



**SCIENTIFIC COMMITTEE
THIRD REGULAR SESSION**

13–24 August 2007
Honolulu, United States of America

BRIEFING DOCUMENT: AGENDA ITEM 5.3

BYCATCH MITIGATION – SMALL TUNA ON FLOATING OBJECTS

WCPFC-Informal Small Group WP-6

SUMMARY OF SMALL GROUP DISCUSSION MEETING

1. The **Small Discussion Group 3** addressing Plenary Agenda Item: **5.3 Juvenile bigeye and yellowfin tuna** met from 1230 – 1350 on 16 August 2007. David Itano facilitated the meeting and lead discussion on summary document SCPFC-SC3: **Informal Small Group/WP-2: SMALL TUNA ON FLOATING OBJECTS.**

The **Small Discussion Group 3** was asked to:

- a) review any FAD-related, industry-associated research in relation to mitigating juvenile mortality of bigeye and yellowfin tuna;
- b) refine analyses of potential management options to reduce such catches;
- c) review any outcome from industry-associated research (paragraph 7, CMM-2006-01);

2. .. and prepare recommendations in support of SC3 Agenda item 5.3 on mitigation measures for small tuna catch with a focus on the use of FADs. These issues were discussed prior to SC3 through email discussions with persons listed in Appendix I to ISG/WP-2.

3. Some members of the group objected to the terminology of “*juvenile bigeye and yellowfin tuna*” that implies some reference to actual maturity stage or reproductive status when in fact it is a general term that has been used to imply undesirably “small” tuna. The reality is that a large proportion of purse seine-caught yellowfin and longline-caught bigeye tuna are of an acceptable market size but are (technically) sexually immature.

4. It was clarified that the issue of concern refers to *small tuna taken in association with floating objects*. **The meeting Convener suggested that this terminology and its acronym of STFO be adopted by the SC.** Floating objects includes Anchored FADs, Drifting FADs and all natural floating objects such as logs and natural flotsam as defined in **SC3 FT IP-4**.

5. The issue refers to three categories of **Small Tuna on Floating Objects** to which the SC and SCTB have recommended reductions in levels of fishing mortality due to concerns related to stock condition. These categories include:

- a) **"UNDERSIZE" tuna and tuna-like species** that have little or no current market value at purse seine landing sites. These tuna often gill in the net or become crushed or damaged during the brailing operation and are often discarded. Discarding can occur during onboard sorting before loading to storage wells, during size and species sorting between wells or during the unloading process.
- b) **“VERY SMALL” tropical tuna** (skipjack, yellowfin and bigeye) and tuna-like species (*Euthynnus affinis*, *Auxis spp.*) that are significant target catches in the **Indonesia and Philippine surface fisheries** (see **Barbaran 2006**). **It should be noted that these fisheries concentrate their effort on Anchored FADs.**
- c) **“ALL BIGEYE TUNA”** and **“SMALL YELLOWFIN TUNA”** taken by purse seine and ringnet fisheries operating on floating objects.

6. The actual size of concern of “*small yellowfin*” was discussed. It was noted that discussions on restricting catches of “*juvenile bigeye and yellowfin tuna*” have been vague as to what size fish were actually being discussed, with some feeling that yellowfin and bigeye less than about 60 cm should be considered. The discussion Convener elected to use the term **Small Tuna on Floating Objects (STFO)** during the discussion and consider it for general use by the SC and SWGs.

7. It was suggested that an analysis should be carried out to determine **what size of yellowfin tuna should be considered** in discussions of reducing fishing mortality of STFO, incorporating such parameters as stock condition, recruitment indices, yield-per-recruit, and economic considerations.

8. In response, SPC noted that **MULTIFAN CL** is based on catch-at-length data by fishery sector, thus can produce this sort of analysis easily, (with the exception of economic considerations).

9. The **Small Discussion Group 3** examined and discussed possible mitigation measures for STFO. For reference purposes, an extensive matrix of potential **Output** and **Input** controls to mitigate STFO fishing mortality are attached to *SCPFC-SC3-**Informal Small Group/WP-2: SMALL TUNA ON FLOATING OBJECTS.***

10. It was noted that the Small Discussion Group **should not re-open debates on the relative merit of all STFO management options.**

11. Instead, it was suggested that the Group should concentrate on reviews of **Industry-associated** research relevant to STFO mitigation and propose recommendations for Industry-associated research.

REVIEW OF INDUSTRY-ASSOCIATED RESEARCH

12. It was noted that very few research programs that worked at sea in close collaboration with commercial fisheries to examine FAD-related and STFO issues have been conducted. Examples include:

- a) The EU funded **FADIO¹ Program** (Indian Ocean, chartered research vessel examining fish behaviour in association with drifting FADs); (Dagorn et al. **SC2 FT WP-3**).
- b) Acoustic surveys on purse seine supply vessel working with purse seiners; (Miguel et al. **SC2 FT WP-8**).

13. **NOTE: These acoustic surveys lacked efficiency as they could not benefit from catch verification and fishermen’s experience that would be available if work was conducted on a commercial purse seiner.**

¹ FADIO (Fish Aggregating Devices as Instrumented Observatories of pelagic ecosystems): a European Union funded project on development of new observational instruments and the behavior of fish around drifting FADs

14. Studies that examined FAD-related influences on STFO catch and fishermen's knowledge of FAD associations include:

15. **Lennert-Cody et al. (2007 and SC3-FT-IP-1)** analyzed FAD-related parameters collected by IATTC purse seine observers in the EPO to examine their possible influence on bigeye catch, finding a positive relationship with bigeye catch and the depth of the “**FAD appendage**” that hangs vertically beneath a drifting FAD (**DFAD**).

