



**SCIENTIFIC COMMITTEE  
FOURTH REGULAR SESSION**

11-22 August 2008  
Port Moresby, Papua New Guinea

---

**THE DEVELOPMENT OF INDUSTRY-RELATED TECHNICAL SOLUTIONS TO REDUCE  
BYCATCH AND FISHING MORTALITY OF STFO**

---

**WCPFC-SC4-2008/FT-WP-6**

**David G. Itano<sup>1</sup>**

---

<sup>1</sup> University of Hawaii, Pelagic Fisheries Research Program, 1000 Pope Rd, MSB 312, Honolulu, HI 96822 USA

## **The development of Industry-related technical solutions to reduce bycatch and fishing mortality of STFO**

**David G. Itano<sup>2</sup>**

### **Abstract**

There are many ways in which scientists can work with the fishing industry to develop gear, techniques and other methods to reduce bycatch and the take of all categories of STFO. Several projects have been proposed but relatively few have been funded and implemented to date. Stronger collaborative links with industry should be encouraged by the Commission and developed by the Scientific Committee. Conducting interviews, surveys and workshops would facilitate this process as would placing specially trained observers or consultants on commercial fishing vessels. A directed use of specialized instruments (TDRs, hook timers, net depth recorders, etc.) can also be used to characterize fleets or fishing gear of specific interest to the Commission. However, cooperation and assistance from the CCMs will be necessary due to the prohibitive costs of chartering large purse seine vessels. Ideally, studies should take place on commercial fishing vessels which would allow verification of catch composition, fish size and bycatch levels on a set by set basis. Encouraging efforts of the IATTC (EPO) are currently in progress and another project (IEO in collaboration with industry) related to acoustic selectivity in the eastern and central Pacific is planned for 2009. Complementary projects should be developed within the WCPO.

### **Introduction**

During the Third Regular Session of the Scientific Committee (Honolulu, Hawaii 13-24 August 2008), Agenda Item 5.3 addressed issues related to the mitigation (reduction) of fishing mortality on juvenile bigeye and yellowfin tuna, primarily by purse seine gear. The outcome of an Informal Small Discussion Group meeting focused on reducing impacts on all small tuna on floating was summarized including an explanation of STFO which includes: (1) commercially undersize tuna and tuna-like species often discarded; (2) very small commercially harvested tuna and tuna like species such as the large landings in the Philippines and Indonesia targeting anchored FADs; and (3) all bigeye tuna and juvenile yellowfin taken by purse seiners and ringnet vessels operating on floating objects (FADs and natural drift objects). The Small Discussion Group reviewed industry-associated research (especially FAD-related) and potential management options to reduce fishing mortality on STFO. A summary of that discussion is contained in Attachment M of the Report of SC3.

It was noted that research programs designed to work with the fishing industry to address FAD and STFO issues were very rare and had not yet been conducted in the WCPO. However, the full charter of active purse seine vessels was recognized as prohibitively expensive. The development of incentive-based systems to encourage industry participation was encouraged. The main point was that scientists and commissions should make better use of the knowledge and experience of commercial fishermen to address issues of common concern.

---

<sup>2</sup> Pelagic Fisheries Research Program, University of Hawaii, Honolulu, Hawaii, USA

## Categories of Industry-related research and data collection

Several industry-related projects or proposals related to FAD management or the reduction of STFO have been recommended but few have actually been carried out. A summary of different categories of industry-related mitigation projects is included below.

- Ask the fishermen what they think
  - One on one interviews (as done in the Indian Ocean, Moreno et al. 2007)
  - Surveys (as done via email prior to SC3)
  - Workshops
- Gear effect experiments
  - Examine net depth, FAD depth, biofouling, area, etc. (Lennert-Cody et al. 2008, Satoh et al. 2008)
  - Note: often dependent on incomplete or inaccurate observer or unverified vessel registry data
- Release gear and techniques
  - Sorting grids (IATTC, WCPFC-SC4\_FT-SWG IP-3)
  - Other? (from workshops?)
- Acoustic discrimination and pre-set avoidance of STFO
  - Ascertain ability of fishermen to interpret acoustic data (surveys, interviews with pre-set estimates of size and species, IATTC and IEO studies in progress, see WCPFC-SC4\_FT-SWG/IP-3 and FT-SWG/WP-2)
  - Verification by species composition and length frequency of the catch
  - Visual verification with underwater video and comparison with echo sounder images (Itano 2008).
- Fine-scale behavior and avoidance
  - Investigate and document species-specific fine-scale horizontal and vertical behavior of tuna on floating objects (IATTC proposed, see , WCPFC-SC4\_FT-SWG IP-3)
    - Acoustic tagging and tracking
    - Visual observations and experience of fishermen
    - Examination of catch and effort data
    - At-sea experiments (may require vessel charter)
  - Examples: catch composition by time in relation to sunrise, diurnal behavior of tuna species
- Fine-scale characterization of fisheries
  - Use of “special” observers given specific duties, elite observer program or consultants
  - Equipping observers or consultants with high tech equipment or specialized gear
    - Time/Depth recorders
    - Hook timers
    - Net depth recorders
    - Current meters

