

Aquatic Invasive Species Team 2006 Activity

Project Strategy

In 2006, the Aquatic Invasive Species (AIS) Response Team continued work on key projects dealing with the eradication and control of target aquatic species. These projects included the eradication of mushroom anemones and upside down jellyfish as well as large-scale control efforts for alien algae. Other activities also included a large effort to map alien algae statewide as well as continue developing techniques and tools for eradication and control.

Highlights

- Mapped significant inshore reef areas for alien algae.
- Completed the construction of a new “Supersucker” barge that will allow alien algae in new geographic regions.
- Completed the eradication of the mushroom anemone, *Actinodiscus nummiformis*.
- Completed the eradication of the Upside Down Jellyfish, *Cassiopea sp.*, in the Waiopae Marine Life Conservation District.
- Finished the treatment phase of Port Allen Commercial pier in order to eradicate the Snowflake Coral, *Carijoa riisei* on Kauai.

Target Species

Gracilaria salicornia (Gorilla Ogo)

Kappaphycus spp/ Euchuma complex (Smothering Seaweed)

Acanthophora spicifera (Prickly Seaweed)

Hypnea musciformis (Hookweed)

Avrainvillea amadelpa (Leather mudweed)

Carijoa riisei (Snowflake Coral)

Mycale armata (Orange Key Hole Sponge)

Actinodiscus nummiformis (Mushroom Anemone)

Cassiopea andromeda (Upside Down Jellyfish)

Staff

The AIS Response Team was formed in 2005 and is comprised of one AIS Research Supervisor, 6 AIS Research Technicians and 1 Americorp Intern. Two technician positions are located in Hilo, Hawaii while other staff are located at the Hawaii Institute of Marine Biology. The collaboration with the Hawaii Institute of Marine Biology (HIMB) is vital to the operations of the AIS Response Team. Available facilities allow staff to work on the bay and be around a prime research community which allows increased exchange of information.

Field Work Alien Algae Management

In 2006, the AIS Response Team initiated an effort to create baseline alien algae distribution maps. To date, significant areas in the State have been mapped. These areas include Hilo coast, parts of south Molokai, windward Oahu, Maunalua Bay, Waikiki, and parts of Ewa Beach, Oahu. The maps (Figure 1) contain presence and absence as well as relative abundance data for Gorilla Ogo.

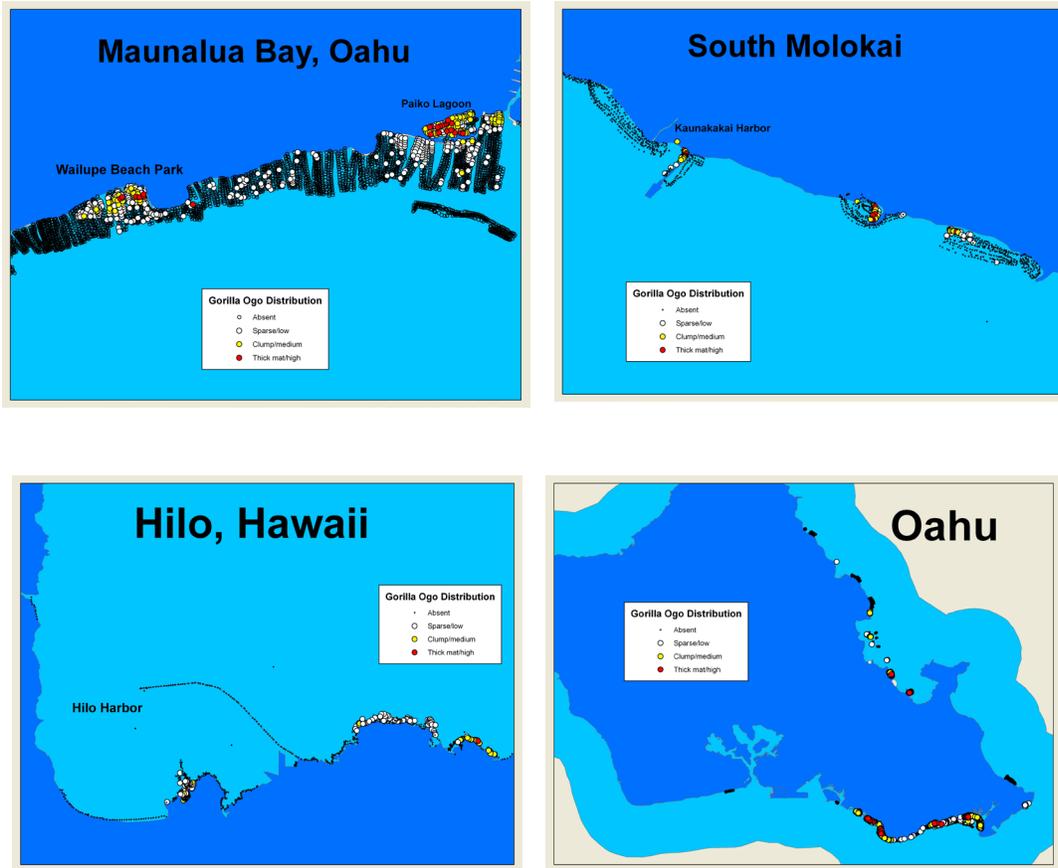
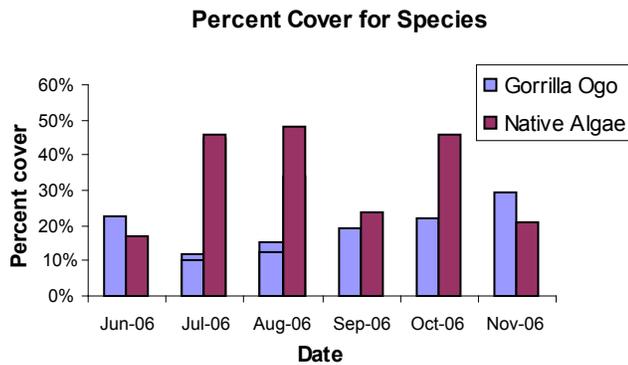


