds of Douglas fir trees and dozens of acres of *Rubus armeniacus* (Himalayan blackberry), *R. laciniatus* (blackberry), *Symphoricarpos albus* (snowberry), and *Crataegus monogyna* (one-seeded hawthorn) from the American Camp prairie. These actions have slowed the invasion of native and nonnative species and encroachment by woody plants and have created early-successional conditions that likely provided some nectaring habitat for the island marble butterfly. However, few larval host plants germinated from the seed bank in the areas cleared of encroaching plants. Another area of focus under the work plan for controlling invasive species is herbicide treatment of Canada thistle in the dunes.

NPS, in collaboration with the Service and other partners, has supported experimental research into the active establishment of island marble butterfly habitat since 2003. In 2014, an experimental approach for establishing oviposition and larval habitat was proposed. The Service, in coordination with NPS, WDFW, and two local island conservation organizations (San Juan Preservation Trust (SJPT) and San Juan County Land Bank (SJCLB)), developed a plan to determine whether habitat patches for the island marble butterfly could be developed in a way that could be scaled up efficiently in a landscape context (Lambert 2014b, entire). Thirty habitat patches were created on park property at American Camp between 2014 and 2016, and 10 more will be created in 2017 (Lambert 2016a, p. 59). Early results from this work indicate that habitat can be created quickly and that island marble butterflies readily use these patches for egg laying and larval development if larval host plants germinate in time to provide oviposition sites for early-flying butterflies (Lambert 2015d, pp. 9–12).

Each year since 2013, NPS has collected and reared a small number of eggs and larvae in a captive-rearing program (see discussion under Factor C, below, for more information). In 2015, the captive individuals emerged from diapause much later than the wild population. Despite the use of the experimental plots for oviposition by these late-flying, captive-reared females, none of the eggs and larvae tracked in the experimental plots survived. The high mortality was attributed to increased predation pressure by late-season spiders and wasps (Lambert 2015d, p. 14) (see ''Direct Predation'' under Factor C, below). Results of captive-rearing were better in 2016, when captive-reared island marble butterflies emerged in synchrony with the wild population. Survivorship from egg to fifth instar larvae was also higher in the experimental plots in 2016; three percent of the tracked larvae survived to the fifth instar, which is a relatively high survival rate for the island marble butterfly.

The Service, in coordination with NPS, supports habitat conservation efforts by funding local conservation groups to establish habitat patches on three conserved sites across the former range of the island marble butterfly. Two of these experimental habitat patches were established outside of American Camp in 2015 and one in 2016. Each experimental patch has been fully fenced to exclude herbivores (primarily deer) and allow the larval host plants to grow without herbivory pressure (also see Factor C, ''Incidental Predation,'' below).

Education and Outreach

In 2009, the Service provided funding to WDFW for the creation of a species fact sheet and informational handout for the public about the biology and conservation needs of the island marble butterfly. This pamphlet provided outreach to interested parties and increased the awareness of the public about the decline of the island marble butterfly. The pamphlet provided basic information about how to protect and support habitat essential to the island marble butterfly. In 2011, the Service collaborated with NPS, WDFW, researchers from the University of Washington, and the Center for Natural Lands Management to reach out to the community in a local Island Prairie Educational Symposium to present information on current approaches to prairie management. Information gained through years of prairie conservation efforts in other northern and southern Puget Sound prairie landscapes was shared with the local island community. Information about the island marble butterfly and the educational materials developed were well distributed within the community; however, this effort did not lead to the protection or restoration of habitat adequate to ameliorate the threat of habitat loss for the island marble butterfly. Despite considerable advances in habitat restoration, new habitat establishment, captive rearing, herbivore exclusion, and outreach and education, the number of individual island marble butterflies remains small in the single remaining population.

Summary of Factor A

Habitat supporting the remaining population at American Camp is protected from development and agriculture, but is exposed to the threats of plant succession and invasive plant species; herbivory by deer, rabbits, and brown garden snails; and storm surges. Habitat loss is likely a major factor impeding the recolonization of areas outside of American Camp. Outside of American Camp, removal of larval host plants by mowing; roadside maintenance; road, residential, or urban development; certain agricultural practices (such as tilling, cropping, and grazing); and landscaping activities has substantially reduced the amount of habitat available for recolonization by the island marble butterfly either temporarily (*e.g.,* mowing, tilling, cropping, or grazing) or permanently (*e.g.,* road, residential, and urban development) since the island marble butterfly was rediscovered (Miskelly and Fleckenstein 2007, p. 6; Miskelly and Potter 2009, p. 9; Hanson *et al.* 2009, p. 18; Vernon 2015b *in litt.,* p. 5). This habitat removal is a primary factor in the loss of all the remaining populations of this species outside of American Camp since 2006.

Since 2011, NPS has made substantial and sustained efforts to expand island marble butterfly habitat and to improve the composition and structure of the plant community to become more suitable for the island marble butterfly. Due to challenges in establishing suitable habitat and protecting it from the threats described above, only a few acres of high-quality habitat for island marble butterfly have been restored on the American Camp landscape. Many more acres within American Camp have been improved by restoration actions or protected from deer herbivory, but are not yet considered high quality or fully secure from herbivory by deer. To date, these efforts may have resulted in a small positive response in the island marble butterfly population, as evidenced by the 3 percent increase in survivorship from the fourth to fifth instar in 2016. However, the number of those individuals that will successfully pupate and emerge as winged adults in the spring remains to be seen. Conservation efforts by NPS have also resulted in significant contributions to our understanding of island marble butterfly habitat and threats to that habitat. Outside of American Camp, the only conservation efforts that specifically create habitat for the species are the small island marble butterfly habitat plots established by SJPT and SJCLB. These efforts will be crucial to establishing new populations of island marble butterfly in the future, but the achievement is too recent for their effectiveness to be evaluated, especially in the context of the extensive, ongoing habitat loss from changing land use, changing agricultural practices, and other factors that inhibit recolonization by island marble butterflies outside of American Camp.

Despite successful habitat restoration experiments, continued use of deer exclusion fencing, and the removal of woody plants and nonnative and native weedy species, the increase in the total area of currently suitable habitat within American Camp has not been fully quantified, although it remains small (on the scale of quarters of acres). Despite these minor gains in habitat as a result of restoration since we published our 12-month finding on April 5, 2016 (81 FR 19527), the range of the species—the number of sites within American Camp where it is observed—has continued to contract, and the number of island marble butterflies observed each year remains low. Conservation measures will need to continue into the future, with monitoring to assess their long-term value to the island marble butterfly. Until measureable changes to the island marble butterfly population have been documented, it will be difficult to determine whether the implemented measures are effecting positive change in the status of the island marble butterfly. Based on the analysis above, we conclude that plant succession and competition with invasive species, herbivory by deer and brown garden snails, and storm surges are likely to have population-level impacts on the island marble butterfly.

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

Overutilization for Commercial or Recreational Purposes

Under NPS regulations, collection of living or dead wildlife, fish, or plants, or products thereof, is prohibited on lands under the jurisdiction of NPS without a permit (36 CFR 2.1(a)(1)(i) and (a)(1)(ii)), but there are no State or County regulations that prohibit recreational collection of the island marble butterfly at this time.

Rare butterflies and moths are highly prized by collectors, and an international trade exists in specimens for both live and decorative markets, as well as the specialist trade that supplies researchers (Collins and Morris 1985, pp. 155–179; Morris *et al.* 1991, pp. 332–334; Rieunier and Associates 2013, entire). Before the island marble butterfly was formally described, collectors may have exerted little pressure on the taxon because it was unknown and because it occurs in remote islands that had been little-surveyed for butterflies. Following formal description of the species in 2001, at least three inquiries about potential for collection were made to WDFW, which is responsible for managing fish and wildlife in the State of Washington, and one with NPS at American Camp, which requires a permit for the collection of any plant or animal from park property (Reagan 2015, *in litt.*). WDFW has discouraged collection, and NPS rejected the single permit request for collection it received (Reagan 2015, *in litt.;* Weaver 2015a, *in litt.*). In addition to these permit requests, we are aware of one specimen of the island marble butterfly purportedly being listed for sale on a website devoted to trade in butterfly species (Nagano 2015, pers. obs.), although the origin and authenticity of this specimen could not be verified.

Even limited collection of butterfly species with small populations could have deleterious effects on the reproductive success and genetic variability within those populations and could thus contribute eventually to extinction or local extirpation (Singer and Wedlake 1981, entire; Gall 1984, entire). Capture and removal of females dispersing from a population also can reduce the probability that new populations will be established or that metapopulation structure will be developed or maintained. (A metapopulation is a group of spatially separated populations that interact when individual members move from one population to another.) Collectors pose a potential threat because they may not be aware of other collection activities, and are unlikely to know, and may not care, whether or not they are depleting numbers below the threshold necessary for long-term persistence of populations and the species (Martinez 1999, *in litt.*). This is especially true if collectors lack adequate biological training or if they visit a collection area for only a short period of time (Collins and Morris 1985, p. 165). In addition, collectors often target adult individuals in perfect condition, including females that have not yet mated or had the opportunity to lay all of their eggs. Some collectors go to the length of collecting butterfly eggs in order to rear perfect specimens (USDOJ 1995, p. 2).

Collection of the island marble butterfly, which is prohibited on NPS lands, could potentially occur without detection because occupied areas are not continuously patrolled and adult butterflies do move outside of protected areas onto adjoining lands where collection is not currently prohibited. Consequently, the potential for collection of adult island marble butterflies, and especially surreptitious collection of early stages (eggs, larvae, and pupae) exists, and such collection could go undetected, despite the protection provided on NPS lands. Taking into consideration the small remaining population, illegal collection could have strong detrimental effects on the known population, were it to occur. However, no illegal collection efforts for this species have been documented to date.

Scientific Overutilization

The widespread surveys that took place in the period 2005–2012 included capturing and releasing butterflies when necessary for positive identification, as specified in Miskelly and Fleckenstein 2007 (p. 4). Although a limited number of individuals may have been injured or killed during handling, no data exist on the number of individuals captured, injured, or killed. To our knowledge, there have been three documented instances of island marble butterfly collection or handling for scientific purposes since the rediscovery of the species. In 2005, two male specimens were collected by WDFW surveyors as vouchers to document newly discovered island marble sites (Miskelly and Potter 2005, pp. 4, 5; Potter 2016, *in litt.*). In 2008, a mark-release-recapture (MRR) study of the species' demography involved the capture and marking of 97 individual adult island marble butterflies and recapture of 56 butterflies across four separate sites, and some individuals were recaptured more than once (Peterson 2009, entire; Peterson 2010, entire). A single individual butterfly was collected as a voucher specimen under a WDFW scientific collection permit in 2008 for the MRR study (Potter 2016, *in litt.*). The other scientific use of the island marble butterfly of which the Service is aware took place in 2013, when two adult butterflies were collected by WDFW for a genetic assessment of the island marble butterfly, the results of which were inconclusive (Potter 2015b, *in litt.*).

The handling of adult butterflies for scientific purposes has been evaluated for effects on populations elsewhere in western North America (Singer and Wedlake 1981; Gall 1984). Murphy (1988, p. 236) reported that MRR work by others resulted in about 10 percent mortality to the endangered mission blue butterfly (*Icaricia icarioides missionensis*); however, studies by Singer and Wedlake (1981, entire) with other butterflies resulted in less than 2 percent of the marked butterflies being recaptured, suggesting that mortality from handling the butterflies may have been a factor.

Peterson's 2008 MRR study may have resulted in unintended injury or mortality to island marble butterfly individuals, but we have no evidence to suggest that the study resulted in population- or species-level effects. Surveyors were unable to recapture 38 percent of the handled individuals during the short duration of this research, but whether this research directly increased mortality for the handled individuals is unknown. Several outcomes could have led to this low recapture rate: The butterflies may have fully matured after completing their life cycle and died during this period; they may have been injured during handling and died following release; they may have become more susceptible to other stressors after handling (*e.g.,* predation); or they may have simply eluded recapture. Based on the relative encounter rate for the island marble butterfly that was measured during subsequent years (see ''Abundance,'' above, for additional information), this research does not appear to have contributed to a constriction in the range of the species or a decline in the abundance of individuals.

The probability of numerous future collections of live island marble butterflies for research purposes is low because all researchers who study the island marble butterfly work collaboratively with the Service, NPS, and WDFW, and are aware of the very low and declining number of individual butterflies. Any research proposal requiring the collection and removal of live island marble butterflies from the population is carefully reviewed to determine whether the conservation benefit to the species outweighs the loss of individuals.

Summary of Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

We continue to find that overutilization does not have a population-level impact on the island marble butterfly for the following reasons: The lack of evidence of commercial or recreational collection of island marble butterflies; our conclusion that handling of the species during the 2008 MRR study did not result in documented negative effects to island marble butterfly populations; and the small number of individuals collected for genetic evaluation.

*Factor C. Disease or Predation*

Disease

There is a single report of disease affecting the island marble butterfly (Miskelly 2004, p. 35). We discussed this observation with the author and discovered that this was an isolated event and that the mortality was likely attributable to causes other than disease (Miskelly 2015a, *in litt.*). Therefore, there is no evidence to suggest that disease is currently a threat to the island marble butterfly.

Direct Predation

Predation is a risk for island marble butterflies during all stages of their life cycle, although mortality is highest during the earliest stages of life: Egg to first instar (Lambert 2011, p. 92). A study conducted from 2005 through 2008 on survivorship of the island marble butterfly identified high levels of mortality attributable to predation by spiders and, to a lesser extent, paper

wasps (*Polistes* spp.) (Lambert 2011, p. 117). Two species of spider, *Pardosa distincta* and *Zelotes puritanus,* both native to Washington State, prey on adult island marble butterflies and may also account for a large proportion of the predation on eggs and larvae (Lambert 2011, p. 100; Crawford 2015, *in litt.*). The paper wasp common to American Camp is the nonnative *Polistes dominula* (Miskelly 2015b, *in litt.*), discovered in the State of Washington in 1998 (Landolt and Antonelli 1999, entire).

Direct predation of eggs and larvae was the greatest source of mortality in this 4-year study, affecting 47 percent of all individuals tracked (Lambert 2011, p. 99). Mortality levels attributable to direct predation varied depending on the larval host plant used, with almost 80 percent mortality attributable to direct predation on Menzies' pepperweed and approximately 40 percent on field mustard (Lambert 2011, p. 117). These differences are likely attributable to variation in the structure and growth form of the larval host plants that can facilitate access by predators (Lambert 2011, p. 100).

In addition, predation on island marble butterfly larvae by spiders and wasps increases as the season advances (Lambert 2015d, p. 14). This increase is likely because: (a) As spiders mature, they are more effective at locating and consuming the larvae; and (b) wasps increase in number as the season progresses (Reeve 1991, pp. 104–106), and the predation pressure they exert on their prey species increases with these increased numbers. Later emergence of island marble butterflies has been observed to correlate closely with increased predation pressure on island marble larvae; in the 2015 field season, when emergence was notably late, none of the 329 individuals tracked from egg through their larval development survived to form a chrysalis (Lambert 2015d, p. 14) (see *Cumulative Effects,* below, for additional discussion). Predation on adult island marble butterflies by birds and spiders has been observed anecdotally, although no effort has been made to quantify mortality attributable to predation on adults (Lambert 2011, p. 90; Vernon and Weaver 2012, p. 10). We found no evidence to suggest that predation by small mammals or other vertebrate predators presents a threat.

