

Reserve Advisory Council  
May 4, 2017

Division of Aquatic Resources Agency Report

STATE OF HAWAII

*Marine Protected Areas (MPAs)*

During this period, DAR Kona presented outcomes from the fall 2015 thermal stress and coral bleaching event at both public outreach events and scientific meetings. The prevalence of coral bleaching and associated health conditions were quantified at 8 permanent monitoring sites from South Kona to North Kohala. Survey results indicated that overall coral bleaching averaged 53.3% in October 2015, ranging from 45.1% to 65.4% at depths of 10 - 15 m. Coral mortality estimates indicate that bleaching severity may have worsened post-survey, and research efforts by colleagues documented higher bleaching rates in shallow reef zones throughout West Hawaii.

Following the bleaching event, benthic cover was compared at 26 permanent monitoring sites using standardized image analyses, and special surveys were conducted to assess post-bleaching mortality for *Pocillopora meandrina*, *Porites evermanni*, and *Porites lobata*. On average, coral bleaching resulted in 49.7% mortality of live coral in West Hawai'i reef areas 10 - 15 m in depth. Coral mortality estimates ranged from 68.8% (Keopuka, South Kona) to 11.4% (Manuka, Kau).

Extensive post-bleaching mortality was observed for three common coral species, including *P. meandrina* (total mortality of 77.6% of colonies), *P. evermanni* (92.5% loss in live coral cover), and *Porites lobata* (55.7% loss in live cover). Moderate loss was documented for the endemic coral species, *Porites compressa* (32.9% loss in live cover). Analyses are underway to compare site-specific coral mortality data with available oceanographic, watershed, and reef fish community datasets in order to inform state managers of possible local management strategies (in addition to climate change mitigation strategies). Clear regional differences in bleaching prevalence and subsequent coral mortality were not immediately detected, however additional analyses are underway to better understand patterns in coral mortality.

A follow-up benthic survey is currently underway to analyze changes in benthic cover over the past year, and to record possible gradual recovery for certain coral species. Topographic complexity (i.e. reef rugosity) created by basalt formations and coral is crucial for supporting nearshore and coral reef fisheries. Due to the recent drastic declines in live coral cover, reef rugosity is anticipated to decline over time due to natural bioerosional processes and swell events. Reef rugosity

will be reanalyzed at permanent monitoring sites, and will be correlated with available fish survey data to better understand the impacts of coral bleaching/mortality on the reef ecosystem. These results will contribute to spatial management discussions.

The West Hawaii Coral Recruitment Project started in April 2004 and has been ongoing for the past thirteen years. Eight terra cotta tiles are replaced biannually at each of nine sites spanning the West Hawai'i coast, from Waiakailio in North Kohala to Manuka in Kau. The tiles from each site are then processed for microscopic analysis, and coral recruits are counted and identified to genus. This project has analyzed over 2000 tiles and is one of the longest running coral recruitment projects in the world.

The coral recruitment rate along the west coast of Hawai'i is among the lowest in the state with an average of about 28 rec/m<sup>2</sup>/year, compared to a high of 7,942 rec/m<sup>2</sup>/year found in Hanalei Bay, Kauai (2003/04) and the rate has been significantly declining ( $p=0.01$ ) along the entire West Hawai'i coast for the past 12 years.

In 2010 and 2015 there were strong recruitment pulses (411 and 483 rec/m<sup>2</sup>/year respectively) at Puako, South Kohala, but despite these higher recruitment rates, there has been a 64% relative decline in coral coverage at Puako since 2007.

Waiakailio, in North Kohala, has always had consistently high recruitment rates compared to the rest of the coast, but this site has seen a 2% decrease in the last two years. This could easily be attributed to the massive coral bleaching event of 2015. Due to elevated temperatures, stressed adult corals may not spawn, and these higher temperatures reduce survivorship and settlement of coral larvae.

Keauhou Bay, North Kona, consistently has the lowest recruitment rate along the West Hawai'i coast. This site also had massive adult coral mortality in the 2015 bleaching event, where almost 50% of live coral coverage was lost since 2014. With persistently low recruitment rates, this area is expected to have a very slow recovery.

#### *MLCDs*

MLCDs and control sites are surveyed for fish and habitat. Routinely the fish surveys are conducted two to three times a year. During this period, 6 of the 11 MLCDs were surveyed for fish. Benthic surveys were also conducted during this period at 3 of the 11 MLCDs.

#### 1. Ecosystem and Habitat

##### *FADs*

During the period of October 2016 to February 2017 activity was high for the FAD Program. In addition to replacing missing FADs other maintenance activities were performed.

