

Crossing the bridge between science and management: The 12th meeting of the Scientific Committee of the WCPFC

Representatives from countries across and beyond the Pacific met this past August in Bali for the 12th Regular Session of the Scientific Committee (SC) of the Western and Central Pacific Fishery Commission (WCPFC). In this meeting, delegates review the latest science relevant to the management of migratory species in the Western and Central Pacific Ocean (WCPO), and make formal recommendations to the WCPFC meeting, which is held in December every year. The SC meeting is the key and most exciting meeting for the scientists of the Oceanic Fisheries Programme (OFP) of the Pacific Community (SPC); as the WCPFC's science services provider, the OFP deliverables presented at this meeting (over 40 SC papers by OFP authors) provide the backbone for these important discussions – and it is the key pathway through which OFP's work translates into concrete outputs for Pacific communities. The OFP team was heavily involved in presentations and working groups for all of the four themes reviewed by the SC: data and statistics, stock status, management issues and ecosystems and bycatch mitigation.

One of the exciting developments on the data and statistics front this year was the first official annual provision of full operational data for all Japanese fleets. Japan now joins Korea and China, which both began providing such data last year, and the USA, which has provided data since 2007. Operational (set-by-set) data are available from all Pacific Island countries and territories but distant-water fishing nations have historically provided data aggregated at a much coarser level (in time and space). This contribution from Japan provides great opportunities for SPC scientists to better account for the impact of fleet dynamics in the management of complex, large-scale fisheries, and in particular to improve the indices of tuna abundance that are used to inform stock assessments.

In parallel, talks of electronic reporting (ER) and electronic monitoring (EM) occupied an important place both before the meeting (with a two-day working group on this topic), and on the floor, with several delegates mentioning ER and EM in their interventions. ER and EM gathered overwhelming support across member countries to move ahead with the development of data standards, trials and implementation. The growing and universal interest in applying these technologies to Pacific fleets is sure to lead to breakthroughs in fisheries data collection and management in the years to come.

In the ongoing quest to improve the quality of species and size composition data for the purse seine fleet, a new data source is being explored: cannery receipts data. Companies routinely document both species and size distribution when they purchase a vessel's catches, and this detailed information is gathered for all catches (compared with current observer-based methods which sample 0.2–0.5% of the catch). SPC verified that the sample of available data matched up with observer records and highlighted the potential for this unconventional source to transform the SPC's data collection toolbox for purse seine fisheries. It was also emphasised that, to realise this potential, the cannery data need to be available comprehensively so that all purse seine trips can be cross-checked in this way.

Assessments of stock status provided by both OFP and ISC¹ again drew lively discussions, with the stock status of Pacific bluefin and skipjack tuna keeping the delegates occupied for many hours. The two stock assessments on the SPC's to-do list for 2016 were skipjack tuna and South Pacific blue shark. Skipjack tuna is the most caught species of tuna in the Pacific (1.8 million tonnes in 2015) and the *raison d'être* for the extensive purse seine fishery in the tropics. This species is fast-growing and short-lived, and, accordingly, previous assessments by SPC have shown that it was above or close to the agreed management target reference point, reflecting the stock's ability to sustainably support high levels of fishing pressure. This year's assessment was no different except for the extra twist of the strong El Niño event that took place during 2014 and 2015, which resulted in increased fishing and relatively large catches in the Central Pacific, which was concurrent with improved recent recruitments and stock status. The dynamics of the stock and fishery over the next few years will be especially interesting to follow as we move away from El Niño conditions.

The stock assessment for the South Pacific blue shark was not such smooth sailing. Successful stock assessment models require good knowledge of the species' biology, together with a reliable and sufficiently long time-series of catches. In this first iteration of an assessment for this stock, the catches for this species, despite it being the most commonly observed shark bycatch in the longline fishery, had to be estimated since catches for sharks tend to be severely under-reported across fleets. As sharks live for so long, especially compared with tropical tunas (e.g. the blue shark lives for over 20 years compared with skipjack, which lives for 5 years), long time-series of catch data are especially important, but the further back in time the data go, the more challenging it becomes to reconstruct catches. Because of both data and modelling challenges, the OFP stock assessment team were unable to satisfactorily estimate the current status of the stock for this year's SC, but are working hard to identify potential approaches to improve this in the future.

¹ International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean

In addition to stock assessments, the OFP team also presented an update on planned management strategy evaluation (MSE) analyses for both skipjack and South Pacific albacore tuna. The MSE approach can directly model all of the practical steps that go into the management of a species, from data collection and assessment to the implementation of fishing regulations, and relies on extensive stakeholder participation for its success. The framework for this participation within WCPFC is still being agreed upon but will likely involve several preparatory workshops to be attended by country delegates.

Another initiative progressed by the OFP team is the development of bycatch data exchange protocol (BDEP) templates to summarise bycatch data. This project is currently focused on ensuring that bycatch data are properly summarised and available to WCPFC members. It will facilitate the exchange and sharing of these data so that this important source of information on the interactions between fisheries and ecosystems can be accessed by all interested stakeholders.

Continuing from the bycatch theme, three species groups were assessed this year for the designation under the 'key shark/elasmobranch species' status: devil rays, manta rays and pelagic stingrays. This designation was based on a review of eligibility criterion done by OFP. Traditionally when species get this designation, they have to be reported on vessel log-sheets (not just by observers) and they become included in the Shark Research Plan, which can entail both formal updates on stock status and/or further research on the species' biology. The main outcome of this year's review process was that, for species where there are good catch estimates already (if, for instance, they are mostly caught on fleets with high observer coverage, as devil and manta rays are), the delegates needed to clarify the definition for 'assessment-only' species (i.e. those that only get considered in the Shark Research Plan). So far, no species have received this special designation.

From the scientists' perspective, a significant win this year was the recognition that tagging programmes should be an ongoing component of the SC's work, given their role as a critical input into tuna stock assessments. To support this, substantial new funding was recommended in the SC budget for the Pacific Tuna Tagging Programme. This research programme relies on extensive tagging trips

across the Western and Central Pacific Ocean and delivers essential inputs into the movement and stock status of key tuna species. The resulting information is particularly important for the WCPO skipjack assessment, and hence the management of equatorial purse seine fisheries, for which indices of abundance are particularly hard to estimate using conventional approaches.

An important increase in funding was also allotted to the tissue bank, which collects and archives a reference collection of biological samples of marine organisms from the Pacific to allow innovative analyses to be conducted on a large geographical scale. For example, it has been used to look at mercury levels in tuna muscle at the scale of the Pacific, allowing us to identify areas of higher and lower levels of mercury content. With some samples as old as 20–30 years, it also provides the opportunity to analyse the effect of climate variability and climate change on this large and complex ecosystem on which tuna fisheries are so reliant.

In addition to SPC's work, excellent contributions were presented by our scientific colleagues who work across the Pacific, including assessments for Pacific bluefin tuna and blue marlin by ISC, seabirds by-catch mitigation measures by New Zealand and Japanese scientists, ongoing research on post-release mortality in sharks by NOAA², and new swordfish growth and maturity estimates by CSIRO³, which will prove useful in next year's assessment for this species.

Back at the office, the team gears up for the next year's assessments for yellowfin tuna, bigeye tuna and swordfish (reflecting SC's recommendations), the meeting of WCPFC's Technical and Compliance Committee, and of course, the Commission meeting to be held in Fiji in a few months, where the SC's and TCC's recommendations are reviewed and translated into actual management measures and regulations.

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² National Oceanic and Atmospheric Administration of the US Department of Commerce

³ Commonwealth Scientific and Industrial Research Organisation, Australia

