

Commercial fisheries biosampling programme in American Samoa

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In 2009, the United States Congress approved funding to the National Marine Fisheries Service in recognition of expanding data requirements to meet responsibilities under the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006. Under this federal funding, fisheries science initiatives in the Pacific Islands region have focused on implementing a Commercial Fisheries Biosampling (CFBS) programme.

The CFBS programme, implemented through the Pacific Islands Fisheries Science Center under the National Oceanic and Atmospheric Administration, has goals to acquire comprehensive life history and size- and age-specific population structure data in order to develop sustainable management regimes for each Pacific Island territory. The CFBS programme has been designed to identify important commercially harvestable species; determine age, growth, life history parameters and reproductive cycles; and provide size-at-age data to estimate levels of exploitation and sustainable yield.

In 2010, the CFBS programme started as a pilot project in American Samoa and has since been implemented through the Department of Marine and Wildlife Resources (DMWR). Although DMWR has already run a successful creel survey programme, the surveys conducted do not include species-level identification. Moreover, the CFBS programme is intended to conduct total catch survey information for each fisherman in order to circumvent sampling issues. Motivation to participate is a perennial problem in fisheries creel surveys; therefore, this programme is unique because it pays for each fish measured, and purchases fish for otolith and gonad extraction at a rate higher than the prevailing market rate.

The objectives of the CFBS programme are to:

- 1) hire and capacitate a staff member of American Samoa's DMWR to identify the catch from any fisherman to the species level;
- 2) develop and field-test logistics for maximizing the amount of length-and-weight-frequency data collected from a broad cross-sample of the fishery;
- 3) develop a protocol for collecting and processing otolith and tissue samples from the field to the laboratory for processing; and
- 4) evaluate lessons learned and be able to make recommendations as a point of departure for expansion and refinement of the programme.

Milestones

Since the pilot project began in 2010, DMWR now has seven personnel trained to identify (to the species level) the catch of boat-based spear fishermen (the major coral reef fishery), and from trolling, handlining and bottom-fishing activities. There has been a deluge of data due to financial incentives. Most of the fieldwork has been conducted in the Tutuila fish market in Pago Pago where fishermen bring their catch. For spearfishing, fieldwork is conducted in the early morning (from 5:30–8:30 am). Bottomfishing has a more variable landing time throughout the day, but sampling is coordinated through close communication between fishermen and DMWR personnel. Bottomfish fishermen inform DMWR staff of their departure time and estimated arrival time in order to coordinate the timing of catch surveys. Sampling is always conducted on Saturdays because this is the most important fishing day — in preparation for the traditional family weekend get togethers, known as *to'anai*. These gatherings usually require that fish be served.



DMWR staff members Alama Tua and TeeJay Letalie measuring and weighing each fish caught by a spear fisherman.

DMWR staff have routinely accessed the catch of 10 spear fishermen, 4 bottomfish boats and 2 troll and handline fishermen, logging approximately 84,000 length-weight fish measurements since October 2010. During biosampling fieldwork, a fisherman is the sampling unit, and audio recorders are used to record catch data and other information. At the beginning of each audio recording, the following data are recorded: date of fishing; fisherman's name; type of fishing activity; mode of transport (boat or fishing from shore); fishing area; boat registration number; total number of fishermen in the boat; and number of hours spent fishing.

Our data indicate that the blue-banded surgeonfish, *Acanthurus lineatus*, dominates the commercial fisheries catch, accounting for about 45% of the total catch. The rest of the commercial catch is dominated by other surgeonfish species (e.g. *Naso lituratus*, *N. unicornis* and *Acanthurus guttatus*), parrotfish and soldier or squirrelfish. The snapper *Lutjanus kasmira* and redgill emperor *Lethrinus rubrioperculatus* were abundant in bottom-fishing catches. The spiny lobster was the most highly targeted invertebrate. Spearfishing accounted for most of the commercial catch, based on the number of fish sold on Tutuila.