Direct predation of island marble butterfly eggs and larvae is ongoing where the species occurs (at American Camp) and is expected to continue into the future. Direct predation of eggs and larvae is a significant cause of mortality for the island marble butterfly, consistently accounting for more than 45 percent of deaths for tracked individuals (Lambert 2011, p. 99; Lambert 2015d, p. 14). Native spiders are responsible for a significant proportion of observed predation, and the island marble butterfly presumably coexisted for hundreds or thousands of years with these spiders. However, the small and declining numbers of island marble butterflies, under pressure from habitat loss and other threats, now cannot tolerate what may once have been a sustainable rate of natural predation. The threat of direct predation affects the island marble butterfly at the individual, population, and species levels (see Factor E discussion, below, for more information).

Incidental Predation

Incidental predation by browsing black-tailed deer also is a common source of mortality for island marble butterfly eggs and larvae (Lambert 2011, pp. 93–97; Lambert 2015d, pp. 17–18). As discussed above under Factor A, female island marble butterflies select oviposition sites on or near the tips of the inflorescences of the larval host plants, which is the same portion of the plant that deer prefer to browse (Lambert 2015c, *in litt.*). Similar to rates of direct predation, each species of larval host plant is correlated with differing levels of mortality attributable to deer browse. Incidental predation by deer was highest on field mustard, which accounted for slightly more than 40 percent of mortality tracked for this larval host plant over the course of the 4-year study (Lambert 2011, p. 117). Mortality attributable to deer browsing was less than 10 percent for both Menzies' pepperweed and tumble mustard (Lambert 2011, p. 117).

In nearly every report provided to the Service, deer browsing has been identified as particularly problematic for the island marble butterfly at American Camp as well as throughout the species' former range, where browsing deer continue to degrade the butterfly's habitat (Miskelly and Fleckenstein 2007, p. 6; Miskelly and Potter 2009, pp. 11, 15; Hanson *et al.* 2009, pp. 4, 13, 20; Hanson *et al.* 2010, pp. 21–22; Potter *et al.* 2011, pp. 5, 13; Lambert 2011, p. 104; Lambert 2014a, entire; Vernon and Weaver 2012, p. 9; Weaver and Vernon 2014, p. 10; Lambert 2014a, p. 3; Lambert 2015d, pp. 17–18; Vernon 2015a, p. 12). Incidental predation by deer is a significant cause of mortality of the island marble butterfly at American Camp (Lambert 2014a, p. 3). Incidental predation by deer is a threat of increasing severity within American Camp, where it affects the island marble butterfly at the individual, population, and species level; outside American Camp, this source of habitat degradation is ongoing throughout the formerly occupied range of the species because of the apparent increase in deer numbers throughout the San Juan Islands (Milner 2015, *in litt.;* McCutchen 2016, *in litt.*).

Although incidental predation by other herbivores has not been as rigorously quantified as it has been for black-tailed deer, the negative effects of livestock on occupied larval host plants cannot be discounted (Miskelly and Fleckenstein 2007, p. 5; Miskelly and Potter 2009, pp. 9, 11, 15; Hanson *et al.* 2009, pp. 18, 20; Hanson *et al.* 2010, pp. 5, 16, 21; Potter *et al.* 2011, p. 13; Vernon 2015c *in litt.,* entire). Incidental predation by livestock, brown garden snails, and European rabbits is possible where the range of the island marble butterfly overlaps with these species. However, in the case of European rabbits, only two documented instances exist of rabbits consuming plants with eggs or larva on them (Lambert 2015d, p. 17). Suitable island marble butterfly larval habitat is closely monitored at American Camp, so while consumption of occupied larval host plants by European rabbits does occasionally take place, it is currently rare, is geographically circumscribed, and does not have a population-level impact to the species. The existing information does not indicate that incidental predation by livestock, brown garden snails, and European rabbits is occurring at a rate that currently causes population-level impacts to the island marble butterfly.

Conservation Efforts To Reduce Disease or Predation

As described above under ''Habitat Conservation and Restoration,'' the Service and NPS installed deer exclusion fencing in American Camp from 2013 to 2016 to reduce browsing by black-tailed deer on the larval host plants field mustard and tumble mustard. The fencing was placed to reduce incidental predation, as well, by protecting areas where larval host plants are most likely to be occupied by island marble butterfly eggs and larvae.

The Service has supported ongoing research into the effects of deer exclusion fencing on island marble butterfly survival. The first deer exclusion fencing was erected in three locations of American Camp in 2013. Areas immediately adjacent to the fenced habitat with similar structure, quality, and connectivity as the fenced habitat were left unfenced as control plots. First-year monitoring of deer

exclusion areas showed that 74 percent of eggs tracked survived to first instar in the fenced area compared with 41 percent survival to first instar in the control plots (Lambert 2014a, p. 6). In 2014, additional deer exclusion fencing was installed, and different types of exclusion fencing were compared. Wire-mesh fencing was found to be effective at preventing incidental predation by deer, while electric fencing was determined to be largely ineffective at excluding deer, although mortality from deer in electric-fenced areas was lower than in previous years (Lambert 2015d, pp. 17–18). Deer exclusion fencing has emerged as an important tool for protecting eggs and early instar larvae from consumption by deer, especially early in the flight season when survivorship is expected to be the highest (Lambert 2015d, p. 19; Lambert 2016a, pp. 3, 27).

Summary of Disease and Predation

The best available information does not indicate that disease is a threat to the island marble butterfly. However, a substantial amount of research completed since 2006 clearly documents the effects of predation. Direct and incidental predation rates, together, account for the vast majority of the recorded deaths of island marble butterfly eggs and larvae at American Camp. Although deer exclusion fencing at American Camp has been an important tool for reducing mortality due to incidental consumption since 2013, the number of island marble butterflies observed continues to be low. No conservation measures have yet been identified to address the threat of predation from paper wasps and spiders. Taken together, all forms of predation have pervasive, population-level impacts on the island marble butterfly.

*Factor D. The Inadequacy of Existing Regulatory Mechanisms*

Under this factor, we examine whether existing regulatory mechanisms ameliorate or exacerbate the threats to the species discussed under the other factors. Section 4(b)(1)(A) of the Act requires the Service to take into account ''those efforts, if any, being made by any State or foreign nation, or any political subdivision of a State or foreign nation, to protect such species . . . .'' In relation to Factor D under the Act, we interpret this language to require the Service to consider relevant Federal, State, and tribal laws, regulations, and other such mechanisms that may ameliorate or exacerbate any of the threats we describe in threat analyses under the other four factors, or otherwise enhance conservation of the species. We give strongest weight to statutes and their implementing regulations and to management direction that stems from those laws and regulations. An example would be State governmental actions enforced under a State statute or constitution, or Federal action under statute.

Federal Laws and Regulations

American Camp, as part of San Juan Island National Historical Park, is managed under the National Park Service's Organic Act and implementing regulations. The National Park Service Organic Act of 1916, as amended (54 U.S.C. 100101 *et seq.*), states that the National Park Service ''shall promote and regulate the use of the National Park System . . . to conserve the scenery, natural and historic objects, and wild life in the System units and to provide for the enjoyment of the scenery, natural and historic objects, and wild life in such manner and by such means as will leave them unimpaired for the enjoyment of future generations'' (54 U.S.C. 100101(a)). Further, 36 CFR 2.1(a)(1)(i) and (a)(1)(ii) specifically prohibit collection of living or dead wildlife, fish, or plants, or parts or products thereof, on lands under NPS jurisdiction. This prohibition on collection extends to the island marble butterfly where it exists on NPS-managed lands. In addition, under the general management plan for San Juan Island National Historical Park, NPS is required to follow the elements of the conservation agreement (NPS 2008, p. 73). This includes restoring native grassland ecosystem components at American Camp, avoiding management actions that would destroy host plants, avoiding vegetation treatments in island marble butterfly habitat when early life-stages are likely to be present, and implementing a monitoring plan for the species (Pyle 2006, pp. 10–12).

The Bureau of Land Management (BLM) owns the 27-ac (11-ha) Cattle Point Lighthouse property east of American Camp and Cattle Point Natural Resource Conservation Area. This site was formerly occupied by island marble butterflies, is proximal to occupied habitat on American Camp, and contains suitable habitat for the species. The Cattle Point Lighthouse property is part of the San Juan Islands National Monument established by Presidential proclamation on March 25, 2013, under the American Antiquities Act of 1906 (54 U.S.C. 320301 *et seq.*). This proclamation specifically identifies the island marble butterfly and states that protection of the lands in the San Juan Islands will maintain their historical and cultural significance and enhance their unique and varied natural and scientific resources, for the benefit of all Americans. Under this proclamation, the monument is being managed as part of the National Landscape Conservation System, requiring that the land be managed ''in a manner that protects the values for which the components of the system were designated'' (16 U.S.C. 7202(c)(2)). The first resource management plan for the National Monument is still in development, so specific regulatory protections for the species and its habitat have not yet been established. Nevertheless, anthropogenic threats at this site are unlikely given its current designation as a National Monument.

The island marble butterfly is also listed as a sensitive species for the purposes of the BLM's Sensitive Species Policy (BLM 2008, p. 3; USFS 2015, entire). This policy directs the BLM to initiate conservation measures that reduce or eliminate threats and minimize the likelihood of listing under the Act, but until the resource management plan for the National Monument is complete, the BLM has not identified the required conservation measures. At this time, it is unclear what protections, if any, these existing regulatory mechanisms will confer to the island marble butterfly.

State Laws and Regulations

State laws and regulations that apply across San Juan and Lopez Islands include provisions to limit collection of butterflies for scientific purposes, but no specific protections to island marble butterfly habitats. The island marble butterfly is currently classified as a candidate species by the State of Washington (WDFW 2015a, p. 2). Candidates are those species considered by Washington State to be sensitive and potentially in need of protection through the process of designation as endangered, following procedures established by the Washington Administrative Code (WAC) (220–610–110). However, candidates are not afforded any specific regulatory protections (Potter 2015c, *in litt.*). The island marble butterfly is afforded limited State regulatory protections from overcollection as the State of Washington requires a scientific collection permit for handling or collecting any fish, or wildlife, their nests, or eggs for scientific purposes (WAC 220–200–150; Revised Code of Washington (RCW) 77.32.240).

The island marble butterfly was identified as critically imperiled in the Washington State Comprehensive Wildlife Conservation Strategy (WDFW

2005, pp. 219, 314, 336–337). Since 2005, WDFW has retired the Comprehensive Wildlife Conservation Strategy and incorporated it into Washington's State Wildlife Action Plan (SWAP). Although the SWAP addresses the island marble butterfly's conservation status, identifies it as a ''species of greatest conservation need,'' and recommends conservation actions (WDFW 2015b, p. 3–39), the SWAP is not a regulatory mechanism.

WDNR owns the Cattle Point Natural Resources Conservation Area consisting of 112 acres directly to the east of American Camp, a portion of which provides potentially suitable habitat for island marble butterflies. Natural resource conservation areas are managed to protect outstanding examples of native ecosystems; habitat for endangered, threatened, and sensitive plants and animals; and scenic landscapes. Removal of any plants or soil is prohibited unless written permission is obtained from WDNR (WAC 332–52–115).

Local Laws and Regulations

American Camp is the only area known to be occupied by the island marble butterfly, and because the area is managed by NPS under the National Park Service's Organic Act and implementing regulations, local laws and regulations governing land use do not apply. However, the following local laws and regulations may provide some benefit to the island marble butterfly, should the species expand its range or recolonize suitable habitat areas outside American Camp.

The Washington State Growth Management Act of 1990 (GMA) requires all jurisdictions in the State to designate and protect critical areas (RCW 36.70A). The State defines five broad categories of critical areas, including: (1) Wetlands; (2) areas with a critical recharging effect on aquifers used for potable water; (3) fish and wildlife habitat conservation areas; (4) frequently flooded areas; and (5) geologically hazardous areas (RCW 36.70A.030). The upland prairie habitat type that island marble butterflies may use, but are not restricted to, is considered both a fish and wildlife habitat conservation area and an area with a critical recharging effect on aquifers under the GMA. Identification as a fish and wildlife habitat conservation area mandates that each county within Washington State preserve and protect the fish and wildlife associated with each habitat conservation area by developing policies and regulations to protect the functions and values of critical areas. Within counties, the mandate to protect and regulate critical areas applies to all unincorporated areas. In addition, incorporated cities within counties are required to address critical areas within their ''urban growth area'' (UGA; the area in which urban growth is encouraged by the municipal government) independently. The only incorporated city within San Juan County is Friday Harbor, which is located outside of NPS-owned land on San Juan Island and outside of habitat currently occupied by the island marble butterfly. The Friday Harbor Comprehensive Plan provides no specific protections for animal species that are not listed as endangered or threatened under State or Federal law; however, Upland Category III may confer some benefits to the species based on conservation status of the species.

San Juan County encompasses the range of the island marble butterfly. The County regulates critical areas through a Critical Areas Ordinance, which mandates protection for species listed under the Act through San Juan County Critical Areas Ordinance (section 18.30.110, Fish and Wildlife Habitat Conservation Areas). The Critical Areas Ordinance also identifies species of local importance, including the island marble butterfly (San Juan County 2018, p. 34), and provides protection for the island marble butterfly by requiring that development applications for areas determined to be occupied by the island marble butterfly develop a habitat management plan consistent with County recommendations for the conservation of the island marble butterfly prior to permitting. The San Juan County Comprehensive Plan recommends that property owners with occupied island marble butterfly habitat avoid the use of insecticides and herbicides, limit grazing and agricultural disturbance, and protect areas with larval host plants during the development process (San Juan County 2018, pp. 51, 56). However, the conservation recommendations are not comprehensive enough to prevent local extirpation of the island marble butterfly because they do not address all of the stressors influencing its persistence (*e.g.,* landscaping, permanent landscape conversion, mowing, etc.), as evidenced by the complete loss of occupied island marble butterfly habitat within areas developed since 2006 (see ''Development,'' above, under Factor A).

In addition, the San Juan County Comprehensive Plan concentrates urban density within UGAs in order to preserve the rural nature of the San Juan archipelago (San Juan County 2010, entire). We considered the plan in our 2006 12-month finding (71 FR 66292; November 14, 2006), concluding that the restriction of high-density development would lead to the maintenance of suitable habitat on Lopez and San Juan Islands. While preserving the low-density agricultural environment on San Juan and Lopez Islands partially prevents the direct conversion of suitable island marble butterfly habitat to other incompatible uses (*e.g.,* impermeable surfaces, manicured lawns, residential housing), new evidence indicates that despite these planning efforts, island marble butterfly habitat has been severely curtailed rangewide since 2006, due to a variety of factors (*e.g.,* mowing, landscaping, or removal of host plants) (Miskelly and Potter 2005, p. 6; Miskelly and Fleckenstein 2007, p. 6; Potter 2015a, *in litt.*).

Summary of Existing Regulatory Mechanisms

The island marble butterfly and its host plant are afforded substantial regulatory protections from anthropogenic threats at American Camp through NPS regulations and the current general management plan for San Juan Island National Historical Park. In addition, State- and County-level regulatory mechanisms that influence development and zoning on San Juan and Lopez Islands are generally beneficial to suitable habitat that could be occupied by the island marble butterfly in the future. However, this impressive suite of regulatory mechanisms has not prevented the extirpation of other populations, and the species remains in precarious shape with only one remaining known location. Therefore, we conclude that the existing Federal, State, and local regulatory mechanisms provide some benefits to the island marble butterfly and its habitat, but do not sufficiently ameliorate the threats to the species such that it does not meet the definition of an endangered species.

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

Under Factor E, we evaluate the island marble butterfly's small population size and its vulnerability to stochastic events, vehicular collisions, insecticide application, late emergence of adult butterflies, and climate change.

