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**REFERENCE DOCUMENT FOR THE REVIEW OF  
CONSERVATION AND MANAGEMENT MEASURES ON BYCATCH MITIGATION**

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**WCPFC15-2018-22  
9 November 2018**

**Paper prepared by the Secretariat**

**A. INTRODUCTION**

1. The purpose of this paper is to provide a quick reference guide to the recommendations of the Scientific Committee (SC) and the Technical Compliance Committee (TCC) of relevance to the discussions in support of the review of bycatch mitigation CMMs. It highlights key recommendations drawn from the SC14 and TCC14 Summary Reports.

**B. SCIENTIFIC COMMITTEE RECOMMENDATIONS**

2. The relevant recommendations of the SC14, with appropriate referencing, on the review of conservation and management measures (CMMs) are listed below:

**SHARKS**

*CMM 2010-07 CMM for Sharks (Paragraph 550, SC14 Summary Report)*

3. SC14 recommends that:
- a) TCC14 and WCPFC15 note that since the adoption of the CMM 2010-07, SC has been unable to confirm the validity of using a 5% fin to carcass ratio and that an evaluation of the 5% ratio is not currently possible due to insufficient or inconclusive information.
  - b) TCC14 and WCPFC15 elaborate a mechanism for generating the data necessary to review the fins to carcass ratio if such a ratio is to be used as a tool for promoting the full utilization of sharks in the WCPFC

*CMM 2013-08 CMM for Silky Sharks (Paragraph 556, SC14 Summary Report)*

4. Therefore SC14 recommends to WCPFC15 that:
- 1) The Scientific Services Provider be tasked with reviewing how observers record sharks that

are cut free, and what data quality improvements might be achieved through improved observer training and/or protocols.

- 2) SC14 also recommends TCC14 and WCPFC15 to consider, through the comprehensive shark CMM, a requirement that non-retention and/or unwanted sharks be hauled alongside the vessel before being cut free in order to facilitate a species identification. This requirement shall only apply when an observer or electronic monitoring camera is present, and should only be implemented taking into consideration the safety of the crew and observer. When adopted by the Commission, the guidelines for safe release of sharks and rays may be a useful guide for this activity.

*Safe release guidelines (Paragraph 566, SC14 Summary Report)*

5. SC 14 adopted the outcomes of an Informal Small Group meeting regarding draft safe release guidelines for sharks and rays (Attachment G, SC14 Summary Report), which is annexed in **Attachment 1**.

*Shark Research Plan (Paragraphs 577, SC14 Summary Report)*

6. SC14 adopted the outputs of an Informal Small Group meeting on the shark research plan, including provision of one research proposal Project 92 (Testing the performance of alternative stock assessments approaches for oceanic whitetip shark) for the 2019 SC work program and budget (Attachment H, SC14 Summary Report), which is annexed in **Attachment 2**.

## SEABIRDS

*Review of CMM 2017-06 on seabirds (Paragraphs 592 – 595 and 612 – 613, SC14 Summary Report)*

7. SC14 noted that hook-shielding devices are a novel seabird bycatch mitigation measure which encases the point and barb of baited hooks to prevent seabird attacks during line setting.
8. SC14 noted that the evidence presented on hook-shielding device effectiveness was for Hookpods, one hook-shielding device which met the following performance characteristics:
  - a) the device encases the point and barb of the hook until it reaches a depth of at least 10 m or has been immersed for at least 10 minutes;
  - b) the device meets current minimum standards for branch line weighting as specified in the seabird bycatch CMM; and
  - c) the device is designed to be retained on the fishing gear rather than being lost.
9. Some CCMs raised operational and cost-related concerns regarding the application of these devices to their fisheries.
10. SC14 recommends:
  - 1) that TCC14 and WCPFC15 note that evidence is available to support the inclusion of hook-shielding devices, specifically Hookpods, on the list of seabird bycatch mitigation options, in addition to already existing mitigation options.
  - 2) the revision of CMM 2017-06 to add the use of hook-shielding devices, specifically Hookpods, as an optional stand-alone seabird bycatch mitigation measure in order to provide more choices and greater flexibility to the fishing industry to mitigate seabird bycatch in their fishing operations.

