ISSF INTERNATIONAL SEAFOOD SUSTAINABILITY FOUNDATION

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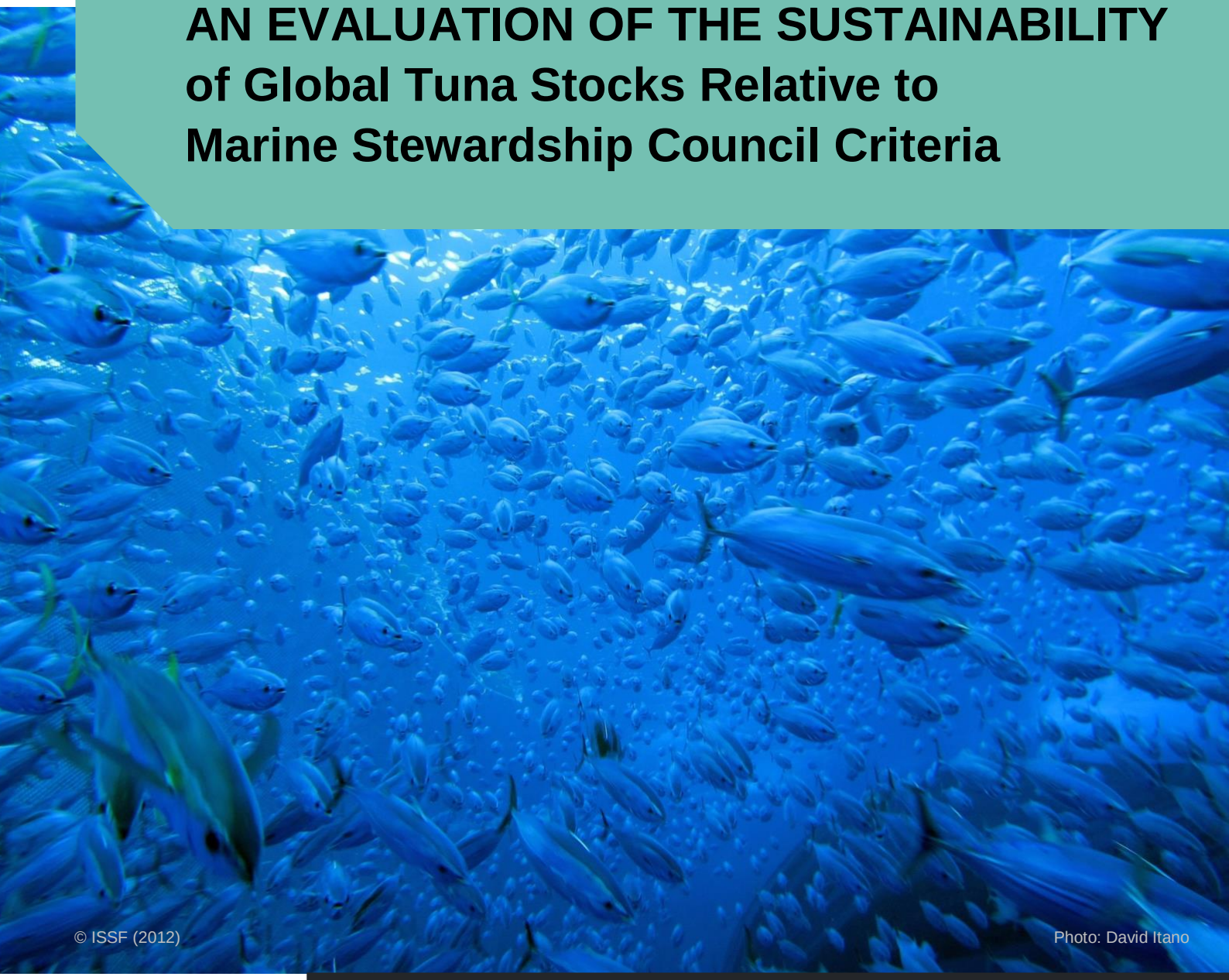
AN EVALUATION OF THE SUSTAINABILITY of Global Tuna Stocks Relative to Marine Stewardship Council Criteria



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An Evaluation of the Sustainability of Global Tuna Stocks Relative to Marine Stewardship Council Criteria: Principles 1 and 3

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Executive Summary

The Marine Stewardship Council (MSC) has established a program whereby a fishery may be certified as being sustainable. The sustainability of a fishery is defined by MSC criteria which are embodied in three Principles: relating to the status of the stock, the ecosystem of which the stock is a member and the fishery management system. Since many of these MSC criteria are comparable for global tuna stocks, the MSC scoring system was used to evaluate nineteen stocks of tropical and temperate tunas[1] throughout the world and to evaluate the management systems of the Regional Fishery Management Organizations (RFMOs) associated with these stocks. No evaluation has been made here of the fishery specific ecosystem criteria in this report. The principles that were assessed were:

- Principle 1 (P1): A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery, and
- Principle 3 (P3): The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.

Each of these Principles is evaluated in relationship to Performance Indicators (PIs) within each Principle. Additionally, the MSC has established rigorous Guidelines for scoring fisheries (MSC Fishery Standard Principles and Criteria for Sustainable Fishing, Version 2.0 – effective from 1st April 2015; http://www.msc.org/).

Table 1 summarizes the findings of this evaluation.

Of the 19 stocks of tropical and temperate tunas, 6 achieved a passing score for Principle 1. A stock will pass if its overall score is 80 or above, and no single score is less than 60. Failure was due mostly to the lack of well-defined harvest control rules in place. Three of the 19 stocks have implemented well-defined harvest control rules, and progress towards this aim is demonstrated by all RFMOs. However, failure to implement controls before rebuilding is required has led to additional failing to meet minimum requirements on harvest control rules, so more stocks have failed to meet minimum standards for certification.

Additionally, under Principle 3, all RFMOs also had similar weaknesses, but these varied between RFMO (Table 1). On the whole, RFMOs score well on Principle 3, which is perhaps more related to their aspirations than achievements.

While a future client tuna fishery will be evaluated on the merits related to all three MSC Principles, the scoring clearly outlines a template for actions to improve the management of the 19 tuna stocks through the RFMOs.

[1] The bluefin tunas (Atlantic, Pacific and southern) are specifically excluded from this study.

Table 1 Assessment of Global Tuna Stocks using MSC P1 and P3 Criteria

P1-Atlantic Ocean ICCAT

Component	PI No.	Performance Indicator (PI)	Yellowfin Score	Bigeye Score	Western Skipjack Score	Eastern Skipjack Score	North Albacore Score	South Albacore Score	Med Albacore Score
Outcome	1.1.1	Stock Status	70	60	80	80	100	80	80
	1.1.2	Stock Rebuilding	100	60					
Management	1.2.1	Harvest Strategy	80	60	70	60	80	80	Fail
	1.2.2	Harvest control rules and tools	60	60	60	60	60	60	Fail
	1.2.3	Information / monitoring	80	80	65	65	80	80	60
	1.2.4	Assessment of stock status	85	90	85	75	90	85	85
Weighted Principle-level scores									
		Stock rebuilding required?	**Yes**	**Yes**	**No**	**No**	**No**	**No**	**No**
		P1 Score:	**80.6**	**66.3**	**75.0**	**72.5**	**88.8**	**78.1**	**Fail**

P1-Pacific Ocean

Component	PI No.	Performance Indicator (PI)	Western Yellowfin Score	Western Bigeye Score	Western Skipjack Score	Eastern Yellowfin Score	Eastern Bigeye Score	Eastern Skipjack Score	North Albacore Score	South Albacore Score
Outcome	1.1.1	Stock Status	100	80	100	80	80	80	90	100
	1.1.2	Stock Rebuilding								
Management	1.2.1	Harvest Strategy	75	75	75	90	90	75	75	75
	1.2.2	Harvest control rules and tools	Fail	Fail	60	80	80	75	Fail	Fail
	1.2.3	Information / monitoring	80	80	90	80	80	80	90	80
	1.2.4	Assessment of stock status	95	80	95	100	100	80	100	95
Weighted Principle-level scores										
		Stock rebuilding required?	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**
		P1 Score:	**Fail**	**Fail**	**90.0**	**83.8**	**83.8**	**78.8**	**Fail**	**Fail**

P1-Indian Ocean

Component	PI No.	Performance Indicator (PI)	Yellowfin Score	Bigeye Score	Skipjack Score	Albacore Score
Outcome	1.1.1	Stock Status	70	100	90	100
	1.1.2	Stock Rebuilding	Fail			
Management	1.2.1	Harvest Strategy	65	80	80	65
	1.2.2	Harvest control rules and tools	Fail	Fail	75	Fail
	1.2.3	Information / monitoring	80	80	80	75
	1.2.4	Assessment of stock status	90	90	90	85
Weighted Principle-level scores						
		Stock rebuilding required?	**Yes**	**No**	**No**	**No**
		P1 Score:	**Fail**	**Fail**	**85.6**	**Fail**

PI < 60 or Principle <80: Principle Fails
60 ≤ PI < 80: Condition Needed
PI or Principle≥80: Passing Score
Unscored
Rebuilding Required

P3 by RFMO

Component	PI No.	Performance Indicator (PI)	ICCAT Score	WCPFC Score	IATTC Score	IOTC Score
Governance and Policy	3.1.1	Legal and/or customary framework	75	95	80	80
	3.1.2	Consultation, roles and responsibilities	75	85	85	75
	3.1.3	Longterm objectives	100	80	80	80
Fishery specific management system	3.2.1	Fishery-specific objectives	80	80	80	80
	3.2.2	Decision-making processes	95	80	85	85
	3.2.3	Compliance and enforcement	75	80	80	70
	3.2.4	Monitoring and management performance evaluation	90	90	90	100
Weighted Principle-level scores						
		P3 Score:	**84.2**	**84.6**	**82.7**	**81.0**

Foreword

One of the primary objectives of ISSF is to improve the sustainability of global tuna stocks by developing and implementing verifiable, science-based practices, commitments and international management measures that result in tuna fisheries meeting the Marine Stewardship Council (MSC) certification standard without conditions.

The MSC is a global certification program. To date, close to 300 fisheries, including several tuna fisheries, have been certified under the MSC standards. ISSF has been actively involved as a stakeholder in MSC tuna fishery assessments and resulting certifications since 2011.

Through our initial involvement with MSC tuna fishery assessments, we observed that there were often significant inconsistencies among the different tuna assessments as they have been conducted by the Conformance Assessment Bodies (CAB), accredited by ASI to apply the MSC standards. The assessment scores assigned to individual sustainability indicators by CABs in what seem to be very similar situations were sometimes quite different. This could be, at least in part, due to a level of subjectivity allowed by any system. In other cases it could be an incorrect interpretation of the standards and scoring guidance issued by the MSC.

In 2013, we decided to ask two experienced MSC assessors to score 19 tuna stocks against the MSC standards for Principle 1 and certain elements of Principle 3 using the very same indicators of sustainability and the guideposts provided by the MSC to take a global, comprehensive approach for consistent scoring. These 19 stocks represent all of the major commercially-exploited tuna stocks in the world, except those for the three species of bluefin tunas. The scores are not a complete MSC assessment as they are not fishery-specific, i.e. they focus only on stock status (MSC Principle 1) and the international management aspects relevant to Regional Fishery Management Organizations (RFMOs) (part of MSC Principle 3). They do not consider management in national or bilateral jurisdictions, nor gear/fleet-specific ecosystem impacts (MSC Principle 2), which are important components in any complete MSC assessment. Nevertheless, our objective was that this exercise would:

- Provide a basis for comparing between stocks scores that are assigned by the same experts;
- Become a useful source document in future tuna certifications;
- Give a "snapshot" of the current status of the stocks and the strengths and weaknesses of RFMOs.

This document has been updated four times since the initial version, adapting it to new MSC standards and to changing stock status and management situations; some of the authors have changed over time. We have noted, with satisfaction, that the document has been taken into consideration in recent Full Assessments of tuna fisheries against the MSC standards and in Fishery Improvement Programs (FIPs) that make use of the MSC scoring principles (although we discourage CABs from considering the scores in this report without consulting the original sources; in a full assessment, much more justification would need to be provided than done here). We believe that this has helped improve consistency in new scores. In addition, the document has served to identify several global shortcomings in tuna management that has led to a more consistent recognition of improvements needed in management of tuna fisheries (for example, the need for adoption of harvest control rules by tuna RFMOs).

We invite you to read *An Evaluation of the Sustainability of Global Tuna Stocks Relative to Marine Stewardship Council Criteria* by Paul Medley and Jo Gascoigne to make use of it to track the sustainability of the major commercial tuna stocks.

Susan S. Jackson
President, ISSF

Acknowledgements

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Version

Pre-assessment Version	Date	Certification Requirements Version
1.0	February 2009	MSC FAMv2
2.0	July 2013	MSC CR 1.3
3.0	March 2015	MSC CR 2.0
4.0	December 2016	MSC CR 2.0
5.0	December 2017*	MSC CR 2.0

* Using RFMO data as of November 5, 2017.

Introduction

The Marine Stewardship Council (MSC) has established a program whereby a fishery may be certified as being sustainable. Client fisheries apply for certification and are evaluated by independent certifying bodies according to established sustainability criteria. Once a fishery becomes certified, then they may use the MSC ecolabel and market their certified products accordingly. The sustainability of a fishery using MSC criteria is embodied in the following three Principles:

> Principle 1 (P1): A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.
>
> Principle 2 (P2): Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.
>
> Principle 3 (P3): The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.

Each of these Principles is evaluated in relationship to Performance Indicators (PIs) within each Principle. Additionally, the MSC has established rigorous Guidance for scoring fisheries (MSC Fishery Standard Principles and Criteria for Sustainable Fishing, Version 2.0 – effective 1 April 2015; http://www.msc.org/). A stock will pass if its overall score is 80 or above on each Principle, and no single score is less than 60 for any performance indicator. Note that Principle 1 relates to the status of the stocks of the fish that would receive the MSC label. It recognizes that other fisheries may be targeting or impacting the same stock of fish, and therefore the entire stock and all fisheries harvesting that stock are assessed. Principle 2 relates to the performance of the specific fishery relative to all wider ecological impacts. Principle 3 addresses governance at all appropriate levels of management: the fishery, national and international governance.

A number of tuna fisheries around the world have applied for MSC certification (http://www.msc.org/). In some cases, separate certification applications have been made by two fisheries that are targeting the same stock of fish. Additionally, tuna stocks are managed under international agreements through Regional Fishery Management Organizations (RFMOs), this being the highest level of management. Therefore, the evaluation of P1 criteria under MSC and the international aspects of P3 are independent of the particular tuna fishery that is requesting certification. This, in turn, implies that there must be consistency in P1 and P3 in relation to a specific tuna stock or a specific RFMO, regardless of the fishery that might be asking for certification. The goal of this report is to address that consistency by providing MSC P1 scores for 19 stocks of tropical and temperate tunas from around the world for P1 and MSC P3 scores for the four RFMOs.

Also, our P3 scoring only addresses aspects that are related to the RFMO. P3 scoring at the level of the fishery and at the national level is part of the MSC process and these additional requirements would be needed for MSC certification of a fishery. However, this report only presents scores for Principle 3 in relation to the international level. These may be adjusted based on performance of the unit of certification. But, unless clear justification is provided, we would expect scores for each performance indicator not to deviate much from the ones given here. Also, we plan to revisit these scores in more detail in the upcoming 2018 version of this report.

Many issues related to management are based on individual State performance. For example, monitoring control and surveillance depends on State performance since the RFMO has no direct enforcement role, but co-ordinates international action. It is also important to note that some artisanal fisheries are exempt from many Conservation and Management Measures (e.g. Maldives and east African nations, Small Island Developing States in the Pacific). Countries may also be able to submit a reservation against a Conversation and Management Measure or simply not implement it.

It each case, the effect of this will need to be assessed particularly if the unit of certification is directly affected.

This report is a pre-assessment and does not follow all full assessment procedures. Stakeholders have not been fully consulted and information on these fisheries may therefore be incomplete, although only publicly available information can be used in scoring, even in a full assessment. The MSC scoring methodology has been followed as closely as possible to indicate what likely scores would be, but scores may change in a full assessment as new information becomes available.

The report is organized by management authority: the Atlantic/Mediterranean, Western Pacific, Eastern Pacific and Indian Oceans; and by the relevant RFMOs for these Oceans (Table 2): the International Commission for the Conservation of Atlantic Tunas (ICCAT), the Inter-American Tropical Tuna Commission (IATTC), the Western and Central Pacific Fisheries Commission (WCPFC) and the Indian Ocean Tuna Commission (IOTC).

Table 2 Membership in Tuna RFMOs (December 2017). (M=Member, C=Cooperating non-Member, P=Participating Territory)									
Country	**IATTC**	**ICCAT**	**IOTC**	**WCPFC**	**Country**	**IATTC**	**ICCAT**	**IOTC**	**WCPFC**
Albania		M			Mauritius			M	
Algeria		M			Mauritania		M		
American Samoa				P	Mexico	M	M		C
Angola		M			Micronesia, F. S.				M
Australia			M	M	Morocco		M		
Bangladesh			C		Mozambique			M	
Barbados		M			Namibia		M		
Belize	M	M			Nauru				M
Bolivia	C	C			New Caledonia				P
Brazil		M			New Zealand				M
Canada	M	M		M	Nicaragua	M	M		
Cape Verde		M			Nigeria		M		
Chile	C				Niue				M
China, P. R.	M	M	M	M	Northern Mariana Islands				P
Chinese Taipei	M	C	*[1]	M	Norway		M		
Colombia	M				Oman			M	
Comoros			M		Pakistan			M	
Cook Islands				M	Palau				M
Costa Rica	M	C			Panama	M	M		C
Cote d'Ivoire		M			Papua New Guinea				M
Curacao		M			Peru	M			
Ecuador	M			C	Philippines		M	M	M
Egypt		M			Russia		M		
El Salvador	M	M		C	St. Pierre and Miquelon (France)		M		
Equatorial Guinea		M			Samoa				M
Eritrea			M		Sao Tome and Principe		M		
European Union	M	M	M	M	Senegal		M	C	
Fiji				M	Seychelles			M	
France	M		M	M	Sierra Leone		M	M	
French Polynesia				P	Solomon Islands				M
Gabon		M			Somalia			M	
Ghana		M			South Africa		M	M	
Grenada		M			Sri Lanka			M	
Guam				P	St. Vincent & the Grenadines		M		

Table 2 Membership in Tuna RFMOs (December 2017). (M=Member, C=Cooperating non-Member, P=Participating Territory)									
Country	**IATTC**	**ICCAT**	**IOTC**	**WCPFC**	**Country**	**IATTC**	**ICCAT**	**IOTC**	**WCPFC**
Guatemala	M	M			Sudan			M	
Guinea Rep.		M	M		Suriname		C		
Guinea Bissau		M			Syria		M		
Guyana		C			Tanzania			M	
Honduras	C	M			Thailand			M	C
Iceland		M			Tokelau				P
India			M		Tonga				M
Indonesia	C		M	M	Trinidad and Tobago		M		
Iran			M		Tunisia		M		
Japan	M	M	M	M	Turkey		M		
Kenya			M		Tuvalu				M
Kiribati	M			M	United Kingdom (Overseas Territories)		M	M	
Korea, Republic of	M	M	M	M	United States	M	M		M
Liberia	C	M	C	C	Uruguay		M		
Libya		M			Vanuatu	M	M		M
Madagascar			M		Venezuela	M	M		
Malaysia			M		Vietnam				C
Maldives			M		Wallis and Futuna				P
Marshall Islands				M	Yemen			M	

[1]Under the UN system, the IOTC Agreement currently inhibits the full involvement of Chinese Taipei in the Commission. However, individuals from Chinese Taipei participate in IOTC meetings as Invited Experts.

There are 19 tropical and temperate tuna stocks that are evaluated in this report. No attempt was made to evaluate Southern, Atlantic and Pacific bluefin tunas. The 19 stocks and their relevant RFMOs are:

Atlantic Ocean	Pacific Ocean		Indian Ocean
ICCAT	WCPFC	IATTC	IOTC
Atlantic Yellowfin (YFT)	Western YFT	Eastern YFT	YFT
Bigeye (BET)	Western BET	Eastern BET	BET
Western Atlantic Skipjack (SKJ)	Western SKJ	Eastern SKJ	SKJ
Eastern Atlantic Skipjack (SKJ)			
North Atlantic Albacore (ALB)	North Pacific ALB[1]		ALB
South Atlantic Albacore (ALB)	South Pacific ALB[1]		
Mediterranean Albacore (ALB)			

[1] Pacific albacores are managed jointly

Scores for P1 were given to each of these 19 stocks using the MSC Default Assessment Tree (http://www.msc.org/). MSC assessments have already occurred for several of the tuna stocks, but these have used previous MSC methodologies. There have been some additional guidance on scoring MSC CR version 2.0 (see below) and tuna fisheries have been undergoing changes, so scores will change with respect to previous versions of this document.

MSC guidelines for Performance Indicator scores, the justifications for scores and the scores, themselves, are given. In many cases the scoring and justifications are redundant. For example, the actions taken by an RFMO relating to a number of P1 and P3 Performance Indicators are universal to all tuna stocks under their jurisdiction. Nevertheless, we chose to include these redundancies. By doing so the report will provide a template for a "living" document that can be more readily updated as new stock assessments become available and as actions taken by the relevant RFMOs evolve.

Additionally we used the following shading codes for the scoring key:

Scoring Key

Scoring tables are shaded to indicate the Guideposts that have been met. For example in the table below the 60 and 80 Guideposts are met; whereas the 100 Guidepost is not.		
60 Guidepost	80 Guidepost	100 Guidepost

Some Notes on Scoring

A new MSC scoring system was introduced in 2015. That new system was utilized in the previous version of this document. Therefore, this current version continues to utilize the same scoring framework.

Just to familiarize the reader, the scoring system introduced in 2015 made some changes to the scoring methodology. Most substantive changes took place in Principle 2, which is not used here. However, one performance indicator from Principle 1 and two from Principle 3 were dropped, some scoring guideposts were changed and additional guidance was provided to interpret the scoring guidepost text. The objective of these changes was not to alter the standard, but to continue to improve consistency in its definition and application across the wide variety of fisheries that are seeking certification.

For Principles 1 and 3 the following changes occurred:

- The performance indicator for reference points was removed, and these requirements incorporated in the status (PI 1.1.1) and harvest control rule (PI 1.2.2) requirements. The net result of this change was to remove one of the conditions on most tuna fisheries that required a limit reference point. There is now no such requirement, but it is necessary to define a point of recruitment impairment (PRI). In addition, it is not clear that the definition of maximum sustainable yield used by MSC is consistent with its use in many tuna stock assessments, which may not be taking full account of uncertainties. As this issue is now incorporated into PI1.1.1, the inconsistency can result in an outright failure of the stock to meet MSC requirements rather than a condition on a performance indicator for reference points, as used to be the case.
- The performance indicator for the harvest control rule (PI1.2.2) now includes reference to "available" HCRs. While it remains unclear what an "available" rule is, it is clearer what available "tools" might be to implement the rule due to additional guidance issued for 2017. Several fisheries have now implemented well-defined harvest control rules, which are straightforward to score, but none yet have full credit for their HCR either because they are

not currently in place or there is a lack of evidence that they are working. Other fisheries have difficulty scoring above 60, the minimum requirement to pass MSC certification. The additional guidance and wording indicated the type of evidence required to meet the 60 scoring guidepost, which included controls applied on other fisheries within the management jurisdiction that can demonstrate that management can and will apply such controls when they are needed. For tuna RFMOs, in common with other fisheries jurisdictions, management is mixed with adequate responses in some cases and inadequate in others. However, it is becoming increasingly more difficult to argue "available" harvest control rules are effective where stocks that have relied on this argument have, at best, demonstrated a slow response from management. This may lead to a domino effect, where choosing to fail a fishery on its harvest control rule puts other fisheries in the same position at risk.

- Principle 3 lost two performance indicators concerning incentives for sustainable fishing and a requirement for a research programme. This somewhat simplified the scoring methodology for this principle, but otherwise left it comparatively unchanged.

Scoring PI 1.2.2 on harvest control rules at the SG60 level continues to be problematic. To be clear, we have applied the following scoring approach to this performance indicator, while recognising that in a full MSC assessment, the assessors would have to reach their own conclusions on this matter.

Firstly, while there is no well-defined harvest control rule (HCR), we recognised a generally understood one (PI 1.2.2a). Evidence for this is given by scientific advice and other documentation which is using this rule to provide advice and evaluations. The rule itself is determined by interpretations of various RFMO texts defining management objectives. Because it is possible to evaluate whether or not the management system is following this rule, as demonstrated by criticism in the performance reviews, the HCR exists.

Secondly, while there is some evidence that management controls "available" to tuna RFMOs can be used to control exploitation (PI 1.2.2.c), such as seasonal area closures, effort limitations and catch limits can be applied by flag states on a significant proportion, but not all, fleets. However, whether these are truly "available" in all cases is at best equivocal. The problem is that in practice, when it may become necessary to apply effective controls, the decision may be rather to delay implementation, possibly indefinitely, for socio-economic or political reasons, which are not stated or explained.

Thirdly, the "available" argument for harvest control rules can only be used as long as the stock is above or around its target reference point. Stocks below this point without a well-defined harvest control rule will fail. As noted above, this may lead to failure of other fisheries reliant on evidence that effective rules are available. Our scoring has emphasized this risk.

Some Principle 1 scoring has been changed significantly in version 5.0/20171 compared to the previous version (version 4.0, December 2016), notably in relation to stocks managed by WCPFC. Since the scoring in this version does not completely align with the scoring of currently certified fisheries, we wanted to be clear on the detailed logic behind our scoring in this version.

Firstly, our scoring has been further aligned with the new wording under version 2.0 (details given above) and with the outcome of the WCPFC pilot harmonisation workshop conducted by MSC in April 2016; a process that had not been completed in the last version. The MSC pilot harmonisation process aimed to agree harmonised scores for tuna stocks with MSC-certified fisheries managed fully or as shared stocks by WCPFC – i.e. north and south Pacific albacore, WCPO yellowfin and skipjack. WCPO bigeye was not included because there are no certified fisheries with this as a target (Principle 1) stock. In particular, the workshop agreed how to interpret the new wording in 1.2.2.a and 1.2.2.c about 'available' HCRs and tools, and agreed scoring and wording for the circumstances of each stock (as they were in April 2016). The scoring has been aligned with the outcome of this workshop in as much as it is still relevant as of November 5, 2017.

Secondly, however, and relevant to the same scoring issues (i.e. 1.2.2.a and 1.2.2.c – harvest control rules and their implementation via management tools) the scoring has been updated to reflect continued progress (or lack of progress) by WCPFC since the harmonisation workshop. WCPFC has put in place a commitment to developing a formal harvest strategy for these stocks (CMM 2014-06) which is one of the requirements set out by MSC in being able to score a HCR as 'available'. Progress toward these harvest strategies has, however, been such as to call into question the genuine commitment of WCPFC CPCs; WCPFC plenaries in 2015 and 2016 did not make progress as set out in the agreed workplan associated with CMM 2015-06 – which does not in any case reach as far as the end of the process of harvest strategy implementation.

Although a new stock assessment in 2017 puts WCPO bigeye in the 'green' zone rather than the overfished/overfishing zone, as previously thought, this is a function of new information on age and growth which changes the underlying model, rather than because of an improvement in stock status derived from management action. There is no evidence that fishing mortality has reduced in recent years, and the biomass trajectory is continuously downwards throughout the time series. Therefore, despite bigeye being considered overfished from 2011-2017, the management actions put in place by WCPFC have shown no evidence so far of being able to reduce fishing mortality on bigeye. Yellowfin and South Pacific albacore are in more or less the same situation; should a new stock assessment give a different perspective of stock status (as happened for bigeye), there is no confidence that WCPFC would take action. In our view, this is an important part of a HCR being 'available' for these stocks. To improve this scoring, we would like to see some genuine progress towards well-defined harvest strategies for these stocks, as per the requirements of CMM 2014-06.

Principle 1: Sustainable fish stocks

A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.

North Atlantic Albacore

1.1 Outcome

P.1.1.1 Stock Status

1.1.1.a Stock status relative to recruitment impairment.		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.

An assessment was conducted in 2016 which included data through 2014. Results indicated that the stock has recovered from biomass reductions several decades ago such that estimated biomass is greater than B_{MSY} (B_{2015}/B_{MSY})=1.36 (1.05-1.78 80% CI). Therefore, the stock is highly likely to be above the level where recruitment would be impaired, meeting SG80.

The 80% bootstrap confidence interval excludes 50% B_{MSY} by a very wide margin. Assuming the statistic is approximately normal, this would also indicate that there is a high degree of certainty that recruitment is not being impaired. Therefore, SG100 is met.

1.1.1.b Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

Stock assessment results indicated that the stock has fully recovered such that estimated biomass is greater than B_{MSY}, and estimated that F_{2014}/F_{MSY}=0.54 (0.35-0.72 80%CI). Maximum sustainable yield was estimated as 37 000t, while catches since 2011 have fluctuated between 20 000t and 31 000t. This meets SG80.

The assessment report noted that the exact condition of the stock is not well determined. But it is reported in the assessment that probability of the stock being above B_{MSY} and below F_{MSY} plot is 96.8% fulfilling the “high degree of certainty” criterion. Therefore, SG100 is being met.

All SG60, SG80 and SG100 were met

PI 1.1.1 : 100

References

ICCAT 2016. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 3 to 7 October 2016

ICCAT 2016. Report of the 2016 ICCAT North and South Atlantic Albacore Stock Assessment Meeting. Madeira, Portugal, 28 April – 6 May 2016

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

1.2 Harvest Strategy (Management)

P.1.2.1 Harvest Strategy

1.2.1.a Harvest strategy design		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.

ICCAT's objective is embedded in the preamble of its Convention finalised in 1966. The preamble states: "The Governments (…) considering their mutual interest in the populations of tuna and tuna-like fishes found in the Atlantic Ocean, and desiring to cooperate in maintaining the populations of these fishes at levels which will permit the maximum sustainable catch for food and other purposes". ICCAT's objective is therefore to maintain populations of tunas and tuna-like fishes at levels that will permit maximum sustainable yield (MSY).

The current strategy is to limit catches to sustainable levels based on a feedback process implemented by the Commission. Scientific advice is provided and a TAC agreed through this process, which therefore also includes evaluation of, and adaptation to, changing circumstance. In 2013, the Commission established a TAC for 2014-2018 of 28 000 t and 30 000t for 2019-20 (Rec. 13-05; Rec. 16-06), but included several provisions that allow the catch to exceed this level. This does not appear to have happened before 2016. Provisional catches were reported as 30 141t in 2016. A harvest control rule has been accepted in 2017, but not implemented yet. There are also intentions to reduce bycatch of bigeye tuna in some gears and limits on overall fishing capacity.

Given these actions, fishing mortality rates have been reduced over the last decade, responding to the perceived status of the stock. There are clear objectives to maintain the stock around the MSY biomass and the harvest strategy elements are working together to achieve this. Thus, the strategy meets SG80.

However, the strategy has been relatively imprecise and lacks a range of components including defining an appropriate mix of capacity by gear types, so it cannot be considered designed and therefore does not yet meet SG100.

1.2.1.b Harvest strategy evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

Maximum sustainable yield is estimated as 37 000 t while catches since 2011 have fluctuated around 25,000t and never exceeding 26,700t. This meets SG80. The current status has been affected by recent years where TACs were established with an objective of recovery of the stock to B_{MSY}. This appears to have been achieved.

The approach to management is clearly improving and evidence that it will continue to work is increasing. The system requires re-evaluation and resetting the TAC through Commission recommendations which must be accepted by the contracting parties on each occasion. The recent track record for this fishery has improved and there is now evidence that objectives are being achieved.

The available evidence indicates that the harvest strategy is achieving its objectives, meeting SG80. However, there need to be further evaluations of the stock status to confirm these expectations, and more broadly, the harvest strategy has only been considered in fairly narrow terms (total catch) and has not yet considered wider context of the fishery, so SG100 is not met yet. However successful implementation of a system with a harvest control rule could lead to the higher score.

1.2.1.c Harvest strategy monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place that is expected to determine whether the harvest strategy is working.		

Monitoring is adequate to determine whether the harvest strategy is working. The strategy consists of limiting catches to maintain fishing mortality at or below the MSY level and biomass above or around the MSY level. Data are collected to estimate suitable quantities in the stock assessment, which indicates whether management is achieving its objectives or not. The fishery clearly meets SG60.

1.2.1.d Harvest strategy review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The harvest strategy is periodically reviewed and improved as necessary.

There is no evidence of any formal review of the harvest strategy. Although the harvest strategy is reasonable, there is inadequate information available to indicate what improvements might be possible. The ICCAT performance reviews did specifically address future harvest strategies, but

focused on past performance of ICCAT in meeting its objectives. Therefore, the fishery does not meet SG100.

1.2.1.f Review of alternative measures		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biannual** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.

Quantities of discards are routinely reported as part of the catches. Therefore, while bycatch and discarding has been monitored, it is less clear what management actions, if any, have been undertaken to reduce discards of tuna. Discards of all tuna species appear very low, so implicitly no management intervention has been required. Incorporating estimates of discards in catch estimates and the stock assessment amounts to a review of discards generally. However, the SG60 requires a review of "measures" to minimise discarding of the target stock rather than a review of discarding itself. There is no evidence of a formal review of measures to prevent discarding at the RFMO level. If this issue was scored, the fisheries are unlikely to meet SG60 unless a national review has been undertaken for a specific fishery. However, it appears that discards of target tunas are generally considered negligible, and do not form part of the reviews of discarding and bycatch in tuna fisheries. Greater concern applies to landings of unrecorded tuna ("faux poisson") rather than discarding. Therefore, this issue is not scored.

All SG60 and SG80 were met, and 0 out of 3 SG100 were met.

PI 1.2.1 : 80

References

ICCAT 2007. Basic Texts. International Commission for the Conservation of Atlantic Tunas. 5th Revision. Madrid, Spain

ICCAT 2015-01. Recommendation by ICCAT on a Multi-annual Conservation and Management Programme for Tropical Tunas http://www.iccat.org/en/RecsRegs.asp

ICCAT 2015. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 28 September to 2 October 2015

ICCAT 2016. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 3 to 7 October 2016

ICCAT 2016. Report of the 2016 ICCAT North and South Atlantic Albacore Stock Assessment Meeting. Madeira, Portugal, 28 April – 6 May 2016

ICCAT 2016. Recommendation 16-06. Multi-Annual Conservation and Management Programme for North Atlantic Albacore

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

Spencer, J, J.J. Maguire and E. J. Molenaar. 2016. Report of the Second Independent Performance Review. ICCAT. PLE-103/2016

P.1.2.2 Harvest control rules and tools

1.2.2.a HCRs design and application		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Generally understood HCRs are in place or **available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the maximum sustainable yield level. The intention inferred from the scientific advice and management response is to maintain the stock at or above the MSY level by maintaining the catches at or below F_{MSY}. There is clear evidence of intention to reduce harvest in the face of depletion and the scientific advice has indicated that the current level of control was adequate for the recovery of the yellowfin stock to towards the MSY level. However, it is currently at 95% of B_{MSY}, although increasing. Additionally, how this has been achieved is not well-defined; for example, the TAC has not been adjusted in response to changes in the stock status, although specific limits on the capacity of some fleets has been applied.

Adjustments in the TAC and management measures if the stock came under increased pressure are available, but these actions are not assured. This marginally meets SG60, but not SG80.

There is currently no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the maximum sustainable yield level. However, HCR has been agreed in 2017, so this is expected to change for 2018 onwards. The score here reflects that the agreed HCR is not in place in 2017.

There is recent clear evidence of intention to reduce harvest in the face of depletion and the scientific advice indicated that the current level of control was adequate for a recovery of the stock to above the MSY level and that no additional action is required. However, this is not well-defined. Whether appropriate action would be taken if the stock came under increased pressure is presumed, but not assured. Seeing that the past harvest control rules are generally understood rather than well defined, SG60 is met, but not SG80.

The Commission has made significant progress in developing a harvest control rule to 2017. There is now a decision-framework (Rec. [11-13]) which meets MSC requirements. Commission requested SCRS to identify a limit reference point for northern albacore (Rec [11-04]). Management advice has been provided based on projections making use of Harvest Control Rule options consistent with the policies identified in Rec [11-13], and using an interim biomass limit of $0.4B_{MSY}$. Commission Rec. 15-04, 15-07 & 16-06, have tasked SCRS with evaluating candidate HCRs through Management Strategy Evaluations process, which was completed in 2017.

1.2.2.b HCRs robustness to uncertainty		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.

It is not possible to evaluate the harvest control in relation to uncertainties, because the HCR has not been defined well enough to do so. The practice of carrying over quota which has not been caught continues, although it has been reduced from a maximum of 50% to 25%. This policy has caused problems in the past. The TAC has been set below the MSY level which is more precautionary than it has been in the past. An LRP has been adopted for this stock, but the overall HCR has not. Until it is well defined and tested, it will not be possible to determine how robust it is. Therefore, SG80 is not achieved.

Development of a new HCR has been through an extensive MSE process, which has tested candidate HCRs through simulation. The HCRs are designed to achieve probabilistic management objectives. The HCR should, when in place, at least meet SG80.

1.2.2.c HCRs evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

The current level of control has resulted in sustainable catch levels for northern albacore leading to recovery of the stock. This amounts to some evidence that the harvest control rules are appropriate and effective, meeting SG60. There are various weaknesses, but catches have been successfully limited 2007-2015 below the recent TAC (28 000t), which will have contributed to stock rebuilding. The TAC was exceeded in 2016, but there are provisions to correct for this. Precise control over the TAC is difficult because is shared among many countries. The practice of allowing the carry-forward of uncaught allocations effectively decreases the control over fishing mortality, but this should be addressed in the new harvest control rule.

Therefore, SG80 is not met. SCRS has been testing candidate HCR using management strategy evaluations, which should provide adequate evidence to meet SG80 taking into account uncertainties such as those identified above.

All SG60 were met, but no SG80 or SG100.

PI 1.2.2 : 60

References

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

Merino G., Arrizabalaga H., Santiago J., Sharma R., Ortiz de Zarate V., De Bruyn P., Kell L. T. 2017. Updated Evaluation of Harvest Control Rules for North Atlantic Albacore Through Management Strategy Evaluation. Collect. Vol. Sci. Pap. ICCAT, 74(2): 45

Spencer, J, J.J. Maguire and E. J. Molenaar. 2016. Report of the Second Independent Performance Review. ICCAT. PLE-103/2016

P.1.2.3 Information / monitoring

1.2.3.a Range of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Although data have been generally poor and ICCAT has had considerable problems in maintaining accurate data in its database, there have been significant improvements over time. There was adequate information on stock structure, productivity and the fleets to allow a full stock assessment to be completed. Furthermore, there is evidence that on-going research is planned to improve information and therefore the stock assessment indicating on-going development of data collection is adequate to detect and remove problems.

The working group has recommended studies for North and South stocks on ageing, fecundity and maturity and improvements in tagging research. Sources of errors in data collection are being investigated, leading to further directed research to reduce them. Ageing errors have been estimated and greater standardization on the approach to improve precision has been recommended. Further evidence of on-going improvement is the updating of albacore catch-at-size data and methods used to convert from size to age.

While information is sufficient, meeting the SG80, it is not comprehensive. There is considerable environmental data not directly used in the current harvest strategy, but various data on age and abundance are limited and understanding of the population dynamics is incomplete. These gaps are recognized and, although there have been improvements, the Working Group made a number of recommendations with respect to information which would improve the assessment. With significant gaps, the fisheries cannot meet SG100.

1.2.3.b Monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.

Monitoring indices are adequate for the current harvest control rule. Indicators of stock abundance consist of standardized catch-per-unit-effort indices. Given the large areas of ocean and dispersal of the species, dedicated surveys are not an option for this type of fishery. A single consistent index was not available for the entire time series. The combined indices appear to provide a consistent picture of the changes in abundance that have occurred, although there are some significant differences among indices. Recommendations have included improved understanding of CPUE and population biology for this species. Information is sufficient to support a reliable stock assessment.

The accuracy and coverage of the monitoring program is adequate for a harvest control rule, and available indicators would also support better defined rules based on fishing mortality and biomass estimates. Therefore, the fisheries meet SG80. The monitoring does not cover all information, and not all information from all fleets is recorded with a high degree of certainty. Therefore, the fisheries do not meet SG100.

1.2.3.c Comprehensiveness of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is good information on all other fishery removals from the stock.	

ICCAT has put considerable effort in getting countries to record and report catches. The current level of reporting is far from perfect given the number of small countries involved and difficulties in monitoring small vessels and activities in oceanic waters well away from the coast. This illustrates the on-going problems ICCAT faces with the contracting parties. Nevertheless, catches are recorded increasingly well with decreasing IUU fishing activity, and data are sufficiently well recorded in the most part for the stock assessment and for assessing the level of control sought by ICCAT over landed catches. This meets SG80.

All SG60 and SG80 were met, and 0 out of 2 SG100 were met.

PI 1.2.3 : 80

References

ICCAT 2016. Report of the 2016 ICCAT North and South Atlantic Albacore Stock Assessment Meeting. Madeira, Portugal, 28 April – 6 May 2016

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

P.1.2.4 Assessment of stock status

1.2.4.a Appropriateness of assessment to stock under consideration		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.

Various stock assessment models and software have been applied in the past. The methods and model structures are generic, but are structured to take advantage of the available data. Available software includes a variety of methods also used in other tuna fisheries and for other national stocks (including VPA, Stock Synthesis and Multifan-CL). Building on the modelling done in the past, the 2016 assessment focused on biomass dynamic modelling methods as being simpler to use and the biomass dynamic modelling approach is being tested in the MSE.

The stock assessment has not been carried out frequently considering it was rebuilding from below the MSY level. However, the most recent interval was shorter (2013-2016) and the stock was considered to be recovered at that time. Thus, this frequency may be considered consistent with the current harvest objectives.

Life history model parameters are specific to the stock and/or species and have been derived from fitting stock assessment models or other independent research. However, these are not used in biomass dynamics models, which rely on a statistical fit of catch and one or more abundance indices.

Because the current stock assessment has been tested in the MSE, it is clearly appropriate for the stock and harvest control rule, and as a result meets SG80. In the past the assessment has attempted to account for some features of the species biology and the fishery, albeit the current assessment approach has rejected such models based on life history. Because the current simplified approach does not use all data or what is known about the biology of the species, SG100 is not met.

1.2.4.b Assessment approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	

The stock assessments have been used to estimate the MSY-related reference points, and these have been used to determine stock status. This meets SG80.

1.2.4.c Uncertainty in the assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment **identifies major sources** of uncertainty.	The assessment takes **uncertainty into account.**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.

While only one model was used in the 2016 assessment, the group built on the prior assessment experience whereby a variety of models were used. Additionally, in 2016 the group conducted several sensitivity analyses, namely considering a logistic production function, the information content of the data, i.e. length of the catch time series (truncated at 1975), and the impact of dropping one of the five CPUE indices at a time. The main assessment is stochastic and advice is provided which is explicitly probabilistic, although the probabilities are based on bootstrapping, which only accounts for observation error. Decision tables are provided for various target fishing mortality and TAC levels, with probabilities that targets will be reached for projected years. Uncertainty has been explicitly considered in assessments throughout the MSE process developing the HCR. Because there is clear evidence that consideration of risk is provided for management decision making, SG100 is met.

1.2.4.d Evaluation of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

A wide range of alternative software has been applied to the available data in past assessments. This resulted in a fundamental change to a simpler biomass dynamics model because the wide range of methods used previously required too much preparation and scrutiny rather than they were inappropriate. More recently, MSE testing has shown that advice should be robust to a wide range of uncertainties and so, with many alternative assessment approaches and alternative hypotheses considered in the past, SG100 is met.

1.2.4.e Peer review of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

The stock assessment is subject to review through a working group process. SCRS meet annually and review models, data and research on the main tuna species as well as other species within ICCAT jurisdiction, meeting SG80. There is no evidence of external review of the 2016 assessment, so SG100 is not met.

All SG60 and SG80 were met, and 2 out of 4 SG100 were met.

PI 1.2.4 : 90

References

ICCAT 2016. Report of the 2016 ICCAT North and South Atlantic Albacore Stock Assessment Meeting. Madeira, Portugal, 28 April – 6 May 2016

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

Merino G., Arrizabalaga H., Santiago J., Sharma R., Ortiz de Zarate V., De Bruyn P., Kell L. T. 2017. Updated Evaluation of Harvest Control Rules for North Atlantic Albacore Through Management Strategy Evaluation. Collect. Vol. Sci. Pap. ICCAT, 74(2): 45

South Atlantic Albacore

1.1 Outcome

P.1.1.1 Stock Status

1.1.1.a Stock status relative to recruitment impairment.		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.

The median estimate of stock size indicates that the South Atlantic albacore stock was approximately 10% higher than the B_{MSY} level in 2015 (80% confidence interval= 0.51 to1.80), which is highly likely to be above the point where recruitment would be impaired, the default value for this being 50% B_{MSY}. Catches in 2016 were estimated to be 13 679t, below the TAC of 24 000t and below the lower 80%CI bound for the MSY (15 270t), so the stock is not likely to have declined much since the assessment. The stock is therefore highly likely to be above the default limit reference point, meeting SG80, but not with a high degree of certainty (<5% probability), so it does not meet SG100.

1.1.1.b Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

The median estimate of stock size indicates that B_{2015}/B_{MSY} =1.10 and F_{2014}/F_{MSY} was 0.54 (0.31-0.87). Since 2004, catches have been below the estimated MSY level of 25 901 t (15 270 - 31 768 t). In recent years, catches have been lower that the TAC level only since 2013. This has contributed to stock recovery whereby the stock is at or fluctuating around B_{MSY}. This meets SG80.

However, there is not a high degree of certainty that the stock is at B_{MSY}. The 80% confidence interval extends from 51% of B_{MSY} to 180%. Thus, SG100 is not met.

All SG60 and SG80 were met, and 0 out of 2 SG100 were met.

PI 1.1.1 : 80

References

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

1.2 Harvest Strategy (Management)

P.1.2.1 Harvest Strategy

1.2.1.a Harvest strategy design		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.

ICCAT's objective is embedded in the preamble of its Convention finalised in 1966. The preamble states: "The Governments (…) considering their mutual interest in the populations of tuna and tuna-like fishes found in the Atlantic Ocean, and desiring to cooperate in maintaining the populations of these fishes at levels which will permit the maximum sustainable catch for food and other purposes". ICCAT's objective is therefore to maintain populations of tunas and tuna-like fishes at levels that will permit maximum sustainable yield (MSY).

The current strategy is to limit catches to sustainable levels based on a feedback process implemented by the Commission. Scientific advice is provided and a TAC agreed through this process, which therefore also includes evaluation of, and adaptation to, changing circumstance. There are also intentions to reduce bycatch of bigeye tuna in some gears and limits on overall fishing capacity. The TAC is set at the median level which stock projections indicate that biomass will continue to increase based on the objective 60% probability being in the "green zone" ($B>B_{MSY}$, $F<F_{MSY}$), demonstrating that the strategy is responsive to the status of the stock. Although the 2016 performance review suggested the TAC was not set in line with SCRS, it does seem consistent with the SCRS 2017 advice. This meets SG80.

However, the strategy is relatively imprecise and, focused only on catch, lacks a range of components including defining an appropriate mix of capacity by gear types, and objectives have not been clearly set out. So it cannot be considered designed and therefore does not meet SG100.

1.2.1.b Harvest strategy evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

The stock trajectory according to the stock assessment does suggest that the stock has recovered. This provides some evidence that the harvest strategy has worked. The Commission has shown a willingness to reduce the TAC in line with scientific advice. Monitoring is in place and the available evidence indicates that the harvest strategy is achieving its objectives, meeting SG80.

The approach to management appears somewhat ponderous and evidence that it will continue to work is limited. The system requires re-evaluation and resetting the TAC through Commission recommendations which must be accepted by the contracting parties on each occasion. There is no pre-agreement on how to react to stock changes and stock assessments required to evaluate management performance have not been frequent given the stock is heavily exploited. Importantly part of the recovery has probably come about because catches have been well below the TAC, which has not confirmed that the TAC is being set at an appropriate level. Because the harvest strategy has only been considered in fairly narrow terms (total catch), has not yet considered wider context of the fishery or maintained the stock at the target level, SG100 is not met.

1.2.1.c Harvest strategy monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place that is expected to determine whether the harvest strategy is working.		

Monitoring is adequate to determine whether the harvest strategy is working. The strategy consists of limiting catches to maintain fishing mortality at or below the MSY level and biomass above or around the MSY level. Data are collected to estimate suitable quantities in the stock assessment, which indicates whether management is achieving its objectives or not. The fishery clearly meets SG60.

1.2.1.d Harvest strategy review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The harvest strategy is periodically reviewed and improved as necessary.

There is no evidence of any formal review of the harvest strategy. Although the harvest strategy is reasonable, there is inadequate information available to indicate what improvements might be possible. The ICCAT performance reviews did specifically address future harvest strategies, but focused on past performance of ICCAT in meeting its objectives. Therefore, the fishery does not meet SG100.

1.2.1.f Review of alternative measures		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biannual** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.

Quantities of discards are routinely reported as part of the catches. Therefore, while bycatch and discarding has been monitored, it is less clear what management actions, if any, have been undertaken to reduce discards of tuna. Discards of all tuna species appear very low, so implicitly no management intervention has been required. Incorporating estimates of discards in catch estimates and the stock assessment amounts to a review of discards generally. However, the SG60 requires a review of "measures" to minimise discarding of the target stock rather than a review of discarding itself. There is no evidence of a formal review of measures to prevent discarding at the RFMO level. If this issue was scored, the fisheries are unlikely to meet SG60 unless a national review has been undertaken for a specific fishery. However, it appears that discards of target tunas are generally considered negligible, and do not form part of the reviews of discarding and bycatch in tuna fisheries. Greater concern applies to landings of unrecorded tuna ("faux poisson") rather than discarding. Therefore, this issue is not scored.

All SG60 and SG80 were met, and 0 out of 3 SG100 were met.

