Interim Core Map Documentation for Island Marble Butterfly (*Euchloe ausonides insulanus*; Entity ID 5610)

Version 1
Review Completed: April 2026
Core Map Developer: Corteva Agriscience, LLC.

Species Summary

- **Location:** The island marble butterfly is currently only found on the San Juan Islands in Washington state. The critical habitat is found within American Camp on San Juan Island.
- **Critical habitat designated:** Yes, in 2020.
- **Habitat preferences:** Adult island marble butterflies need open, treeless habitat with diverse topographic features to support movement and dispersal and promote landscape connectivity. While all three larval host plants occur in open grass- and forb-dominated systems, 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; and tumble mustard in sand dune habitat.
- **Diet information:** The island marble butterfly has three known species of host plants: the native Menzies' pepperweed (*Lepidium virginicum* var. *menziesii*), non-native field mustard (*Brassica rapa*), and non-native tumble mustard (*Sisymbrium altissimum*).
- **Dispersal:** Island marble butterfly larvae usually form a chrysalis on standing vegetation within about 13 ft (4 m) of the individual plant upon which the larvae hatched. Adult butterflies are not believed to commonly disperse across distances greater than 1.2 mi (1.9 km) and are rarely observed to move greater than 0.4 mi (0.6 km) from their site.
- **Timing considerations:** Development from egg to chrysalis occurs in a little over a month, and island marble butterfly individuals spend up to 334 days in diapause as a chrysalis in the wild. The butterfly will remain in this stage for nearly a year until it emerges as an adult the following spring. Adults emerge from early April to mid-June and live as winged individuals for up to 15 days, but most persist for 2 to 9 days. Males emerge 4 to 7 days before females.
- **Notable relevant pesticide use sites:** Adjacent habitats were at one time largely agricultural lands and have been mostly developed for residential use. Removal or destruction of habitat by conversion from agricultural uses that provide suitable habitat (e.g., old field pasture) to a use 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. 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.

Evaluation of Known Location Information

The island marble is only found on San Juan Island, WA, within American Camp and adjacent land (FWS, 2023).

Review Notes

The developers created this core map using the U.S. Environmental Protection Agency's (EPA) process available at: https://www.epa.gov/endangered-species/process-epa-uses-develop-core-maps-pesticide-use-limitation-areas. EPA reviewed the core map and documentation and evaluated if: (1) the map and documentation are consistent with EPA's process; (2) areas included or excluded from the core map are consistent with the biology, habitat, and/or recovery needs of the species; (3) data sources are documented and appropriate; and (4) the Geographic Information System (GIS) data and mapping process are consistent with the stated intention of the developer. EPA agrees that this map is a reasonable depiction of core areas for this species and was consistent with EPA's mapping process. This documentation was not prepared by EPA, and EPA may have edited this documentation for clarity or other purposes. Some views included in this documentation may not necessarily be the views of EPA or its staff.

The core map developed for this species is considered interim and has not yet been reviewed by the U.S. Fish and Wildlife Service (FWS) species expert(s). EPA intends to use this core map to develop pesticide use limitation areas (PULAs). This core map incorporates information developed by FWS and made available to the public. This core map may be revised in the future after FWS species expert(s) review the map or as additional relevant information becomes available.

Approach Used to Create Core Map

The core map for the Island marble is based on critical habitat because the species is only found within the critical habitat parcel on San Juan Island (USFWS Species Biological Report 2023). The current species critical habitat was confirmed by the 2023 FWS recovery document and the listing and designation of critical habitat document.

Description of Core Map

The core map for the island marble butterfly (Figure 1) is based on critical habitat. This interim core map has a "none" best professional judgement classification for uncertainties since the core map was made using the critical habitat designated area with no additions or subtractions.