- 3) that if hook-shielding options other than Hookpods, or any other innovative options, are proposed for use in WCPFC in the future, SC and TCC should review the evidence on effectiveness, efficiency, and practicality of the technology in mitigating seabird bycatch.
  - 4) that if the revision of CMM 2017-06 to include hook-shielding devices is accepted, SC should be tasked with reviewing information on the use of Hookpods in commercial fishing operations no later than 3 years from the implementation date.
  - 5) that while there was no proposal that hook-shielding devices be made mandatory, if this was proposed in future thorough review by SC and TCC would be required.
11. SC 14 noted that:
- 1) the most recent geolocation data on Antipodean wandering albatross, a priority population of conservation concern, indicates the extent of foraging up to and north of 25° S.
  - 2) substantial fishing effort occurs in waters of the WCPFC area between 30°S and 25°S which is within the Antipodean wandering albatross foraging range.
  - 3) as CMM 2017-06 does not require the use of seabird mitigation in the WCPFC area between 30°S and 25°S, this fishing effort poses a bycatch risk to Antipodean wandering albatross and other species foraging in the area.
  - 4) revision of CMM 2017-06 to extend the area of application up to 25°S will reduce the bycatch risks faced by Antipodean wandering albatross and other seabirds.
12. SC 14 recommended that TCC14 and WCPFC15 consider a revision to the southern area of application of CMM2017-06, including implementation considerations of SIDS and Territories.

## SEA TURTLES

### *Review of CMM 2008-03 on sea turtles (Paragraphs 633 – 636, SC14 Summary Report)*

13. SC14 noted that only limited information exists on direct comparison of catch rates of target and non-target species among J hook, Japanese tuna hook, and large circle hook, in particular for deep longline sets.
14. SC14 encouraged CCMs to collect further information on catch rates of target and non-target species separated by hook types and hook sizes and to report them to the WCPFC.
15. SC14 recommended that the Commission note that:
- less than 1% of Western and Central Pacific Ocean (WCPO) longline effort is subject to mitigation under CMM 2008-03, even though approximately 20% of the WCPO longline effort consists of shallow sets. This results because CMM 2008-03 only applies to longline vessels that fish for swordfish in a shallow-set manner.
  - Noting that SC13 recommended that:  
TCC and the Commission note the following findings of the Joint Analysis of Sea Turtle Mitigation Effectiveness Workshop when discussing sea turtle mitigation in the WCPFC Convention Area:
    - a. The WCPFC does not hold sufficient information to quantify the severity of the threat posed by longline fisheries to sea turtle populations;
    - b. The effect of large circle hooks (size 16/0 or larger) in reducing interactions is generally greater than the effect of fish bait;
    - c. The effect of fish bait in reducing both interactions and mortality is generally similar to that of removal of the first hook position closest to each float;

- d. The effect of large circle hooks (size 16/0 or larger) in reducing both interactions and mortality is generally similar to that of removal of the first two hook positions closest to each float;
- e. While approximately 20% of the WCPO longline effort is in shallow sets, analysis suggests that <1% of WCPO longline effort is currently subject to mitigation;
- f. Noting that the workshop separated shallow and deep sets at 10 hooks per basket, it found that although interaction rates are higher in shallow-set longlines, introducing mitigation to deep-set longlines would deliver greater reductions in total interactions as compared to shallow-set longlines due to the four-times greater effort in deep-set longline fisheries;
- g. Similarly, introducing mitigation to deep-set longlines would deliver greater reductions in at-vessel mortality as compared to shallow-set mitigation because sea turtles have a higher probability of asphyxiation in deep sets;
- h. The effects of these and other combinations of mitigation measures are quantified and discussed in the final workshop report “Joint Analysis of Sea Turtle Mitigation Effectiveness” which can serve as a reference for the Commission’s further consideration of CMM 2008-03.
- i. It be determined if sufficient data exist to conduct further analyses to evaluate the impacts of various mitigation measures on fisheries operations in WCPO and on populations of sea turtle species.

16. In responding to the Commission’s request in WCPFC14 Summary Report, para 362, SC14 discussed two papers (WCPFC-2018-SC14/EB-WP-06 and WCPFC-2018-SC14/EB-WP-08) examining the effects of circle hooks on target and other bycatch species, but did not reach consensus on the effectiveness of circle hooks compared to other hook types on catch rates of target and other bycatch species.