Small Population Size and Vulnerability to Stochastic Events

Since its rediscovery in 1998, the island marble butterfly has been

documented to have a narrow distribution, which has become increasingly constrained as secure habitat has been reduced or destroyed throughout the butterfly's range (Miskelly and Potter 2005, entire; Miskelly and Fleckenstein 2007, entire; Miskelly and Potter 2009, entire; Hanson *et al.* 2009, entire; Hanson *et al.* 2010, entire; Potter *et al.* 2011, entire; Vernon and Weaver 2012, entire; Weaver and Vernon 2014, entire; Potter 2015a, *in litt.;* Vernon 2015a, entire). Declining numbers for the island marble butterfly have been documented during annual monitoring at American Camp that has taken place from 2004 through 2015 (see ''Abundance,'' above), and the species now appears to be restricted to a single known population centered on American Camp.

Compared to large populations, small populations are disproportionately affected by environmental, demographic, and genetic stochasticity, and thus face greater risk of extinction (Frankham 1996, p. 1506; Saccheri *et al.* 1998, entire; Harper *et al.* 2003, pp. 3349, 3354). Environmental stochasticity is the variation in birth and death rates from one season to the next in response to weather, disease, competition, predation, or other factors external to the population (Shaffer 1981, p. 131). For example, drought or predation in combination with a low population year could result in extirpation, and butterflies are known to be sensitive to environmental variation, increasing the influence of this factor (Weiss *et al.* 1993, pp. 267–269). Stochastic environmental events can be natural or human-caused.

Demographic stochasticity refers to random variability in survival or reproduction among individuals within a population (Shaffer 1981, p. 131). This random variability has a proportionately large effect on small populations, such that any loss of beneficial alleles (genes that provide for more successful reproduction and survival) may result in a rapid reduction in fitness, making small populations much more likely to go extinct than large populations (Frankham 1996, p. 1507). Genetic stochasticity, or genetic drift, describes random changes in the genetic composition of a population that are not related to systemic forces such as natural selection, inbreeding, or migration. In small populations, genetic stochasticity is more likely to result in reduced fitness and ultimately a lower number of individuals contributed to each successive generation. Small, narrowly distributed populations generally have lower genetic diversity than larger populations, which can result in less resilience to changing environmental conditions.

Because the island marble butterfly persists in low numbers, loss of a portion of the remaining population could have disproportionately negative effects. Storm surges that destroy nearshore habitat containing overwintering island marble butterfly chrysalids may further deplete the genetic diversity of the island marble butterfly. Similarly, in grassland habitat, a poorly timed or uncontrolled fire could destroy a large portion of the remaining population. The effect of predation, which has always been at least a baseline limiting factor for the island marble butterfly, is magnified when there are so few individuals left. Additional stochastic events that could potentially be devastating include a late-spring weather abnormality, such as an extended hard freeze or a powerful storm during the flight season; a year in which predator populations were unusually high; or introduction of a novel predator. Given that the very small population at American Camp is likely the only remaining population of the species, we conclude that small population size makes it particularly vulnerable to a variety of likely stochastic events, and this constitutes a threat to the island marble butterfly at the individual, population, and species levels.

Vehicular Collisions

Habitat occupied by the island marble butterfly within American Camp is bisected by Cattle Point Road, a highway that is the only point of access for a small residential community at the southeastern tip of San Juan Island (approximately 100–150 housing units) and, as such, is routinely driven by the residents. The highway runs along the shoulder of Mount Finlayson, a landscape feature that male island marble butterflies typically follow when patrolling for females (Lambert 2016b, pers. comm.). While there have been no specific reports of island marble butterfly road kills, the presence of the highway within occupied habitat exposes the species to potential vehicle collisions. Few studies provide detail on the scale of vehicle-caused mortality for invertebrate species, and even fewer specifically examine butterfly mortality or the effects of traffic on individual butterfly species (Seibert and Conover 1991, p. 163; Munguira and Thomas 1992, entire; Rao and Girish 2007, entire).

One peer-reviewed study that examined vehicular mortality for butterflies found that a species in the same family as the island marble butterfly, *Pieris rapae,* was more likely to be struck and killed by vehicles in comparison to the other more sedentary species in the study, with 7 percent of a local population killed by cars in a 44-day period (Munguira and Thomas 1992, p. 325). The study was conducted along ''main roads'' in the United Kingdom that connected relatively large cities (Munguira and Thomas 1992, p. 317); thus, it is likely they had more traffic than the highway at American Camp. While the authors of the study did not find the percentage of the population killed by vehicles to be significant in comparison to mortality caused by other natural factors affecting their survival (Munguira and Thomas 1992, p. 316), the loss of individual island marble butterflies could have disproportionately large negative effects on the species as a whole because of its restricted range and small population size.

Male island marble butterflies are attracted to white (ultraviolet-reflecting) objects that may resemble females and have been observed to investigate white flowers (*e.g.,* field chickweed and yarrow), white picket fences, and white lines painted on the surface of roads (Lambert 2011, p. 47). The highway through American Camp has fog lines that are painted white that could be attractive to adult butterflies, thereby increasing their risk of being killed by vehicles. The centerlines on the highway are painted yellow.

Given the presence of a highway within the single remaining site occupied by island marble butterflies, and their attraction to white road stripes that are present along the Cattle Point Road edges, we expect that some vehicular mortality is likely. However, we cannot estimate the severity of this stressor, as vehicular mortality has not been specifically studied for the island marble butterfly or documented at American Camp. Therefore, while there is the potential for mortality resulting from vehicular collisions, the best available information does not indicate that vehicular collision currently has an individual-, population-, or species-level impact to the island marble butterfly.

Insecticide Application

The best available information does not indicate any insecticide use in proximity to areas that are currently known to be occupied by the island marble butterfly at American Camp. However, remnant patches of potentially suitable habitat for the species are located within a matrix of rural agricultural lands and low-density residential development, where

insecticides may be used. One such insecticide that has the potential to adversely affect the island marble butterfly if applied during its larval phase is *Bacillus thuringiensis* var. *kurstaki* (Btk). This insecticide, derived from a common soil bacterium, is used in a wide range of settings, including organic agriculture, for the control of lepidopteran (butterfly and moth) pest species (National Pesticide Information Center 2015, p. 1; Oregon Health Authority 2015, p. 1). In forestry, it is used broadly for the control of the Asian and European gypsy moth species (*Lymantria dispar,* and *L. dispar dispar,* respectively) (see WSDA 2015, entire). Btk is also more generally applied for other lepidopteran pest species, such as tent caterpillars (*Malacosoma* spp.).

Btk has the potential to kill the island marble butterfly larvae if applied in close proximity and upwind of an occupied site. Spraying of Btk has had adverse effects to nontarget butterfly and moth species (Severns 2002, p. 169; Wagner and Miller 1995, p. 19), with butterfly diversity, richness, and abundance (density) reduced for up to 2 years following the application of Btk (Severns 2002, p. 168). One study demonstrated that most nontarget lepidopteran species may be more susceptible to Btk than target species such as Asian and European gypsy moths or western tent caterpillars (Haas and Scriber 1998). For nontarget lepidopterans, the early instar stages of larvae are the most susceptible stage (Wagner and Miller 1995, p. 21).

Large-scale application of Btk in Washington State is done in a targeted fashion in response to positive trapping of pest species. In most years, Btk application is conducted at the scale of hundreds of acres per year, although in years when detection of pest species are high, such as in 2015, application of Btk may be scaled up to thousands of acres in response (WSDA 2015, p. 1). Large-scale application of Btk does not normally overlap with areas where the island marble butterfly is known to occur within American Camp, although if pest species were detected in close proximity and if the target species is active at the same time as larvae of the island marble butterfly, the effect of Btk treatment could be detrimental. Because the island marble butterfly produces a single brood per year, has a spring flight season, and has developing larvae during the summer insecticide application period, this species is more likely to be susceptible to the adverse effects of Btk than butterfly species with later flight and developmental periods or those that produce multiple broods per year. Btk is commonly used to control tent caterpillars and is likely to have been used on San Juan Island (Potter 2015d, *in litt.*), although the effect on the island marble butterfly at American Camp is not documented. At this time, the best available information does not indicate that Btk has been applied at or adjacent to any location where island marble butterflies are known to occur.

We recognize that the use of insecticides could have a negative impact on larvae of the island marble butterfly if applied in such a way that individuals were exposed. However, there is no documented exposure to insecticide use in the island marble butterfly at this time. While there is the potential for high levels of mortality resulting from insecticide exposure, we conclude that insecticide use is not having a known impact on the island marble butterfly, principally because of the low likelihood of exposure at American Camp.

Late Emergence of Adult Butterflies

Since regular transect surveys for the island marble butterfly began in 2004, the first date of the flight period has shifted an average of approximately 9 days later in the year (USFWS 2016, unpublished data). The reason for this change is unclear, and the existing time-series is too brief to ascertain whether this change is a trend or part of natural variability on a longer time scale. For example, no clear correlation exists between average winter temperatures and the beginning of the island marble flight season and the shift toward later emergence between 2004 and 2016. Later emergence cannot currently be attributed to climate change, although temperature may play a role. When conditions inside the captive-rearing lab for island marble butterflies were cooler than the ambient temperature in 2015, butterflies emerged later than the wild population (Shrum 2015b, *in litt.*). The temperature was increased inside in 2016, and the captive and wild adults emerged at the same time (Weaver 2015b, *in litt.;* Shrum 2016, *in litt.*). Other environmental conditions, including moisture, likely influence emergence time as well (Tauber *et al.* 1998, entire).

Ongoing research has recently detected a steep increase in mortality for late-season eggs and larvae compared to the mortality of early-season eggs, with none of the larvae observed in study plots surviving to the fifth instar in 2015 (Lambert 2015d, p. 14). Only a portion of the mortality documented was attributable to starvation (25 percent); the greatest cause of mortality was attributable to direct predation (60 percent) (Lambert 2015d, p. 14; see discussion above under Factor C). The single, small population of island marble butterflies likely cannot sustain the increased late-season predation pressure, and probable survival of fewer offspring, over multiple years.

Climate Change

Our analyses under the Act include consideration of ongoing and projected changes in climate. The majority of climate models for the Pacific Northwest region predict wetter winters, with an increase in the proportion of precipitation falling as rain rather than snow due to increasing ambient temperature, and drier summers as a result of reduced snowpack and ensuing hydrologic drought (Mote and Salathé 2010, p. 48). No downscaled climate models specific to the San Juan Island archipelago are available, and San Juan Island is not reliant on snowpack for its water. The portion of San Juan Island where the known population of the island marble butterfly occurs is in the rain shadow of mountain ranges on Vancouver Island, Canada, and in Washington State, resulting in weather patterns commonly drier than much of the rest of the Pacific Northwest (Mass 2009, entire). While the San Juan Island archipelago may be subject to the increasing average annual temperatures associated with climate change, it is unclear how changing temperatures will affect the island marble butterfly.

One predicted stressor associated with climate change for herbivorous (plant-eating) insect species is the potential for the development of phenological asynchrony (a mismatch in timing) between insects and their larval host plants (Bale *et al.* 2002, p. 8). If an herbivorous insect emerges earlier or later than the optimal stage of its larval host plant, the insect may not be able to find plants at the right stage for egg laying, or the insect's larvae may not have adequate food resources. If the insect emerges earlier than its larval host plant, the plants may not be detectable, leaving the animal with no place to lay her eggs, or the plants may be too small to provide enough forage for larvae, leading to starvation. Conversely, if the insect emerges when the plant is at a later phenological stage, eggs may be laid on a larval host plant that has matured to the point that plant tissues are too tough for the larvae to consume, or the plant may die before the insect has acquired enough resources to survive to the pupation stage. The island marble butterfly is an early-flying species, generally emerging in April and immediately mating and laying eggs on the larval host plants that

are available. This strategy ensures that the host plants are young enough to provide tender plant tissue for first instar larvae, which have mouthparts incapable of consuming anything but the high-moisture flower buds. In the absence of access to tender buds, early instar larvae die from desiccation (Lambert 2011, p. 12). Although evidence exists that some larvae of late-emerging island marble butterflies have suffered starvation (Lambert 2015d, p. 14), perhaps as a result of mismatch between butterfly and food-plant phenology, no recurring pattern in such mismatch exists now that can be associated with climate change. However, monitoring of phenology and survival in the island marble butterfly is ongoing and may shed light on this relationship in the future.

Sea-level rise associated with climate change is expected to continue as polar ice melts, leading to an increase in ocean volume (Adelsman *et al.* 2012, p. 82). The warming climate is also expected to lead to rising ocean temperatures resulting in thermal expansion of the water, which will also increase the volume of the ocean (Dalton *et al.* 2013, p. 70). Both of these effects of climate change are expected to lead to rising sea level, which will have the direct effect of increasing the impacts of storm surges and flooding events in low-lying areas, such as the nearshore lagoon habitat of the island marble butterfly (MacLennan *et al.* 2013, pp. 4–5; Vose *et al.* 2014, p. 381; Friends of the San Juans 2014, p. 7; Whitman and MacLennan 2015, *in litt.;* NOAA 2015a, entire; NOAA 2015b, entire). Because the nearshore habitat is barely above sea level, rise in sea level increases the risk of inundation and direct mortality for island marble butterflies overwintering as chrysalids in low-lying nearshore habitat. Powerful storm surges have historically deposited large amounts of coarse sediment and driftwood in areas occupied by Menzies' pepperweed (an estimated 5 to 8 percent of habitat occupied in 2006) and where a number of island marble butterflies were overwintering as chrysalids, leading to low numbers of individuals detected in nearshore habitat in years following a storm surge event (Lambert 2011, pp. 99, 145–146; Lambert 2015f, *in litt.*). Due to the small number of individuals remaining, mortality and habitat loss resulting from storm surges likely has a population-level impact on the island marble butterfly, and we expect these impacts to increase over time as an effect of global climate change.

While some effects of global climate change, such as sea-level rise and storm intensity, are expected to be nearly universal, warming associated with climate change is expected to be variable or even patchy, depending on localized weather patterns (*e.g.,* patterns influenced by oceanographic phenomena such as El Niño and La Niña) (Adelsman *et al.* 2012, p. 37). The Pacific Northwest region of the United States abuts the eastern edge of the Pacific Ocean, which warms and cools in sync with the Pacific Decadal Oscillation (Mantua and Hare 2002, entire). Given the unclear direction of climate trends in the San Juan archipelago, we cannot conclude that the island marble butterfly is exhibiting phenological changes such as later emergence as a result of climate change, or that the species will do so in the future.

Climate conditions that affect phenology in a given year can have important impacts to the species, however. Cooler temperatures are associated with later emergence of butterflies reared in captivity (Weaver 2015b, *in litt.*), and late emergence leads to a spike in late-season predation on island butterfly larvae, when spider and wasp populations are greatest (see discussions above under Factor C, and above under ''Late Emergence of Adult Butterflies''). Compared with an abundant species with numerous, well-distributed populations, the island marble butterfly's small remaining population is far more vulnerable to such fluctuations in mortality.

Conservation Efforts To Reduce Other Natural or Manmade Factors Affecting Its Continued Existence

The Service, NPS, and other partners have been implementing multiple conservation efforts in an attempt to ameliorate the threats posed by small population size, vulnerability to stochastic events, and insecticide applications. No conservation efforts currently address collisions with vehicles or the effects of climate change. Below we summarize the conservation measures that have been implemented by NPS, WDFW, University of Washington researchers, and conservation partners on San Juan Island to address the threats to the island marble butterfly described above under Factor E.