PI 1.2.1 : 80

References

ICCAT 2007. Basic Texts. International Commission for the Conservation of Atlantic Tunas. 5th Revision. Madrid, Spain

ICCAT 2015-01. Recommendation by ICCAT on a Multi-annual Conservation and Management Programme for Tropical Tunas http://www.iccat.org/en/RecsRegs.asp

ICCAT 2015. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 28 September to 2 October 2015

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ICCAT 2016. Recommendation 16-07. Southern Albacore Catch Limits for the Period 2017 to 2020

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

Spencer, J, J.J. Maguire and E. J. Molenaar. 2016. Report of the Second Independent Performance Review. ICCAT. PLE-103/2016

P.1.2.2 Harvest control rules and tools

1.2.2.a HCRs design and application		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Generally understood HCRs are in place or **available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the maximum sustainable yield level. The intention inferred from the scientific advice and management response is to maintain the stock at or above the MSY level by maintaining the catch rates at or below F_{MSY}. Therefore, the "generally understood" HCR is to set catches low enough that the stock rebuilds to B_{MSY}, and subsequently set future catches so that the stock remains at this level. Precisely how this will be done is unclear and how catches are set taking into account various uncertainties is not defined. The HCR has not been tested in projections as it is too vague. Fixed catches have been tested in projections, but this does not meet requirements of a MSC harvest control rule. Because there is no well-defined HCR, SG80 is not met.

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the maximum sustainable yield level. The intention inferred from the scientific advice and management response is to maintain the stock at or above the MSY level by maintaining the catches at or below F_{MSY}. There is clear evidence of intention to reduce harvest in the face of depletion and the scientific advice has indicated that the current level of control was adequate for the recovery of the yellowfin stock to towards the MSY level. However, it is currently at 95% of B_{MSY}, although increasing. Additionally, how this has been achieved is not well-defined; for example, the TAC has not been adjusted in response to changes in the stock status, although specific limits on the capacity of some fleets has been applied.

Adjustments in the TAC and management measures if the stock came under increased pressure are available, but these actions are not assured. This marginally meets SG60, but not SG80.

Adjustments in the TAC and management measures if the stock came under increased pressure are available, as demonstrated through the implementation of catch limits to countries (Rec. 16-07). This meets SG60.

1.2.2.b HCRs robustness to uncertainty		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.

It is not possible to evaluate the harvest control in relation to uncertainties, because the HCR has not been defined well enough to do so. The stock assessment does report probabilistic outcomes for various fixed catches and fishing mortalities, but this is not consistent with an MSC HCR. Therefore, SG80 is not achieved.

1.2.2.c HCRs evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

The current level of control has resulted in sustainable catch levels for southern albacore leading to recovery to B_{MSY}. There is evidence that adjustment in response to scientific findings is likely, that the lower TAC will be effective in decreasing mortality, and that there has been an increase in biomass, which amounts to some evidence that the tools used to control harvest are appropriate and effective, meeting SG60.

There are various weaknesses preventing higher scores under this performance indicator. The TAC is shared among many countries and control is not precise. The practice of allowing the carry-forward of uncaught allocations effectively decreases the control over fishing mortality. Catches in practice have been well below the TAC, so the TAC has not been called upon to limit harvest yet. Therefore, SG80 is not met.

All SG60 were met, but no SG80 or SG100.

PI 1.2.2 : 60

References

ICCAT 2015-07. Recommendation by ICCAT on the Development of Harvest Control Rules and of Management Strategy Evaluation http://www.iccat.org/en/RecsRegs.asp

ICCAT 2015-01. Recommendation by ICCAT on a Multi-annual Conservation and Management Programme for Tropical Tunas http://www.iccat.org/en/RecsRegs.asp

ICCAT 2015. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 28 September to 2 October 2015

ICCAT 2016. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 3 to 7 October 2016

ICCAT 2016. Report of the 2016 ICCAT North and South Atlantic Albacore Stock Assessment Meeting. Madeira, Portugal, 28 April – 6 May 2016

ICCAT 2016. Recommendation 16-07. Southern Albacore Catch Limits for the Period 2017 to 2020

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

P.1.2.3 Information / monitoring

1.2.3.a Range of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Although data have been generally poor and ICCAT has had considerable problems in maintaining accurate data in its database, there have been significant improvements over time. There was adequate information on stock structure, productivity and the fleets to allow a full stock assessment to be completed. Furthermore, there is evidence that on-going research is planned to improve information and therefore the stock assessment indicating on-going development of data collection is adequate to detect and remove problems.

The working group has recommended studies for North and South stocks on ageing, fecundity and maturity and improvements in tagging research. Sources of errors in data collection are being investigated, leading to further directed research to reduce them. Ageing errors have been estimated and greater standardization on the approach to improve precision has been recommended. Further evidence of on-going improvement is the updating of albacore catch-at-size data and methods used to convert from size to age.

While information is sufficient, meeting the SG80, it is not comprehensive. There is considerable environmental data not directly used in the current harvest strategy, but various data on age and abundance are limited and understanding of the population dynamics is incomplete. These gaps are recognized and, although there have been improvements, the Working Group made a number of recommendations with respect to information which would improve the assessment. With significant gaps, the fisheries cannot meet SG100.

1.2.3.b Monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.

Monitoring indices are adequate for the current harvest control rule. Indicators of stock abundance mainly consist of standardized catch-per-unit-effort indices. Given the large areas of ocean and dispersal of the species, dedicated surveys are not an option for this type of fishery. A single consistent index is not available for the entire time series, but the combined indices do appear to provide a consistent picture of the changes in abundance that have occurred. Recommendations have included improved size composition coverage and CPUE standardization.

This accuracy and coverage of the monitoring program is adequate for the limited current harvest control rule, and available indicators would also support better defined rules based on fishing mortality and biomass estimates. Therefore, the fisheries meet SG80. The monitoring does not cover all information, and not all information from all fleets is recorded with a high degree of certainty. Therefore, the fisheries do not meet SG100.

1.2.3.c Comprehensiveness of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is good information on all other fishery removals from the stock.	

ICCAT has put considerable effort in getting countries to record and report catches. The current level of reporting is far from perfect given the number of small countries involved and difficulties in monitoring small vessels and activities in oceanic waters well away from the coast. This illustrates the on-going problems ICCAT faces with the contracting parties. Nevertheless, catches are recorded increasingly well with decreasing IUU fishing activity, and data are sufficiently well recorded in the most part for the stock assessment and for assessing the level of control sought by ICCAT over landed catches. This meets SG80.

All SG60 and SG80 were met, and 0 out of 2 SG100 were met.

PI 1.2.3 : 80

References

ICCAT 2016. Report of the 2016 ICCAT North and South Atlantic Albacore Stock Assessment Meeting. Madeira, Portugal, 28 April – 6 May 2016

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

P.1.2.4 Assessment of stock status

1.2.4.a Appropriateness of assessment to stock under consideration		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.

Various stock assessment models and software have been applied in the past. All methods and model structures are generic, but are structured to take advantage of the available data. The 2016 assessment built on prior assessment experience, using forms of biomass dynamics (production) models.

The stock assessment has not been carried out frequently considering it was rebuilding from below the MSY level. However, the most recent interval was smaller (2013-2016) and the stock was deemed to have recovered. This frequency is still consistent with current harvest control objectives.

Life history model parameters are specific to the stock and/or species and have been derived from fitting stock assessment models or other independent research. This information is used only to a very limited extent in production models (mainly in the priors for one of the parameters in one of the models).

The assessment attempts to account for some features of the species biology and the fishery, but the approach remains broadly generic, meeting the SG80, but not SG100. Improved information on the biology from, for example, tagging studies, and used in the stock assessments could lead to meeting SG100.

1.2.4.b Assessment approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	

The stock assessments have been used to estimate the MSY-related reference points, and these have been used to determine stock status. This meets SG80.

1.2.4.c Uncertainty in the assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment **identifies major sources** of uncertainty.	The assessment takes **uncertainty into account.**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.

The biomass dynamics model used (BSP) is Bayesian and reports results in a probabilistic way. The ASPIC model uses a different approach (bootstrap resampling), but essentially this captures the uncertainty and was interpreted in the same way. The models and various sensitivities have been

combined to produce probabilities of achieving objectives based on various management decisions. This decision table approach used for management advice is explicitly probabilistic. Therefore, SG100 is met.

1.2.4.d Evaluation of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

Alternative software has been applied to the available data, although this falls short of a rigorous exploration of alternative hypotheses and approaches to assessment. The assessment in 2016 is based on simple production models which do not attempt to use size or age information. Alternative methods have been looked at for age-structure models, but the methods reviewed so far may not have been exhaustive. It is not clear that the assessment is robust. No MSE has been conducted and yet confidence intervals are very wide. There are recommendations to continue work on developing improved statistical models. Overall, the stock assessment has only partially met SG100.

1.2.4.e Peer review of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

The stock assessment is subject to review through a working group process. SCRS meet annually and review models, data and research on the main tuna species as well as other species within ICCAT jurisdiction, meeting SG80. There is no evidence of external review of the 2016 assessment, so SG100 is not met.

All SG60 and SG80 were met, and 1 out of 4 SG100 were met.

PI 1.2.4 : 85

References

ICCAT 2016. Report of the 2016 ICCAT North and South Atlantic Albacore Stock Assessment Meeting. Madeira, Portugal, 28 April – 6 May 2016

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

Mediterranean Albacore

1.1 Outcome

P.1.1.1 Stock Status

1.1.1.a Stock status relative to recruitment impairment.		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.

The 2017 stock assessment estimated that the median ratio of B_{2015}/B_{MSY} was 1.0, and the 95%CI for this status indicator was 0.456-1.760. Assuming a default limit reference point of 0.5 B_{MSY}, and allowing for the MSC guidance on high degree of certainty (95% rather than 97.5% lower bound) suggests that the lower bound for 90%CI would be a little above 0.5 B_{MSY}. Although this ostensibly meets the SG100. However, the SCRS use the term "not likely" the stock being below MSY level and do not feel confident enough in these results to run projections, for example. Overall, this suggests downgrading "high degree of certainty" to "highly likely", meeting the SG80, but not the SG100.

1.1.1.b Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

The state of the stock in relation to any target is not known precisely, but an estimate was made in 2017. The SCRS concluded that the stock is "not likely" below B_{MSY} level, and quantitative estimates suggests that it is at or close to the B_{MSY} level. Recent catches have been below the MSY level (3419t, 2187-7842t 95%CI) since 2012, with catches in 2016 being at MSY. This suggests that SG80 is met. The SCRS, however, indicated that these results are uncertain, so SG100 is not met. The uncertainty associated with this determination is picked up elsewhere.

All SG60 and SG80 were met, and 0 out of 2 SG100 were met.

PI 1.1.1 : 80

References

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

1.2 Harvest Strategy (Management)

P.1.2.1 Harvest Strategy

1.2.1.a Harvest strategy design		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.

ICCAT's objective is embedded in the preamble of its Convention finalised in 1966. The preamble states: "The Governments (…) considering their mutual interest in the populations of tuna and tuna-like fishes found in the Atlantic Ocean, and desiring to cooperate in maintaining the populations of these fishes at levels which will permit the maximum sustainable catch for food and other purposes". ICCAT's objective is therefore to maintain populations of tunas and tuna-like fishes at levels that will permit maximum sustainable yield (MSY).

The current harvest strategy is not expected to achieve management objectives for this stock, so SG60 is not met. The strategy has clearly improved by developing a list of vessels authorized to target Mediterranean albacore in 2017. In addition, the fishery is affected by an annual two-month longline closure primarily directed at protecting Mediterranean swordfish juveniles, although this doesn't explicitly form part of a albacore harvest strategy. With no management cycle of feedback and control yet established, SG60 cannot be met.

Some progress has been made, however, with MSY reference points have been estimated and the albacore vessel list, so in theory a system of catch limits could be implemented in future. On balance, recent catches have probably been sustainable, but are not the result of a management strategy. A strategy will still need to be developed which would allow SG60 and SG80 to be met.

1.2.1.b Harvest strategy evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

It is not possible to state that the current harvest strategy is likely to work, so the fishery does not meet SG60. There are no ICCAT regulations directly aimed at managing the Mediterranean albacore stock, except for the authorization list of vessels targeting albacore established in 2017. Management recommendations made by the Scientific Committee are to establish limits on catch and effort, as well as improving the stock assessment data. Limits on the fishing activities directed at this stock are still based on social or economic controls, or other factors which do not appear to be directly under the control of ICCAT.

1.2.1.c Harvest strategy monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place that is expected to determine whether the harvest strategy is working.		

Some monitoring is in place, but limited to total catch and this is considered unreliable. Other data used for monitoring was considered incomplete. Limited tagging studies have been undertaken. It appears that there is no evidence whether the harvest strategy could achieve its objectives. The current strategy relies on limits on fishing capacity and targeting which do not appear to be controlled directly.

The 2017 stock assessment attempted to use the available information to evaluate the performance of the fishery. The tentative conclusion of this was that the current exploitation was probably less than MSY, and therefore the *laissez faire* strategy, such as it is, has probably not resulted in significant problems. While the data have shortcomings (see PI 1.2.3), it is likely that with a longer time series the results will become more confident in showing whether overfishing is occurring. This is adequate to meet SG60.

1.2.1.d Harvest strategy review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The harvest strategy is periodically reviewed and improved as necessary.

Without a clear harvest strategy to review, it will not be possible to meet SG100.

Only 1 out of 3 SG60 were met.

PI 1.2.1 : Fail

References

ICCAT 2007. Basic Texts. International Commission for the Conservation of Atlantic Tunas. 5th Revision. Madrid, Spain

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

Spencer, J, J.J. Maguire and E. J. Molenaar. 2016. Report of the Second Independent Performance Review. ICCAT. PLE-103/2016

P.1.2.2 Harvest control rules and tools

1.2.2.a HCRs design and application		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Generally understood HCRs are in place or **available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.

There is no generally-understood or well-defined harvest control rule and therefore there is no specific plan of control if the stock size is determined as below the maximum sustainable yield level. There is clear evidence of intention to reduce harvest in the face of depletion (implied from the management of other stocks), but information is currently inadequate to provide guidance on this. The harvest control rule is not well-defined. Whether appropriate action would be taken if it was detected that the stock was overfished might be assumed, but is not assured. Seeing that the harvest control rules are not generally understood, not well defined and essentially not yet available, SG60 is not met.

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the maximum sustainable yield level. The intention inferred from the scientific advice and management response is to maintain the stock at or above the MSY level by maintaining the catches at or below F_{MSY}. There is clear evidence of intention to reduce harvest in the face of depletion and the scientific advice has indicated that the current level of control was adequate for the recovery of the yellowfin stock to towards the MSY level. However, it is currently at 95% of B_{MSY}, although increasing. Additionally, how this has been achieved is not well-defined; for example, the TAC has not been adjusted in response to changes in the stock status, although specific limits on the capacity of some fleets has been applied.

Adjustments in the TAC and management measures if the stock came under increased pressure are available, but these actions are not assured. This marginally meets SG60, but not SG80.

1.2.2.b HCRs robustness to uncertainty		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.

It is not possible to evaluate the harvest control in relation to uncertainties, because the HCR has not been defined well enough to do so. Projections of fixed catches have not been conducted due to uncertainties with the stock assessment, although some guidance on sustainable catch levels has been given. Without a better defined harvest control rule consistent with MSC requirements, SG80 cannot be met.

1.2.2.c HCRs evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

There appears to be no effective control over this fishery, at least by ICCAT. Therefore, SG60 is not met. There is evidence of improvement in this area however, with the establishment of a list of vessels authorized to target albacore, which might be a precursor for implementing appropriate tools to control harvest.

Only 0 out of 2 SG60 were met.

PI 1.2.2 : Fail

References

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

P.1.2.3 Information / monitoring

1.2.3.a Range of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Genetic studies suggest this stock is separated from the North Atlantic stock, and therefore needs to be managed separately. Mediterranean albacore data were reviewed in 2010 and as a result, deficiencies and a lack of information were identified in statistics from major fleets. It was concluded that in order to assess the status of this stock, the CPCs should provide revised and complete data for this purpose. A stock assessment was completed in 2017 suggesting data are now sufficient to complete a “data poor” assessment and may be sufficient to meet the default ICCAT harvest strategy requirements. This now meets SG60.

1.2.3.b Monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.

Fishery removals are probably incomplete, but are monitored. Completion of the 2017 stock assessment indicates that there was at least one acceptable indicator for monitoring stock abundance. Therefore, the data seem sufficient to establish a harvest control rule, particularly taking into account recent and future improvements with data reporting, and should now meet SG60. It is not clear that data are accurate enough to establish a reliable harvest control rule. Specifically, the assessment model was not used to carry out projections due to uncertainties in the 2017 stock assessment, which could be attributed to poor data. Projections would be a requirement for a HCR, so SG80 is not met.

1.2.3.c Comprehensiveness of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is good information on all other fishery removals from the stock.	

In general, the Mediterranean catches are highly uncertain. Estimated albacore catches, mainly by Italy and Greece, are still minor (less than 4,000 t) and do not show any significant trend over time. However, there is a lack of information concerning reported catches by many nations in recent years. The trend of fishing effort of the various gears fishing for albacore in the Mediterranean Sea is still not possible to estimate, due to short time series and inadequate coverage of artisanal gears. Information on size composition of the catch is also very limited. Although SCRS identified the abundance indices as the main source of uncertainty in the 2017 stock assessment, it not yet clear that catches are sufficiently complete, so SG80 cannot be met.

All SG60 were met, but no SG80 or SG100.

PI 1.2.3 : 60

References

ICCAT 2010. Report of the 2010 ICCAT Mediterranean Albacore Data Preparatory Meeting. Madrid, Spain – June 28 to July 2, 2010

ICCAT 2011. The 2011 ICCAT South Atlantic and Mediterranean Albacore Stock Assessment Sessions Madrid, Spain July 25-29, 2011

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

P.1.2.4 Assessment of stock status

1.2.4.a Appropriateness of assessment to stock under consideration		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.

Note that no report was available for the 2017 Mediterranean Albacore stock assessment was available, so scoring was based on the SCRS 2017 report only.

Two stock assessments appropriate for data-poor fisheries were undertaken in 2017. These approaches are appropriate for this stock given the information available, meeting SG80. However, the methods are generic, and do not account for specific life history features or different sources of uncertainty in the population dynamics which might be addressed through a catch-at-age model, for example, so SG100 is not met.

1.2.4.b Assessment approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	

The stock assessments have been used to estimate the MSY-related reference points, and these have been used to determine stock status. This meets SG80.

1.2.4.c Uncertainty in the assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment **identifies major sources** of uncertainty.	The assessment takes **uncertainty into account.**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.

The main sources of uncertainty in the data have been identified and clearly reviewed and reported. All assessments took account of uncertainty in one way or another. The state space biomass dynamics model would have evaluated stock status probabilistically (separating observation and process probabilities). The length-based methods dealt with uncertainty through accounting for observation error and qualitatively in discussion of scenarios, alternative selectivity and so on. Therefore the assessment of uncertainty meets SG60 and SG80. Given that stock status would be available as a marginal probability density and this was reported as a median with confidence intervals in the SCRS report, stock status is being evaluated relative to reference points in a probabilistic way, meeting SG100.

1.2.4.d Evaluation of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

It was not clear that a wide range of assessment approaches have been undertaken. The rejection of stock assessment projections by SCRS suggest that results are not considered particularly robust. Alternative hypotheses will need to be developed and explored through additional assessment models, simulations and scenarios before SG100 could be met.

1.2.4.e Peer review of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

The stock assessment is subject to review through a working group process. SCRS meet annually and review models, data and research on the main tuna species as well as other species within ICCAT jurisdiction, meeting SG80. There is no evidence of external review of the 2016 assessment, so SG100 is not met.

All SG60 and SG80 were met, and 1 out of 4 SG100 were met.

PI 1.2.4 : 85

References

ICCAT 2011. The 2011 ICCAT South Atlantic and Mediterranean Albacore Stock Assessment Sessions Madrid, Spain July 25-29, 2011

ICCAT 2016. Report of the 2016 ICCAT North and South Atlantic Albacore Stock Assessment Meeting. Madeira, Portugal, 28 April – 6 May 2016

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

Atlantic Bigeye

1.1 Outcome

P.1.1.1 Stock Status

1.1.1.a Stock status relative to recruitment impairment.		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.

The best estimate of stock size (2015 assessment) indicates that the stock was approximately 67% of the B_{MSY} level in 2014. This level is above the point where recruitment would be impaired (the default value for this is approximately 50% of the B_{MSY} level). Also, probability analysis conducted in the most recent assessment indicated that there may be close to an 80% probability that the stock was above ½ $B_{MSY.}$ But there was also greater than an 80% probability that B/B_{MSY} is less than 1. Additionally, there is considerable uncertainty as to where recruitment would be impaired. If the level at which recruitment is impaired was known more certainly to be ½ B_{MSY} then this would marginally meet SG80. However, given that uncertainty, it can only be said that B is *likely* to be above the level where recruitment is impaired. Therefore, this meets SG60 but does not meet SG80.

1.1.1.b Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

In the 2010 assessment the stock biomass and fishing mortality rate were approximately equal to their MSY reference points. A new assessment was conducted in 2015 which considered catch, size and effort data collected since the 1950s. The assessment used several different modelling approaches that utilized the available data. The conclusion of that assessment was that B_{2014}/B_{MSY} was 0.67 and the F_{2014}/F_{MSY} was 1.28. Additionally, the biomass was estimated to have been below B_{MSY} for approximately 5 years. The current assessment estimates MSY as 78,824 t, current (2016-18) TAC is 65,000 t, yet 2014 and provisional 2015 catches were 78,824 and 79,577 t, respectively. Catches maintained at this level are not likely to allow the stock to rise above B_{MSY}. Probability estimates suggested that there was greater than an 80% probability that B_{2017}/B_{MSY} is less than 1 (assuming catches 75,000-80,000t 2014-16). Therefore, the stock is not fluctuating around a level consistent with MSY and SG80 and SG100 are not met.

All SG60 were met, but no SG80 or SG100.

PI 1.1.1 : 60

References

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

P.1.1.2 Stock Rebuilding

1.1.2.a Rebuilding timeframes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
A rebuilding timeframe is specified for the stock that is the **shorter of 20 years or 2 times its generation time**. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.		The shortest practicable rebuilding timeframe is specified which does not exceed **one generation time** for the stock.

Given the life history characteristics of bigeye and the history of fishing on this bigeye stock, the stock has the potential to recover relatively quickly (within a 5-10 year period) with appropriate management measures. Projections have indicated that catches at the current TAC level (65,000 t) would have 51% chance of achieving the Convention objectives ($B>B_{MSY}$) by 2028. This implies that current TAC catches are likely to cause the stock to fluctuate at levels below B_{MSY} for the near future. The probability of recovery may be improved by the additional measures (*i.e.* FAD moratorium) agreed by the Commission in Rec. 15-01 and implemented in 2016, but there is no evidence for this yet. Note that recent (2014-2015) catches were more than 65,000 t.

The rebuilding time frame of 2028 is within the 20 years or 2 times the approximate generation time. Based on the estimates of age 50% maturity of 3 years and natural mortality used in the 2015 stock assessment, generation time would be around 6.5 years (M = 0.279; $A_{50\%}$=3 see CR2.0 Box GSA4). The actions taken in 2015 were based on the assessment referred to here with the implication of achieving objectives by 2028, but these may require further updating. Nevertheless, it is concluded that at this time the rebuilding time frame should fulfil SG60, but not SG100 as it clearly exceeds one generation time.

1.1.2.b Rebuilding evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.	There is **evidence** that the rebuilding strategies are rebuilding stocks, **or it is likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.	There is **strong evidence** that the rebuilding strategies are rebuilding stocks, **or it is highly likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.

Projections indicated that catches at the current TAC level (65,000 t) would have 51% chance of achieving Convention Objectives by 2028, the specified time frame. Additional measures (*i.e.* FAD

moratorium) agreed by the Commission in Rec. 15-01 and implemented in 2016 indicate an attempt at achieving recovery. The progress of the recovery will be monitored through catch monitoring and a planned new assessment in 2018. Monitoring is clearly sufficient to indicate whether rebuilding is taking place, which meets SG60.

With current catches, it is not yet clear that rebuilding will be successful by 2028, the specified timeframe, as the catches have exceeded the TAC. Simulations of future stock status suggest that the median stock size will be around the MSY level if the catches are limited to the TAC, but there is considerable uncertainty, so this does not amount to evidence. The FAD management at this stage seems more about collection of catch and effort data, rather than limiting, per se, the number of FADs. The rationale for the figure of 500 FADs per vessel active at any one time, when there are over 50 purse seiners (> 20 meters) authorised to fish, is not clear. The Commission is due to review these provisions in 2016. A future stock assessment should either provide such evidence or lead to further management action for the SG80 to be met.

All SG60 were met, but no SG80 or SG100.

PI 1.1.2 : 60

References

ICCAT 2015. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 28 September to 2 October 2015

ICCAT 2016. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 3 to 7 October 2016

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

1.2 Harvest Strategy (Management)

P.1.2.1 Harvest Strategy

1.2.1.a Harvest strategy design		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.

ICCAT's objective is embedded in the preamble of its Convention finalised in 1966. The preamble states: "The Governments (…) considering their mutual interest in the populations of tuna and tuna-like fishes found in the Atlantic Ocean, and desiring to cooperate in maintaining the populations of these fishes at levels which will permit the maximum sustainable catch for food and other purposes". ICCAT's objective is therefore to maintain populations of tunas and tuna-like fishes at levels that will permit maximum sustainable yield (MSY).

ICCAT, being a regional organisation, provides a forum where the various countries exploiting tunas can work together to implement the strategy to meet this objective. The current strategy is to limit catches to sustainable levels based on a feedback process implemented by the Commission and primarily reduce bycatch of small bigeye and yellowfin tunas. Scientific advice is provided and a TAC

with a seasonal closed area agreed through this process, which therefore also includes evaluation of, and adaptation to, changing circumstance.

The 2016 external review panel found that recent changes appear to have been made to the seasonal closure without reference to scientific advice, rendering this management action less effective. The TAC is also not implemented precisely and there has been an overshoot in recent years, although catches are being reduced to the target level. The external review panel indicated that they thought more effective measures were needed to deal with the catch of small bigeye tuna. The Panel noted that, according to the SCRS, the area-time closure has not achieved its objective and therefore its impact on reducing juvenile catches of bigeye and yellowfin, is negligible. The panel recommended that this policy needs to be re-examined and this can, in part, be done through initiatives on limiting the number and use of FADs. Because it has been shown that the seasonal area closures (Rec. 14-01) have not been effective and have been subject to unplanned changes (Rec. 15-01), the strategy cannot have been designed.

Constant TAC projections under the current TAC (65,000 t) predict increasing biomass over the projection period. There is just a probability of 51% of $B>B_{MSY}$ by the end of the projection time period (2028), but the biomass is projected to be still increasing at that time. It should be noted that the strategy is not to maintain constant catches in reality, but adjust them with future stock assessments, so further decreases in catches will be expected if the stock does not appear to be recovering. This marginally supports SG60 being met.

While the 2016 ICCAT performance review noted that overall ICCAT management performance had improved since the previous review in 2009, it also singled out bigeye tuna as a problem, with both fishing mortality and biomass above and below their targets respectively.

Otherwise, given that some control has been demonstrated at limiting catches, the harvest strategy may be expected to achieve objectives in the longer term, but it is not clear that the different elements (TAC, spatial closures, FAD controls etc.) are working together to achieve the desired objectives, not least because the individual elements have not yet been shown to be fully effective. For these reasons the assigned score for this issue is SG60 and not SG80.

1.2.1.b Harvest strategy evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

In the case of the bigeye stock, the TAC established in 2016 is 65 000t, but recent catches in 2014 to 2016 were above 65,000 t. The stock assessment suggested that the bigeye stock is probably below B_{MSY} and above F_{MSY}. Although projections indicated that catches at the TAC level (65,000 t.) would have 51% chance of achieving Convention Objectives by 2028, this probability may be improved by the additional measures (*i.e.* FAD moratorium) agreed by the Commission in Rec. 15-01, if they are effective. However, catches around the 2015 level (80000t) has only a 32% probability of $B>B_{MSY}$ by 2028.

The approach to management appears somewhat ponderous and evidence that it will continue to work is limited, preventing a higher score. The system requires re-evaluation and resetting the TAC through Commission recommendations which must be accepted by the contracting parties on each occasion. There is no pre-agreement on how to react to stock changes (picked up by PI 1.2.2 below)

and stock assessments required to evaluate management performance are not frequent given the stock is heavily exploited. Explanations have not been provided for final decisions, so it is difficult to predict how management decisions will respond to changes in status and other factors affecting the stock. It has yet to be shown that the management system can maintain stock at the target level ($B>B_{MSY}$, $F<F_{MSY}$). However, catches have been reduced from around 83,000t in 2011 to 73,000t in 2013, so some control is being implemented and catches had been approaching the required target before an increase to 79,000t in 2015. This is still low compared to historical catches which regularly exceeded 100,000t during the 1990s. Given further assessment, monitoring and action to be taken as required, SG60 is met as the fishery is likely to work if managers follow their own strategy (rebuilding the stock and maintaining catches at F_{MSY}). Evidence is still lacking that the desired outcome will be actually be achieved in practice, so SG80 is not met.

1.2.1.c Harvest strategy monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place that is expected to determine whether the harvest strategy is working.		

Monitoring is adequate to determine whether the harvest strategy is working. The different parts of the strategy include increasing the mean size and holding catches at around the current level or lower. Data are collected to estimate these quantities, although there is considerable uncertainty associated with the accuracy of a large component of the catch monitoring. Also, the stock assessments regularly report estimates of biomass and biomass trend, which indicates whether management is achieving its objectives or not. Therefore, the fishery clearly meets SG60.

1.2.1.d Harvest strategy review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The harvest strategy is periodically reviewed and improved as necessary.

There is no evidence of any formal review of the harvest strategy. Although the harvest strategy is reasonable, there is inadequate information available to indicate what improvements might be possible. The ICCAT performance reviews did specifically address future harvest strategies, but focused on past performance of ICCAT in meeting its objectives. Therefore, the fishery does not meet SG100.

1.2.1.f Review of alternative measures		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biannual** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.

Quantities of discards are routinely reported as part of the catches. Therefore, while bycatch and discarding has been monitored, it is less clear what management actions, if any, have been undertaken to reduce discards of tuna. Discards of all tuna species appear very low, so implicitly no management intervention has been required. Incorporating estimates of discards in catch estimates and the stock assessment amounts to a review of discards generally. However, the SG60 requires a review of "measures" to minimise discarding of the target stock rather than a review of discarding itself. There is no evidence of a formal review of measures to prevent discarding at the RFMO level. If this issue was scored, the fisheries are unlikely to meet SG60 unless a national review has been undertaken for a specific fishery. However, it appears that discards of target tunas are generally considered negligible, and do not form part of the reviews of discarding and bycatch in tuna fisheries. Greater concern applies to landings of unrecorded tuna ("faux poisson") rather than discarding. Therefore, this issue is not scored.

All SG60 were met, but no SG80 or SG100.

PI 1.2.1 : 60

References

ICCAT 2007. Basic Texts. International Commission for the Conservation of Atlantic Tunas. 5th Revision. Madrid, Spain

ICCAT 2015-01. Recommendation by ICCAT on a Multi-annual Conservation and Management Programme for Tropical Tunas http://www.iccat.org/en/RecsRegs.asp

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ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

Spencer, J, J.J. Maguire and E. J. Molenaar. 2016. Report of the Second Independent Performance Review. ICCAT. PLE-103/2016

P.1.2.2 Harvest control rules and tools

1.2.2.a HCRs design and application		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Generally understood HCRs are in place or **available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the maximum sustainable yield level. The intention inferred from the scientific advice and management response is to maintain the stock at or above the MSY level by maintaining the catch rates at or below F_{MSY}. Therefore, the "generally understood" HCR is to set catches low enough that the stock rebuilds to B_{MSY}, and subsequently set future catches so that the stock remains at this level. Precisely how this will be done is unclear and how catches are set taking into account various uncertainties is not defined. The HCR has not been tested in projections as it is too vague. Fixed catches have been tested in projections, but this does not meet requirements of a MSC harvest control rule. Because there is no well-defined HCR, SG80 is not met.

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the maximum sustainable yield level. The intention inferred from the scientific advice and management response is to maintain the stock at or above the MSY level by maintaining the catches at or below F_{MSY}. There is clear evidence of intention to reduce harvest in the face of depletion and the scientific advice has indicated that the current level of control was adequate for the recovery of the yellowfin stock to towards the MSY level. However, it is currently at 95% of B_{MSY}, although increasing. Additionally, how this has been achieved is not well-defined; for example, the TAC has not been adjusted in response to changes in the stock status, although specific limits on the capacity of some fleets has been applied.

Adjustments in the TAC and management measures if the stock came under increased pressure are available, but these actions are not assured. This marginally meets SG60, but not SG80.

The approach to controlling the harvest is broadly the same for yellowfin and bigeye tuna. Both are based on setting TAC to control the exploitation rate.

Past actions show clear evidence of intention to reduce harvest in the face of depletion and the scientific advice has indicated that the current level of control was adequate for the recovery of the bigeye stock to above the MSY level. However, more recently the stock has been reduced below the MSY reference point with fishing mortality being above F_{MSY}. Management has responded in Rec. 15-01 implemented in 2016. But it is not clear to the SCRS whether those measures will be effective; for example, the TAC has not yet been adjusted in response to changes in the stock status, although specific limits on the capacity of some fleets has been applied and there is some evidence that exploitation rate has declined as a result. Adjustments in the TAC and management measures if the stock came under increased pressure are available. If implemented, these are expected to rebuild the stock. This meets SG60.

1.2.2.b HCRs robustness to uncertainty		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.

No well-defined harvest control has been selected, making it difficult to evaluate uncertainties. The current TAC has been set for the period starting in 2016 at 65 000t and forecasts suggest catches at this level would rebuild the stock at MSY levels. One source of uncertainty is implementation error, where TAC is exceeded in practice. Recent catches have significantly exceeded the TAC and at the recent catch level, rebuilding will not be achieved. Therefore SG80 cannot be met.

1.2.2.c HCRs evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

The current level of control, perhaps at least partly through controls placed on capacity, has resulted in sustainable catch levels for bigeye tuna. Individual countries apply quota controls on their own fleets and foreign fleets. Quota is decided upon at the Commission and clearly not all quotas are fully effective. As demonstrated by the implementation of a seasonal closed area, controls other than a TAC are available to control fishing mortality, although the seasonal closure has been shown to be ineffective. If 2015 catches continue, the stock could decrease. The most recent catch estimate for 2016 suggested that catches of bigeye tuna were around 72,000t. Although this is above the TAC, it suggests catches have been reduced since 2015 when catches were around 80,000t. If such reductions can be sustained so that the catches approach the target TAC, the tools in use might be indicated as being appropriate and effective. Without that evidence, SG80 cannot be met.

There are various weaknesses preventing higher scores under this performance indicator. The TAC is shared among many countries and control is not precise. The practice of allowing the carry forward of uncaught allocations in all fisheries effectively decreases the control over fishing mortality. ICCAT has had significant problems in implementing appropriate management measures for other species, indicating a higher risk should apply to all species under its auspices. However, the observed limits and reductions in overall bigeye catch that have been achieved amount to some evidence that tools being used appropriate and effective, meeting the SG60. Conversely, if the management system is unable to achieve the target catch and by extension, the target biomass, then the fishery may fail to meet SG60 in future since the evidence will suggest that the tools in use are not appropriate and/or effective.

All SG60 were met, but no SG80 or SG100.

PI 1.2.2 : 60

References

ICCAT 2015-07. Recommendation by ICCAT on the Development of Harvest Control Rules and of Management Strategy Evaluation http://www.iccat.org/en/RecsRegs.asp

ICCAT 2015-01. Recommendation by ICCAT on a Multi-annual Conservation and Management Programme for Tropical Tunas http://www.iccat.org/en/RecsRegs.asp

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P.1.2.3 Information / monitoring

1.2.3.a Range of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Although data, particularly size data, have been generally poor and ICCAT has had considerable problems in maintaining accurate data in its database, the situation is not so bad for bigeye tuna that stock assessments could not be completed. There is adequate information on stock structure, productivity and the fleets to allow a full stock assessment to be completed. For example, data were adequate to propose and evaluate a seasonal closure to reduce catches of small bigeye.

Furthermore, there is evidence that on-going research and is planned to improve the information available and on-going development of data collection should be adequate to detect and remove problems. The working group has recommended studies on fecundity and maturity and a tuna tagging programme was initiated in 2015. Data from the tagging programme should be available for the 2018 stock assessment.

Sources of errors in data collection are being investigated, leading to further directed research to reduce them. For example, there are on-going developments in the observer scientific data collection protocols for the different fleets, which provide accurate at-sea data. Estimates of catches from some fleets (e.g. Ghana) have clearly improved. These recent improvements result in SG80 being met. But the data are not comprehensive and the suite of information is not fully supportive of the harvest strategy so SG100 is not met.

1.2.3.b Monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.

While far from perfect, monitoring indices are adequate for the harvest strategy. Indicators of stock abundance mainly consist of standardised catch-per-unit-effort indices. Given the large areas of ocean and dispersal of the species, dedicated surveys are not an option for this type of fishery. A single consistent index is not available for the entire time series, but the combined indices do appear to provide a consistent picture of the changes in abundance that have occurred.

For the 2015 stock assessment, updated indices of relative abundance were made available to the Committee, making in total six indices. The Japanese and Chinese Taipei's longline indices account for the longest time series and majority of the catch. The 2016 external review panel noted that generally, ICCAT scores well in terms of agreed forms and protocols for data collection. However, data, especially, on FAD use could be improved in relation to the catch of small bigeye tuna, which is a concern.

SG80 is met because several abundance indicators with wide coverage are monitored regularly, allowing a stock assessment sufficient to support the harvest control rule. However, as noted above, there is not a 'high degree of certainty' in these data sets, nor do they all cover the entire time series, nor is there a full understanding of uncertainties, particularly in historical data, hence SG100 is not met.

1.2.3.c Comprehensiveness of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is good information on all other fishery removals from the stock.	

ICCAT operate a Statistical Document Program through recommendations 01-21 and 01-22, which establish very detailed programs for bigeye tuna and swordfish. Although not perfect, this sort of documentation scheme makes marketing IUU catch more difficult. Otherwise, catch data from some fleets has to be estimated and estimates are poor. ICCAT has demonstrated on-going improvements in obtaining more accurate "Task I" data. Overall, data on total removals from the stock from all significant sources is sufficient for SG80 to be met.

All SG60 and SG80 were met, and 0 out of 2 SG100 were met.

PI 1.2.3 : 80

References

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P.1.2.4 Assessment of stock status

1.2.4.a Appropriateness of assessment to stock under consideration		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.

Various stock assessment models and software were applied consisting of non-equilibrium production models, virtual population analysis and integrated statistical model. All methods and model structures are standard versions used widely in stock assessment, but are structured to take advantage of the available data and attributes of the species. Available software includes a variety of methods also used in tuna and other fisheries. The main advice is obtained from the combination of these models which includes the limited size composition data. Therefore, the assessment is appropriate for the stock, harvest control rule and available data; SG80 is met.

Fishery data is separated out into fleets and standardised, and some work has gone into evaluating growth, stock-recruitment “steepness”, natural mortality rate and other parameters. These various features are covered well in the main assessment models. However, tuna is characterised by its high migration rates which are not explicitly addressed. This is primarily due to the lack of tagging or other spatial data, but the lack of these data are most clearly seen in the stock assessment. Without improvements in spatial and age structured modelling, SG100 is not met.

1.2.4.b Assessment approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	

The stock assessments have been used to estimate the MSY-related reference points, and these have been used to determine stock status. This meets SG80.

1.2.4.c Uncertainty in the assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment **identifies major sources** of uncertainty.	The assessment takes **uncertainty into account.**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.

Stock assessment methods which have been used report uncertainty in estimates of stock status and other values of interest. They attempt to report information in a probabilistic way, but in this respect the assessments are limited. Management advice was developed using a joint distribution of the non-equilibrium production model and the integrated statistical model. Additional uncertainties in growth, stock-recruitment, abundance indices and information sources were explored using sensitivity runs. Therefore, the stock assessment has taken all main sources uncertainty into account, meeting SG80.

Uncertainty estimation used in the advice was based upon the combined biomass dynamics model and integrated statistical model bootstrap projections, which are based on observation error estimates only. Furthermore, while the recommended TAC is based upon the median outcome from model projections, probabilities of being above limit reference points are not reported or used. Given the *ad hoc* approach to quantitative uncertainty estimation and use, SG100 is not met.

1.2.4.d Evaluation of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

The 2015 assessment was conducted using non-equilibrium production model (ASPIC), integrated statistical model (SS3) and virtual population analysis (VPA). Multiple runs were conducted for each model to explore assumptions, which covered a wide range of issues including uncertainties in growth, abundance index selection and data weighting. There remain gaps, a primary issue being missing size and effort information from some fleets. However, the wide range of scenarios explored indicated that the stock assessment was robust and alternative stock assessment approaches have certainly been rigorously explored, meeting SG100.

1.2.4.e Peer review of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

The stock assessment is subject to review through a working group process. SCRS meet annually and review models, data and research on the main tuna species as well as other species within ICCAT jurisdiction. In 2015 an external reviewer was invited to attend and participate in the working group stock assessment meeting. This expert also provided a report of the review to the SCRS at their annual meeting where the assessment was reviewed and management advice was finalized.

All SG60 and SG80 were met, and 2 out of 4 SG100 were met.

PI 1.2.4 : 90

References

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Atlantic Yellowfin

1.1 Outcome

P.1.1.1 Stock Status

1.1.1.a Stock status relative to recruitment impairment.		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.

The best estimate of stock size for 2014 (using 2016 assessment) indicates that the stock is approximately 95% (71-136% CI) of the B_{MSY} level in 2014. The lower 10 percentile estimate is based on joint distributions of age-structured and production model bootstrap. The default value for the PRI is taken here to be 50% of the B_{MSY} level (GSA 2.2.3.1). Therefore, there is at least a 90% probability that the true status of the stock is higher than the point at which there is an appreciable risk of recruitment being impaired. Assuming the estimates are approximately normally distributed, the 95%CI with also exclude the PRI, so the status will meet SG100 (SA2.2.1).

1.1.1.b Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

Based on the 2016 assessment which considers catch, size and effort since the 1950s, it is likely that the stock was below the MSY level in 2014 (95% B_{MSY}), while fishing mortality rate was about 77% of F_{MSY}. Therefore, the stock as of 2014 was rebuilding to take it back to the target level (above B_{MSY}), as reflected in the stock status improvement since the previous assessment in 2011.

Since the last stock assessment (2011), the total catch has remained below the estimated MSY (119,100-151,255 t), varying between 104,528t in 2012 and 96,988t in 2014. The preliminary estimate of the 2016 catches is 127,777t, which is within the lower bounds of the estimated MSY, is an increase on the 2015 catch and above the yellowfin TAC of 110,000t (Rec. 15-01). Importantly projections suggest that there is a declining probability that $B>B_{MSY}$ by 2024 for catches around 130,000t, although it remains well above 50%, and the majority of projections suggest that catches at this level would result in $F>F_{MSY}$.

Given that $F<F_{MSY}$ for more than a generation (4-5 years) and the stock based on projections should have recovered (median $B > B_{MSY}$), the fishery is a candidate for meeting SG80. However, with the most recent increase in catches above this level suggesting that at least in 2016 F_{MSY} may have been exceeded, it cannot be said that the stock is fluctuating around B_{MSY} yet, so SG80 is not met. A stock assessment tentatively planned for 2021 or lower catches in the interim could lead to rescoring to the SG80 level.

All SG60 were met, and 1 out of 2 SG80 were met.

PI 1.1.1 : 70

References

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

P.1.1.2 Stock Rebuilding

1.1.2.a Rebuilding timeframes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
A rebuilding timeframe is specified for the stock that is the **shorter of 20 years or 2 times its generation time**. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.		The shortest practicable rebuilding timeframe is specified which does not exceed **one generation time** for the stock.

A strategy is being applied to achieve the B_{MSY} objective. The main constraint on fishing operations is the requirement to reduce fisheries targeting bigeye tuna. Yellowfin is caught alongside bigeye both

in the surface fisheries (smaller, younger bigeye and yellowfin) and longline. As of 2016 there is a TAC in place to limit catches of yellowfin to 110 000t unallocated by country, with unspecified actions indicated should catches exceed this. Limiting fishing mortality to a level which will allow recovery of bigeye should also help recovery of yellowfin.

Based on simulation modelling and at the recent average levels of catch, the stock should rebuild by 2017 (>60% probability) if catches remain at or below 110,000t, which had been the case from 2010-2015. However, the TAC was exceeded in 2016. Maintaining catch levels at the TAC of 110,000 t is expected to maintain healthy stock status ($B>B_{MSY}$, $F<F_{MSY}$) through 2024 with at least 68% probability, increasing to 97% by 2024. Two generations would be approximately 8.5 years (one generation being approximately 1/0.54 + 2.5 years; MSC CR2.0 Box GSA4). This meets SG60 for a specified time horizon.

Catches have demonstrably remained below the MSY estimate until 2016. Having been below the catch required to rebuild the stock above B_{MSY} based, it is likely that the stock is above B_{MSY}. This was based on a model projection however, and has not yet been confirmed through stock assessment. The stock recovery is not strongly supported by the available abundance indices and there remains uncertainty in the assessment. In addition, the recent increase in catch could reverse the trend if sustained. Therefore, SG100 is not met.

1.1.2.b Rebuilding evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.	There is **evidence** that the rebuilding strategies are rebuilding stocks, **or it is likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.	There is **strong evidence** that the rebuilding strategies are rebuilding stocks, **or it is highly likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.

Data collection supports regular stock assessments which report stock status, providing feedback on whether the harvest strategy is achieving its objectives. Therefore, monitoring is clearly sufficient to indicate whether rebuilding is taking place, which meets SG60.

Based on the stock assessment model projections, exploitation rates or previous quotas, maintaining catch levels at the current TAC of 110,000 t is expected to maintain good stock status ($B>B_{MSY}$, $F<F_{MSY}$) through 2024 with 68% probability in 2017, increasing to 97% by 2024. Even with the higher catch in 2016, assuming some appropriate action is taken in the medium term, the stock size should continue to increase above B_{MSY} to 2020. This meets SG100 as being highly likely.

All SG60, SG80 and SG100 were met

PI 1.1.2 : 100

References

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

1.2 Harvest Strategy (Management)

P.1.2.1 Harvest Strategy

1.2.1.a Harvest strategy design		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.

ICCAT's objective is embedded in the preamble of its Convention finalised in 1966. The preamble states: "The Governments (…) considering their mutual interest in the populations of tuna and tuna-like fishes found in the Atlantic Ocean, and desiring to cooperate in maintaining the populations of these fishes at levels which will permit the maximum sustainable catch for food and other purposes". ICCAT's objective is therefore to maintain populations of tunas and tuna-like fishes at levels that will permit maximum sustainable yield (MSY).

ICCAT, being a regional organisation, provides a forum where the various countries exploiting tunas can work together to implement the strategy to meet this objective. The current strategy is to limit catches to sustainable levels based on a feedback process implemented by the Commission and primarily reduce bycatch of small bigeye and yellowfin tunas. Scientific advice is provided and a TAC with a seasonal closed area agreed through this process, which therefore also includes evaluation of, and adaptation to, changing circumstance.

The 2016 external review panel found that recent changes appear to have been made to the seasonal closure without reference to scientific advice, rendering this management action less effective. The TAC is also not implemented precisely and there has been an overshoot in recent years, although catches are being reduced to the target level. The external review panel indicated that they thought more effective measures were needed to deal with the catch of small bigeye tuna. The Panel noted that, according to the SCRS, the area-time closure has not achieved its objective and therefore its impact on reducing juvenile catches of bigeye and yellowfin, is negligible. The panel recommended that this policy needs to be re-examined and this can, in part, be done through initiatives on limiting the number and use of FADs. Because it has been shown that the seasonal area closures (Rec. 14-01) have not been effective and have been subject to unplanned changes (Rec. 15-01), the strategy cannot have been designed.

For yellowfin, the strategy depends on the relative selectivity of the different fishing methods between yellowfin and bigeye tunas. While multispecies aspects of the catches have been explored in various analyses, there is no cohesive designed strategy to jointly manage these stocks. The reliance is on responding to detected problems rather than designing an approach to optimize the multispecies fisheries. For example, catches have exceeded the TAC in 2016 and there is no predefined plan of action to reduce them.

Therefore, a responsive harvest strategy has been developed that appears to be succeeding in achieving target stock levels, meeting SG80. However, the strategy being partly a side-effect of bigeye management and being relatively imprecise cannot be considered designed and therefore does not meet SG100.

1.2.1.b Harvest strategy evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

In the case of the yellowfin stock, the fishing mortality is constrained by controls primarily intended to limit fishing mortality on bigeye tuna. The assessment showed that the yellowfin stock was slightly overfished moving to fully exploited state. This amounts to some evidence that the harvest strategy has been working and is achieving its objectives, meeting SG80.

The approach to management appears somewhat ponderous and evidence that it will continue to work is limited, preventing a higher score. The system requires re-evaluation and resetting the TAC through Commission recommendations which must be accepted by the contracting parties on each occasion. There is no pre-agreement on how to react to stock changes (picked up by PI 1.2.2 below) and stock assessments required to evaluate management performance are not frequent given the stock is heavily exploited. The next stock assessment for yellowfin is tentatively planned for 2021 which suggests the re-evaluation of management performance is around every 4-5 years.

The most recent evaluation of the stock status was unable to confirm the current expectations, and more broadly, the harvest strategy has only been developed in fairly narrow terms (total catch) and has not yet considered the wider context of the fishery through (for example) management strategy evaluations, so SG100 is not met.

1.2.1.c Harvest strategy monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place that is expected to determine whether the harvest strategy is working.		

Monitoring is adequate to determine whether the harvest strategy is working. The different parts of the strategy include increasing the mean size and holding catches at around the current level or lower. Data are collected to estimate these quantities, although there is considerable uncertainty associated with the accuracy of a large component of the catch monitoring. Also, the stock assessments regularly report estimates of biomass and biomass trend, which indicates whether management is achieving its objectives or not. Therefore, the fishery clearly meets SG60.

1.2.1.d Harvest strategy review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The harvest strategy is periodically reviewed and improved as necessary.

There is no evidence of any formal review of the harvest strategy. Although the harvest strategy is reasonable, there is inadequate information available to indicate what improvements might be

possible. The ICCAT performance reviews did specifically address future harvest strategies, but focused on past performance of ICCAT in meeting its objectives. Therefore, the fishery does not meet SG100.

1.2.1.f Review of alternative measures		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biannual** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.

Quantities of discards are routinely reported as part of the catches. Therefore, while bycatch and discarding has been monitored, it is less clear what management actions, if any, have been undertaken to reduce discards of tuna. Discards of all tuna species appear very low, so implicitly no management intervention has been required. Incorporating estimates of discards in catch estimates and the stock assessment amounts to a review of discards generally. However, the SG60 requires a review of "measures" to minimise discarding of the target stock rather than a review of discarding itself. There is no evidence of a formal review of measures to prevent discarding at the RFMO level. If this issue was scored, the fisheries are unlikely to meet SG60 unless a national review has been undertaken for a specific fishery. However, it appears that discards of target tunas are generally considered negligible, and do not form part of the reviews of discarding and bycatch in tuna fisheries. Greater concern applies to landings of unrecorded tuna ("faux poisson") rather than discarding. Therefore, this issue is not scored.

