



WESTERN  
PACIFIC  
REGIONAL  
FISHERY  
MANAGEMENT  
COUNCIL

## Cooperative Research Priorities for 2012/2013

### AMERICAN SAMOA ARCHIPELAGO

#### **1. A study to determine what the FADs are producing in terms of catches (including discards and zero catches), size structure, and look at stock structure by tagging fish at FADs**

Fish aggregating devices frequently are used by the commercial and recreational fishing sector of Tutuila, American Samoa. The commercial bottomfishermen utilizes the FADs to capture their bait fish that they will in turn use in their bottomfishing operation. Recreational fishermen frequented FAD for mahi mahi and skipjacks. The information on FAD catch and effort are not reported separately from the main fishing trips. Hours spent on fishing are reported as total hours. This can have a profound effect on the catch per unit effort where the catch in the FADs are not reported while the effort may have been included in the total number of hours fishing. The catch composition around FADs had been reported in earlier work by David Itano in the 1980s. This, however, did not include size and stock structure.

#### **2. Exploring the potential for using an alternate improved FAD design**

The current FAD design is the aluminum catamaran and had been the same for the past three decades. With recent advances in materials and design, i.e. storm resistant FADs similar to the SPC design, concurrent with a change in the socio-economic climate impacting the fishery in American Samoa, a cost-benefit and economic analysis are needed to determine the feasibility of transitioning from a catamaran to a more improved design. This would be done in consultation with the fishermen particularly on the location of these newly designed FADs.

#### **3. Mapping coral reef fishing grounds to identify critical habitats for fisheries management**

Coral reef fish communities vary within-island scale due to differing scales of the impact of recruitment, growth and mortality processes coupled with various within-island oceanographic and geological characteristics. All of these factors influence the location of nursery habitats and within-island differences in fisheries production. Anecdotes from fishermen indicate that various species of parrotfish are found in different reef sites in Tutuila Island. Moreover, Ochavillo et al. (2011) showed that bristletooth surgeonfish move to deeper parts of the coral reef as they bigger and older. The aim of this project is to map various coral reef fishery fishing grounds and determine potential differences in species composition, size structure, productivity (in terms of catch-per-unit effort) and species seasonality. The project will conduct species-level and size-structure fish catch surveys and fishermen interviews of spearfishermen at least 4 days per week (approximately 20% sampling effort) in Tutuila Island. GPS will also be issued to the fishermen every trip to verify the location they report during the interviews. Various studies have shown significant differences in fish species and size compositions between fisheries-dependent and fisheries-independent survey methods (e.g. underwater visual census). Data will be plotted in a GIS map to overlay various biological and socio-economic survey data

conducted by other projects in Tutuila Island. The results of this project will complement current monitoring program of the department involving underwater visual census of key reef fish species in American Samoa and will help in marine spatial planning for fisheries management in the island.

## **MARIANAS ARCHIPELAGO**

### **1. An evaluation of shark depredation occurrence in the Guam and Saipan small boat fishery**

The series of public meetings in Guam and Saipan yield some issues with depredation by sharks in the Guam and Saipan small boat fishery. Shark depredation results in loss of income of the fishermen as well as some bias in the catch reporting where the catch is lowered whereas the effort is reported in total yielding a decrease in CPUE. This is an artificial decrease due to non-reporting of depredated catch. Environmental organizations are pushing for the conservation of sharks in the Marianas based on supposed decline in shark biomass from the underwater census surveys. Evaluating the depredation rates would provide a different angle to the shark population status because these are the population segments that interact with the fishery as opposed from those that are being sighted on a depth limited and area specific survey.

### **2. A study of near shore FADs including catches and stock structure by tagging fish**

A baseline assessment of near shore FADs is needed to determine the amount of catch it generates relative to open ocean fishing and also to determine the stock structure of assemblages associated with FADs. These FADs are essential for the small boat fishery that has limited sea time and area coverage. Taking advantage of aggregations makes the trip efficient resulting in an increase in CPUE if the catches from FADs are reported properly. The effectiveness of FADs would also vary depending on location. FADs known to be close to a larger structure has less aggregation.