The Service, NPS, and other partners have conducted conservation efforts to address the effects of small population size and vulnerability to stochastic events on the island marble butterfly since 2008. Specifically, NPS and other partners began exploring methods for captive-rearing island marble butterflies in 2008. In 2009, 16 island marble butterfly individuals were rescued from a construction site, reared to emergence as adult butterflies, and released in the spring of 2010 (Vernon 2015d, p. 2). In 2010, more individuals were reared as part of a food preference experiment (Trapp and Weaver 2010, entire), and 32 adults were released in 2011 (Vernon 2015d, p. 5). These opportunistic events demonstrated that rescue, rearing, and releasing of island marble butterflies could be successful. A handbook based on these captive-rearing events and more recent efforts was developed to guide captive-rearing and release efforts for the island marble butterfly (Vernon 2015d, entire).

In 2013, continued decline in the number of island marble butterflies observed in the wild led to the rescue, captive-rearing, and release of the species in an effort to improve survivorship and reverse the trend of declining numbers, and provide a safety net against stochastic events. Forty-seven individuals successfully formed chrysalids, and 40 adult island marble butterflies emerged in the spring of 2014, and were released at American Camp (85 percent survival) (Vernon 2015d, p. 3). NPS has scaled up and streamlined the captive-rearing program. In 2014, NPS converted an outbuilding into a rearing facility, and 89 eggs and larvae were brought in for captive-rearing. Of those, 75 adult island marble butterflies emerged (84 percent survival) in the spring of 2015, and were released at American Camp (Silahua 2015, *in litt.*). In 2015, 126 eggs and larvae were brought in for captive-rearing, 114 of which survived to become chrysalids (Silahua 2015, *in litt.*). The productivity of the captive rearing facility has continued to increase in subsequent years; in 2016, 111 adult island marble butterflies were released; in 2017, 136; and in 2018, 158 adults were released (SJINHP 2018, *in litt.*). In total, more than 500 adult island marble butterflies have been released back into the wild through this program (SJINHP 2018, *in litt.*).

Although the number of adult island marble butterflies recorded during annual surveys remains small (fewer than 30 butterflies were observed each year during monitoring for the 2014 and 2015 flight seasons), the captive-rearing effort has likely provided crucial support to the population remaining in the wild and will remain necessary in the future. We note, that there is no data available allowing a precise characterization of the success released individuals have in contributing to the overall population of the species. However, this ongoing conservation effort to address small population size

and vulnerability to stochastic events is not without risk and does not ameliorate other threats to the species in the long term. For example, in 2015, individuals reared in captivity emerged late in the flight season (on or around May 13) (Weaver 2015b, *in litt.*), and available data suggest that the majority of the offspring of these captive-reared individuals died as a result of high late-season predation rates (Lambert 2015d, p. 14; see discussion under Factor C, above). In 2016, the date of emergence in the captive-rearing facility was better calibrated to ambient environmental temperatures by adjusting the temperature in the facility to match those of the surrounding outdoor area, but there are likely to be other unforeseen challenges to successful captive-rearing.

Conservation efforts to reduce natural or manmade factors include efforts to reduce the application of the insecticide Btk in close proximity to sites occupied by the island marble butterfly. The final decision over the use of insecticide for control of invasive moths and butterflies has been, and will continue to be, made by the Washington State Department of Agriculture after coordination with the Service and WDFW. All pesticide used by the State of Washington is applied in compliance with label instructions, which are designed to reduce overspray, drift, and other negative impacts to nontarget organisms and areas.

Summary of Other Natural or Manmade Factors Affecting Its Continued Existence

The small population size of the island marble butterfly makes the species highly vulnerable to stochastic events (such as storm surges and climate anomalies) that directly or indirectly affect survival and reproductive success or the extent of habitat. Storm surges, which can cause direct mortality of island marble butterflies and habitat loss, are likely to increase with climate change. Although successful captive-rearing and release of island marble butterflies is an important achievement that has supplemented numbers at American Camp since 2013, threats to the species and its habitat continue. The range of the island marble butterfly has continued to contract at American Camp, and the number of island marble butterflies observed annually has continued to decline. These conservation efforts will need to be continued into the future and be monitored to assess their long-term conservation value to the island marble butterfly before we can determine their efficacy.

*Cumulative Effects*

In our analysis of the five factors, we found that the island marble butterfly is likely to be affected by loss and degradation of habitat, direct and incidental predation, and vulnerabilities associated with small population size. Multiple stressors acting in combination have greater potential to affect the island marble butterfly than each factor alone. For example, increased sea level resulting from climate change may enhance the impacts of storm surges and flooding on low-lying coastal habitat where the one native larval host plant for the species occurs. The combined effects of environmental and demographic stochasticity, especially on a small population, can lead to a decline that is unrecoverable and results in extinction (Brook *et al.* 2008, pp. 457–458). The impacts of the stressors described above, which might be sustained by a larger, more resilient population, have the potential in combination to rapidly affect the size, growth rate, and genetic integrity of a species that persists as a small, isolated population. Thus, factors that, by themselves, may not have a significant effect on the island marble butterfly, may affect the species when considered in combination.

**Determination of Island Marble Butterfly**

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species meets the definition of ''endangered species'' or ''threatened species.'' The Act defines an ''endangered species'' as a species that is ''in danger of extinction throughout all or a significant portion of its range,'' and a ''threatened species'' as a species that is ''likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.'' The Act requires that we determine whether a species meets the definition of ''endangered species'' or ''threatened species'' because of any of the following 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.

*Status Throughout All of Its Range*

As required by the Act, we have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to the island marble butterfly. Since the species was discovered in the San Juan Islands in 1998, the species' range has contracted from five populations on two islands (San Juan and Lopez) to a single population, at American Camp on San Juan Island, today. The causes of these extirpations are not well understood, but likely include habitat loss outside American Camp from a combination of sources. Within the single remaining population at American Camp, the number of sites where island marble butterflies are detected during surveys declined from 25 in 2007, to 4 in 2015. Encounter rates for adult butterflies calculated from survey data have declined each year, from almost 2 per 100 meters in 2004, to about 0.3 per 100 meters in 2015. The slight increase in this rate in 2016, to 0.6 per 100 meters, does not reverse the overall trend of decline. Captive rearing and release of the island marble butterfly shows promise for bolstering the remaining population of the species. However, the potential for this species to recolonize areas within its historical range is uncertain due to ongoing, pervasive habitat degradation that results from herbivory by deer and other animals on larval host plants, from plant succession and invasion by nonnative plants that render habitat unsuitable for larval host plants, and potentially from cultivation and other land uses. The widespread occurrence of native (spiders) and nonnative (wasps) predators of eggs and larvae is also an ongoing threat that may hamper or prevent potential recolonizations. Furthermore, the source for any recolonizations consists of a single, small population already vulnerable to these threats and to stochastic sources of mortality, such as severe storms and other climate anomalies.

In summary, we have identified the following threats to the island marble butterfly: (1) Habitat loss and degradation from plant succession and competition with invasive species that displace larval host plants; herbivory by deer, European rabbits, and brown garden snails; and storm surges (Factor A); (2) direct predation by spiders and wasps, and incidental predation by deer (Factor C); (3) small population size and vulnerability to stochastic events (Factor E); and (4) the cumulative effects of small population size and the restricted range combined with any stressor that removes individuals from the population or decreases the species' reproductive success (Factor E). These threats affect the island marble butterfly

throughout the entirety of its range and are ongoing and likely to persist into the foreseeable future. These factors pose threats to the island marble butterfly whether considered individually or cumulatively. The existing regulatory mechanisms (Factor D) and ongoing conservation efforts are not currently sufficient to ameliorate the impact of these threats; despite intense focused efforts to conserve the species, population numbers continue to decline.

The ongoing threats of habitat loss and degradation, predation, the effects of small population size, and stochastic events that cause mortality or reduce reproductive success render this species in its entirety presently in danger of extinction throughout all of its range.

The Act defines an endangered species as any species that is ''in danger of extinction throughout all or a significant portion of its range'' and a threatened species as any species ''that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.'' The ongoing threats of habitat loss and degradation, predation, the effects of small population size, and stochastic events that cause mortality or reduce reproductive success render this species in its entirety presently in danger of extinction. Therefore, on the basis of the best available scientific and commercial information, we are listing the island marble butterfly as endangered in accordance with sections 3(6) and 4(a)(1) of the Act. We find that threatened species status is not appropriate for the island marble butterfly because of its already contracted range and single remaining population, because the threats are ongoing and affecting the entirety of the species, and because these threats are expected to continue into the future.

*Status Throughout a Significant Portion of Its Range*

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so in the foreseeable future throughout all or a significant portion of its range. We have determined that the island marble butterfly is in danger of extinction throughout all of its range, and accordingly, did not undertake an analysis of any significant portion of its range. Because we have determined that the island marble butterfly warrants listing as endangered throughout all of its range, our determination is consistent with the decision in *Center for Biological Diversity* v. *Everson,* 2020 WL 437289 (D.D.C. Jan. 28, 2020), in which the court vacated the aspect of the 2014 Significant Portion of its Range Policy that provided the Services do not undertake an analysis of significant portions of a species' range if the species warrants listing as threatened throughout all of its range.

*Determination of Status*

Our review of the best available scientific and commercial information indicates that the island marble butterfly meets the definition of an endangered species. Therefore, we are listing the island marble butterfly as an endangered species in accordance with sections 3(6) and 4(a)(1) of the Act.

**Available Conservation Measures**

Conservation measures provided to species listed as endangered or threatened species under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing results in public awareness, and conservation by Federal, State, Tribal, and local agencies, private organizations, and individuals. The Act encourages cooperation with the States and requires that recovery actions be carried out for all listed species. The protection required by Federal agencies and the prohibitions against certain activities are discussed, in part, below.

The primary purpose of the Act is the conservation of endangered and threatened species and the ecosystems upon which they depend. The ultimate goal of such conservation efforts is the recovery of these listed species, so that they no longer need the protective measures of the Act. Subsection 4(f) of the Act requires the Service to develop and implement recovery plans for the conservation of endangered and threatened species. The recovery planning process involves the identification of actions that are necessary to halt or reverse the species' decline by addressing the threats to its survival and recovery. The goal of this process is to restore listed species to a point where they are secure, self-sustaining, and functioning components of their ecosystems.

Recovery planning includes the development of a recovery outline shortly after a species is listed and preparation of a draft and final recovery plan. The recovery outline guides the immediate implementation of urgent recovery actions and describes the process to be used to develop a recovery plan. Revisions of the plan may be done to address continuing or new threats to the species, as new substantive information becomes available. The recovery plan identifies site-specific management actions that set a trigger for review of the five factors that control whether a species remains endangered or may be reclassified from endangered to threatened (''downlisted'') or removed from listed status (''delisted''), and methods for monitoring recovery progress. Recovery plans also establish a framework for agencies to coordinate their recovery efforts and provide estimates of the cost of implementing recovery tasks. Recovery teams (composed of species experts, Federal and State agencies, nongovernmental organizations, and stakeholders) are often established to develop recovery plans. When completed, the recovery outline, draft recovery plan, and the final recovery plan will be available on our website (*http://www.fws.gov/endangered*) or from our Washington Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

Implementation of recovery actions generally requires the participation of a broad range of partners, including other Federal agencies, States, Tribes, nongovernmental organizations, businesses, and private landowners. Examples of recovery actions include habitat restoration (*e.g.,* restoration of native vegetation), research, captive propagation and reintroduction, and outreach and education. The recovery of many listed species cannot be accomplished solely on Federal lands because their range may occur primarily or solely on non-Federal lands. To achieve recovery of these species requires cooperative conservation efforts on private, State, and Tribal lands.

Following publication of this final rule, funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost share grants for non-Federal landowners, the academic community, and nongovernmental organizations. In addition, pursuant to section 6 of the Act, the State of Washington will be eligible for Federal funds to implement management actions that promote the protection or recovery of the island marble butterfly. Information on our grant programs that are available to aid species recovery can be found at: *http://www.fws.gov/grants.*

Please let us know if you are interested in participating in recovery efforts for the island marble butterfly. Additionally, we invite you to submit any new information on this species whenever it becomes available and any information you may have for recovery planning purposes (see **FOR FURTHER INFORMATION CONTACT**).

Section 7(a) of the Act requires Federal agencies to evaluate their

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

Federal agency actions within the species' habitat that may require conference or consultation or both as described in the preceding paragraph include management and any other landscape-altering activities on Federal lands administered by the Bureau of Land Management, Farm Service Agency, Federal Highway Administration, National Park Service, U.S Army Corps of Engineers, U.S. Fish and Wildlife Service, U.S. Department of Agriculture, and the U.S. Coast Guard.

The Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to endangered wildlife. The prohibitions of section 9(a)(1) of the Act, codified at 50 CFR 17.21, make it illegal for any person subject to the jurisdiction of the United States to take (which includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or to attempt any of these) endangered wildlife within the United States or on the high seas. In addition, it is unlawful to import; export; deliver, receive, carry, transport, or ship in interstate or foreign commerce in the course of commercial activity; or sell or offer for sale in interstate or foreign commerce any listed species. It is also illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply to employees of the Service, the National Marine Fisheries Service, other Federal land management agencies, and State conservation agencies.

We may issue permits to carry out otherwise prohibited activities involving endangered wildlife under certain circumstances. Regulations governing permits are codified at 50 CFR 17.22. With regard to endangered wildlife, a permit may be issued for the following purposes: For scientific purposes, to enhance the propagation or survival of the species, and for incidental take in connection with otherwise lawful activities. There are also certain statutory exemptions from the prohibitions, which are found in sections 9 and 10 of the Act.

It is our policy, as published in the **Federal Register** on July 1, 1994 (59 FR 34272), to identify to the maximum extent practicable at the time a species is listed, those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of a final listing on proposed and ongoing activities within the range of a listed species. Due to the cryptic nature of this species throughout a large portion of the year, we are unable, at this time, to identify specific activities within the known range of the species that wouldnot result in unauthorized take under section 9 of the Act.

Based on the best available information, the following activities may potentially result in a violation of section 9 the Act; this list is not comprehensive:

(1) Unauthorized collecting, handling, possessing, selling, delivering, carrying, or transporting of island marble butterflies, including import or export across State lines and international boundaries, except for properly documented antique specimens at least 100 years old, as defined by section 10(h)(1) of the Act;

(2) Introduction of nonnative species that compete with or prey upon the island marble butterfly or its host and nectar plants—for example, the introduction of competing, nonnative plants or animals to the State of Washington, and in particular the San Juan Islands;

(3) The unauthorized release of biological control agents that attack any life stage of the island marble butterfly—for example, Btk release in the range of the species;

(4) Unauthorized modification of the soil profiles or the vegetation components on sites known to be occupied by island marble butterflies; or

(5) Intentional disturbance of butterflies (or any life stage thereof), especially mowing or burning of areas where butterflies are known to occur during the breeding season.

Questions regarding whether specific activities would constitute a violation of section 9 of the Act should be directed to the Washington Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

## Critical Habitat

### *Background*

Critical habitat is defined in section 3 of the Act as:

(1) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical or biological features

(a) Essential to the conservation of the species, and

(b) Which may require special management considerations or protection; and

(2) Specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Our regulations at 50 CFR 424.02 define the geographical area occupied by the species as an area that may generally be delineated around species' occurrences, as determined by the Secretary (*i.e.,* range). Such areas may include those areas used throughout all or part of the species' life cycle, even if not used on a regular basis (*e.g.,* migratory corridors, seasonal habitats, and habitats used periodically, but not solely by vagrant individuals).

Conservation, as defined under section 3 of the Act, means to use and the use of all methods and procedures that are necessary to bring an endangered or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking.