All SG60 and SG80 were met, and 0 out of 3 SG100 were met.

PI 1.2.1 : 80

References

ICCAT 2007. Basic Texts. International Commission for the Conservation of Atlantic Tunas. 5th Revision. Madrid, Spain

ICCAT 2015-01. Recommendation by ICCAT on a Multi-annual Conservation and Management Programme for Tropical Tunas http://www.iccat.org/en/RecsRegs.asp

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Spencer, J, J.J. Maguire and E. J. Molenaar. 2016. Report of the Second Independent Performance Review. ICCAT. PLE-103/2016

P.1.2.2 Harvest control rules and tools

1.2.2.a HCRs design and application		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Generally understood HCRs are in place or **available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the maximum sustainable yield level. The intention inferred from the scientific advice and management response is to maintain the stock at or above the MSY level by maintaining the catch rates at or below F_{MSY}. Therefore, the "generally understood" HCR is to set catches low enough that the stock rebuilds to B_{MSY}, and subsequently set future catches so that the stock remains at this level. Precisely how this will be done is unclear and how catches are set taking into account various uncertainties is not defined. The HCR has not been tested in projections as it is too vague. Fixed catches have been tested in projections, but this does not meet requirements of a MSC harvest control rule. Because there is no well-defined HCR, SG80 is not met.

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the maximum sustainable yield level. The intention inferred from the scientific advice and management response is to maintain the stock at or above the MSY level by maintaining the catches at or below F_{MSY}. There is clear evidence of intention to reduce harvest in the face of depletion and the scientific advice has indicated that the current level of control was adequate for the recovery of the yellowfin stock to towards the MSY level. However, it is currently at 95% of B_{MSY}, although increasing. Additionally, how this has been achieved is not well-defined; for example, the TAC has not been adjusted in response to changes in the stock status, although specific limits on the capacity of some fleets has been applied.

Adjustments in the TAC and management measures if the stock came under increased pressure are available, but these actions are not assured. This marginally meets SG60, but not SG80.

It is also not clear how levels of yellowfin or skipjack catch relate to the target catch for bigeye or what would be done if a higher fishing mortality could be directed at yellowfin and skipjack.

The approach to controlling the harvest is broadly the same for yellowfin and bigeye tuna. Both are based on setting TAC to control the exploitation rate.

Past actions show clear evidence of intention to reduce harvest in the face of depletion and the scientific advice has indicated that the current level of control was adequate for the recovery of the bigeye stock to above the MSY level. However, more recently the stock has been reduced below the MSY reference point with fishing mortality being above F_{MSY}. Management has responded in Rec. 15-01 implemented in 2016. But it is not clear to the SCRS whether those measures will be effective; for example, the TAC has not yet been adjusted in response to changes in the stock status, although specific limits on the capacity of some fleets has been applied and there is some evidence that exploitation rate has declined as a result. Adjustments in the TAC and management measures if the stock came under increased pressure are available. If implemented, these are expected to rebuild the stock. This meets SG60.

1.2.2.b HCRs robustness to uncertainty		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.

It is not possible to evaluate the harvest control in relation to uncertainties, because it has not been defined well enough to do so. The current TAC has been set for the period starting in 2016 at 110,000t, but was exceeded in 2016. While there is commitment to action of some sort should the TAC be exceeded, nothing has been specified. Therefore SG80 cannot be met.

1.2.2.c HCRs evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

The current level of control, mainly through limits on fishing capacity and a catch limit (110,000 t), has resulted in sustainable catch levels for yellowfin tuna. In 1993, the Commission recommended "that there be no increase in the level of effective fishing effort exerted on Atlantic yellowfin tuna, over the level observed in 1992". As measured by fishing mortality estimates from the 2016 stock assessment, effective effort in 2014 appeared to be well below (about 25-30% below) the 1992 levels, and there has been a declining trend in recent years.

Individual countries apply quota controls on their own and foreign fleets, which limits effective fishing effort on yellowfin in the surface and longline fisheries, although there is no quota allocation scheme as used for bigeye. If current yellowfin catches continue the stock should increase in size and the fishery objectives should be met. Other tools are available in the form of seasonal closed areas. Overall, the tools appear to have been effective in controlling exploitation, meeting SG60. This evidence is limited, however, since it is not clear how much this is a result of the side effect of controls on bigeye tuna. If catches of bigeye rise again, it is not clear that yellowfin catches would still maintain the biomass at the target level and without a quota allocation scheme, overshooting the TAC appears more likely. Therefore, SG80 is not met.

All SG60 were met, but no SG80 or SG100.

PI 1.2.2 : 60

References

ICCAT 2015-04. Recommendation by ICCAT to Establish Harvest Control Rules for the North Atlantic Albacore Stock http://www.iccat.org/en/RecsRegs.asp

ICCAT 2015-07. Recommendation by ICCAT on the Development of Harvest Control Rules and of Management Strategy Evaluation http://www.iccat.org/en/RecsRegs.asp

ICCAT 2015-01. Recommendation by ICCAT on a Multi-annual Conservation and Management Programme for Tropical Tunas http://www.iccat.org/en/RecsRegs.asp

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Spencer, J, J.J. Maguire and E. J. Molenaar. 2016. Report of the Second Independent Performance Review. ICCAT. PLE-103/2016

P.1.2.3 Information / monitoring

1.2.3.a Range of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Although data from some fleets have been generally poor and ICCAT has had considerable problems in maintaining accurate data in its database, there have been significant improvements over time. For yellowfin tuna, the data were sufficient for a stock assessment with several approaches possible. Overall, there was adequate information on stock structure, productivity and the fishing fleets to allow a full stock assessment to be completed

There is evidence that on-going research is planned to improve information and therefore the stock assessment. This suggests that on-going development of data collection is adequate to detect and remove problems over time. The working group has recommended studies on fecundity and maturity and a tagging program was initiated in 2015, although not all these have not been directed at yellowfin. This demonstrates progress in data collection and research. Various scientific studies using available data are regularly presented at ICCAT scientific meetings. Sources of errors in data collection are being investigated, leading to further directed research to reduce them. There is evidence that data are being corrected and updated.

While information is sufficient for stock assessment, it is not comprehensive. There is considerable environmental data not directly used in the current harvest strategy, but data on growth, age, mortality and abundance are limited and understanding of the population dynamics is incomplete compared to other stocks. These gaps are recognized and, although there have been improvements, the Working Group indicated a need to increase biological studies of yellowfin. With significant gaps, the fisheries cannot meet SG100.

1.2.3.b Monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.

Monitoring indices are adequate for the current harvest control rule. Indicators of stock abundance mainly consist of standardized catch-per-unit-effort indices. Given the large areas of ocean and dispersal of the species, dedicated surveys are not an option for this type of fishery. Two abundance indices are available for the entire time series covering the majority range of the stock. The Japanese and Chinese Taipei's longline indices account for the longest time series and majority of the catch. The 2009 external review panel recommended, among other things, that efforts continue to be made to improve the timeliness and accuracy of fisheries data and progress on this was confirmed by the 2016 review panel, which believed that ICCAT scores well on data reporting for the target stocks.

This accuracy and coverage of the monitoring program is adequate for the limited current harvest control rule (see PI 1.2.2), and available indicators would also support better defined rules based on fishing mortality and biomass estimates. Therefore, the fisheries meet SG80. The monitoring does not cover all information, and not all information from all fleets is recorded with a high degree of certainty. Uncertainties are known to occur from many sources, but their precise nature is also not known. For example, landings rejected by canneries and sold in local West African markets ("*faux poisson*") since 1980s consist of many species and sizes, and yellowfin tuna sold this way can only be estimated approximately. Therefore, the fisheries do not meet SG100.

1.2.3.c Comprehensiveness of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is good information on all other fishery removals from the stock.	

ICCAT has put considerable effort in getting countries to record and report catches. The current level of reporting is far from perfect given the number of small countries involved and difficulties in monitoring small vessels and activities in oceanic waters well away from the coast. This illustrates the on-going problems ICCAT faces with the contracting parties. Nevertheless, catches are recorded increasingly well with decreasing IUU fishing activity, and data are sufficiently well recorded in the most part for the stock assessment and for assessing the level of control sought by ICCAT over landed catches. This meets SG80.

All SG60 and SG80 were met, and 0 out of 2 SG100 were met.

PI 1.2.3 : 80

References

ICCAT 2015. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 28 September to 2 October 2015

ICCAT 2015. Report of the 2015 ICCAT Bigeye Tuna Stock Assessment Session (Madrid, Spain July 13 to 17, 2015

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Spencer, J, J.J. Maguire and E. J. Molenaar. 2016. Report of the Second Independent Performance Review. ICCAT. PLE-103/2016

P.1.2.4 Assessment of stock status

1.2.4.a Appropriateness of assessment to stock under consideration		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.

Various stock assessment models and software were applied in the most recent 2016 assessment. All methods and model structures were standard models used in other fisheries, but were structured to take advantage of the available data and biology of yellowfin. Available software includes a variety of methods also used in other tuna fisheries and for other national stocks (including stock synthesis, VPA, age-aggregated and age-specific production models). Results from these stock assessment models were combined to formulate the main advice.

The stock assessment has not been carried out frequently, considering the stock is rebuilding from below the MSY level. However, this frequency is still consistent with the current harvest control rule.

The assessment attempts to account for some features of the species biology and the fishery, but the approach remains broadly generic, meeting SG80, but not SG100. Improved information on the biology from, for example, tagging studies, will lead to an improved assessment and could meet SG100, particularly if spatial characteristics of the stock can be accounted for. Fishery data is separated out into fleets and standardised, and some effort has gone into evaluating growth, steepness, natural mortality rate and other parameters.

1.2.4.b Assessment approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	

The stock assessments have been used to estimate the MSY-related reference points, and these have been used to determine stock status. This meets SG80.

1.2.4.c Uncertainty in the assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment **identifies major sources** of uncertainty.	The assessment takes **uncertainty into account.**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.

The 2016 assessment was conducted applying three age-structured models and a non-equilibrium production model to the available catch data through 2014. As has been done in previous stock assessments, stock status was evaluated using both surplus production and age-structured models.

Models used to develop management advice considered two primary sources of scientific uncertainty, the use of index clusters that reflect two disparate hypotheses regarding trends in abundance of yellowfin tuna, and alternative model structures as implemented using four model platforms which weight and use data differently. Surplus production models that used Cluster 2 indices did not converge and were not considered.

Management advice was developed using a joint distribution of the results of seven models, which were weighted equally. Additional uncertainties in growth, age-slicing, mortality, index selection and data weighting were explored in sensitivity runs. This takes accounts for the identified major sources of uncertainty and fully takes account of uncertainty in the advice to management, meeting SG80. However, combining entirely different assessment models in this way is not a consistent approach to estimating probabilities, and perhaps indicates a lack of consensus over appropriate model structures and formulations. Given further work is probably required to obtain good quantitative estimates of uncertainty, SG100 is not met.

1.2.4.d Evaluation of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

The 2016 assessment was conducted applying three age-structured models and a non-equilibrium production model to the available catch data through 2014. As has been done in previous stock assessments, stock status was evaluated using both surplus production and age-structured models. Given the wide range of models applied and additional sensitivity runs carried out, the model results

were shown to be robust to uncertainty. In addition, a wide range of alternative hypotheses and model structures were explored, meeting SG100

1.2.4.e Peer review of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

The stock assessment is subject to review through a working group process. SCRS meet annually and review models, data and research on the main tuna species, as well as other species within ICCAT jurisdiction. No external review appears to have taken place for the most recent (2016) assessment It is planned that the Working Group on Stock Assessment Methods will have invited experts and external reviewers. Because there is clearly a review process through the working group system, SG80 is met. However, external does not appear to have been completed for this stock, so SG100 is not met.

All SG60 and SG80 were met, and 1 out of 4 SG100 were met.

PI 1.2.4 : 85

References

ICCAT 2016. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 3 to 7 October 2016

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East Atlantic Skipjack

1.1 Outcome

P.1.1.1 Stock Status

1.1.1.a Stock status relative to recruitment impairment.		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.

The best estimate of the Eastern Atlantic skipjack stock size (2014 assessment) indicates that the stock was most likely above the B_{MSY} level in 2013, which was highly likely to be above the point where recruitment would be impaired – the default value for this being around 50% of the B_{MSY} level. This meets SG80.

However, there is considerable uncertainty over the information used in the determination of stock status. The SCRS believed that it was not in a position to provide a reliable estimate of the maximum sustainable yield and therefore nor provide advice on the state of the eastern stock beyond general

observation that biomass was likely to be above MSY point (and therefore highly likely to be above PRI) even though the biology and dynamics of skipjack suggest inherent resilience skipjack stocks. In addition, since 2012, catches have been between 200,000 and 220,000t, above the MSY estimate (140,000-170,000t), which suggests that the stock will be declining, decreasing the probability of it being above any limit reference point. As a result it is not possible to state that there is a high degree of certainty recruitment is not impaired so that SG100 is not met.

1.1.1.b Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

Based on the 2014 assessment which considers catch and effort since the 1950s, it is likely that the Eastern skipjack stock was above the maximum sustainable yield (MSY) level in 2012. Therefore, based on the available information, the stock appears to be within its target region, above B_{MSY}, and has been since data has been recorded for this fishery. This meets SG80.

However, since 2012, catches have been between 200,000 and 220,000t, above the MSY estimate (140,000-170,000t), which suggests that the stock will be declining, decreasing the probability of it being above MSY. Without further information and with catches above MSY, the fisheries could fail this scoring issue. The next stock assessment is due in 2019, which would need to more clearly demonstrate the stock is at or above MSY to continue to meet SG80.

The stock assessment and the data on which it is based are not reliable enough to indicate there is a high degree of certainty the stock is above B_{MSY}, so SG100 is not met.

All SG60 and SG80 were met, and 0 out of 2 SG100 were met.

PI 1.1.1 : 80

References

ICCAT 2014a. Report of the 2014 ICCAT East and West Atlantic Skipjack Stock Assessment Meeting. Dakar, Senegal - June 23 to July 1, 2014

ICCAT 2016. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 3 to 7 October 2016

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

1.2 Harvest Strategy (Management)

P.1.2.1 Harvest Strategy

1.2.1.a Harvest strategy design		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.

ICCAT's objective is embedded in the preamble of its Convention finalised in 1966. The preamble states: "The Governments (…) considering their mutual interest in the populations of tuna and tuna-like fishes found in the Atlantic Ocean, and desiring to cooperate in maintaining the populations of these fishes at levels which will permit the maximum sustainable catch for food and other purposes". ICCAT's objective is therefore to maintain populations of tunas and tuna-like fishes at levels that will permit maximum sustainable yield (MSY).

The current hypothesis of two independent skipjack stocks (East and West) may be adequate for current management purposes, but the stock fishery indicators, and probably future stock assessments, may be improved if based on smaller more homogeneous areas.

The current strategy relevant to skipjack is to limit catches to sustainable levels based on a feedback process implemented by the Commission and to reduce bycatch of small bigeye tunas. There is currently no specific regulation in effect for skipjack tuna. Because the Eastern stock status was considered above the MSY reference point, no management recommendations were made by the Scientific Committee except catches should not be allowed to exceed the level of catch in recent years. Currently catches are estimated to be below MSY, and are constrained by controls on bigeye bycatch. Skipjack is notably caught with juvenile yellowfin and bigeye on FADs, which are being subject to further controls.

Although a side-effect of controls on bigeye tuna catches, the harvest strategy appears to have been effective so far for skipjack. It is consistent with the multispecies nature of much of these fisheries, and appears likely to continue to achieve management objectives, meeting SG60. Although more advanced than the Western skipjack harvest strategy, it still has a number of anomalies making it difficult to see how the different elements work together. The seasonal closure has changed to cover only 7.5% of the historical purse seine catch and the closure was originally changed without scientific advice. Furthermore, there is no specific skipjack control such as a TAC, the assumption being that controls on bycatch are adequate. Catches over the last 5 years have increased possibly by more fisheries directed at skipjack due to increase in prices. Recent catch levels may be unsustainable in the longer term and further action by management may be expected in 2019, when the next stock assessment is due. More directed feedback and control will be required to meet SG80.

1.2.1.b Harvest strategy evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

In the case of the Eastern skipjack stock, the most recent assessment showed that the skipjack stock is unlikely to be overfished. Monitoring of catches and fishing effort and size composition is in place. Evidence exists that the current constraints on fishing mortality (limits on effective fishing effort and other controls) are probably adequate to maintain the stock above B_{MSY} if appropriate action is taken in future and appropriate controls on FADs implemented. This meets the SG60.

However, recent catches have exceeded 200,000 t, whereas the scientific advice suggests that MSY is in excess of previous estimates of (143-170,000 t), but is very uncertain. A stock assessment will be required to confirm current stock status, and this is not due until 2019. Evidence of a strategy to achieve MSY is not there yet, so SG80 is not met.

1.2.1.c Harvest strategy monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place that is expected to determine whether the harvest strategy is working.		

Monitoring is adequate to determine whether the harvest strategy is working. Although the strategy is largely dependent on the bigeye and yellowfin harvest strategy, skipjack mean size and catch are monitored, which allows the effects of the harvest strategy on skipjack to be monitored. Data are collected to estimate these quantities. Also the stock assessment reports best estimates of biomass, which indicates whether management is achieving its objectives or not. Therefore, the fishery clearly meets SG60.

1.2.1.d Harvest strategy review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The harvest strategy is periodically reviewed and improved as necessary.

There is no evidence of any formal review of the harvest strategy. Although the harvest strategy is reasonable, there is inadequate information available to indicate what improvements might be possible. The ICCAT performance reviews did specifically address future harvest strategies, but focused on past performance of ICCAT in meeting its objectives. Therefore, the fishery does not meet SG100.

1.2.1.f Review of alternative measures		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biannual** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.

Quantities of discards are routinely reported as part of the catches. Therefore, while bycatch and discarding has been monitored, it is less clear what management actions, if any, have been undertaken to reduce discards of tuna. Discards of all tuna species appear very low, so implicitly no management intervention has been required. Incorporating estimates of discards in catch estimates and the stock assessment amounts to a review of discards generally. However, the SG60 requires a review of "measures" to minimise discarding of the target stock rather than a review of discarding itself. There is no evidence of a formal review of measures to prevent discarding at the RFMO level. If this issue was scored, the fisheries are unlikely to meet SG60 unless a national review has been undertaken for a specific fishery. However, it appears that discards of target tunas are generally considered negligible, and do not form part of the reviews of discarding and bycatch in tuna fisheries. Greater concern applies to landings of unrecorded tuna ("faux poisson") rather than discarding. Therefore, this issue is not scored.

All SG60 were met, but no SG80 or SG100.

PI 1.2.1 : 60

References

ICCAT 2007. Basic Texts. International Commission for the Conservation of Atlantic Tunas. 5th Revision. Madrid, Spain

ICCAT 2014a. Report of the 2014 ICCAT East and West Atlantic Skipjack Stock Assessment Meeting. Dakar, Senegal - June 23 to July 1, 2014

ICCAT 2015-01. Recommendation by ICCAT on a Multi-annual Conservation and Management Programme for Tropical Tunas http://www.iccat.org/en/RecsRegs.asp

ICCAT 2015. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 28 September to 2 October 2015

ICCAT 2016. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 3 to 7 October 2016

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

Spencer, J, J.J. Maguire and E. J. Molenaar. 2016. Report of the Second Independent Performance Review. ICCAT. PLE-103/2016

P.1.2.2 Harvest control rules and tools

1.2.2.a HCRs design and application		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Generally understood HCRs are in place or **available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the maximum sustainable yield level. The intention inferred from the scientific advice and management response is to maintain the stock at or above the MSY level by maintaining the catch rates at or below F_{MSY}. Therefore, the "generally understood" HCR is to set catches low enough that the stock rebuilds to B_{MSY}, and subsequently set future catches so that the stock remains at this level. Precisely how this will be done is unclear and how catches are set taking into account various uncertainties is not defined. The HCR has not been tested in projections as it is too vague. Fixed catches have been tested in projections, but this does not meet requirements of a MSC harvest control rule. Because there is no well-defined HCR, SG80 is not met.

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the maximum sustainable yield level. The intention inferred from the scientific advice and management response is to maintain the stock at or above the MSY level by maintaining the catches at or below F_{MSY}. There is clear evidence of intention to reduce harvest in the face of depletion and the scientific advice has indicated that the current level of control was adequate for the recovery of the yellowfin stock to towards the MSY level. However, it is currently at 95% of B_{MSY}, although increasing. Additionally, how this has been achieved is not well-defined; for example, the TAC has not been adjusted in response to changes in the stock status, although specific limits on the capacity of some fleets has been applied.

Adjustments in the TAC and management measures if the stock came under increased pressure are available, but these actions are not assured. This marginally meets SG60, but not SG80.

It is also not clear how levels of yellowfin or skipjack catch relate to the target catch for bigeye or what would be done if a higher fishing mortality could be directed at yellowfin and skipjack.

Adjustments in the TAC and management measures if the stock came under increased pressure are available, but these actions are not assured. Recent conservation measures have been extended to Eastern Atlantic skipjack (Rec. 15-01). This marginally meets SG60.

1.2.2.b HCRs robustness to uncertainty		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.

It is not possible to evaluate the harvest control in relation to uncertainties, because it has not been defined well enough to do so.

1.2.2.c HCRs evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

The current level of control, mainly through limits on fishing capacity and a bigeye tuna catch limit, has resulted in sustainable catch levels for skipjack tuna until recent years. There has so far been relatively little pressure on this stock compared to the more valuable tunas. Evidence is therefore limited to controls which could be placed on this species should this become necessary, and the proven ability of contracting parties to apply these limits.

The tools appear to have been effective in controlling exploitation, meeting SG60, although this is becoming increasingly difficult to argue with increasing catches. This evidence is limited to observing the outcomes, so that not all available controls have been tested, and therefore SG80 is not met.

All SG60 were met, but no SG80 or SG100.

PI 1.2.2 : 60

References

ICCAT 2015-07. Recommendation by ICCAT on the Development of Harvest Control Rules and of Management Strategy Evaluation http://www.iccat.org/en/RecsRegs.asp

ICCAT 2015-01. Recommendation by ICCAT on a Multi-annual Conservation and Management Programme for Tropical Tunas http://www.iccat.org/en/RecsRegs.asp

ICCAT 2015. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 28 September to 2 October 2015

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ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

Spencer, J, J.J. Maguire and E. J. Molenaar. 2016. Report of the Second Independent Performance Review. ICCAT. PLE-103/2016

P.1.2.3 Information / monitoring

1.2.3.a Range of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Initial studies including tagging and others provide information related to stock structure. Basic biology of skipjack assists understanding of stock productivity. Fleets are monitored. These data are available to support the strategy. SG60 is met.

The external review panels were concerned that there appears to be little knowledge and information on skipjack tuna. Data have been generally poor and ICCAT has had considerable problems in maintaining accurate data in its database. In the case of skipjack, data limitations are significant enough to prevent quality stock assessments from being carried out.

The current hypothesis of two independent skipjack stocks (East and West) is probably adequate for current management purposes, but the stock fishery indicators, and probably future stock assessments, may be improved if based on smaller, more homogeneous areas.

There is evidence that on-going research is planned to improve information and therefore the stock assessment. This suggests that on-going development of data collection should be adequate to detect and remove problems in the long term.

Data exist on fleets, catches, catch and fishing effort, size composition of the catch and stock structure (tagging). There is adequate information on the fleets, but information on stock structure and productivity seems to be a limiting factor for this stock.

The scientific working group appears to believe, among other things, that the Eastern stock comprises a series of sub-stocks for which the structure is not well understood. Dividing the data into more homogenous consistent sets may improve assessments, but may also exacerbate problems with errors and data absence. The lack of a generally accepted stock assessment underlines these problems. Collectively, these are the reasons SG80 is not met.

1.2.3.b Monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.

Fishery removals are monitored at a level consistent with the harvest control rule. The abundance monitoring indices are very imprecise. The external review panel recommended, among other things, that efforts continue to be made to improve the timeliness and accuracy of fisheries data. Indicators of stock abundance mainly consist of a number of standardized catch-per-unit-effort indices. Given the large areas of ocean and dispersal of the species, dedicated surveys are not an option for this type of fishery. There were a number of abundance indices available from bait boats and purse seine catch and effort. However, the skipjack fishery has changed significantly since the early 1990s (progressive use of FADs and the increase of the fishing area towards the west and north), which has most likely increased catchability. In addition, effort directed at catching skipjack is not well recorded. This makes it difficult to use these data for reliable abundance indices.

This accuracy and coverage of the monitoring program is still adequate for a harvest control rule for this stock (see PI 1.2.2); at least for as long as exploitation levels remain relatively low (because of the low precision with which stock status is determined), meeting SG60. The SCRS committee has expressed concern that skipjack in particular has been under-reported and this could affect the perception of the status of the stock. Therefore, with recent sustained higher exploitation, the fisheries will need to develop more accurate abundance indices and catches measures to meet SG80.

The monitoring does not cover all information, and not all information from all fleets is recorded with a high degree of certainty. For example, landings rejected by canneries and sold in local West African markets (“faux poisson”) since 1980s consist of many species and sizes, and skipjack tuna sold this way can only be estimated approximately. Therefore, the fisheries cannot meet SG100.

1.2.3.c Comprehensiveness of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is good information on all other fishery removals from the stock.	

ICCAT has put considerable effort in getting countries to record and report catches. The current level of reporting is far from perfect given the number of small countries involved and difficulties in monitoring small vessels and activities in oceanic waters well away from the coast. This illustrates the on-going problems ICCAT faces with the contracting parties. Nevertheless, catches are recorded increasingly well with decreasing IUU fishing activity, and data are sufficiently well recorded in the

most part for the stock assessment and for assessing the level of control sought by ICCAT over landed catches. This meets SG80.

All SG60 were met, and 1 out of 3 SG80 were met.

PI 1.2.3 : 65

References

ICCAT 2014a. Report of the 2014 ICCAT East and West Atlantic Skipjack Stock Assessment Meeting. Dakar, Senegal - June 23 to July 1, 2014

ICCAT 2016. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 3 to 7 October 2016

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

Spencer, J, J.J. Maguire and E. J. Molenaar. 2016. Report of the Second Independent Performance Review. ICCAT. PLE-103/2016

P.1.2.4 Assessment of stock status

1.2.4.a Appropriateness of assessment to stock under consideration		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.

Various stock assessment models and software have been applied, but none fitted the data sufficiently well to provide precise management advice. All methods and model structures were generic, but are structured to take advantage of the available data. Available software includes a variety of methods also used in other tuna fisheries and for other national stocks (catch-only production model, Bayesian biomass dynamics models and length based methods). Although there were problems with the assessments, these were probably due to problems with the data and treatment of data rather than the assessment methods themselves (see PI 1.2.3). As well as stock assessment modelling, more general assessment of indicators such as mean size and catch rates do not indicate that the stock is currently overexploited. The assessment has attempted to account for some features of the species biology and the fishery, but approaches remain broadly generic, and have not taken into account major features of the biology. However, the approaches being developed are appropriate to this species and should be able to support the type of harvest control rule being considered, meeting SG80. However, the stock structure and other major biological features which affect the assessment have not satisfactorily been addressed, so SG100 is not achieved.

1.2.4.b Assessment approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	

While previously, imprecise determinations of stock status have been adequate, increased levels of catch suggest risks are increasing, making this increasingly difficult to justify. The lack of a reliable fit of a stock assessment model suggests that the current determination of stock status is no longer appropriate. Catches since 2012 have exceeded 200 000t, and the provision catch estimate for 2016 was around 217 000t. This compares to the previous MSY estimate of 143 000-170 000t. While the SCRS considers the MSY is likely an underestimate and that the stock is above B_{MSY}, the stock appears to be exploited now to a level where risks of undetected overexploitation are no longer negligible. The next stock assessment is due in 2019.

The general approach to assessment is probably appropriate if the data are sufficient and are interpreted correctly. This is adequate to give a general determination of stock status relative to generic reference points, meeting SG60. However, MSY reference points have not been estimated with any confidence, perhaps partly because the assessment is not appropriately aligned with stock structure. Therefore, the stock assessment approach is not now appropriate for this stock, and does not meet SG80.

1.2.4.c Uncertainty in the assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment **identifies major sources** of uncertainty.	The assessment takes **uncertainty into account.**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.

The assessments undertaken include fully stochastic (Bayesian) methods, and results are reported along with other assessment approaches. It is recognition of the uncertainty that prevents precise management advice for this stock. However, although the models would allow stock status to be evaluated probabilistically, it is not clear that explicit consideration of risk is included in management decision making and no explicit reference is made to levels of risk in scientific advice beyond a vague reference to the likely stock status. Therefore uncertainty is taken into account, meeting SG80, but the quantitative probabilities that could be generated are not reported and not used, so that SG100 is not met.

1.2.4.d Evaluation of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

Alternative software has been applied to the available data, although this falls short of a rigorous exploration of alternative hypotheses and approaches to assessment. Most of these assessments were exploratory and only preliminary results were available. There are recommendations to continue work on developing improved statistical models. The assessment models that have been tried have not been robust. This does not meet SG100.

1.2.4.e Peer review of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

The stock assessment is subject to review through a working group process. SCRS meet annually and review models, data and research on the main tuna species as well as other species within ICCAT jurisdiction. In addition, an external technical reviewer attended the last stock assessment workshop, so both SG80 and SG100, are met.

All SG60 were met, and 3 out of 4 SG80 were met.

PI 1.2.4 : 75

References

ICCAT 2014a. Report of the 2014 ICCAT East and West Atlantic Skipjack Stock Assessment Meeting. Dakar, Senegal - June 23 to July 1, 2014

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

West Atlantic Skipjack

1.1 Outcome

P.1.1.1 Stock Status

1.1.1.a Stock status relative to recruitment impairment.		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.

The best estimate of the Western Atlantic skipjack stock size (2014 assessment) indicates that the stock was most likely above the B_{MSY} level in 2013, which is highly likely to be above the point where recruitment would be impaired – the default value for this being around 50% of the B_{MSY} level. This meets SG80.

However, there is considerable uncertainty over the information used in the stock assessment. For example, the stock structure remains uncertain even though the biology and dynamics of skipjack suggest inherent resilience skipjack stocks. As a result, it is not possible to state that there is a high degree of certainty that recruitment is not impaired so that SG100 is not met.

1.1.1.b Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

Based on the 2014 assessment which considers catch and effort since the 1950s, it is likely that the Western skipjack stock was above the maximum sustainable yield (MSY) level in 2013. Overall the various assessment models results indicate that the stock is unlikely to be overexploited. For the apparently most favoured assessment model (ASPIC), biomass relative to B_{MSY} at the beginning of 2014 was estimated to be 1.28 (1.21-1.33) and the fishing mortality in 2013 relative to F_{MSY} to be 0.69 (0.64-0.76). More broadly, none of the available stock status indicators suggest that this stock is below MSY and catches since 2013 have been below the MSY level (30 000t). Therefore, based on the available information, the stock appears to be within its target region, above B_{MSY}, and has been since data has been recorded for this fishery. This meets SG80.

The stock assessment and the data on which it is based are not reliable enough to indicate there is a high degree of certainty the stock is above B_{MSY}. Therefore, SG100 is not met.

All SG60 and SG80 were met, and 0 out of 2 SG100 were met.

PI 1.1.1 : 80

References

ICCAT 2014a. Report of the 2014 ICCAT East and West Atlantic Skipjack Stock Assessment Meeting. Dakar, Senegal - June 23 to July 1, 2014

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

1.2 Harvest Strategy (Management)

P.1.2.1 Harvest Strategy

1.2.1.a Harvest strategy design		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.

ICCAT's objective is embedded in the preamble of its Convention finalised in 1966. The preamble states: "The Governments (…) considering their mutual interest in the populations of tuna and tuna-like fishes found in the Atlantic Ocean, and desiring to cooperate in maintaining the populations of these fishes at levels which will permit the maximum sustainable catch for food and other purposes". ICCAT's objective is therefore to maintain populations of tunas and tuna-like fishes at levels that will permit maximum sustainable yield (MSY).

The current strategy relevant to skipjack is to limit catches to sustainable levels based on a feedback process implemented by the Commission and to reduce bycatch of small bigeye tunas. There is currently no specific regulation in effect for skipjack tuna. Because the Western stock status was considered above the MSY reference point, no management recommendations were made by the Scientific Committee except that catches should not be allowed to exceed MSY. Between 2001 and 2010, catches have been reported as below 30 000t, a conservative estimate of the MSY. Catches in 2011-2013 exceeded 30 000t while 2014 and 2014 are below that. Yet the estimated fishing mortality was below F_{MSY}. Catches above the replacement yield should lead to a decline in biomass towards the MSY level. Even with a decline in stock size, it will likely be several years before the stock approaches the MSY level, if the stock assessment is correct. The Committee also indicated that increasing harvests and fishing effort for skipjack could lead to consequences for the management of other species that are harvested in combination with skipjack in some fisheries (e.g. yellowfin in the Venezuelan purse seine fishery). There appears to be no strategy to manage this for the Western stock.

The Western skipjack stock does not appear to have been a priority for ICCAT, and the current management objectives beyond those defined by the Convention are vague. Western Atlantic skipjack was not included in the 2015 recommendation (Rec. 15-01). Limits on fisheries catching bigeye probably do not apply to the Western skipjack stock. Without the limits on fleet activity created by bigeye tuna management recommendations which apply to the Eastern stock, there appears to be little in terms of strategy for Western stock beyond management responses which

might be expected rather than demonstrated. However, it has been agreed to develop harvest control rules for skipjack stocks and some work has been conducted towards this end, but as yet no strategy has been determined.

The stock status is above B_{MSY} therefore it is understandable that there has been a lack of management measures as of yet. Essentially, the basis of the harvest strategy is monitoring and stock assessment, with the ability to take action if necessary, i.e. those mechanisms are available. This marginally meets SG60. But without clear evidence for a coordinated harvest strategy directed at Western skipjack, SG80 cannot be met.

1.2.1.b Harvest strategy evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

In the case of the western skipjack stock, the fishing mortality is constrained by fishery capacity and availability of bait. The assessment showed that the skipjack stock is very unlikely to be overfished, but the stock may continue to decline towards the MSY level. Monitoring of catches and fishing effort and size composition is in place. The recent catches 2014-2016 have been between 20 000t and 29 000t, whereas the MSY is 30-32,000 t. Thus, evidence exists that the current constraints on fishing mortality are probably adequate to maintain the stock above B_{MSY}. This meets SG80.

The harvest strategy is not well-defined and has not been evaluated. The stock size is uncertain relative to target levels. These fisheries cannot meet SG100.

1.2.1.c Harvest strategy monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place that is expected to determine whether the harvest strategy is working.		

Monitoring is adequate to determine whether the harvest strategy is working. Catch and effort are monitored to estimate total catch, CPUE and mean size. The stock assessment reports best estimates of biomass, which indicates whether management is achieving its objectives or not. Therefore, the fishery clearly meets SG60.

1.2.1.d Harvest strategy review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The harvest strategy is periodically reviewed and improved as necessary.

There is no evidence of any formal review of the harvest strategy. Although the harvest strategy is reasonable, there is inadequate information available to indicate what improvements might be possible. The ICCAT performance reviews did specifically address future harvest strategies, but

focused on past performance of ICCAT in meeting its objectives. Therefore, the fishery does not meet SG100.

1.2.1.f Review of alternative measures		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biannual** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.

Quantities of discards are routinely reported as part of the catches. Therefore, while bycatch and discarding has been monitored, it is less clear what management actions, if any, have been undertaken to reduce discards of tuna. Discards of all tuna species appear very low, so implicitly no management intervention has been required. Incorporating estimates of discards in catch estimates and the stock assessment amounts to a review of discards generally. However, the SG60 requires a review of "measures" to minimise discarding of the target stock rather than a review of discarding itself. There is no evidence of a formal review of measures to prevent discarding at the RFMO level. If this issue was scored, the fisheries are unlikely to meet SG60 unless a national review has been undertaken for a specific fishery. However, it appears that discards of target tunas are generally considered negligible, and do not form part of the reviews of discarding and bycatch in tuna fisheries. Greater concern applies to landings of unrecorded tuna ("faux poisson") rather than discarding. Therefore, this issue is not scored.

All SG60 were met, and 1 out of 2 SG80 were met.

PI 1.2.1 : 70

References

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ICCAT 2015-01. Recommendation by ICCAT on a Multi-annual Conservation and Management Programme for Tropical Tunas http://www.iccat.org/en/RecsRegs.asp

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Spencer, J, J.J. Maguire and E. J. Molenaar. 2016. Report of the Second Independent Performance Review. ICCAT. PLE-103/2016

P.1.2.2 Harvest control rules and tools

1.2.2.a HCRs design and application		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Generally understood HCRs are in place or **available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the maximum sustainable yield level. The intention inferred from the scientific advice and management response is to maintain the stock at or above the MSY level by maintaining the catch rates at or below F_{MSY}. Therefore, the "generally understood" HCR is to set catches low enough that the stock rebuilds to B_{MSY}, and subsequently set future catches so that the stock remains at this level. Precisely how this will be done is unclear and how catches are set taking into account various uncertainties is not defined. The HCR has not been tested in projections as it is too vague. Fixed catches have been tested in projections, but this does not meet requirements of a MSC harvest control rule. Because there is no well-defined HCR, SG80 is not met.

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the maximum sustainable yield level. The intention inferred from the scientific advice and management response is to maintain the stock at or above the MSY level by maintaining the catches at or below F_{MSY}. There is clear evidence of intention to reduce harvest in the face of depletion and the scientific advice has indicated that the current level of control was adequate for the recovery of the yellowfin stock to towards the MSY level. However, it is currently at 95% of B_{MSY}, although increasing. Additionally, how this has been achieved is not well-defined; for example, the TAC has not been adjusted in response to changes in the stock status, although specific limits on the capacity of some fleets has been applied.

Adjustments in the TAC and management measures if the stock came under increased pressure are available, but these actions are not assured. This marginally meets SG60, but not SG80.

Preliminary work has been undertaken on developing an appropriate harvest control rule. It will be important to check that the HCR are consistent with MSC criteria. Reference has been made to UN Fish Stocks Agreement as the basis for setting HCR, but as was noted, there has been some confusion over various meanings for terms and reference points used. Adjustments in the TAC and management measures if the stock came under increased pressure are available, but these actions are not assured. It is notable that Rec. 15-01 does not apply to the Western skipjack stock. Given past progress being made towards an HCR and availability of controls should they been needed, the fishery meets SG60.

1.2.2.b HCRs robustness to uncertainty		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.

It is not possible to evaluate the harvest control in relation to uncertainties, because it has not been defined well enough to do so.

1.2.2.c HCRs evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

The current level of control, mainly through limits on fishing capacity, has resulted in sustainable catch levels for skipjack tuna. This appears to apply to the Western stock, but the limits on fishing capacity are not clear. Therefore, the monitoring data suggest current levels of fishing effort are sustainable.

The tools appear to have been effective in controlling exploitation, meeting SG60. This evidence is limited to observing the results. Detailed information on capacity controls (for example, limits of bait availability for bait boats) was unavailable. Therefore, SG80 is not met.

All SG60 were met, but no SG80 or SG100.

PI 1.2.2 : 60

References

ICCAT 2015-07. Recommendation by ICCAT on the Development of Harvest Control Rules and of Management Strategy Evaluation http://www.iccat.org/en/RecsRegs.asp

ICCAT 2015-01. Recommendation by ICCAT on a Multi-annual Conservation and Management Programme for Tropical Tunas http://www.iccat.org/en/RecsRegs.asp

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Spencer, J, J.J. Maguire and E. J. Molenaar. 2016. Report of the Second Independent Performance Review. ICCAT. PLE-103/2016

P.1.2.3 Information / monitoring

1.2.3.a Range of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Initial studies including tagging and others provide information related to stock structure. Basic biology of skipjack assists understanding of stock productivity. Fleets are monitored. These data are available to support the strategy. SG60 is met.

The external review panels were concerned that there appears to be little knowledge and information on skipjack tuna. Data have been generally poor and ICCAT has had considerable problems in maintaining accurate data in its database. In the case of skipjack, data limitations are significant enough to prevent quality stock assessments from being carried out.

The current hypothesis of two independent skipjack stocks (East and West) is probably adequate for current management purposes, but the stock fishery indicators, and probably future stock assessments, may be improved if based on smaller, more homogeneous areas.

There is evidence that on-going research is planned to improve information and therefore the stock assessment. This suggests that on-going development of data collection should be adequate to detect and remove problems in the long term.

There is adequate information on the fleets, but information on stock structure and productivity seems to be a limiting factor for this stock. However, the data were sufficient to complete stock assessments based on catch and fishing effort data and size composition data.

Although incomplete, information is sufficient to allow a stock assessment to be undertaken, meeting SG60. Information is not yet sufficient to apply the harvest strategy which is currently the same as other more heavily exploited stocks, and therefore the fisheries do not meet SG80.

1.2.3.b Monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.

Fishery removals are monitored at a level consistent with the harvest control rule. However, the abundance monitoring indices are very imprecise. There are only three indicators of stock abundance, all of which are likely to be poor indices, as it is likely that their effort measurement may not be entirely appropriate, there are likely to have been catchability changes within the time series, and indices may suffer from localized abundance effects which may not apply to the whole stock. Available indices show some conflicting trends. Given the large areas of ocean and dispersal of the species, scientific surveys are not an option for this type of fishery. However, it should be noted that larval surveys are used to monitor spawning stock size in key areas (Gulf of Mexico). Although abundance monitoring is undertaken with sufficient frequency, meeting SG60, they are not sufficiently accurate for actions which might be taken to support the strategy of maintaining the stock at or just above B_{MSY}. Additionally, basic understanding of western skipjack stock identification is limited and it is not totally accepted that western stock management is appropriate. Therefore, this does not meet SG80.

1.2.3.c Comprehensiveness of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is good information on all other fishery removals from the stock.	

ICCAT has put considerable effort in getting countries to record and report catches. The current level of reporting is far from perfect given the number of small countries involved and difficulties in monitoring small vessels and activities in oceanic waters well away from the coast. This illustrates the on-going problems ICCAT faces with the contracting parties. Nevertheless, catches are recorded increasingly well with decreasing IUU fishing activity, and data are sufficiently well recorded in the most part for the stock assessment and for assessing the level of control sought by ICCAT over landed catches. This meets SG80.

All SG60 were met, and 1 out of 3 SG80 were met.

PI 1.2.3 : 65

References

ICCAT 2014a. Report of the 2014 ICCAT East and West Atlantic Skipjack Stock Assessment Meeting. Dakar, Senegal - June 23 to July 1, 2014

ICCAT 2016. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 3 to 7 October 2016
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Spencer, J, J.J. Maguire and E. J. Molenaar. 2016. Report of the Second Independent Performance Review. ICCAT. PLE-103/2016

P.1.2.4 Assessment of stock status

1.2.4.a Appropriateness of assessment to stock under consideration		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.

Various stock assessment models and software have been applied. All methods and model structures were generic, but are structured to take advantage of the available data. Available software includes a variety of methods also used in other tuna fisheries and for other national stocks (catch only production model, Multifan-CL and Bayesian and non-Bayesian biomass dynamics models, length-based models). The main advice was obtained from a relatively simple production model, which only uses catch and effort data.

Although there were problems with the assessments, these may have been due to problems with the data rather than the assessment methods themselves. The final indices used for the assessment of the western stock were therefore, the Brazilian baitboat, the Venezuelan purse seine, the US longline and the Gulf of Mexico larval index. Western indices tend to show large inter-annual variability and a slight tendency of increase since 2000. It is unclear whether these are good indices of abundance for the entire stock being assessed.

The assessment attempted to account for some features of the species biology and the fishery, but the most reliable approaches remain broadly generic, meeting SG80, but not SG100. Uncertainty varies among different data sources, but these are treated in much the same way in the assessment. Also, improved information on the biology from, for example, through tagging studies, could lead to an improved assessment meeting SG100.

1.2.4.b Assessment approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	

The stock assessments have been used to estimate the MSY-related reference points, and these have been used to determine stock status. This meets SG80.

1.2.4.c Uncertainty in the assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment **identifies major sources** of uncertainty.	The assessment takes **uncertainty into account.**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.

Major sources of uncertainty were identified during the data review and discussions at the stock assessment meeting in 2014. These are clearly documented in the meeting report, achieving SG60.

Two types of modelling were used: biomass dynamics (surplus production) models and mean length (a dynamic variant of the Beverton-Holt length-based Z estimator). The assessments undertaken include fully stochastic (Bayesian) methods, and these results are reported. Although, there appeared to be significant issues with the stock assessments, a general estimate of stock status was determined by the working group. Uncertainty in the models and results was addressed and reported in management advice, so SG80 is achieved.

Even if some of the models allow stock status to be evaluated probabilistically, it is not clear that explicit consideration of risk is included in management decision making and no explicit reference is made to levels of risk in scientific advice beyond a vague reference to the likely stock status. This would currently prevent SG100 being met.

1.2.4.d Evaluation of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

Alternative software has been applied to the available data, although this falls short of a rigorous exploration of alternative hypotheses and approaches to assessment. However, the approaches were limited to two basic types, and results among these approaches were not consistent. There are recommendations to continue work on developing improved statistical models. Overall, the stock assessment has not been tested against many alternative hypotheses, and preliminary results available suggest the assessments may not be robust. This does not meet SG100.

1.2.4.e Peer review of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

The stock assessment is subject to review through a working group process. SCRS meet annually and review models, data and research on the main tuna species as well as other species within ICCAT jurisdiction. In addition, an external technical reviewer attended the last stock assessment workshop, so both SG80 and SG100, are met.

All SG60 and SG80 were met, and 1 out of 4 SG100 were met.

PI 1.2.4 : 85

References

ICCAT 2014a. Report of the 2014 ICCAT East and West Atlantic Skipjack Stock Assessment Meeting. Dakar, Senegal - June 23 to July 1, 2014

ICCAT 2017. Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, 2 to 6 October 2017

Indian Ocean Albacore

1.1 Outcome

P.1.1.1 Stock Status

1.1.1.a Stock status relative to recruitment impairment.		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.

Estimated MSY reference point for biomass is 30% B_0. Steepness is fixed at 0.8, which is reasonably precautionary. The interim limit reference set by IOTC (Resolution 15/10) is 40% B_{MSY}, which results in a limit reference point is 12% B_0. This is below the MSC default limit reference point (20% B_0) and below the default limit reference for B_{MSY} estimates immediately below 27% B0 (GSA2.2.3.1). In terms of levels precaution consistent with MSC criteria, the PRI used here should be 15% B_0 (i.e. 50% B_{MSY}) rather than the IOTC LRP.

The IOTC's Working Party on Temperate Tunas in 2016 reported on albacore assessments that were done using a variety of models, but used primarily the age structured statistical model (Stock Synthesis v3: SS3) and to a lesser extent, the biomass dynamics model (ASPIC), for the final advice. The SS3 analyses suggested that biomass has declined to about 37% of the unexploited level (28-46% 80%CI). The assessment results suggest biomass is above the MSY level (B_{2014}/B_{MSY} = 1.8; 1.38-2.23) and is thus classified as not overfished. The fishing mortality rate is F_{2014}/F_{MSY}=0.85 (0.57-1.12). Assuming the estimates are normally distributed and with appropriate adjustments, the lower bound for the 90% CI is 1.25 B_{MSY} and 25% B_0, so there is a high degree of certainty that the stock is above any PRI. Thus, SG100 is met.

1.1.1.b Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

Based on the 2014 stock assessment, the stock was classified as not being overfished (B_{2014}/B_{MSY} = 1.8; 1.38-2.23 80%CI) and that overfishing was not occurring (F_{2014}/F_{MSY}=0.85; 0.57-1.12 80%CI). Average catch 2011-2015 was 34,902t compared to MSY 38,800t (33,900-43,600t 80%CI). The phase plots indicate recent status has been above MSY with a high degree of certainty and there is a 42% probability that the stock will be below B_{MSY} in 2024 if the 2014 catch of around 40,000t was maintained. Catches in 2015 were 35,068, below the 2014 catch. Because there is a high degree of certainty the stock has been above MSY level in recent years, SG100 is met.

All SG60, SG80 and SG100 were met

PI 1.1.1 : 100

References

IOTC 2015. Executive Summaries by species or species group http://www.iotc.org/science

IOTC 2015. Resolution 15/10 http://iotc.org/cmm/resolution-1510-target-and-limit-reference-points-and-decision-framework

IOTC–WPTmT06 2016. Report of the Sixth Session of the IOTC Working Party on Temperate Tunas. Shanghai, China, 18–21 July 2016. IOTC–2016–WPTmT06–R[E]: 58 pp

1.2 Harvest Strategy (Management)

P.1.2.1 Harvest Strategy

1.2.1.a Harvest strategy design		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.

IOTC's objectives include the adoption, on the basis of scientific evidence, conservation and management measures to ensure the conservation of the stocks and to promote the objective of their optimum utilisation throughout the Indian Ocean. Therefore, the harvest strategy objective is to maintain stock levels at or above the biomass which would produce MSY. This was established as an interim threshold reference point under 15-10.

The harvest strategy is based on a system of feedback based on stock assessments every 3 years which evaluate stock status, provide management advice and evaluate management performance.

Scientific advice has been formulated relative to a harvest strategy using MSY reference points. This part of the harvest strategy is responsive to that state of the stock and to limit and target reference points used for albacore.

Links among the strategy components appear to be weak and it is unclear whether the harvest strategy has been fully responsive or that the management components are working together with the scientific advice. Catches reduced in 2011-2013, but increased again in 2014. Mean catches 2011-2015 are around 35,000t, slightly above the lower bound for the MSY 80%CI, so there is a greater than 10% probability that the stock is being overfished. It is not clear that catch reductions since 2000 were due to any particular management action and management advice for this stock points to displacement of longline effort due to piracy as an important factor in albacore catches. This is not under management control. Although reductions in fishing effort had been recommended by scientific committee for a number of years, no such reduction has yet been implemented (e.g. capacity reduction initiatives are not effective), suggesting that the system is slow to respond for this stock. The SG60 is met on the basis that the harvest strategy has worked, although this may be attributed as much to circumstance than the harvest strategy. It appears at least possible that the exploitation level could increase to levels inconsistent with stated management aims, would lead to failure to meet SG60. CPCs have indicated that they might increase capacity in this fishery. Therefore, in its current form, there is significant doubt that the harvest strategy will be fully effective in the longer term, so SG60, but not SG80, is met.