October – No activity

November – No activity

During December 2016, two FADs were reported missing and four FADs were replaced as detailed below:

- EK – Hanalei, Kauai (missing on 12/8)
- N – Cape Halawa, Molokai (missing on 12/8)
- HO – Hoolawa Pt., Maui (replaced on 12/7)
- DD – Opana Pt., Maui (replaced on 12/7)
- Q – Pauwela Pt., Maui (replaced on 12/7)
- M – Hana Bay, Maui (replaced on 12/7)

During January 2017, one FAD was recovered, two were reported missing and two FADs replaced as detailed below:

- S – Pokai Bay., Oahu (recovered off Waianae, Oahu on 1/27)
- R – Makaha, Oahu (missing on 1/5)
- S – Pokai Bay, Oahu (missing on 1/27)
- K – Palaoa, Lanai (replaced on 1/16)
- SO – Kealaikahiki, Kahoolawe (replaced on 1/16)

During February 2017, one FAD was recovered and eleven FADs were replaced as detailed below:

- F – Kailua-Kona (recovered off Keokea Bay, Hawaii on 2/9)
- HS – Halona Pt., Kahoolawe (replaced on 2/3)
- XX – Puako, Hawaii (replaced on 2/3)
- F – Kailua-Kona, Hawaii (replaced on 2/3)
- OT – Waikoloa, Hawaii (replaced on 2/4)
- A – South Pt., Hawaii (replaced on 2/4)
- SS – Apua Pt., Hawaii (replaced on 2/4)
- KH – Kehena, Hawaii (replaced on 2/4)
- D – Kumukahi, Hawaii (replaced on 2/7)
- E – Leleiwi, Hawaii (replaced on 2/7)
- G – Pepeekeo, Hawaii (replaced on 2/9)
- FF – Pukualua, Maui (replaced on 2/9)

#### *Coastal Areas, Reefs*

##### Coral Reef Task Force

In December 2016 the U.S. Coral Reef Task Force published the “Handbook on Coral Reef Impacts: Avoidance, Minimization, Compensatory Mitigation, and Restoration”. This project was initiated a few years ago when NOAA and the All Islands Committee of the 7-Coral Reef jurisdiction agreed that a mitigation process guide be established for the importance of Coral and steps that can be

implemented to protect and preserve Coral. The document is directed towards officials and planners in NOAA and all coral reef jurisdictions.

*Coral Reef Ecosystem Management*  
Coral Bleaching Recovery Plan

DAR has been working with the Hawaii Coral Reef Initiative to develop a *Coral Bleaching Recovery Plan* to support DAR's decision-making process to implement management actions to promote coral recovery and resiliency throughout the state. The first step in the plan development process was to synthesize peer-reviewed literature analyzed to identify the role of resource managers in coral bleaching recovery and to collect case studies of previous management interventions following a mass bleaching event. Then opinions were garnered from global coral bleaching experts on which management actions they felt would be most ecologically effective in Hawaii. Through a workshop with Hawaii-based coral experts, the management actions were further prioritized. The workshop group also ranked specific actions that DAR could take in four priority areas: West Hawaii, Maui, Kaneohe Bay, and North Kauai. Finally, the top-ranked management interventions were further analyzed in a process to investigate how well each tool met coral reef recovery objectives. The *Coral Bleaching Recovery Plan* is currently undergoing final review. Online resources for the *Coral Bleaching Recovery Plan* can be found at <http://dlnr.hawaii.gov/reefresponse/>.

*Subsistence/Recreational*

The Department is preparing to hold public meetings on Oahu and Molokai to discuss a community proposal for a subsistence fishing area along the North coast of Molokai. Three meetings will be held at the following times and locations: March 16, 2017, Kulana Oihi Halau, 600 Mauna Loa Highway, Kaunakakai, Molokai from 12:00 to 2:00 p.m.; Mitchell Pauole Center Conference Room, 90 Ainoa Street, Kaunakakai, Molokai from 5:30 to 8:30 p.m.; and March 21, 2017, Kawananakoa Middle School Cafeteria, 49 Funchal Street, Honolulu, Oahu from 6:00 to 9:00 p.m. Announcements for these meetings have been sent to appropriate participants.

*Hawaii Marine Recreational Fishing Survey (HMRFS)*

The HMRFS program continues to collect non-commercial fisheries data for the State of Hawaii. From October 2016 through February 2017, approximately 1,250 angler intercepts will be completed for both the shoreline and private boat modes from Kauai, Oahu, Maui, Molokai and Hawaii.

The two Marine Recreational Information Program (MRIP) pilot project reports are still in review (2015 shoreline pilot project) and in progress (2016 private boat pilot project). Results from these and past reports will be used to recommend survey design changes for the HMRFS project in conjunction with the MRIP Regional Implementation Plan.

2. Other Issues

### *Statistical Unit Activities*

#### Commercial Marine Licenses

A public list of alien crew commercial marine license information was prepared. The list was prepared to satisfy the news media Freedom of Information Act. DLNR received a request for an investigation on the license application procedures used for foreign longline fishers who are detained on fishing vessels.

#### Commercial Fisheries Reports

The 2016-2017 Deep 7 Bottomfish fishing year began on September 1, 2016 with a new Annual Catch Limit (ACL) of 314,000 pounds. As of February 10, 2017, 274 licensed bottomfishers made 1,236 trips and landed 131,621 pounds of Deep 7 bottomfish. This is 41.4% of the ACL.

The public Online Fishing Report (OFR) web portal application, which was developed by the Hawaii Information Consortium (HIC) appears to be functioning properly. Some fishermen have contacted DAR statistics staff for assistance to learn how to use the system. A few fishermen did not realize that the report submission format allows them to submit fishing trip activity and receive immediate credit for the report submission.