## **BYCATCH MANAGEMENT**

17. SC-14 noted SC14-EB-IP-10 *Bycatch Management Information System (BMIS): redevelopment update*. (Paragraph 637, SC14 Summary Report)

## **C. TECHNICAL AND COMPLIANCE COMMITTEE RECOMMENDATIONS**

18. [Sharks (CMM 2010-07, CMM 2011-04, CMM 2012-04, CMM 2013-08 & CMM 2014-05)] TCC14 recommended that WCPFC15 note that
  - a. Despite the improvements noted since 2015, specimens of prohibited shark species are still retained and, in some cases, finned in WCPFC fisheries.
  - b. The percentage of conclusion of investigations related to sharks CMMs related infringements in the online compliance case file system remains relatively low (8%-53%).  
(*TCC14 draft summary report, para 325*)
19. [b. Intersessional activity report on IWG-Sharks] On 2 October the Shark SWG provided a report back on its discussions of the 5th Consolidated Shark CMM text. The following were agreed points from the SWG discussions held during TCC14:
  - TCC14 considered that a fins naturally attached (FNA) policy would be the most practical and implementable option in terms of evaluating and assessing compliance. However, some CCMs noted concerns about its implementation from the perspective of fishermen, such as crew safety from frozen fins, separation of product at port for different markets which is difficult if fins are not removed at sea, and lower prices if quantities of

meat are left attached to fins. It was recommended to study a document by Gulak et al. (2017) illustrating how FNA is practiced in the United States.

- TCC14 indicated that since 2010 it has not been able to assess compliance with the 5% fins to carcass ratio currently included in CMM 2010-07 (see TCC13 para. 312, TCC12 para. 391, TCC11 para. 462). Enforcement at sea was also noted as being problematic. Port inspections of fin to carcass ratios is in effect by some CCMs for domestic fleets. Concerns were noted about the appropriateness of the 5% fins to carcass ratio per se.

*(TCC14 draft summary report, para 327)*

20. TCC14 did not raise any technical and compliance issues with Attachment G of the SC14 Summary Report concerning safe release guidelines for sharks.

TCC14 recommended to WCPFC15 that it adopt the best practice guidelines for the safe handling of sharks (Attachment G of the SC14 Summary Report). TCC14 suggested to the Shark IWG Chair that he note the discussion in TCC14 as reported above (*TCC14 draft summary report paragraph 327*) and consider the appropriate inclusions and references to paragraph 561 and Attachment G of the SC14 summary report when developing the 6th draft of the comprehensive shark CMM.).

*(TCC14 draft summary report, para 328-330)*

21. [Sea turtles (CMM 2008-03)] TCC14 recommended to WCPFC15 that it adopt revisions to paragraph 7 of CMM 2008-03 that remove ambiguities in the scope of application of the measure. TCC14 recommended to WCPFC15 that the Commission continue to consider the necessity and practicality of sea turtle bycatch mitigation measures in deep set fisheries. Recognizing the need for improved data collection on sea turtle interactions, TCC14 recommended to WCPFC15 that the Commission consider revisions to ROP Minimum Standard Data Fields, taking into consideration those presented in *WCPFC-TCC14-2018-DP04\_rev1*.

*(TCC14 draft summary report, para 341, 343-344)*

22. [Seabirds (CMM 2017-06)] TCC14 recommended WCPFC15 agrees to revise CMM 2017-06 to add the use of the hook-shielding devices recommended by SC14, as an optional stand-alone seabird bycatch mitigation measure in order to provide more choices and greater flexibility to mitigate seabird bycatch, noting the SC14 recommendation to consider effectiveness, efficiency and practicality of emerging technologies. TCC14, in recognition of the scientific advice that the spatial distribution of vulnerable seabirds extends northward to 25°S, and the substantial fishing effort in waters of the WCPFC area between 30°S and 25°S, recommended that WCPFC15 consider revising the southern boundary of CMM 2017-06 northward, and appropriate mitigation measures in that particular area. TCC14 recommended that, when considering revising the boundary, WCPFC15 take into account the low fishing effort in EEZs, and the implementation impact of extending the boundary on SIDS and Participating Territories, while noting the importance of ensuring fairness and effectiveness in implementing seabird mitigation measures.