1.2.1.b Harvest strategy evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

The stock has been classified as not overfished, and not undergoing overfishing. There is no pre-agreement on how to react to stock changes (picked up by PI 1.2.2 below). And current catches are about equal to the scientifically recommended catch limits. It has yet to be shown that the management system can maintain stock at the target level ($B>B_{MSY}$, $F<F_{MSY}$). Although in general terms the current strategy will likely work, meeting SG60, evidence that it will work is still lacking in this particular case, so SG80 cannot be met.

1.2.1.c Harvest strategy monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place that is expected to determine whether the harvest strategy is working.		

Monitoring is adequate to determine whether the harvest strategy is working. Indicators are regularly estimated and reported by the relevant Working Party, including catches and stock status indicators. In addition, there is a regular external RFMO review which looks at issues relevant to the harvest strategy. Therefore, SG60 is met.

1.2.1.d Harvest strategy review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The harvest strategy is periodically reviewed and improved as necessary.

There is no evidence of any formal review of the harvest strategy. The harvest strategy is still under development, with plans to introduce more precise control over exploitation, and to improve monitoring, compliance, scientific advice and decision making. Performance have been conducted on RFMO, but these have focused on the wider issues (compliance, funding, CPC participation) and past performance rather than developing a harvest strategy for the future. Because this falls short of the detail review of options for a species specific harvest strategy that this scoring issue requires, SG100 is not met.

1.2.1.f Review of alternative measures		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biannual** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.

A joint meeting of the tuna Regional Fisheries Management Organisations (tRFMOs) in Brisbane 2010 as part of the KOBE process, specifically focused on bycatch and discarding, although this focused on non-tuna species. Discards are routinely estimated for all target species where possible. This depends upon the presence of at-sea monitoring (observers), however.

The main concern with discards of tuna appears to apply to the purse seine fleet. Discarding is clearly subject to review, and resolutions are proposed and discussed at meetings. A current resolution 17/04 has replaced 15/06 on this issue. This shows at the very least that discarding of tuna is discussed and reviewed regularly and that controls are being implemented, meeting SG80. It is not clear this review is biannual, so SG100 is not met.

All SG60 were met, and 1 out of 3 SG80 were met.

PI 1.2.1 : 65

References

Clarke, S., Sato, M., Small, C., Sullivan, B., Inoue, Y. & Ochi, D. 2014. Bycatch in longline fisheries for tuna and tuna-like species: a global review of status and mitigation measures. FAO Fisheries and Aquaculture Technical Paper No. 588. Rome, FAO. 19

IOTC 2014. Report of the Fifth Session of the IOTC Working Party on Temperate Tunas. Busan, Rep. of Korea, 28–31 July 2014. IOTC–2014–WPTmT05–R[E]

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IOTC 2017c. Compendium of Active [and pending] Conservation and Management Measures for Indian Ocean Tuna Commission. 3 October 2017
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IOTC–PRIOTC02 2016. Report of the 2nd IOTC Performance Review. Seychelles 2–6 February & 14–18 December 2015. IOTC–2016–PRIOTC02–R[E]: 86 pp
IOTC–WPDCS13 2017. Report of the 13th Session of the IOTC Working Party on Data Collection and Statistics. Victoria, Seychelles, 26-28 November 2017. IOTC–2017–WPDCS13–R[E]: 52 pp
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IOTC–WPTT19 2017. Report of the 19th Session of the IOTC Working Party on Tropical Tunas. Seychelles, 17–22 October 2017. IOTC–2017–WPTT19–R[E]: 118 pp

P.1.2.2 Harvest control rules and tools

1.2.2.a HCRs design and application		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Generally understood HCRs are in place or **available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the maximum sustainable yield level. There is evidence of intention to reduce harvest should depletion occur and the scientific advice is prepared to make recommendations to that effect if it were to occur, meeting SG60. Controls, including indirect effects, limit fishing effort and catches through various conservation measures (see the Compendium of Active CMM for 2016).

There is an interim decision framework with reference points (Resolution 15/10) for all tunas and swordfish, which is being applied in management advice. This includes the intention to develop harvest control rules (HCRs) using simulations and guidelines in the UNFSA and the IOTC Agreement. The stated objectives are based on the status phase plot, are in place, well-defined and are consistent with SG80. These reasons coupled with the overall status of the stock suggest that there is a generally understood HCR where exploitation rates are to be reduced in some way where stocks fall below target levels. This is demonstrated by the rebuilding plan for yellowfin (Resolutions 16/01 and 17/01). This meets SG60.

However, exactly what action would be taken in particular cases has yet to be determined, and therefore although the intention of the HCR is clear, it is not well-defined and does not fully meet SG80.

1.2.2.b HCRs robustness to uncertainty		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.

It is not possible to evaluate the harvest control in relation to uncertainties, because the HCR has not been defined well enough to do so. Therefore, SG80 cannot be met. The interim decision framework clearly intends that reference points and HCR under development (Resolution 15/10) will be robust and this is identified as one of the criteria for evaluation. Once HCR are development consistent with Resolution 15/10 are implemented, SG80 would be likely met.

1.2.2.c HCRs evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

In the case of albacore, there has as yet been no reduction in fishing effort despite the scientific advice indicating that such a reduction is necessary for precautionary management under the current harvest strategy. Therefore, although tools may be available to implement a HCR, they have yet to demonstrate they can reduce fishing mortality. Furthermore, with no appropriate response, it will become increasingly difficult to argue that tools are, in reality, available to reduce the exploitation level.

A level of control to respond to excess fishing pressure has not been demonstrated partially because biomass has remained above or around that which would produce MSY (the stated target). The tools that the IOTC have available include TACs, area access and other measures. The IOTC has begun to develop allocation mechanisms for both TACs and access agreements and the Scientific Committee has initiated the process of control rule development. However, it should be noted that Resolution 14/02 replaced Resolution 12/13 for tropical tunas, removing previous management controls despite there being evidence that intervention may be required. Although controls on fleet capacity have had limited success, there is some evidence that some CPC members have controlled their own catches in an effective manner and that this could be extended across key fleets (e.g. larger purse seine and longline vessels).

Therefore, meeting the SG60 relies on arguments that controls are available to be implemented if needed, as demonstrated by yellowfin which currently needs rebuilding. However, because yellowfin has not been able to show rebuilding despite warnings of the stock falling below MSY, it does appear that tools are available in the sense that controls may take too long to apply. This would be a common problem in international fisheries where consensus may take considerable time to obtain. Just as evidence of appropriate and effective action might be used to argue controls are available,

failure of one stock to apply “available” controls in a timely manner is evidence that tools may not be appropriate or effective in other untested cases. This suggests that SG60 is not met for these stocks, and may make it difficult to meet without a well-defined HCR in place.

Only 1 out of 2 SG60 were met.

PI 1.2.2 : Fail

References

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P.1.2.3 Information / monitoring

1.2.3.a Range of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

There are two primary sources of data that drive the stock assessment: total catches and CPUE. These data are considered highly uncertain, but have undergone some investigation and are adequate to support a harvest strategy. Information is incomplete on various issues, such as stock structure, for which a research programme has been commissioned. Information on fleet composition and environmental data is sufficient. Overall, the available data provide some basis for management advice and could support a precautionary harvest strategy, meeting SG60. However, the range of information is insufficient to support the current harvest strategy which is directed at relatively high target levels of exploitation and does not take account of the quality and quantity of data available. Additionally, it is probably insufficient to support a truly adequate strategy as might be used to score 1.2.1 as an SG80 or higher. Therefore, SG80 is not met.

1.2.3.b Monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.

Monitoring indices from several fleet's standardized CPUE and from tagging data are adequate for the harvest strategy. Indicators of stock abundance mainly consist of standardised catch-per-unit-effort indices. A single consistent index is not available for the entire time series, but the combined indices do appear to provide some picture of the change in abundance that has occurred. External reviewers recommended extended use of tagging studies. Although data are limited, a stock assessment has been successfully completed, demonstrating that data are now sufficient for the appropriate precautionary harvest control rule, so SG80 is met.

1.2.3.c Comprehensiveness of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is good information on all other fishery removals from the stock.	

IOTC has put considerable effort into the reporting and recording of all tuna catches by the contracting parties. The current level of reporting is adequate given the number of small countries involved and difficulties in monitoring small vessels and activities in pelagic waters well away from the coast. For example, some countries do not report tuna catch by species, so only estimates are available. Total catches are estimated reasonably well, and data are sufficiently well recorded for the stock assessment and for assessing the level of control sought by IOTC over landed catches. Overall, data are sufficient to meet SG80. While some problems exist, they are being addressed and do not increase the risk for the assessment and management of the stocks.

All SG60 were met, and 2 out of 3 SG80 were met.

PI 1.2.3 : 75

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P.1.2.4 Assessment of stock status

1.2.4.a Appropriateness of assessment to stock under consideration		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.

The stock assessment models for Indian Ocean albacore applied cover both age structured (Stock Synthesis: SS3) and biomass dynamics models. Both approaches were considered to offer useful scientific advice, although final status determination was taken from the SS3 fits. Therefore, appropriate models have been identified and used for the stock assessment, meeting SG80. Although this is due to a lack of information on the stock rather than a problem with the model, it has not been clearly demonstrated that the stock assessment has taken full account of the biology of the species or attributes of the fleets, so SG100 was not met.

1.2.4.b Assessment approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	

All tuna stock assessments have been used to estimate the MSY and other reference points, and these have been used to determine stock status. This meets SG80.

1.2.4.c Uncertainty in the assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment **identifies major sources** of uncertainty.	The assessment takes **uncertainty into account.**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.

Stock assessment methods have been used to report uncertainty in estimates of stock status. Uncertainties have been examined as alternative model configurations and estimates of statistical uncertainty in parameters. The configurations have been evaluated so that the final results represent an expert consensus of their relative importance. The stock status associated with each model has been evaluated in a probabilistic manner (based on an assumed multivariate normal distribution for parameters). These probabilities have been carried through the Kobe plots and Kobe strategy matrix (phase diagram of fishing mortality versus SSB at time and projections of the

probability of exceeding reference points for alternative catch levels, respectively). Therefore, uncertainty is carried through from the assessment to management advice, meeting SG80 and SG100.

1.2.4.d Evaluation of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

The stock assessment has reviewed a range of models and software in identifying the appropriate approach to the stock assessment. As well as SS3 and ASPIC, software has included Multifan-CL, various Bayesian biomass dynamics models, and age structured production models. However, it may be the way the model is configured rather than the software that needs to be rigorously explored. The SS3 stock assessment was rigorous, and explored various structural changes in fitting the available data, so were statistical in nature. Basic information on the biology and suspected stock structure (spawning vs feeding areas, distribution of adults and juveniles, shared stock with ICCAT etc.) was not included likely due to data limitations. So, although the stock assessment itself was rigorous, it is not clear that alternative hypotheses have been rigorously explored yet and therefore whether the assessment was robust to these is unclear, so SG100 was not met.

1.2.4.e Peer review of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

The stock assessments are reviewed through the Working Party for Tropical Tunas of the IOTC's Scientific Committee. Additionally, outside experts are regularly invited to participate in the Working Party meetings. However, the structure of the WP meeting limited the degree of both external and internal review. Levels of review are clearly adequate to meet SG80, but not SG100. Short publicly available technical reports based on external reviewers' observations would likely merit SG100.

All SG60 and SG80 were met, and 1 out of 4 SG100 were met.

PI 1.2.4 : 85

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Indian Ocean Bigeye

1.1 Outcome

P.1.1.1 Stock Status

1.1.1.a Stock status relative to recruitment impairment.		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.

The assessment advice given by the Working Party in 2016 suggested that the stock was not overfished (B_{2015}/B_{MSY} = 1.29, with estimates ranging from 1.07 to 1.51) and overfishing was not occurring (F_{2015}/F_{MSY}=0.76 0.49 - 1.03 80%CI). Spawning stock biomass in 2015 was estimated to be 38% of the unfished levels. These were based upon Stock Synthesis v3 (SS3) Alternative model (ASPM and ASAP) have also been run but results were similar to the SS3, but were not as flexible as SS3. The range of SS3 runs was thought to capture the uncertainty in the assessment. Average catch 2011-2015 (101,500t) was slightly lower than the median MSY value (104000t; 87000-121000).

These results imply that the stock is above the point where recruitment would be impaired with a high degree of certainty. The default value for PRI is around 50% of the B_{MSY} level. The lower bound of the estimate range for B_{2015}/B_{MSY} is higher than 0.5 and B_{2015}/B_0 is higher than 20%, indicating there is a high degree of certainty that the stock is above the point where recruitment would be impaired. Thus, this meets SG100.

1.1.1.b Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

Based on the 2016 assessment, it is likely that the stock biomass in 2015 was above that which would produce MSY and the fishing mortality rate was very likely below F_{MSY} in 2015. The 80% CI suggests that there is an 90% probability that B/B_{MSY} >1.07. Catches since 2011 have likely been below the MSY. The stock would seem to be at level consistent with MSY and likely to remain at this level if catches do not increase. This meets SG80.

In retrospect, catches 1995-2010 appear to have been relatively high compared to the current estimate of MSY, but the stock assessment does not indicate this led to a reduction of the stock below the MSY level. The stock assessment suggests that the stock has been continuously reducing towards MSY, but has not reached it yet. With current catches suggesting fishing mortality is likely

below F_{MSY}, and a high degree of certainty the stock is above B_{MSY} in 2015 (by adjusting the lower 80%CI to the 95% bound assuming the estimate is normally distributed) SG100 is achieved.

All SG60, SG80 and SG100 were met

PI 1.1.1 : 100

References

IOTC 2015. Resolution 15/10 http://iotc.org/cmm/resolution-1510-target-and-limit-reference-points-and-decision-framework

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1.2 Harvest Strategy (Management)

P.1.2.1 Harvest Strategy

1.2.1.a Harvest strategy design		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.

IOTC's objectives include the adoption, on the basis of scientific evidence, conservation and management measures to ensure the conservation of the stocks and to promote the objective of their optimum utilisation throughout the Indian Ocean. Therefore, the harvest strategy objective is to maintain stock levels at or above the biomass which would produce MSY. This was established as an interim threshold reference point under 15-10.

This basic harvest strategy is understood and is expected to achieve stock management objectives consistent with B_{MSY}. The strategy consists of periodic stock assessment updates (every three years) providing management advice. Resolutions are required for nations to take necessary action. Current management resolutions being applied consist of banning discarding (Res. 17/04), and limitation on capacity (Res. 15/11). Resolution 15/10 establishes reference points, and although it is directed at the fisheries scientists, clearly sets out management objectives so that advice can be clarified. Further harvest strategy improvements are only in the development stage, such as establishing a quota system (Res. 14/02).

Average catch 2011-2015 (101,500t) was slightly lower than the median MSY value (104000t; 87000-121000). Management is clearly taking some action to try to ensure catches are maintained around this level in future. The strategy therefore appears to be responsive to the stock and the different parts (science, management and fishing operations) appear to be working together to maintain the stock status. This meets SG80.

The strategy is still in development and further actions expected to ensure catches are maintained at appropriate levels. This is reasonable, but the development of a strategy by piece by piece does not suggest it has been designed, noting that designing a strategy in an international context would be difficult. Therefore, SG100 is not met.

1.2.1.b Harvest strategy evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

Given that the strategy is still in development, and the stock has not fallen below B_{MSY}, the strategy has not been fully tested. The current catches and stock status suggest that the exploitation has been maintained at sustainable levels over recent years. However, although catches have been reduced since 2007 mainly due to reductions in longline fishing effort, this was not as a direct result of the harvest strategy. Therefore, its ability to reduce exploitation when required has not been tested.

Testing is also provided by short term projections of the expected mortality, suggest that the stock will not be depleted in the short term and that therefore there is a window of opportunity to implement further measures tightening control. Therefore, some evidence exists that objectives are being met, at least in the short term. This meets SG80.

There is insufficient evidence that the harvest strategy will work fully, preventing a higher score. There is no pre-agreement on how to react to stock changes (picked up by PI 1.2.2 below). The Scientific Committee suggested that the recent drop in catches may be due in part to increased piracy in the Northwest India Ocean, which is not the result of management action. In addition, the seasonal closed area off Somalia has been removed, reducing control somewhat. It is unclear what will happen as the marine security situation improves. So, it has yet to be shown that the management system can maintain stock at the target level ($B>B_{MSY}$, $F<F_{MSY}$) if circumstances change, so SG100 is not met.

1.2.1.c Harvest strategy monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place that is expected to determine whether the harvest strategy is working.		

Monitoring is adequate to determine whether the harvest strategy is working. Indicators are regularly estimated and reported by the relevant Working Party, including catches and stock status indicators. In addition, there is a regular external RFMO review which looks at issues relevant to the harvest strategy. Therefore, SG60 is met.

1.2.1.d Harvest strategy review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The harvest strategy is periodically reviewed and improved as necessary.

There is no evidence of any formal review of the harvest strategy. The harvest strategy is still under development, with plans to introduce more precise control over exploitation, and to improve monitoring, compliance, scientific advice and decision making. Performance have been conducted on RFMO, but these have focused on the wider issues (compliance, funding, CPC participation) and past performance rather than developing a harvest strategy for the future. Because this falls short of the detail review of options for a species specific harvest strategy that this scoring issue requires, SG100 is not met.

1.2.1.f Review of alternative measures		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biannual** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.

A joint meeting of the tuna Regional Fisheries Management Organisations (tRFMOs) in Brisbane 2010 as part of the KOBE process, specifically focused on bycatch and discarding, although this focused on non-tuna species. Discards are routinely estimated for all target species where possible. This depends upon the presence of at-sea monitoring (observers), however.

The main concern with discards of tuna appears to apply to the purse seine fleet. Discarding is clearly subject to review, and resolutions are proposed and discussed at meetings. A current resolution 17/04 has replaced 15/06 on this issue. This shows at the very least that discarding of tuna is discussed and reviewed regularly and that controls are being implemented, meeting SG80. It is not clear this review is biannual, so SG100 is not met.

All SG60 and SG80 were met, and 0 out of 4 SG100 were met.

PI 1.2.1 : 80

References

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IOTC 2017c. Compendium of Active [and pending] Conservation and Management Measures for Indian Ocean Tuna Commission. 3 October 2017
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P.1.2.2 Harvest control rules and tools

1.2.2.a HCRs design and application		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Generally understood HCRs are in place or **available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the maximum sustainable yield level. There is evidence of intention to reduce harvest should depletion occur and the scientific advice is prepared to make recommendations to that effect if it were to occur, meeting SG60. Controls, including indirect effects, limit fishing effort and catches through various conservation measures (see the Compendium of Active CMM for 2016).

There is an interim decision framework with reference points (Resolution 15/10) for all tunas and swordfish, which is being applied in management advice. This includes the intention to develop harvest control rules (HCRs) using simulations and guidelines in the UNFSA and the IOTC Agreement. The stated objectives are based on the status phase plot, are in place, well-defined and are consistent with SG80. These reasons coupled with the overall status of the stock suggest that there is a generally understood HCR where exploitation rates are to be reduced in some way where stocks fall below target levels. This is demonstrated by the rebuilding plan for yellowfin (Resolutions 16/01 and 17/01). This meets SG60.

However, exactly what action would be taken in particular cases has yet to be determined, and therefore although the intention of the HCR is clear, it is not well-defined and does not fully meet SG80.

1.2.2.b HCRs robustness to uncertainty		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.

It is not possible to evaluate the harvest control in relation to uncertainties, because the HCR has not been defined well enough to do so. Therefore, SG80 cannot be met. The interim decision framework clearly intends that reference points and HCR under development (Resolution 15/10) will be robust and this is identified as one of the criteria for evaluation. Once HCR are development consistent with Resolution 15/10 are implemented, SG80 would be likely met.

1.2.2.c HCRs evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

A level of control to respond to excess fishing pressure has not been demonstrated partially because biomass has remained above or around that which would produce MSY (the stated target). The tools that the IOTC have available include TACs, area access and other measures. The IOTC has begun to develop allocation mechanisms for both TACs and access agreements and the Scientific Committee has initiated the process of control rule development. However, it should be noted that Resolution 14/02 replaced Resolution 12/13 for tropical tunas, removing previous management controls despite there being evidence that intervention may be required. Although controls on fleet capacity have had limited success, there is some evidence that some CPC members have controlled their own catches in an effective manner and that this could be extended across key fleets (e.g. larger purse seine and longline vessels).

Therefore, meeting the SG60 relies on arguments that controls are available to be implemented if needed, as demonstrated by yellowfin which currently needs rebuilding. However, because yellowfin has not been able to show rebuilding despite warnings of the stock falling below MSY, it does appear that tools are available in the sense that controls may take too long to apply. This would be a common problem in international fisheries where consensus may take considerable time to obtain. Just as evidence of appropriate and effective action might be used to argue controls are available, failure of one stock to apply “available” controls in a timely manner is evidence that tools may not be appropriate or effective in other untested cases. This suggests that SG60 is not met for these stocks, and may make it difficult to meet without a well-defined HCR in place.

Only 1 out of 2 SG60 were met.

PI 1.2.2 : Fail

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P.1.2.3 Information / monitoring

1.2.3.a Range of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Bigeye data in the Indian Ocean are reasonably informative containing relevant information on the spatial distribution of catches, size frequencies, fleets, tagging data and alternative growth and natural mortality models. Environmental factors, such as ENSO cycle, are monitored and some environmental data are available as covariates in CPUE standardization. Fleet composition is increasingly being reported more accurately. These data have been sufficient to conduct a 3-area ocean-wide stock assessment, and to evaluate the harvest strategy of maintaining stocks at or above the biomass that would produce MSY, meeting SG80.

Despite having tagging data, there are significant information gaps. Catch data are missing for some artisanal and industrial fleets (e.g. small yellowfin and bigeye may have been combined into a single group). Size data are not complete for all fleets, but this relates primarily to historical data (before 1980) and the situation has improved, but is still not fully resolved. There is considerable environmental information, but this is not directly used. Therefore, the range of information is not comprehensive, so SG100 cannot be fully met.

1.2.3.b Monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.

Monitoring indices from several fleets' standardized CPUE and from tagging data are adequate for the harvest strategy. The catch history and CPUE series were updated and new information added into the assessment, and evidence suggests that data are improving. Indicators of stock abundance mainly consist of standardised catch-per-unit-effort indices, but tagging data exist as well, which are informative. A single consistent index is not available for the entire time series, but the combined indices do appear to provide some picture of the change in abundance that has occurred.

For the 2016 stock assessment, all catch effort data from longline were combined into three separate CPUE based on clustering (identifying groups of homogeneous vessels). Tagging data exist from 2005-2009. The Working Party on Tropical Tunas noted on-going significant problems with the available data, mainly in terms of catch and CPUE indices. Overall, data are sufficient for stock assessment and for an appropriate harvest control rule, meeting SG80. However, the data do not presently allow a harvest control rule to be applied with a high degree of certainty and not all sources of uncertainty are well understood, so SG100 is not met.

1.2.3.c Comprehensiveness of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is good information on all other fishery removals from the stock.	

IOTC has put considerable effort into the reporting and recording of all tuna catches by the contracting parties. The current level of reporting is adequate given the number of small countries involved and difficulties in monitoring small vessels and activities in pelagic waters well away from the coast. For example, some countries do not report tuna catch by species, so only estimates are available. Total catches are estimated reasonably well, and data are sufficiently well recorded for the stock assessment and for assessing the level of control sought by IOTC over landed catches. Overall, data are sufficient to meet SG80. While some problems exist, they are being addressed and do not increase the risk for the assessment and management of the stocks.

All SG60 and SG80 were met, and 0 out of 2 SG100 were met.

PI 1.2.3 : 80

References

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P.1.2.4 Assessment of stock status

1.2.4.a Appropriateness of assessment to stock under consideration		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.

The main assessment model used for Indian Ocean BET is Stock Synthesis v3 (SS3). Multiple fisheries, gears, and selectivity models have examined and alternative assessment models have been explored, and the most appropriate model configurations have been adopted for the scientific advice. This meets SG80. There are remaining difficulties with key productivity parameters which could change the perception of stock status to some extent. The software allows the model to capture the main features of the stock and fishery, and use all the available data, although it did not make use of the tagging data in the 2013 assessment. The available biological information is unable to inform on key life history parameters ("steepness") and other data are available yet. Nevertheless, the assessment models integrate all the available data relevant to the biology and fisheries. Thus, SG100 is met.

1.2.4.b Assessment approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	

All tuna stock assessments have been used to estimate the MSY and other reference points, and these have been used to determine stock status. This meets SG80.

1.2.4.c Uncertainty in the assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment **identifies major sources** of uncertainty.	The assessment takes **uncertainty into account.**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.

Stock assessment methods have been used to report uncertainty in estimates of stock status. Uncertainties have been examined as alternative model configurations and estimates of statistical uncertainty in parameters. The configurations have been evaluated so that the final results represent an expert consensus of their relative importance. The stock status associated with each model has been evaluated in a probabilistic manner (based on an assumed multivariate normal distribution for parameters). These probabilities have been carried through the Kobe plots and Kobe strategy matrix (phase diagram of fishing mortality versus SSB at time and projections of the probability of exceeding reference points for alternative catch levels, respectively). Therefore, uncertainty is carried through from the assessment to management advice, meeting SG80 and SG100.

1.2.4.d Evaluation of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

The main assessment based on Stock Synthesis v3 (SS3) has been tested and the range of plausible models has been evaluated, showing that the assessment is robust. Alternative models (ASPM and ASAP) have also been run with results similar to the SS3. The range of SS3 runs was thought to capture the uncertainty in the assessment. Although alternative assessment approaches and a range of hypotheses have been used to derive alternative results, it is not clear that these have been rigorously explored. This might be addressed by more formal development of hypotheses on model structure to capture uncertainties rather than focusing on different parameter values, for example. Thus, SG100 is not met.

1.2.4.e Peer review of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

The stock assessments are reviewed through the Working Party for Tropical Tunas of the IOTC's Scientific Committee. Additionally, outside experts are regularly invited to participate in the Working Party meetings. However, the structure of the WP meeting limited the degree of both external and internal review. Levels of review are clearly adequate to meet SG80, but not SG100. Short publicly available technical reports based on external reviewers' observations would likely merit SG100.

The stock assessments are reviewed through the Working Party for Tropical Tunas of the IOTC's Scientific Committee. Additionally, outside experts are regularly invited to participate in the Working Party meetings. However, the structure of the WP meeting limited the degree of both external and internal review. Levels of review are clearly adequate to meet SG80, but not SG100. Short publicly available technical reports based on external reviewers' observations would likely merit SG100.

All SG60 and SG80 were met, and 2 out of 4 SG100 were met.

PI 1.2.4 : 90

References

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Indian Ocean Yellowfin

1.1 Outcome

P.1.1.1 Stock Status

1.1.1.a Stock status relative to recruitment impairment.		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.

The stock assessment in 2016 updated the 2015 assessment using biomass dynamics model and age structured model (SS3). Stock status is based on the SS3 model formulation. The stock status is overfished and subject to overfishing where: SB_{2015}/SB_{MSY} = 0.89 (0.79-0.99 80%CI); F_{2015}/F_{MSY} = 1.11 (0.86-1.36 80%CI) and SB_{2015}/SB_0 = 0.29. There have been large catches over the last few years. Catches in 2015 were estimated as 408,000t and the average over last 5 years was 390,000t. This has a resulted in larger fishing mortality rates partly because where the stock has fallen below B_{MSY}. The 2016 update provides slightly more of an optimistic status than that the stock assessment in 2015 due to changes in abundance index estimates. Recent lower recruitment is driving the current projections.

These results indicate that there is an 90% probability that B_{2015}/B_{MSY} is greater than 0.79, the default PRI being B/B_{MSY}=0.5. Allowing for the 95% percentile consistent (SA2.2.1.3: adjusting the lower 80%CI to the lower 90%CI assuming the estimate is normally distributed=0.76), the stock is above the PRI with a high degree of certainty. Therefore, SG100 is met.

1.1.1.b Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

With the stock estimated as below the B_{MSY} in 2015, fishing mortality estimated as likely greater than F_{MSY} assessment in 2016 and no evidence of a reduction in catches in 2016, the stock is clear not fluctuating around B_{MSY}, but is in danger of declining further towards the PRI. Therefore, SG80 is not met.

All SG60 were met, and 1 out of 2 SG80 were met.

PI 1.1.1 : 70

References

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Langley, A. 2016. An update of the 2015 Indian Ocean Yellowfin Tuna stock assessment for 2016. IOTC-WPTT18-27

P.1.1.2 Stock Rebuilding

1.1.2.a Rebuilding timeframes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
A rebuilding timeframe is specified for the stock that is the **shorter of 20 years or 2 times its generation time**. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.		The shortest practicable rebuilding timeframe is specified which does not exceed **one generation time** for the stock.

The scientific committee suggested that the stock could recover to B_{MSY} within 10 years (2025) with a 63% probability if catches were set at 85% of current. Assuming a natural mortality of 0.8 yr^{-1}, generation time for yellowfin should be around 3.75 and 2 generation times 7.5 years (GSA4). This suggests that rebuilding needs to have been completed within 7 years from when the overfished state was detected.

With only an “available” HCR, catches have not been demonstrably reduced in 2016. Catches in 2017 have not been published yet. Even if successfully implemented, what reduction in catches will be achieved in practice by Resolutions 16/01 and 17/01 is unclear. Reductions need to be achieved by CPCs and vary by fleet from 5% to 15%. Bearing in mind at least a two year delay before reductions occur and probably a maximum of 10% reduction in practice based on the resolutions, there would be >60% probability $B_{2025}<B_{MSY}$. Therefore, it appears unlikely rebuilding will now be achieved within

two generations. Although no rebuilding time is specified, the implication from the resolutions is that rebuilding time frame is in the region of 10-12 years. This does not meet SG60.

1.1.2.b Rebuilding evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.	There is **evidence** that the rebuilding strategies are rebuilding stocks, **or it is likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.	There is **strong evidence** that the rebuilding strategies are rebuilding stocks, **or it is highly likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.

Resolution 16/01 is to be implemented in 2017 and Resolution 17/01 in 2018 and there is no information available from these years to evaluate the effectiveness of the rebuilding programme. It is not clear that the current resolutions will be effective, so SG80 is not met. However, catch monitoring and stock assessments have taken place and are planned such that rebuilding can be fully evaluated. This meets SG60.

Only 1 out of 2 SG60 were met.

PI 1.1.2 : Fail

References

IOTC 2016. Resolution 16/01 on Interim Plan for Rebuilding the Indian Ocean Yellowfin Tuna. IOTC–2016–S20–Prop–F_ [E] Adopted

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1.2 Harvest Strategy (Management)

P.1.2.1 Harvest Strategy

1.2.1.a Harvest strategy design		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.

IOTC's objectives include the adoption, on the basis of scientific evidence, conservation and management measures to ensure the conservation of the stocks and to promote the objective of

their optimum utilisation throughout the Indian Ocean. Therefore, the harvest strategy objective is to maintain stock levels at or above the biomass which would produce MSY. This was established as an interim threshold reference point under 15-10.

Scientific advice has been formulated relative to a harvest strategy relative to MSY reference points and is responsive to that state of the stock and to limit and target reference points commonly used for yellowfin and other tropical tunas. This included two closed areas (UK IOT and Resolution 12/13 closed area 0°-10° N. and 40°-60° E. in November to purse seine - removed under Resolution 14/02). Much of the strategy is untested and it is unclear whether the harvest strategy will be fully effective, particularly as a number of provisions, like catch limits, are still in development and have not been implemented yet.

The stock was estimated to be at 89% B_{MSY} in 2015 and declining, suggesting that the previous strategy has not worked. Subsequently, the scientific committee suggested that the stock could recover to B_{MSY} within 8 years (2024) with a 50% probability if catches were set at 80% of current. Resolutions 16/01 and 17/01 established interim plans for rebuilding the Indian ocean yellowfin tuna stock in the IOTC area of competence, coming into force in 2017 and 2018 respectively. The catch limits, if successfully applied, will still higher than those recommended by the SC to rebuild the stock, but could plausibly recover the stock with 10-12 years, which would fulfil management objectives to attain B_{MSY}. Because this is expected to achieve MSY based management objectives, SG60 is met. It is not clear yet that elements of the harvest strategy are working together towards achieving management targets. The decisions represented by the resolutions did not quite align with SC advice, the rebuilding timeframe was not clearly defined, and it is not yet certain catch reductions will be achieved in a timely manner. This does not meet SG80.

1.2.1.b Harvest strategy evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

The catch limits will likely result in stock recovery over the next 10 years. Some reduction in catch is highly likely, and, based on prior experience, it should be possible to reduce fishing mortality through the provisions to below F_{MSY}. This meets SG60. What actual reduction will be achieved in practice remains in doubt, and whether this will be sufficient (or more than sufficient) is uncertain. Recent recruitment has been low and if this continues, rebuilding may take more time. A full stock assessment is planned in 2018 and this could provide evidence that the rebuilding plan is beginning to achieve its objectives, in which case SG80 would be met. Until further evidence is obtained, SG80 cannot be met.

1.2.1.c Harvest strategy monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place that is expected to determine whether the harvest strategy is working.		

Monitoring is adequate to determine whether the harvest strategy is working. Indicators are regularly estimated and reported by the relevant Working Party, including catches and stock status indicators. In addition, there is a regular external RFMO review which looks at issues relevant to the harvest strategy. Therefore, SG60 is met.

1.2.1.d Harvest strategy review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The harvest strategy is periodically reviewed and improved as necessary.

There is no evidence of any formal review of the harvest strategy. The harvest strategy is still under development, with plans to introduce more precise control over exploitation, and to improve monitoring, compliance, scientific advice and decision making. Performance have been conducted on RFMO, but these have focused on the wider issues (compliance, funding, CPC participation) and past performance rather than developing a harvest strategy for the future. Because this falls short of the detail review of options for a species specific harvest strategy that this scoring issue requires, SG100 is not met.

1.2.1.f Review of alternative measures		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biannual** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.

A joint meeting of the tuna Regional Fisheries Management Organisations (tRFMOs) in Brisbane 2010 as part of the KOBE process, specifically focused on bycatch and discarding, although this focused on non-tuna species. Discards are routinely estimated for all target species where possible. This depends upon the presence of at-sea monitoring (observers), however.

The main concern with discards of tuna appears to apply to the purse seine fleet. Discarding is clearly subject to review, and resolutions are proposed and discussed at meetings. A current resolution 17/04 has replaced 15/06 on this issue. This shows at the very least that discarding of tuna is discussed and reviewed regularly and that controls are being implemented, meeting SG80. It is not clear this review is biannual, so SG100 is not met.

All SG60 were met, and 1 out of 3 SG80 were met.

PI 1.2.1 : 65

References

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P.1.2.2 Harvest control rules and tools

1.2.2.a HCRs design and application		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Generally understood HCRs are in place or **available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the maximum sustainable yield level. There is evidence of intention to reduce harvest should depletion occur and the scientific advice is prepared to make recommendations to that effect if it were to occur, meeting SG60. Controls, including indirect effects, limit fishing effort and catches through various conservation measures (see the Compendium of Active CMM for 2016).

There is an interim decision framework with reference points (Resolution 15/10) for all tunas and swordfish, which is being applied in management advice. This includes the intention to develop harvest control rules (HCRs) using simulations and guidelines in the UNFSA and the IOTC Agreement. The stated objectives are based on the status phase plot, are in place, well-defined and are consistent with SG80. These reasons coupled with the overall status of the stock suggest that there is a generally understood HCR where exploitation rates are to be reduced in some way where stocks fall below target levels. This is demonstrated by the rebuilding plan for yellowfin (Resolutions 16/01 and 17/01). This meets SG60.

However, exactly what action would be taken in particular cases has yet to be determined, and therefore although the intention of the HCR is clear, it is not well-defined and does not fully meet SG80.

1.2.2.b HCRs robustness to uncertainty		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.

It is not possible to evaluate the harvest control in relation to uncertainties, because the HCR has not been defined well enough to do so. Therefore, SG80 cannot be met. The interim decision framework clearly intends that reference points and HCR under development (Resolution 15/10) will be robust and this is identified as one of the criteria for evaluation. Once HCR are development consistent with Resolution 15/10 are implemented, SG80 would be likely met.

1.2.2.c HCRs evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

In the case of yellowfin, the stock has declined and based on projections in the assessments before 2015 was likely to fall below its target point. The most recent assessments confirmed that this indeed had happened.

Based on 16-01 a number of tools for controlling catches were adopted including percent reductions in purse seine, gillnet and other gear catch; reduction in FADs. This may still result in catches above scientific advice, but would also likely eventually to rebuild the stock. The details of implementation are not known as of yet. On that basis it can be said that tools are available and shortly to be in used (implementation 2017) and there is some evidence that they will work based on projections and CPC reporting.

However, once the stock has fallen the target level, controls must be in place, not just “available” (GSA2.5.2). In this case, without clear, well-defined to bring about rebuilding, there is insufficient evidence at this point that management objectives will be achieved in a timely manner. Therefore, SG60 cannot be met.

Only 1 out of 2 SG60 were met.

PI 1.2.2 : Fail

References

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P.1.2.3 Information / monitoring

1.2.3.a Range of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Yellowfin data in the Indian Ocean are reasonably informative containing relevant information on the spatial distribution of catches, size frequencies, from numerous fleets, tagging data and alternative growth and mortality models. These data have been sufficient to conduct assessments and to evaluate the harvest strategy to maintain stocks at or above the biomass that would produce MSY. Some environmental data are used as covariates in CPUE standardization and to help explain recruitment dynamics. Stock structure data are limited, but are consistent with an Indian Ocean-wide stock. Overall, data are sufficient to meet SG80. There remain significant gaps in the data, however, related to catches, stock structure and fleet operations, such that the range of information is not comprehensive, so SG100 cannot be fully met.

1.2.3.b Monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.

Monitoring indices from several fleets' standardized CPUE and from tagging data are adequate for the harvest strategy. Indicators of stock abundance mainly consist of standardised catch-per-unit-effort indices. A single consistent index is not available for the entire time series, but the combined indices do appear to provide some picture of the change in abundance that has occurred. External reviewers recommended extended use of tagging studies. Data are sufficient to meet the requirements of SG80. However, the data do not presently allow the harvest control rule to be used with great confidence, preventing SG100 being met.

1.2.3.c Comprehensiveness of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is good information on all other fishery removals from the stock.	

IOTC has put considerable effort into the reporting and recording of all tuna catches by the contracting parties. The current level of reporting is adequate given the number of small countries involved and difficulties in monitoring small vessels and activities in pelagic waters well away from the coast. For example, some countries do not report tuna catch by species, so only estimates are available. Total catches are estimated reasonably well, and data are sufficiently well recorded for the stock assessment and for assessing the level of control sought by IOTC over landed catches. Overall, data are sufficient to meet SG80. While some problems exist, they are being addressed and do not increase the risk for the assessment and management of the stocks.

All SG60 and SG80 were met, and 0 out of 2 SG100 were met.

PI 1.2.3 : 80

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P.1.2.4 Assessment of stock status

1.2.4.a Appropriateness of assessment to stock under consideration		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.

The primary assessment tool for stock status is based on the age structured statistical model (SS3). Biomass dynamics and other age structured models were also explored. The SS3 model allowed major features of tuna biology to be taken into account, such as age specific natural mortality and spatial dynamics based on multiple areas. The model was able to make use of all the available data, including tagging, and therefore met SG100.

1.2.4.b Assessment approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	

All tuna stock assessments have been used to estimate the MSY and other reference points, and these have been used to determine stock status. This meets SG80.

1.2.4.c Uncertainty in the assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment **identifies major sources** of uncertainty.	The assessment takes **uncertainty into account.**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.

Stock assessment methods have been used to report uncertainty in estimates of stock status. Uncertainties have been examined as alternative model configurations and estimates of statistical uncertainty in parameters. The configurations have been evaluated so that the final results represent an expert consensus of their relative importance. The stock status associated with each model has been evaluated in a probabilistic manner (based on an assumed multivariate normal distribution for parameters). These probabilities have been carried through the Kobe plots and Kobe strategy matrix (phase diagram of fishing mortality versus SSB at time and projections of the probability of exceeding reference points for alternative catch levels, respectively). Therefore, uncertainty is carried through from the assessment to management advice, meeting SG80 and SG100.

1.2.4.d Evaluation of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

Application of alternative assessment models (BBPM, SCAA, SS3) to Indian Ocean yellowfin has been relatively recent. A variety of hypotheses have been considered, including growth, linkages between areas and natural mortality. However, some implications of different model structures have not been rigorously explored yet in newest assessment methods. In addition, recent adjustments in the 2016 assessment update led to a significant change in the perception of stock status, so it is not clear that the assessment is robust. This prevents the assessment meeting SG100.

1.2.4.e Peer review of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

The stock assessments are reviewed through the Working Party for Tropical Tunas of the IOTC's Scientific Committee. Additionally, outside experts are regularly invited to participate in the Working Party meetings. However, the structure of the WP meeting limited the degree of both external and internal review. Levels of review are clearly adequate to meet SG80, but not SG100. Short publicly available technical reports based on external reviewers' observations would likely merit SG100.

The stock assessments are reviewed through the Working Party for Tropical Tunas of the IOTC's Scientific Committee. Additionally, outside experts are regularly invited to participate in the Working Party meetings. However, the structure of the WP meeting limited the degree of both external and internal review. Levels of review are clearly adequate to meet SG80, but not SG100. Short publicly available technical reports based on external reviewers' observations would likely merit SG100.

All SG60 and SG80 were met, and 2 out of 4 SG100 were met.

PI 1.2.4 : 90

References

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Indian Ocean Skipjack

1.1 Outcome

P.1.1.1 Stock Status

1.1.1.a Stock status relative to recruitment impairment.		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.

The stock assessment in 2017 suggested that the stock was fully exploited ($B_{2016}=B_{MSY}$) and that overfishing is probably not occurring (Average Catch 2012-2016 < MSY). Spawning stock biomass (SB) was estimated to be around 40%B_0 in 2016 (35%–47% 80%CI), which is the designated target (i.e. MSY proxy). The point where recruitment would be impaired (PRI) is assumed here to be 50% B_{MSY} (i.e. 20% SB_0), which is the limit reference point set by Resolution 16/02.

The stock status estimate implies that the stock is likely to be above the PRI with a high degree of certainty. The stock status in relation to MSY is given as $SB_{2016}/SB_{40\%}$ = 1.0 (0.88-1.17 80%CI). Assuming that the estimate is approximately normally distributed, the lower bound of the 90% confidence interval is 0.78, which is still well above the PRI (0.5). This suggests that there is a high degree of certainty that the stock is above the point where recruitment would be impaired, meeting the SG100.

1.1.1.b Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

The new stock assessment in 2017 suggested that the stock is now at the MSY level. Given the current status of the fishery, the scientific committee indicates that the stock should fluctuate around the MSY level if the HCR is implemented (Resolution 16/02). The average exploitation rate over the past few years has likely not exceeded F_{MSY} (Average Catch 2009-2013 < MSY). The stock status was officially determined as not overfished and not subject to overfishing. Therefore, SG80 is met.

However, there is not a “high degree of certainty” that the stock has been above the MSY reference points in recent years. The new stock assessment estimates mark a significant change from the previous assessment, and it may take a few years further research to establish a more robust assessment which is widely accepted. A number of alternative models indicated lower stock status. So, although on balance the stock was determined to be at the MSY level, this conclusion is not highly certain, so SG100 is not met.

All SG60 and SG80 were met, and 1 out of 2 SG100 were met.

PI 1.1.1 : 90

References

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1.2 Harvest Strategy (Management)

P.1.2.1 Harvest Strategy

1.2.1.a Harvest strategy design		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.

IOTC's objectives include the adoption, on the basis of scientific evidence, conservation and management measures to ensure the conservation of the stocks and to promote the objective of their optimum utilisation throughout the Indian Ocean. Therefore, the harvest strategy objective is to maintain stock levels at or above the biomass which would produce MSY. This was established as an interim threshold reference point under 15-10.

The harvest strategy consists of collection of monitoring data, scientific assessment of the performance of various controls on exploitation and decision making consistent with well-defined objectives and procedures. Scientific advice has been formulated relative to MSY reference points and is responsive to that state of the stock. A number of resolutions and other provisions ban discards, limit fishing capacity and FADs, and apply closed areas, which also contribute to controlling exploitation on components of the stock. The different elements of the harvest strategy (scientific, management, CPC) appear to be work together sufficiently well to achieve objectives for this stock. This meets SG80.

While parts of the harvest strategy have been designed, other aspects have not. There is no TAC yet, and controls on exploitation are imprecise and may not achieve the desired catches exactly. Various provisions have been *ad hoc*, and what their impact has been is unclear. Therefore, the designed aspect of the strategy to change overall selectivity cannot be given full credit and SG100 is not met.

1.2.1.b Harvest strategy evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

The present catch is below MSY. Testing is provided by stock assessment and short term projections of the expected mortality. The assessment has shown that the skipjack stock is not overfished, indicating that so far the harvest strategy has been effective in controlling exploitation on this stock. There is some evidence that the harvest strategy will work as long as resolutions successfully limit exploitation to current levels. This meets SG80 because although the harvest strategy is still under development and has therefore not been fully tested, there is some evidence that it is effective in achieving management objectives.

Until more planned components of the system are in place and these are tested at least through simulation based on a realistic level of control that can be applied in the international fishery, the fishery cannot be considered fully evaluated, so SG100 is not met.

1.2.1.c Harvest strategy monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place that is expected to determine whether the harvest strategy is working.		

Monitoring is adequate to determine whether the harvest strategy is working. Indicators are regularly estimated and reported by the relevant Working Party, including catches and stock status indicators. In addition, there is a regular external RFMO review which looks at issues relevant to the harvest strategy. Therefore, SG60 is met.

1.2.1.d Harvest strategy review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The harvest strategy is periodically reviewed and improved as necessary.

There is no evidence of any formal review of the harvest strategy. The harvest strategy is still under development, with plans to introduce more precise control over exploitation, and to improve monitoring, compliance, scientific advice and decision making. Performance have been conducted on RFMO, but these have focused on the wider issues (compliance, funding, CPC participation) and past performance rather than developing a harvest strategy for the future. Because this falls short of the detail review of options for a species specific harvest strategy that this scoring issue requires, SG100 is not met.

1.2.1.f Review of alternative measures		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biannual** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.

A joint meeting of the tuna Regional Fisheries Management Organisations (tRFMOs) in Brisbane 2010 as part of the KOBE process, specifically focused on bycatch and discarding, although this focused on non-tuna species. Discards are routinely estimated for all target species where possible. This depends upon the presence of at-sea monitoring (observers), however.

The main concern with discards of tuna appears to apply to the purse seine fleet. Discarding is clearly subject to review, and resolutions are proposed and discussed at meetings. A current resolution 17/04 has replaced 15/06 on this issue. This shows at the very least that discarding of tuna is discussed and reviewed regularly and that controls are being implemented, meeting SG80. It is not clear this review is biannual, so SG100 is not met.

All SG60 and SG80 were met, and 0 out of 4 SG100 were met.

PI 1.2.1 : 80

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P.1.2.2 Harvest control rules and tools

1.2.2.a HCRs design and application		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Generally understood HCRs are in place or **available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.

Resolution 16-02 established a biomass limit reference point of 20% of unfished spawning biomass, a biomass target reference point of 40% of unfished spawning biomass (MSY proxy), and a harvest control rule whereby the exploitation rate is proportionally reduced as biomass declines from $0.4B_0$ to $0.1B_0$. The HCR is now well defined and is clearly intended to maintain the stock at target levels. The annual catch limit was set to 470,029t for the period 2018-2020 (IOTC-2017-SC20-12 Rev_1).

Target control rule parameters have been set at values consistent with maintaining the stock around the MSY level, which has been shown from simulations and stock assessment projections. The HCR also has attribute of decreasing the exploitation rate as the stock approaches the PRI. The HCR has been well defined because it can be included in a simulation. This clearly meets SG80.

Although the HCR is expected to keep the stock fluctuating at the target level consistent with MSY, this has not been tested in practice. The HCR has only just been implemented so cannot be evaluated with confidence yet. The HCR also does not explicitly take into account the stock's ecological role. Given the preliminary nature of the HCR, it cannot be said that that the HCR will keep the stock at or above MSY most of the time, so SG100 is not met.

1.2.2.b HCRs robustness to uncertainty		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.

An HCR was established through 16-02 and is just now being implemented. Simulations have been used to develop and test the rule, and determined that the current formulation should be effective and precautionary. Because the simulation includes the main uncertainties (future recruitment etc.), the HCR has been shown to be likely robust to these. Therefore, SG80 is met.

The HCR has only just been implemented so cannot be evaluated with confidence yet. The HCR does not explicitly take into account the stock's ecological role or other uncertainties, most notably alternative stock structures, so these remain untested. Given the preliminary nature of the HCR, it cannot be said that that the HCR is robust to uncertainties, so SG100 is not met.

1.2.2.c HCRs evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

The HCR defined in Resolution 16/02 is only now being implemented, and the tools which will be used to limit catches remain unclear. The tools that the IOTC CPC have available include TACs, area access and other measures. The IOTC has begun to develop allocation mechanisms for both TACs and access agreements. There is some evidence that some IOTC members have controlled their own catches in an effective manner and that this could be extended across key fleets (e.g. larger purse seine and longline vessels). On this basis, tools are 'available' to implement the HCR, which should be able to control exploitation rates if required. SG60 is met.

The catch in 2016 (446,723t) was below the catch limit set for 2018-2020 (470,029t). The pressure on the catch limits may not arise, but if catches do increase as capture opportunities increase, it is not clear whether limits will be effectively or precisely applied. Because clear tested tools, such as fleet specific TACs, are not yet 'in place' for the implementation of the HCR, SG80 is not met.

Note that the failure to introduce effective tools to reduce exploitation in yellowfin could impact skipjack scoring on this issue. However, with a well-defined HCR so that target catches are agreed in the management advice means evidence can be determined directly. An inability to maintain catches around or below this target level would be evidence that tools in use are not appropriate or effective, leading to immediate failure to meet SG60.

All SG60 were met, and 2 out of 3 SG80 were met.

PI 1.2.2 : 75

References

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P.1.2.3 Information / monitoring

1.2.3.a Range of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Skipjack data in the Indian Ocean are reasonably informative containing relevant information on the spatial distribution of catches, size frequencies, from numerous fleets, tagging data and alternative growth and mortality models. These data have been sufficient to conduct an initial assessment and to evaluate whether stocks are maintained at or above the biomass that would produce MSY. Some environmental data are used as covariates in CPUE standardization and to help explain recruitment dynamics. Stock structure data are limited, but are so far consistent with an Indian Ocean-wide stock, although this may change if more tagging is carried out in the western ocean. Overall, the data are sufficient for the harvest strategy at the current level of exploitation, meeting SG80. There remain significant gaps in the data, however, related to catches, stock structure and fleet operations, such that the range of information is not comprehensive, so SG100 cannot be fully met.