The administrative OFR web version is used by staff to process paper fishing reports, and this application requires additional revisions. The first of two draft applications were tested by the staff in late February 2017.

During October, DAR and Western Pacific Fisheries Information Network (WPacFIN) staff visited several Oahu fish dealers. The reason for their visit was to provide them with a perspective on the various procedures dealers use for purchasing marine life directly from fishers. The group also learned about the steps involved in the initial intake of fish from the fishermen and recording that transaction on receipts and then what the dealers have to do to compile this information onto the fish dealer reports that they submit to DLNR-DAR. The fish dealer reports satisfy the monthly DLNR-DAR dealer report requirement.

During November, 2016 WPacFIN and DLNR-DAR participated in a 3-day Visual Stream Mapping (VSM) workshop. The VSM documented all of the detailed steps that DLNR-DAR performs to collect and process the fish dealer reports. It also identified procedural limitations such as duplicate tasks, or inefficient work flow.

In March, 2017 DLNR-DAR will utilize the VSM to scope business rules for a web portal system design specification to file the primary commercial marine dealer reports online.

WPacFIN, HIC and DLNR-DAR met in December 2016 to discuss the development of the My Structure Query Language (MySQL) database to support the modernization of the commercial fisheries reporting system. HIC related that

they are having a difficult time retaining the remote network connection to the DLNR MySQL fileserver because of the state Information Communication Services Division (ICSD) security. The group agreed to bypass the HIC and state ICSD network connection and accept HIC's offer to migrate the CMLS and OFR Oracle database files to MySQL, and replicate it to a virtual file server at their site. WPacFIN would then be responsible for developing desktop database applications that access the MySQL databases on the HIC virtual fileserver so that DLNR-DAR can directly use the live master online database files. This eliminates the cumbersome daily protocol procedure for file transfer which involves downloading extract export files from HIC to receive the CMLS and OFR data.

In January and February, 2017 WPacFIN reviewed a December 22, 2016 production copy of the OFR MySQL annual database files to compare with the imported annual databases that were developed by WPacFIN 2010 through 2016. DLNR-DAR plans to have the OFR MySQL portion of the commercial fisheries reporting system completed by the end of year 2017.

#### Other Statistical Unit Activities

In late January, 2017, Pacific Islands Fisheries Science Center (PIFSC) and DLNR-DAR administrators met to discuss and share the highlights of their agency's perspective program goals; and the objectives for past and future years. DLNR-DAR elaborated on the continued commitment from PIFSC for WPacFIN technical support in order to continue work on programming back-office database application development to modernize DAR's commercial fisheries reporting system.

This February, 2017 DLNR-DAR attended the Council sponsored Fish Flow Workshop held at the Modern Hotel, Waikiki. Fish dealer businesses were invited to participate in the workshop to share information about their business operations; such as where they obtain their fish (source), to whom (destination) the fish is distributed, and to share the volume (in percentages) of product they handle. Discussion focused on data and information gaps in the market. State and federal fisheries agencies wanted to gain a better perspective of how pelagic fish, whether imported or locally caught, are distributed throughout Hawaii's markets.

#### *Alien Species Projects*

##### State Aquatic Invasive Species (AIS) Management

##### **Use of mechanical removal suction devices ("Super Sucker") in conjunction with sea urchin biocontrol experiments to control alien algae on coral reefs in Kaneohe Bay.**

Due to a natural decline in invasive algae in Kaneohe Bay that occurred in 2015, no super sucker algae removal was conducted during this period. Ongoing invasive algae monitoring indicates that the target species (*Kappaphycus alvarezii* and *Eucheuma denticulatum*) have not rebounded significantly since the crash.

Sea urchin biocontrol continues in the bay, with approximately 67,000 urchins released during this reporting period.

**Kaneohe Bay Fish/Benthic Monitoring**

Staff completed monitoring surveys on reefs in Kaneohe Bay collecting invasive algae and coral data.

**Japan Tsunami Marine Debris Response**

DAR continues to log marine debris reports and suspected Japanese Tsunami Debris.

**Ballast Water/Hull Fouling**

Ballast water management compliance inspections on foreign-flagged ships have been conducted in coordination with the USCG. In collaboration with the Smithsonian Environmental Research Center, the report on vessel in-water cleaning biosecurity risks, technology, and regulatory/policy risk management, was completed. DAR continues to work with local and inter-state government agencies to oppose federal legislation that preempts states from addressing aquatic biosecurity risks associated with vessel incidental discharges including ballast water and hull fouling.

*Management Changes*

**Division of Aquatic Resources**

The Department is preparing amendments to its administrative rules relating to dealer licensing, dealer reporting deadlines, and increases in the commercial marine license fees from \$50 to \$100 (year 1) and \$150 (year 2). The fee increases are needed to cover an anticipated shortfall in revenues to continuing issuing licenses and make necessary website upgrades. The Board approved DAR's request to hold statewide public hearings on these issues at its meeting of January 13, 2017. DAR will be seeking Governor's approval shortly.