Interim Core Map Documentation for the Nioi (*Eugenia koolauensis*)

Draft Core Map Development

ArcGIS Pro 3.3 was used to perform all spatial operations.

Draft Interim Core Map Developer: Tessenderlo Kerley Inc./GESTF

Date Uploaded to the U.S. Environmental Protection Agency's (EPA) GeoPlatform: September 2025

EPA Review Notes

The developers created this core map using EPA's process available at: https://www.epa.gov/endangered-species/process-epa-uses-develop-core-maps-pesticide-use-limitation-areas. EPA reviewed the draft interim map and documentation and evaluated if: (1) the map and documentation are consistent with the agency's process; (2) areas included or excluded from the interim 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 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 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 can be used to develop pesticide use limitation areas (PULAs). This core map incorporates information developed by FWS and made available to the public; however, the core map has not been formally reviewed by FWS. This interim core map may be revised in the future to incorporate expert feedback from FWS.

This core map does not replace or revise any range or designated critical habitat developed by FWS.

Basis for Core Map: The interim core map for this species is biological information type based on critical habitat and known historical locations.
Level of Best Professional Judgement (EPA scale): 3-average. The core map is based directly on critical habitat and clear maps of historical locations.

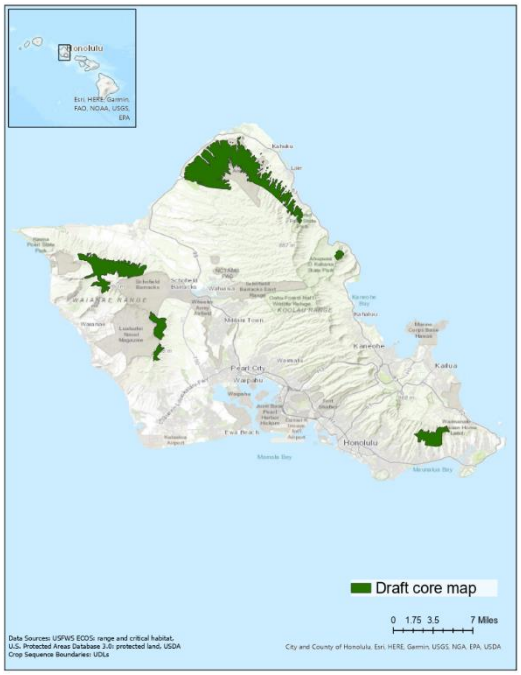

Figure 1. Interim core map for the Nioi based on critical habitat and known locations.

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

Example pesticide use sites/types	NLCD Class/Value	% Area	Total area for landcover type
Forestry	Deciduous Forest (41)	0	85
Forestry	Evergreen Forest (42)	85	85
Forestry	Mixed Forest (43)	0	85
Agriculture	Pasture/Hay (81)	0	0
Agriculture	Cultivated Crops (82)	0	0
Mosquito adulticide, residential	Open space, developed (21)	0	2
Mosquito adulticide, residential	Developed, Low intensity (22)	2	2
Mosquito adulticide, residential	Developed, Medium intensity (23)	0	2
Mosquito adulticide, residential	Developed, High intensity (24)	0	2
Invasive species control	Woody Wetlands (90)	0	12
Invasive species control	Emergent Herbaceous Wetlands (95)	0	12
Invasive species control	Open water (11)	0	12
Invasive species control	Grassland/herbaceous (71)	2	12
Invasive species control	Scrub/shrub (52)	10	12
Invasive species control	Barren land (rock/sand/clay; 31)	0	12
Total Acres	**Interim Core Map Acres**	**~20,000**	

[1] Hawaii CCAP Land Cover https://coast.noaa.gov/digitalcoast/data/ccapregional.html

Key Core Area Inputs

Sourced from most up-to-date documentation available on ECOS.