Critical habitat receives protection under section 7 of the Act through the requirement that Federal agencies ensure, in consultation with the Service, that any action they authorize, fund, or carry out is not likely to result in the destruction or adverse modification of critical habitat. The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. Such designation does not allow the government or public to access private lands. Such designation does not require implementation of restoration, recovery, or enhancement measures by non-Federal landowners. Where a landowner requests Federal agency funding or authorization for an action that may affect a listed species or critical habitat,

the consultation requirements of section 7(a)(2) of the Act would apply, but even in the event of a destruction or adverse modification finding, the obligation of the Federal action agency and the landowner is not to restore or recover the species, but to implement reasonable and prudent alternatives to avoid destruction or adverse modification of critical habitat.

Under the first prong of the Act's definition of critical habitat, areas within the geographical area occupied by the species at the time it was listed are included in a critical habitat designation if they contain physical or biological features (1) which are essential to the conservation of the species and (2) which may require special management considerations or protection. For these areas, critical habitat designations identify, to the extent known using the best scientific and commercial data available, those physical or biological features that are essential to the conservation of the species (such as space, food, cover, and protected habitat). In identifying those physical or biological features within an area, we focus on the specific features that support the life-history needs of the species, including, but not limited to, water characteristics, soil type, geological features, prey, vegetation, symbiotic species, or other features. A feature may be a single habitat characteristic, or a more complex combination of habitat characteristics. Features may include habitat characteristics that support ephemeral or dynamic habitat conditions. Features may also be expressed in terms relating to principles of conservation biology, such as patch size, distribution distances, and connectivity.

Under the second prong of the Act's definition of critical habitat, we can designate critical habitat in areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. For example, an area currently occupied by the species but that was not occupied at the time of listing may be essential to the conservation of the species and may be included in the critical habitat designation.

Section 4 of the Act requires that we designate critical habitat on the basis of the best scientific data available. Further, our Policy on Information Standards Under the Endangered Species Act (published in the **Federal Register** on July 1, 1994 (59 FR 34271)), the Information Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106–554; H.R. 5658)), and our associated Information Quality Guidelines provide criteria, establish procedures, and provide guidance to ensure that our decisions are based on the best scientific data available. They require our biologists, to the extent consistent with the Act and with the use of the best scientific data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat.

When we are determining which areas should be designated as critical habitat, our primary source of information is generally the information from the species status assessment (SSA) document and information developed during the listing process for the species. Additional information sources may include any generalized conservation strategy, criteria, or outline that may have been developed for the species; the recovery plan for the species; articles in peer-reviewed journals; conservation plans developed by States and counties; scientific status surveys and studies; biological assessments; other unpublished materials; or experts' opinions or personal knowledge.

Habitat is dynamic, and species may move from one area to another over time. We recognize that critical habitat designated at a particular point in time may not include all of the habitat areas that we may later determine are necessary for the recovery of the species. For these reasons, a critical habitat designation does not signal that habitat outside the designated area is unimportant or may not be needed for recovery of the species. Areas that are important to the conservation of the species, both inside and outside the critical habitat designation, will continue to be subject to: (1) Conservation actions implemented under section 7(a)(1) of the Act; (2) regulatory protections afforded by the requirement in section 7(a)(2) of the Act for Federal agencies to ensure their actions are not likely to jeopardize the continued existence of any endangered or threatened species; and (3) section 9 of the Act's prohibitions on taking any individual of the species, including taking caused by actions that affect habitat. Federally funded or permitted projects affecting listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases. These protections and conservation tools will continue to contribute to recovery of this species. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans (HCPs), or other species conservation planning efforts if new information available at the time of these planning efforts calls for a different outcome.

On August 27, 2019, we published a final rule in the **Federal Register** (84 FR 45020) to revise our regulations concerning the procedures and criteria used for listing or removing species from the Lists of Endangered and Threatened Wildlife and Plants and designating critical habitat. That rule became effective on September 26, 2019, but as stated in that rule, the revisions it sets forth apply to classification and critical habitat rules for which a proposed rule was published after September 26, 2019. Since the proposed rule for the Island marble butterfly critical habitat was published on April 12, 2018 (83 FR 15900), this final rule follows the version of § 424.12 that was in effect prior to September 26, 2019.

*Physical or Biological Features*

In accordance with section 3(5)(A)(i) of the Act and regulations at 50 CFR 424.12(b), in determining which areas within the geographical area occupied by the species at the time of listing to designate as critical habitat, we consider the physical or biological features that are essential to the conservation of the species and which may require special management considerations or protection. For example, physical features might include gravel of a particular size required for spawning, alkali soil for seed germination, protective cover for migration, or susceptibility to flooding or fire that maintains necessary early-successional habitat characteristics. Biological features might include prey species, forage grasses, specific kinds or ages of trees for roosting or nesting, symbiotic fungi, or a particular level of nonnative species consistent with conservation needs of the listed species. The features may also be combinations of habitat characteristics and may encompass the relationship between characteristics or the necessary amount of a characteristic needed to support the life history of the species. In considering whether features are essential to the conservation of the species, the Service may consider an appropriate quality, quantity, and spatial and temporal arrangement of habitat characteristics in the context of the life-history needs, condition, and status of the species. These characteristics include, but are not limited to, space for individual and population growth and for normal behavior; food, water, air, light, minerals, or other nutritional or

physiological requirements; cover or shelter; sites for breeding, reproduction, or rearing (or development) of offspring; and habitats that are protected from disturbance.

We derive the specific physical or biological features essential to the conservation of the island marble butterfly from studies of this species' habitat, ecology, and life history as described below. We have determined that the following physical or biological features are essential to the conservation of the island marble butterfly:

Space for Individual and Population Growth and for Normal Behavior

The island marble butterfly has previously been documented as having as many as five core populations across San Juan and Lopez Islands in the San Juan archipelago, but of those five, there is only one location where it has been consistently detected on an annual basis since its rediscovery in 1998 at American Camp, part of San Juan Island National Historical Park. The long-term occupancy of American Camp indicates that one or more aspects of this site provide the combination of habitat factors needed by the species. American Camp encompasses multiple small populations within large expanses of diverse habitat, including open south-facing slopes, varied broad-scale topographic features, and low-statured plant communities (Lambert 2011, pp. 151–152; Lambert 2016a, p. 4). Surface topography (slope and aspect) and landscape features that have topographic relief (slopes, bluffs, sand banks, or driftwood berms) are critical to the movement and dispersal of the island marble butterfly (Lambert 2011, p. 152).

The portion of the park where the island marble butterfly persists contains an open expanse of prairie and dune habitat greater than 700 ac (283 ha) and is bounded on two sides by marine shoreline. The island marble butterfly uses landscape features to fly low across the land, following shallow ridgelines associated with sand dunes, road cuts, and coastal bluffs. We surmise that island marble butterflies use the lee of rolling hills or hollows in broader expanses of prairie and dune habitats to facilitate their movements. Therefore, we determine habitat areas large enough to include broad topographic features (*e.g.,* ridgelines, hills, and bluffs) to be physical or biological features for the island marble butterfly.

At a rangewide scale, the island marble butterfly exhibits metapopulation dynamics, while on a local scale, ''patchy'' population dynamics best describes the movement of individuals between suitable habitat patches (Lambert 2011, pp. 147–148). Specifically, the island marble butterfly tends to occupy multiple habitat patches within a larger, heterogeneous area, with some small amount of movement between suitable habitat patches. Individual butterflies rarely move distances greater than 0.4 mi (600 m) (Peterson 2010, p. 3). Marked individuals are nearly always recaptured at the sites where they were marked, with a single exception when a marked individual was recaptured 1.2 mi (1.9 km) from its site of origin (Peterson 2010, p. 3). Within the last known occupied site, smaller occupied patches have been observed to undergo local extirpation events, but the close proximity of nearby populations within the larger contiguous area has allowed for recolonization (Lambert 2011, p. 155). Areas large enough to contain multiple small populations of island marble butterfly that allow for population connectivity and re-establishment are essential to the conservation of the species. Therefore, we conclude that areas large enough to support multiple small populations of the species are a physical or biological feature essential to the island marble butterfly.

Island marble butterflies tend to fly close to the ground, along the edges of treed areas or along marine shorelines. Therefore, forest and open water create natural barriers to movement (Lambert 2011, pp. 49, 50). Male island marble butterflies fly low (approximately 5 ft (1.5 m) above the ground) and follow ridgelines, bluffs, road-cuts, trail edges, fence lines, and shrub or forest edges in search of mates (Lambert 2011, pp. 47–48). Female island marble butterflies have been observed to fly in low (approximately 3 ft (1 m) above the ground), wide (330–980 ft (100–500 m)) circles above the ground searching for suitable host plants upon which to lay their eggs (Lambert 2011, p. 49). We conclude that large open areas with few trees are a physical or biological feature for the island marble butterfly.

Based on the best information available, we estimate that the conservation of the island marble butterfly is best supported by open, primarily treeless areas with short-statured forb- and grass-dominated vegetation. Areas should be large enough to allow for the inclusion of diverse topographic features and habitat types, including sites for mating, egg laying, feeding, refugia (places to safely harbor), and diapause locations, and should support multiple discrete occupied habitat patches, which increases the likelihood of recolonization if local extinction takes place. Therefore, we conclude that open, primarily treeless habitat areas that are large enough to support multiple, small populations and that include broad topographic features such as ridgelines, hills, and bluffs are physical or biological features essential to the conservation of the island marble butterfly.

Food, Water, Air, Light, Minerals, or Other Nutritional or Physiological Requirements

The island marble butterfly needs larval and adult food resources in order to complete its life cycle: larval host plants (food plants required by the immature stages of the butterfly) and nectar plants for the adults. The island marble butterfly has three known larval host plants, all in the mustard family (Brassicaceae). One is native, Menzies' pepperweed, and two are nonnative, field mustard and tumble mustard (Miskelly 2004, pp. 33, 38; Lambert 2011, p. 2). These three larval host plants are essential components of habitat for the island marble butterfly.

All three larval host plants occur in open grass- and forb-dominated plant communities, but each species is most robust in one of three specific habitat types, with little overlap: Menzies' pepperweed at the edge of low-lying coastal lagoon habitat; field mustard in upland prairie habitat, disturbed fields, and disturbed soils, including soil piles from construction; and tumble mustard in sand dune habitat (Miskelly 2004, p. 33; Miskelly and Potter 2009, p. 9; Lambert 2011, pp. 24, 121–123). While each larval host plant can occur in each of the three habitat types referenced above, female island marble butterflies typically lay eggs on only the most robust host plants in each aforementioned habitat type (Miskelly 2004, p. 33; Lambert 2011, pp. 24, 41, 50, 55–57, 121–123).

We conclude that the presence of Menzies' pepperweed, field mustard, or tumble mustard is a physical or biological feature upon which the island marble butterfly depends.

Adults primarily forage for nectar on their larval host plants (Potter 2015e, pers. comm.). They also use a variety of other nectar plants that flower during the island marble butterfly's flight period, which is generally from mid-April to mid- to late-June. Adults have been observed to nectar on yellow sand verbena, yarrow, small-flowered fiddleneck, American sea rocket, field chickweed, common stork's bill, dovefoot geranium, hairy cat's ear, common lomatium, seashore lupine, common forget-me-not, California

buttercup, trailing blackberry, dandelion, death camas, and Howell's brodiaea (Miskelly 2004, p. 33; Pyle 2004, pp. 23–26, 33; Miskelly and Potter 2005, p. 6; Lambert 2011, p. 120; Vernon and Weaver 2012, appendix 12; Lambert 2015a, p. 2; Lambert 2015b, *in litt.*). Of these additional nectar resources, island marble butterflies are most frequently observed feeding on yellow sand verbena, small-flowered fiddleneck, and field chickweed (Potter 2015e, pers. comm.). We conclude that adult nectar resources, including, but not limited to, those listed here, are a physical or biological feature upon which the island marble butterfly depends.

Like many animals that rely on external sources of body heat (ectotherms), the island marble butterfly is more active at warmer temperatures; for this species, this generally means temperatures that are higher than 55 degrees Fahrenheit (°F) (13 degrees Celsius (°C)). This leads to adult (winged) island marble butterflies being most active between the hours of 10 a.m. and 4 p.m. The island marble butterfly relies upon solar radiation for the warmth that drives their development, mate-finding, and reproduction. We conclude that exposure to the sun provided by open, primarily treeless areas with some south-facing slopes and short-statured vegetation is a physical or biological feature upon which the island marble butterfly depends.

We consider open sunlit areas containing at least one species of larval host plant, Menzies' pepperweed, field mustard, and/or tumble mustard, with both flower buds and blooms between the months of May through July to be physical or biological features of island marble butterfly habitat. We additionally consider the presence of adult nectar plants in flower to be a physical or biological feature of island marble butterfly habitat.

Sites for Breeding, Reproduction, or Rearing (or Development) of Offspring

Male island marble butterflies are attracted to white and may investigate white picket fences, white lines on surface roads, or other white objects while searching for a mate (Lambert 2011, p. 47). The island marble butterfly primarily uses short-statured, white-flowering plants such as field chickweed as sites for mate attraction and mating (Lambert 2014b, p. 17). We conclude that the presence of short-statured, white-flowering plants during the flight period (generally from mid-April to mid- to late-June) for the island marble butterfly to be a physical or biological feature of the island marble butterfly habitat.

Once mated, gravid female island marble butterflies seek out larval host plants at an optimal growth stage for egg laying (recently hatched caterpillars require tender plant parts, such as immature flower buds, because their mouthparts are not developed enough to eat hardened plant matter) (Lambert 2011, pp. 9–10). Larval host plant flowering phenology (timing of flower opening) is important for island marble butterflies. If the plants emerge too early, there may not be enough tissue at the right stage available for the larvae to go through their developmental phases. If the plants emerge too late, female butterflies may not recognize the larval host plants as suitable sites to lay eggs.

Female island marble butterflies carefully gauge the suitability of each larval host plant, preferentially selecting plants that possess both flowers and buds to lay eggs on. Plants with greater than 50 percent of their flowers in bloom are more likely to be selected than plants in an earlier (less than 50 percent of flowers in bloom) or later developmental stage (Lambert 2011, pp. 59–60). Female island marble butterflies tend to lay eggs singly on the immature buds of the flowers of their larval host plants, rarely laying eggs on inflorescences that are already occupied by island marble butterfly eggs or larvae (Lambert 2011, pp. 51–57). Female island marble butterflies prefer larval host plants growing in low-density patches with less than one plant per meter square and tend to choose plants that are along the outer edge of a patch of larval host plants rather than in areas with a high density of host plants (Lambert 2011, pp. 53, 68–69; Lambert 2015d, p. 9). Additionally, host plant phenology (timing of development) plays a significant role in determining where females lay eggs. Low- to medium-density larval host plants, with both flower buds and blooms on them between the months of May through July, for egg-laying and larval development are a physical or biological feature of island marble butterfly habitat.

After hatching, larvae of the island marble butterfly rapidly progress through five instars (larval growth stages) and have been documented to then move up to 13 ft (4 m) from their larval host plant to nearby standing vegetation (usually tall grasses) to pupate (Lambert 2011, p. 19). Island marble butterfly larvae use nearby vegetation as bridges to other plants and appear to avoid being close to the ground while searching for a safe site on which to form a chrysalis (pupal casing) (Lambert 2011, pp. 20–21). Therefore, we find that the presence of larval host plants, in complement with tall, standing vegetation that provides the structure necessary to allow mature larvae to cross to a safe pupation site, is a physical or biological feature of island marble butterfly habitat.