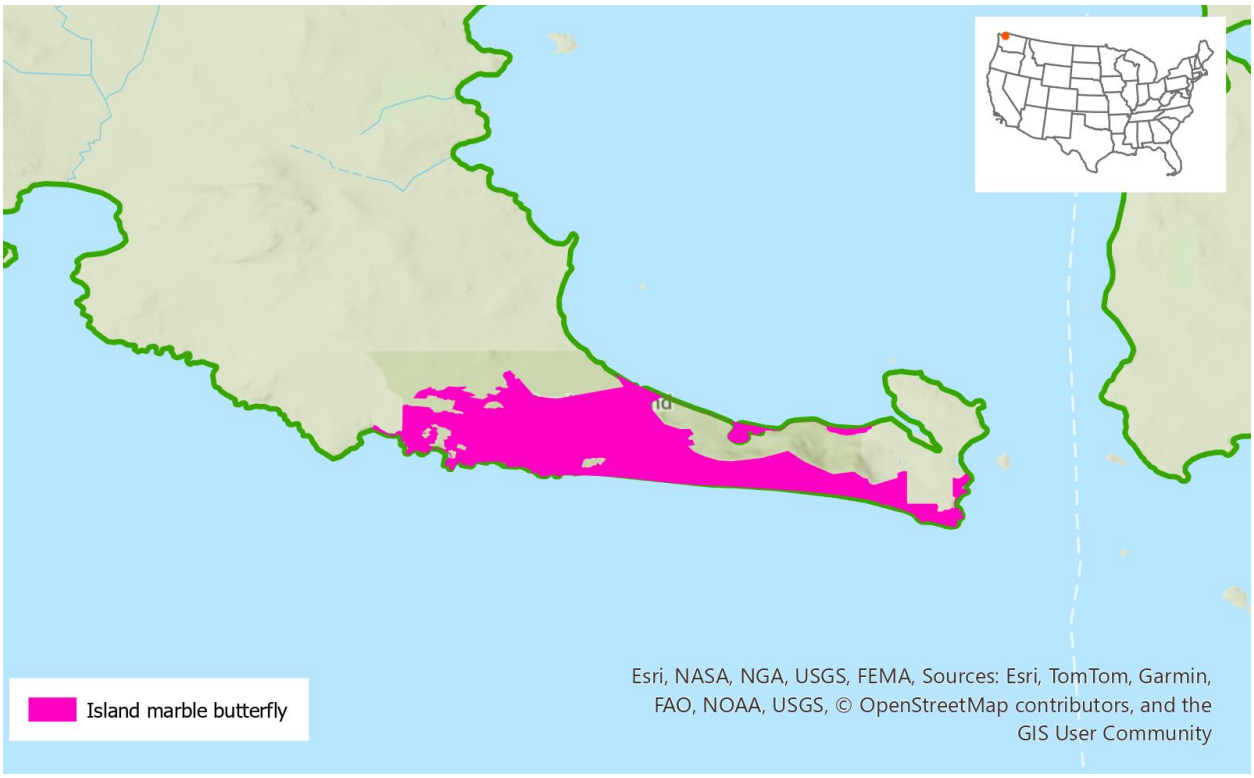


Figure 1. Interim core map for the island marble butterfly (*Euchloe ausonides insulanus*; Entity ID 5610)

Table 1. Percentage of Interim Core Map Represented by NLCD[1] Land Covers and Associated Example Pesticide Use Sites/Types.

Example pesticide use sites/types	NLCD Class/Value	% Area
Forestry	Deciduous Forest (41)	<1%
Forestry	Evergreen Forest (42)	<1%
Forestry	Mixed Forest (43)	<1%
Agriculture	Pasture/Hay (81)	75%
Agriculture	Cultivated Crops (82)	0%
Mosquito adulticide, residential	Open space, developed (21)	<1%
Mosquito adulticide, residential	Developed, Low intensity (22)	5%
Mosquito adulticide, residential	Developed, Medium intensity (23)	5%
Mosquito adulticide, residential	Developed, High intensity (24)	<1%
Invasive species control	Woody Wetlands (90)	0%
Invasive species control	Emergent Herbaceous Wetlands (95)	2%
Invasive species control	Open water (11)	1%
Invasive species control	Grassland/herbaceous (71)	5%
Invasive species control	Scrub/shrub (52)	0%