Habitat	Descriptions/Datasets
Range	Updated 2021
Critical habitat	Designated 2016
Suitable habitat	2008 5-year review: Dry to mesic forests, usually on gulch slopes
Known locations (General Descriptions)	2024 5-year review: 4 populations on O'ahu. 2008 5-yr review: Presumed extirpated on Moloka'i, the region it existed has been converted to pineapple fields. 10 populations in the Koolau mountains of O'ahu, with only one wild individual remaining in the Waianae mountains 1998 recovery plan has map with known populations (Fig 4)
Element occurrences	GBIF and iNaturalist had no occurrences with coordinates NatureServe was searched for occurrence data; however the occurrences found did not impact the core map.
Relevant recovery criteria	2024 5-year review: Minimum of 3 populations on O'ahu with a minimum of 25 reproducing individuals per population

Datasets Used in Core Map Development

- ECOS Datasets:
  - Most recent species range: https://ecos.fws.gov/docs/species/shapefiles/usfws_complete_species_current_range.zip
  - Most recent species critical habitat downloaded via aggregate feature class, current update status checked on individual species page: https://ecos.fws.gov/ecp/report/critical-habitat
  - Recovery plan for Oahu Plants https://ecos.fws.gov/docs/recovery_plan/980810.pdf
  - Eugenia koolauensis 5-Year Review: 2024 https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/17377.pdf
  - Nioi (Eugenia koolauensis) 5-Year Review: 2019 https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/2862.pdf
  - Nioi (Eugenia koolauensis) 5-Year Review: 2013 https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/2072.pdf
  - Nioi (Eugenia koolauensis) 5-Year Review: 2008 https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/1173.pdf

Deciding Factors for Core Map Formation

- 2024 document confirms only four populations are currently known on O'ahu
- Species is considered extirpated on Moloka'i
- 1998 recovery plan has a map showing the known populations at that time in O'ahu
- 2024 5-year review: In 2022, a census was conducted at four populations (Pahipahi'ālua, 'Ō'io, Kaleleiki, and Kaunala). All these populations occur in the Kahuku Training Area region in northern O'ahu. Given that only four populations are definitively known to occur on O'ahu in 2024, these may be the only remaining populations. In this case, the critical habitat portion of the core map could be removed.
- Core map is based on critical habitat, as well as the range area overlapping the Kuhuku military base and listed survey areas. These areas also correlate to the population map in the 1998 recovery plan.

Core Map Development

- The most recent range and critical habitat shapefiles were downloaded from ECOS.
- Critical habitat was copied to a new feature class called "Core map."
- Edit "Core map", Create > Trace tool was used to trace the outline of the range feature class in the Kahuku Training Area region in northern O'ahu and add this area to the core map feature class.

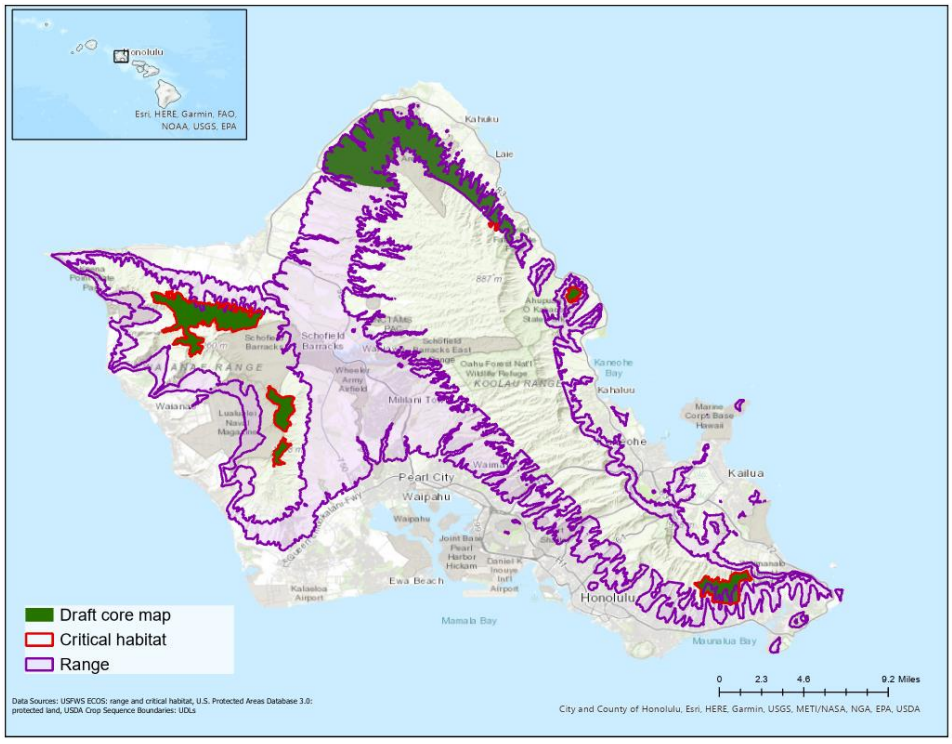

Figure 2. Interim Core map for O'ahu includes critical habitat and segment of range overlapping with 2024 survey locations and 1998 population locations.