*(TCC14 draft summary report, para 349-351)*

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## **SHARK SAFE RELEASE GUIDELINES**

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### **BEST HANDLING PRACTICES FOR THE SAFE RELEASE OF SHARKS (OTHER THAN WHALE SHARKS AND MANTAS/MOBULIDS)<sup>1</sup>**

The following are recommended non-binding guidelines of best handling practices of sharks for both purse seine and longline fisheries:

**Safety First:** These guidelines should be considered in light of safety and practicability for crew. Crew safety should always come first. Crew should wear suitable gloves and avoid working around the jaws of sharks.

For all gear types, keep animals in the water if possible. If necessary to land on deck, minimize time and release shark to the water as soon as possible.

#### **Purse Seine**

##### **Do's (make sure that "do" graphics are clearly labelled as examples only):**

###### If in purse seine net:

- Release sharks while they are still free-swimming whenever possible (e.g. back down procedure, submerging corks, cutting net)
- For sharks that cannot be released from the purse seine net, consider removing them using a hook and line.

###### If in brail or on deck:

- For sharks that are too large to be lifted safely by hand out of the brailer, it is preferable they are released using a purpose-built large-mesh cargo net or canvas sling or similar device<sup>2</sup>. If the vessel layout allows, these sharks could also be released by emptying the brail directly on a ramp held up at an angle that connects to an opening on the top deck railing, without need to be lifted or handled by the crew.
- Generally, small sharks are fragile and need to be handled very carefully. If this can be done safely, it is best to handle and release them with two people, or one person using both hands.
- When entangled in netting, if safe to do so carefully cut the net away from the animal and release to the sea as quickly as possible with no netting attached.

##### **Don'ts (graphics are useful here):**

- Do not wait until hauling is finished to release sharks. Return them to the sea as soon as possible.
- Do not cut or punch holes through the shark's body.
- Do not gaff or kick a shark and do not insert hands into the gill slits.

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<sup>1</sup> These guidelines are appropriate for live individuals of shark species to be released under no-retention policies as well as any other live sharks to be released voluntarily.

<sup>2</sup> As recommended in document SC8-EB-IP-12 (Poisson et al. 2012)

## **Longline**

### **Do's (make sure that "do" graphics are clearly labelled as examples only):**

- The preference is to release all sharks while they are still in the water, if possible. Use a dehooker to remove the hook or a long-handled line cutter to cut the gear as close to the hook as possible (ideally leaving less than 0.5 meters of line attached to the animal).
- If de-hooking in the water proves to be difficult, and the shark is small enough to be accommodated in a dip net, bring it on board and remove as much gear as possible by using a dehooker. If hooks are embedded, either cut the hook with bolt cutters or cut the line at the hook and gently return the animal to the sea.
- For all sharks that are brought on deck, minimize time before releasing to the water.

### **Don'ts (graphics are useful here):**

- Do not strike a shark against any surface to remove the animal from the line.
- Do not attempt to dislodge a hook that is deeply ingested and not visible.
- Do not try to remove a hook by pulling sharply on the branchline.
- Do not cut the tail or any other body part.
- Do not gaff or ~~drag~~, kick or ~~pull~~ a shark, and do not insert hands into the gill slits.

Additional recommendation:

Knowing that any fishing operation may catch sharks, several tools can be prepared in advance (e.g. canvas or net slings or stretchers for carrying or lifting, large mesh net or grid to cover hatches/hoppers in purse seine fisheries, long handled cutters and de-hookers in longline fisheries).

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**SHARK RESEARCH PLAN**

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**SC14 – ISG7 – Review of the Shark Research Plan**

ISG7 reviewed progress under the Shark Research Plan and recommended changes and updates that are reflected in Table 1 below.

ISG-7 considered the range of potential projects under the Shark Research Plan contained in SC14-EB-WP-04. ISG-7 also considered the final report of Project 78 on data available for sharks which included potential assessment approaches supported by these data SC14-EB-WP-02. In the light of this, ISG-7 developed an additional project proposal entitled *Testing the performance of alternative stock assessments approaches for oceanic whitetip shark* (SRP Sheet 9, attached below) and gave this new project the highest priority for completion in 2018/19.