Figure 1: Maps showing distribution of Gorilla ogo



Based on the alien algae distribution maps generated, key areas in Maunalua Bay were targeted as areas of interest. One of the areas chosen includes Waiupe Beach Park. This area has shown an increase of alien algae abundance over the last 5 years and may serve as a source population for continued spread. In order to work towards longer-term management of alien algae in Maunalua Bay, a removal and regeneration experiment was conducted. This basic experiment consists of 2 large plots

estimated to be 2700 m². One plot was an experimental removal plot while the other was a control plot. Replication of plots was compromised in order to increase the size of an experimental removal plot. A removal plot of this magnitude has not been tested for algae regeneration to date and may serve as the largest experiment for alien algae removal. In the absence of large-scale mechanical removal for this area, the AIS Response Team worked with the Youth Conservation Corp interns (Figure x) to clear approximately 5,000 pounds of Gorilla Ogo from the removal plot. This plot was monitored for species coverage for six months. Over the course of six months, the removal plot returned to the original state prior to removal (Figure x). This data indicates that other forms of management need to be implemented in order to keep the algal abundance to low levels.



In order to remove 5,000 pounds of algae from Wailupe Beach Park, it required more than a dozen individuals 5 full days of hand pulling algae from the reef flat. With the continued development of more efficient technologies, the AIS Response Team also worked on testing the algae vacuum known as “The Supersucker.” This project continues to be a joint venture between the Hawaii Department of Land & Natural Resources, the University Hawaii Manoa, and The Nature Conservancy. The Supersucker operates with a 5-person crew in Kaneohe Bay, Oahu and is capable of sucking up hundreds of pounds of algae per hour of dive time. In 2006, the invasive alga, Smothering Seaweed, was also tested on the Supersucker, and the results are quite promising. The continuing development of this technology will allow increased biomass to be removed from the reefs and allow managers to explore other management options to maintain the algal biomass at low levels.

To further expand this capacity, a new barge designed and built for deployment to new locations. As the original barge is limited to the new smaller barge can be launched from any the State and deploy in most habitats. Early barge suggests it will be as efficient as the original its smaller size.



(Figure x) was geographic Kaneohe Bay, boat ramp in testing of this barge despite

As the results of the experimental removal plot in Wailupe show, the manual removal of alien algae is not the sole solution to alien algae issues. The algae needs to be further controlled in a more cost effective way. In order to achieve this, the AIS Response Team is beginning to look at the role of fishes as a biocontrol tool. Native fishes naturally graze on algae; however, when the abundance of some species reaches a critical mass, fish grazing pressure is unable to maintain the algal biomass low. By examining the role of fish grazing pressure on algal abundance, new approaches will begin to emerge in the long-term management of alien algae. This research also

compliments the on-going research in raising native Sea Urchins to plant on reefs to help maintain low levels of alien algae.

This past year marked the 4th year of the A’ohe Limu’e, No Alien Algae, events. These invasive algae volunteer cleanup events continue to be a success with the general public and serve an excellent venue for public awareness for aquatic invasive species issues. They were held in Waikiki at the Hilton Hawaii Village Resort and the Waikiki Marine Life Conservation District. These events allow volunteers from the local community, including individual community members, local school groups, extra-curricular activity groups, and other local community service groups to actively participate in a large-scale removal effort. The events inform the public about the threat of introduced species in an experiential manner by having them participate in removing mats of algae from the reefs in Waikiki. The volunteers see first-hand the destruction the algae is creating on the coral reef ecosystem in Hawaii.

Table X. Results of alien algae community clean-up events.

2006	Location	Number of Volunteers	Tons Removed
28-Jan-06	Hilton Hawaiian Village	79	2
11-Mar-06	Hilton Hawaiian Village	97	2
10-Jun-06	Hilton Hawaiian Village	60	1
12-Aug-08	Waikiki MLCD	61	1
23-Sep-06	Waikiki MLCD	106	1
18-Nov-06	Waikiki MLCD	88	0.5

These events have received considerable media coverage, including a story in the Honolulu Star-Bulletin Mid-Week publication, feature in a BBC documentary about various environmental problems in the Hawaiian Islands, and a segment on the television show “Outside Hawaii.”