[1] Dewitz, J., 2023, National Land Cover Database (NLCD) 2021 Products: U.S. Geological Survey data release, https://doi.org/10.5066/P9JZ7AO3

Example pesticide use sites/types	NLCD Class/Value	% Area
Invasive species control	Barren land (rock/sand/clay; 31)	4%
Total Acres	**Interim Core Map Acres**	**822 Acres**

Approach Used to Create Core Map

Corteva Agriscience LLC compiled available information for the island marble butterfly from FWS (no observation information available from publicly available sources (including iNaturalist, GBIF and NatureServe)). The information compiled for the island marble butterfly is included in Appendix 1. Influential information that impacted the development of the core map included:

- FWS documentation notes species is only found in critical habitat.
- No occurrence data from other sources supported expanding the core map beyond the critical habitat.

Corteva Agriscience LLC used the compiled information to identify the core map type. Since known location data is only found in the critical habitat, no further assessing was done. Based on the refined critical habitat that includes all occurrence data identified by FWS, Corteva Agriscience LLC selected the critical habitat to use as the species interim core map.

Appendix 1. Species Information for the Island Marble Butterfly

1. References

- FWS. 2023a. Recovery Plan for Island Marble Butterfly (*Euchloe ausonides insulanus*). US Fish and Wildlife Service, Portland, OR. https://ecos.USFWS.gov/docs/recovery_plan/Island%20Marble%20Butterfly%20Recovery%20Plan%2020230823.pdf
- FWS. 2023b. Species Biological Report for Island Marble Butterfly (*Euchloe ausonides insulanus*). US Fish and Wildlife Service. https://ecos.fws.gov/docs/recovery_plan/IMB%20SBR_20230724.pdf
- 85 FR 26786. 2020, Endangered and Threatened Wildlife and Plants; Endangered Status for the Island Marble Butterfly and Designation of Critical Habitat. Federal Register 85(87):26786-26820. https://www.govinfo.gov/content/pkg/FR-2020-05-05/pdf/2020-07856.pdf

2. Background Information

2.1 Species Information

Status: Endangered, June 4, 2020

Resiliency, redundancy, and representation (the 3Rs)

- Resiliency – low resiliency because there is only one core occurrence complex (OC) that is highly susceptible to stochastic events
- Redundancy – No redundancy because there is only one core OC
- Representation – Low representation because genetic diversity is low and ecological diversity is limited to three habitat types in one area.

Habitat:

Adult island marble butterflies need open, treeless habitat with diverse topographic features to support movement and dispersal and to promote landscape connectivity. While all three larval host plants occur in open grass- and forb-dominated systems, 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; and tumble mustard in sand dune habitat.

Life History:

The island marble is an early-spring flying, univoltine butterfly. Adults emerge between April and June, mate, and lay eggs on three known species of host plants: the native Menzies' pepperweed (*Lepidium virginicum* var. *menziesii*), non-native field mustard (*Brassica rapa*), and non-native tumble mustard (*Sisymbrium altissimum*).

Development from egg to chrysalis occurs in a little over a month, and island marble butterfly individuals spend up to 334 days in diapause as a chrysalis in the wild. Island marble butterfly larvae usually form a chrysalis on standing vegetation within about 13 ft (4 m) of the individual plant upon which the larvae hatched. The chrysalis mimics dead grass and is very difficult to see. The butterfly will remain in this stage for nearly a year until it emerges as an adult the following spring.

