SCIENTIFIC COMMITTEE
FIFTH REGULAR SESSION

10–21 August 2009
Port Vila, Vanuatu

IMPLICATIONS FOR SCIENTIFIC DATA COLLECTION BY OBSERVERS OF NEW REQUIREMENTS FOR 100% OBSERVER COVERAGE OF PURSE SEINERS

WCPFC-SC5-2009/ST-WP-6

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1. BACKGROUND

In the western and central Pacific purse seine fishery, observers have been deployed under the licensing provisions of two sub-regional arrangements, the US Tuna Treaty (between the United States and members of the FFA) and the FSM Arrangement (an arrangement for joint licensing of vessels flagged or sponsored by members of the PNA). The observer programmes associated with these arrangements are often referred to as sub-regional observer programmes, and are administered by the FFA Secretariat. Typically, these programmes have achieved observer coverage rates in excess of 20%.

Observers have also been deployed in several countries under national programmes, which cover domestic purse seine vessels fishing primarily in the home EEZ, and/or bilaterally licensed purse seiners fishing in that EEZ. These programmes have been managed by the coastal States concerned. Coverage rates have been variable, ranging from >20% in the PNG national observer programme, to typically <10% in most other national programmes.

These sub-regional and national programmes have been supported by both SPC-OFP and the FFA. SPC-OFP has taken the lead role in the provision of observer training, data forms, data processing and data quality assurance. FFA has managed the logistics of observer placement and general programme administration for the sub-regional programmes and assisted in observer training and data management.

The WCPFC has developed a Regional Observer Programme (ROP) that will provide coverage by ROP observers of trips by fishing vessels that occur (i) in more than one EEZ; (ii) in one or more EEZ and on the high seas; and (iii) exclusively on the high seas. For purse seine, much of the observer coverage occurring under the two sub-regional programmes and of bilaterally-licensed vessels covered under national programmes will contribute to the ROP. Additionally, these existing observer programmes, and a number of other observer programmes of WCPFC CCMs, have been accredited to provide trained observers to operate under the ROP. Coastal States also have the option of having vessels fishing exclusively in their EEZ covered by the ROP. As a result, it is expected that most of the purse seine fishing in the region will be eligible for coverage by the ROP.

WCPFC recently decided, as part of the Conservation and Management Measure for Bigeye and Yellowfin Tuna in the Western and Central Pacific Ocean (CMM 2008-01), to implement 100% observer coverage (with ROP-accredited observers) of purse seine vessels (except vessels fishing exclusively in one EEZ) from 1 January 2010. This decision was motivated mainly by a need to monitor compliance of purse seine operations with two important provisions of CMM 2008-01: (i) the closure of the purse seine fishery to fishing on fish aggregation devices (FADS) for two months in 2009 and for three months from 2010; (ii) the requirement from 2010 for purse seiners to retain all catch of bigeye, skipjack and yellowfin tuna on board for subsequent landing or transshipment (subject to certain specific exceptions); and (iii) the closure of the high-seas pockets from 2010. The decision presents a number of logistical challenges, which include observer training, logistics of deployment, data processing and data quality assurance. There are major cost implications associated with these challenges, a number of which will be considered during this session of the Scientific Committee.

Observers collect a range of data on board purse seiners that are critical for stock assessment. The most important of these are size and species composition of the retained tuna catch; estimates of by-catch quantity, size and species composition; interactions with and mortality of species of special interest; and estimates of discarded catch. Observers also collect a range of other information that may be used to monitor compliance with various provisions of the vessel's license. This paper briefly examines some of the implications of 100% observer coverage for scientific data collection in the western and central Pacific purse seine fishery.

2. IMPLICATIONS OF 100% OBSERVER COVERAGE

2.1 Observer training

Until recently, all observers trained by SPC/FFA had been trained to a single, comprehensive standard. This standard included all of the competencies required for catch sampling and scientific data collection. A typical training course lasted 3-4 weeks and a maximum of 15 trainees was considered appropriate. However, the new requirement for 100% observer coverage has created high demand for new observers and hence observer training. To meet the immediate demand, SPC, with the concurrence of member countries and territories and the support of the WCPFC Secretariat, designed a reduced set of competencies and training for a "cadet" observer. These competencies are focused on the monitoring requirements of CMM 2008-01 and omit, amongst other things, catch sampling and other biological data collection. A "cadet" observer training course takes one week to deliver and up to 30 trainees can be accommodated.