1.2.3.b Monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.

Monitoring indices from standardized CPUE and from tagging data are adequate for the harvest strategy and current level of exploitation. Indicators of stock abundance consist of standardised catch-per-unit-effort indices.

The Scientific Committee expressed concerns on the ability of the available CPUE and to reflect changes in stock size. There is no longline CPUE, which is usually relied upon. However, the two independent indices in 2017 were coherent, giving rise to limited confidence in their tracking abundance. Overall, data are sufficient for the application of a precautionary harvest control rule which has been implemented through 16/02, so SG80 is met.

Significant information is missing (for example, CPUE indices do not extend far, size composition data are sparse for some fleets, and so on). There have been no recent tagging programmes. Data collection is improving, so data may build into the future where all information useful to the stock assessment (and hence harvest control rule) is available and its uncertainties are well understood, but this is not the case yet. SG100 is not met.

1.2.3.c Comprehensiveness of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is good information on all other fishery removals from the stock.	

IOTC has put considerable effort into the reporting and recording of all tuna catches by the contracting parties. The current level of reporting is adequate given the number of small countries involved and difficulties in monitoring small vessels and activities in pelagic waters well away from the coast. For example, some countries do not report tuna catch by species, so only estimates are available. Total catches are estimated reasonably well, and data are sufficiently well recorded for the stock assessment and for assessing the level of control sought by IOTC over landed catches. Overall, data are sufficient to meet SG80. While some problems exist, they are being addressed and do not increase the risk for the assessment and management of the stocks.

All SG60 and SG80 were met, and 0 out of 2 SG100 were met.

PI 1.2.3 : 80

References

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P.1.2.4 Assessment of stock status

1.2.4.a Appropriateness of assessment to stock under consideration		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.

The primary assessment tool for Indian Ocean skipjack is Stock Synthesis v3 (SS3) which incorporates multiple fisheries, gears, selectivity models and spatial variability. Since the first assessment in 2011, the assessment has improved and has become reliable, with fewer unresolved uncertainties. The assessment approach can use all available data, even if not all data are available to be included in the assessment at the current time. Therefore, the assessment is appropriate for the stock and for

the current harvest control rule, meeting SG80. In addition, the model known biological features (e.g. age-variant natural mortality) and use all available data, so SG100 is met.

1.2.4.b Assessment approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	

All tuna stock assessments have been used to estimate the MSY and other reference points, and these have been used to determine stock status. This meets SG80.

1.2.4.c Uncertainty in the assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment **identifies major sources** of uncertainty.	The assessment takes **uncertainty into account.**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.

Stock assessment methods have been used to report uncertainty in estimates of stock status. Uncertainties have been examined as alternative model configurations and estimates of statistical uncertainty in parameters. The configurations have been evaluated so that the final results represent an expert consensus of their relative importance. The stock status associated with each model has been evaluated in a probabilistic manner (based on an assumed multivariate normal distribution for parameters). These probabilities have been carried through the Kobe plots and Kobe strategy matrix (phase diagram of fishing mortality versus SSB at time and projections of the probability of exceeding reference points for alternative catch levels, respectively). Therefore, uncertainty is carried through from the assessment to management advice, meeting SG80 and SG100.

1.2.4.d Evaluation of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

Application of SS3 to skipjack has been relatively recent. New data are becoming available (e.g. a new purse seine abundance index), which may have a significant impact on estimates. Various credible hypotheses regarding stock structure, life history, and changes in fleets have not been explored yet. Because the implications of alternative model structures have not yet been rigorously explored, SG100 is not met.

1.2.4.e Peer review of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

The stock assessments are reviewed through the Working Party for Tropical Tunas of the IOTC's Scientific Committee. Additionally, outside experts are regularly invited to participate in the Working Party meetings. However, the structure of the WP meeting limited the degree of both external and internal review. Levels of review are clearly adequate to meet SG80, but not SG100. Short publicly available technical reports based on external reviewers' observations would likely merit SG100.

The stock assessments are reviewed through the Working Party for Tropical Tunas of the IOTC's Scientific Committee. Additionally, outside experts are regularly invited to participate in the Working Party meetings. However, the structure of the WP meeting limited the degree of both external and internal review. Levels of review are clearly adequate to meet SG80, but not SG100. Short publicly available technical reports based on external reviewers' observations would likely merit SG100.

All SG60 and SG80 were met, and 2 out of 4 SG100 were met.

PI 1.2.4 : 90

References

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IOTC 2014. Report of the Fifth Session of the IOTC Working Party on Temperate Tunas. Busan, Rep. of Korea, 28–31 July 2014. IOTC–2014–WPTmT05–R[E]

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IOTC 2016. Report of the 18th Session of the IOTC Working Party on Tropical Tunas. Seychelles, 5-10 November 2016. IOTC-2016-WPTT18-R[E]

IOTC–WPTmT06 2016. Report of the Sixth Session of the IOTC Working Party on Temperate Tunas. Shanghai, China, 18–21 July 2016. IOTC–2016–WPTmT06–R[E]: 58 pp

IOTC–WPTT19 2017. Report of the 19th Session of the IOTC Working Party on Tropical Tunas. Seychelles, 17–22 October 2017. IOTC–2017–WPTT19–R[E]: 118 pp

North Pacific Albacore

1.1 Outcome

P.1.1.1 Stock Status

1.1.1.a Stock status relative to recruitment impairment.		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.

The most recent stock assessment by the Albacore Working Group of ISC was in 2017. The default PRI is taken here to be the LRP agreed by WCPFC, i.e. 20%$SB_{F=0}$ (although in practice it is likely to be lower). The assessment estimated SSB (in terms of female spawner biomass) to be ~2.5 times above the LRP. Projections at constant fishing intensity suggest a high degree of certainty (>99%) that the SSB will not fall below the LRP in 2020 and 2025. SG100 is met.

1.1.1.b Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

The stock assessment estimates SSB_{MSY} to be lower than the WCPFC LRP (~14%SSB_0). In this circumstance, MSC proposes that 2xPRI / 40%$SB_{F=0}$ could be used as a suitable proxy for SSB_{MSY} in the sense intended by MSC. The Working Group set out three different model scenarios in the report: the base case, an alternative with M=0.3 instead of 0.4 and an alternative with a slightly different growth model. For the base case and the alternative growth model, SSB_{2015} is estimated to be >2 times higher than the LRP (2.47 times higher for the base case model, 2.15X higher for the alternative growth model) i.e. overall above this proxy SSB_{MSY}. For the M=0.3 model, however, SSB_{2015} is estimated to be 1.31xLRP or 0.26$SSB_{F=0}$. However, the assessment cites research (a meta-analysis) suggesting that M=0.3 (used elsewhere for albacore assessments) is not well supported, while M=0.4 (or higher) is a more plausible value based on work done by ICCAT and a previous analysis of tagging data from this stock. (The stock assessment for South Pacific albacore previously used M=0.4 because it gave the best model fit, but the most recent assessment changed to assuming M=0.3 for improved consistency with other albacore stock assessments).

On this basis, we can reasonably say that it is highly likely that SSB is at or above a level consistent with MSY, as defined in a precautionary way by MSC, but there may not be a 'high degree of certainty' that the stock is above that level. SG80 is met but SG100 is not met.

All SG60 and SG80 were met, and 1 out of 2 SG100 were met.

PI 1.1.1 : 90

References

Albacore Working Group 2017. Stock assessment of albacore tuna in the North Pacific Ocean in 2017. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean. 12-17 July 2017, Vancouver, Canada. WCPFC reference: WCPFC-SC1

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Kinney, M.J., and Teo, S.L.H. 2016. Meta-analysis of north Pacific albacore tuna natural mortality. ISC/16/ALBWG-02/07. Nanaimo, British Columbia, Canada

WCPFC, 2017. Thirteenth Regular Session of the Scientific Committee. Rarotonga, Cook Islands, 9-17 August, 2017

1.2 Harvest Strategy (Management)

P.1.2.1 Harvest Strategy

1.2.1.a Harvest strategy design		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.

The general objective of the WCPFC is to maintain populations of tunas and tuna-like fishes at levels that will permit maximum sustainable yield (MSY). A specific commitment to long-term sustainable fisheries management was adopted at the Western and Central Pacific Fisheries Commission in 2014 (CMM 2014-06). At its 2015 meeting, the WCPFC adopted a workplan for developing and implementing a HS approach that includes TRP, HCR and other elements.

The current harvest strategy for North Pacific albacore is set out in IATTC Resolution C-05-02 and WCPFC CMM 2005-03 which state the same thing: i.e. CPCs/CCMs should take measures to ensure that fishing effort on North Pacific albacore does not increase above 'current levels' (i.e. $F_{2002\text{-}4}$). IATTC have also passed Resolution C-13-03 which improves the reporting framework.

In 2017, the WCPFC Northern Committee passed an 'interim harvest strategy' for North Pacific albacore which supplements the above harvest strategy (see report Attachment H); although it will not come into force unless endorsed by the WCPFC plenary. This puts in place the WCPFC LRP of $20\%SB_{F=0}$. It does not fix a TRP but notes that this should be determined as part of a MSE included under the Committee's future work. It also puts in place a decision rule relating to the LRP, as follows:

In the event that, based on information from ISC, the spawning stock size decreases below the LRP at any time, NC will, at its next regular session or intersessionally if warranted, adopt a reasonable

timeline, but no longer than 10 years, for rebuilding the spawning stock to at least the LRP and recommend a CMM that can be expected to achieve such rebuilding within that timeline. …

The 2017 stock assessment estimates that F (fishing intensity; 1-SPR) is below all the proxy targets evaluated (F_{MSY}, $F_{0.1}$, $F_{10\%}$-$F_{50\%}$) except for $F_{50\%}$ (the base case model estimates it to be ~at this level). Fishing intensity is estimated to have fluctuated at a ~constant level since the 2002-4 reference period (see stock assessment, Figure 5.16.).

Projections at constant fishing intensity (consistent with the harvest strategy) suggest a low probability (<1%) that biomass will decline below the WCPFC LRP by 2025, however, these projections imply a reduction in catch over this period, because of patterns of recent recruitment. Projections at constant catch suggest <5% probability that female SSB will drop below the LRP by 2020, but this rises to a 30% probability by 2025.

On this basis, the harvest strategy (no increase in fishing effort) can be expected to achieve stock management objectives, at least in the short term; SG60 is met. In the longer term it does not seem that the current management measures to implement the harvest strategy can be argued to be likely to achieve stock management objectives (maintain biomass above the LRP), since there is currently no means of controlling catches directly and no means of enforcing the requirements on fishing effort at regional level (in any case difficult because the Resolution/CMM does not define what it means by 'fishing effort'). There is a commitment to introduce another CMM should biomass fall below the LRP, but not necessarily in the circumstances of increased probability of biomass falling below the LRP in the future. On this basis, taking into account the usual definition of a LRP (i.e. that biomass should be maintained above this level with a high probability), there is not clear evidence that the harvest strategy will continue to meet this objective. SG80 is not met.

In order to improve this score, the harvest strategy need to be improved such that i) it takes into account the risk of the stock falling below the LRP, and ii) such that there is evidence that tools can be put in place to implement the strategy, if required.

1.2.1.b Harvest strategy evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

There is evidence that the harvest strategy is achieving its objectives at present, (stability in fishing intensity, low probability of the biomass dropping below the LRP). If the harvest strategy can be maintained into the future, there is evidence that objectives will continue to be met (projections based on constant fishing intensity); if biomass falls below the LRP there is a commitment by the Northern Committee that additional measures will be put in place. On this basis, SG80 is met. The harvest strategy has not been fully evaluated, so SG100 is not met.

It should be noted that this scoring is contingent on continuing improvement in the harvest strategy as set out in the scoring for 1.2.1.a; it is not clear that under the status quo, the harvest strategy will continue to be able to achieve its objectives.

1.2.1.c Harvest strategy monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place that is expected to determine whether the harvest strategy is working.		

Monitoring of catch, effort, size and other elements (see 1.2.3) are sufficient that the stock assessment can determine that the harvest strategy is working (see above). SG60 is met.

1.2.1.d Harvest strategy review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The harvest strategy is periodically reviewed and improved as necessary.

CMM 2005-03 is reviewed annually by the Northern Committee, although they have never recommended that any change is required. The harvest strategy overall is currently undergoing review by WCPFC's Northern Committee, following the requirements of CMM 2014-06. They have proposed an interim harvest strategy which sits alongside existing measures (see above). The development of a TRP and HCR is part of MSE work currently underway by ISC. This process is, however, incomplete; the existing harvest strategy (i.e. CMM 2005-03 and C-05-02) has not been updated for quite some time, although some elements such as reporting have been improved. For the moment, SG100 is not met.

1.2.1.f Review of alternative measures		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biannual** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.

The main concern with discards of tuna appears to apply to the purse seine fleet. WCPFC has in place CMM 2009-02 which aims to limit discard mortality and requires reporting of discard events. In addition, recent CMMs (2014-01, 2015-01, 2016-01) aim to reduce undesirable catch of juvenile bigeye and purse seine through control of effort on FADs. On this basis, discarding is clearly subject to review and that controls are being implemented, meeting SG80. It is not clear this review is biannual, so SG100 is not met.

All SG60 were met, and 2 out of 3 SG80 were met.

PI 1.2.1 : 75

References

Albacore Working Group 2017. Stock assessment of albacore tuna in the North Pacific Ocean in 2017. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean. 12-17 July 2017, Vancouver, Canada. WCPFC reference: WCPFC-SC1

IATTC, 2005. Resolution on Northern Albacore Tuna. 73rd Meeting, Lanzarote (Spain), 20-24 June 2005. Resolution C-05-02

IATTC, 2013. Supplemental Resolution on North Pacific Albacore. 85th Meeting, Veracruz (Mexico). 10-14 June 2013, Resolution C-13-03

ISC 2017. Report of the 17th meeting of the International Scientific Committee for tuna and tuna-like species in the North Pacific Ocean. Plenary Session, 12-17 July 2017, Vancouver, Canada.

WCPFC 2005. Conservation and Management Measure for North Pacific Albacore. CMM-2005-03

Conservation and management measure on the application of high seas FAD closures and catch retention. CMM 2009-02

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WCPFC 2015. Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. Twelfth Regular Session. 3-8 December 2015. Bali, Indonesia. Summary Report

WCPFC, 2017. Thirteenth Regular Session of the Scientific Committee. Rarotonga, Cook Islands, 9-17 August, 2017

WCPFC 2017. Northern Committee, 13th Regular Session. Summary Report. Busan, Korea, 28 August-1 September, 2017.

P.1.2.2 Harvest control rules and tools

1.2.2.a HCRs design and application		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Generally understood HCRs are in place or **available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.

At SG60, MSC allows a harvest control rule to be 'available' rather than 'in place' if the requirements summarised below are met (for full list see SA2.5.2, 2.5.3):

- Stock biomass has not previously been reduced below the MSY level, or has been maintained at that level for a recent period of time … and is not predicted to be reduced below BMSY within the next 5 years;

- HCRs are effectively used in other stocks by the same management body or an agreement or framework is in place requiring the management body to adopt HCRs before the stock declines below BMSY.

The second of MSC's requirements for scoring an 'available' HCR is met for northern albacore by WCPFC CMM 2014-06. In terms of the first, the first difficulty is to evaluate what estimate of B_{MSY} to use. The ISC stock assessment provides an estimate which is low relative to SSB_0 (see 1.1.1); if this estimate is used, biomass is not predicted to drop below this level. If the MSC proxy of 2xLRP is used (i.e. 40%$SSB_{F=0}$), biomass is projected to drop to ~this level by 2025 based on constant fishing intensity, but below this level by 2020 based on constant catch.

The estimate of B_{MSY} from the stock assessment is low relative to unfished biomass and is therefore not a precautionary target. Although the harvest strategy is predicated on constraining fishing effort, there are no stock-wide measures in place to do this; the harvest strategy relies on individual countries taking action for their fleets. The most recent stock assessment, however, estimates that in order to maintain F at the level requirement for the stock biomass to be kept above the LRP, some reduction in catch is required from present levels. Since there is no evidence at the moment that this can be achieved, there is not really a good reason to expect that the harvest strategy can reduce the exploitation rate as the LRP is approached. Therefore, SG60 is not met.

1.2.2.b HCRs robustness to uncertainty		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.

It is not possible to evaluate the harvest control in relation to uncertainties, because the HCR has not been defined well enough to do so. Therefore SG80 cannot be met.

1.2.2.c HCRs evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

At SG60, to evaluate the effectiveness of 'available' tools, MSC states that following is required (SA2.5.5):

a. Evidence that HCRs are being 'effectively' used in other named UoAs, also managed by the same management body, including the basis on which they are regarded as 'effective'; or

b. A description of the formal agreement or legal framework that the management body has defined, and the indicators and trigger levels that will require the development of HCRs

For the moment, it is not clear that there are any tools in place to control fishing capacity, despite the requirements of C-05-02 and CMM 2005-03; fishing capacity appears to have been restrained by relatively higher levels of recruitment than in previous decades. WCPFC have a formal framework for the development of a HCR (CMM 2014-06); for this stock it should be implemented by the Northern

Committee. The NC have proposed an interim harvest strategy to WCPFC (see above), which includes a trigger level (SSB<LRP) for the development of a more effective CMM (including rebuilding timeframe), meanwhile ISF are working on a MSE to put in place a TRP and HCR, and the NC also have this in their 2018-2020 workplan (see 2017 report, Attachment I). IATTC do not have such a formal commitment in place for this stock, but so far, management has been coordinated between the two RFMOs and there is no reason to suppose that this will not continue.

The situation at present, however, is that unlike of the past. It appears that action is required to reduce catches relative to current levels, otherwise there is an increased risk that the stock will fall below the agreed LRP. There are no convincing tools in place at present to achieve this. In this situation of increased risk to the stock under the current management regime, it is not appropriate to consider that 'available' tools will be effective in constraining F to appropriate levels, so SG60 is not met.

In order to improve this scoring, the interim (and final) harvest strategy needs to include management tools (stock-wide effort or catch limits) which have a reasonable expectation of being able to constrain exploitation rate to appropriate levels.

Only 0 out of 2 SG60 were met.

PI 1.2.2 : Fail

References

Albacore Working Group 2017. Stock assessment of albacore tuna in the North Pacific Ocean in 2017. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean. 12-17 July 2017, Vancouver, Canada. WCPFC reference: WCPFC-SC1

IATTC, 2005. Resolution on Northern Albacore Tuna. 73rd Meeting, Lanzarote (Spain), 20-24 June 2005. Resolution C-05-02

ISC 2017. Report of the 17th meeting of the International Scientific Committee for tuna and tuna-like species in the North Pacific Ocean. Plenary Session, 12-17 July 2017, Vancouver, Canada.

WCPFC 2005. Conservation and Management Measure for North Pacific Albacore. CMM-2005-03

WCPFC, 2014. Conservation and management measures to implement a harvest strategy approach for key fisheries and stocks in the WCPO. CMM 2014-06. https://www.wcpfc.int/doc/cmm-2014-06/conservation-and-management-measures-develop-and-implement-harvest-stra

WCPFC 2017. Northern Committee, 13th Regular Session. Summary Report. Busan, Korea, 28 August-1 September, 2017.

P.1.2.3 Information / monitoring

1.2.3.a Range of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

The stock assessment uses fishery-specific catch data, size data and various abundance indices; the assessment had a choice of 13 possible indices of relative abundance with good contrast. Biological data including tagging, age and growth and sex composition data are also available, although some uncertainties remain, e.g. in relation to growth. Historical data may also be uncertain; the most recent assessment shortened the time series from 1996-2015 to 1992-2015, due to poor fits and data conflict in the earlier part of the time series. Overall, however, data are comprehensive, and data not used directly in the stock assessment, such as environmental studies, are also available. SG100 is met.

1.2.3.b Monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.

The harvest strategy is based on fishing effort, which can be measured in the stock assessment (as fishing intensity, 1-SPR) using the data described above. Female SSB can also be estimated relative to various reference points including the WCPFC LRP which is used in the proposed NC interim harvest strategy. On this basis, data are sufficient for the requirements of the harvest strategy; SG80 is met.

In relation to SG100, it is probably not the case that all information is collected with a high frequency and high degree of certainty; furthermore, the stock assessment and ISC note a variety of uncertainties (e.g. in age/growth, sex-specific growth, historical data and natural mortality), some of which have a significant effect on the conclusions of the assessment and the management advice. SG100 is not met.

1.2.3.c Comprehensiveness of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is good information on all other fishery removals from the stock.	

Overall, catch data are sufficient to meet SG80. While some problems exist, they are being addressed and do not increase the risk for the assessment and management of the stock. The WCPFC Secretariat notes considerable improvements in data submission in 2017.

All SG60 and SG80 were met, and 1 out of 2 SG100 were met.

PI 1.2.3 : 90

References

Albacore Working Group 2017. Stock assessment of albacore tuna in the North Pacific Ocean in 2017. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean. 12-17 July 2017, Vancouver, Canada. WCPFC reference: WCPFC-SC1

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Williams P. 2017. Scientific data available to the Western and Central Pacific Fisheries Commission. Report to the Scientific Committee, 13th Regular Session, Rarotonga, Cook Islands, 9-17 August 2017. WCPFC-SC13-2017/ST WP-1 (rev 1.)

P.1.2.4 Assessment of stock status

1.2.4.a Appropriateness of assessment to stock under consideration		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.

North Pacific albacore stock was assessed in 2017 using the Stock Synthesis 3 modelling framework. This is a modern well-tested statistical catch-at-age modelling approach that has wide application across a large number of fisheries. 29 fisheries were defined on the basis of gear, location, season, and the unit of catch (numbers or weight). Quarterly indices of relative abundance were developed for 13 fisheries. Catch was treated as known with low error. These data have been sufficient to conduct assessments and to evaluate the harvest strategy. Stock structure data are limited, but are consistent with North Pacific Ocean-wide stock. Species biology is incorporated (e.g. size structure, age and growth, estimates of natural mortality). Overall, the assessment is high quality and accounts for the data available. SG100 is met.

1.2.4.b Assessment approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	

The stock assessment estimates female SSB and fishing intensity (1-SPR) in relation to a wide range of reference points (e.g. SSB and F at MSY, F over a range of %SPR, $F_{0.1}$, $SSB_{F=0}$ and SSB_0). SG80 is met.

1.2.4.c Uncertainty in the assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment **identifies major sources** of uncertainty.	The assessment takes **uncertainty into account.**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.

The stock assessment methods allow estimation of uncertainty in estimates of stock status and other parameters. Uncertainties have also been examined as alternative model structures and/or input values (sensitivities). This probabilistic information is reported in stock assessment conclusions and in projections under different scenarios (see 1.1.1, 1.2.2). SG100 is met.

1.2.4.d Evaluation of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

There is sufficient evidence that the model structure has been explored extensively. Various sensitivity analyses are used to evaluate alternative assumptions and model structures, selected during the stock assessment meeting as well as in preliminary preparation workshops. Diagnostics are presented and suggest the assessment is robust, so SG100 is met.

1.2.4.e Peer review of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

The original SS3 stock assessment of North Pacific albacore was externally reviewed in 2011 and recommendations were incorporated into subsequent assessments. The stock assessment report is reviewed by ISC in their plenary. External reviews also took place on the original 2011 assessment. SG100 is met.

All SG60, SG80 and SG100 were met

PI 1.2.4 : 100

References

Albacore Working Group 2016. Report of the Albacore Working Group workshop, International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean, 8-14 November 2016, Nanaimo, British Columbia, Canada

Albacore Working Group 2017. Stock assessment of albacore tuna in the North Pacific Ocean in 2017. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean. 12-17 July 2017, Vancouver, Canada. WCPFC reference: WCPFC-SC1

ISC 2017. Report of the 17th meeting of the International Scientific Committee for tuna and tuna-like species in the North Pacific Ocean. Plenary Session, 12-17 July 2017, Vancouver, Canada.

South Pacific Albacore

1.1 Outcome

P.1.1.1 Stock Status

1.1.1.a Stock status relative to recruitment impairment.		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.

The most recent 2015 assessment determined that overfishing is not occurring and the stock is not in an overfished state. The conclusions of the assessment were that: current catch is either at or less than MSY while recent levels of spawning potential are most likely above the MSY level. SB_{2013} is estimated to be 40%$SB_{F=0}$ with grid 5% and 95%iles ranging from 33% to 64% (the agreed LRP is 20%). $F_{2009\text{-}2012}$ is 39% of F_{MSY} (11-59%). Therefore, it appears that there is a high degree of certainty that the stock is above the PRI, meeting SG100.

1.1.1.b Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

The stock assessment does not estimate SB relative to SB_{MSY} directly. SB_{2013} is estimated to be 40% $SB_{F=0}$. $F_{2009\text{-}2012}$ is 39% of F_{MSY} (11-59%) and F has been below F_{MSY} over the entire time series. For this stock, SB_{MSY} is estimated to be close to the agreed limit reference point (25% $SB_{F=0}$; the LRP is 20% $SB_{F=0}$). The biomass has likewise been above this level over the entire time series. A biomass of 38%$SB_{F=0}$ is estimated to give a 5% probability of the biomass falling below the LRP (under

equilibrium conditions); SB_{MSY} is somewhat higher than the LRP, but likewise the most up-to-date biomass estimate is above 38%. Overall, therefore the stock has been above a level consistent with MSY for the duration of the fishery, and there is a high degree of certainty that it is still above it – SG100 is met.

It is worth noting, however, that the median estimate of MSY from the structural sensitivity analysis (76,800 t) is comparable to the recent levels of (estimated) catch from the fishery (average 2011-2015: 77,817t). Longline catch rates are declining, and catches over the last 10 years have been at historically high levels and are increasing. It is questionable whether B_{MSY} and F_{MSY} are suitable target reference points for this fishery.

All SG60, SG80 and SG100 were met

PI 1.1.1 : 100

References

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1.2 Harvest Strategy (Management)

P.1.2.1 Harvest Strategy

1.2.1.a Harvest strategy design		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.

The general objective of the WCPFC is to maintain populations of tunas and tuna-like fishes at levels that will permit maximum sustainable yield (MSY). A specific commitment to long-term sustainable fisheries management was adopted at the Western and Central Pacific Fisheries Commission in 2014 (CMM 2014-06). At its 2015 meeting, the WCPFC adopted a workplan for developing and implementing a HS approach that includes TRP, HCR and other elements.

Management of the albacore stock throughout the South Pacific is a responsibility of the Western and Central Pacific Fisheries Commission (WCPFC). The current harvest strategy is set out in CMM 2015-02, which states that CCMs shall not increase the number of their fishing vessels actively fishing for South Pacific albacore in the Convention Area south of 20°S above 2000-2005 levels, although it allows SIDS (Pacific islands) to pursue a responsible level of development of their domestic albacore fisheries; it also does not put any checks on effort north of 20°S, which is non-negligible. Nevertheless, catch has been declining gradually but constantly since 2012, and recent

projections based on 2015 catch suggest that biomass will fall to 35% $SB_{F=0}$ by 2033, with a probability of 7% that it will fall below the LRP; this is an improvement on the estimate of a 20% probability seen in earlier projections based on 2013 catch.

WCPFC have put in place a commitment to developing a more formal and structured harvest strategy, incorporating a clear HCR; this is set out in CMM 2014-06 and the associated workplan (updated at WCPFC13; see report Attachment N).

On this basis, it can be argued that the harvest strategy is expected to achieve stock management objectives, at least for some time into the future; SG60 is met. It is not, however, responsive to the state of the stock, so SG80 is not met.

1.2.1.b Harvest strategy evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

Countries undertake to control catches mainly through effort limits and limits on capacity (i.e. number of vessels targeting albacore). Countries are required to monitor and report catches and fishing activities, and fishing activity targeting albacore appears to be well monitored, although the measure of effort or capacity stipulated in CMM 2015-02 is not particularly easy to quantify. For the moment, SB is above the level giving a 5% risk of falling below the LRP and F is $<<F_{MSY}$. Hence there is evidence that (for the moment) the harvest strategy is achieving its objectives; SG80 is met. Its performance has not, however, been 'fully evaluated', nor is it completely clear that in the long run it will be able to maintain biomass at target levels (depending on what the target is finally agreed to be). Hence SG100 is not met.

1.2.1.c Harvest strategy monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place that is expected to determine whether the harvest strategy is working.		

All significant fisheries on SPA report catch and effort data (operational or aggregated) to SPC. CCMs are required to report annually to WCPFC the details of their fisheries (Part 1 reports) and compliance with the CMMs (Part 2 reports). Periodic stock assessments are conducted. SG60 is met.

1.2.1.d Harvest strategy review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The harvest strategy is periodically reviewed and improved as necessary.

There has not been a formal review of the harvest strategy; it has been adjusted several times (CMMs 2005-05, 2010-05 and 2015-02), but not noticeably improved during this process. SG100 is not met.

1.2.1.f Review of alternative measures		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biannual** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.

The main concern with discards of tuna appears to apply to the purse seine fleet. WCPFC has in place CMM 2009-02 which aims to limit discard mortality and requires reporting of discard events. In addition, recent CMMs (2014-01, 2015-01, 2016-01) aim to reduce undesirable catch of juvenile bigeye and purse seine through control of effort on FADs. On this basis, discarding is clearly subject to review and that controls are being implemented, meeting SG80. It is not clear this review is biannual, so SG100 is not met.

All SG60 were met, and 2 out of 3 SG80 were met.

PI 1.2.1 : 75

References

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P.1.2.2 Harvest control rules and tools

1.2.2.a HCRs design and application		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Generally understood HCRs are in place or **available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.

At SG60, MSC allows a harvest control rule to be 'available' rather than 'in place' if the requirements summarised below are met (for full list see SA2.5.2, 2.5.3):

- Stock biomass has not previously been reduced below the MSY level, or has been maintained at that level for a recent period of time … and is not predicted to be reduced below BMSY within the next 5 years;
- HCRs are effectively used in other stocks by the same management body or an agreement or framework is in place requiring the management body to adopt HCRs before the stock declines below BMSY.

The second of MSC's requirements for scoring an 'available' HCR is met by CMM 2014-06. In terms of the first, for SP albacore, stock biomass has not previously been reduced below the MSY level, according to the stock assessment; projections based on 2015 conditions do not predict that stock biomass will decline to the MSY level (~25%$SB_{F=0}$) at any time. These conditions are therefore met.

However, the biomass trajectory is consistently downwards throughout the time series, except for a brief period in the early 2000s. Under 2014 levels of effort, it is predicted to stabilise at ~35%$SB_{F=0}$, which is below the MSC default target level, and below an appropriate economic level for most of the fleets targeting the stock.

The case of bigeye also raises the question as to what actions WCPFC could be relied on to take, should the next stock assessment for SP albacore to give a different perception of the stock status (as happened for bigeye in 2017). Despite bigeye being considered overfished from 2011-2017, the

management actions put in place by WCPFC have shown no evidence so far of being able to reduce fishing mortality on bigeye, as shown by the most recent stock assessment. On this basis, there is no particular evidence that any 'available' HCR is able to reduce the exploitation rate as the PRI is approached. On this basis, SG60 is not met.

For improvement in this scoring, some demonstrable progress is required towards a formal harvest strategy and HCR (as per CMM 2014-06) such that a more convincing argument can be made that effective action will be taken if required.

1.2.2.b HCRs robustness to uncertainty		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.

Since there is no HCR in place, it cannot be robust to the main uncertainties. SG80 is not met.

1.2.2.c HCRs evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

Under SA2.5.5, in order to conclude that 'available' HCRs are 'effective' (SG60), MSC requires evidence of i) the use of effective HCRs in other stocks or fisheries under the same management body; or ii) a formal agreement or framework with trigger levels which will require the development of a well-defined HCR. It also requires consideration of current exploitation rates in relation to biological reference points and the agreed trigger level (guidance for SA2.5.6: 'evidence that current F is equal to or less than F_{MSY} should usually be taken as evidence that the HCR is effective').

Taking this last point first, it is clear that $F<<F_{MSY}$ (see 1.1.1). Fishing the stock at MSY level would require a massive increase in effort from current levels. A formal agreement for the development of a well-defined HCR is provided by CMM 2014-06, with a framework provided by the updated workplan. A trigger level is provided by the agreed limit reference point ($20\%SB_{F=0}$) which is close to SB_{MSY} and well above the PRI (see 1.1.1).

Stock projections suggest that under the current management regime, biomass will stabilise in the long term above the LRP with ~90% probability. On this basis, there is not an imminent requirement for additional tools to be put in place in terms of risk to the stock (although there is in terms of maintaining the stock at an appropriate target level – see 1.2.2.a). On this basis, SG60 is met. SG80 is not met because there are no stock-wide tools in place to control exploitation.

To improve this score, some progress needs to be made in terms of agreeing an appropriate target reference point and defining and implementing whatever tools are required to maintain the stock biomass at this level (as per CMM 2014-06).

Only 1 out of 2 SG60 were met.

PI 1.2.2 : Fail

References

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P.1.2.3 Information / monitoring

1.2.3.a Range of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

A 2017 review of the scientific data available to WCPFC notes that there have been considerable improvements in the last few years. In 2017, all CCMs provided aggregate catch and effort estimates for 2016 by the deadline (30 April), and the quality of these data have also improved (fewer gaps). Operational-level data is now received from several major fleets, including China, Korea, Japan, Chinese Taipei and Indonesia (these last two for the first time in 2017), as well as other smaller fleets. Purse seine fisheries are required to have 100% observer coverage, and although not all achieve it, observer coverage is high, providing detailed operational-level data, as well as information on catch proportions by species etc.

WCPFC has been providing technical assistance to Vietnam, Indonesia and the Philippines to address data issues, although some problems still remain for these CCMs. Work is also underway to improve historical data. The key data gaps identified in the data availability report generally relate to species other than the main tuna species under WCPFC management – e.g. sharks, species which are discarded, species lacking good length/weight conversion factors.

The information used by SPC to inform the stock assessment, projections etc. for SP albacore (and hence support the harvest strategy) includes fishery-dependent catch, effort and size, tagging and biological data. Longline CPUE data provide an abundance index. There are some gaps in the data however; for example, for the latest stock assessment Japan (the key fleet for the early part of the time series) refused to provide operational data, although the situation in relation to operational data appears to have improved since then. There is also uncertainty around growth rates, and conflict in the assessment between the troll length-frequency data and the CPUE data.

The harvest strategy (CMM 2015-02) depends on being able to measure the number of vessels 'actively fishing for SP albacore', which is not easy; it is essentially left to flag states to define what constitutes 'actively fishing' and they then report to the Commission as part of their annual reporting on compliance with CMMs, but there is a regional register of vessels fishing in the region (see https://www.wcpfc.int/vessels). According to agreed harmonised scoring across MSC CABs (2014), SG80 is met but SG100 is not met. The improvement in operational data supplied to SPC may merit a review of whether SG100 is met after publication of the next stock assessment.

1.2.3.b Monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.

Catch data from all fleets are relatively complete and sufficient for the stock assessment. The abundance indices are primarily obtained from catch and effort data, particularly from the many longline fleets operating across the region, giving relatively long time series of information. Cohorts recruiting to specific fisheries are evident in catch length distributions making the data very informative on recruitment to the fishery. This assessment is supported by the analysis of operational longline data to construct both the CPUE time series and regional weights and the analysis of longline size data. Finally, the assessment includes results from a wide-scale study of the biological parameters of albacore (in particular results from the age and growth study aimed to address uncertainty around growth which has troubled previous assessments). This meets SG80. However not all information for all fleets was available to the most recent assessment (although the situation seems to have improved), and the uncertainties with growth and the abundance indices are not fully understood, so SG100 is not met.

1.2.3.c Comprehensiveness of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is good information on all other fishery removals from the stock.	

Catches appear to be reported at an acceptable level of accuracy for the stock assessment, meeting SG80. Data have been identified as missing, but these are generally related to operational data (fishing gear, target species and fishing activity) rather than catch. Discards, incidental mortality and recreational catch are not generally reported. As long as these sources of mortality remain constant and/or negligible, this lack of recording should not present a problem to the stock assessment.

All SG60 and SG80 were met, and 0 out of 2 SG100 were met.

PI 1.2.3 : 80

References

Harley, J., N. Davies, L. Tremblay-Boyer, J. Hampton and S. McKechnie. 2015. Stock Assessment for South Pacific Albacore Tuna. Scientific Committee Eleventh Regular Session. Pohnpei, FSM. 5-13 August 2015. WCPFC-SC11-2015/SA-WP-06 (REV 1), 4 August 2015

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P.1.2.4 Assessment of stock status

1.2.4.a Appropriateness of assessment to stock under consideration		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.

The assessment carried out in 2015, like the previous assessment in 2012, used the integrated stock assessment software MULTIFAN-CL (or MFCL), under the assumption that there is a single stock of albacore tuna in the South Pacific Ocean. Parameters of the model are estimated by maximizing an objective function consisting of likelihood (data) and “prior” information.

The model partitioned the population into 8 spatial regions and 48 quarterly age-classes. The last age-class comprised a plus group in which mortality and other characteristics were assumed to be constant. The population was monitored in the model at quarterly time steps, extending through 1960-2013.

The current assessment included eight longline fisheries, and three each of driftnet and troll fisheries. The assessment method is able to support all appropriate reference points and harvest control rules, attaining SG80.

This assessment is supported by the analysis of operational longline data to construct both the CPUE time series regional weights and the analysis of longline size data. Finally, the assessment included results from a wide-scale study of the biological parameters of albacore in particular results from a study aimed to address uncertainty around growth, which has troubled previous assessments. The

results are sensitive to the growth model in particular, which is may be inaccurate. Nevertheless, the model structure takes into account major features of the species biology and nature of the fisheries; SG100 is met.

1.2.4.b Assessment approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	

The stock assessment estimates SB and F in relation to a range of reference points including MSY reference points and depletion reference points ($SB_{current,F=0}$) – see 1.1.1; other reference points such as MEY-based reference points have also been considered. As is often the case, the estimates of reference points depend on assumptions about steepness and other parameters, but estimates are sufficiently robust that the stock status can be determined with reasonable confidence. SG80 is met.

1.2.4.c Uncertainty in the assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment **identifies major sources** of uncertainty.	The assessment takes **uncertainty into account.**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.

The MFCL software fits the population model to the data using likelihood. While not claiming to be fully Bayesian (probabilistic), it does include “priors” and penalties to improve estimation and produce likelihood profiles for estimate values of interest, which are used as a measure of uncertainty. However, the assessment recognizes structural errors as the largest source of uncertainty, and therefore produces ranges from sensitivity analyses as a better indicator of uncertainty.

The assessment reports a conflict between the CPUE and length frequency data, and it is suspected that separate growth models by sex and location may be required to resolve this. The model results are highly sensitive to the growth curve, so this is a key source of structural uncertainty.

A relatively large number of sensitivity analyses have been conducted on the stock assessments for this species, as recommended by the stock assessment preparatory meeting as well as identified by the assessment scientists. Natural mortality, size data relative weighting, regional weights, steepness and structural uncertainty analysis are examples. The “uncertainty analysis”, which tried all combinations of sensitivity analyses, was used to consider both individual uncertainties and their interactions. While the assessment deals well with all main uncertainties, meeting SG80, it not clear how these uncertainties might be used in decision-making, except in a very general way. Given the assessment indicates that the stock is well above any target reference point, more probabilistic approaches, such as the Kobe II strategy matrices, are unlikely to influence decision making. Therefore, SG100 is met.

1.2.4.d Evaluation of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

Alternative hypotheses and assessment approaches have been explored. Many of the underlying structural assumptions of the model have been reviewed and the assessment model and/or data have been adjusted to match research findings and changes in expert opinion and judgment. This constant review and adjustment is good practice and should reduce structural errors in the model. The open documentation and model review process increases confidence in the robustness of the assessment. Model diagnostics indicate that some sources of bias have been removed. SG100 is met.

1.2.4.e Peer review of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

The stock assessment has been developed and continues to be used by the SPC. The method has been well-documented and published in peer-review journals. The assessment is conducted by several scientists at the SPC and then presented to and reviewed by a pre-assessment workshop, the WCPFC Scientific Committee, meeting SG80. The WCPFC is considering independent external review, but the approach will depend on costs. Without an external review, SG100 cannot be met.

All SG60 and SG80 were met, and 3 out of 4 SG100 were met.

PI 1.2.4 : 95

References

Harley, J., N. Davies, L. Tremblay-Boyer, J. Hampton and S. McKechnie. 2015. Stock Assessment for South Pacific Albacore Tuna. Scientific Committee Eleventh Regular Session. Pohnpei, FSM. 5-13 August 2015. WCPFC-SC11-2015/SA-WP-06 (REV 1), 4 August 2015

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Western Pacific Bigeye

1.1 Outcome

P.1.1.1 Stock Status

1.1.1.a Stock status relative to recruitment impairment.		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.

A new stock assessment in 2017 used updated growth curves and as a result gave much more optimistic conclusions as to stock status than the previous assessment (2015). WCPFC SC13 agreed to use the stock assessment outputs to generate an uncertainty grid, weighing the new growth curve model as three times more likely than the old growth curve model; the other grid axes (steepness, tagging dispersion, size frequency and regional structure) weighed all model options as equally likely. The median and 90/10 percentile values of SB and F from this uncertainty grid were used to characterise stock status and uncertainty. According to this analysis, there is a ~16% probability that the stock has breached the agreed LRP (20%$SB_{F=0}$). Taking this to be the default PRI (although it is probably higher than the actual PRI), this would make the stock 'highly likely' (defined by MSC as 80% probability) that the stock is above the PRI, but there is not a 'high degree of certainty' (95%). SG80 is met but SG100 is not met.

1.1.1.b Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

Note that SB_{latest} is 2015, and SB_{recent} is 2011-14 average. The median value of the uncertainty grid (see 1.1.1.a) puts SB_{latest}/SB_{MSY} at 1.45 (10%ile 0.86) and SB_{recent}/SB_{MSY} at 1.23 (10%ile 0.63). The median value for F_{recent}/F_{MSY} is 0.83, with a probability of ~23% than F is above F_{MSY}. On this basis, the stock can be considered to be 'at or fluctuating around a level consistent with MSY'. SG80 is met. There is not, however a 'high degree of certainty' (95% probability) that the stock is at or above a level consistent with MSY. SG80 is met but SG100 is not met.

All SG60 and SG80 were met, and 0 out of 2 SG100 were met.

PI 1.1.1 : 80

References

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WCPFC, 2017. Thirteenth Regular Session of the Scientific Committee. Rarotonga, Cook Islands, 9-17 August, 2017

1.2 Harvest Strategy (Management)

P.1.2.1 Harvest Strategy

1.2.1.a Harvest strategy design		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.

The general objective of the WCPFC is to maintain populations of tunas and tuna-like fishes at levels that will permit maximum sustainable yield (MSY). A specific commitment to long-term sustainable fisheries management was adopted at the Western and Central Pacific Fisheries Commission in 2014 (CMM 2014-06). At its 2015 meeting, the WCPFC adopted a workplan for developing and implementing a HS approach that includes TRP, HCR and other elements.

The current harvest strategy (CMM 2016-01) states that the fishing mortality rate for bigeye tuna will be reduced to a level no greater than F_{MSY} (i.e. $F/F_{MSY} \leq 1$), and that this objective shall be achieved through step by step approach through to 2017. Management measures for 2014-2017 include limitations on FAD sets and fishing days for purse seine (which tend to catch juvenile bigeye and yellowfin), and catch limits on longline.

The harvest strategy contained in CMM 2016-01 has been in place since 2013, but was intended to be a one-year interim measure. It has, however, been renewed several times as attempts continue to put in place a formal and responsive harvest strategy and harvest control rule for the tropical tuna stocks, as per the requirements of CMM 2014-06 (workplan updated at 2016 plenary; see WCPFC13 report, Attachment N). In 2017 (plenary, December) WCPFC is due to consider performance indicators for the HCR, but is not now due to agree a target reference point and other key elements of the harvest strategy until 2019 at the earliest, according to the workplan. On this basis, it is hard to argue that the harvest strategy is 'responsive to the state of the stock' with the elements 'working together'; it is rather an ad hoc series of measures. The improved stock status is a function of a changed view of the biology of bigeye, rather than any actual increase in biomass. Nevertheless, since it is achieving stock management objectives (see 1.1.1), then SG60 is met, but SG80 is not met.

1.2.1.b Harvest strategy evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

The 2017 stock assessment estimates that $F<F_{MSY}$ with ~77% probability, while biomass is above the agreed LRP ($20\%SB_{F=0}$) with ~84% probability. On this basis, there is evidence that the harvest strategy is achieving its objectives (stated objective of CMM 2016-01; to maintain $F<F_{MSY}$). SG80 is met. The strategy has not, however, been 'fully evaluated' in relation to stock status, and it is also hard to argue, given the uncertainty around the stock assessment approach (with recent changes in the approach resulting in a significant qualitative change in the conclusions) that the harvest strategy is 'clearly able to maintain the stock at target levels' (also because no biomass target has been agreed). SG100 is not met.

1.2.1.c Harvest strategy monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place that is expected to determine whether the harvest strategy is working.		

There is a stock assessment by SPC every ~3 years (most recently for bigeye 2014 and 2017) with a review of stock indicators and trends in intervening years. The different parts of the strategy include reducing capacity overall, increasing the mean size and reducing catches from the main fisheries. Data are collected to estimate these quantities. Monitoring is therefore adequate to determine whether the harvest strategy is working. Met.

1.2.1.d Harvest strategy review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The harvest strategy is periodically reviewed and improved as necessary.

According to CMM 14-06, a formal harvest strategy for bigeye should be put in place by WCPFC, with provision for periodic review (see 14-06, Annex 1, para. 9). This has, however, not yet been achieved. Meanwhile, the existing harvest strategy, currently set out in CMM 2016-01, has been more or less the same for several years, despite the previous two stock assessments concluding that the stock was depleted. SG100 is not met.

1.2.1.f Review of alternative measures		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biannual** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.

The main concern with discards of tuna appears to apply to the purse seine fleet. WCPFC has in place CMM 2009-02 which aims to limit discard mortality and requires reporting of discard events. In addition, recent CMMs (2014-01, 2015-01, 2016-01) aim to reduce undesirable catch of juvenile bigeye and purse seine through control of effort on FADs. On this basis, discarding is clearly subject to review and that controls are being implemented, meeting SG80. It is not clear this review is biannual, so SG100 is not met.

All SG60 were met, and 2 out of 3 SG80 were met.

PI 1.2.1 : 75

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P.1.2.2 Harvest control rules and tools

1.2.2.a HCRs design and application		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Generally understood HCRs are in place or **available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.

At SG60, MSC allows a harvest control rule to be 'available' rather than 'in place' if the requirements summarised below are met (for full list see SA2.5.2, 2.5.3):

- Stock biomass has not previously been reduced below the MSY level, or has been maintained at that level for a recent period of time … and is not predicted to be reduced below BMSY within the next 5 years;
- HCRs are effectively used in other stocks by the same management body or an agreement or framework is in place requiring the management body to adopt HCRs before the stock declines below BMSY.

For WCPO bigeye, the second of MSC's requirements to score a HCR as 'available' is met via CMM 2014-06. In terms of the first, the stock biomass has not previously been reduced below the MSY level, according to the 2017 stock assessment. There are no short-term projections available at present based on the new assessment to evaluate likely stock trajectory over the next five years. SC13, however, emphasise the following:

- There is a moderate probability (~one in four) that F has actually exceeded FMSY.
- Overall uncertainty about the status of the stock is greater than previously, because the 'old' and 'new' growth models give different perspectives on stock status.
- Stock biomass has been declining continuously for 60 years, while fishing mortality has been increasing over the long term.
- Depletion levels are higher in some regions than others.

It is also worth noting that confidence intervals on the estimate of B relative to B_{MSY} are quite wide (80% CIs 0.86-1.97 for 'latest' and 0.63-1.66 for 'recent'). On this basis, it is hard to say with confidence that biomass will not decline below B_{MSY} in the next 5 years. Following a precautionary scoring approach, it is concluded that the requirements for a HCR to be 'available' at SG60 are not met.

The current harvest strategy (CMM 2016-01) does not have a well-defined HCR. It has a series of measures (restrictions on purse seine effort, FAD purse seine sets and longline catch limits) which are intended to restrain catches of bigeye to rebuild the stock (which has been evaluated since 2011 as overfished, up to the most recent stock assessment in 2017). Although the most recent stock assessment puts the stock in the Kobe plot green zone, this is a function of a change in the growth model rather than the effect of management action, which has not had been able to reduce fishing mortality, either on adults or on juveniles, according to the 2017 stock assessment. On this basis, the HCR has not worked to address the perception of stock status, and there is no reason to suppose that it will work now to avoid further declines, given that F remains at a historic high. On this basis,

we do not expect that the HCR will reduce the exploitation rate as the PRI is approach. SG60 is not met.

For improvement in this scoring, some demonstrable progress is required towards a formal harvest strategy and HCR (as per CMM 2014-06) such that a more convincing argument can be made that effective action will be taken if required.

1.2.2.b HCRs robustness to uncertainty		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.

Since there is no HCR in place, it cannot be robust to the main uncertainties. SG80 is not met.

1.2.2.c HCRs evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

The tools by which CMM 2016-01 is implemented for bigeye are as follows:

- temporal / spatial limits on purse seine setting on FADs
- restrictions on purse seine effort (days)
- longline catch limits for bigeye

The catch time series in the 2017 stock assessment runs to 2015; the harvest strategy has only been in place since 2014, and is incremental, so it is hard to say what impact it has had on either purse seine or longline catch up till now. Estimated juvenile and adult fishing mortality has stabilised but there is no evidence as yet that it is decreasing. The improved perception of stock status is a consequence of structural changes in the stock assessment model, not a consequence of management. On this basis, there is no particular evidence that the various tools in place are effective in controlling fishing mortality, and no reason to suppose that the stock trajectory will not continue downwards. On this basis, SG60 is not met.

For improvement in this scoring, some demonstrable progress is required towards a formal harvest strategy (as per CMM 2014-06) such that it is more clear that management tools are likely to be effective in maintaining a stable biomass at or above reference levels.

Only 0 out of 2 SG60 were met.

PI 1.2.2 : Fail

References

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P.1.2.3 Information / monitoring

1.2.3.a Range of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

A 2017 review of the scientific data available to WCPFC notes that there have been considerable improvements in the last few years. In 2017, all CCMs provided aggregate catch and effort estimates for 2016 by the deadline (30 April), and the quality of these data have also improved (fewer gaps). Operational-level data is now received from several major fleets, including China, Korea, Japan, Chinese Taipei and Indonesia (these last two for the first time in 2017), as well as other smaller fleets. Purse seine fisheries are required to have 100% observer coverage, and although not all achieve it, observer coverage is high, providing detailed operational-level data, as well as information on catch proportions by species etc.