Adults emerge from early April to mid-June and live as winged individuals for up to 15 days, but most persist for 2 to 9 days. Males emerge 4 to 7 days before females. Adult butterflies are not believed to commonly disperse across distances greater than 1.2 mi (1.9 km) and are rarely observed to move

greater than 0.4 mi (0.6 km) from their origin site; just one marked individual was recaptured 1.2 mi (1.9 km) from its site of origin.

Diet:
Adults primarily nectar on their larval host plants but use a variety of other nectar plants, including yellow sand verbena (*Abronia latifolia*), yarrow (*Achillea millefolium*), small-flowered fiddleneck (*Amsinckia menziesii*), American sea rocket (*Cakile edentula*), field chickweed (*Cerastium arvense*), common stork's bill (*Erodium cicutarium*), dovefoot geranium (*Geranium molle*), hairy cat's ear (*Hypochaeris radicata*), common lomatium (*Lomatium utriculatum*), seashore lupine (*Lupinus littoralis*), common forget-me-not (*Myosotis discolor*), California buttercup (*Ranunculus californicus*), trailing blackberry (*Rubus ursinus*), dandelion (*Taraxacum officinale*), death camas (*Toxicoscordion venenosum*), and Howell's brodiaea (*Triteleia grandiflora*).

Pollination Type and Pollinator:
N/A

Taxonomy:
The island marble butterfly (*Euchloe ausonides insulanus*) is a terrestrial invertebrate (Order: Lepidoptera, Family: Pieridae).

Relevant Pesticide Use Sites:
Adjacent habitats were at one time largely agricultural lands but now have been mostly developed for residential use. Removal or destruction of habitat by conversion from agricultural uses that provide suitable habitat (e.g., old field pasture) to a use 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.

Agricultural practices on the 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 the tilling takes place during the fall and the winter months (e.g., December through February), it allows 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.

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.

Relevant Recovery Criteria and Actions (FWS, 2023a):
A major cause of the species' decline is the loss and degradation of suitable habitat throughout its range due to vegetational succession, invasive nonnative plants, and herbivory. The island marble butterfly also

faces threats of predation from spiders and wasps, incidental predation by black-tailed deer (Odocoileus hemionus columbianus), and vulnerabilities associated with occupancy being limited to a single area.

1. Objective: Establish multiple core OCs of the island marble butterfly across its range that are resilient and will conserve or expand genetic and ecological representation. Suitable habitat should be established on conserved sites where habitat loss and degradation, incidental predation, and small population size will be adequately managed.
2. Criteria:

   Downlisting Criteria:
   1. At least 4 core OCs, with 2 on San Juan Island and 1 on Lopez Island
   2. Suitable habitat remaining stable or increasing in at least 9 of 12 years
   3. Sufficient suitable habitat is conserved and managed with long-term management commitments, including conservation of large, open treeless areas with diverse topographic features, suitable habitat representing the diversity of habitat types used by this species (coastal lagoons/shoreline, grassland/prairie and sand dune), and stepping-stone habitat connecting them.

   Delisting Criteria:
   1. At least 6 core OCs, with 3 on San Juan Island and 2 on Lopez Island
   2. Suitable habitat remaining stable or increasing in at least 9 of 12 years without population augmentation
   3. Sufficient suitable habitat is conserved and managed with long-term management commitments, including conservation of large, open treeless areas with diverse topographic features, suitable habitat representing the diversity of habitat types used by this species (coastal lagoons/shoreline, grassland/prairie and sand dune), and stepping-stone habitat connecting them.
3. Recovery Actions:
   1. Protect the island marble and its habitat at American Camp by reducing herbivory on host plants and incidental predation on butterflies, enhancing suitable habitat and controlling invasive plants
   2. Establish and expand suitable habitat for the island marble butterfly across its range representing the diversity of habitat types used by this species (coastal lagoons/shoreline, grassland/prairie and sand dune)
   3. On sites with long-term conservation commitments, conserve and manage suitable habitat for the island marble butterfly by maintaining disturbance regimes and reducing herbivory on host plants and incidental predation on butterflies
   4. In areas of suitable habitat within the species range, identify or establish (through captive rearing, augmentation, reintroduction, and/or dispersal) three to five core OCs to increase the species' resiliency, representation, and redundancy
   5. Actively and adaptively manage dispersal corridors and stepping-stone habitat to improve connectivity among core OCs
   6. Conduct research on life history, management techniques, and the effects of climate change on the species and habitat to guide conservation efforts for the island marble butterfly
   7. Monitor the species range-wide, track trends over time and assess threats
   8. Coordinate and collaborate with partners to conserve the island marble butterfly throughout its range