The above approach has been taken to fill the gap in observer resources that would otherwise have occurred in 2010 if observer training had continued to follow the traditional model – there was not enough time or training resources to train enough observers to meet the requirement of 100% coverage for the FAD closure in 2009 or for the fishery in general in 2010. Of course, it is possible that observers from outside the Pacific Islands region may be used to meet the demand; however, Pacific Island countries are keen for their national and sub-regional programmes to be used to the greatest extent possible. To date, the regional agencies have been limited in the amount of observer training that can be delivered because of their own limited training resources. It is hoped that those resources can be augmented in 2010 to conduct a greater number of training courses, including training to upgrade "cadet" observers to regular observers. At the same time, SPC and FFA are attempting to develop observer training capacity in-country, through training trainers and providing essential training tools such as the observer training competency-based standards. Nevertheless, if is fairly clear that 100% coverage of the purse seine fishery during the 2009 FAD closure and in 2010 with regular observers trained in catch sampling and biological data collection will not be achieved. Therefore, the priorities for data collection by observers and strategies for their deployment need to be considered.

2.2 Current priorities for scientific data collection by observers

Regular observers are required to collect a variety of different types of scientific data relating to target catch, by-catch, species of special interest and discards. As noted by Lawson (2006), these different objectives may require different levels of observer coverage to achieve certain statistical quality objectives. However, new information (Lawson 2008, 2009) has focused attention on the need for observer-based catch sampling to estimate the species and size composition of the tuna catch. For the reasons outlined by Lawson (2008, 2009), observer-based sampling appears to be the only means of consistently sampling unsorted catches of known set type and area/time stratum that is required for most scientific purposes[2]. For 2010, it is proposed that there are two priorities for observer-based catch sampling:

1. Transitioning of observer-based catch sampling for the estimation of species and size composition from grab-sample to spill-sample methodology – Lawson (2008, 2009) has clearly shown the bias in species composition in particular that appear to be inherent in observer-based (and possibly port-based) grab sampling. It is critical that we now begin

[2] Port sampling of catches to estimate stratified size and species composition is becoming increasingly problematic because of onboard size-and species-sorting, and the increasing amount of transshipment, a more difficult environment to conduct sampling. However, port sampling of catches being unloaded to onshore processing facilities can be sampled to provide accurate estimates of trip-based size and species composition, which would be a useful supporting sampling activity to observer-based sampling.

to transition all observer-based catch sampling to the new spill-sampling methodology. Trials have been undertaken to show that spill sampling can be conducted with minimal disruption to fishing operations. Some alternative procedures are possible, depending on the vessel, e.g. sampling conducted on the work deck or on the well deck, and procedures will be fine-tuned and adapted as necessary. Spill sampling is now being incorporated into observer training. The cooperation of vessel operators is important in this process and we request their understanding as this important transition is made.

2. Continued acquisition of paired spill and grab samples so that the large amount of historical observer data can be corrected for size selectivity bias in grab samples – The paired sampling requires two regular observers to conduct independent sampling of the same purse seine sets, one using grab sampling and the other using spill sampling. To date, paired sampling has been conducted on board PNG, NZ and Solomon Islands purse seiners, with the cooperation and permission of the vessel operators. More paired sampling is required on other types of vessels, in different areas and using different operational strategies in order to obtain the best data possible for calibrating the historical grab-sample data – see comments below regarding a sampling design for this activity. It is hoped that the industry will assist in undertaking this work on a broad basis during the remainder of 2009 and in 2010.

2.3 Strategies for regular observer deployment

Need for a sampling design

Because regular observers are trained in catch sampling and "cadet" observers are not, it would be desirable to consider a sampling design for the deployment of regular observers for the purpose of catch sampling. The elements of a sampling design that should be considered include area and time strata, set type and vessel nationality. To date, such a sampling design has not been used for the deployment of observers in the various sub-regional and national observer programmes. For the sub-regional programmes that have achieved relatively high levels of observer coverage, the non-stratified deployment of observers does seem to have achieved a good level of spatial coverage of the fishing activities of those fleets, although not always by set type (Figure 1). With higher levels of coverage, the need for a stratified sampling design is less important, and representative sampling of important strata is likely to be achieved by a "random" deployment strategy. Nevertheless, given that a number of national fleets have received very low observer coverage in the past, it will be important to at least consider vessel nationality in the deployment of regular observers, and to strive for approximately equal regular-observer coverage of all nationalities participating in the fishery.