### **3. Improving catch-by-fishing location information and ground-truthing interview information through advanced technology**

Geographic Information System assisted mapping had revolutionized spatial management across different disciplines including marine, fishery science and fishery management. This was made possible through development of advanced technology that enabled accurate mapping of habitats, critical fishing grounds and associated biota using optical and acoustic instrumentation all coupled with the use of a geographic positioning system. Marianas currently derive its fishing ground information from the catch interview phase of the creel survey. This needs to be validated using the GPS with the collaboration and consent of the participating fishermen. All the data generated will be treated confidentially. This will also generate area specific CPUE to determine area productivity with the aim of generating an enhanced stock assessment.

## **HAWAII ARCHIPELAGO**

### **1. Continuation of the bottomfish tagging study**

Bottomfish tagging is essential to determine the spatial distribution of its home range as well as elucidating the temporal vertical migration pattern of this essential resource for the Hawaii market. Part of elucidating home ranges is the evaluation of the effectiveness of the Bottomfish Restricted Fishing Areas both in federal and state waters. The effectiveness of Restricted Fishing Areas would depend on whether it was properly designed (by size and location) incorporating biology and ecology of bottomfish. Cross area tagging (fish captured outside, tagged and released within the BRFAs) would

elucidate information on BRFA retention of adults when the tagged bottomfish are captured outside the BRFA boundary. The objective Tagging data would also fine tune the survival estimates as well as the population parameters needed for stock assessments.

## **2. Continue cooperative sampling through bottomfishers and PIFG in obtaining bottomfish samples for life history studies**

Researchers within PIFSC's Fisheries Monitoring and Stock Assessment Division (FRMD) have been working with cooperative bottomfishers and the Pacific Islands Fisheries Group (PIFG) to capture rarely encountered sizes (juveniles and large adults) of Deep-7 bottomfish species. These sizes are needed by FRMD Life History Program researchers to determine early growth rates and to verify 1<sup>st</sup> and 2<sup>nd</sup> annual growth marks within otoliths (juvenile stages) and to determine longevity (from large adults) based on otolith trace geochemistry techniques. This information provides a more complete determination of the length-at-age relationship, size at sexual maturity, and lifespan within these species; information that is essential to provide an improved stock assessment of this species group.

Fishermen participating in this research project had established a good working relationship with their clients (either markets or restaurants). One of the arrangements was to supply the fish already gilled and gutted which provides a good opportunity to sample otolith and gonads from the fish they provide their clients. This increases the sampling opportunity for life history studies.

## **PACIFIC PELAGICS**

### **1. Study to determine longline fishery post-hooking mortality of marlin and secondarily of other species, as appropriate**

An increase in size limits for any given fishery will result in an increase in the number of fish that will be tossed back to sea after being caught in a fishing gear if it does not meet the minimum size requirement. In the longline fishery, it will entail release of hooked marlins (or other pelagic species) and it has to be determined whether post-hooked individuals are able to survive. It is important to determine the post hooking mortality in a situation where a regulatory change will result in an increase in release of caught fish whereby it may be just a biological waste if the fish is not able to survive and would have been better off being retained.

### **2. Mark and recapture studies of reef and pelagic sharks in the Mariana Archipelago to determine residency time and migration**

This priority is supplemental to the shark depredation priority in the Marianas Archipelago. There are conflicting views between the fishing industry and scientist towards the status of the shark population in the Marianas archipelago. Mark and recapture studies can support determining the shark population size, residency times, and migration patterns. Tagging using pop-up archival tag or radio tags could provide home ranges information and habitat utilization pattern that could resolve the differences in view and opinion regarding visual observation and capture via fishing interactions.