DMWR has routinely collected otoliths and gonads of the following species from spearfish catches: *Sargocentron tere*, *Myripristis berndti*, *M. murdjan*, *M. amaena*, *Naso unicornis*, *Scarus rubroviolaceus* and *Sargocentron spiniferum*. From the bottomfish catch, DMWR has routinely collected otoliths and gonads from *Lutjanus gibbus*, *L. rufolineatus* and *Lethrinus xanthochilus*. Because spearfishing is a size-selective fishery, DMWR has asked some fishermen to collect newly settled larvae and juvenile fish if they are encountered. The CFBS programme also

conducts pectoral fin clip collection to confirm species identification via the DNA ("Fish Barcode of Life") international database. Length and weight measurements, and two whole fish photographs are taken from each sample collected for the fin clip (DNA) collection.

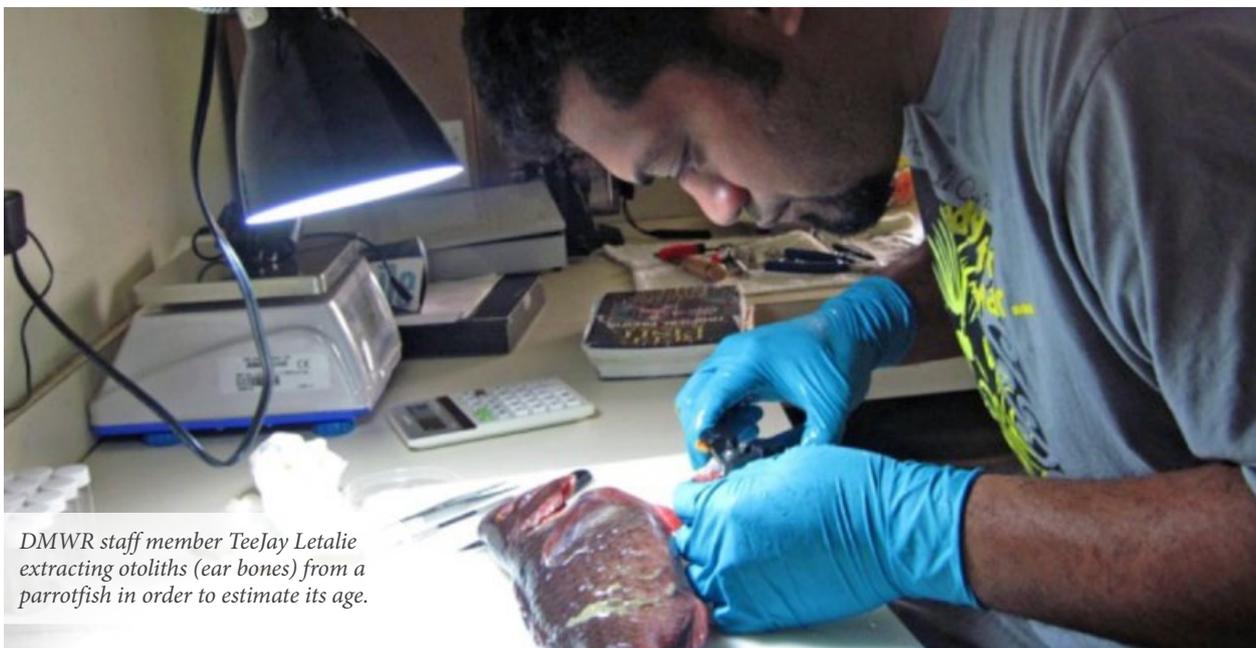
Audio data are later entered into the biosampling database designed by the National Oceanic and Atmospheric Administration's Pacific Islands Fisheries Science Center in collaboration with DMWR staff. Audio files have been archived according to labeling protocols required by the center. DMWR has also developed a system that allows fish purchased for otolith and gonad extraction to be traced to a particular fisherman on a given date.

The benefits of the CFBS programme in American Samoa have been many-fold: it refines current creel survey to the species level and total catch level data, and has enhanced local capacity to identify fish and invertebrate species. It also provides funds for continued off-island training for DMWR staff. The programme will produce valuable information on growth rates, longevity and reproductive patterns for the most important fish species. Together with fish length data, this information will be very critical in length-based coral reef fishery stock assessment, which can determine natural and fishing mortality rates, and estimate sustainable exploitation rates and provide directions on appropriate size limits for fishing.

For more information:

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DMWR staff member TeeJay Letalie extracting otoliths (ear bones) from a parrotfish in order to estimate its age.