**Table 1.** ISG7 Schedule of analyses under the WCPFC Shark Research Plan. New proposed project outlines for 2019 are identified with # and the project details are provided in SC14-EB-WP-04 except for project #9 which is attached below. For 2018, work submitted to SC14 with reports or project updates are indicated in **red** with the corresponding SC14 paper number for ease of reference.

Species	Region	Last assessment	2018	2019	2020	2021	2022	Priority	Potential assessment approach	Notes
Silky shark	WCPO	2013 (SC9-SA-WP-03) (SPC)	Assessment (SC14-SA-WP-08 addendum) (ABNJ)	-			Assessment?	High	Integrated age-structured (F+B)	no need for assessment in 2019; SC14-SA-WP-08 recommends re-visiting the assessment no later than 2021
	Pacific-wide		Assessment (SC14-SA-WP-08) (ABNJ)		-	-	Assessment?	High	Integrated age-structured (F+B)	SC14-SA-WP-08 recommends re-assessment no later than 2021
Oceanic whitetip shark	WCPO	2012 (SC8-SA-WP-06) (SPC)		Testing the performance of alternative OWT stock assessments approaches. #9				High	Integrated age-structured (F+B)	Re-assessment with an integrated model should be possible as it was done in 2012
Blue shark	SW, SE or full South Pacific	2016		SE Data preparation #1 (ABNJ)	SW Data preparation (SPC) Assessment (move to avoid tuna work overlap?)			High	Integrated or surplus production stock assessment (F+B)	As BSH is the most common species, if other sharks can be assessed BSH can probably be assessed too; SW Pacific data prep by SPC is required regardless of assessment region. Whole of Pacific assessment will require SE Pacific data are prepared (ABNJ funding).
	North Pacific	2017	Stock Assessment and Future Projections		Assessment (ISC)			High	Integrated age-structured (F+B)	There was no decision on whether WCPFC should fund SPC participation
Shortfin Mako	SW, SE or full South Pacific	-		SE Data preparation #1 (ABNJ)	SW Data preparation (SPC)	Assessment (if data supports) #2		High	Integrated or surplus production stock assessment (F+B)	SW Pacific data prep by SPC is required regardless of assessment region. South Pacific wide is an option only if SE Pacific data are prepared. ABNJ cannot fund the assessment.
	North Pacific	2015 (Indicator analysis)	Assessment (ISC) (SC14-SA-WP-11)			Assessment (ISC)		High	Integrated age-structured (F+B)	There was no decision on whether WCPFC should fund SPC participation

Species	Region	Last assessment	2018	2019	2020	2021	2022	Priority	Potential assessment approach	Notes
Longfin Mako								Low	EASI-Fish, SAFE or similar	
Porbeagle	Pacific-wide (southern hemisphere)	2017 (ABNJ)						Low	Spatially-explicit risk assessment (F only)	2017 assessment showed low risk
Bigeye thresher	Pacific-wide	2017 (ABNJ)						Medium	Spatially-explicit risk assessment (F only)	2017 assessment showed F exceeds notional limit reference points in some areas
Common thresher								low	EASI-Fish, SAFE or similar	
Pelagic thresher								low	EASI-Fish, SAFE or similar	
Hammerhead (4 species)	WCPO	-		-	-			Low	EASI-Fish, SAFE or similar	only ~1200 hammerhead records since the start of observer programme (recently ~100 per year) and ~half are not species-specific
Whale Shark	Pacific-wide	-	Risk assessment (SC14-SA-WP-12)					Low	Spatially-explicit risk assessment (time series of F only)	2018 assessment showed low risk
Manta and mobulids (8 species)	WCPO	-	Develop manta and mobulid - observer training and identification guides (SC14-EB-IP-03) (ABNJ+SPC)					Medium	EASI-Fish, SAFE or similar	Focus on data improvement (high priority) but it will take time before any kind of quantitative assessment (indicators) can be done
General shark work	WCPO	N/A	Review of shark data and modelling framework to support stock assessments (proj 78) (SC14-EB-WP-02) WCPFC/SPC	Operational and management histories (#4)	Develop a 2021-2025 shark research plan to be presented to SC16 in 2020?			Low		
			SRP mid-term review? SC13#7	Updated indicator				Low		

