



Hawaii Archipelago Fishery Ecosystem

Plan Team Meeting

April 19 to 20, 2012

WPRFMC Conference Room

Bishop St, Honolulu, Hawaii

DRAFT REPORT

CHAIR: DR. FRANK PARRISH (PIFSC)

Plenary Presentation: “Guiding Principles for Development of Effective Fishery Monitoring Programs”

Shawn Stebbins from the Archipelago Marine Research Limited presented on the guiding principles for developing an effective fishery monitoring program. This was based on case studies and experience on Canadian fisheries. Most fisheries struggle with monitoring that is affected by several factors particularly: 1) essential information to be gathered; 2) degree of coverage; 3) quality of data expected for management; and 4) cost of conducting monitoring. Monitoring results are used for stock assessments that require a defensible and comprehensive catch accounting which equates to total mortality. Total mortality has several components: 1) landings; 2) at sea discards; and 3) gear mortality. Monitoring these three components entail different kinds of approach.

Management is about uncertainties. The level of uncertainties would depend on the reliability of the data being used for management. High accuracy of data to reflect the true stock status will result in a low risk and inversely for low accuracy information. Balancing data accuracy with management needs and resources available would require input from various stakeholders involved in the fishery and management. The guiding principle document was developed to help facilitate decision making for management in the Canadian marine fisheries. This document would be useful for the Western Pacific region as it undergo the process of improving its fishery data collection programs.

Status of Fishery Monitoring Programs and Research Projects

Coral Reef Fisheries

There is currently no existing data summarization template that generates the annual catch, effort and CPUE tables and charts that would allow for the formation of an annual report module for this fishery. Council staff will be working with DAR to generate data summaries and will present the information in the next plan team meeting.

Crustacean Fisheries

Jo Anne Kushima presented an overview of the history of the changes in the crustacean regulations. The commercial landing for spiny lobster in 2011 is just a little below 9000 lbs. The total trips were 218. The annual average is 278 and the landing is around 11000 lbs. The catch is

more than 75% green lobsters (*Panulirus penicillatus*) with the rest being red lobster (*Panulirus marginatus*). Nearly all the capture is by divers. Landings were reported in Maui and the Big Island and were absent in Kauai and Oahu. It is not clear if these patterns in catch and landings are due to demand (e.g. hotel and restaurant), accessibility of lobsters to divers, or reflects current patterns in abundance. Public comment included opinions that the abundance of red lobster was considerably lower than historical levels.

Inshore area catches by method harvest mostly the green spiny lobster. Offshore area catches also show harvest of mostly green spiny lobster. There are anecdotal accounts that spiny lobsters are disappearing in the shallow and deep. The red spiny lobsters which typically inhabits the deeper areas outside of diving depths are highly susceptible to trapping while the green spiny lobsters which typically inhabits the shallow habitat within diving depths are not prone to being caught by traps. There appears to be something happening to both of the spiny lobster populations in the main Hawaiian islands.

There was interest in comparing current data to historical landings (e.g. last few decades) but prior reporting did not distinguish red from green lobsters. Currently participation in the fishery is getting low enough to compromise confidentiality requirements and that will limit the resolution at which the data can be presented.

For Kona crab there was 207 trips in 2011. Total lbs landed was a little over than 11000 lbs. The annual average trips were 210 trips and the average landing was 10300 lbs. The auction and retailers did not have kona crabs in a long time. Kona crab is directly sold to the hotel and restaurants. Port of landing for spiny lobster is in Maui due to demand by high end hotel and restaurant. Participation in the fishery is getting low thus getting into confidentiality issue. Port of landing for Kona crab is higher in Oahu.

There was study done in the past that there is a high mortality of Kona crab when one leg get cut off. There was a recommendation to conduct education and outreach to inform fishermen about this finding. Kushima did some research on how fishermen in Hawaii harvest the kona crab. She did some interviews to characterize the method of handling crabs. DAR plans to produce outreach materials

Regarding the Kona crab fishery, the Hawaii Plan Team recommends the Council, in collaboration with HDAR and PIFSC, to produce outreach materials regarding the potential effect of the leg breakage on the Kona crab survival.

The Hawaii Plan Team further recommends the Council, in collaboration with HDAR and PIFSC, to review the recent science related to Kona crab biology and ecology and evaluate the population impact of the “no take of female” regulation.