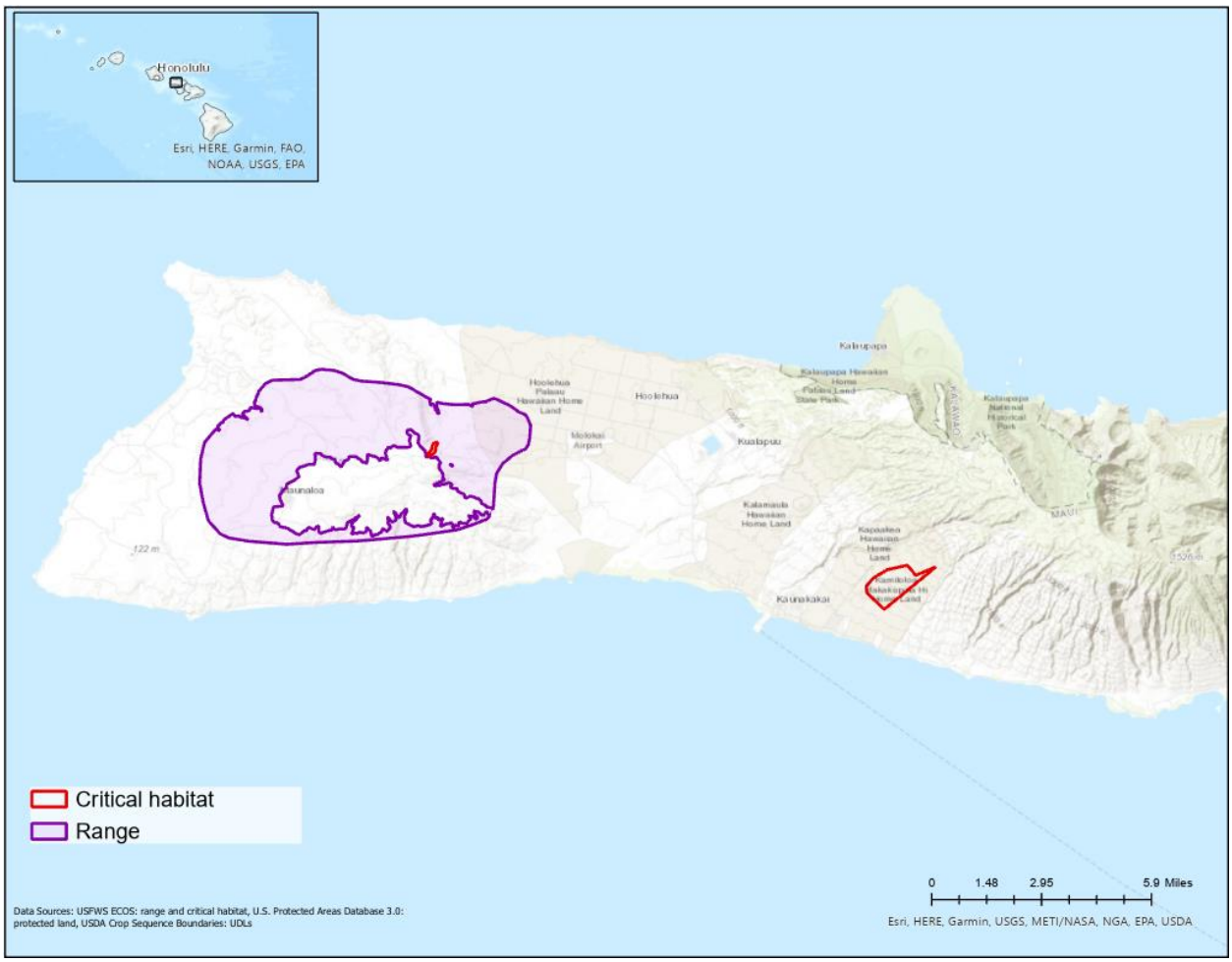

Figure 3. The species is presumed extirpated on Moloka'I, therefore, no core map was created for this island.