Paired spill and grab sampling

As noted above, it is a high priority to undertake continued paired spill and grab sampling for the purpose of calibrating historical grab-sampling data. Our initial objective for the remainder of 2009 and 2010 is to undertake a total of 50 observer trips for this purpose, spread over vessel nationalities approximately in proportion to their expected involvement in the fishery, as follows:

Vessel nationality/arrangement	Trips
FSM Arrangement	8
Korea	8
Chinese Taipei	8
US	8
Japan	6
China	2
New Zealand	2
EC and EPO-based fleets	2
Philippines	2
Solomon Islands	2
Vanuatu	2
TOTAL	50

Progress on the sampling trials by SPC-OFP and individual CCMs would be reported to SC6 and any required adjustments to the sampling plan agreed at that time.

2.4 Longer-term considerations

As noted above, SPC/FFA, with the assistance of national trainers, will continue observer training through 2009-2010. Training will likely focus on "cadet"-level training for the remainder of 2009, with a shift back to regular observer training in 2010, including the upgrading of existing "cadet" observers who have conducted at least one observer trip satisfactorily and who wish to continue. Hopefully by the end of 2010, there will be a sufficient cadre of regular observers associated with the sub-regional and national observer programmes to meet most of the needs of the ROP by 2011.

By the end of 2010, it is anticipated that spill sampling will be in routine use, and that sufficient paired spill and grab sampling will have been conducted to calibrate the historical data. However, a longer term issue to consider is what proportion of observer trips would it be desirable to cover with catch sampling.

Lawson (2006) conducted a number of analyses to investigate the question of coverage rates. If the objective is to estimate catch and catch per unit effort (CPUE) of target species and common non-target species, then a coverage rate of around 20% would seem to be appropriate. Higher coverage rates might be necessary to estimate catch and CPUE of rare non-target species, including species of special interest, such as marine turtles. However, there has been significant progress made recently in understanding the various biases in observer-based sampling for species and size composition, and it would be useful to conduct further simulation analysis to estimate an optimal observer coverage rate. There are other considerations that may impact on this issue, e.g. the Commission could decide to manage the purse seine fishery on the basis of species-specific catch limits rather than the current effort limits and closures of one sort or another. If such a decision were to be made, then it is likely that a considerably higher coverage rate for species composition sampling, possibly 100%, would be required depending on how such a catch limitation might be applied. While high coverage rates for size and species composition sampling would not significantly increase the costs of observer-based data collection (as the observers would be on board in any case), attention would need to be given to the costs and resources required for data processing and data quality assurance (see Secretariat 2009).

3. CONCLUSIONS

A number of issues have been raised in this paper that relate to the scientific requirements of observer programmes. The Statistics SWG may wish to discuss and make recommendations on the following:

- The current SPC/FFA strategy for observer training, and possible WCPFC support (possibly through the Special Requirements Fund) for training of observers from small-island developing states;
- Sampling design for the deployment of regular observers for the purposes of routine catch sampling for species and size composition, including the desired level of observer coverage in the long term;
- Sampling design for paired spill-grab sampling for the calibration of historical observer-based species and size composition samples;
- A request to the purse seine industry for their cooperation and assistance in the transition to routine spill sampling and in the conduct of further paired spill-grab sampling.

4. REFERENCES

Lawson, T. 2006. Scientific aspects of observer programmes for tuna fisheries in the western and central Pacific Ocean. WCPFC-SC3-2006/ST-WP-1. Manila, Philippines, 13-24 August 2006.

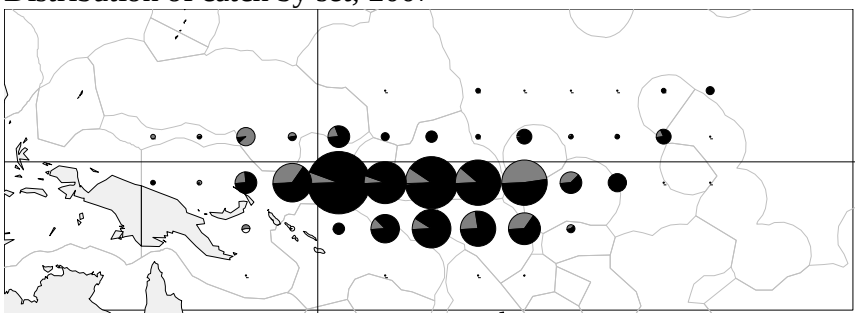
Lawson, T. 2008. Factors affecting the use of species composition data collected by observers and port samplers from purse seiners in the western and central Pacific Ocean. WCPFC-SC4-2008/ST-WP-3. Port Moresby, Papua new Guinea, 11-22 August 2008.