Species	Region	Last assessment	2018	2019	2020	2021	2022	Priority	Potential assessment approach	Notes
			but now rolled into proj 78.	analysis?						
			Post-release mortality of silky and oceanic whitetip sharks in longline and purse seine fisheries (SC13-EB-IP-06 and SC14-EB-IP-06) (ABNJ/SPC)	Shark modelling project (#6)				Low		
			Identifying LRPs for elasmobranchs (SC14-MI-WP-07) (WCPFC/ABNJ)	Operational planning for shark biological data improvement (#7)				High		
			Longline Bycatch Estimate (SC14-ST-WP-03) (SPC)	Assess spawner recruit relationships? (#8)				Low		
			Purse seine bycatch estimation (SC14-ST-IP-04) (SPC)	Testing the performance of alternative shark stock assessments approaches. (#9)				High		
			Silky shark tagging movement and FAD entanglement (ISSF-ongoing)							
Review of shark CMM(s)	WCPFC key sharks	Not previously undertaken:	Potential scientific or technical work for SC pending finalised consolidated shark CMM.					Pending		

<b>Sheet Number</b>	SRP sheet 9 (draft)
<b>Project 92 title</b>	Testing the performance of alternative stock assessments approaches for oceanic whitetip shark.
<b>Objectives</b>	<p>Undertake quantitative stock assessments of WCPO oceanic whitetip shark to evaluate the performance of a variety of less data-demanding assessments approaches in comparison to a full, integrated, age-structured assessment model (such as MFCL or SS3). The project will provide:</p> <ul style="list-style-type: none"> <li>• A stock assessment of WCPO oceanic whitetip shark for the purposes of generating management advice.</li> <li>• An evaluation of alternative assessment approaches that have potential application to other key shark species with less data.</li> </ul>
<b>Rationale</b>	The Western and Central Pacific Fisheries Commission Scientific Committee has had a number of low information assessments of sharks but it has been difficult for members to interpret these results without a comparison to a known baseline. Undertaking both high and low-information assessments simultaneously on the same species may provide members with a better understanding of how full integrated age-structured assessment results can be compared to the results of less data-demanding assessments.
<b>Assumptions</b>	<ul style="list-style-type: none"> <li>• Much of the existing fisheries and biological data are readily available.</li> <li>• Assessment personnel are available to undertake this work</li> </ul>
<b>Scope</b>	<p>Reviewing the previous shark assessments in the WCPO and North Pacific to assess and improve on methods to increase the understanding of data strengths and weaknesses, and update stock status. Update WCPO longline and purse seine catch estimates and abundance indices using recent observer data.</p> <p>Undertake a quantitative stock assessment on WCPO oceanic whitetip shark to assess the level of F (fishing mortality) and B (biomass) trends for this species. The analysis should present the stock status in terms of common WCPFC quantities of management interest such as <math>F/F_{MSY}</math>, <math>SB/SB_{MSY}</math> and <math>SB/SB_{F=0}</math> ratios, fishing mortality, (SPR) spawner per recruit, yield and biomass.</p> <p>Undertake less data-demanding assessments of WCPO oceanic whitetip shark to assess the level of similar common WCPFC quantities of management interest including the above (where applicable). Candidate assessment approaches can include:</p> <ul style="list-style-type: none"> <li>• Surplus production model</li> <li>• Catch only methods</li> <li>• Area-based assessment approaches with a range of decreasing data inputs (such as stock density, gear efficiency, and post-discard survival). <ul style="list-style-type: none"> <li>○ Spatially-explicit risk assessment</li> <li>○ EASI-Fish model</li> <li>○ Sustainability assessment for fishing effects (SAFE);</li> </ul> </li> </ul> <p>Input data must be consistent between assessment methods where the same data are an input. Separate analysis teams may be involved.</p> <p>The focus of these analyses is the estimate of management quantities rather than the development of reference points (shark limit reference points are the subject of a separate (Project 57)).</p> <p>Consideration should be given to the suitability of assessment approaches for regular application across a large number of key shark species (simultaneously) or, alternatively, for separate one-off assessments of a species.</p> <p>Prepare a report containing the above results for SC15.</p>
<b>Budget</b>	1.5 FTE \$75,000