WCPFC has been providing technical assistance to Vietnam, Indonesia and the Philippines to address data issues, although some problems still remain for these CCMs. Work is also underway to improve historical data. The key data gaps identified in the data availability report generally relate to species other than the main tuna species under WCPFC management – e.g. sharks, species which are discarded, species lacking good length/weight conversion factors.

In terms of fishery-independent data for bigeye, there are tagging data incorporated into the stock assessment, as well as recent age and growth information which has resulted in a major change to the conclusions of the stock assessment (see 1.1.1).

On this basis, sufficient information (on stock structure, stock productivity, fleet composition), is available for bigeye to monitor and assess stock status, including: aggregate and operational catch and effort data, historical catch data, size-frequency data and biological information (size at age, tagging), sufficient to support the harvest strategy as well as evaluate alternative management measures as required. SG80 is met. In relation to SG100, while data are comprehensive, there still remain some issues that could apply to bigeye; e.g. longline observer coverage, data provision from the above-mentioned countries. Furthermore, uncertainties remain about the biology of the species, which have an impact on our view of the stock; e.g. the definition of stock boundaries in the Pacific Ocean, age and growth (the new growth model had a dramatic impact on stock assessment

conclusions and remains controversial) and environmental drivers of recruitment. On this basis, SG100 is not met.

1.2.3.b Monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.

Catch, effort and stock status are monitored at a level that is sufficient for the current harvest strategy, meeting SG80 (details given above). There are, however, considerable uncertainties – to some extent in the data but in particular in the stock assessment, notably via growth models (see 1.1.1). The Scientific Committee emphasise that the most recent stock assessment is more uncertain than previous iterations, although presumably (according to SPC) more correct – i.e. more accurate but less precise. This uncertainty in the biological information available for stock assessment will have an impact in terms of the future development of the harvest strategy. On this basis, SG100 is not met.

1.2.3.c Comprehensiveness of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is good information on all other fishery removals from the stock.	

In 2017 all CCMs submitted aggregate catch data by the WCPFC deadline. Some of these data sets are higher quality than others. Catches of tuna are measured and monitored well enough for stock assessment and the harvest strategy. Although monitoring of catches in some areas is far from perfect, these do not pose an unacceptable risk to the harvest strategy. There are a number of on-going initiatives to strengthen data collection of member states. Overall, this meets SG80.

All SG60 and SG80 were met, and 0 out of 2 SG100 were met.

PI 1.2.3 : 80

References

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P.1.2.4 Assessment of stock status

1.2.4.a Appropriateness of assessment to stock under consideration		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.

The most recent assessment of bigeye tuna in the WCPO was conducted in 2017 using the Multifan-CL software. The bigeye tuna model is age-structured (40 quarterly age classes) and spatially-structured (9 regions). The catch, effort, size composition and tagging data used in the model are classified by 32 fisheries and quarterly time steps from 1952 to 2015. The assessment included a range of model options and sensitivities that were applied to investigate key structural assumptions and sources of uncertainty in the assessment. The model has and continues to be developed over the years with frequent supporting analysis and research and workshops. SG80 is met. The model tries to account for the major features of the biology of the species, but age and growth of bigeye turns out to be quite uncertain, and has a major impact on the conclusions of the stock assessment (compare 2014 and 2017). Until this is better determined, SG100 is not met.

1.2.4.b Assessment approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	

The assessment estimates spawner biomass and fishing mortality relative to a range of reference points which can be estimated (although some with more certainty than others), including MSY reference points (F_{MSY}, SB_{MSY}) and depletion-based reference points ($SB_{F=0}$, SB_0). SG80 is met.

1.2.4.c Uncertainty in the assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment **identifies major sources** of uncertainty.	The assessment takes **uncertainty into account.**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.

The assessment evaluates uncertainty in terms of alternative model structures and addresses uncertainty in data and observations, with critical uncertainties represented across the sensitivity analyses. This meets SG80. The Scientific Committee reviewed these uncertainties (different model options) carefully and established an uncertainty grid with different weighting for the different growth model options (see 1.1.1); this grid was used to set out median and 10% and 90% estimates of parameter values and stock status relative to various reference points (see Table BET-2). The Scientific Committee also estimate the probabilities that the biomass is below the LRP and that F is above F_{MSY} (see 1.1.1). However, quantitative probabilistic figures quoted in the stock assessment and SC reports do not capture the full range of uncertainty in the stock assessment; and averaging outputs across models with different structural assumptions is not an appropriate way to estimate uncertainty. On this basis, SG100 is not met.

1.2.4.d Evaluation of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

The stock assessment process is rigorous, including reviews of data and models through pre-assessment workshops. The 2017 assessment considers a range of alternative model structures and inputs, including different growth models, different software, different approaches to CPUE standardisation, a different regional structure, different approaches to estimating recruitment and with or without length-frequency data (because of data conflicts). Sensitivities were also tested for a range of assumptions, including steepness, tag mixing period, weighting of length- vs. weight-frequency (because of data conflicts) as well as different assumptions about growth and maturity/natural mortality as well as some more technical elements. On this basis it is reasonable to say that alternative hypotheses and approaches have been rigorously explored. SG80 is met.

In is obvious that the more alternative possibilities are explored, the more the final outcome is uncertain. However, the new growth curve has change radically our perspective on the stock, and until the wider scientific community has had a chance to review and potentially challenge this aspect of the model, it is hard to say that the new stock assessment has been ‘shown to be robust’. The Scientific Committee reports emphasises the uncertainty of its conclusions. SG100 is not met.

1.2.4.e Peer review of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

The assessment is subject to internal peer review through the WCPFC SC; preparatory workshops are also held before the stock assessment takes place to review data and the approach. An external peer review was completed for the 2011 stock assessment, which was published in 2012, but there has been no specific external review for the 2014 or 2017. For this reason, SG100 is not met.

All SG60 and SG80 were met, and 0 out of 4 SG100 were met.

PI 1.2.4 : 80

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WCPFC, 2017. Thirteenth Regular Session of the Scientific Committee. Rarotonga, Cook Islands, 9-17 August, 2017

Western Pacific Yellowfin

1.1 Outcome

P.1.1.1 Stock Status

1.1.1.a Stock status relative to recruitment impairment.		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.

The most recent stock assessment for WCPO yellowfin was in 2017. The default MSC estimate of the PRI is the agreed LRP (20%$SB_{F=0}$). The median estimate across the model grid was for SB_{latest} (2015) to be at 33%$SB_{F=0}$, with a <5% probability that it is below the LRP. Recruitment is estimated to have

increased in recent years, perhaps as a result of favourable environmental conditions. On this basis there is a 'high degree of certainty' (95% probability or greater) that the stock is above the PRI. SG100 is met.

1.1.1.b Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

Fishing mortality on both adults and juveniles has increased consistently through the time series, but has remained below the estimated level of F_{MSY} throughout. The median estimate of $F_{current}/F_{MSY}$ is 0.75, with only 2 out of 48 model configurations estimating that F is above F_{MSY}. The Scientific Committee estimate the median value of SB_{recent} (2011-14)/SB_{MSY} = 1.41 and SB_{latest} (2015) /SB_{MSY} is 1.39, with the 10%ile estimated at 1.05/1.02, and they estimate the 90%ile of F_{recent}/F_{MSY} at 0.97. The stock is at a level consistent with MSY. There is not necessarily a 'high degree of certainty' that the stock is above the MSY level at this point (roughly a 90% probability according to the above figures), but SG100 does not require this, and since it is probable that the stock remains above the MSY level and it has clearly been this way throughout the time series (so far), SG100 is met.

All SG60, SG80 and SG100 were met

PI 1.1.1 : 100

References

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WCPFC, 2017. Thirteenth Regular Session of the Scientific Committee. Rarotonga, Cook Islands, 9-17 August, 2017

1.2 Harvest Strategy (Management)

P.1.2.1 Harvest Strategy

1.2.1.a Harvest strategy design		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.

The general objective of the WCPFC is to maintain populations of tunas and tuna-like fishes at levels that will permit maximum sustainable yield (MSY). A specific commitment to long-term sustainable fisheries management was adopted at the Western and Central Pacific Fisheries Commission in 2014

(CMM 2014-06). At its 2015 meeting, the WCPFC adopted a workplan for developing and implementing a HS approach that includes TRP, HCR and other elements.

The objective of the current harvest strategy (CMM 2016-01) for yellowfin is that the fishing mortality rate will be maintained at a level no greater than F_{MSY} (i.e. $F/F_{MSY} \leq 1$). Management measures for 2014-2017 include limits on FAD sets and fishing days for purse seine; unlike bigeye there are no longline catch limits for yellowfin.

The harvest strategy contained in CMM 2016-01 has been in place since 2013, but was intended to be a one-year interim measure. It has, however, been renewed several times as attempts continue to put in place a formal and responsive harvest strategy and harvest control rule for the tropical tuna stocks, as per the requirements of CMM 2014-06 (workplan updated at 2016 plenary; see WCPFC13 report, Attachment N). In 2017 (plenary, December) WCPFC is due to consider performance indicators for the yellowfin HCR, and is due to agree a target reference point and candidate HCRs for yellowfin in 2018. For the moment, however, it is hard to argue that the harvest strategy is 'responsive to the state of the stock' with the elements 'working together'; it is rather an ad hoc series of measures targeted more at bigeye. Nevertheless, since it is achieving (exceeding) stock management objectives (see 1.1.1), SG60 is met, but SG80 is not met.

1.2.1.b Harvest strategy evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

The 2017 SC report estimates F_{recent}/F_{MSY} at 0.74 (median) with a probability <10% that F is above F_{MSY} (see 1.1.1). Longline catch has been fairly stable for several years, but purse seine catch expanded massively between 1980 and 2000. It is a bit too early to evaluate the impact of CMM 2013-01 and its successors up to 2016-01 on purse seine yellowfin removals since the stock since the stock assessment uses a time series to the end of 2015.

The new stock assessment does not provide short-term projections, but projections based on the previous stock assessment (the 2017 assessment is noted as being consistent with the previous one) indicate that it was very unlikely (<1%) that the stock would fall below the limit reference point by 2032 and relatively unlikely (<10%) that the stock would fall below B_{MSY} over the same time period; updated short-term projections from 2016 predicted that the stock biomass would increase under current conditions, although these projections estimate $SB_{2016}/SB_{F=0}$ to be considerably higher (0.49) than is the estimate of $SB_{latest}/SB_{F=0}$ from the 2017 stock assessment (0.35). Overall, however, there is evidence that the harvest strategy is achieving its objective for yellowfin, and that this is likely to continue for the next several years, although perhaps not indefinitely. SG80 is met. The harvest strategy has not, however, been 'fully evaluated' so SG100 is not met.

1.2.1.c Harvest strategy monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place that is expected to determine whether the harvest strategy is working.		

There is a stock assessment by SPC every ~3 years (most recently for yellowfin in 2014 and 2017) with a review of stock indicators and trends in intervening years. The different parts of the strategy include reducing capacity overall, increasing the mean size and reducing catches from the main fisheries. Data are collected to estimate these quantities. Monitoring is therefore adequate to determine whether the harvest strategy is working. SG100 is met.

1.2.1.d Harvest strategy review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The harvest strategy is periodically reviewed and improved as necessary.

According to CMM 14-06, a formal harvest strategy for yellowfin should be put in place by WCPFC, with provision for periodic review (see 14-06, Annex 1, para. 9). This has, however, not yet been achieved. Meanwhile, the existing harvest strategy, currently set out in CMM 2016-01, has been more or less the same for several years; although it is not clear that improvement is required as a matter of urgency. SG100 is not met.

1.2.1.f Review of alternative measures		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biannual** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.

The main concern with discards of tuna appears to apply to the purse seine fleet. WCPFC has in place CMM 2009-02 which aims to limit discard mortality and requires reporting of discard events. In addition, recent CMMs (2014-01, 2015-01, 2016-01) aim to reduce undesirable catch of juvenile bigeye and purse seine through control of effort on FADs. On this basis, discarding is clearly subject to review and that controls are being implemented, meeting SG80. It is not clear this review is biannual, so SG100 is not met.

All SG60 were met, and 2 out of 3 SG80 were met.

PI 1.2.1 : 75

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P.1.2.2 Harvest control rules and tools

1.2.2.a HCRs design and application		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Generally understood HCRs are in place or **available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.

At SG60, MSC allows a harvest control rule to be 'available' rather than 'in place' if the requirements summarised below are met (for full list see SA2.5.2, 2.5.3):

- Stock biomass has not previously been reduced below the MSY level, or has been maintained at that level for a recent period of time … and is not predicted to be reduced below BMSY within the next 5 years;

- HCRs are effectively used in other stocks by the same management body or an agreement or framework is in place requiring the management body to adopt HCRs before the stock declines below BMSY.

MSC's second requirement for an 'available' HCR is met for yellowfin by CMM 2014-06. In terms of the first, for WCPO yellowfin, stock biomass has not previously been reduced below the MSY level, according to the stock assessment. There are no short-term projections available at present based on the new assessment to evaluate likely stock trajectory over the next five years but as noted in 1.1.1 and 1.2.1, the probability of either SB or F being below the MSY level is quite small, and on that basis, it is not likely that the biomass will decline below the MSY level in the next five years. However, the biomass trajectory is consistently downwards throughout the time series, and there is no particular reason at present to suppose that it will stabilise above B_{MSY} under the current management regime.

However, the case of bigeye raises the question as to what actions WCPFC could be relied on to take, should the next stock assessment for yellowfin give a different perception of the stock status (as happened for bigeye in 2017). Despite bigeye being considered overfished from 2011-2017, the management actions put in place by WCPFC have shown no evidence so far of being able to reduce fishing mortality on bigeye, as shown by the most recent stock assessment. On this basis, there is no particular evidence that any 'available' HCR is able to reduce the exploitation rate as the PRI is approached. On this basis, SG60 is not met.

For improvement in this scoring, some demonstrable progress is required towards a formal harvest strategy and HCR (as per CMM 2014-06) such that a more convincing argument can be made that effective action will be taken if required.

1.2.2.b HCRs robustness to uncertainty		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.

Since there is no HCR in place, it cannot be robust to the main uncertainties. SG80 is not met.

1.2.2.c HCRs evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

The tools by which CMM 2016-01 is implemented for yellowfin are as follows:

- temporal / spatial limits on purse seine setting on FADs
- restrictions on purse seine effort (days)

There are no limits on longline fishing for yellowfin, although catch limits for bigeye may (*may*) limit effort for some CCMs.

The catch time series in the 2017 stock assessment runs to 2015; the harvest strategy has only been in place since 2014, and is incremental, so it is hard to say what impact it has had up till now. Estimated juvenile F has stabilised and perhaps decreased, but the trajectory of adult F does not seem to have been altered. The trajectory of stock biomass is downwards throughout the time series. On this basis, there is no particular evidence that the various tools in place are effective in controlling fishing mortality, and no reason to suppose that the stock trajectory will not continue downwards. On this basis, SG60 is not met.

For improvement in this scoring, some demonstrable progress is required towards a formal harvest strategy (as per CMM 2014-06) such that it is more clear that management tools are likely to be effective in maintaining a stable biomass at or above reference levels.

Only 0 out of 2 SG60 were met.

PI 1.2.2 : Fail

References

Tremblay-Boyer L., McKechnie S., Pilling G. and Hampton J. 2017. Stock assessment of yellowfin tuna in the western and central Pacific Ocean. WCPFC-SC13-2017/SA-WP-06, Rev1 August 4th

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P.1.2.3 Information / monitoring

1.2.3.a Range of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

A 2017 review of the scientific data available to WCPFC notes that there have been considerable improvements in the last few years. In 2017, all CCMs provided aggregate catch and effort estimates for 2016 by the deadline (30 April), and the quality of these data have also improved (fewer gaps). Operational-level data is now received from several major fleets, including China, Korea, Japan, Chinese Taipei and Indonesia (these last two for the first time in 2017), as well as other smaller fleets. Purse seine fisheries are required to have 100% observer coverage, and although not all achieve it, observer coverage is high, providing detailed operational-level data, as well as information on catch proportions by species etc.

WCPFC has been providing technical assistance to Vietnam, Indonesia and the Philippines to address data issues, although some problems still remain for these CCMs. Work is also underway to improve historical data. The key data gaps identified in the data availability report generally relate to species other than the main tuna species under WCPFC management – e.g. sharks, species which are discarded, species lacking good length/weight conversion factors.

In terms of fishery-independent data for yellowfin, tagging data and biological information (age and growth etc.) are incorporated into the stock assessment.

The key data gaps identified in the report generally relate to species other than the main tuna species under WCPFC management – e.g. sharks, species which are discarded, species lacking good length/weight conversion factors.

On this basis, sufficient information (on stock structure, stock productivity, fleet composition), is available to monitor and assess stock status, including: aggregate and operational catch and effort data, historical catch data, size-frequency data and biological information (size at age, tagging), sufficient to support the harvest strategy as well as evaluate alternative management measures as required. SG80 is met. In relation to SG100, while data are comprehensive, there still remain some issues that could apply to yellowfin; e.g. longline observer coverage, data provision from the above-mentioned countries. The stock assessment notes uncertainties about the biology of the species: the definition of stock boundaries in the Pacific Ocean (stocks may be structured at a smaller spatial scale than previously thought) as well as age and growth; the stock assessment scientists note a paucity of data on yellowfin growth and maturity, and emphasise that uncertainties in this area can have a big impact on stock assessment conclusions (as per bigeye). On this basis, SG100 is not met in full.

1.2.3.b Monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.

Catch, effort and stock status are monitored at a level that is sufficient for the current harvest strategy, meeting SG80 (details given above), although there are some uncertainties in the data and the stock assessment (see above). SG100 requires that all information required by the harvest strategy is monitored with a high frequency and a high degree of certainty. Given that stock assessments are only every 3 or so years, and given that some inputs are uncertain (see above) this is not met in full.

1.2.3.c Comprehensiveness of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is good information on all other fishery removals from the stock.	

In 2017 all CCMs submitted aggregate catch data by the WCPFC deadline. Some of these data sets are higher quality than others. Catches of tuna are measured and monitored well enough for stock assessment and the harvest strategy. Although monitoring of catches in some areas is far from perfect, these do not pose an unacceptable risk to the harvest strategy. There are a number of on-going initiatives to strengthen data collection of member states. Overall, this meets SG80.

All SG60 and SG80 were met, and 0 out of 2 SG100 were met.

PI 1.2.3 : 80

References

McKechnie S., Tremblay-Boyer L., and Pilling G. 2017. Background analyses for the 2017 stock assessments of bigeye and yellowfin tuna in the western and central Pacific Ocean. WCPFCSC13-2017/SA-IP-06, Rarotonga, Cook Islands, 9–17 August 2017

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P.1.2.4 Assessment of stock status

1.2.4.a Appropriateness of assessment to stock under consideration		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.

The most recent assessment of yellowfin tuna in the WCPO was conducted in 2017 using the Multifan-CL software. The yellowfin model is age-structured (28 quarterly age classes) and spatially-structured (9 regions). The catch, effort, size composition and tagging data used in the model are classified by 32 fisheries and quarterly time steps from 1952 to 2015. The assessment included a range of model options and sensitivities that were applied to investigate key structural assumptions and sources of uncertainty in the assessment. The model has and continues to be developed over the years with frequent supporting analysis and research and workshops. It is able to account for major features of the biology of the species and makes use of the available data, meeting SG100.

1.2.4.b Assessment approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	

The assessment estimates spawner biomass and fishing mortality relative to a range of reference points which can be estimated (although some with more certainty than others), including MSY reference points (F_{MSY}, SB_{MSY}) and depletion-based reference points ($SB_{F=0}$, SB_0). SG80 is met.

1.2.4.c Uncertainty in the assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment **identifies major sources** of uncertainty.	The assessment takes **uncertainty into account.**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.

The assessment evaluates uncertainty in terms of alternative model structures and addresses uncertainty in data and observations, with critical uncertainties represented across the sensitivity analyses. This meets SG80. The Scientific Committee reviewed these uncertainties (different model options) and discussed weightings (concluding that all options should have the same weighting). The grid was used to estimate median and 10% and 90% estimates of parameter values and stock status relative to various reference points (see Table YFT-2). The Scientific Committee also estimate the probabilities that the biomass is below the LRP and that F is above F_{MSY} (see 1.1.1). SG100 is met.

1.2.4.d Evaluation of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

The stock assessment process is rigorous, including reviews of data and models through pre-assessment workshops. The 2017 assessment tested a range of alternative model structures and inputs, including software, different approaches to CPUE standardisation, a different regional structure, different approaches to estimating recruitment and with or without length-frequency data (because of data conflicts). Sensitivities were also evaluated for a range of assumptions, including steepness, tag mixing period, weighting of length- vs. weight-frequency (because of data conflicts) as well as different assumptions about growth and maturity/natural mortality as well as some more technical elements. On this basis it is reasonable to say that alternative hypotheses and approaches have been rigorously explored.

The assessment provides results that are robust to general determinations of stock status. The set of hypotheses that have been considered appear to cover all likely possibilities. SG100 is met.

1.2.4.e Peer review of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

The assessment is subject to internal peer review through the WCPFC SC so SG80 is met. The assessment was subject to an external peer review in 2009 and relevant guidance was used from the 2012 external review directed at bigeye. There has, however, been no recent formal external review for yellowfin in recent years; SG100 is not met.

All SG60 and SG80 were met, and 3 out of 4 SG100 were met.

PI 1.2.4 : 95

References

Ianelli, J, Maunder, M., Punt, A.E. 2011 Independent Review of 2011 WCPO Bigeye Tuna Assessment. WCPFC-SC8-2012/SA-WP-01

McKechnie S., Tremblay-Boyer L., and Pilling G. 2017. Background analyses for the 2017 stock assessments of bigeye and yellowfin tuna in the western and central Pacific Ocean. WCPFCSC13-2017/SA-IP-06, Rarotonga, Cook Islands, 9–17 August 2017

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WCPFC, 2017. Thirteenth Regular Session of the Scientific Committee. Rarotonga, Cook Islands, 9-17 August, 2017

Western Pacific Skipjack

1.1 Outcome

P.1.1.1 Stock Status

1.1.1.a Stock status relative to recruitment impairment.		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.

The 2016 SC meeting was not able to reach consensus regarding which model runs should be used to characterize stock status. The view held by the majority of SC members was using the "reference case" model, which is largely consistent with previous assessments: B_{2015}/B_{MSY} = 2.56 (1.81-2.93

across sensitivity runs); SB_{2015}/ SB_0 = 0.62 (0.45-0.68 across sensitivity runs). This indicates the stock is well above the limit reference point (20% B_0), which is taken here as being the PRI. Because there is a very low probability of recruitment overfishing occurring, with a high degree of certainty that the stock is above the point where recruitment would be impaired, SG100 is met.

1.1.1.b Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

The most recent stock assessment stock assessment estimated SB_{2015}/SB_{MSY} = 2.56 (1.81-2.93 across sensitivity runs); and F_{2015}/F_{MSY} = 0.45 (0.40-0.62 across sensitivity runs). In relation to the agreed TRP ($50\%SB_{F=0}$), the stock was estimated to be approximately at this level (0.58 (0.41-0.65 across sensitivity runs)). This indicates that there is a high degree of certainty that the stock has been above MSY and will remain above MSY unless directed fishing effort increases substantially. This meets SG100.

All SG60, SG80 and SG100 were met

PI 1.1.1 : 100

References

McKechnie, S., J. Hampton, G. M. Pilling and N. Davies. 2016. Stock assessment of skipjack tuna in the western and central Pacific Ocean. WCPFC-SC12-2016/SA-WP-04

WCPFC. 2016. Twelfth Regular Session of the Scientific Committee. Bali, Indonesia, 3-11 August 2016. Summary Report

1.2 Harvest Strategy (Management)

P.1.2.1 Harvest Strategy

1.2.1.a Harvest strategy design		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.

The general objective of the WCPFC is to maintain populations of tunas and tuna-like fishes at levels that will permit maximum sustainable yield (MSY). A specific commitment to long-term sustainable fisheries management was adopted at the Western and Central Pacific Fisheries Commission in 2014 (CMM 2014-06). At its 2015 meeting, the WCPFC adopted a workplan for developing and implementing a HS approach that includes TRP, HCR and other elements.

The current harvest strategy for skipjack (CMM 2016-01) states that the fishing mortality rate for skipjack tuna will be maintained at a level no greater than F_{MSY} (i.e. $F/F_{MSY} \leq 1$). CMM 2015-06 established an interim target for skipjack equal to 50% of the equilibrium spawning biomass that would be expected in the absence of fishing under current environmental conditions (most recent 10 years of the current assessment, excluding the last year) ($50\%SB_{current, F=0}$). The most recent stock assessment (2016) estimates the biomass to be more or less at this level (see 1.1.1b).

Management measures for 2014-2017 include limitations on FAD sets and fishing days for purse seine. The management measures can be expected to meet management objectives in the short term, as they limit purse seine activities. This meets SG60. Specific management measures are, however, more directed at bigeye tuna rather than skipjack, so objectives for skipjack cannot be assured. Not all issues are addressed and, for example, some fisheries have been excluded from the requirements on capacity reduction as they intend to develop their fisheries.

The harvest strategy contained in CMM 2016-01 has been in place since 2013, but was intended to be a one-year interim measure. It has, however, been renewed several times as attempts continue to put in place a formal and responsive harvest strategy and harvest control rule for the tropical tuna stocks, as per the requirements of CMM 2014-06 (workplan updated at 2016 plenary; see WCPFC13 report, Attachment N). In 2017 (plenary, December) WCPFC is due to consider advice from the SC on the performance of candidate HCRs against the agreed reference points. However, SC did not explicitly provide such advice; MSE work is currently under way and being applied to skipjack, but it does not appear to be ready.

Meanwhile, the current harvest strategy is expected to achieve stock management objectives, according to the stock assessment; SG60 is met. It is not clear, however, that the strategy is responsive to stock status or that all its components are working together effectively, so SG80 is not met.

1.2.1.b Harvest strategy evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

According to the 2016 stock assessment, the fishing mortality has not increased to the MSY level and the stock is very unlikely to be overfished. The stock biomass is above the MSY level and ~at the target level. Short-term projections from 2017 estimate that the stock will decline below the TRP by 2018 ($SB/SB_{F=0} = 0.47$) as recent large recruitments move through the stock (note this is still above the estimated B_{MSY}), but in the longer term is projected to increase again to above the target level. Therefore, there is evidence that the current constraints on fishing mortality are adequate to maintain the stock above B_{MSY}. SG80 is met. However, the harvest strategy is dependent upon general limits on fishing activity rather than directed controls specific to the skipjack stock, and has not been fully evaluated; it therefore does not meet SG100.

1.2.1.c Harvest strategy monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place that is expected to determine whether the harvest strategy is working.		

There is a stock assessment by SPC every 2-3 years (2014, 2016) with a review of stock indicators and trends in intervening years. Catch and effort are monitored to estimate total catch, CPUE and mean size. The stock assessment reports best estimates of biomass, which indicates whether management is achieving its objectives or not. SG100 is met.

1.2.1.d Harvest strategy review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The harvest strategy is periodically reviewed and improved as necessary.

According to CMM 14-06, a formal harvest strategy for yellowfin should be put in place by WCPFC, with provision for periodic review (see 14-06, Annex 1, para. 9). This has, however, not yet been achieved. Meanwhile, the existing harvest strategy, currently set out in CMM 2016-01, has been more or less the same for several years; although it is not clear that improvement is required as a matter of urgency. SG100 is not met.

1.2.1.f Review of alternative measures		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biannual** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.

The main concern with discards of tuna appears to apply to the purse seine fleet. WCPFC has in place CMM 2009-02 which aims to limit discard mortality and requires reporting of discard events. In addition, recent CMMs (2014-01, 2015-01, 2016-01) aim to reduce undesirable catch of juvenile bigeye and purse seine through control of effort on FADs. On this basis, discarding is clearly subject to review and that controls are being implemented, meeting SG80. It is not clear this review is biannual, so SG100 is not met.

All SG60 were met, and 2 out of 3 SG80 were met.

PI 1.2.1 : 75

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P.1.2.2 Harvest control rules and tools

1.2.2.a HCRs design and application		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Generally understood HCRs are in place or **available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.

At SG60, MSC allows a harvest control rule to be 'available' rather than 'in place' if the requirements summarised below are met (for full list see SA2.5.2, 2.5.3):

- Stock biomass has not previously been reduced below the MSY level, or has been maintained at that level for a recent period of time … and is not predicted to be reduced below BMSY within the next 5 years;

- HCRs are effectively used in other stocks by the same management body or an agreement or framework is in place requiring the management body to adopt HCRs before the stock declines below BMSY.

The second of MSC's requirements for scoring an 'available' HCR is met for skipjack by CMM 2014-06. In terms of the first, for WCPO skipjack, stock biomass has not previously been reduced below the MSY level, according to the stock assessment. Short-term projections suggest that biomass will decline below the agreed TRP in 2018 but in the longer term will increase again (i.e. is projected to 'fluctuate around' the agreed target, which is above the MSY level). Unlike bigeye and yellowfin, there is no consistent downwards trend in skipjack biomass across the region, suggesting that the existing management system will continue to work.

On that basis, the conditions are met such that a HCR for WCPO skipjack can be considered to be 'available', meeting the requirements at SG60. Since there is no HCR 'in place', SG80 is not met.

1.2.2.b HCRs robustness to uncertainty		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.

Since there is no HCR in place, it cannot be robust to the main uncertainties. SG80 is not met.

1.2.2.c HCRs evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

The tools by which CMM 2016-01 is implemented for skipjack are:

- temporal / spatial limits on purse seine setting on FADs
- restrictions on purse seine effort (days)

The catch time series in the 2016 stock assessment runs to 2014; the harvest strategy has only been in place since 2014, so it is hard to say what impact it has had up till now; however status quo projections in 2017 do not give any cause for concern (see 1.2.1). This provides some evidence that the tools in place are sufficient to restrain harvesting rates to an appropriate level; SG60 is met. However, a HCR is not 'in place', and furthermore, issues such as local depletion (given that skipjack stock structure in the WCPO is unknown) are not dealt with by the management tools in place. On this basis, SG80 is not met.

All SG60 were met, but no SG80 or SG100.

PI 1.2.2 : 60

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P.1.2.3 Information / monitoring

1.2.3.a Range of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

A 2017 review of the scientific data available to WCPFC notes that there have been considerable improvements in the last few years. In 2017, all CCMs provided aggregate catch and effort estimates for 2016 by the deadline (30 April), and the quality of these data have also improved (fewer gaps). Operational-level data is now received from several major fleets, including China, Korea, Japan, Chinese Taipei and Indonesia (these last two for the first time in 2017), as well as other smaller fleets. Purse seine fisheries are required to have 100% observer coverage, and although not all achieve it, observer coverage is high, providing detailed operational-level data, as well as information on catch proportions by species etc.

WCPFC has been providing technical assistance to Vietnam, Indonesia and the Philippines to address data issues, although some problems still remain for these CCMs. Work is also underway to improve historical data. The key data gaps identified in the data availability report generally relate to species other than the main tuna species under WCPFC management – e.g. sharks, species which are discarded, species lacking good length/weight conversion factors.

In terms of fishery-independent data for skipjack, tagging data and biological information (age and growth etc.) are incorporated into the stock assessment.

On this basis, there is a comprehensive range of information (on stock structure, stock productivity, fleet composition) to monitor and assess stock status including; tagging data for stock identification, catch reporting and size-frequency sampling by each fleet and detailed catch-per-unit-effort data

from these fleets from observers, as well as port sampling and transshipment monitoring. Unlike some other skipjack stock assessments, this assessment can use the pole-and-line fisheries to provide CPUE time series; something which is different to derive from purse seine fisheries. SG100 is met.

1.2.3.b Monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.

That information is sufficient to determine stock status and therefore implement a harvest control rule is clearly demonstrated. Indicators include CPUE time series and size / age composition from the catches. These are regularly monitored and cover the whole stock. While the data are adequate for a suitable harvest control rule meeting the SG80, uncertainties in data are significant and not necessarily fully understood. The abundance indices depend on commercial fishing activities which may introduce bias to the index. While indices are standardized, the uncertainties are not necessarily well understood and may change over time. Not all countries are covering their fisheries, so there are gaps in the data. Therefore, because not all information is available and significant uncertainties in some data exist, SG100 is not met.

Catch, effort and stock status are monitored at a level that is sufficient for the current harvest strategy, meeting SG80 (details given above). SG100 requires that all information required by the harvest strategy is monitored with a high frequency and a high degree of certainty. Given that stock assessments are only every 2 or so years, and given that the key abundance indices from pole-and-line fisheries make up a small proportion of the total catch. SG100 is not met in full.

1.2.3.c Comprehensiveness of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is good information on all other fishery removals from the stock.	

In 2017 all CCMs submitted aggregate catch data by the WCPFC deadline. Some of these data sets are higher quality than others. Catches of tuna are measured and monitored well enough for stock assessment and the harvest strategy. Although monitoring of catches in some areas is far from perfect, these do not pose an unacceptable risk to the harvest strategy. There are a number of on-going initiatives to strengthen data collection of member states. Overall, this meets SG80.

All SG60 and SG80 were met, and 1 out of 2 SG100 were met.

PI 1.2.3 : 90

References

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P.1.2.4 Assessment of stock status

1.2.4.a Appropriateness of assessment to stock under consideration		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.

The most recent assessment of skipjack tuna in the WCPO was conducted in 2016 using the Multifan-CL software. The yellowfin model is age-structured (16 quarterly age classes) and spatially-structured (5 regions). The catch, effort, size composition and tagging data used in the model are classified by 23 fisheries and quarterly time steps from 1952 to 2014. The assessment included a range of model options and sensitivities that were applied to investigate key structural assumptions and sources of uncertainty in the assessment. The model has and continues to be developed over the years with frequent supporting analysis and research and workshops. It is able to account for major features of the biology of the species and makes use of the available data, meeting SG100.

1.2.4.b Assessment approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	

The assessment estimates spawner biomass and fishing mortality relative to a range of reference points which can be estimated (although some with more certainty than others), including MSY reference points (F_{MSY}, SB_{MSY}) and depletion-based reference points ($SB_{F=0}$, SB_0). SG80 is met.

The assessment estimates spawner biomass and fishing mortality relative to a range of reference points which can be estimated (although some with more certainty than others), including MSY reference points (F_{MSY}, SB_{MSY}) and depletion-based reference points ($SB_{F=0}$, SB_0) (see Scientific Committee report 2016 Table SK2). SG80 is met.

1.2.4.c Uncertainty in the assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment **identifies major sources** of uncertainty.	The assessment takes **uncertainty into account.**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.

New developments to the stock assessment include addressing the recommendations of the 2014 stock assessment report, exploration of uncertainties in the assessment model, particularly in response to the inclusion of additional years of data, and to improve diagnostic weaknesses of previous assessments

In addition to a single reference case model, one-off sensitivity models were used to explore the impact of key data and model assumptions for the reference case model on the stock assessment results and conclusions. They also undertook a structural uncertainty analysis (model grid) for consideration in developing management advice where all possible combinations of those areas of uncertainty from the one-off models were included.

These outputs are useful for evaluating uncertainty relative to general determinations of stock status, and it is clear that uncertainty is taken into account, meeting SG80. Probability based estimates are reported, and "Kobe-type" plots are presented to assist risk-based decisions. SG100 is met.

1.2.4.d Evaluation of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

Alternative model structures and sensitivity analyses have been applied to the available data and results are reported as a range of outcomes resulting from the model structures. The assessment and its alternatives provide results that are robust as to their general determinations of stock status. Evidence shows that the set of hypotheses that have been considered in sensitivity analyses, for example, cover likely possibilities. This meets SG100.

1.2.4.e Peer review of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

The assessment is subject to internal peer review through the WCPFC SC, meeting SG80. The WCPFC is also beginning to apply an external peer review process but this has not been applied directly to this assessment. Nevertheless, recommendations were taken from the bigeye assessment to apply to this assessment. Given the similarities between the data and methods, this could be accepted as a partial external review. However, differences of this assessment to the yellowfin and bigeye

assessments are probably significant enough not to accept this as a full external peer review, so SG100 is not met.

All SG60 and SG80 were met, and 3 out of 4 SG100 were met.

PI 1.2.4 : 95

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WCPFC, 2017. Thirteenth Regular Session of the Scientific Committee. Rarotonga, Cook Islands, 9-17 August, 2017

Eastern Pacific Bigeye

1.1 Outcome

P.1.1.1 Stock Status

1.1.1.a Stock status relative to recruitment impairment.		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.

The most recent stock assessment was in 2016, updated in 2017.

The IATTC agreed LRP ($SB_{0.5R0}$, assuming h = 0.75) is below the PRI, by definition. The MSC's default PRI is 20%SB_0; this is more or less the estimated level of SB_{MSY} (21%B_0). The updated assessment estimates SB_{2016}/SB_{MSY} at 1.23 (SB_{2016}/SB_0 ~0.26). F is below the MSY level: F_{mult} ($F_{MSY}/F_{current}$) = 1.15; F_{mult} has fluctuated close to 1 since the late 1990s. Even taking the hyper-precautionary sensitivity run with h=0.75, SB is estimated to be above the MSY level; B (total biomass from the 3rd quarter) is also estimated to be above the MSY level for both model configurations. Recruitment has fluctuated without trend for the last two decades at a level higher than the long-term average. On this basis, it is highly likely that the stock is above the level at which recruitment is impaired. SG80 is met.

In relation to SG100, the lower 5% confidence interval for SB/SB_{MSY} for the base case model is at approximately $0.6SB_{MSY}$. This is above the LRP, but not necessarily above the PRI, so SG100 is not met.

1.1.1.b Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

The 2017 update assessment indicates that SB and B are above the MSY level while F is below, for the case with no SR relationship (steepness=1) and with a precautionary SR relationship (steepness=0.75) (see 1.1.1a). SG80 is met. The stock has recently recovered from below this level, so SG100 is not met.

All SG60 and SG80 were met, and 0 out of 2 SG100 were met.

PI 1.1.1 : 80

References

Aires-da-Silva, A., C. Minte-Vera and M. N. Maunder. 2016. Status of Bigeye Tuna in the Eastern Pacific Ocean in 2015 and Outlook for the Future. Inter-American Tropical Tuna Commission Scientific Advisory Committee Seventh Meeting. La Jolla, California (

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1.2 Harvest Strategy (Management)

P.1.2.1 Harvest Strategy

1.2.1.a Harvest strategy design		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.

In 2016, IATTC adopted a HCR for tropical tunas based on the interim target and limit reference points adopted in 2014 (Resolution C-16-02). The HCR aims to prevent fishing mortality from exceeding the MSY level for the tropical tuna stock (bigeye, yellowfin or skipjack) that requires the strictest management. If fishing mortality or spawning biomass are approaching the corresponding limit reference point with a probability of 10% or greater, the HCR triggers the establishment of additional management measures to reduce fishing mortality and rebuild the stock. The HCR is implemented via time/area closures and catch limits which vary for different fleets (Resolution C-17-01).

The duration of the closure is set according to the level of F_{mult} ($F_{MSY}/F_{current}$) for the stock requiring the strictest management (at present yellowfin). This harvest strategy is responsive to the state of the stock; SG80 is met.

SG100 requires the harvest strategy to be 'designed' to achieve stock management objectives. The HCR and tools are linked via F_{mult}, which is used to adjust the duration of the closure. It is a bit unclear on what basis the 62-day closure was initially determined to be the correct duration. At the 2017 plenary, it was agreed to extend the duration of closure to 72 days, based on a recommendation of the Commission scientific staff, even though F_{mult} for yellowfin (the relevant stock) remains close to one. The rationale for this is that they also estimate a 6.7 % capacity increase, which is also taken into account in evaluating the duration of the closure (by adjusting F_{mult} to take account of the capacity increase). Presumably, they estimate that an additional 10 days of closure will reduce effort by the correct amount to obtain the target biomass, although this working is not provided in the document. Nevertheless, this type of re-adjustment provides reassurance that this is a clear linkage between stock status and the duration of closure, and that there is a clearly-designed system for fixed the duration of the closure based on F_{mult} and other relevant factors. SG100 is met.

1.2.1.b Harvest strategy evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

According to the stock assessment the stock has recovered above SB_{MSY} – there is therefore evidence that the harvest strategy is achieving its objectives; SG80 is met. The harvest strategy is not due to be 'fully evaluated' until 2018 (C-16-02), so SG100 is not met.

1.2.1.c Harvest strategy monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place that is expected to determine whether the harvest strategy is working.		

The harvest strategy is well monitored both in terms of the status of the stock and the catches and fishing mortality rates affecting status. Data are collected to estimate management quantities. Also the stock assessment reports best estimates of biomass, which indicates whether management is achieving its objectives or not, meeting SG60.

1.2.1.d Harvest strategy review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The harvest strategy is periodically reviewed and improved as necessary.

C-17-01 requires review of the harvest strategy during 2018 – see para. 18. IATTC has been going through a process for some years of reviewing, evaluating and adjusting the harvest strategy to arrive at the current point; for example, stock assessment methodologies have changed, and quite a bit of work has gone into defining appropriate reference points and harvest control rules. This provides confidence that the review will be undertaken as planned in 2018. SG100 is met.

Note that if the review is not undertaken as planned during 2018, the score would reduce to 80.

1.2.1.f Review of alternative measures		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biannual** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.

The main concern with discards of tuna appears to apply to the purse seine fleet. Under IATTC rules, all bigeye, skipjack and yellowfin brought on board is required to be landed, except that unfit for human consumption (see C-17-01, paragraph 16). Work is ongoing to try and reduce catch of juvenile tunas and non-target species in the purse seine catch (see C-17-01, para. 15). On this basis, unwanted catch is clearly subject to review and research and controls are being implemented, meeting SG80. It is not known whether the review is biannual, so SG100 is not met.

All SG60 and SG80 were met, and 2 out of 4 SG100 were met.

PI 1.2.1 : 90

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P.1.2.2 Harvest control rules and tools

1.2.2.a HCRs design and application		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Generally understood HCRs are in place or **available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.

The HCR for EPO tropical tunas is set out in Res. C-16-02, as follows:

- If the probability that F>Flim is >10%, management measures shall be established such that there is at least a 50% probability that F will reduce to FMSY or below, and with a probability of <10% of F>Flim.
- If the probability that SB<SBlim is >10%, management measures shall be established such that there is at least a 50% probability that SB will recover to SBMSY or above, and with a probability of <10% that SB will decline to <SBlim within two generations or 5 years, whichever is greater.

i.e. It can be expected to keep the biomass above the limit reference point, and most likely above the PRI (given the relatively precautionary probability of $B<B_{lim}$ set as a trigger for management action) and fluctuating around MSY level. SG60 is met.

In relation to SG80, it is 'well-defined' so the first part is met. In relation to the PRI, the HCR requires action to be taken if the probability of F or SB exceeding the limit reference point is >10% - i.e. action is required to reduce the exploitation rate well above the point at which the limit is actually reached. If $SB<SB_{MSY}$, the HCR requires at least a 50% probability that will recover to at or above SB_{MSY}; this therefore suggests that it allows a probability of up to 50% that it will not recover to this level. But in the case that the stock does not recover, the HCR would require additional action such that the stock arrives again at a 50% probability of recovery, and so on, until the stock recovers. On this basis, the HCR should keep the stock fluctuating around the target level, with the time scale of fluctuations depending on the management decisions that are made once the stock has recovered (which are not specified in the HCR). SG80 is met.

In relation to SG100, since the HCR has nothing to say about management above the target level, it is (in theory) impossible to say what will happen to the stock at that point (although in practice management is driven by the status of the worst of several stocks, so is likely to be more rather than less precautionary); however, conversely the method of estimating MSY reference points is not very precautionary. SG100 is not met.

1.2.2.b HCRs robustness to uncertainty		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.

The base case model is more optimistic than several of the sensitivity runs, notably the one that assumes a stock-recruit relationship of h=0.75, as well as the one assuming lower adult M. However, the limit reference points are defined based on the assumption of a stock-recruit relationship, so this is taken into account in the HCR to some extent. In addition, the HCR requires action when $p(SB<SB_{lim})$ reaches 10% - i.e. well above the actual limit reference point level. So overall there is considerable precaution built into the HCR. Furthermore, empirically the harvest strategy seems to be working since it has maintained both bigeye and yellowfin Fmult at or close to one; corresponding to scientific advice.

A preliminary MSE has been attempted on the reference points and HCR for tropical tunas; using bigeye as an example, which suggests that although the key uncertainties (as well as recruitment variability) have an impact on the probability of biomass or fishing mortality going outside the bounds of the limit reference points, overall the harvest strategy does rebuild the (bigeye) stock towards the target under all scenarios.

On this basis, SG80 is met. SG100 is not met because there remain large uncertainties in the stock dynamics (e.g. stock definition, stock-recruit relationship, natural mortality, recruitment).

1.2.2.c HCRs evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

The tools to implement the HCR are set out in Res. C-17-01; the key tool is the seasonal closure. They were selected by IATTC because they have been used in the past and/or can be used over periods longer than a year (see C-16-02); i.e. IATTC have taken a pragmatic approach to the selection of appropriate tools. The closure is not explicitly linked to the HCR in the way that (for example) catch limits would be, but the number of days of closure have been adjusted according to F_{mult} (F_{MSY}/F) and other factors (e.g. estimated increases in capacity). There is provision for review and adjustment according to outcome. On that basis, the available evidence all indicates that the tools are likely to be effective controlling exploitation rates. SG80 is met.

In relation to SG100, in 2017 the closure period for 2017-2020 was extended to 72 days (C-17-01 and C-17-02), based on F_{mult} reportedly adjusted for capacity increases, providing some confidence that tools are used appropriately. However, the link between the closure duration and exploitation rates is very unclear, and the duration of the closure is a matter of negotiation between IATTC members rather than a clearly-defined element of the HCR. On this basis, SG100 is not met.

All SG60 and SG80 were met, and 0 out of 3 SG100 were met.

PI 1.2.2 : 80

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P.1.2.3 Information / monitoring

1.2.3.a Range of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Sufficient information (on stock structure, stock productivity, fleet composition), is available to monitor and assess stock status including reporting and size-frequency sampling by each fleet and catch-per-unit-effort data from these fleets.

There is a long history of biological and environmental research on EPO tuna stocks, and considerable environmental information that is not explicitly used in the harvest strategy.

Bigeye tuna are distributed across the Pacific Ocean and it has been questioned whether the current division of stock assessment and management into the EPO and the WCPO is appropriate; joint stock assessments have been tried in the past but not considered to be an improvement on the current system.

Biology and life history is relatively well understood and sufficient for stock assessment. Fleet compositions are well monitored. There is considerable environmental data, which is not directly used in the harvest strategy. Some key information on stock productivity is not well-estimated, notably on growth and natural mortality, although some improvements in these estimates have taken place. Overall these data are sufficient for stock assessments to monitor status and mortality rates to support a harvest strategy, meeting SG80. However, available data falls short of being comprehensive with gaps in the information for some fleets. Overall, this meets SG80, but not SG100.

1.2.3.b Monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.

Stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with the HCR, and indicators of catch and effort are available and monitored with sufficient frequency to support the HCR, including annual updates of the stock assessment (better practice than other tRFMOs). Substantial amounts of information are collected, including data on retained catches, discards, indices of abundance (CPUE), and the size compositions of the catches of the various fisheries. In addition there is observer data which provides discard estimates. However, data from some fleets are incomplete. In general, however, there is good information on fishery removals from the stock. SG80 is met, but since reporting from some fleets is limited, there is not a high degree of certainty about all information needed for the HCR. SG100 is not met.

1.2.3.c Comprehensiveness of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is good information on all other fishery removals from the stock.	

Catches are reasonably well monitored and are sufficient for stock assessment. There has been an IATTC observer program since 1993 for larger vessels, and the United States has had an observer program from the 1970s. Observer coverage has allowed discards of tuna to be estimated, as well as estimates of bycatch of other species. The level of monitoring is sufficient for the harvest strategy, and therefore meets SG80.

All SG60 and SG80 were met, and 0 out of 2 SG100 were met.

PI 1.2.3 : 80

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P.1.2.4 Assessment of stock status

1.2.4.a Appropriateness of assessment to stock under consideration		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.

The assessment was benchmarked in 2016 and updated in 2017. The assessment uses an integrated statistical age-structured stock assessment model (Stock Synthesis). The stock assessment requires substantial amounts of information, including data on retained catches, discards, indices of abundance (CPUE), and the size compositions of the catches of the various fisheries. Assumptions have been made about processes such as growth, recruitment, movement, natural mortality and stock structure. The assessment is able to use all available data and was well-adapted to take account of bigeye biology. The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points, taking into account the biology and distribution of bigeye. This meets SG100.

1.2.4.b Assessment approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	

The stock assessment has been used to estimate the MSY-related reference point, and these have been used to determine stock status. This meets SG80.

1.2.4.c Uncertainty in the assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment **identifies major sources** of uncertainty.	The assessment takes **uncertainty into account.**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.

The assessment reports trends and projections of quantities with confidence intervals. Therefore, estimation uncertainty is being evaluated. It also addresses wider uncertainties in model configuration and input parameter estimates (model diagnostics and sensitivity analyses), and sets out probabilistic projections of future stock trajectories under different model assumptions. SG100 is met.

1.2.4.d Evaluation of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

The software (SS3) which has been applied has been tested on many stocks worldwide. Additionally, SS3 provides considerable flexibility in modifying model structure based on diagnostics such as degree of fit to key data sources (catch at size, indices of abundance, etc.). Exploratory analyses during the original assessment with this software established appropriate spatial and fishery strata.

In the current assessment the robustness of scientific advice is evaluated through alternative hypotheses about productivity through the stock recruitment relationship and by testing sensitivity of parameters (steepness, mortality rates). It is worth noting, however, that the assessment uses two rather extreme variants of the SR relationship representing very high and low steepness (i.e. no relationship vs steepness=-0.75) rather than the middle ground of steepness=0.8 or 0.9 usually used in tuna stock assessments, and more or less discards the much more pessimistic conclusions of the steepness=0.75 output, except for the purposes of estimating the LRP. Nevertheless, the assessment includes a wide range of sensitivity analyses, meeting the requirements of SG100.

1.2.4.e Peer review of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

The Scientific Advisory Committee provides internal review of stock assessments each year; the most recent report shows extensive discussion on model inputs, output uncertainties, stock structure and data gaps. IATTC periodically convenes external expert panels to peer review stock assessments. SG100 is met.

All SG60, SG80 and SG100 were met

PI 1.2.4 : 100

References

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Eastern Pacific Yellowfin

1.1 Outcome

P.1.1.1 Stock Status

1.1.1.a Stock status relative to recruitment impairment.		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.