2.2 Range

The island marble was historically known from the southeastern coast of Vancouver Island north to Nanaimo, Canada, but has not been observed in Canada since 1908. The species was rediscovered in 1998 on San Juan Island, Washington, United States. In 2006, five areas of occupied habitat were documented across San Juan and Lopez Islands, WA. By 2012, the species distribution contracted to a single population at American Camp of San Juan Island National Historical Park (operated by the National Park Service [NPS]), with a few larvae detected on Lopez Island. The species is now (as of 2023 recovery plan) considered extirpated from Lopez Island and is only found at American Camp. In 2020, 812 acres on the south end of San Juan Island were designated as critical habitat.

The range (Figure 2) was last updated 03-01-2022 and covers approximately 111,134 acres.

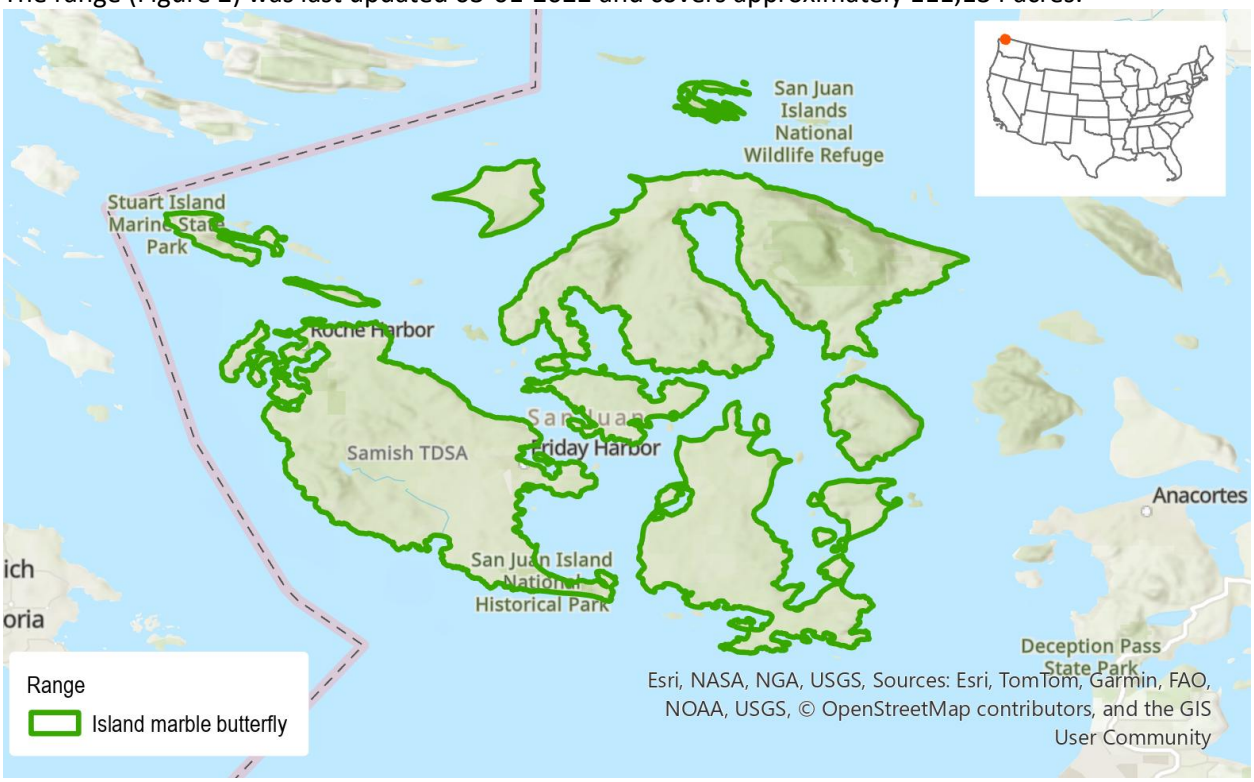


Figure 2. Range for the island marble butterfly (https://ecos.USFWS.gov/ecp/species/3285). The total acreage of the range is approximately 111,134 acres.

2.3 Critical Habitat

Critical habitat for the island marble has been designated on the south end of San Juan Island, WA. A total of 812 acres are included.

Essential Physical Biological Features (PBFs) for Designated Critical Habitat:

1. 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.

2. 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.

3. 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-menot), *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).

4. 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 for the island marble butterfly to complete its life cycle.