Precious Coral Fisheries and gold coral moratorium

The Council will have to make a recommendation on the status of the gold coral moratorium which will expire in August 2013. The last recommendation was to continue the moratorium and conduct studies to estimate coral colony growth using radiometric studies.

Regarding the gold coral moratorium, the Hawaii Plan Team recommends the Council to renew the harvest moratorium for gold coral that expires in 2013. Recent study of marked and re-measured gold colonies (Parrish and Roark 2009) indicates the linear growth is 2.2 +/- 0.2 mm per year, much slower than the 6 cm per year growth rate historically used for management.

Status of the black coral surveys

Tony Montgomery's presentation was on the changes in the size structure of the Hawaiian black corals. The lead fisherman involved in the black coral fishery recently passed away and it is uncertain as to how this may impact the future development in this the fishery.

In 1975, it was an unfished population. There were colonies to 40 years old. Size bins are better in analyzing the data. In 1975, the slope was estimated as indicating a 7.5 mortality rate. By 1998, the bigger colonies were disappearing. By 2004, the bigger ones were still missing but it seemed the earlier size classes were suppressed a bit. The data needs to be cleaned thus these results need to be taken carefully. By 2010, the population was nearly flat. The age 13 and 14 is the size that they are fishable.

Mortality rate has been increasing over time for the 0-13 age class. Recruitment has increased at age 14-18 for the 14-40 age class. The population therefore had experienced a decline in fishing mortality. However, there are fewer coral colonies recruiting into the population.

There have been changes in the population structure because recruitment of younger colonies into the population continues to decrease. The harvest of bigger colonies may have slowed. The size classes impacted by the reduction of recruitment may begin to move into harvestable size classes over the next several years; therefore the future sustainable of harvest is questionable.

Based on Montgomery's analysis there appears to be a need to implement more stringent restriction on harvest by placing a moratorium or ban on harvest. There was a proposal package developed by DAR to regulate the black coral fishery but due to cutbacks in funding and potential reorganization within the Department/Division was difficult to move forward. The HI Plan Team suggested that a minimum size and closed areas to be implemented by the state.

The HI Plan Team recognizes that the new scientific information available for the black coral population dynamics and the precious coral workshop in 2006 yielded support from the fishermen for black coral area closure. ***Regarding the black coral fishery, the HI Plan Team recommends the Council to convene a subgroup to review new data on black corals and make recommendations on potential changes in the regulations to conserve the black coral population.***

Bottomfish Fisheries

MHI ACT Monitoring

Jessica Miller presented an overview of the fast tracking process involving the near-real-time monitoring of the deep 7 bottomfish in the MHI bottomfish fishery. The reported landings at the time of this report were 108K roughly 58% of the ACT. The slow landing can be attributed to bad weather this year compared to last year. A Suggestion for future presentation was to add

error bars on the weight over time chart and add a chart on maximum size. The north shore of Oahu initially had good production and had subsequently decline after the cold water set in.

Performance of trip level reporting

75% of the “Deep 7” bottomfish fishing trip reports are submitted on time. Of the trip reports that were submitted on time (within 5 days after the end of the trip), the average number of submission days was 2.7. Part of this reporting requirement compliance is attributed to the online capabilities. During the winter months when fishermen are busy there is a lag in reporting. If there is a pulse fishery, there is a chance of that the trip reports may not be submitted on time. 35% of the trip reports are submitted on-line. The monthly fishing report online submission rate is 51%.

There needs to be enforcement for late submission of the trip reports especially when the pulse fishery occurs to issue Civil Resources Violation System notices.

Status of Cooperative Research Projects

Gerard DiNardo provided an overview on the Cooperative Research Program. The CRWG meets annually discussing projects. Initially the CR projects focused on the crustacean fishery and had recently moved to bottomfish. The 4 components of the current BF research include:

1. Bottomfish tagging project
2. Developing a fishery dependent data collection program
3. Life history project for bottomfish
4. Outreach efforts to build collaboration and relationship with the fishermen

Clay Tam presented an overview of the pilot fishery independent survey for bottomfish in waters around Oahu, Maui and Guam. This is a volunteer data collection effort from participating fishermen. This provides catch and effort information on bottomfishing trips. Tam also presented on the PIFG bottomfish tagging project which includes some BioSampling. The tagging involved fishermen and the techniques were developed to successfully release the tagged bottomfish at depth.