There was a full stock assessment for EPO yellowfin in 2016, updated in 2017.

The IATTC agreed LRP ($SB_{0.5R0}$, assuming h = 0.75) is below the PRI, by definition. The PRI taken to be $2*LRP = 20\%SB_0 = 0.56SB_{MSY}$.

Recruitment has seen several regime shifts not apparently related to fishing pressure (since the lowest productivity regime was at the start of the time series) – it has been in a 'medium' regime but recruitment in 2015 and 2016 are estimated to be above average for the first time since 2006. Biomass fluctuates according to the regime as well, and hence estimating a single value for MSY reference points across the whole time series may not be valid (but for the moment this is how it is done).

The 2016 stock assessment estimates $SB_{2015}/2*LRP = 1.7$; this is ~95% of SB_{MSY} under the base case model. Under the alternative scenario (h=0.75), SB/2*LRP = 0.8; i.e. under this alternative scenario, biomass is estimated to be below this estimate of the PRI. The stock assessment notes, however, that evidence for a stock-recruit relationship is 'weak' and 'probably an artefact of the apparent regime shifts' (p.5); recent recruitment has been high. On this basis, it is highly likely that the stock is above the PRI, but based on precautionary scoring there is not a 'high degree of certainty'. SG80 is met but SG100 is not met.

1.1.1.b Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

The base case model (updated in 2017) estimates SB_{2016} at ~86% of SB_{MSY}, and B_{2016} at ~130% of B_{MSY}. It predicts that SB will recover to above the MSY level in 2018 with high probability (>95% according to the projection confidence intervals) because of recent high recruitment. SB has been fluctuating around the level of SB_{MSY} for several years according to the updated assessment. Sensitivity analyses (full set run in 2016) give a wide range of values for SB/SB_{MSY} from 0.56-1.3. F is estimated to be approximately equal to F_{MSY}, and has been above F_{MSY} throughout the time series aside from a short period around 2005. The stock has therefore been fluctuating around a level consistent with MSY, but not with a high degree of certainty (based on the sensitivity runs) and not above this level in recent years. S80 is met but SG100 is not met.

All SG60 and SG80 were met, and 0 out of 2 SG100 were met.

PI 1.1.1 : 80

References

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1.2 Harvest Strategy (Management)

P.1.2.1 Harvest Strategy

1.2.1.a Harvest strategy design		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.

In 2016, IATTC adopted a HCR for tropical tunas based on the interim target and limit reference points adopted in 2014 (Resolution C-16-02). The HCR aims to prevent fishing mortality from exceeding the MSY level for the tropical tuna stock (bigeye, yellowfin or skipjack) that requires the strictest management. If fishing mortality or spawning biomass are approaching the corresponding limit reference point with a probability of 10% or greater, the HCR triggers the establishment of additional management measures to reduce fishing mortality and rebuild the stock. The HCR is implemented via time/area closures and catch limits which vary for different fleets (Resolution C-17-01).

The duration of the closure is set according to the level of F_{mult} ($F_{MSY}/F_{current}$) for the stock requiring the strictest management (at present yellowfin). This harvest strategy is responsive to the state of the stock; SG80 is met.

SG100 requires the harvest strategy to be 'designed' to achieve stock management objectives. The HCR and tools are linked via F_{mult}, which is used to adjust the duration of the closure. It is a bit unclear on what basis the 62-day closure was initially determined to be the correct duration. At the 2017 plenary, it was agreed to extend the duration of closure to 72 days, based on a recommendation of the Commission scientific staff, even though F_{mult} for yellowfin (the relevant stock) remains close to one. The rationale for this is that they also estimate a 6.7 % capacity increase, which is also taken into account in evaluating the duration of the closure (by adjusting F_{mult} to take account of the capacity increase). Presumably, they estimate that an additional 10 days of closure will reduce effort by the correct amount to obtain the target biomass, although this working is not provided in the document. Nevertheless, this type of re-adjustment provides reassurance that this is a clear linkage between stock status and the duration of closure, and that there is a clearly-designed system for fixed the duration of the closure based on F_{mult} and other relevant factors. SG100 is met.

1.2.1.b Harvest strategy evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

According to the stock assessment (projections of the base case model) the stock is likely to will recover above SB_{MSY} in the short term, even without C-17-01 – there is therefore evidence that the harvest strategy is achieving its objectives; SG80 is met. The harvest strategy is not due to be 'fully evaluated' until 2018 (C-16-02), so SG100 is not met.

1.2.1.c Harvest strategy monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place that is expected to determine whether the harvest strategy is working.		

The harvest strategy is well monitored both in terms of the status of the stock and the catches and fishing mortality rates affecting status. Data are collected to estimate management quantities. Also the stock assessment reports best estimates of biomass, which indicates whether management is achieving its objectives or not, meeting SG60.

1.2.1.d Harvest strategy review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The harvest strategy is periodically reviewed and improved as necessary.

C-17-01 requires review of the harvest strategy during 2018 – see para. 18. IATTC has been going through a process for some years of reviewing, evaluating and adjusting the harvest strategy to arrive at the current point; for example, stock assessment methodologies have changed, and quite a bit of work has gone into defining appropriate reference points and harvest control rules. This provides confidence that the review will be undertaken as planned in 2018. SG100 is met.

Note that if the review is not undertaken as planned during 2018, the score would reduce to 80.

1.2.1.f Review of alternative measures		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biannual** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.

The main concern with discards of tuna appears to apply to the purse seine fleet. Under IATTC rules, all bigeye, skipjack and yellowfin brought on board is required to be landed, except that unfit for human consumption (see C-17-01, paragraph 16). Work is ongoing to try and reduce catch of juvenile tunas and non-target species in the purse seine catch (see C-17-01, para. 15). On this basis, unwanted catch is clearly subject to review and research and controls are being implemented, meeting SG80. It is not known whether the review is biannual, so SG100 is not met.

All SG60 and SG80 were met, and 2 out of 4 SG100 were met.

PI 1.2.1 : 90

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P.1.2.2 Harvest control rules and tools

1.2.2.a HCRs design and application		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Generally understood HCRs are in place or **available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.

The HCR for EPO tropical tunas is set out in Res. C-16-02, as follows:

- If the probability that F>Flim is >10%, management measures shall be established such that there is at least a 50% probability that F will reduce to FMSY or below, and with a probability of <10% of F>Flim.
- If the probability that SB<SBlim is >10%, management measures shall be established such that there is at least a 50% probability that SB will recover to SBMSY or above, and with a probability of <10% that SB will decline to <SBlim within two generations or 5 years, whichever is greater.

i.e. It can be expected to keep the biomass above the limit reference point, and most likely above the PRI (given the relatively precautionary probability of $B<B_{lim}$ set as a trigger for management action) and fluctuating around MSY level. SG60 is met.

In relation to SG80, it is 'well-defined' so the first part is met. In relation to the PRI, the HCR requires action to be taken if the probability of F or SB exceeding the limit reference point is >10% - i.e. action is required to reduce the exploitation rate well above the point at which the limit is actually reached. If $SB<SB_{MSY}$, the HCR requires at least a 50% probability that will recover to at or above SB_{MSY}; this therefore suggests that it allows a probability of up to 50% that it will not recover to this level. But in the case that the stock does not recover, the HCR would require additional action such that the stock arrives again at a 50% probability of recovery, and so on, until the stock recovers. On this basis, the HCR should keep the stock fluctuating around the target level, with the time scale of fluctuations depending on the management decisions that are made once the stock has recovered (which are not specified in the HCR). SG80 is met.

In relation to SG100, since the HCR has nothing to say about management above the target level, it is (in theory) impossible to say what will happen to the stock at that point (although in practice management is driven by the status of the worst of several stocks, so is likely to be more rather than

less precautionary); however, conversely the method of estimating MSY reference points is not very precautionary. SG100 is not met.

1.2.2.b HCRs robustness to uncertainty		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.

For yellowfin, the base case model is more optimistic than several of the sensitivity runs, notably the one that assumes a stock-recruit relationship of h=0.75. However, the limit reference points are defined based on the assumption of a stock-recruit relationship, so this is taken into account in the HCR to some extent. In addition, the HCR requires action when $p(SB<SB_{lim})$ reaches 10% - i.e. well above the actual limit reference point level. So overall there is considerable precaution built into the HCR. Furthermore, empirically the harvest strategy seems to be working since it has maintained both bigeye and yellowfin F_{mult} at or close to one; corresponding to scientific advice.

A preliminary MSE has been attempted on the reference points and HCR for tropical tunas; using bigeye as an example, which suggests that although the key uncertainties (as well as recruitment variability) have an impact on the probability of biomass or fishing mortality going outside the bounds of the limit reference points, overall the harvest strategy does rebuild the (bigeye) stock towards the target under all scenarios.

On this basis, SG80 is met. SG100 is not met because there remain large uncertainties in the stock dynamics (e.g. stock definition, stock-recruit relationship, natural mortality, recruitment).

1.2.2.c HCRs evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

The tools to implement the HCR are set out in Res. C-17-01; the key tool is the seasonal closure. They were selected by IATTC because they have been used in the past and/or can be used over periods longer than a year (see C-16-02); i.e. IATTC have taken a pragmatic approach to the selection of appropriate tools. The closure is not explicitly linked to the HCR in the way that (for example) catch limits would be, but the number of days of closure have been adjusted according to F_{mult} (F_{MSY}/F) and other factors (e.g. estimated increases in capacity). There is provision for review and adjustment according to outcome. On that basis, the available evidence all indicates that the tools are likely to be effective controlling exploitation rates. SG80 is met.

In relation to SG100, in 2017 the closure period for 2017-2020 was extended to 72 days (C-17-01 and C-17-02), based on F_{mult} reportedly adjusted for capacity increases, providing some confidence that tools are used appropriately. However, the link between the closure duration and exploitation rates is very unclear, and the duration of the closure is a matter of negotiation between IATTC members rather than a clearly-defined element of the HCR. On this basis, SG100 is not met.

All SG60 and SG80 were met, and 0 out of 3 SG100 were met.

PI 1.2.2 : 80

References

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P.1.2.3 Information / monitoring

1.2.3.a Range of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Sufficient information (on stock structure, stock productivity, fleet composition), is available to monitor and assess stock status including reporting and size-frequency sampling by each fleet and catch-per-unit-effort data from these fleets.

There is a long history of biological and environmental research on EPO tuna stocks, and considerable environmental information that is not explicitly used in the harvest strategy.

Yellowfin tuna are distributed across the Pacific Ocean. Movement of tagged yellowfin tuna is generally limited to hundreds of kilometres in most cases and exchange between the EPO and the WCPO appears to be limited, and limited genetic information suggests more limited movement. The current stock designation is sufficient, even if improvements are possible.

Biology and life history is relatively well understood and sufficient for stock assessment. Fleet compositions are well monitored. There is considerable environmental data, which is not directly used in the harvest strategy. Some key information on stock productivity is not well-estimated, notably on growth and natural mortality, although some improvements in these estimates have taken place. Overall these data are sufficient for stock assessments to monitor status and mortality rates to support a harvest strategy, meeting SG80. However, available data falls short of being comprehensive with gaps in the information for some fleets. Overall, this meets SG80, but not SG100.

1.2.3.b Monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.

Stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with the HCR, and indicators of catch and effort are available and monitored with sufficient frequency to support the HCR, including annual updates of the stock assessment (better practice than other tRFMOs). Substantial amounts of information are collected, including data on retained catches, discards, indices of abundance (CPUE), and the size compositions of the catches of the various fisheries. In addition there is observer data which provides discard estimates. However, data from some fleets are incomplete. In general, however, there is good information on fishery removals from the stock. SG80 is met, but since reporting from some fleets is limited, there is not a high degree of certainty about all information needed for the HCR. SG100 is not met.

1.2.3.c Comprehensiveness of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is good information on all other fishery removals from the stock.	

Catches are reasonably well monitored and are sufficient for stock assessment. There has been an IATTC observer program since 1993 for larger vessels, and the United States has had an observer program from the 1970s. Observer coverage has allowed discards of tuna to be estimated, as well as estimates of bycatch of other species. The level of monitoring is sufficient for the harvest strategy, and therefore meets SG80.

All SG60 and SG80 were met, and 0 out of 2 SG100 were met.

PI 1.2.3 : 80

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P.1.2.4 Assessment of stock status

1.2.4.a Appropriateness of assessment to stock under consideration		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.

The assessment was benchmarked in 2016 and updated in 2017. The assessment uses an integrated statistical age-structured stock assessment model (Stock Synthesis). The stock assessment requires substantial amounts of information, including data on retained catches, discards, indices of abundance (CPUE), and the size compositions of the catches of the various fisheries. Assumptions have been made about processes such as growth, recruitment, movement, natural mortality and stock structure. The assessment is able to use all available data and was well-adapted to take account of yellowfin biology. The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points, taking into account the biology and distribution of yellowfin. This meets SG100.

1.2.4.b Assessment approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	

The stock assessment has been used to estimate the MSY-related reference point, and these have been used to determine stock status. This meets SG80.

1.2.4.c Uncertainty in the assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment **identifies major sources** of uncertainty.	The assessment takes **uncertainty into account.**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.

The assessment reports trends and projections of quantities with confidence intervals. Therefore, estimation uncertainty is being evaluated. It also addresses wider uncertainties in model configuration and input parameter estimates (model diagnostics and sensitivity analyses), and sets out probabilistic projections of future stock trajectories under different model assumptions. SG100 is met.

1.2.4.d Evaluation of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

The software (SS3) which has been applied has been tested on many stocks worldwide. Additionally, SS3 provides considerable flexibility in modifying model structure based on diagnostics such as degree of fit to key data sources (catch at size, indices of abundance, etc.). Exploratory analyses during the original assessment with this software established appropriate spatial and fishery strata.

In the current assessment the robustness of scientific advice is evaluated through alternative hypotheses about productivity through the stock recruitment relationship and by testing sensitivity of parameters (steepness, mortality rates). It is worth noting, however, that the assessment uses two rather extreme variants of the SR relationship representing very high and low steepness (i.e. no relationship vs steepness=-0.75) rather than the middle ground of steepness=0.8 or 0.9 usually used in tuna stock assessments, and more or less discards the much more pessimistic conclusions of the steepness=0.75 output, except for the purposes of estimating the LRP. Nevertheless, the assessment includes a wide range of sensitivity analyses, meeting the requirements of SG100.

1.2.4.e Peer review of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

The Scientific Advisory Committee provides internal review of stock assessments each year; the most recent report shows extensive discussion on model inputs, output uncertainties, stock structure and data gaps. IATTC periodically convenes external expert panels to peer review stock assessments. SG100 is met.

All SG60, SG80 and SG100 were met

PI 1.2.4 : 100

References

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Eastern Pacific Skipjack

1.1 Outcome

P.1.1.1 Stock Status

1.1.1.a Stock status relative to recruitment impairment.		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.

It is not possible to estimate quantitative reference points for EPO skipjack, so IATTC use a series of proxies to evaluate stock status, based on a series of indicators and expert judgement.

The situation in 2016 can be summarised as follows:

- total catch, CPUE (both indicators), relative biomass and relative recruitment are estimated to be above the upper reference level;
- standardised effort and relative exploitation rate are close to the historical mean level;
- average weight per fish is below the lower reference level.

IATTC scientists note that the main concern previously has been the consistent increase in the exploitation rate; but this has now levelled off. The low average weight may be an indicator of overexploitation, but may also be a function of recent high recruitment and/or changes in selectivity or other characteristics of the fishery.

Overall, none of the indicators detect any adverse consequences from current levels of exploitation, except smaller average weight, which is unlikely to indicate any effect on recruitment (and may be a consequence of high recruitment). Given this and the resilient life history characteristics of skipjack, it is highly likely that the stock is above any PRI, meeting SG80.

The lack of a recent full stock assessment means that it is not possible to determine that the stock is above the PRI with high certainty, so SG100 is not met.

1.1.1.b Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.

It has not been possible to estimate any credible MSY reference points for EPO skipjack. Indicators (see 1.1.1.a) suggest that biomass and recruitment are high relative to historical levels. IATTC scientists have also used a productivity-susceptibility analysis (PSA) to compare skipjack status with other stocks for which an assessment is possible: the logic is that skipjack and bigeye have similar susceptibility (overlap with fisheries) but skipjack has higher productivity (and therefore a lower B_{MSY} and a higher F_{MSY}); since for bigeye $B_{current}>B_{MSY}$, logically (they argue) this must also be true for skipjack. Although this argument is not completely convincing, nevertheless on this basis, SG80 is

met. Since there are considerable uncertainties, and since one of the indicators (average weight) gives some possible cause for concern, SG100 is not met.

All SG60 and SG80 were met, and 0 out of 2 SG100 were met.

PI 1.1.1 : 80

References

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1.2 Harvest Strategy (Management)

P.1.2.1 Harvest Strategy

1.2.1.a Harvest strategy design		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.

In 2016, IATTC adopted a HCR for tropical tunas based on the interim target and limit reference points adopted in 2014 (Resolution C-16-02). The HCR aims to prevent fishing mortality from exceeding the MSY level for the tropical tuna stock (bigeye, yellowfin or skipjack) that requires the strictest management. If fishing mortality or spawning biomass are approaching the corresponding limit reference point with a probability of 10% or greater, the HCR triggers the establishment of additional management measures to reduce fishing mortality and rebuild the stock. The HCR is implemented via time/area closures and catch limits which vary for different fleets (Resolution C-17-01).

The duration of the closure is set according to the level of F_{mult} ($F_{MSY}/F_{current}$) for the stock requiring the strictest management (at present, yellowfin).

Given that skipjack is more resilient to exploitation than yellowfin and bigeye, the harvest strategy based on the above HCR can be expected to achieve stock management objectives for skipjack; SG60 is met. It is difficult to see, however, how it can be responsive to the status of the skipjack stock directly, since there is no means of estimating the reference values which would trigger a change in the harvest strategy for skipjack – the strategy operates on the assumption that yellowfin and bigeye will always require management first. On this basis, SG80 is not met.

In order to improve this score, the harvest strategy needs to incorporate something that would trigger management action for skipjack in case of need; this cannot be F_{mult} as it is for yellowfin and bigeye, since F_{MSY} cannot be estimated for skipjack.

1.2.1.b Harvest strategy evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

The analysis of indicators provides evidence that the biomass and recruitment are at a high level, while exploitation at close to the historical mean level. SG80 is met.

1.2.1.c Harvest strategy monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring is in place that is expected to determine whether the harvest strategy is working.		

The harvest strategy is well monitored both in terms of the status of the stock and the catches and fishing mortality rates affecting status. Data are collected to estimate management quantities. Also the stock assessment reports best estimates of biomass, which indicates whether management is achieving its objectives or not, meeting SG60.

1.2.1.d Harvest strategy review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The harvest strategy is periodically reviewed and improved as necessary.

C-17-01 requires review of the harvest strategy during 2018 – see para. 18. It is, however, unclear how this will apply in this case, since it is not clear in the first place how the reference points can be applied to skipjack. A variety of efforts to develop a stock assessment model and estimate MSY or other reference values have been unsuccessful. SG100 is not met.

1.2.1.f Review of alternative measures		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biannual** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.

The main concern with discards of tuna appears to apply to the purse seine fleet. Under IATTC rules, all bigeye, skipjack and yellowfin brought on board is required to be landed, except that unfit for human consumption (see C-17-01, paragraph 16). Work is ongoing to try and reduce catch of juvenile tunas and non-target species in the purse seine catch (see C-17-01, para. 15). On this basis, unwanted catch is clearly subject to review and research and controls are being implemented, meeting SG80. It is not known whether the review is biannual, so SG100 is not met.

All SG60 were met, and 2 out of 3 SG80 were met.

PI 1.2.1 : 75

References

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P.1.2.2 Harvest control rules and tools

1.2.2.a HCRs design and application		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Generally understood HCRs are in place or **available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.

The HCR for EPO tropical tunas is set out in Res. C-16-02, as follows:

- If the probability that F>Flim is >10%, management measures shall be established such that there is at least a 50% probability that F will reduce to FMSY or below, and with a probability of <10% of F>Flim.
- If the probability that SB<SBlim is >10%, management measures shall be established such that there is at least a 50% probability that SB will recover to SBMSY or above, and with a probability of <10% that SB will decline to <SBlim within two generations or 5 years, whichever is greater.

i.e. It can be expected to keep the biomass above the limit reference point, and most likely above the PRI (given the relatively precautionary probability of $B<B_{lim}$ set as a trigger for management action) and fluctuating around MSY level. SG60 is met.

In relation to SG80, the HCR is 'well-defined' but its detailed application to skipjack is not because for skipjack F_{mult} cannot be estimated. Given that the PRI for skipjack is likely to be at a very low biomass, and given that various indicators, including recruitment, are monitored and have lower reference levels which could trigger management action as per the HCR, it can be argued that the HCR will ensure that the PRI is avoided. In relation to the MSY level, IATTC makes the argument, using a PSA, that the MSY level for skipjack is at a level at which the MSY reference points for yellowfin and bigeye would be exceeded, and hence will ensure by default that it maintains skipjack at or above a level consistent with MSY, but this also does not provide a 'well-defined' HCR. On this basis, SG80 is not met.

In order to improve this scoring, the application of the HCR to skipjack (i.e. the trigger value for taking management action in relation to skipjack stock status) needs to be defined in terms of some parameter than can be estimated for skipjack.

1.2.2.b HCRs robustness to uncertainty		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.

Given the differences in life history and the nature of the fisheries in the EPO, managing skipjack based on the measures put in place for yellowfin and bigeye is likely to be a robust strategy, despite the numerous uncertainties regarding the skipjack stock. SG80 is met.

1.2.2.c HCRs evaluation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is **some evidence** that tools used **or available** to implement HCRs are appropriate and effective in controlling exploitation.	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

The tools to implement the HCR are set out in Res. C-17-01; the key tool is the seasonal closure. They were selected by IATTC because they have been used in the past and/or can be used over periods longer than a year (see C-16-02); i.e. IATTC have taken a pragmatic approach to the selection of appropriate tools. The closure is not explicitly linked to the HCR, nor is there a clearly-defined trigger value for skipjack; the HCR relies on the assumption that yellowfin and bigeye will always need management first (which is not unreasonable). There is provision for review and adjustment according to outcome, and regular review of a variety of indicators for skipjack ensure that stock status is tracked. On that basis, the available evidence all indicates that the tools are likely to be effective controlling exploitation rates. SG80 is met.

In relation to SG100, since the tools are not linked either directly to the HCR or to skipjack stock status, it cannot be said that the evidence is clear that they will work in all circumstances. SG100 is not met.

All SG60 were met, and 2 out of 3 SG80 were met.

PI 1.2.2 : 75

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P.1.2.3 Information / monitoring

1.2.3.a Range of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Sufficient information (on stock structure, stock productivity, fleet composition), is available to monitor and assess stock status including reporting and size-frequency sampling by each fleet and catch-per-unit-effort data from these fleets.

There is a long history of biological and environmental research on EPO tuna stocks, and considerable environmental information that is not explicitly used in the harvest strategy.

Skipjack stock status is monitored a suite of indicators, covering stock abundance and exploitation. Recruitment cannot be well-estimated, but is an important driver for stock size in this short-lived tuna species. There is some tagging and other data for the evaluation of stock structure.

These data are sufficient for to monitor status and mortality rates to support the harvest strategy. However, the data are limited relative to direct estimates of stock productivity or determine accurate MSY reference points. For a precautionary harvest strategy, this meets SG80, but not SG100.

1.2.3.b Monitoring		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and **one or more indicators** are available and monitored with sufficient frequency to support the harvest control rule.	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.

Stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with the HCR, and indicators of catch and effort are available and monitored with sufficient frequency to support the HCR, including annual updates of the stock assessment (better

practice than other tRFMOs). Substantial amounts of information are collected, including data on retained catches, discards, indices of abundance (CPUE), and the size compositions of the catches of the various fisheries. In addition there is observer data which provides discard estimates. However, data from some fleets are incomplete. In general, however, there is good information on fishery removals from the stock. SG80 is met, but since reporting from some fleets is limited, there is not a high degree of certainty about all information needed for the HCR. SG100 is not met.

1.2.3.c Comprehensiveness of information		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is good information on all other fishery removals from the stock.	

Catches are reasonably well monitored and are sufficient for stock assessment. There has been an IATTC observer program since 1993 for larger vessels, and the United States has had an observer program from the 1970s. Observer coverage has allowed discards of tuna to be estimated, as well as estimates of bycatch of other species. The level of monitoring is sufficient for the harvest strategy, and therefore meets SG80.

All SG60 and SG80 were met, and 0 out of 2 SG100 were met.

PI 1.2.3 : 80

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P.1.2.4 Assessment of stock status

1.2.4.a Appropriateness of assessment to stock under consideration		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.

The most recent formal age-structured stock assessment for EPO skipjack (2005) is still considered preliminary, because it is not clear whether standardised CPUE is a good indicator of abundance for skipjack. A full stock assessment was also attempted in 2012, but was rejected as did not provide a reliable assessment. Therefore, since then, IATTC scientists have focused on a series of data- and model-based indicators which are updated annually and used to evaluate relative status; other approaches have been tried periodically but mainly discarded as unsuitable or unrealistic. The most recent update in 2017 evaluates stock status in 2016 via these indicators and their reference levels (historical mean with 90%CI). The indicators are as follows (note they are non-independent):

- total catch
- catch per day fished on floating objects
- catch per day fished, unassociated
- standardised effort
- average weight per fish
- relative exploitable biomass
- relative recruitment
- relative exploitation rate

Given the likely exploitation level and risk for this stock, this is appropriate and allows the implementation of the HCR, more or less (see 1.2.2), meeting SG80. However, it is not clear that the current method to monitor stock status is taking into account major features of the biology and fishery, so SG100 is not met.

1.2.4.b Assessment approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	

The primary monitoring method is now based on relative changes in 8 indicators. These have reference levels based on the approximate 5th and 95th percentiles of historical values (see 1.1.1 for details). Together these are used as proxy indicators of stock trends over time.

These reference points are stock-specific rather than ‘generic’, they are an appropriate approach given data limitations, and they can be estimated – in fact they are updated each year. Overall, therefore, SG80 is met.

1.2.4.c Uncertainty in the assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The assessment **identifies major sources** of uncertainty.	The assessment takes **uncertainty into account.**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.

The use of empirical, trends-based indicators rather than a model-based assessment already deals with a significant source of uncertainty. The reference levels are associated with 'confidence intervals' (based on the SD of the time series). The assessment approach also takes uncertainty into account in as much as it accepts that the outputs of a formal stock assessment are likely to be too uncertain to be meaningful. On this basis, SG80 is met. SG100 is not met.

1.2.4.d Evaluation of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

The assessment has been not been tested and shown to be robust. Many alternative hypotheses exist without formal evaluation. It has been suggested that this stock assessment (and management) would benefit from a full Management Strategy Evaluation which would help to rigorously explore assessment approaches and couple them with management evaluation in the context of harvest control rules. SG100 is not met.

1.2.4.e Peer review of assessment		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.

The stock assessment is subject to review through internal review processes where model structure, data and research are examined for the assessment. The review process has led to rejection of the previous assessment. There is no evidence of external peer review for this stock assessment, or whether the indicators are sufficient for the harvest strategy. SG80 is met but SG100 is not met.

All SG60 and SG80 were met, and 0 out of 4 SG100 were met.

PI 1.2.4 : 80

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Principle 3: Effective management

The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.

International Convention for the Conservation of Atlantic Tunas

3.1 Governance and Policy

P.3.1.1 Legal and/or customary framework

3.1.1.a Compatibility of laws or standards with effective management		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is an effective national legal system and a **framework for cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and **organised and effective cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and **binding procedures governing cooperation with other parties** which delivers management outcomes consistent with MSC Principles 1 and 2.

Fishing for tuna and tuna like species, both on the high seas and in zones of national jurisdiction, is governed by the International Conventions on the Conservation of Atlantic Tuna (ICCAT) of 1966. The Commission is established under the Convention and is tasked to co-ordinate scientific research and make recommendations designed to maintain populations of tuna at levels which will permit maximum sustainable yield. The Commission has adopted minimum permissible weight limits at which tuna may be caught and retained, overall catch limits for various species, time-area closures, gear regulations and schemes for international and port inspection. The basic texts of ICCAT were first issued in 1972. Revised and updated versions were issued in 1977, 1985, 2003, 2005 and 200. Although a recent review recommended modernising these texts to reflect current approaches to fisheries management, they remain generally consistent with MSC Principles and Criteria (MSC P&C).

The most relevant international legislation is the Law of the Sea 1982 Convention and the Fish Stocks Agreement 1995. The purpose of the 1995 UN Fish Stocks Agreement (UNFSA) is to facilitate the implementation of certain provisions of the 1982 Convention concerning the conservation and management of straddling fish stocks and highly migratory fish stocks. The Agreement complements the 1993 FAO Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (1993 FAO Compliance Agreement) and the 1995 FAO Code of Conduct for Responsible Fisheries. This legislation and guidance requires co-operation among states through international institutions where appropriate, and in the case of Atlantic tunas, ICCAT performs this function. UNFSA is particularly important in the case of highly migratory species as addressed by ICCAT, since this is a focus of this legislation.

Duties similar to those elaborated in UNFSA are also set out in article 8 of the FAO Code of Conduct for Responsible Fisheries (CCRF). While CCRF is not binding, it does set out best practice and therefore provides a broad structure through which fisheries can be evaluated.

Although ICCAT pre-dates much of the relevant international legislation on the management of fisheries, it is compliant with that legislation and sets out to meet the requirements of those laws relevant to the management of shared stocks.

A large proportion of CPCs (Contracting Parties to the Convention) to ICCAT have not ratified the UNFSA. These articles underpin the MSC P&C, and therefore failure to ratify the UNFSA does suggest that the state may not have acceded to these principles, and other evidence in each case should be sought. Any fishery operating within the jurisdiction of a state which has not ratified the UNFSA will need to demonstrate through other means that the laws it is applying are entirely consistent with the MSC P&C. Otherwise ICCAT sanctioned fisheries should meet the SG80, but the lack of binding procedures prevent the fisheries meeting SG100.

3.1.1.b Resolution of disputes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The management system incorporates or is subject by law to a **mechanism** for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a **transparent mechanism** for the resolution of legal disputes which is **considered to be effective** in dealing with most issues and that is appropriate to the context of the UoA.	The management system incorporates or is subject by law to a **transparent mechanism** for the resolution of legal disputes that is appropriate to the context of the fishery and has been **tested and proven to be effective.**

There are three mechanisms for dealing with legal disputes at the international level. Firstly, disputes can be dealt with at the annual meetings of the CPCs through consultation and conciliation. Secondly, technical disputes might be resolved by an appropriately composed expert or technical panel. Thirdly, disputes that remain unresolved might be resolved through either the International Court of Justice (ICJ) or the International Tribunal for the Law of the Sea. The first two mechanisms are arguably the main overall purpose of ICCAT.

ICCAT has no formal dispute resolution procedure within the convention, but the meetings provide an opportunity to resolve disputes informally. Such disputes are still considered legal in that they set out to resolve issues defined in the 1982 UN Law of the Sea Convention.

ICCAT (the Commission) is not subject to any court challenges as of 2016. There is no evidence that other entities flout the law, with the notable exception of particular fishing companies and fishing vessels, which are listed on the IUU fishing list. CPCs have avoided resorting to using international law to settle disputes. By resolving disputes through ICCAT meetings (being members of ICCAT and agreeing to abide by ICCAT provisions), the CPCs have pro-actively avoided legal disputes.

52 ICCAT contracting parties (in 2017, as published on website 20th Nov 2017), who along with observers and co-operating non-contracting parties, have representatives at ICCAT meetings. In accordance with the Convention, the Commission holds a regular meeting every other year and a special meeting in alternate years. The Commission can, on the basis of scientific evidence and of other relevant information, adopt recommendations and resolutions with the objective of maintaining ICCAT stocks around MSY. Negotiations on these occur both at technical and political levels. Normally, Recommendations and Resolutions are drafted by auxiliary bodies (such as the 4 species-group Panels, or the Compliance Committee), and are presented to the Commission for adoption.

This system is transparent in that it makes sure that all members are fully informed of the issues under consideration and are able to participate in informed discussion. ICCAT requires that final decisions and the adoption of management recommendations may be made only in plenary at the

annual meeting. However, disputes resolved in this way would still not necessarily be entirely transparent in the sense that how a resolution is reached may not be fully reported. However, independent observers, including NGO and IGOs, are present at such meetings and would observe any resolutions and justifications that are presented.

Objections can be lodged against recommendations, eventually allowing any party to "opt out". This could, at least in the short term, prevent timely dispute resolution due to the lack of an effective arbitration procedure. Objections have been used to prevent recommendations being fully implemented. Within the context of an international system, the dispute cannot override a nation's sovereign rights, but nevertheless a better dispute mechanism could be provided through providing formal arbitration and conciliation procedures to remove the necessity for objections over conservation issues.

Perhaps not surprisingly, any provisions within ICCAT would not deal with disputes including Non-contracting Parties. It is capable of exercising sanction, however, as demonstrated by the sanctions levied against St Vincent & Grenadines. This should encourage all participants in the fishery to make use of the dispute resolution procedures that ICCAT offers.

It is, at least in theory, possible for international disputes to be resolved through the International Court of Justice (ICJ) or through the International Tribunal for the Law of the Sea (ITLOS) if they cannot be resolved in more efficient ways. This has been used by CPCs in other RFMOs (e.g. WCPFC: ITLOS Cases Nos 3 & 4 between New Zealand, Australia and Japan), but so far no cases have taken place among ICCAT members over issues relevant to tuna conservation. This recourse is most likely to be used by states which have ratified the UNFSA, in which such a provision is made. Therefore, where a fishery is not under the jurisdiction of a state which has ratified UNFSA, it may be questioned how effective this option would be. For states which have ratified UNFSA, it is likely this mechanism would be transparent and effective, meeting SG80. However, it has not been tested and proven effective yet, and therefore could not meet SG100.

Non-Contracting Parties can apply to become Co-operating Non-contracting Parties, which implement the measures and requirements set by ICCAT, even if not becoming a full Contracting Party.

The presence of observers and the requirement that decisions are made in plenary makes the process transparent. In ICCAT, observers are admitted under rule 5 of the rules of procedure. Observers are not required to reapply annually after the grant of observer status, and they may also present statements and documents to the meetings of the Commission and its subsidiary bodies. This makes the observer status reasonably accessible to interested groups.

There are explicit and transparent decision-making and dispute resolution mechanisms defined and in place, meeting SG60. However, the system cannot be considered fully effective with the current objections procedure, which does not represent "best practice". The objectives can and have affected fisheries attempting to implement conservation measures, which prevents the fishery meeting SG80. Neither have the other dispute resolution procedures in existence been tested or proven to be effective. There are no outstanding disputes among members for the fisheries considered here, but no disputes have been referred to ICJ/ITLOS (checked 22 Nov 2017). The effectiveness of the other informal ICCAT mechanisms is unclear, and it seems likely many disputes are in abeyance rather than resolved. This may prevent these fisheries meeting SG100 even if the objections mechanism was improved.

3.1.1.c Respect for rights		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The management system has a mechanism to **generally respect** the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to **observe** the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to **formally commit** to the legal rights created explicitly or established by custom on people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.

ICCAT provides only for the rights of nations to fish resources. How these are distributed among groups within the nation state depends on national policy and legislation (such as Canadian First Nations to swordfish resources; Devitt et al. 2010).

Where tested, the national legal and/or customary framework for management of stocks has been found to comply with SG80 on this scoring issue, although such tests have been limited. The fisheries of both St. Helena (Carleton et al. 2010) and Canada (Devitt et al. 2010) have been found to have sufficient provision to protect fishing rights of its citizens. Little reliance was placed on ICCAT for meeting the scoring guideposts in these previous MSC assessments.

Among States, ICCAT allocates quota based often, but not always, on a CPC's track record in the fishery. Measures are based on specific periods of activity. For example, CPCs have been required to limit the number of their commercial fishing vessels larger than 24 meters length fishing for bigeye tuna in the Convention area to the average number of its fishing vessels actually having fished for bigeye tuna in the Convention area over 1991 and 1992, so as not to increase the total fishing capacity. However, it is noteworthy that ICCAT also has taken account of developing country capacity in developing their fisheries where traditional fisheries may not have previously existed. Otherwise Atlantic tunas, outside the Mediterranean, were not subject to widespread traditional fisheries, due to limitations of technology for operating on the high seas.

ICCAT's internal allocation criteria, developed in 2001, now include eight standards relating to the status of qualified participants. These include the interests of artisanal subsistence coastal fishers and coastal communities, coastal states whose economies are overwhelmingly dependent on the exploitation of marine resources, the socio-economic contribution of the fisheries to the developing States, especially small island States, the economic and/or social importance of the fishery based on historical use, the contribution of the fishery to national food security, domestic consumption, income resulting from exports and employment, and the right of qualified participants to engage in fishing on the high seas for the stocks to be allocated.

The criteria are applied on a stock-by-stock basis by the relevant ICCAT panels according to certain conditions, including the requirements that they are to be applied gradually to allow industry to adapt, be fair and equitable, allow opportunities for all qualifying participants, be consistent with international law, prevent and eliminate overfishing and excess fishing capacity, do not legitimize IUU catches and encourage cooperation between developing States and other States. Since 2001, the ICCAT allocation criteria have been applied in such a way as to increase fishing opportunities for a number of developing States.

These criteria are less binding than in some other RFMOs (WCPFO), and exactly how conflicting interests among these criteria might be resolved is unclear. Nevertheless, ICCAT does apply best practice in the sense that it tries to resolve these issues considering all valid criteria.

Several ICCAT contracting parties have made available substantial funds to finance improved data collection and reporting activities and to help with travel assistance for scientific meetings. These funds are destined exclusively for scientists from developing countries.

ICCAT has developed methods and an intention to allow access to the resources under its purview, and these are consistent with MSC Principles 1 and 2. Therefore the international management system meets the requirement for SG60 and SG80.

While ICCAT has demonstrated the intention to develop and implement methods to allow a fair distribution and mechanisms to achieve this objective, such mechanisms are not formal commitments, just statements of what arguments might be admissible in determining fishing rights allocation. As a result, this does not meet SG100.

All SG60 were met, and 2 out of 3 SG80 were met.

PI 3.1.1 : 75

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P.3.1.2 Consultation, roles and responsibilities

3.1.2.a Roles and responsibilities		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **generally understood**.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for key areas** of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for all areas** of responsibility and interaction.

ICCAT is itself an organization set up to define roles and responsibilities for its contracting parties and co-operating non-contracting parties. These functions, roles and responsibilities are explicitly defined. Among ICCAT's responsibilities is to ensure that CPCs understand their areas of responsibility and interaction. On the whole, it is successful in many areas, including providing basic catch data and catch sampling, implementing research programs and ensuring stock assessments and scientific advice are provided in a timely manner.

The performance of the Secretariat is sound and well regarded as both efficient and effective by CPCs. The CPCs themselves vary in their ability to perform their role, but the roles and responsibilities are nevertheless explicitly defined at least at the national level for key areas. Key areas include providing catch and monitoring data to the ICCAT Secretariat, taking part in various meetings sharing information and making decisions, meeting the requirements for conservation and other recommendations for ICCAT and applying appropriate levels of control and surveillance.

With respect to implementing management controls, providing monitoring data and scientific research, tasks are allocated, coordinated and monitored through ICCAT and its annual meetings. This system broadly works. Organizations and individuals involved in the management process in those cases limited to Contracting Parties will be well-defined for key areas.

Roles and responsibilities are not well defined or well understood in many areas, however. ICCAT has had a number of problems with flag states that have not applied appropriate controls to their vessels, CPCs not submitting timely data and not in the correct form, and so on. Some problems in providing basic data on vessels and catches are likely due to a lack of understanding of requirements which appear to be complex. While these problems are not all in key areas in the sense that they do not prevent ICCAT completing many of its tasks, they nevertheless undermine its overall effectiveness and increase risks for fishery sustainability. The establishing of a capacity building fund (Rec 2013-919), a meeting participation fund (Rec 2014-14) and other programs could help. For example ICCAT has recently released video tutorials for the completion of some of its data submission forms, and is working on similar videos for the remaining forms. These could help address this problem. Hence the fisheries do not meet SG80 and SG100.

Although roles within ICCAT and among its CPCs are well defined, these are not necessarily well understood by entities within nations. This would have to be evaluated for each fishery. Furthermore, while responsibilities might be understood, it does not follow that those responsibilities are met, as in the case of Eastern Atlantic bluefin tuna. However, this problem, where it occurs, may be picked up under other performance indicators.

3.1.2.b Consultation processes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The management system includes consultation processes that **obtain relevant information** from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that **regularly seek and accept** relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that **regularly seek and accept** relevant information, including local knowledge. The management system demonstrates consideration of the information and **explains how it is used or not used.**

Much of the purpose of ICCAT is to regularly seek data, particularly the data monitoring fishing activity and catches. ICCAT holds a plenary meeting every two years, and specialist working groups of ICCAT (comprising scientists from the contracting parties) convene technical meetings on an annual basis. Information derived from the CPCs and the inputs from the specialist working groups is considered and such consideration forms the basis of the management advice provided by ICCAT. "Local knowledge" at the international level is assumed to refer to national information and experience.

The management system demonstrates consideration of the information obtained. The scientific reports state exactly what information is being used, how it is used, and justification is provided for all information which is rejected. This is best practice and meets SG100. However, information used by management other than the scientific information is not so clearly reported. Although much of this information can be inferred from various sources, it is not necessarily clear how different sources of information are weighted. This includes information on compliance, economics and social issues. For example, the change in the West African seasonal closed area designed to reduce bycatch of small bigeye tunas appears to have been made in 2004 without reference to scientific advice (Rec. 04-01 now replaced by Rec. 11-01). Although the intention is stated clearly in the recommendation, how the available information was used to reach this particular decision is unclear. The change in area caused the control to fail in its objective, which resulted in the recommendation being replaced again in 2008, but this time clearly based on a scientific evaluation (Rec. 08-01 now replaced by Rec. 10-01). Therefore, these fisheries do not meet SG100 because the management system cannot demonstrate in all cases consideration of all the information or explain how it uses information in decisions.

3.1.2.c Participation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The consultation process **provides opportunity** for all interested and affected parties to be involved.	The consultation process provides **opportunity and encouragement** for all interested and affected parties to be involved, and **facilitates** their effective engagement.

Consultation occurs at several levels within the management system. Consultation at the international level is formalized, and there are well-developed mechanisms for the seeking and consideration of appropriate information. At the national and fishery level the opportunity for interested parties to be involved in management varies.

The opportunity to become a Contracting Party or Co-operating Non-contracting Party is open to all, including non-states. ICCAT has taken and continues to take steps to encourage states to become Contracting Parties, and for Non-Contracting Parties to co-operate with ICCAT's conservation measures. The success is demonstrated by the increase in membership over the last few decades and the high level of participation.

The Commission may be joined by any government that is a member of the United Nations (UN) and that is a member of a Specialized Agency of the United Nations. In addition, any inter-governmental economic integration organization constituted by States that have transferred to it competence over the matters governed by the ICCAT Convention can join, such as the EU. To become a Contracting Party, an instrument of adherence to the ICCAT Convention must be deposited with the Director-General of the Food and Agriculture Organization of the United Nations (FAO). Membership becomes effective on the date that the instrument is deposited. In addition, the Commission can also grant the special status of a Co-operator, who has many of the same rights and obligations that Contracting Parties have. The procedures and criteria for attaining this status are clearly laid out in a 2003 Recommendation (2003-20).

An applicant for Cooperating non-Contracting Party, Entity or Fishing Entity Status is required to confirm its commitment to respect the Commission's conservation and management measures and inform ICCAT of the measures it takes to ensure compliance by its vessels with ICCAT conservation and management measures. It is important to note that the provision of information forms an important part of the decision to award this status. The Commission's Permanent Working Group for the Improvement of ICCAT Statistics and Conservation Measures (PWG) is responsible for reviewing requests for Cooperating Status and for recommending to the Commission whether or not an applicant should receive Cooperating Status. However, the requirements state that this provision should not allow over-capacity from elsewhere or legitimize IUU activity.

ICCAT facilitates effective engagement of its stakeholders. ICCAT also provides training and support to States lacking the capacity in areas of data management and fisheries science, which facilitates effective and full involvement in its activities. Additionally, ICCAT meetings are open to stakeholders such as NGOs and fisher-groups upon registration requiring some administrative cost.

Therefore, there is sufficient evidence that, at the international level, ICCAT meets SG80 and SG100.

All SG60 were met, and 2 out of 3 SG80 were met.

PI 3.1.2 : 75

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P.3.1.3 Longterm objectives

3.1.3.a Objectives		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Long term objectives to guide decision-making, consistent with MSC fisheries standard and the precautionary approach, are **implicit** within management policy.	**Clear** long term objectives that guide decision-making, consistent with MSC fisheries standard and the precautionary approach, are **explicit** within management policy.	**Clear** long term objectives that guide decision-making, consistent with MSC fisheries standard and the precautionary approach, are **explicit** within **and required by** management policy.

The ICCAT Basic Texts provide clear, long-term objectives that guide decision making under Principle 1. The long-term objectives for each stock are clear enough that the science-based advice and management of these stocks can be evaluated.

The original ICCAT Convention had no explicit provision regarding the precautionary approach or ecosystem based management which forms part of the MSC Principles and Criteria, although there was evidence that these principles were being applied in fisheries management, albeit implicitly.

Evidence of applying the precautionary approach and ecosystem based management include bycatch reduction programs, monitoring of ecosystem indicators and precautionary management measures. The ecosystem approach is not explicit, but underpins the reason for many ICCAT activities. ICCAT has undertaken the collection of data on bycatch, including seabirds and sharks, research on biological and physical oceanography. In addition, ICCAT has banned the use of high-seas driftnets and shark finning, encouraged the live release of billfish and juvenile bluefin tuna and encouraged the use of circle hooks to reduce sea turtle mortalities, all of which imply the precautionary and ecosystem approaches to management. ICCAT has also formed a committee on Ecosystem Monitoring. However, being implicit has allowed considerable leeway to some CPCs who do not appear to take some of these aspects of management seriously.

At its 2015 meeting, ICCAT adopted Resolution 2015-12 which states that the Commission should apply a precautionary approach, in accordance with relevant international standards. The formulation of the resolution is entirely consistent with the UN Fish Stock Agreement and with the FAO Code of Conduct for Responsible Fisheries. Resolution 2015-11 2 states that the Commission should apply an ecosystem-based approach to fisheries management. The formulation of the resolution is consistent with international texts. These Resolutions deal explicitly with Principle 1 and Principle 2 of the MSC Principles and Criteria. Thus, SG100 is met.

All SG60, SG80 and SG100 were met

PI 3.1.3 : 100

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3.2 Fishery Specific Management System

P.3.2.1 Fishery-specific objectives

3.2.1.a Objectives		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **implicit** within the fishery-specific management system.	**Short and long term objectives,** which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **explicit** within the fishery-specific management system.	**Well defined and measurable short and long term objectives**, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **explicit** within the fishery-specific management system.

The ICCAT basic texts offer guidance and principles on which management plans might be based.

As this PI looks at fishery-specific issues, each stock in the ICCAT Convention area could therefore be treated at an element approach. There is a "Convention Objective" applied to all stocks, which is to maintain them at their most productive. This has led to setting total catches and fishing capacity to take stock abundance to above B_{MSY}. Specific fishery objectives are in the form of the annual TAC and quota allocations for bigeye, yellowfin and albacore, for example, to fish at or above the MSY level (Principle 1), and it is implicit that ecosystem issues, such as bycatch reduction, are addressed at the fishery-specific level. The fishery specific objectives are issued by ICCAT and agreed by its membership. ICCAT's objective is embedded in the preamble of its Convention finalised in 1966. The preamble states: "The Governments (…) considering their mutual interest in the populations of tuna and tuna-like fishes found in the Atlantic Ocean, and desiring to cooperate in maintaining the populations of these fishes at levels which will permit the maximum sustainable catch for food and other purposes". The scientific advice is based on MSC Principles 1 and 2, because these objectives are implicit in the management of each stock. Thus SG60 is met.

Not all stocks have TACs defined. For example, no TAC or quota is set for skipjack because the stock is considered to be under-exploited (this is not considered best practice, and is addressed under P1). However, the same management objective applies to this stock.

The ICCAT framework provides explicit objectives, and it appears that they are genuinely treated as objectives in the management of an individual stock. For example, at the 25th annual ICCAT meeting

(in Marrakesh, Morocco 14-21 November 2017) data showed a widely recognised improvement in the overall situation for Atlantic tuna stocks, compared to a decade ago, based on strict TACs over the years. For the first time in ICCAT history, a Harvest Control Rule was adopted, here for Northern Albacore. Moreover, ICCAT adopted measures to freeze the fishing effort on the stock of Mediterranean albacore, adopting a precautionary approach. Also, ICCAT adopted Recommendations reducing the TACs for Northern and Southern Atlantic swordfish with the objective of adopting a precautionary approach encouraged by the Scientific Committee. Regarding sharks, ICCAT adopted measures aimed at protecting sharks in the North Atlantic, such as the short fin mako. It may be argued that SG80 is met for those stocks where the P1 management framework is strongest, and bycatch issues are known, at least for Primary species. Although the original convention text, outlining amongst others the function of ICCAT, does not explicitly detail ecosystem related issues (P2), ICCAT continues to align with the FAO Code of Conduct for Responsible Fisheries, and Article IV (1) of the Convention text has been amended to establish ICCAT's ecosystem approach to fisheries (EAF) management (e.g. in terms of by-catch or predator-prey relationships). The 2nd ICCAT Performance Review report (2016) specifically highlights explicit measures to address bycatch of seabirds and turtles, as well as pollution and waste management. SG80 is met.

Objectives apart from MSY are not well defined and therefore not measurable. There is no explicit consideration of risks (for example, precautionary approach) and no explicit consideration of ecosystem-based management. Thus, SG100 is not met.

All SG60 and SG80 were met, and 0 out of 1 SG100 were met.

PI 3.2.1 : 80

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P.3.2.2 Decision-making processes

3.2.2.a Decision-making processes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There are **some** decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are **established** decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	

Decision-making processes are in place, which are established, responsive and largely transparent. However, there are some weaknesses, which have been highlighted by the performance review.

Members can vote, but cooperating non-members are not entitled to take part in voting. For example, Chinese Taipei is a Co-operating Fishing Entity and has observer status only. Many decisions are obtained from consensus rather than majority voting.

ICCAT allows its parties to opt out of decisions. The 2006 UNFSA Review Conference recommended that States through RFMOs should ensure that post opt-out behaviour is constrained by rules to prevent opting-out parties from undermining conservation, clear processes for dispute resolution, and a description of alternative measures that will be implemented in the interim (UN, 2006, paragraph 32(f) of the Annex). ICCAT has not implemented these yet.