Table X: Comparison of different methods of algae removal

Method	Total # algae Removed (lbs.)	Total # of manpower hrs.*	Avg. # lbs./ person/hr.
Supersucker	10,460	480	21.8
Community Cleanups	15,000	1964	7.6

* based on 8 hrs. per 5 Supersucker crewmember per outing and 4 hrs. per event per volunteer for Community Cleanups.

Eradication:

The AIS Response Team has begun some key projects to eradicate invasive or potentially invasive aquatic species. In 2006, three species were targeted for eradication (Mushroom Anemones, Upside Down Jellyfish, and Snowflake Coral). Significant progress has been made on all 3 species with 2 species believed to be successful.



The Mushroom Anemone (Figure X) was an intentionally-introduced organism sometime prior to 1996. Although the AIS Response Team worked on this species throughout 2005, the organism was unable to be eradicated. In 2006, few polyps existed, but they proved to be difficult to remove.

series of surveys and the implementation of two methods (Figure x), it is believed that all been removed. Since July 2006, surveys have revealed no new polyps. continue in 2007 to ensure that no new been overlooked.



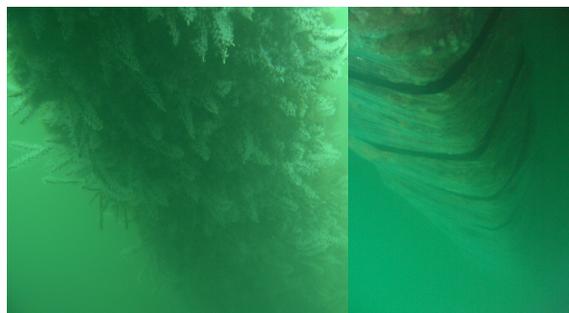
find and Through a repeated separate polyps have monthly Surveys will polyps have



In addition to the Mushroom Anemone, the Up-side Down Jellyfish was also targeted for eradication in the Waiopae Marine Life Conservation District (MLCD). This Jellyfish population inhabited an isolated tide pool in the MLCD. Given the distribution of this species, the discovery of this organism in the Waiopae MLCD was a new record. In an attempt to eradicate this local population, more than 200 individuals were manually removed from the tide pools. Research at the Hawaii Institute of Marine Biology suggests that the Up-side Down

Jellyfish may play a role in the transmission of coral disease. Although, much research needs to be conducted on this topic to verify the significance of this connection, it was decided to respond to a situation that was containable. Since their removal in early 2006, no Jellyfish has been detected at this site, and this species is thought to be locally eradicated. The site will continued to be monitored in 2007 to assess the long-term success of the eradication efforts.

The eradication of Snowflake continued in 2006. In May 2006, under the commercial pier were commercial plastic (Figure x). repeated surveys were conducted colonies not killed. Early after the treatment, many small discovered at the bottom of the between the plastic and silt).



Coral all pier pilings treated with Since May, to detect completing colonies were pilings (in With

continued wrapping, most colonies were killed. However, approximately 3-16 colonies have been found every month under different areas of the pier. It is uncertain where the source of these is located, but continued monitoring in 2007 will provide critical insight into the future success of the project. Additional work planned for 2007 includes the removal of all plastic as well as side scan sonar mapping of the harbor and extensive reef surveys. This project has proven to the most challenging project undertaken by the AIS Response Team.

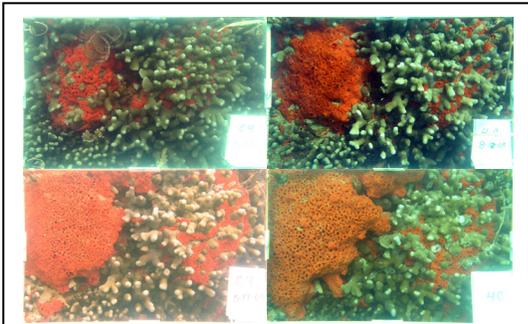


Figure x. Semi-annual photos of *Mycale armata* on a control quadrat. a: Nov 17, 2004; b: May 11, 2005; c: May 17, 2006; d: Nov 20, 2006.

Another project the AIS Response Team has worked on during 2006, was research into the invasiveness of the Orange Keyhole Sponge. This project concluded a 2-year monitoring project led by the Bishop Museum as well as the testing of a new control technique. Over the last two years, the sponge has increased in density and it is unclear to the extent the sponge will spread. The control technique tested involved using air injection into the sponge cavity. The results of the research suggest this tool may be useful under some circumstances, but is not practical on a large-scale. This technique needs to be refined and may be appropriate for small-scale projects and may even potentially be a tool applicable for eradication under the right circumstances.

Partnerships

DLNR Division of Aquatic Resources, HDOA, Hawaii Department of Transportation, Hawaii Institute of Marine Biology, TNC, Bishop Museum, UH at Manoa, UH at Hilo, Windward Community College, Hoomaluhia Botanical Gardens, City and County of Honolulu, Hawaii Tourism Authority, US Fish & Wildlife Service, National Fish and Wildlife Foundation, National Oceanic & Atmospheric Administration, Hilton Hawaiian Village, and KISC.