There had been significant life history samples gathered by the PIFG project. Life history information plays an important role in stock assessments. The life history information used in the most recent stock assessment was not from the most recent samples gathered from the current Cooperative research project. ***Regarding the bottomfish life history projects, the Hawaii Plan Team recommends the Council request PIFSC to update the life history information for onaga and opakapaka using more recent samples from the PIFG project.***

Evaluation of effectiveness of BFRAs

Jeff Drazen presented on the one year result of the evaluation of the BRFA effectiveness using the BOTCAM. The study compared abundance, size and biomass inside and outside the BRFAs and BRFAs with varying level of protections and closure duration. Initial results showed BRFAs can change bottomfish demographics: 1) produces larger and reproductively mature bottomfish; 2) the enhancement of the bottomfish population within the BRFAs; however 3) the variance in the data is so high that changes in relative abundance are hard to detect. Current data collection doubled the sampling effort in order to minimize the variance in the data. Poaching in the

BRFAs complicate the interpretation because the main assumption of the study was BRFAs are fully no-take areas.

There were several concerns raised by the fishermen regarding the results of the study. They commented that the BOTCAM does not accurately estimate relative abundance of the bottomfish population. The locations of the BRFAs are in exposed areas inaccessible for most part of the year thus there is no need for establishing BRFAs. The BRFAs were set up to protect spawning and recruitment areas. The study failed to establish recruitment area relationship because it failed to account for movement patterns in and out of the BRFAs. The study also has not documented any spawning behavior inside or outside the BRFAs. The method also does not account for the small sized fish as either recruits or remainder of the population impacted by fishing.

BRFAs are concentrating fishermen in smaller areas. In a concentrated area, there is an increased chance of depletion. Fishermen are already pushed towards fishing in the limited productive open areas on the banks. The results of the BOTCAM are confounded by the fact that the now protected BRFA areas were already known to be the productive areas that produces catches of the big fish. The BOTCAM has not captured the population segment that fishermen “see”, target, and catch. There are differences in the perspective and knowledge between scientist and fishermen that needs to be addressed by enhancing communication between the two groups.

Cooperative research project may have a potential to alleviate the conflict between scientist and the fishermen. Open up the BRFA and create a baseline and use multiple monitoring and data collection systems to determine spatially explicit productivity of BRFAs.

Regarding the BRFAs, the Hawaii Plan Team recommends the Council to request DLNR-DOCARE and NMFS OLE to enhance the enforcement of the BFRA. Some anecdotal evidence and concerns expressed by complying fishermen about poaching in the area should be evaluated.

Hawaii non-commercial landing estimation

Lauren Ballou presented the results of the non-commercial landing estimation using the HMRFSS data. Coral reef species account for the majority of harvest by number in the Hawai‘i recreational fishery. Of these species, the CREMUS group “other,” with a majority of harvest attributable to bait species, has the greatest harvest by numbers of fish. Akule, goatfish, jacks, and surgeonfish are important components of catch. Akule (bigeye scad *Selar crumenophthalmus*) is the most caught species while the goatfish *Mulloidichthys flavolineatus*, the surgeonfish *Acanthurus triostegus*, the introduced clupeid herring *Herklotsichthys quadrimaculatus*, mackerel scad *Decapterus macarellus*, and aholehole *Kuhlia sandvicensis* are also important components of the catch by species. Rod and reel is the most important gear type by number of fish for harvesting coral reef species in the Hawai‘i noncommercial fishery, as in the other regions.

An important complication for a species-level analysis is that there are taxonomic inconsistencies in the database. A data user should consider harvest of closely-related species and check for records stored under all species synonyms.

There are significant amounts of variability among years in both fisher-intercept and estimated catch data. The variability is usually associated with pulse events. The large spike in 2003 for the “other” group can be partially attributed to the 2003 *Priacanthus meeki* pulse event. There is also high variation in year-to-year harvest of akule, a pulse fishery. The extent to which limitations in the sampling frame and the estimation procedure affect the temporal variability of harvest is unknown.