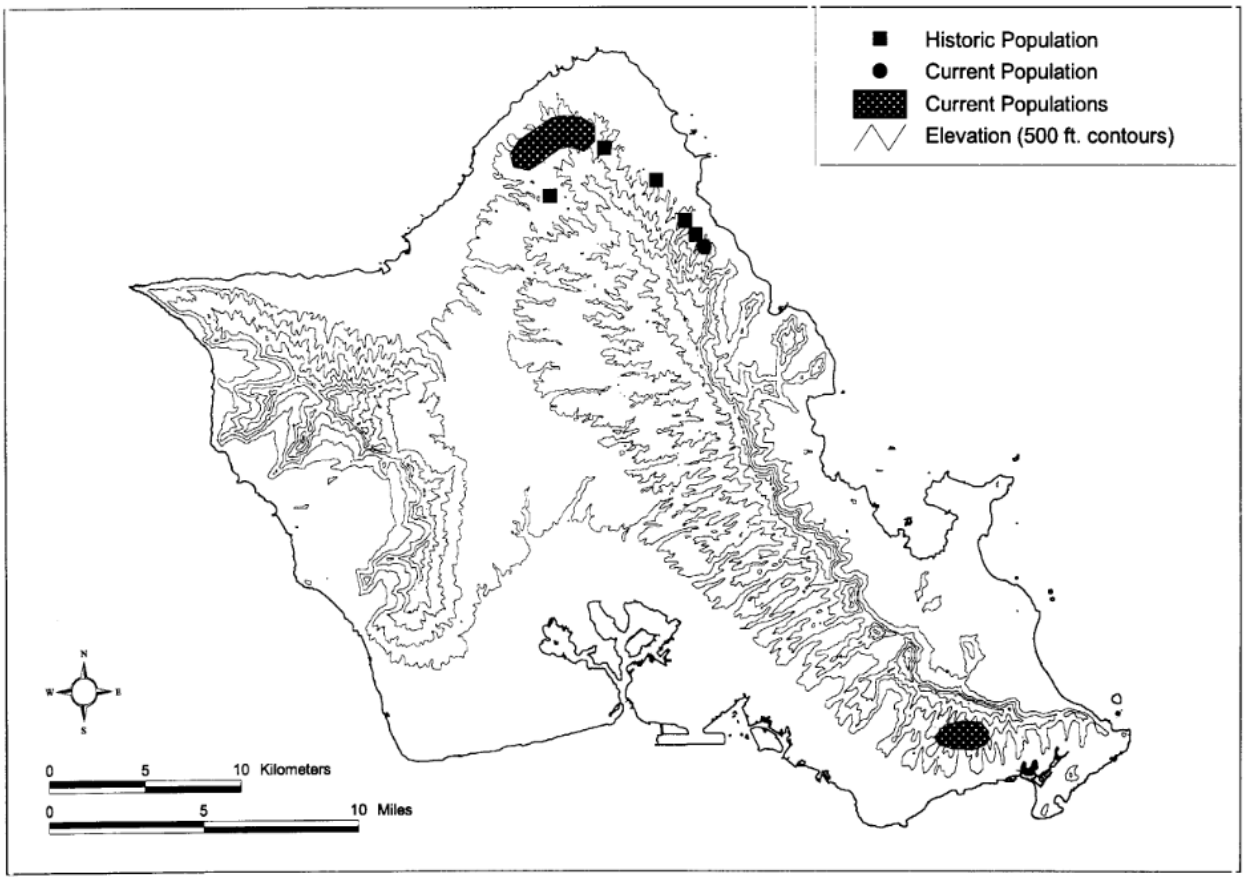

Figure 4. 1998 Recovery plan map showing population distribution on O'ahu (Recovery Plan for O'ahu Plants, 1998 [C-30, page 307]).