Habitats That Are Protected From Disturbance or Are Representative of the Historical, Geographical, and Ecological Distributions of a Species

The island marble butterfly spends approximately 300 days in diapause (a form of dormancy) as a chrysalis (pupa) before undergoing metamorphosis to emerge as a winged adult the following spring. Unlike other butterfly species that may diapause underground or, alternatively, rapidly advance from egg to winged adult and overwinter in an adult phase, the island marble butterfly enters diapause aboveground and very close to where it hatched. During diapause, the island marble butterfly is vulnerable to any activity such as trampling, mowing, harvesting, grazing, or plowing that may disturb or destroy the vegetative structure to which a larva has attached its pupal casing. The larval host plants for the island marble butterfly are annual (or biennial), and habitat patches for the island marble butterfly do not tend to persist in the same area continuously over time. Leaving the vegetation near where larval host plants established in the spring until mid-summer the following year provides a safe place for the island marble butterfly chrysalids to harbor until they emerge. Therefore, we find that sufficient areas of undisturbed vegetation surrounding larval host plants that are left standing for a sufficient period of time in order for the island marble butterfly to complete its life cycle is a physical or biological feature of island marble butterfly habitat.

Summary of Essential Physical or Biological Features

We have determined that the following physical or biological features of the areas on San Juan Island, Washington, that are essential to the conservation of the island marble butterfly are:

(a) Open, primarily treeless areas with short-statured forb- and grass-dominated vegetation that include diverse topographic features such as ridgelines, hills, and bluffs for patrolling, dispersal corridors between habitat patches, and some south-facing terrain. Areas must be large enough to allow for the development of patchy-population

dynamics, allowing for multiple small populations to establish within the area.

(b) Low- to medium-density larval host plants, with both flower buds and blooms on them between the months of May through July, for egg-laying and larval development. Larval host plants may be any of the following: *Brassica rapa, Sisymbrium altissimum,* or *Lepidium virginicum*.

(c) Adult nectar resources in flower and short-statured, white-flowering plants in bloom used for mate-finding, which may include, but are not limited to, *Abronia latifolia* (yellow sand verbena), *Achillea millefolium* (yarrow), *Amsinckia menziesii* (small-flowered fiddleneck), *Cakile edentula* (American sea rocket), *Cerastium arvense* (field chickweed), *Erodium cicutarium* (common stork's bill), *Geranium molle* (dovefoot geranium), *Hypochaeris radicata* (hairy cat's ear), *Lomatium utriculatum* (common lomatium), *Lupinus littoralis* (seashore lupine), *Myosotis discolor* (common forget-me-not), *Ranunculus californicus* (California buttercup), *Rubus ursinus* (trailing blackberry), *Taraxacum officinale* (dandelion), *Toxicoscordion venenosum* (death camas, formerly known as *Zigadenus venenosus*), and *Triteleia grandiflora* (Howell's brodiaea, formerly *Brodiaea howellii*).

(d) Areas of undisturbed vegetation surrounding larval host plants sufficient to provide secure sites for diapause and pupation. The vegetation surrounding larval host plants must be left standing for a sufficient period of time for the island marble butterfly to complete its life cycle.

Special Management Considerations or Protection

When designating critical habitat, we assess whether the specific areas within the geographical area occupied by the species at the time of listing contain features that are essential to the conservation of the species and which may require special management considerations or protection. Because the island marble butterfly depends on vegetation that requires disturbance and open areas to establish, special management may be necessary to both maintain low-level disturbance and to prevent the invasion of weedy native and nonnative plant species, such as Douglas fir, Mediterranean pasture grasses, and thistle. Beneficial special management activities could include prescribed burning to remove standing vegetation and seedlings and to reduce seed set of nonnative plant species. Additionally, the application of selective herbicides to combat specific invasive plants may also prove useful in vegetation management. For some weedy species, hand-pulling can be an effective vegetation management tool, if staffing and resources allow.

Special management considerations within the critical habitat unit may include protection of larval host plants from herbivory by browsing deer, European rabbits, and brown garden snails. These herbivores constitute the primary threat to the larval host plants upon which the island marble butterfly depends. Special management actions that could ameliorate the threat of herbivory by deer, European rabbits, and brown garden snails could include lethal control methods, such as targeted hunting or professional removal. For deer, exclusion fencing increases the survivorship of both larval host plants and the island marble butterfly in the fenced areas, but the fences are difficult to erect and maintain and provide a host of other challenges for the land management agencies. Additionally, exclusion fencing does nothing to reduce the number of deer, which is the primary cause of the intense browsing pressure on the larval host plants for the island marble butterfly (Lambert 2011, pp. 85–104, 127; Lambert 2014a, p. 3; Lambert 2015d, pp. 14–18). Fencing is not effective against European rabbits and brown garden snails.

*Criteria Used To Identify Critical Habitat*

As required by section 4(b)(2) of the Act, we use the best scientific data available to designate critical habitat. In accordance with the Act and our implementing regulations at 50 CFR 424.12(b), we review available information pertaining to the habitat requirements of the species and identify specific areas within the geographical area occupied by the species at the time of listing and any specific areas outside the geographical area occupied by the species to be considered for designation as critical habitat. In this case, we are not designating any areas outside the geographical area occupied by the species.

When we are determining which areas should be designated as critical habitat, our primary source of information is generally the information developed during the listing process for the species. Additional information sources may include the recovery plan for the species, articles in peer-reviewed journals, conservation plans developed by States and counties, scientific status surveys and studies, biological assessments, other unpublished materials, or experts' opinions or personal knowledge. In this case, we used existing occurrence data for the island marble butterfly and information on the habitat and ecosystems upon which it depends. These sources of information included, but were not limited to:

(1) Data used to prepare the rule to list the species;

(2) Information from biological surveys;

(3) Various agency reports and databases;

(4) Information from NPS and other cooperators;

(5) Information from species experts;

(6) Data and information presented in academic research theses; and

(7) Regional Geographic Information System (GIS) data (such as species occurrence data, land use, topography, aerial imagery, soil data, and land ownership maps) for area calculations and mapping.

Areas Occupied at the Time of Listing

In accordance with the Act and our implementing regulations at 50 CFR 424.12(b), we reviewed available information pertaining to the habitat requirements of the species, identified specific areas within the geographical area occupied by the species at the time of listing, and examined whether we could identify any specific areas outside the geographical area occupied by the species to be considered for designation as critical habitat. In this case, as we are listing the island marble butterfly concurrently with the designation of critical habitat, all areas presently occupied by the island marble butterfly constitute those areas occupied at the time of listing.

We plotted the known locations of the island marble butterfly where they occur in Washington using 2015 National Agriculture Imagery Program (NAIP) digital imagery in ArcGIS, version 10.4 (Environmental Systems Research Institute, Inc.), a computer geographic information system program, and determined that the currently occupied areas contain the physical or biological features needing special management, as discussed above. We also analyzed the appropriate quantity and spatial arrangement of these features in the context of the life history, status, and conservation needs of the species.

We note that limitations in available GIS data and the scale of designations can affect our precision in mapping critical habitat boundaries. We strive to use clearly recognizable geographic or legal features in designating critical habitat boundaries; however, in those instances where we think critical habitat maps may cause uncertainty over the precise extent of mapped critical

habitat, we have attempted to clarify with supplemental narrative descriptions.

Survey effort for the island marble butterfly has not been consistent spatially or temporally. Island-wide surveys of San Juan and Lopez Islands were discontinued by WDFW in 2012, due to decreased detections and the lack of larval host plants in previously occupied areas across both islands. In 2015, the Service funded an island-wide survey of San Juan, and no occurrences were documented outside of the known occupied area centered on American Camp at the southern end of San Juan Island. The last survey of Lopez Island was conducted in 2012, and a single larva was observed. There have been no reports of island marble butterflies from Lopez Island since 2012.

Therefore, the Service considers areas to be occupied at the time of listing if there are occurrence records within those areas within the last 5 years, or if areas adjacent to known occupied areas have the physical or biological features upon which the island marble butterfly depends and there are no barriers to dispersal. It is reasonable to conclude that the species regularly occurs in such areas because of the species' population dynamics and frequent movement between habitat patches, as discussed above. Occurrence records are deemed credible if recorded by a Federal, State, or contract biologist, or a qualified surveyor for the island marble butterfly.

We have also determined that all of these occupied areas (areas with documented occurrences as well as adjacent areas containing suitable habitat and where there are no barriers to dispersal) contain one or more of the essential physical or biological features. For these reasons and due to the restricted range of the island marble butterfly, we determined that all known occupied areas should be designated as critical habitat. The only known occupied area is centered on American Camp at San Juan Island National Historical Park and includes adjacent lands to the east and west of the National Park that are owned and/or managed by BLM, WDNR, San Juan County, Washington State Parks and Recreation, and private individuals.

The critical habitat designated on the private parcels along Eagle Cove only includes the area of steep coastal bluff between the marine shoreline and the upland edge at the top of the bluff. It does not include areas landward of the top of the bluff, which are typically mowed and maintained as yard.

When determining critical habitat boundaries within this final rule, we made every effort to avoid including developed areas such as lands covered by buildings, pavement, and other structures because such lands lack physical or biological features for the island marble butterfly. The scale of the maps we prepared under the parameters for publication within the Code of Federal Regulations may not reflect the exclusion of such developed lands. Any such lands inadvertently left inside critical habitat boundaries shown on the maps of this final rule have been excluded by text in the rule and are not designated as critical habitat. Therefore, a Federal action involving these lands will not trigger section 7 consultation with respect to critical habitat and the requirement of no adverse modification unless the specific action would affect the physical or biological features in the adjacent critical habitat. Please note that we specifically include road margins and shoulders in the critical habitat designation, as the island marble butterfly larval host plants often establish in these disturbed areas and may be used by the island marble butterfly for egg-laying and development. Special management considerations for road margins and shoulders may apply.

We are not designating any areas as critical habitat outside the geographical area occupied by the species at the time of listing. While we know the conservation of the species will depend on increasing the number and distribution of populations of the island marble butterfly, not all of its historical range will be essential to the conservation of the species, and we are unable to delineate any specific unoccupied areas that are essential at this time. Sites both within and outside of the central valleys of San Juan and Lopez Islands were previously occupied by the island marble butterfly. A number of areas within and outside of these valleys continue to contain some or could develop many of the physical and biological features upon which the species depends, although the best available scientific data indicate all these areas are currently unoccupied. The areas of the central valleys with the potential to support the physical and biological features continue to be important to the overall conservation strategy for the island marble butterfly. However, due to the ephemeral and patchy nature of island marble butterfly habitat, only some of these areas within these larger central valley landscapes will likely be essential to the species' long-term persistence and conservation because of the ease with which field mustard recruits and the uncertainty associated with habitat patch longevity at any one site.

Any specific areas essential to the species' conservation within these broader landscapes are not currently identifiable due to our limited understanding regarding the ideal configuration for the development of future habitat patches to support the island marble butterfly's persistence, the ideal size and number of these habitat patches, and how these habitat patches may naturally evolve within and persist on the landscape. Finally, the specific areas needed for conservation will depend in part on landowner willingness to restore and maintain the species' habitat in these areas.

Consequently, the Service is considering proposing the future establishment of one or more experimental populations (such as, but not limited to, those provided for under section 10(j) of the Act) within these broad geographic areas after we list the island marble butterfly under the Act. Section 10(j) of the Act authorizes the Service, by rulemaking, to establish new populations of listed species that are within the species' historical range but outside its current natural range. If we designate a nonessential population, we can adopt a rule to minimize restrictions on landowners. Any such rule would, to the maximum extent practicable, represent an agreement between the Service and affected landowners and government agencies (50 CFR 17.81(d)).

The critical habitat unit was designated based on one or more of the elements of physical or biological features being present to support island marble butterfly life processes. The critical habitat unit contains all of the identified elements of physical or biological features and supports multiple life processes. Some segments contain only some elements of the physical or biological features necessary to support the island marble butterfly's particular use of that habitat.

The critical habitat designation is defined by the map or maps, as modified by any accompanying regulatory text, presented at the end of this document under Regulation Promulgation. We include more detailed information on the boundaries of the critical habitat designation in the preamble of this document. We will make the coordinates or plot points or both on which each map is based available to the public on *http://www.regulations.gov* at Docket No. FWS–R1–ES–2016–0145, on our internet site at *https://www.fws.gov/wafwo/*, and at the field office responsible for the designation (see **FOR FURTHER INFORMATION CONTACT**, above).

*Final Critical Habitat Designation*

We are designating one unit as critical habitat for the island marble butterfly. The critical habitat area described below constitutes our best assessment at this time of areas that meet the definition of critical habitat. Table 1 shows the unit, which is occupied.

TABLE 1—DESIGNATED CRITICAL HABITAT FOR THE ISLAND MARBLE BUTTERFLY

| Critical habitat unit | Land ownership by type | Size of unit in acres (hectares) |
|---|---|---|
| Island marble butterfly critical habitat | NPS | 718 (291) |
| | BLM | 19 (8) |
| | DHS | 5 (2) |
| | WDNR and SJCLB | 1 (0.4) |
| | WDNR | 37 (15) |
| | SJCPD | 30 (12) |
| | Private | 2 (0.8) |
| Total: | | 812 (329) |

**Note:** Area sizes may not sum due to rounding. NPS = National Park Service, BLM = Bureau of Land Management, DHS = Department of Homeland Security (Coast Guard), WDNR = Washington Department of Fish and Wildlife, SJCLB = San Juan County Land Bank, SJCPD = San Juan County Parks Department.

The critical habitat designation consists of 812 ac (329 ha) of land at the southern end of San Juan Island, with San Juan Island National Historical Park (NPS) being the largest landholder of 718 ac (291 ha). The Bureau of Land Management (BLM) owns and manages 19 ac (8 ha), Washington Department of Natural Resources (WDNR) owns and manages 37 ac (15 ha) at Cattle Point, the Department of Homeland Security owns 5 ac (2 ha), WDNR and the San Juan County Land Bank (SJCLB) jointly own 1 ac (0.4 ha), San Juan County Parks Department owns 30 ac (12 ha), and approximately 2 ac (0.8 ha) is in private ownership. The critical habitat designation is centered on the American Camp portion of San Juan Island National Historical Park, which is owned and managed by the National Park Service, but includes adjacent lands both to the east and the west of National Park Service lands. Boundaries for the critical habitat unit follow the open, generally treeless habitat that the island marble butterfly relies upon during its flight period for mate-finding, reproduction, feeding, and dispersal.

The entirety of the critical habitat unit is within the geographical area occupied at the time of listing. The designation contains all of the physical or biological features required to support the island marble butterfly. The critical habitat designation is almost entirely conserved for use by or for the benefit of the public and is heavily used for recreation, primarily in the form of day hiking on easy trails. NPS has maintained a conservation agreement for the island marble butterfly with the Service since 2006, with the most recent renewal signed in December of 2018. As the largest landholder within the critical habitat unit, NPS continues to support and participate in ongoing research integral to the conservation of the island marble butterfly. BLM, DHS, WDNR, SJCLB, and San Juan County Parks are all engaged in the conservation of the island marble butterfly and meet with the Service multiple times annually to coordinate conservation efforts.

Within the critical habitat designation, all of the current threats to the island marble butterfly are present. Please see Determination, above, for a summary of the threats and ''Special Management Considerations or Protection'' for additional recommendations.

*Effects of Critical Habitat Designation*

Section 7 Consultation

Section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that any action they fund, authorize, or carry out is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of designated critical habitat of such species. In addition, section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any agency action which is likely to jeopardize the continued existence of any species proposed to be listed under the Act or result in the destruction or adverse modification of proposed critical habitat.

