

# Papahānaumokuākea Marine National Monument

## Invasive Species

### Management Issue

An invasive species can be defined as an organism that is not native to a particular ecosystem, that demonstrates rapid growth and spread, invades habitats, and displaces native organisms. Managers need to understand the potential ecological impacts of these introductions to the native 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. These species established in the main Hawaiian Islands are found associated with natural and man-made habitats 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 Northwestern Hawaiian Islands but only 11 of these are considered to be established. All species recorded in the Northwestern Hawaiian Islands are represented in the established populations of the main Hawaiian Islands. Eleven of the species have disjunct distributions in the Northwestern Hawaiian Islands 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 Northwestern Hawaiian Islands; 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 native biodiversity; functional changes of ecosystems; and alterations in nutrient cycling pathways..

### Questions and Information Needs

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

### Scientific Approach and Actions

Develop an interagency Northwestern Hawaiian Islands 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 pertaining to research, conservation and refuge facility support.

*Updated: 5/1/2010*

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

## Scientific Approach and Actions *(continued)*

Examples would be:

- 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; conducting research on detection and control; and working with partners in responding to newly identified
- Develop predictive models for marine species exposure and spread that apply to the Islands
- 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 non-indigenous species and invasive behavior into the mindset of monitoring and assessment activities occurring in the NWHI. This would be done through the development of reference materials for potential and established 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 Dept of Land and Natural Resources, Division of Aquatic Resources; State of Hawai‘i Dept of Land and Natural Resources, Division of Forestry and Wildlife (Kure Atoll); NOAA Marine and Aviation Operations

## Management Support Products

- Support products for research 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 exposure and spread in the monument
- Field guides contained species descriptions for established and potential new invaders and distribution data for established marine aliens 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 marine alien species introductions to 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 model 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 marine alien species detection
- 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 marine alien species introductions 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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