PIRO Administrative Activities

Toby Wood presented the summary of the NMFS-PIRO administrative and regulatory activities in Hawaii. Regarding updates for the National Actions:

1. PIRO and PIFSC coordinated the development of a draft Pacific Islands Marine Recreation Action Plan;
2. Approval of the Regional Saltwater Recreational Fishing Action Plan;
3. Development of the MRIP proposal to enhance non-commercial data collection;

Regarding updates to rule making:

1. Published a proposed rule that would change the advance notification period for in-season closure of the MHI Deep 7 bottomfish fishery from 14 to 7 days. Final rule became effective 04/20/2011;
2. NMFS notified the Council that Pacific blue fin tuna is subject to overfishing;
3. Secretary of Commerce approved Amendment 3 to the HI FEP establishing a mechanism for setting ACLS and AMs;
4. NMFS issued a special coral reef ecosystem fishing permit to Kona Blue Water Farms to test floating pods in the EEZ to raise kampachi;
5. NMFS published the proposed 2011-12 specification for main Hawaiian Islands Deep 7 bottomfish of a 325,000 lb quota based on the Council’s recommended ACL of 346,000 lb (76 FR 46719);
6. NMFS published in the *Federal Register* a temporary rule that would have closed the U.S. pelagic longline fishery for bigeye tuna in the western and central Pacific Ocean as a result of the fishery reaching the 2011 bigeye tuna catch limit, effective November 27, 2011 (76 FR 71469);
7. NMFS closed the pelagic shallow-set longline fishery north of the Equator for the remainder of 2011 for all vessels registered under the Hawaii longline limited access program (76 FR 72643) because the fishery reached the 2011 limit on physical interactions with sea turtles. The fishery re-opened on January 1, 2012;
8. NMFS established the annual harvest guideline for the commercial lobster fishery in the Northwestern Hawaiian Islands for 2012 at zero lobsters;
9. NMFS proposed annual catch limits for western Pacific bottomfish, crustacean, precious coral, and coral reef ecosystem fisheries

Regarding program activities:

1. SF staff, with staff from NMFS PIFSC, HDAR, and the Council, participated in Hawaii bottomfish workshops;
2. PIRO mailed reminders to Hawaii longline limited entry permit holders in early January that their permits expire March 3, 2012, and that they must renew their permits to continue fishing;

3. Sustainable Fisheries trained 216 Hawaii-based longline fishermen and vessel owners at protected species workshops at the Commercial Fishing Village at Pier 38, Honolulu Harbor, or on line.

Report on reef fish tagging in Palmyra

Gen Del Raye presented on the reef fish tagging project at the Palmyra atoll. Emperor species, HHW (humphead wrasse, *Cheilinus undulatus*), wahoo, and bluefin trevally were tagged and monitored the movement patterns. Movement patterns varied among these species, with wahoo and trevally having the greatest movement range and with the HHW and emperors limited to 400m. There were also temporal variations in detection among species, with HHW being diurnal, wahoo and trevally being crepuscular, and emperors being nocturnal. The habitat analysis showed wahoo and trevally being associated mostly with geomorphic structures while the true reef fishes are associated with both geomorphic structures and biological cover. The movement patterns have implication in MPA design. If the aim of the MPA is to maximize protection of a particular fish species it has to be scaled to the movement range of the species.

Improving ACL specifications and stock assessments

Overview of the ACL process and FY2012 specification

Jarad Makaiau presented an overview of the ACL process and the recent ACL specification for the management unit species in Hawaii. He also presented on the accountability measures and the process to which it is applied once the ACL had been exceeded.

Regarding Annual Catch Limits, the Hawaii Plan Team recommends the Council immediately pursue the ecosystem component (EC) option for fisheries that do not occur in federal waters. The Plan Team further recommends the Council, in collaboration with NMFS and the FEP Plan Teams, evaluate the management unit species of each FEP that may be eligible for ecosystem component classification. The classification of ecosystem component species for each FEP area should be implemented prior to the start of the 2014 fishing year. EC species remain in the FEP for data collection purposes and ecosystem considerations, but do not require specification of reference points.

Regarding improving the specified ACLs, the Hawaii Plan Team recommends the Council request PIFSC to review and provide recommendations to the Council on the approach developed by Council staff using biomass, catch, and natural mortality information to generate an MSY proxy for various reef fish families to improve ACL specification.

Report on the Council – NMFS ACL Revisited Workshop

Marlowe Sabater presented on the outcome of the Council-NMFS Workshop on Annual catch Limits convened at the Council office in December 2011. The aim of this workshop is to identify steps in improving the ACLs for the problematic species that have a high potential of exceeding the ACLs. Eight options were presented ranging from a “no-action” option to conducting specialized research to determine status of the stock. The full report is available from the Council.