We published a final rule with a new definition of destruction or adverse modification on February 11, 2016 (81 FR 7214). Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features.

If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with us. Examples of actions that are subject to the section 7 consultation process are actions on State, tribal, local, or private lands that require a Federal permit (such as a permit from the U.S. Army Corps of Engineers under section 404 of the Clean Water Act (33 U.S.C. 1251 *et seq.*) or a permit from the Service under section 10 of the Act) or that involve some other Federal action (such as funding from the Federal Highway Administration, Federal Aviation Administration, or the Federal Emergency Management Agency). Federal actions not affecting listed species or critical habitat, and actions on State, tribal, local, or private lands that are not federally funded or authorized, do not require section 7 consultation.

As a result of section 7 consultation, we document compliance with the requirements of section 7(a)(2) through our issuance of:

(1) A concurrence letter for Federal actions that may affect, but are not likely to adversely affect, listed species or critical habitat; or

(2) A biological opinion for Federal actions that may affect and are likely to adversely affect, listed species or critical habitat.

When we issue a biological opinion concluding that a project is likely to jeopardize the continued existence of a listed species and/or destroy or adversely modify critical habitat, we provide reasonable and prudent

alternatives to the project, if any are identifiable, that would avoid the likelihood of jeopardy and/or destruction or adverse modification of critical habitat. We define ''reasonable and prudent alternatives'' (at 50 CFR 402.02) as alternative actions identified during consultation that:

(1) Can be implemented in a manner consistent with the intended purpose of the action,

(2) Can be implemented consistent with the scope of the Federal agency's legal authority and jurisdiction,

(3) Are economically and technologically feasible, and

(4) Would, in the Service Director's opinion, avoid the likelihood of jeopardizing the continued existence of the listed species and/or avoid the likelihood of destroying or adversely modifying critical habitat.

Reasonable and prudent alternatives can vary from slight project modifications to extensive redesign or relocation of the project. Costs associated with implementing a reasonable and prudent alternative are similarly variable.

Regulations at 50 CFR 402.16 require Federal agencies to reinitiate consultation on previously reviewed actions in instances where we have listed a new species or subsequently designated critical habitat that may be affected and the Federal agency has retained discretionary involvement or control over the action (or the agency's discretionary involvement or control is authorized by law). Consequently, Federal agencies sometimes may need to request reinitiation of consultation with us on actions for which formal consultation has been completed, if those actions with discretionary involvement or control may affect subsequently listed species or designated critical habitat.

Application of the ''Adverse Modification'' Standard

The key factor related to the adverse modification determination is whether, with implementation of the Federal action, the affected critical habitat would continue to serve its intended conservation role for the species. Activities that may destroy or adversely modify critical habitat are those that result in a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of the island marble butterfly. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of these species or that preclude or significantly delay development of such features. As discussed above, the role of critical habitat is to support physical or biological features essential to the conservation of a listed species and provide for the conservation of the species.

Section 4(b)(8) of the Act requires us to briefly evaluate and describe, in any proposed or final regulation that designates critical habitat, activities involving a Federal action that may destroy or adversely modify such habitat, or that may be affected by such designation.

Activities that may affect critical habitat, when carried out, funded, or authorized by a Federal agency, should result in consultation for the island marble butterfly. These activities include, but are not limited to:

(1) Actions that destroy the habitat within the critical habitat unit. Such activities could include, but are not limited to, new infrastructure developments, planting forests in historical prairie, or large paving projects. These activities could disrupt dispersal, mate finding, and patchy population dynamics, as well as prevent the recruitment of future habitat.

(2) Actions that would temporarily or permanently remove host plants from areas within the critical habitat unit that were otherwise phenologically and spatially available for use by the species. Such activities could include, but are not limited to, mowing, burning, or applying herbicide to host plants leading up to or during the flight season. These activities could reduce the quantity or distribution of oviposition sites available to the species.

(3) Actions that would temporarily or permanently remove nectar resources or plants used for mate finding from areas within the critical habitat unit that were otherwise phenologically and spatially available for use by the species. Such activities could include, but are not limited to, mowing, burning, or applying herbicide to nectar or mate-finding plants leading up to or during the flight season. These activities could reduce nectaring opportunities or disrupt mate finding, both of which could reduce fecundity.

(4) Actions that would physically disturb appropriate areas for diapause and pupation. Such activities could include, but are not limited to, mowing, trampling, grazing, or burning between flight seasons. These activities could also kill island marble butterflies in diapause as pupae.

*Exemptions*

Application of Section 4(a)(3) of the Act

Section 4(a)(3)(B)(i) of the Act (16 U.S.C. 1533(a)(3)(B)(i)) provides that: ''The Secretary shall not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan [INRMP] prepared under section 101 of the Sikes Act (16 U.S.C. 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation.'' There are no Department of Defense (DoD) lands with a completed INRMP within the final critical habitat designation.

*Consideration of Impacts Under Section 4(b)(2) of the Act*

Section 4(b)(2) of the Act states that the Secretary shall designate and make revisions to critical habitat on the basis of the best available scientific data after taking into consideration the economic impact, national security impact, and any other relevant impact of specifying any particular area as critical habitat. The Secretary may exclude an area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless he determines, based on the best scientific data available, that the failure to designate such area as critical habitat will result in the extinction of the species. In making that determination, the statute on its face, as well as the legislative history are clear that the Secretary has broad discretion regarding which factor(s) to use and how much weight to give to any factor.

*Consideration of Economic Impacts*

Section 4(b)(2) of the Act and its implementing regulations require that we consider the economic impact that may result from a designation of critical habitat. In order to consider economic impacts, we prepared an incremental effects memorandum (IEM) and screening analysis, which, together with our narrative and interpretation of effects, we consider our draft economic analysis (DEA) of the proposed critical habitat designation and related factors. The DEA was made available for public review and comment concurrently with the April 12, 2018, proposed rule (Industrial Economics, Incorporated 2017). The DEA addresses probable economic impacts of the critical habitat designation for island marble butterfly. No additional information was

submitted during the comment period that pertained to our consideration of the probable incremental economic impacts of this critical habitat designation. Additional information relevant to the probable incremental economic impacts of critical habitat designation for the island marble butterfly is summarized below and available in the screening analysis for the island marble butterfly (Industrial Economics, Incorporated 2017), available at *http://www.regulations.gov*.

The critical habitat designation for the island marble butterfly is comprised of a single unit and is considered occupied. The critical habitat designation consists of 812 ac (329 ha) and is owned and managed by NPS, BLM, DHS, WDNR, San Juan County, and private landowners. In these areas, any actions that may affect the species or its habitat would also affect designated critical habitat, and it is unlikely that any additional conservation efforts will be recommended to address the adverse modification standard over and above those recommended as necessary to avoid jeopardizing the continued existence of the island marble butterfly. Therefore, the potential incremental economic impacts of the island marble butterfly critical habitat designation are expected to be limited to administrative costs. We anticipate that the incremental administrative costs of addressing adverse modification of the island marble butterfly critical habitat in a section 7 consultation will be minor.

Total annualized incremental costs of critical habitat designation for the island marble butterfly are anticipated to be less than $150,000 over the next 20 years, or approximately $10,000 annually. The incremental administrative burden resulting from the designation of critical habitat for the island marble butterfly is not anticipated to reach $100 million in any given year based on the anticipated annual number of consultations and associated consultation costs, which are not expected to exceed $10,000 in most years.

*Exclusions*

Exclusions Based on Economic Impacts

The Service considered the economic impacts of the critical habitat designation and the Secretary is not exercising his discretion to exclude any areas from this designation of critical habitat for the island marble butterfly based on economic impacts.

A copy of the IEM and screening analysis with supporting documents may be obtained by contacting the Washington Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**) or by downloading from the internet at *http://www.regulations.gov.*

Exclusions Based on Impacts on National Security and Homeland Security

Section 4(a)(3)(B)(i) of the Act may not cover all DoD lands or areas that pose potential national-security concerns (*e.g.,* a DoD installation that is in the process of revising its INRMP for a newly listed species or a species previously not covered). If a particular area is not covered under section 4(a)(3)(B)(i) of the Act, national-security or homeland-security concerns are not a factor in the process of determining what areas meet the definition of ''critical habitat.'' Nevertheless, when designating critical habitat under section 4(b)(2), the Service must consider impacts on national security, including homeland security, on lands or areas not covered by section 4(a)(3)(B)(i) of the Act. Accordingly, we will always consider for exclusion from the designation areas for which DoD, Department of Homeland Security (DHS), or another Federal agency has requested exclusion based on an assertion of national-security or homeland-security concerns.

We cannot, however, automatically exclude requested areas. When DoD, DHS, or another Federal agency requests exclusion from critical habitat on the basis of national-security or homeland-security impacts, it must provide a reasonably specific justification of an incremental impact on national security that would result from the designation of that specific area as critical habitat. That justification could include demonstration of probable impacts, such as impacts to ongoing border-security patrols and surveillance activities, or a delay in training or facility construction, as a result of compliance with section 7(a)(2) of the Act. If the agency requesting the exclusion does not provide us with a reasonably specific justification, we will contact the agency to recommend that it provide a specific justification or clarification of its concerns relative to the probable incremental impact that could result from the designation. If the agency provides a reasonably specific justification, we will defer to the expert judgment of DoD, DHS, another Federal agency as to: (1) Whether activities on its lands or waters, or its activities on other lands or waters, have national-security or homeland-security implications; (2) the importance of those implications; and (3) the degree to which the cited implications would be adversely affected in the absence of an exclusion. In that circumstance, in conducting a discretionary 4(b)(2) exclusion analysis, we will give great weight to national-security and homeland-security concerns in analyzing the benefits of exclusion.

Department of Homeland Security currently owns 5 ac (2 ha) of land that is surrounded by land owned and managed by BLM and lies within the critical habitat boundary. Specifically, these lands include a lighthouse facility that is managed by the U.S. Coast Guard. The U.S. Coast Guard is in the process of transferring ownership of these lands to BLM; therefore, we anticipate no impact on national security from the inclusion of these lands in the critical habitat designation. Consequently, the Secretary is not intending to exercise his discretion to exclude any areas from the final designation based on impacts on national security.

Exclusions Based on Other Relevant Impacts

Under section 4(b)(2) of the Act, we consider any other relevant impacts, in addition to economic impacts and impacts on national security. We consider a number of factors including whether there are permitted conservation plans covering the species in the area such as HCPs, safe harbor agreements, or candidate conservation agreements with assurances (CCAA), or whether there are non-permitted conservation agreements and partnerships that would be encouraged by designation of, or exclusion from, critical habitat. In addition, we look at the existence of tribal conservation plans and partnerships and consider the government-to-government relationship of the United States with tribal entities. We also consider any social impacts that might occur because of the designation.

In preparing this final rule, we have determined that there are currently no non-permitted conservation agreements or partnerships for the island marble butterfly. There is a CCAA which is designed to provide non-federal landowners with the opportunity to create and maintain habitat for the island marble butterfly while providing incidental take coverage and regulatory certainty. The final designation does not include any tribal lands or tribal trust resources. We anticipate no impact on tribal lands, partnerships, permitted or non-permitted plans or agreements from this critical habitat designation. Accordingly, the Secretary is not exercising his discretion to exclude any areas from this final designation based on other relevant impacts.

**Required Determinations**

*Regulatory Planning and Review (Executive Orders 12866 and 13563)*

Executive Order 12866 provides that the Office of Information and Regulatory Affairs (OIRA) will review all significant rules. The Office of Information and Regulatory Affairs has determined that this rule is not significant.

Executive Order 13563 reaffirms the principles of E.O. 12866 while calling for improvements in the nation's regulatory system to promote predictability, to reduce uncertainty, and to use the best, most innovative, and least burdensome tools for achieving regulatory ends. The executive order directs agencies to consider regulatory approaches that reduce burdens and maintain flexibility and freedom of choice for the public where these approaches are relevant, feasible, and consistent with regulatory objectives. E.O. 13563 emphasizes further that regulations must be based on the best available science and that the rulemaking process must allow for public participation and an open exchange of ideas. We have developed this rule in a manner consistent with these requirements.

*Executive Order 13771*

This rule is not an E.O. 13771 (''Reducing Regulation and Controlling Regulatory Costs'') (82 FR 9339, February 3, 2017) regulatory action because this rule is not significant under E.O. 12866.

*Regulatory Flexibility Act (5 U.S.C. 601 et seq.)*

Under the Regulatory Flexibility Act (RFA; 5 U.S.C. 601 *et seq.*), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA; 5 U.S.C. 801 *et seq.*), whenever an agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effects of the rule on small entities (*i.e.,* small businesses, small organizations, and small government jurisdictions). However, no regulatory flexibility analysis is required if the head of the agency certifies the rule will not have a significant economic impact on a substantial number of small entities. The SBREFA amended the RFA to require Federal agencies to provide a certification statement of the factual basis for certifying that the rule will not have a significant economic impact on a substantial number of small entities.

According to the Small Business Administration, small entities include small organizations such as independent nonprofit organizations; small governmental jurisdictions, including school boards and city and town governments that serve fewer than 50,000 residents; and small businesses (13 CFR 121.201). Small businesses include manufacturing and mining concerns with fewer than 500 employees, wholesale trade entities with fewer than 100 employees, retail and service businesses with less than $5 million in annual sales, general and heavy construction businesses with less than $27.5 million in annual business, special trade contractors doing less than $11.5 million in annual business, and agricultural businesses with annual sales less than $750,000. To determine if potential economic impacts to these small entities are significant, we considered the types of activities that might trigger regulatory impacts under this designation as well as types of project modifications that may result. In general, the term ''significant economic impact'' is meant to apply to a typical small business firm's business operations.

The Service's current understanding of the requirements under the RFA, as amended, and following recent court decisions, is that Federal agencies are only required to evaluate the potential incremental impacts of rulemaking on those entities directly regulated by the rulemaking itself, and are, therefore, not required to evaluate the potential impacts to indirectly regulated entities. The regulatory mechanism through which critical habitat protections are realized is section 7 of the Act, which requires Federal agencies, in consultation with the Service, to ensure that any action authorized, funded, or carried out by the agency is not likely to destroy or adversely modify critical habitat. Therefore, under section 7, only Federal action agencies are directly subject to the specific regulatory requirement (avoiding destruction and adverse modification) imposed by critical habitat designation. Consequently, it is our position that only Federal action agencies will be directly regulated by this designation. There is no requirement under the RFA to evaluate the potential impacts to entities not directly regulated. Moreover, Federal agencies are not small entities. Therefore, because no small entities are directly regulated by this rulemaking, the Service certifies that the final critical habitat designation will not have a significant economic impact on a substantial number of small entities.

During the development of this final rule, we reviewed and evaluated all information submitted during the comment period that may pertain to our consideration of the probable incremental economic impacts of this critical habitat designation. Based on this information, we affirm our certification that this final critical habitat designation will not have a significant economic impact on a substantial number of small entities, and a regulatory flexibility analysis is not required.

*Energy Supply, Distribution, or Use—Executive Order 13211*

Executive Order 13211 (Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use) requires agencies to prepare Statements of Energy Effects when undertaking certain actions. OMB has provided guidance for implementing this Executive Order that outlines nine outcomes that may constitute ''a significant adverse effect'' when compared to not taking the regulatory action under consideration. The economic analysis finds that none of these criteria is relevant to this analysis. Thus, based on information in the economic analysis, energy-related impacts associated with island marble butterfly conservation activities within critical habitat are not expected. As such, the designation of critical habitat is not expected to significantly affect energy supplies, distribution, or use. Therefore, this action is not a significant energy action, and no Statement of Energy Effects is required.