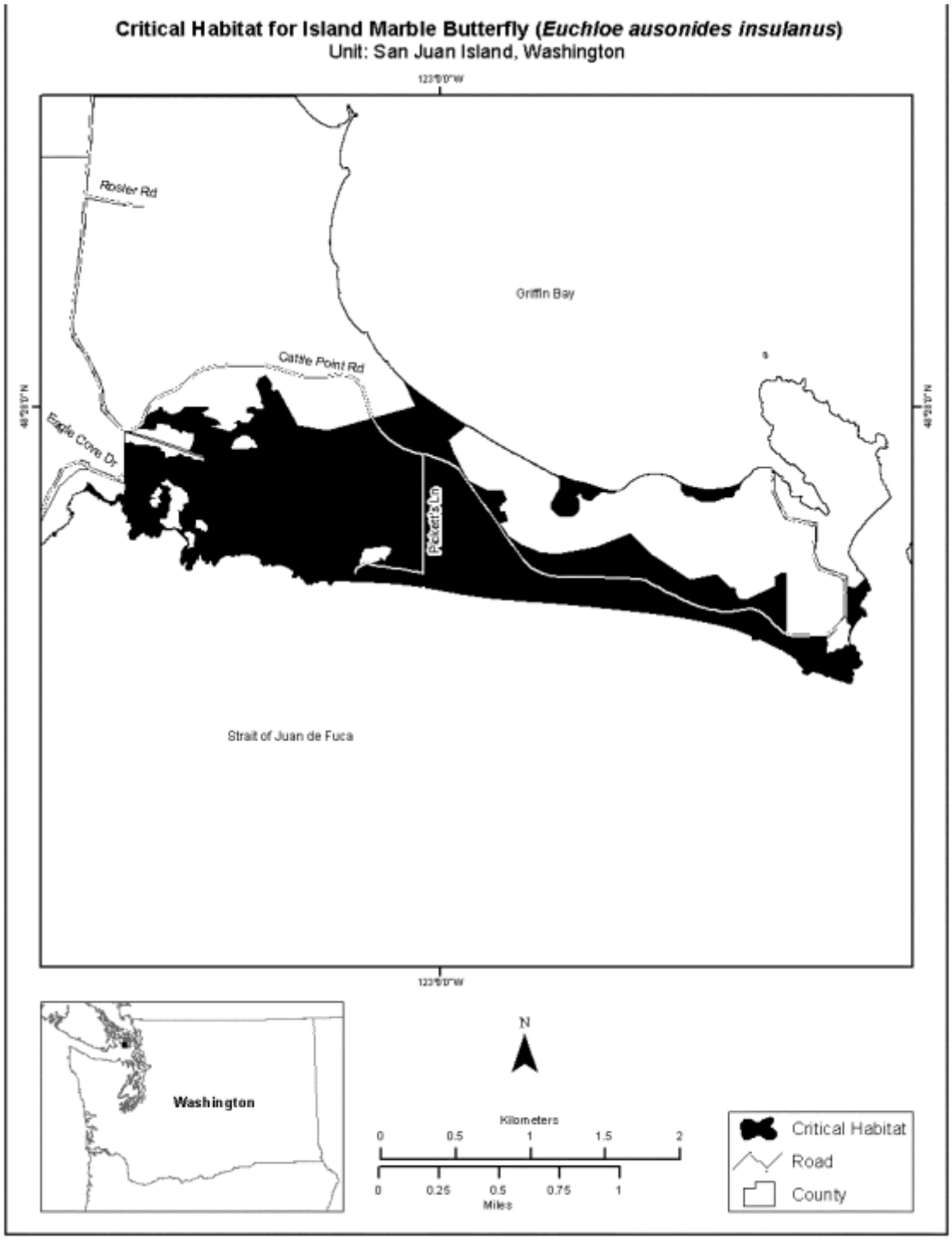


Figure 3**. Critical habitat for the island marble butterfly. The total area is 812 acres (85 FR 26786).**

2.4 Known Locations

The island marble is only found in American Camp at Washington's San Juan Island National Historical Park and adjacent areas.

2.5 Additional Information

N/A

Appendix 2. Core Map Development

3. References and Software

Software used: *ArcGIS Pro 3.4.0*

4. Datasets Used in Core Map Development

4.1 Critical Habitat

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, operated by the 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 NPS but includes adjacent lands both to the east and the west of NPS 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 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.

Table 2. Critical Habitat for the Island Marble Butterfly

Land ownership by type	Size of unit in acres (hectares)
National Park Service (NPS)	718 (291)
Bureau of Land Management (BLM)	19 (8)
Dept. of Homeland Security (DHS)- Coast Guard	5 (2)