Surplus production model using biomass, catch, and natural mortality estimates

Paul Dalzell presented on the new analysis using biomass estimates from CRED, catch estimates from creel surveys and an estimate of natural mortality to generate an estimate of MSY for respecifying ACLs. This approach was discussed during the ACL workshop in December 2011. This could be an alternative to the Tier 5 control rule using catch only information. This methodology provides a better estimate of stock status than the 75th percentile. If the Council moves forward with this approach, then the ABC control rule to be used will be the higher tier once MSY estimates are established.

Length-based estimation of fishing and natural mortality in Hawaii coral reef fishes

Ivor Williams briefly outlined planned work by NOAA PIFSC CRED and FBSAB staff to apply length-based models to coral reef visual survey data as a means of estimating fishing mortality (F) for species where appropriate life history data (e.g. K, L_{inf}) is available. In brief, these approaches allow for estimation of M (natural mortality) from longevity data, and of Z (total mortality) from size distribution data. If Z and M are known, F can be simply derived ($Z=F+M$). These techniques have previously been applied to Atlantic coral reef fish stocks using highly comparable visual survey data, and the proposed work would apply them to a range of Hawaiian reef species. Examples of currently available data and data needs were shown, along with pointers to species that are most suitable (based on existing data) for Hawaii population analysis - likely between 5 and up to 15 species may have sufficient data. Some preliminary analyses for MHI and NWHI reef fish species demonstrate promising initial results. Although focus of current work is on MHI stocks, parallel analysis of unfished populations in NWHI may provide some validation of the approach and of model parameters used in the MHI analyses (e.g. for unfished stocks, $Z=M$, thus Z calculated for NWHI stocks can be compared with M (and Z) derived for MHI stocks). Current plans are for the MHI work to begin in early 2012, with substantial progress on MHI stocks, and perhaps on small number of species from other regions also, by end of 2012.

Kona crab stock assessment

Lennon Thomas presented the result of the Kona crab stock assessment. Using State of Hawaii, Division of Aquatic Resources commercial Kona crab landings data from 1948-2009, a stock assessment of the Kona crab fishery in the Main Hawaiian Islands was conducted to determine the status of the stock. Recreational catch data was not available and not incorporated into the assessment. Known life history characteristics of the Kona crab were summarized and gaps in biological information were identified. Data analyses revealed clear temporal and spatial trends in the fishery. Catch Per Unit Effort (CPUE) varied significantly by statistical fishing area and by season. In recent years, the commercial fishery has been dominated by a few high volume fishers at Penguin Bank, which accounts for roughly half of the commercial landings. CPUE was standardized using a generalized linear model, which removed effects of potential spatial and temporal changes in the CPUE that are unrelated to stock abundance. The model produced a relative index of stock abundance (standardized CPUE) which shows a decline in the Kona crab stock of ~50% over the last 18 yrs. Changes in environmental conditions, changes in fishing effort, and overexploitation of the stock are all likely factors contributing to the decline, however, the exact cause of the decline is unknown. The full report is available from the Council.

Limb loss for kona crab is high (70%) for partial breakage and 100% if one leg is lost. The issue on no take of berried female is significant because the males must be larger than the female in

order for the male crab to dig the female crab out from under the sand, for a successful mating. If there is high fishing pressure on males and the males in the population consists of smaller and smaller males, then it will affect successful mating and hamper future recruitment.

Update on the kumu stock assessment and the use of fish trap CPUE as proxy for estimating stock abundance

Martha Maciasz presented the result of the CPUE analysis of the fish trap fishery. This project characterized the fish trap catch characteristics and CPUE trends. The full report is available at the Council.

The preliminary results of the kumu stock assessment were presented including trends across time for nominal CPUE, landings, and landings by gear type. A Generalized Linear Model and a surplus production model will be used to determine stock status of kumu in Oahu.

Data collection and reporting issues

Report on the Non-Commercial Data Workshop

Joshua DeMello presented a summary of the outcome of the Non-commercial Data Workshop convened by the Council last December 2011. The group discussed potential projects to be submitted to MRIP for funding. The full report is available at the Council.

Report on the PIRO data contracts

Chris Hawkins presented on the status of the data related projects of PIRO. The Sustainable Fisheries Division has an open contract with Dr. Fiona McCormack of the University of Hawaii Hilo. Dr. McCormack is conducting a small project to understand and map fish flow in several communities on the Big Island (Keaukaha Hawaiian Homelands community, Pohoiki, and Ke'ei).

