

Papahānaumokuākea Marine National Monument

Alien Species

Management Issue

An alien or non-indigenous species can be defined as an organism that is not native to a particular ecosystem. In some cases, such alien species may become invasive by demonstrating rapid growth and spread, invading habitats and thereby displacing native organisms. Managers need to understand the potential ecological impacts of alien species to the natural resources of the Papahānaumokuākea Marine National Monument (PMNM or Monument).

Description

Populations of marine alien species that are established in areas of the main Hawaiian Islands represent the high probability source for species affecting the Northwestern Hawaiian Islands (NWHI). Marine alien species established in the main Hawaiian Islands are typically found associated with natural and man-made structures ranging from the littoral zone to the outer reef slope. In the marine environment, the introduction of marine alien species through anthropogenic activities has occurred throughout the world through a variety of mechanisms including maritime shipping, live seafood and bait, aquaculture, shipments of commercial and institutional aquarium species, and the activities of education and research institutions.



The alien hydroid Pennaria disticha. Photo credit: S. Godwin

A total of 13 introduced invertebrate, fish and algal species have been authoritatively recorded in the NWHI, but only 11 of these are considered to be established. All species recorded in the NWHI are represented in the established populations of the main Hawaiian Islands. Eleven of the species have disjunct distributions in the NWHI and are presently only recorded from altered habitats with high levels of historic human activity at Midway Atoll and French Frigate Shoals. There are only two marine alien species found throughout the NWHI: the hydroid *Pennaria disticha* and the blue-lined snapper *Lutjanus kasmira*. Not all marine alien species that become established will become invasive, but those that do exhibit this quality can produce devastating impacts including loss of biodiversity, functional changes of ecosystems and alterations in nutrient cycling pathways.

Questions and Information Needs

- 1) What alien species represent the biggest threat to the NWHI?
- 2) How often and where are alien species coming into the NWHI?
- 3) What are effective controls for marine alien species?
- 4) Are established alien species spreading, and if so, at what rate?
- 5) What environmental conditions or other factors determine whether alien marine species become invasive?

Scientific Approach and Actions

Develop an interagency NWHI alien species plan to address best management practices for minimizing transport, possible control measures and response strategies. This would take the form of specific detection and remediation requirements and guidelines for all permitted activities in the Monument including research, conservation and management, education, Native Hawaiian practices, recreation and special ocean use.

Examples include:

- Inspections for detecting marine alien species associated with research and support vessels (including secondary launches and platforms), scientific sampling gear and instrumentation, and any materials to be used for shoreline construction projects
- Identify, characterize and monitor established populations of invasive species; conducting research on detection and control, and working with partners in responding to newly identified alien populations

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For More Information -- <http://www.sanctuaries.noaa.gov/science/assessment>

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- Develop predictive models for marine alien species exposure and spread
- Inform Monument users and the public by integrating alien species information into an overall outreach program for permittees; and information into general Monument outreach materials
- Integrate the concepts of marine alien species and invasive behavior into the mindset of monitoring and assessment activities occurring in the NWHI. This should be done through the development of reference materials for potential and established alien species
- Participate in statewide and regional efforts on marine alien species management

Potential Key Partners and Information Sources

US Fish and Wildlife Service; State of Hawai‘i Department of Land and Natural Resources, Division of Aquatic Resources; State of Hawai‘i Department of Land and Natural Resources, Division of Forestry and Wildlife (Kure Atoll); NOAA Marine and Aviation Operations; Bernice P. Bishop Museum; Hawai‘i Institute of Marine Biology.

Management Support Products

- Support research products will support pro-active, reactive and post-event management measures
- Guidelines concerning measures for minimizing the transport of marine alien species to the Monument
- GIS integrated predictive model for marine alien species arrival and spread in the Monument
- Field guides contained species descriptions for established and potential new invaders and distribution data for established marine alien species in the Monument
- Spatial and quantitative data sets of the distribution of marine alien species in the Monument
- Web accessible information gained from local and international meetings focusing on invasive species
- Guidelines for interagency post-event management measures for introductions of marine alien species into the Monument associated with both natural and anthropogenic mechanisms (i.e. vessel grounding and debris)

Planned Use of Products and Actions

- Guidelines will be provided to all entities applying for entry permits to the Monument
- Predictive models will be used in conjunction with other pro-active measures to support decisions concerning present and future activities in the Monument
- Field guides will be provided to all entities conducting field diving operations to provide expanded survey capabilities for detection of marine alien species
- Spatial and quantitative data sets will be used to document new species records and determine if expansion out of present locations is occurring
- Web products used by local entities to review activities concerning marine alien species management
- Guidelines for post-event measures would be used on an interagency basis when dealing with introductions of marine alien species that are a secondary factor associated with a primary natural or anthropogenic events

Program References

PMNM Management Plan

- Action Plan 3.1.1 Marine Conservation Science (Strategy MCS-1)
- Action Plan 3.3.2 Alien Species (Strategy AS-1; AS-2; AS-3; AS-7; AS-8; AS-9; AS-10)
- *Other Action Plans*: Threatened and Endangered Species, Habitat Management and Conservation, Marine Debris, Maritime Transportation and Aviation, Permitting, Enforcement, Constituency Building and Outreach, Ocean Ecosystems Literacy, Information Management, Coordinated Field Operations

PMNM Condition Report

- Question 11 notes the issue of Invasive Species

Other Documents

- Monument Goals 1, 2, 3, 4, and 5.

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