Washington Dept. of Fish and Wildlife (WDNR) and San Juan County Land Bank (SJCLB)	1 (0.4)
Washington Dept. of Fish and Wildlife (WDNR)	37 (15)
San Juan County Parks Dept. (SJCPD)	30 (12)
Private	2 (0.8)
Total	**812 (329)**

Note: Area sized may not sum due to rounding

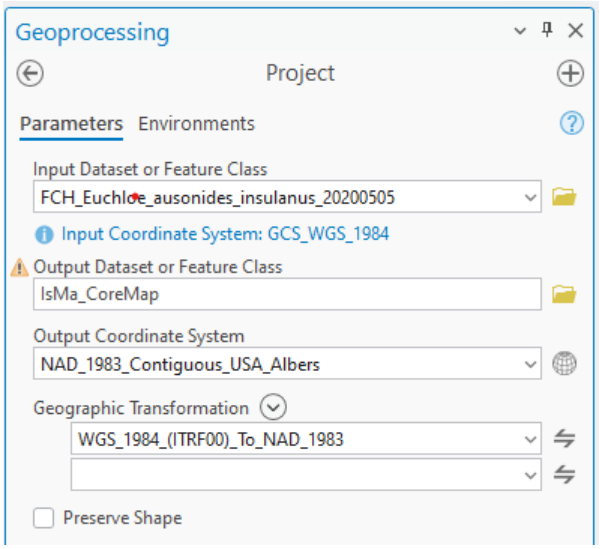
Critical habitat data was last updated on May 5, 2020, and a GIS file was downloaded on May 14, 2025.

5. Core Map Development

This core map was created based on the critical habitat.
Dataset References and Software

- NLCD Land Cover 2021 (landcover percentages)
- Software used: ArcGIS Pro 3.2

The core map was developed by downloading the critical habitat data from the FWS Environmental Conservation Online System (ECOS) website using the following URL https://ecos.fws.gov/docs/crithab/zip/FCH_Euchloe_ausonides_insulanus_20200505.zip. The data was unzipped and reprojected to the default CONUS region Coordinate Reference System (CRS) used by EPA, the NAD 1983 Contiguous US Albers CSR. The resulting feature dataset is the core map named "IsMa_CoreMap".