Lawson, T. 2009. Selectivity bias in grab samples and other factors affecting the analysis of species composition data collected by observers on purse seiners in the western and central Pacific Ocean. WCPFC-SC5-2009/ST-WP-3. Port Vila, Vanuatu, 10-21 August 2009.

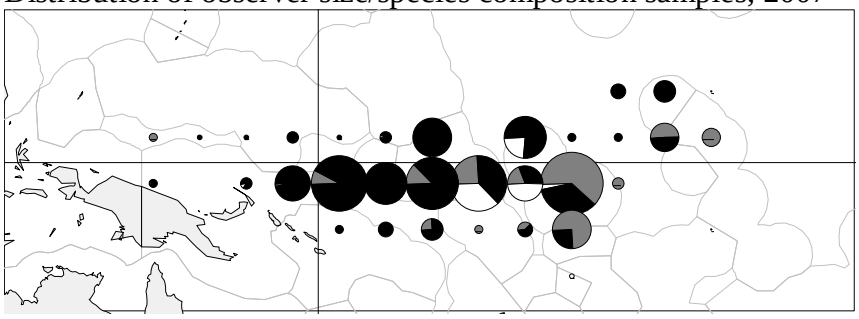
Secretariat. 2009. Regional Observer Programme data administration and management options. WCPFC-SC5-2009/ST-WP-9. Port Vila, Vanuatu, 10-21 August 2009.

A. US Treaty

Distribution of catch by set, 2007

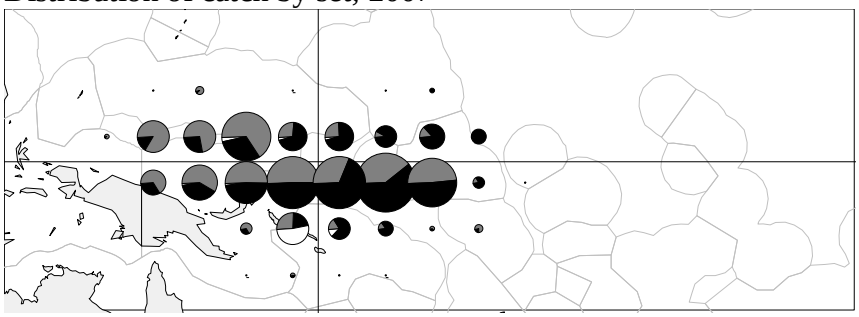


Distribution of observer size/species composition samples, 2007



B. FSM Arrangement

Distribution of catch by set, 2007



Distribution of observer size/species composition samples, 2007

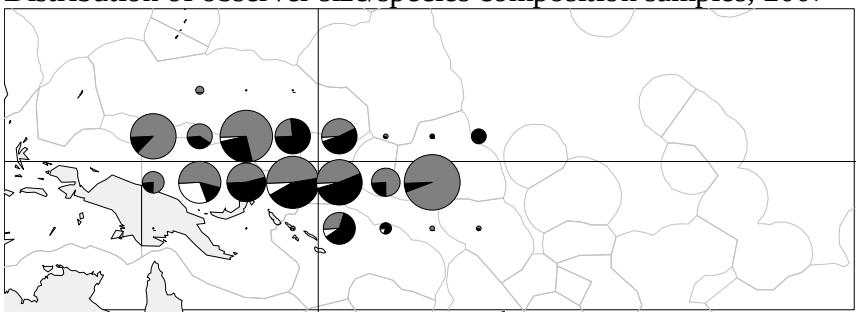


Figure 1. Distribution of catch by set type (as declared on logsheets) and weight of catch sampled by observers, by set type for vessels operating under (A) the US Treaty and (B) the FSM Arrangement in 2007. (black: drifting FAD and log sets; grey: unassociated sets; white: other set types).