16. These appendages are usually constructed of surplus purse seine netting that is weighted to hang vertically beneath a drifting FAD. **SC3 FT IP-4 (A summary of operational, technical and fishery information on WCPO purse seine fisheries operating on floating objects)** describes FAD construction and the use of sub-surface structure in FAD construction. The Convener noted that sub-surface structure is so important to DFAD construction that some designs are completely submerged and have no surface float or raft at all to reduce potential pirating of DFADs by purse seiners.

17. **NOTE: Studies of this type are possible only if adequate data is available suggesting that FAD-specific parameters should be collected by observer programs.**

18. **Satoh et al. (SC3 FT-WP-4)** described similar work conducted in the WCPO on the relationship between drifting FAD depth and catch rates of bigeye tuna. However, the work is very preliminary having recently begun with only a limited dataset examined to date.

19. **Moreno et al (SC3 FT WP-5)** was presented to SC3 FT SWG. This paper describes a study that directly interviewed purse seine captains to explore aggregative behavior of tuna and other fish to drifting FADs. However, means to reduce catches of STFO were not directly investigated.

15. **NOTE: Studies of this type highlight the wealth of knowledge fishermen have on tuna behavior useful for targeting and bycatch avoidance that should be consulted.**

16. Other papers noted that a relatively small number of purse seine vessels within a seemingly homogenous fleet captured disproportionately high percentages of bigeye tuna on floating object sets (**Harley et al 2004; Harley and Suter 2007 and SC3 FT IP-2; Langley (2004)**).

17. **NOTE: These studies suggest that some boats may be designing DFADs or employing FAD-associated fishing techniques that somehow increase bigeye catch.**

18. **Schaefer and Fuller (SC3 FT WP-2)** discuss the physiological differences in swim bladder volume between skipjack, yellowfin and bigeye tuna that produce distinct and identifiable acoustic signatures on echo sounder and sonar equipment and other factors related to experience and verification with catch that allow purse seine fishermen to make **reliable estimates of school size, species identifications and even size-specific estimates of tuna schools prior to setting.**

19. **NOTE: This suggests that purse seine fishermen could avoid bigeye tuna and STFO if provided with incentives or financial motivations to do so.**

RECOMMENDATIONS ON INDUSTRY-RELATED RESEARCH ON STFO

SC SPECIALIST WORKING GROUP RESEARCH

1. An analysis to determine what size of yellowfin tuna should be considered in discussion of reducing fishing mortality of STFO incorporating such parameters as stock condition, recruitment indices, yield-per-recruit, and economic considerations.
2. A comparative study on relative rates of STFO and floating-object associated fauna between:
 - a) floating objects in the eastern vs western regions of the WCPO;
 - b) analysis of the relative rates of STFO (especially bigeye) between drifting FADs and anchored FADs; and
 - c) relative rates of STFO taken in archipelagic areas close to large island environments vs catch rates offshore or in high seas areas
3. A detailed analysis of skipjack, yellowfin and bigeye catch on floating object sets by time of day
4. An examination of vessel specific bigeye quotas with vessel owners as a means to reduce bigeye catch and improve targeting by purse seine fisheries.

INDUSTRY-ASSOCIATED RESEARCH

1. Survey of purse seine operators as to their accuracy in estimating set size, species composition and fish size prior to setting.
2. Designed acoustic studies ON BOARD commercial purse seine vessels engaged in commercial fishing operations to document the accuracy of set size, species composition and fish size prior to setting.

Note: this would test the feasibility of vessel or fleet-specific STFO quotas as a management option.

3. The use of net depth recorders or other depth recording devices in conjunction with ADCP or Doppler current meters and set details to characterize actual pursing depth of WCPO purse seine gear in different areas and conditions.
4. Closer collaboration and communication between the SC and the tuna industry to seek new ideas and workable solutions to reducing the take of STFO, particularly on drifting and anchored FADs.

Note: designed personal interviews and surveys as conducted by Moreno et al (2007) should be conducted in the WCPO.

GENERAL IDEAS ON HOW TO REDUCE STFO FISHING MORTALITY AND LANDINGS AND IMPLEMENT INDUSTRY-ASSOCIATED RESEARCH

Other comments of a general nature were submitted relevant to reducing STFO landings with ways in which industry-related research may progress. Some suggestions from the Small Discussion Group 3 are included below.

1. Enforce 100% retention.
2. Require larger minimum processing sizes of bigeye and yellowfin by canneries.
3. Provide an incentive-based allocation of purse seine effort within the VDS system for purse seine effort on unassociated schools or a demerit system for fishing on floating objects.
4. Provide exclusive access to time/area closed zones to purse seine vessels willing to cooperate with scientific studies to reduce STFO catch and bigeye catch in particular.

SUMMARY STATEMENT

The largest constraint of scientists working with commercial vessels was recognized as the **prohibitive charter costs and loss of revenue** by commercially operating fleets. Some means to offset vessel time while providing cooperating vessels with an **incentive to participate** will need to be developed. Structured scientific cruises working close to commercial fleets are desirable but extremely expensive.

The main point is that these cruises attempt to emulate commercial conditions and are not able to better utilize the accumulated experience and knowledge of commercial fishermen who are undeniably the experts on acoustic recognition, school assessment and tuna behavior. **Closer collaboration and communication with the tuna industry should be fostered** by the SC and Commission in order to seek practical and incentive based mechanisms to reduce fishing mortality on small tuna taken in WCPO surface fisheries.

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