*Unfunded Mandates Reform Act (2 U.S.C. 1501 et seq.)*

In accordance with the Unfunded Mandates Reform Act (2 U.S.C. 1501 *et seq.*), we make the following findings:

(1) This rule will not produce a Federal mandate. In general, a Federal mandate is a provision in legislation, statute, or regulation that would impose an enforceable duty upon State, local, or tribal governments, or the private sector, and includes both ''Federal intergovernmental mandates'' and ''Federal private sector mandates.'' These terms are defined in 2 U.S.C. 658(5)–(7). ''Federal intergovernmental mandate'' includes a regulation that ''would impose an enforceable duty upon State, local, or tribal governments'' with two exceptions. It excludes ''a condition of Federal assistance.'' It also excludes ''a duty arising from participation in a voluntary Federal program,'' unless the regulation ''relates to a then-existing Federal program under which $500,000,000 or more is provided annually to State, local, and tribal governments under entitlement

authority,'' if the provision would ''increase the stringency of conditions of assistance'' or ''place caps upon, or otherwise decrease, the Federal Government's responsibility to provide funding,'' and the State, local, or tribal governments ''lack authority'' to adjust accordingly. At the time of enactment, these entitlement programs were: Medicaid; Aid to Families with Dependent Children work programs; Child Nutrition; Food Stamps; Social Services Block Grants; Vocational Rehabilitation State Grants; Foster Care, Adoption Assistance, and Independent Living; Family Support Welfare Services; and Child Support Enforcement. ''Federal private sector mandate'' includes a regulation that ''would impose an enforceable duty upon the private sector, except (i) a condition of Federal assistance or (ii) a duty arising from participation in a voluntary Federal program.''

The designation of critical habitat does not impose a legally binding duty on non-Federal Government entities or private parties. Under the Act, the only regulatory effect is that Federal agencies must ensure that their actions do not destroy or adversely modify critical habitat under section 7. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency. Furthermore, to the extent that non-Federal entities are indirectly impacted because they receive Federal assistance or participate in a voluntary Federal aid program, the Unfunded Mandates Reform Act would not apply, nor would critical habitat shift the costs of the large entitlement programs listed above onto State governments.

(2) We do not believe that this rule will significantly or uniquely affect small governments because the area included in the critical habitat designation is largely owned by Federal and State agencies (greater than 95 percent). None of these government entities fits the definition of ''small government jurisdiction.'' Consequently, we do not believe that the critical habitat designation would significantly or uniquely affect small government entities. As such, a Small Government Agency Plan is not required.

*Takings—Executive Order 12630*

In accordance with E.O. 12630 (Government Actions and Interference with Constitutionally Protected Private Property Rights), we have analyzed the potential takings implications of designating critical habitat for the island marble butterfly in a takings implications assessment. The Act does not authorize the Service to regulate private actions on private lands or confiscate private property as a result of critical habitat designation. Designation of critical habitat does not affect land ownership, or establish any closures or restrictions on use of or access to the designated areas. Furthermore, the designation of critical habitat does not affect landowner actions that do not require Federal funding or permits, nor does it preclude development of habitat conservation programs or issuance of incidental take permits to permit actions that do require Federal funding or permits to go forward. However, Federal agencies are prohibited from carrying out, funding, or authorizing actions that would destroy or adversely modify critical habitat. A takings implications assessment has been completed and concludes that this designation of critical habitat for the island marble butterfly does not pose significant takings implications for lands within or affected by the designation.

*Federalism—Executive Order 13132*

In accordance with E.O. 13132 (Federalism), this rule does not have significant federalism effects. A federalism summary impact statement is not required. In keeping with Department of the Interior and Department of Commerce policy, we requested information from, and coordinated development of this critical habitat designation with, appropriate State resource agencies in Washington. We did not receive comments from Washington Department of Fish and Wildlife. From a federalism perspective, the designation of critical habitat directly affects only the responsibilities of Federal agencies. The Act imposes no other duties with respect to critical habitat, either for States and local governments, or for anyone else. As a result, the rule does not have substantial direct effects either on the States, or on the relationship between the national government and the States, or on the distribution of powers and responsibilities among the various levels of government. The designation may have some benefit to these governments because the areas that contain the features essential to the conservation of the species are more clearly defined, and the physical and biological features of the habitat necessary to the conservation of the species are specifically identified. This information does not alter where and what federally sponsored activities may occur. However, it may assist these local governments in long-range planning (because these local governments no longer have to wait for case-by-case section 7 consultations to occur).

Where State and local governments require approval or authorization from a Federal agency for actions that may affect critical habitat, consultation under section 7(a)(2) will be required. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency.

*Civil Justice Reform—Executive Order 12988*

In accordance with Executive Order 12988 (Civil Justice Reform), the Office of the Solicitor has determined that the rule does not unduly burden the judicial system and that it meets the applicable standards set forth in sections 3(a) and 3(b)(2) of the Order. We are designating critical habitat in accordance with the provisions of the Act. To assist the public in understanding the habitat needs of the species, the rule identifies the elements of physical or biological features essential to the conservation of the island marble butterfly. The designated areas of critical habitat are presented on maps, and the rule provides several options for the interested public to obtain more detailed location information, if desired.

*Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.)*

This rule does not contain any new collections of information that require approval by the Office of Management and Budget (OMB) under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*). An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

*National Environmental Policy Act (42 U.S.C. 4321 et seq.)*

We have determined that environmental assessments and environmental impact statements, as defined under the authority of the National Environmental Policy Act

(NEPA; 42 U.S.C. 4321 *et seq.*), need not be prepared in connection with listing a species as an endangered or threatened species under the Endangered Species Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244).

It is our position that, outside the jurisdiction of the U.S. Court of Appeals for the Tenth Circuit, we do not need to prepare environmental analyses pursuant to NEPA in connection with designating critical habitat under the Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). This position was upheld by the U.S. Court of Appeals for the Ninth Circuit (*Douglas County* v. *Babbitt,* 48 F.3d 1495 (9th Cir. 1995), cert. denied 516 U.S. 1042 (1996)).

*Government-to-Government Relationship With Tribes*

In accordance with the President's memorandum of April 29, 1994 (Government-to-Government Relations with Native American Tribal Governments; 59 FR 22951), Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments), and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with tribes in developing programs for healthy ecosystems, to acknowledge that tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to tribes. We determined that there are no tribal lands occupied by the island marble butterfly at the time of listing that contain the physical or biological features essential to conservation of the species, and no tribal lands unoccupied by the island marble butterfly that are essential for the conservation of the species. Therefore, we are not designating critical habitat for the island marble butterfly on tribal lands.

**References Cited**

A complete list of references cited in this rulemaking is available on the internet at *http://www.regulations.gov* and upon request from the Washington Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

**Authors**

The primary authors of this final rule are the staff members of the Washington Fish and Wildlife Office.

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

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

**Regulation Promulgation**

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

## PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

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

**Authority:** 16 U.S.C. 1361–1407; 1531–1544; and 4201–4245, unless otherwise noted.

■ 2. Amend § 17.11(h) by adding an entry for ''Butterfly, island marble'' to the List of Endangered and Threatened Wildlife in alphabetical order under ''INSECTS'' to read as follows:

**§ 17.11 Endangered and threatened wildlife.**

* * * * *

(h) * * *

| Common name | Scientific name | Where listed | Status | Listing citations and applicable rules |
|---|---|---|---|---|
| * | * | * | * | * |
| **INSECTS** | | | | |
| * | * | * | * | * |
| Butterfly, island marble | *Euchloe ausonides insulanus.* | Wherever found | E | 85 FR [insert **Federal Register** page where the document begins], 5/5/2020; 50 CFR 17.95(i).[CH] |
| * | * | * | * | * |

■ 3. In § 17.95, amend paragraph (i) by adding an entry for ''Island Marble Butterfly (*Euchloe ausonides insulanus*)'' in the same alphabetical order that the species appears in the table at § 17.11(h), to read as follows:

**§ 17.95 Critical habitat—fish and wildlife.**

* * * * *

(i) *Insects.*

* * * * *

Island Marble Butterfly (*Euchloe ausonides insulanus*)

(1) The critical habitat unit is depicted for San Juan County, Washington, on the map below.

(2) Within the critical habitat area on San Juan Island, Washington, the physical or biological features essential to the conservation of the island marble butterfly consist of the following components:

(i) Open, primarily treeless areas with short-statured forb- and grass-dominated vegetation that include diverse topographic features such as ridgelines, hills, and bluffs for patrolling, dispersal corridors between habitat patches, and some south-facing terrain. Areas must be large enough to allow for the development of patchy-population dynamics, allowing for multiple small populations to establish within the area.

(ii) Low- to medium-density larval host plants, with both flower buds and blooms on them between the months of May through July, for egg-laying and larval development. Larval host plants may be any of the following: *Brassica rapa, Sisymbrium altissimum,* or *Lepidium virginicum.*

(iii) Adult nectar resources in flower and short-statured, white-flowering plants in bloom used for mate-finding, which may include, but are not limited to, *Abronia latifolia* (yellow sand verbena), *Achillea millefolium* (yarrow), *Amsinckia menziesii* (small-flowered fiddleneck), *Cakile edentula* (American sea rocket), *Cerastium arvense* (field chickweed), *Erodium cicutarium*

(common stork's bill), *Geranium molle* (dovefoot geranium), *Hypochaeris radicata* (hairy cat's ear), *Lomatium utriculatum* (common lomatium), *Lupinus littoralis* (seashore lupine), *Myosotis discolor* (common forget-me-not), *Ranunculus californicus* (California buttercup), *Rubus ursinus* (trailing blackberry), *Taraxacum officinale* (dandelion), *Toxicoscordion venenosum* (death camas, formerly known as *Zigadenus venenosus*), and *Triteleia grandiflora* (Howell's brodiaea, formerly *Brodiaea howellii*).

(iv) Areas of undisturbed vegetation surrounding larval host plants sufficient to provide secure sites for diapause and pupation. The vegetation surrounding larval host plants must be left standing for a sufficient period of time for the island marble butterfly to complete its life cycle.

(3) Critical habitat includes road shoulders and road margins, but does not include other manmade structures (such as buildings, aqueducts, runways, paved portions of roads, and other paved areas) and the land on which they are located existing within the legal boundaries on June 4, 2020.

(4) *Critical habitat map unit.* Data layers defining the map were created using 2015 National Agriculture Imagery Program (NAIP) digital imagery in ArcGIS, version 10.4 (Environmental Systems Research Institute, Inc.), a computer geographic information system program. The map in this entry, as modified by any accompanying regulatory text, establishes the boundaries of the critical habitat designation. The coordinates or plot points or both on which the map is based are available to the public at the Service's internet site at *https://www.fws.gov/wafwo/,* at *http://www.regulations.gov* at Docket No. FWS–R1–ES–2016–0145, and at the field office responsible for this designation. You may obtain field office location information by contacting one of the Service regional offices, the addresses of which are listed at 50 CFR 2.2.

(5) Island marble butterfly critical habitat, San Juan County, Washington.

(i) Island marble butterfly critical habitat consists of 812 acres (ac) (329 hectares (ha)) on San Juan Island in San Juan County, Washington, and is composed of lands in Federal (742 ac (301 ha)), State (37 ac (15 ha)), State/County joint (1 ac (0.4 ha)), County (30 ac (12 ha)), and private (2 ac (0.8 ha)) ownership. The critical habitat designated on private parcels along Eagle Cove only includes the area of steep coastal bluff between the marine shoreline and the upland edge at the top of the bluff; it does not include areas landward of the top of the bluff, which are typically mowed and maintained as yard.

(ii) Map of island marble butterfly critical habitat follows:

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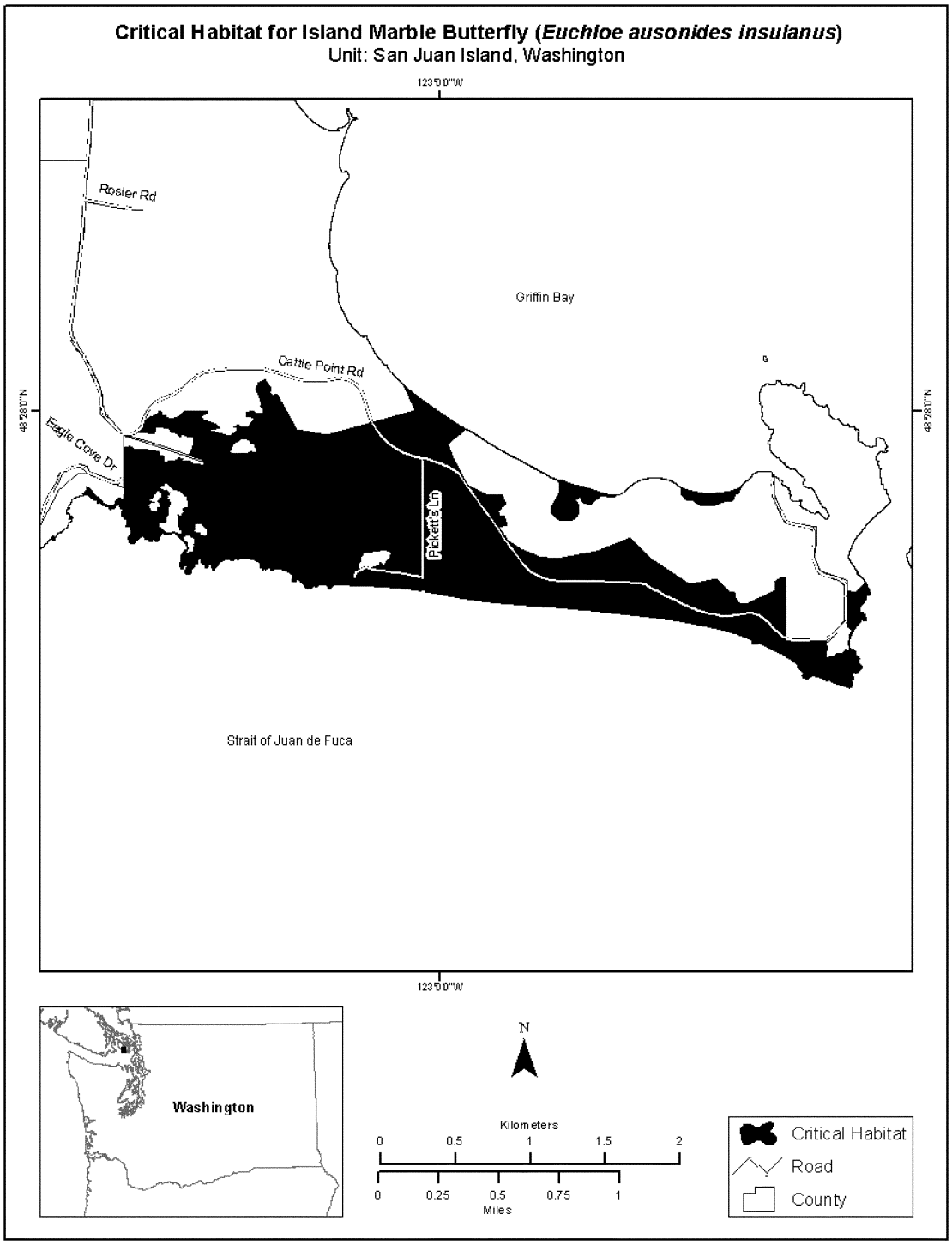


* * * * *

Signed:

**Aurelia Skipwith,**

*Director, U.S. Fish and Wildlife Service.*

[FR Doc. 2020–07856 Filed 5–4–20; 8:45 am]

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