## Recommendations and discussion

The most important aspect of developing and funding industry-related projects is to put resources toward ideas and projects that have a higher chance of success and also to develop innovative approaches that industry will embrace. A positive way to do this is to consult and interact with fishermen, vessel operators and industry experts thus investing them in the process and benefiting from their experience. Interviews are generally more productive than impersonal surveys but both are limited by the scope of questions the scientists develop and include inherent biases. Convening a **workshop of invited industry experts** would be a better way to search out and develop solutions to reducing STFO that may be more acceptable than mitigation measured developed by scientists alone.

Studies to examine gear effects on STFO catch have been significantly hindered by observer and vessel registry data quality issues as well as under-reporting of STFO (particularly discards and bigeye catch). These problems suggest that **specific gear influences** or fine-scale observations of **tuna school behavior** should be monitored by **specially trained observers, targeted observer programs or paid consultants**. The SPC SPRTRMP observer program was a good example of the use of four “super observers” who were selectively placed on specific vessels to characterize poorly documented fleets. Consultants or exceptional observers from domestic observer programs or consultants could be funded by the Commission to do similar work in conjunction with projects to reduce bycatch and STFO.

Specially trained observers or consultants should be used to **characterize specific fleets or practices of special management concern**. Currently, this is taking place with some observers having been equipped SPC/WCPFC with TDRs to characterize the depth of longline sets by fleet. The same could be done for purse seine sets. Currently, the Commission does not know how deep the purse seine nets of different fleets are effectively fishing despite the fact that net depth regulations have been proposed as a management option. Reported net depth on vessel registries provides a proxy for how deep their nets operate but even these figures are often out of date. Pursing depth of a purse seine depends on many factors such as current, pursing speed, winch power, etc. Also, gear is often fairly uniform within fleets and flags but can differ significantly between fleets.

The IATTC has already expended considerable effort toward the development and testing of sorting grids to reduce bigeye catch in the EPO. Sorting grids could a promising measure to release undersize tuna and tuna-like species but appear problematic for releasing bigeye which are often larger than skipjack that are desirable to retain. Other **gear related solutions** need to be suggested and developed. Once again, consulting industry or conducting industry attended workshops may be a way to draw out and foster innovative techniques and gear to release STFO after it has been encircled by the purse seine.

However, avoiding STFO and bigeye tuna before the set has been made is the better option. Refining or documenting industry expertise with **acoustic selectivity** should continue using a variety of methods such as specialized observer or consultant interviews with purse seine operators and use of video verification with depth sounders. Better documentation of the ability of fishermen to acoustically or visually identify bigeye schools could lead to vessel or fleet-specific incentives to avoid bigeye while preserving effort allocations of skipjack. Fine scale observations of diurnal movement patterns using acoustic tags and visual observations should also continue. The important point is that these studies should ideally **take place on an active and efficient commercial purse seine vessel** which will allow verification of catch composition, fish size and bycatch levels on a set by set basis.

A noted earlier, chartering a fully operational purse seine vessel is cost prohibitive and beyond the scope of most funding agencies. Other mechanisms to **foster industry collaboration** need to be developed and instituted within STFO management options. The Scientific Committee needs to develop a prioritized list

of industry-related projects for funding. The Commission needs to solicit CCMs to provide vessel time and collaborative links between purse seine operators and scientists.

## References

Itano, D.G. 2008. **The use of underwater video to characterize the species, size composition and vertical distribution of tunas and non-tuna bycatch around floating objects.** WCPFC SC4. FT-SWG WP-3.

Lennert-Cody, C. E., J. J. Roberts, and R. J. Stephenson. 2008. **Effects of gear characteristics on the presence of bigeye tuna (*Thunnus obesus*) in the catches of the purse-seine fishery of the eastern Pacific Ocean.** ICES Journal of Marine Science, 65: 970-978.

Moreno, G., L. Dagorn, G. Sancho, D. Itano. 2007. **Fish behaviour from fishermen knowledge: the case study of tropical tuna around drifting fish aggregating devices (DFADs).** Can. J. Fish. Aquat.Sci. 64: 1517-1528.

Satoh, K., H. Okamoto, Y. Takeuchi, H. Shono, T. Matsumoto, K. Watanabe, N. Miyabe and H. Honda. **Effects of depth of underwater structures of FADs on catch of bigeye tuna (*Thunnus obesus*).** WCPFC SC4. FT-SWG WP-1.