5.1 Data Reviewed but not Used in Development

iNaturalist, Global Biodiversity Information Facility (GBIF), and NatureServe were all assessed for occurrences. None of these databases contained any data points for the island marble butterfly.

6. Proposed Core Map

The interim core map for the island marble butterfly is shown in Figure 4 below.

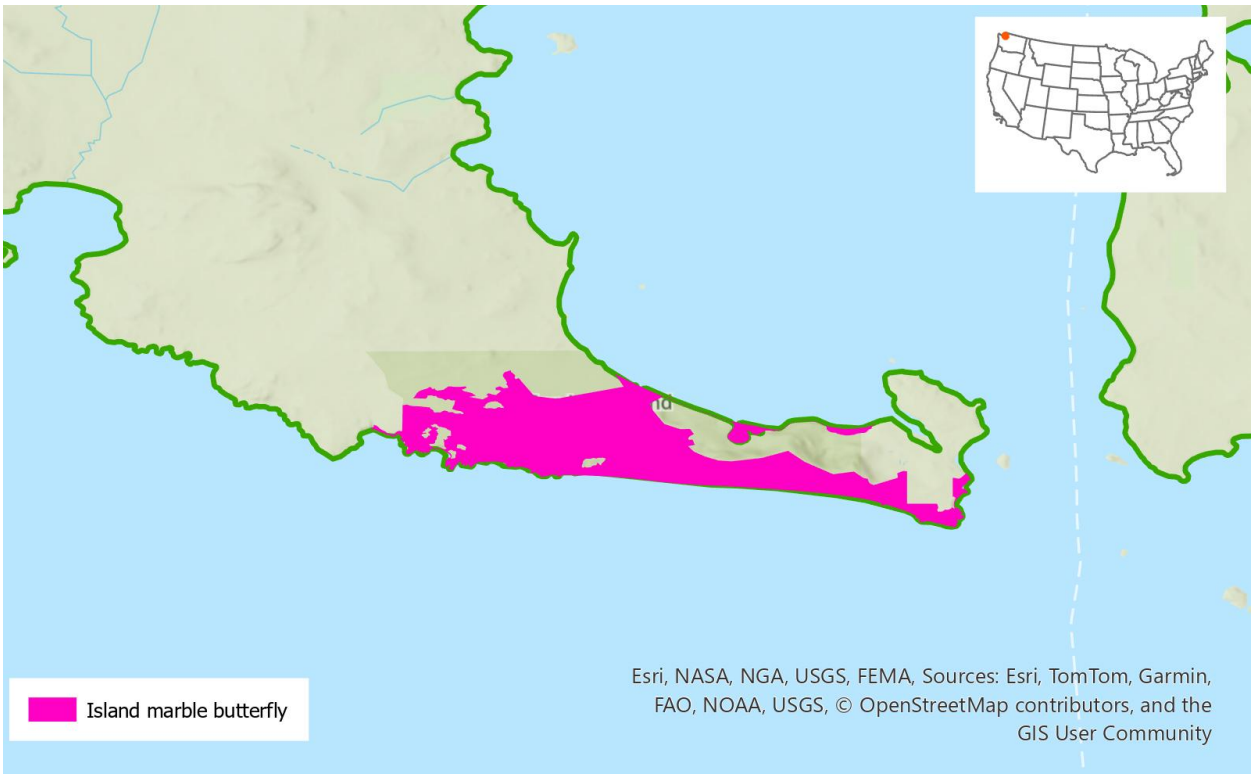


Figure 4. Interim core map for the island marble butterfly (*Euchloe ausonides insulanus*; Entity ID 5610)