The Sustainable Fisheries Division, in partnership with the Western Pacific Fishery Management Council and PIFSC, has received funding from NMFS' Marine Recreational Information Program (MRIP) to conduct a one-time mail survey of the Division of Boating and Ocean Recreation's (DBOR) private boat registry. The objectives of this survey, which will be implemented later in 2012, are to: (1) obtain an estimate of private boat owners who fish from their vessels in Hawaii and adjacent federal waters (i.e., the "private vessel universe"), as well as indications of how many (non-boat owner) family and friends fish with these individuals on their boat in a given time period; (2) provide basic information about fishing activities as engaged in by those in the private boat registry; and (3) obtain estimates of effort and participation to compare to the estimates generated from the coastal household telephone survey conducted in Hawaii

Though not a formal research project, the Sustainable Fisheries Division will host a meeting of invited regional non-commercial fishery participants in Honolulu in August 2012. Invitees will help develop the next iteration of the regional recreational action agenda. Due to funding limitation, formal participation must be limited to several representatives each from American Samoa, the CNMI, Guam, and each of the Hawaiian Islands. However, the meeting is open to the public, and non-commercial fishermen are encouraged to attend, observe and communicate with invited representatives.

Annual Archipelagic Fishery Ecosystem Reports

Marlowe Sabater led the discussion on how the Hawaii Plan Team will develop Archipelagic Annual report. There is no programming language available at WPacFIN that will support the generation of the annual reports. Staff from the Council, WPacFIN, DAR, and PIRO will work on the data summaries that will mirror the other island areas for consistency and will reflect the family groupings for ACLs to streamline the reporting effort. A summary will be provided at the next HI Plan Team Meeting.

Essential Fish Habitat/Habitat Area of Particular Concern

Hawaii coral reef Essential Fish Habitat project

Daniel Luck presented the results of the HPU Coral Reef EFH Project. Life history, species-habitat information, and habitat maps derived from IKONOS images were used to specify EFH for some coral reef species. GIS was used to narrow down the EFH designation for a particular species. The EFH designation area was reduced significantly using this method. The full report is available at the Council.

Hawaii EFH and HAPC for coral reef, pelagic and precious corals

Danielle Jayewardene presented the management recommendations for the territorial coral reef, pelagic and precious coral essential fish habitat and habitat area of particular concern. The management recommendations were based on the science review of PIFSC. The coral reef EFH/HAPC created some issues with the criteria mostly focused on MPAs. Some of the MPAs in the Marianas were created without fish-habitat consideration thus cannot be used as a proxy for the EFH/HAPC. There is no change in the pelagic and precious coral EFH/HAPC due to lack of additional information.

Protected species issues

List of fisheries 2012: MMPA issues

Paul Dalzell presented an overview of the Marine Mammal Protection Act – List of Fisheries for 2012. The issue raised was the MMPA had increasingly been interfering with the regulation of fisheries through marine mammal interaction. A proposed rule was made to upgrade the category of the Hawaii small boat troll fishery from category 3 to category 2 which will increase the requirements from fishermen to minimize marine mammal interaction. The issue also includes the assertion that science behind the list of fishery determination is faulty. The recent proposed uplisting of the Hawaii small boat troll fishery was based on an oral account of a troll fisherman following a pod of spotted dolphins. This is considered an example of non-scientific data that has potentially significant impact to the fishery.

Biological report on 82 species corals

Lance Smith presented an overview of the status of the 82 species of coral petition. PIRO staff announced the availability of the biological review team report and management report for public review and additional information. The comments are due on July 31, 2012.

Developing Cooperative Research priorities

Marlowe Sabater presented the current Cooperative Research priorities for Hawaii. The team recognizes the importance of the life history information for stock assessment. The recent increase in MSY was due to updated life history information for opakapaka. Recent samples from the BioSampling Program need to be analyzed and incorporated in the next stock assessment. Market sampling in Maui is feasible due to close working relationship of the bottomfish fishermen with the market and restaurant operators. Samples can be gathered prior to delivery of the fish which provides an opportunity for obtaining otolith and gonadal samples.

Regarding Cooperative Research Program, the Hawaii Plan Team recommends the following activities to be added to the Hawaii Cooperative Research priorities: 1) tagging in the BRFA's in both state and federal waters to gather movement patterns across BRFA boundaries; and 2) Biosampling in retail markets to gather bottomfish life history samples

Other Business

The Hawaii Plan Team prefers PDF copies of the briefing document instead of the printed copies. This, however, has a caveat that the HI Plan Team members will submit their documents and materials ahead of time for proper dissemination via email.

PAU