Despite this, decision-making processes are in place, and they do generally result in measures and strategies to achieve objectives, which meet SG80. The result of the decision-making is primarily addressed in Principle 1 (PI 1.1.1, 1.2.1, 1.2.2) and elsewhere.

3.2.2.b Responsiveness of decision-making processes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Decision-making processes respond to **serious issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to **serious and other important issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to **all issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.

Article VIII of the Basic Texts sets out the procedure for dealing with recommendations, which should be made on the basis of scientific evidence and be designed to maintain tuna populations at levels that will permit the maximum sustainable catch. Recommendations may be made at the initiative of the Commission or by an appropriate Panel established with the approval of at least two-thirds of all the Contracting Parties. However, ICCAT (as well as NAFO, CCAMLR, NEAFC and SEAFO) permits a member to submit an objection, which can allow an objector to opt out of the recommendation. This follows a well-defined procedure.

If a CPC persists in objecting to a conservation recommendation, the recommendation will not be binding on that contracting party. The contracting party is not required to justify its objection and there are no limits placed upon when an objection might be acceptable or not. Under best practice, permissible reasons would be limited to any alleged incompatibility with the LOS Convention, UNFSA or the RFMO's constitutive texts, or alleged discrimination against the member concerned that cannot be justified. It is therefore currently possible that an objection in ICCAT could be incompatible with the MSC Principles and Criteria. A unilateral claim to increase or create a quota, for example, is incompatible with the object and purpose of ICCAT and undermines the conservation measures. Solutions such as the CPC seeking a review by an independent panel of the recommendation it is objecting to, as used by CCAMLR and WCPFC for example, is not available in ICCAT.

While the objections procedure is a weakness, it does not appear in practice to have been deleterious to the decision-making processes for the stocks considered here. Objections have been used primarily in response to quota allocation schemes. Eastern Atlantic bluefin tuna, which is outside the scope of this report, may not meet the SG60, since the objections procedure has undermined decisions on conservation in this case. The fact that such objections may unduly delay the resolution of disputes is addressed in PI 3.1.1.

The decision-making is transparent. ICCAT resolves most disputes at its annual meetings by consensus. While the outcome of such decisions is transparent and, we presume, initial positions and the information used for the basis of the decision is available, exactly how a decision is reached is not necessarily obvious. However, this degree of transparency is adequate to show a gross mis-

match between the information being provided and the decision being made. The system makes sure that all members are fully informed of the issues under consideration and are able to participate in informed decision-making. The annual calendar of meetings is crowded, with inter-sessional meetings of various scientific, compliance and technical sub-committees, so decision-making could become unclear. This may be an issue particularly for developing countries, whose capacity to attend and participate in meetings of technical committees is likely to be limited. For this reason, ICCAT ensures that final decisions and the adoption of management recommendations may be made only in plenary at the annual meeting.

The decision-making is adaptive in that decisions are evaluated by the various specialist meetings and feedback is provided to the Commission. The Commission can be shown to react appropriately. For example, following an evaluation in 2008 of the time-area closure intended to reduce the catch of undersize bigeye, appropriate adjustments were made by the Commission ([Rec 04-01] was replaced by [Rec 08-01]).

Overall the decision-making is adequate for the stocks being considered. It can be shown that it deals with serious and important issues in a transparent, timely and adaptive manner meeting SG80. It cannot be claimed that the decision-making deals with all issues. The objections process probably stops contentious issues from being raised wherever possible and therefore these may remain unresolved. Therefore, the fishery does not meet SG100.

3.2.2.c Use of precautionary approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	Decision-making processes use the precautionary approach and are based on best available information.	

Decision-making processes clearly attempt to use the best available information. A large number of meetings are conducted and reports written for the Commission which provide analyses and advice based on all the available information.

Although the precautionary approach is implicit rather than explicit in decision making processes (Resolution 15-11 and 15-12), it can be demonstrated that it is used in practice under most circumstances. For example, various recommendations and resolutions have been made on the basis of the potential harm they might do, and have not been delayed while waiting for relevant research to be conducted. However, because the precautionary approach and its use are not defined explicitly, it is difficult to determine whether it is properly used in all decisions. This weakness is recognized and being addressed.

Overall, ICCAT decision-making processes meet SG80. They are based on the best available information, and in most cases can be shown to be based on the precautionary approach. Importantly, there is now a clear intention to include the precautionary approach explicitly in its basic texts, which should clarify its use and ensure reference to it in giving explanations for decisions.

3.2.2.d Accountability and transparency of management system and decision making process		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some information on the fishery's performance and management action is generally available on request to stakeholders.	**Information on the fishery's performance and management action is available on request**, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	Formal reporting to all interested stakeholders **provides comprehensive information on the fishery's performance and management actions** and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.

Recommendations from research, monitoring, evaluation and performance review are published formally. Likewise, reports of the plenary sessions of meetings are published formally and are publicly available. This formal reporting represents best practice. While some groups may believe that the way all information that is used in the decision making is reported, it is difficult to see how the current system could be improved in this respect. Even where doubt is expressed as to how a decision is reached, all information available for the decision making is published, allowing any stakeholder to draw their own conclusions, and there is frequent feedback from NGOs, scientists and other stakeholders.

For example, in 2006/07 Libya and Turkey objected to the recommendation for a rebuilding plan for Mediterranean bluefin tuna, on the basis that quota allocation was unfair. They proposed their catch limits unilaterally on the basis of historical catch from a particular year. Even though in this case a credible explanation was provided, the dispute remains unresolved. Other decisions, such as reducing bycatch, improving size composition or setting the overall catch and effort limits, can be clearly linked to the scientific reports. With detailed formal public reporting of decisions and all information on which those decisions are based, the ICCAT fisheries meet SG100.

3.2.2.e Approach to disputes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.

ICCAT (the Commission) is not subject to any court challenges as of 2017. It does not indicate any disrespect or defiance of the law through repeated violations. There is no evidence that other entities flout the law, with the notable exception of particular fishing companies and fishing vessels, which are listed on the IUU fishing list. Therefore, excluding these, ICCAT and CPCs meet the SG60.

Given that there are no current outstanding judicial disputes and that so far CPCs have avoided resorting to using international law to settle disputes, the management system meets SG80 and SG100. By resolving disputes through ICCAT meetings (being members of ICCAT and agreeing to abide by ICCAT provisions), the CPCs have pro-actively avoided legal disputes.

However, specific fisheries undergoing certification will operate under national management systems, which would have to be considered in certifying that fishery. In most cases, it is likely a suitable legal system will exist to deal with significant disputes between stakeholders, but this should be verified.

All SG60 and SG80 were met, and 2 out of 3 SG100 were met.

PI 3.2.2 : 95

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P.3.2.3 Compliance and enforcement

3.2.3.a MCS implementation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring, control and surveillance **mechanisms** exist, and are implemented in the fishery and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance **system** has been implemented in the fishery and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A **comprehensive** monitoring, control and surveillance system has been implemented in the fishery and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.

ICCAT's strategies to improve compliance with its requirements and procedures revolve around vessel registration, catch monitoring and diplomatic and other pressures applied to nation states. In addition, in certifying a particular fishery, the MSC assessment will need to consider the particular performance of the responsible nation state.

A number of positive developments have taken place since 2006: a legally binding instrument on Port State Measures to prevent, deter and eliminate illegal, unreported or unregulated (IUU) fishing ("Port State Measures Agreement"); the work of FAO to develop a global record of fishing vessels and to develop criteria to assess the performance of flag States; the second meeting of the five RFMOs dealing with highly migratory fish stocks in San Sebastian, Spain, and the follow-up work already under way.

Most of the RFMOs managing tuna and tuna-like species use their vessel registers to establish 'positive lists'. ICCAT was the first RFMO to adopt such a measure, by establishing a record of large-scale fishing vessels authorized to operate within its area of competence. This record is based on information submitted by parties and cooperating non-parties. Importantly, vessels not entered into the record are deemed to be unauthorized to fish for, retain on board, transship or land tuna and tuna-like species. Parties to ICCAT are required to take a number of measures, among them prohibiting the transshipment and landing of tuna and tuna-like species by large-scale fishing vessels that are not entered into its record.

The main weakness of these lists is that they do not indicate whether a vessel is active in any particular ocean. Satellite based vessel monitoring systems are being introduced for vessels over 24 metres length. ICCAT adopted a recommendation requiring parties to implement VMS on vessels above 24 metres in length by no later than 1 July 2005 (later extended to 1 November 2005 and now implemented) and on vessels above 15 metres fishing for bluefin tuna from 1 January 2010.

In 2006 a combined list of all vessels included on the authorized lists of the five tuna RFMOs was established and published on the Internet (http://tuna-org.org/). It includes information from the authorized lists maintained by the CCSBT, IATTC, WCPFO, ICCAT and IOTC authorized list. In addition, the website contains links to the IUU vessel lists of each RFMO. This information sharing should improve enforcement.

ICCAT has established a port inspection scheme with minimum standards that guide inspectors as they monitor landings and transshipments, check compliance with ICCAT management measures, including quotas, and collect data and other information (ICCAT Recommendation 98-11 3).

A problem among many fisheries management systems, and tuna is no exception, is monitoring transshipment to prevent illegal catch entering the legal market. In 2005, ICCAT established a regional independent observer program for carrier vessels to monitor every transshipment operation involving large-scale tuna longline fishing vessels, which includes a record of vessels authorized to receive transshipment in the ICCAT area. Carrier vessels not entered on the record are deemed to be unauthorized to receive tuna or tuna-like species in transshipment operations. The flag State of the donor vessel is obliged to validate the statistical documents for the transshipped fish.

There is a statistical documentation program (SDP) for bluefin, bigeye and swordfish which is linked to information from observers. Criticisms of this have mainly centred on bluefin tuna which may be captured and then "farmed", delaying their entry to markets and providing opportunities for circumventing the scheme.

Further control is possible through third party states. Some States have taken action to make it a violation of their domestic laws for their nationals to engage in activities that conflict with the fisheries laws of other countries. Perhaps the most powerful example is the Lacey Act in the United States of America, which is directed at the illicit trade in illegally caught fish and wildlife. United States prosecutors have used the Lacey Act's provisions to deal with importations of illegally caught fish. In Guam and American Samoa, important ports for offloading tuna, the Lacey Act has been used to deal with violations of the laws of a number of Pacific island states.

Below the international level under direct ICCAT control, the fishery being certified will depend upon the performance of the flag state and vessels within the unit of certification. Many of the conservation and enforcement measures established by RFMOs put clear obligations on parties as

the flag States. But there are also some measures directed at masters of fishing vessels, or even the fishing vessel itself. Typical examples are regulations for bycatch, minimum fish sizes and time and area restrictions.

Ultimately, it is the flag State that is responsible to the relevant RFMO for any failure to ensure that its measures are implemented and for the resulting violations of those measures by that State's vessels. Problems persist over the general failure of certain flag States to exercise effective jurisdiction and control over their vessels. These States include both members and non-members of RFMOs. While there have been recommendations to monitor flag State performance in this regard, this has not yet been done.

Consolidated landings and other data should be submitted annually to ICCAT as required. The accuracy and timeliness of these submissions will need to be checked for each fishery in the unit of certification. Information on compliance is published as part of the Commission meeting report as Compliance Tables. If a flag state does not enforce the ICCAT's recommendations and requirements such that MCS is compromised, those vessels will not meet SG60 and will not be eligible for certification.

At the international level, monitoring control and surveillance mechanisms exist, and have been implemented in these fisheries. In all cases considered here, they have been demonstrated to be effective where they are applied, meeting SG60 and SG80. Whether they are effective in a particular unit of certification will need to be determined.

At the international level, the system is not comprehensive and cannot be demonstrated to have the ability to consistently enforce relevant management measures which prevent meeting SG100.

3.2.3.b Sanctions		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, **are consistently applied** and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and **demonstrably** provide effective deterrence.

Conservation measures, including annual landings quotas are set by ICCAT, but enforcement is carried out by the national authorities. Although flag states are supposed to control the activities of their vessels, it is recognized that there are weaknesses and CPCs are given authority to check and apply controls to such vessels. A register of vessels that flout ICCAT conservation measures is maintained and shared with other RFMOs. These vessels should be restricted in their fishing opportunities once they are recognized in this way.

The most serious sanctions that can be applied collectively by the members of an RFMO are blacklisting of member vessels and quota reductions. These have been applied to a limited extent in ICCAT.

The blacklisting of non-member vessels (IUU lists) has become a widespread practice among all RFMOs including ICCAT. ICCAT has also introduced a system for blacklisting vessels flying the flags of members that have been engaged in IUU fishing, although this has not been effective. Only CCAMLR has used this system to any extent and therefore represents best practice in this regard.

An example of a sanction on a non-Contracting Party is the quota limit applied to Chinese Taipei for activities in the bigeye tuna fishery. The sanction consisted in cutting the 2006 quota of bigeye tuna from what could have been 16 500t to 4 600t. In addition, ICCAT stipulated Chinese Taipei vessels must have a maximum of 15 vessels targeting bigeye reduced from approximately 100 vessels in 2005.

Punitive measures are also applied to discourage flouting agreements. If an ICCAT member nation exceeds its catch limit for two consecutive management periods, ICCAT will recommend appropriate measures including, but not limited to, reduction in the catch limit equal to 125% of the overage, and if necessary, trade measures. Such measures have been applied to the EU for example.

Also, ICCAT has adopted framework provisions enabling trade restrictive measures to be taken against individual States if necessary, but only when other actions either have proved to be unsuccessful or would not be effective, and after due process. Although also available to other RFMOs, ICCAT is the only RFMO to have used trade-restrictive measures against an individual State. It currently has import bans in place against Bolivia and Georgia, neither of which is a member of ICCAT.

On the whole, sanctions appear to be applied among countries consistent with their involvement in ICCAT. The most serious sanctions have been applied to countries and fishing entities which are not members of ICCAT. Sanctions applied to CPCs have generally been weak.

Sanctions are not fully effective as a deterrent. At the extreme end, Mediterranean bluefin tuna conservation agreements appear constantly to be in difficulty, and, although bluefin is outside the scope of this report, some vessels appear to believe that they can flout the same basic management system which is applied to all fisheries. There are constant problems with other fisheries (see ICCAT Compliance Tables), presumably because the perpetrators feel they have a reasonable chance of not suffering sanctions or that sanctions are too weak. However, many issues of non-compliance in relation to providing data and information may also be due to limits on technical capacity in the responsible management authorities, particularly developing countries. It is noticeable that in responding to each State's compliance issues, the Compliance Committee intends to write to each State requesting improvements in data provided.

Sanctions to deal with non-compliance certainly exist and there is evidence that they are applied, meeting SG60. However, evidence suggests that they are not an effective deterrent, which does not meet SG80. Given that individual assessments are dealing with the fishery-specific enforcement and compliance system here, however, it may be that individual fisheries can score higher based on national enforcement systems.

3.2.3.c Compliance		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Fishers are **generally thought** to comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	**Some evidence exists** to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a **high degree of confidence** that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.

This performance indicator applies to fishers and therefore needs to consider the requirements of ICCAT when considering compliance. This would need to be addressed for each specific unit of certification.

There are numerous issues with non-compliance, although it is not always clear where or why they occur or who is responsible. The Performance Review indicated that there are so many rules and requirements, with many being difficult to understand, that some if not all CPCs struggled to comply with all requirements. The Performance Review found that CPCs have consistently failed to provide timely and accurate data and failed to implement monitoring, control and surveillance (MCS) arrangements on nationals and national companies. However, it also stated that "Most of the

problems and challenges ICCAT faces would be simple to fix if CPCs developed the political will to fully implement and adhere to the letter and spirit of the rules and recommendations of ICCAT." This seems to place the blame on the national institutions rather than fishers. Nevertheless, the ultimate test is whether the fishers themselves comply with ICCAT provisions.

ICCAT has a Compliance Committee that monitors compliance with ICCAT recommendations. This Committee has the potential to address problems over implementation of ICCAT recommendations. The performance review found that the ICCAT standing committee and panel structure was sound and the committees provide timely advice, but had strong reservations on the performance of the Compliance Committee (CC).

ICCAT prepares and distributes an annual "Compliance Annex" that includes: 1) all catch limits and minimum sizes/tolerances; 2) each party's catch statistics submitted to SCRS for the current reporting year, and any revisions to previous years' data; 3) any overages and underages; 4) all catch limit reductions that the party must take; and 5) the dates by when such reductions shall be taken. ICCAT also provides a compliance table which records a summary of issues, CPC responses and actions taken by the Committee. However, without an observer programme, assessing compliance of fishers with various Recommendations may be difficult.

With the exception of those cases where specific non-compliance has been identified (e.g. IUU fishing), compliance of fishers typically appears adequate in the fisheries considered here, which meets SG80.

However, there are sufficient gaps in information to prevent there being high degree of confidence that fishers in most fisheries comply, making it difficult to meet SG100. In addition, any fishery would not meet SG60 if they were not providing catch data (ICCAT requires such data even if the flag state does not).

In summary, the scores given here are going to depend to a large extent on the specifics of the fishery under assessment.

3.2.3.d Systematic non-compliance		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is no evidence of systematic non-compliance.	

There is no evidence of systematic non-compliance. Non-compliance with conservation measures appears mostly opportunistic for the tuna species considered here. Non-compliance by CPCs with ICCAT requirements appears most often related to genuine difficulties in obtaining the relevant information from fisheries in a timely manner. As information improves, it is possible more non-compliance will become apparent, but for stocks being considered here, such non-compliance is not systematic and does not threaten the sustainability of the fishery.

There has been systematic non-compliance for Mediterranean bluefin tuna, but this is outside the scope of this report. In this case, ICCAT's failure to meet its objectives is due in large part to the lack of compliance by many of its CPCs.

All SG60 were met, and 3 out of 4 SG80 were met.

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P.3.2.4 Monitoring and management performance evaluation

3.2.4.a Evaluation coverage		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There are mechanisms in place to evaluate **some** parts of the fishery-specific management system.	There are mechanisms om place to evaluate **key** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **all** parts of the fishery-specific management system.

ICCAT has in place mechanisms to evaluate all parts of the management system and is subject to regular internal review. This is demonstrated by the various committees and working groups that meet regularly and report their findings to the Commission. An external performance review has been conducted and it has evaluated all parts of the management system. This meets the requirements for the SG100.

3.2.4.b Internal and/or external review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The fishery-specific management system is subject to **occasional internal** review.	The fishery-specific management system is subject to **regular internal** and **occasional external** review.	The fishery-specific management system is subject to **regular internal and external** review.

ICCAT has in place mechanisms to evaluate all parts of the management system and is subject to regular internal review. This is demonstrated by the various committees and working groups that meet regularly and report their findings to the Commission. An external performance review has been conducted and it has evaluated all parts of the management system.

While the reviews do meet SG100 requirement that all parts of the management system are evaluated, there is no evidence that the external review will be regular. This is the first and only review of this kind that has been conducted. It is likely to be occasional as required by SG80, in response to calls for external reviews of all RFMOs. A new external review report is available and will be presented at the 2016 ICCAT annual meeting. SG80 is met but SG100 is not met.

All SG60 and SG80 were met, and 1 out of 2 SG100 were met.

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Indian Ocean Tuna Commission

3.1 Governance and Policy

P.3.1.1 Legal and/or customary framework

3.1.1.a Compatibility of laws or standards with effective management		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is an effective national legal system and a **framework for cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and **organised and effective cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and **binding procedures governing cooperation with other parties** which delivers management outcomes consistent with MSC Principles 1 and 2.

The IOTC framework created in 1998 provides for an organised and effective co-operation among parties. The operating procedures (IOTC rules of procedures) are fully transparent and are posted on the IOTC website. The restrictions on the membership could affect the ability of IOTC to take effective conservation and management measures, because unrecognised governments, notably Chinese Taipei, cannot be a member or a cooperating party of IOTC, and, therefore cannot formally fulfil its obligations to cooperate with IOTC. This may not meet SG60 which requires a complete framework for co-operation. However, various “work-arounds” have been applied to allow Chinese Taipei to take part and they co-operate with international procedures, including the scientific observer programme. This level of co-operation is sufficient to meet SG80, but because it is not binding, SG100 cannot be met.

3.1.1.b Resolution of disputes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The management system incorporates or is subject by law to a **mechanism** for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a **transparent mechanism** for the resolution of legal disputes which is **considered to be effective** in dealing with most issues and that is appropriate to the context of the UoA.	The management system incorporates or is subject by law to a **transparent mechanism** for the resolution of legal disputes that is appropriate to the context of the fishery and has been **tested and proven to be effective.**

There are three mechanisms for dealing with legal disputes at the international level. Firstly, disputes can be dealt with at the annual meetings of the CPCs through consultation and conciliation. Secondly, technical disputes might be resolved by an appropriately composed expert or technical panel. Thirdly, disputes that remain unresolved might be resolved through either the International Court of Justice or the International Tribunal for the Law of the Sea. The first two mechanisms are arguably the main overall purpose of an RFMO in general and IOTC in particular.

IOTC has no formal dispute resolution procedure within the convention, but the meetings provide an opportunity to resolve disputes informally. Such disputes are still considered legal in that they set out to resolve issues defined in the 1982 UN Law of the Sea Convention.

The IOTC holds annual meetings at which they consider Resolutions for management measures and other technical actions. This system is transparent in that it makes sure that all members are fully informed of the issues under consideration and are able to participate in informed discussion. However disputes resolved in informal negotiations would not necessarily be entirely transparent. However, independent observers, including NGO and IGOs, are present at such meetings and would observe any resolutions and justifications that are presented.

The rules of procedure specify voting procedures for issues coming before the Commission including personnel matters. For example “Conservation and management measures binding on Members of the Commission must be adopted by a two-thirds majority of Members present and voting. Individual members objecting to a decision are not bound by it. If objections to a measure are made by more than one-third of the Members of the Commission, the other Members are not bound by that measure; but this does not preclude any or all of them from giving effect.” In fairness, the IOTC is relatively new and the major effort since its inception has been to establish catch and other data for scientific use and compliance. As such the management measures that have been adopted thus far have focused on this issue and the technical means to achieve it.

There are no current outstanding judicial disputes. So far CPCs have avoided resorting to using international law to settle disputes. However, since the process is relatively new the management system has not demonstrated it will act proactively and there are no sanctions yet in place for CPCs not complying with their obligations.

It is, at least in theory, possible for international disputes to be resolved through the International Court of Justice (ICJ) or through the International Tribunal for the Law of the Sea (ITLOS) if they cannot be resolved in more efficient ways. This has been used by CPCs in other RFMOs (e.g. WCPFC: ITLOS Cases Nos 3 & 4 between New Zealand, Australia and Japan), but as mentioned the actions taken have tended to be technical and with limited controversy. This may change as the Commission is currently developing allocation mechanisms both between States and internal to the States.

Note that the PRP highlighted the lack of compliance and the resulting uncertainty in the data. However, the compliance that they were discussing largely related to reporting of catches and other

stewardship responsibilities often by non-members. Again since management measures are fairly limited, there are few other compliance problems and there is general agreement of CPCs as to the acceptance of the need for actions. And there is no history of wilful ignoring of management measures. Perhaps, this has as much to do with the exploitation history within the Indian Ocean compared to other oceans. But nevertheless, this meets SG80. However, there are many problems with CPC compliance which have yet to be resolved, and therefore it has not been proven fully effective, so SG100 is not met.

3.1.1.c Respect for rights		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The management system has a mechanism to **generally respect** the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to **observe** the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to **formally commit** to the legal rights created explicitly or established by custom on people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.

IOTC provides only for the rights of nations to fish resources. How these are distributed among groups within the nation state depends on national policy and legislation. IOTC has accepted methods and objectives for allowing access to the resources under its purview that are consistent with MSC Principles 1 and 2. Therefore the international management system meets the requirement for SG60 and SG80. Essentially, the IOTC is just now entering into formal negotiations on access rights and allocations (PRIOTC02.09 (para. 129) in IOTC 2017). Thus far, debates have addressed common allocation principles such as historical participation, the rights of Coastal States and the rights of developing States, but are not yet fully accepted. At the present time, this does not yet meet SG100.

All SG60 and SG80 were met, and 0 out of 3 SG100 were met.

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P.3.1.2 Consultation, roles and responsibilities

3.1.2.a Roles and responsibilities		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **generally understood**.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for key areas** of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for all areas** of responsibility and interaction.

As noted the IOTC Rules of Procedure define roles and responsibilities for its contracting parties and co-operating non-contracting parties. Collectively it is the responsibility of CPCs and the Secretariat to ensure that CPCs understand their areas of responsibility and interaction. On the whole, it is successful in many areas, including providing basic catch data and catch sampling, implementing research programs and developing initial stock assessments and scientific advice.

The performance of the Secretariat is sound and well regarded as both efficient and effective by CPCs. The CPCs themselves vary in their ability to perform their role, but the roles and responsibilities are nevertheless explicitly defined at least at the national level for key areas. Key areas include providing catch and monitoring data to the Secretariat, taking part in various meetings sharing information and making decisions, meeting the requirements for conservation and other recommendations.

Roles and responsibilities are not well defined and/or well understood in many areas, however. Recent (2015, 2016) resolutions defining data requirements still need clearer definition. But IOTC has had problems with flag states that have not applied appropriate controls to their vessels, not submitting timely data and so on. Additionally, the broader roles of constituents of CPCs and sometimes the CPCs themselves are not always well understood. While these problems are not all in key areas in the sense that they do not prevent IOTC from completing many of its tasks, they nevertheless undermine its overall effectiveness and increase risks for fishery sustainability. Hence the fisheries do not meet SG80 and SG100.

3.1.2.b Consultation processes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The management system includes consultation processes that **obtain relevant information** from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that **regularly seek and accept** relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that **regularly seek and accept** relevant information, including local knowledge. The management system demonstrates consideration of the information and **explains how it is used or not used.**

Much of the purpose of IOTC is to regularly seek data, particularly the data monitoring fishing activity and catches. IOTC holds annual plenary meetings, and specialist working groups of IOTC (comprising scientists from the contracting parties) convene technical meetings on an annual basis. Information derived from the CPCs and the inputs from the specialist working groups is considered and such consideration forms the basis of the management advice provided by IOTC. “Local knowledge” at the international level is assumed to refer to national information and experience.

The management system demonstrates consideration of the information obtained. The scientific reports state exactly what information is being used, how it is used, and justification is provided for all information which is rejected. This is best practice and meets SG100. However, information used by management other than the scientific information is not so clearly reported. Although much of this information can be inferred from various sources, it is not necessarily clear how different sources of information are weighted. This includes information on compliance, economics and social issues. Therefore, this does not meet SG100 because the management system cannot demonstrate in all cases consideration of all the information or explain how it uses information in decisions.

3.1.2.c Participation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The consultation process **provides opportunity** for all interested and affected parties to be involved.	The consultation process provides **opportunity and encouragement** for all interested and affected parties to be involved, and **facilitates** their effective engagement.

Consultation occurs at several levels within the management system. Consultation at the international level is formalized, and there are well-developed mechanisms for the seeking of and consideration of appropriate information. At the national and fishery level whether there is an opportunity for interested parties to be involved in management may vary and will need to be taken into account in each case.

The Commission may be joined by any government that is a member of the United Nations (UN). In addition, any inter-governmental economic integration organization constituted by States that have transferred to it competence over the matters governed by the Convention, such as the EU, may also become a member. To become a Contracting Party, an instrument of adherence to the Convention must be deposited with the Director-General of the Food and Agriculture Organization of the United Nations (FAO). The procedures and criteria for attaining this status are clearly laid out. Important exceptions apply to States which are not members of the UN. A non-governmental organization

representing the fishing interests of Taiwan Province of China has been invited to participate in IOTC meetings, which affords an opportunity and encouragement for Chinese Taipei to be involved as an affected party.

IOTC facilitates effective engagement of its stakeholders. IOTC also provides training and support to States lacking the capacity in areas of data management and fisheries science, which facilitates effective and full involvement in its activities.

Therefore, there is sufficient evidence that, at the international level, IOTC meets SG80 and SG100.

All SG60 were met, and 2 out of 3 SG80 were met.

PI 3.1.2 : 75

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P.3.1.3 Longterm objectives

3.1.3.a Objectives		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Long term objectives to guide decision-making, consistent with MSC fisheries standard and the precautionary approach, are **implicit** within management policy.	**Clear** long term objectives that guide decision-making, consistent with MSC fisheries standard and the precautionary approach, are **explicit** within management policy.	**Clear** long term objectives that guide decision-making, consistent with MSC fisheries standard and the precautionary approach, are **explicit** within **and required by** management policy.

The objective of the IOTC is "to promote cooperation among its Members with a view to ensuring, through appropriate management, the conservation and optimum utilisation of stocks covered by this Agreement and encouraging sustainable development of fisheries based on such stocks." In addition, Resolution 12-01 states that IOTC shall "… apply the precautionary approach, in accordance with relevant internationally agreed standards, in particular with the guidelines set forth in the UNFSA, and to ensure the sustainable utilisation of fisheries resources as set forth in Article V of the IOTC Agreement." and "In applying the precautionary approach, the Commission shall adopt, after due consideration of the advice supplied by the IOTC Scientific Committee, stock-specific reference points … and associated harvest control rules …". As this resolution, which is consistent with the MSC standard, makes these general objectives explicit and required by management, SG80 and, ostensibly SG100, are met. However, despite this, there is less evidence for the implementation of the precautionary approach in practice for some stocks, notably albacore and yellowfin. Management has not taken precautionary action despite these stocks being at risk, and adopted provisional limits and targets do not appear to account for uncertainties. An HCR for skipjack, bigeye and yellowfin has recently been established through Resolution 16/02. As of November 2017, the implementation of the HCRs for the 2017 fishing season awaits (see for example the advice summary for skipjack - http://iotc.org/science/status-summary-species-tuna-and-tuna-species-under-iotc-mandate-well-other-species-impacted-iotc). This prevents SG100 being met but this should be re-evaluated during 2018.

All SG60 and SG80 were met, and 0 out of 1 SG100 were met.

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3.2 Fishery Specific Management System

P.3.2.1 Fishery-specific objectives

3.2.1.a Objectives		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **implicit** within the fishery-specific management system.	**Short and long term objectives,** which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **explicit** within the fishery-specific management system.	**Well defined and measurable short and long term objectives**, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **explicit** within the fishery-specific management system.

The IOTC basic texts offers guidance and principles on which management plans might be based. The management objective is to achieve MSY. The allocation negotiations are designed to proportion access and catches such that MSY and F_{MSY} are not exceeded. The foundation for specific objectives has been established (see PI 3.1.3). B_{MSY} is defined as an interim target reference point for all stocks except skipjack (15-10); for skipjack 15-10 has been superseded by 16-01 which sets 40%B_0 as a target reference point.

While the IOTC Convention Agreement does not make reference to the principles of the precautionary or ecosystem approach, since its creation it has had the ability to assimilate these principles in the form of adoption of formal management measures. Yet these management measures have not provided practical guidance on how to make operational an Ecosystem Approach to Fisheries Management (EAFM) within IOTC. In the most recent Scientific Report, probability statements and "Kobe" plots are used to communicate risk. However, objectives apart from MSY are not well defined and therefore not measurable. There are no explicit objectives or constraints on risk for ecosystem-based management. Capacity building among CPC representatives could help develop specific objectives for many fisheries.

The scientific advice is based on MSC Principles 1 and 2, because these objectives are implicit in the management of each stock, meeting SG60. Additionally, with the adoption of 15-10 and 16-02, the SG80 is met.

All SG60 and SG80 were met, and 0 out of 1 SG100 were met.

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P.3.2.2 Decision-making processes

3.2.2.a Decision-making processes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There are **some** decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are **established** decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	

Decision-making processes are in place, which are established, responsive and largely transparent. However, there are some weaknesses, which have been highlighted by the performance reviews.

Members can vote, but cooperating non-members are not entitled to take part in voting. Most if not all decisions are obtained from consensus rather than majority voting.

IOTC allows its parties to opt out of decisions. The 2006 UNFSA Review Conference recommended that States through RFMOs should ensure that post opt-out behaviour is constrained by rules to prevent opting-out parties from undermining conservation, clear processes for dispute resolution, and a description of alternative measures that will be implemented in the interim (UN, 2006, paragraph 32(f) of the Annex). IOTC has not implemented these yet, but it has yet to be an issue. There has been a recent opt-out of resolutions, which may lead to improvements.

Despite this, decision-making processes are in place, and they do generally result in measures and strategies to achieve objectives (e.g. reference points, harvest control rules), which meets SG80.

3.2.2.b Responsiveness of decision-making processes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Decision-making processes respond to **serious issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to **serious and other important issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to **all issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.

The Rules of Procedure set mechanisms for dealing with resolutions, which should be made on the basis of scientific evidence and be designed to maintain tuna populations at levels that will permit optimum utilization. Resolutions may be made at the initiative of the CPC to the Commission.

If a CPC persists in objecting to a conservation measure, the recommendation will not be binding on that contracting party. The contracting party is not required to justify its objection and there are no limits placed upon when an objection might be acceptable or not. Under best practice, permissible reasons would be limited to any alleged incompatibility with the LOS Convention, UNFSA or the RFMO's constitutive texts, or alleged discrimination against the member concerned that cannot be justified. It is therefore currently possible that an objection in IOTC could be incompatible with the MSC Principles and Criteria. A unilateral claim to increase or create a quota, for example, is incompatible with the object and purpose of IOTC and could undermine a conservation measure. Solutions such as the CPC seeking a review by an independent panel of the recommendation it is objecting to, as used by CCAMLR and WCPFC for example, are not available.

Objections have not as of yet appear in practice to be deleterious to the decision-making processes for the stocks considered here. For the first time, objections were submitted for resolutions 13/01, 13/02, 13/03, 13/06 and 13/07, because the country believed that its vessels did not have the capacity to meet these reporting requirements, but is most likely a statement to indicate that any non-compliance is not because the CPC does not wish to comply.

The decision-making is transparent. IOTC resolves most disputes at its annual meetings by consensus. While the outcome of such decisions is transparent and, we presume, initial positions and the information used for the basis of the decision is available, exactly how a decision is reached is not necessarily obvious. However, this degree of transparency is adequate to show a gross mismatch between the information being provided and the decision being made. The system makes sure that all members are fully informed of the issues under consideration and are able to participate in informed decision-making. The annual calendar of meetings is crowded, with inter-sessional meetings of various scientific, compliance and technical sub-committees, so decision-making could become unclear. This may be an issue particularly for developing countries, whose capacity to attend and participate in meetings of technical committees is likely to be limited.

Overall the decision-making is adequate for the stocks being considered. It can be shown that it deals with serious and important issues in a transparent, timely and adaptive manner meeting SG80.

It cannot be claimed that the decision-making deals with all issues. The objections process probably stops contentious issues from being raised wherever possible and therefore these may not be resolved. Therefore the fishery does not meet SG100.

3.2.2.c Use of precautionary approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	Decision-making processes use the precautionary approach and are based on best available information.	

Decision-making processes clearly attempt to use the best available information. A large number of meetings are conducted and reports written for the Commission which provide analyses and advice based on all the available information.

Although the precautionary approach is implicit rather than explicit in decision making processes, it can be demonstrated that it is used in practice under most circumstances. For example, various recommendations and resolutions have been made on the basis of the potential harm they might do, and have not been delayed while waiting for relevant research to be conducted. However, because the precautionary approach and its use are not defined explicitly, it is difficult to determine whether it is properly used in all decisions. This weakness is recognized and being addressed.

Overall, IOTC decision-making processes meet SG80. They are based on the best available information, and in most cases can be shown to be based on the precautionary approach. Importantly, there is now a clear intention to include the precautionary approach explicitly in its basic texts, which should clarify its use and ensure reference to it in giving explanations for decisions.

3.2.2.d Accountability and transparency of management system and decision making process		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some information on the fishery's performance and management action is generally available on request to stakeholders.	**Information on the fishery's performance and management action is available on request**, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	Formal reporting to all interested stakeholders **provides comprehensive information on the fishery's performance and management actions** and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.

Recommendations from research, monitoring, evaluation and performance reviews are published formally. Likewise, reports of the plenary sessions of meetings are published formally and are publicly available. This formal reporting represents best practice. While some groups may believe that how all information used in the decision making is reported, it is difficult to see how the current system could be improved in this respect. Even where doubt is expressed as to how a decision is reached, all information available for the decision making is published, allowing any stakeholder to draw their own conclusions, and there is frequent feedback from NGOs, scientists and other stakeholders.

With detailed formal public reporting of decisions and all information on which those decisions are based, the IOTC fisheries meet SG100.

3.2.2.e Approach to disputes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.

There are no current outstanding judicial disputes and so far CPCs have avoided resorting to using international law to settle disputes. However, since the process is relatively new the management system has not demonstrated it will act proactively. This meets SG80, but not SG100.

All SG60 and SG80 were met, and 1 out of 3 SG100 were met.

PI 3.2.2 : 85

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P.3.2.3 Compliance and enforcement

3.2.3.a MCS implementation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring, control and surveillance **mechanisms** exist, and are implemented in the fishery and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance **system** has been implemented in the fishery and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A **comprehensive** monitoring, control and surveillance system has been implemented in the fishery and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.

IOTC's strategy to improve compliance started with the formation of a Compliance Committee which monitors the actions of the CPCs and has made resolutions for technical improvements. Resolution 16/12 establishes a permanent Working Party on the Implementation of Conservation and Management Measures (WPICMM) which shall act as an advisory body to the Commission via the Compliance Committee. However, as noted by the PRP compliance in the form of catch reporting continues to be a problem. Indeed the creation of the current function of the Compliance Committee coincided with the PRPs recommendations.

However, this cannot be termed a compliance "system" as of yet. Such a system would demonstrate an ability to enforce relevant management measures. This will be especially important once allocations are made in that compliance monitoring is closely linked to perceived fairness. A number of recommendations from the 2009 performance review relevant to compliance are being acted upon. This includes recommendation 51 "IOTC should develop a comprehensive monitoring, control and surveillance (MCS) system through the implementation of the measures already in force, and through the adoption of new measures and tools such a possible on–board regional observers' scheme, a possible catch documentation scheme as well as a possible system on boarding and inspection.". This is reported as "on-going" and is also included among the recommendations arising from the 2nd IOTC performance review panel (Res 16/03), with some actions such as the regional observer programme having been implemented and others, such as the regional high-seas boarding, under development.

At the international level, monitoring control and surveillance mechanisms do not yet fully exist, and have yet to be implemented, although some measures are being rolled out. During the 17th Session of the Commission (IOTC 2013), three Conservation and Management Measures were adopted to strengthen Compliance by Fishing Vessels in the IOTC Area. These CMMs make it mandatory for Flag States and Coastal States to send to the IOTC Secretariat samples and templates of the following official documents: Flag State Authorization to Fish (ATF), Fishing Logbooks and Coastal State Fishing License. This meets SG60 but not SG80. Note, however, that individual fisheries will be able to score this PI by reference to national fisheries enforcement systems (from the flag state and/or EEZ) as well as with regard to compliance and enforcement from IOTC sources.

3.2.3.b Sanctions		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, **are consistently applied** and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and **demonstrably** provide effective deterrence.

Sanctions to deal with non-compliance exist and there is some evidence that they are applied. This is a function of the Compliance Committee. But as discussed by the PRP the actions have been limited. This is seen as primarily the duty of Contacting and Non-Contracting Parties (CPCs), among which sanctions are not necessarily consistently applied (for an MSC assessment, this will depend on the relevant national system(s) for the fishery in question). There is no scheme of penalties and incentives for CPCs. The WPICMM established by Res 16/12 includes in its mandate to develop recommendations and guidelines for a schedule of sanctions for non-compliance with IOTC CMMs for consideration by the CPCs and the Commission. This meets SG60 but not SG80.

3.2.3.c Compliance		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Fishers are **generally thought** to comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	**Some evidence exists** to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a **high degree of confidence** that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.

This performance indicator applies to fishers and therefore needs to consider the requirements of IOTC when considering compliance. This would need to be addressed for each specific unit of certification.

There are numerous issues with non-compliance, although it is not always clear where or why they occur or who is responsible. The 2009 Performance Review indicated that there are so many rules and requirements, with many being difficult to understand, that some if not all CPCs struggled to comply with all requirements. The Performance Review found that some countries have consistently failed to provide timely and accurate data. Issues have been raised by CPCs in response to the Compliance Committee. The WPICMM established by Res 16/12 should improve the Compliance Committee performance, plus one of its objectives is to enhance the technical capacity of Contracting Party (Member) and Cooperating Non-Contracting Party (CNCP) (collectively termed CPCs) to understand and implement IOTC Conservation and Management Measures (CMMs).

IOTC has a Compliance Committee that monitors compliance with recommendations. This Committee has the potential to address problems over implementation of IOTC recommendations. The 2009 performance review found that the committee structure was sound. The Committee publishes compliance reports for each CPC based on information received. Together, some information is provided that the fisheries comply with the majority of IOTC management measures. The compliance reports are published on the IOTC website, http://iotc.org/compliance/monitoring

Compliance of fishers typically appears adequate in the fisheries considered here, which meets SG80. However, there are sufficient gaps in information to prevent there being high degree of

confidence that fishers in most fisheries comply, making it difficult to meet SG100. In addition, any fishery would not meet SG80 if they were not meeting basic IOTC reporting obligations. The scoring of this PI will depend largely on the specifics of the fishery in question.

3.2.3.d Systematic non-compliance		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is no evidence of systematic non-compliance.	

There is no evidence of major systematic non-compliance. Compliance problems largely relate to catch reporting, especially by some non-Member States. It appears most often related to genuine difficulties in obtaining the relevant information from fisheries in a timely manner. For example,IOTC-2016-CoC13-08c[E] (http://iotc.org/documents/reporting-vessels-transit-ukot): Of the 22 vessels inspected 15 were found to be in breach of IOTC CMMs. As information improves, it is possible more non-compliance will become apparent. For stocks being considered here, such non-compliance does not threaten the sustainability of the fisheries, although more precaution might be needed in the management system to allow for resulting potential increased levels of unreported and illegal fishing. However, for a UoA (e.g. longliners belonging to these groups) any evidence of such systematic breaches of measures should lead to the fishery not meeting SG80. For fisheries overall, the SG80 is met.

All SG60 were met, and 2 out of 4 SG80 were met.

PI 3.2.3 : 70

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P.3.2.4 Monitoring and management performance evaluation

3.2.4.a Evaluation coverage		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There are mechanisms in place to evaluate **some** parts of the fishery-specific management system.	There are mechanisms om place to evaluate **key** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **all** parts of the fishery-specific management system.

IOTC has in place mechanisms to evaluate all parts of the management system. This is demonstrated by the various committees and working groups that meet regularly and report their findings to the Commission. As noted, the 2016 PRP has also evaluated all parts of the management system. These evaluations meet SG100.

3.2.4.b Internal and/or external review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The fishery-specific management system is subject to **occasional internal** review.	The fishery-specific management system is subject to **regular internal** and **occasional external** review.	The fishery-specific management system is subject to **regular internal and external** review.

IOTC is subject to regular internal review. This is demonstrated by the various committees and working groups that meet regularly and report their findings to the Commission. As noted, the 2009 and 2015 PRP was a formal external performance review that was conducted and it has evaluated all parts of the management system. There is a clear monitored response to the reviews, where progress against recommendations is being reported. Through Resolution 16/03, the Commission endorses that a Performance Review of the IOTC shall be carried out every five (5) years in line with the recommendations of the Kobe process

The reviews do meet SG100 requirement that all parts of the management system are evaluated. In addition, with the initiation of a new performance review within 5 years of the first review, current reviews appear to be undertaken regularly (although there is no requirement to do this). Based on the current level of external review, the IOTC meets SG100.

All SG60, SG80 and SG100 were met

PI 3.2.4 : 100

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Western Central Pacific Fisheries Commission

3.1 Governance and Policy

P.3.1.1 Legal and/or customary framework

3.1.1.a Compatibility of laws or standards with effective management		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is an effective national legal system and a **framework for cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and **organised and effective cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and **binding procedures governing cooperation with other parties** which delivers management outcomes consistent with MSC Principles 1 and 2.

Fishing for tuna and tuna like species, both on the high seas and in zones of national jurisdiction, is governed by the Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (WCPF Convention). The Commission was established under the Convention and is tasked to co-ordinate scientific research and make recommendations designed to maintain populations of tuna and tuna like species sharing the same ecosystem at levels which will prevent recruitment failure and permit maximum sustainable yield. The WCPF Convention entered into force on 19 June 2004.

The WCPF Convention draws on many of the provisions of the UN Fish Stocks Agreement. It also is designed to reflect the regional political, socio-economic, geographical and environmental characteristics of the western and central Pacific Ocean.

The WCPF Convention seeks to address problems in the management of high seas fisheries resulting from unregulated fishing, over-capitalization, excessive fleet capacity, vessel re-flagging to escape controls, insufficiently selective gear, unreliable databases and insufficient multilateral cooperation in respect to conservation and management of highly migratory fish stocks.

The framework for the participation of fishing entities in the Commission reflects the unique geo-political environment in which the Commission operates. It legally binds fishing entities to the provisions of the Convention, participation is by territories and possessions in the work of the Commission; the framework recognises the special requirements of developing States, and there is cooperation with other Regional Fisheries Management Organizations (RFMO) whose respective areas of competence overlap with the WCPFC.

A large proportion of members and co-operating non-members to WCPFC have not ratified the UNFSA. These articles underpin the MSC P&C, and therefore failure to ratify the UNFSA does suggest that the state may not have acceded to these principles. Any fishery operating within the jurisdiction of a state which has not ratified the UNFSA will need to demonstrate through other means that the laws it is applying are entirely consistent with the MSC P&C. Provided this is met, WCPFC sanctioned fisheries should meet SG100, since it provides a system for effective co-operation among the parties and procedures can apply binding measures, so co-operation among parties to be enforced with a majority, meeting SG100.

3.1.1.b Resolution of disputes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The management system incorporates or is subject by law to a **mechanism** for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a **transparent mechanism** for the resolution of legal disputes which is **considered to be effective** in dealing with most issues and that is appropriate to the context of the UoA.	The management system incorporates or is subject by law to a **transparent mechanism** for the resolution of legal disputes that is appropriate to the context of the fishery and has been **tested and proven to be effective.**

There are three mechanisms for dealing with legal disputes at the international level. Firstly, disputes can be dealt with at the WCPFC annual meetings of the members through consultation and conciliation. Secondly, disputes might be resolved by an appropriately composed review panel. Thirdly, disputes might be resolved through either the International Court of Justice (ICJ) or the International Tribunal for the Law of the Sea. The first two mechanisms are arguably the main overall purpose of all RFMOs including WCPFC.

WCPFC (the Commission) is not subject to any court challenges as of 2017. It does not indicate any disrespect or defiance of the law through repeated violations. There is no evidence that other entities flout the law, with the notable exception of particular fishing companies and fishing vessels, which are listed on the IUU fishing list.

WCPFC has a dispute resolution procedure within its convention (Annex I and II). The procedure is reasonably prescriptive. While encouraging resolution of disputes among its members, it provides for an appropriate review panel to be convened should it be necessary. An application for a review of a Commission decision can be submitted within 30 days by written notification to the Commission Executive Director. The application is required to state the grounds for the dispute.

In addition, the Convention also allows for disputes between fishing entities to be submitted to final and binding arbitration through a Permanent Court of Arbitration (The Hague) at the request of either party. However, this provision as of 2017 does not appear to have been used (i.e. if any arbitration is being carried out, it is not in the public domain). The Convention proscribes peaceful settlement of all disputes (Article 31).

WCPFC members and observers can have representatives at meetings. In accordance with the Convention, the Commission holds a regular meeting every year. The Commission can, on the basis of scientific evidence and of other relevant information, adopt binding measures and non-binding resolutions with the objective of maintaining stocks around MSY, giving due consideration to the integrity of the ecosystem and biodiversity. Negotiations on these occur both at technical and political levels. Conservation and Management Measures and Resolutions are proposed by members of the Commission, and are presented to the Commission for adoption at the annual meeting. Non-parties to the convention can apply to become Co-operating Non-members, which implement the

measures and requirements set by WCPFC, even if not becoming a full member of the Commission (CMM 2009-11).

This system is transparent in that it makes sure that all members are fully informed of the issues under consideration and are able to participate in informed discussion. Under Article 21 of the Convention, the Commission is required to promote transparency in its decision-making processes and other activities. This is addressed in detail in the Rules of Procedure. Independent observers, including NGO and IGOs, are present at such meetings and would observe any resolutions and justifications that are presented. Such organizations shall be given timely access to pertinent information subject to the rules and procedures which the Commission may adopt. It should be noted that although observers are allowed to make presentations to members, subject to approval of the chairperson. Disputes resolved in this way would still not necessarily be entirely transparent in the sense that how a resolution is reached may not be fully reported.

There is no "opt out" to Conservation and Management Measures (CMM). While the Commission encourages consensus, more contentious CMM may be passed through 75% majority vote both among Pacific Islands Forum Fisheries Agency (FFA) members and non-FFA members unless consensus is expressly required. FFA represents 17 members, including the independent Pacific Island states. If consensus is required, the Commission is required to promote conciliation. No explanation is required, but meetings do report discussion.

It is, at least in theory, possible for international disputes to be resolved through the International Court of Justice (ICJ) or through the International Tribunal for the Law of the Sea (ITLOS) if they cannot be resolved in more efficient ways. This has been used by WCPFC (ITLOS Cases Nos 3 & 4 between New Zealand, Australia and Japan, in 1999), but only for southern bluefin which is not covered by this assessment. This recourse is most likely to be used by states which have ratified the UNFSA, in which such a provision is made. Therefore, where a fishery is not under the jurisdiction of a state which has ratified UNFSA, it may be questioned how effective this option would be.

There are explicit and transparent decision-making and dispute resolution mechanisms defined and in place, meeting SG60. The consensus and voting procedures are considered to be effective. There are no outstanding disputes among members for the fisheries considered here. A dispute over southern bluefin (not considered here) has been referred to ICJ/ITLOS, proving the possibility of using this recourse. The effectiveness of the other informal WCPFC mechanisms is unclear, and it is possible that some disputes are in abeyance rather than resolved. However, overall the available evidence indicates, in particular for those which have ratified UNFSA, that these fisheries are meeting both SG80 and SG100.

3.1.1.c Respect for rights		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The management system has a mechanism to **generally respect** the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to **observe** the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to **formally commit** to the legal rights created explicitly or established by custom on people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.

Legal rights of people dependent on fishing for food or livelihood are protected through national interests of Parties to the Convention. The Convention deals with the rights of a State's access to resources and, in this case, explicitly protects access for subsistence and traditional resource use.

This takes the form of a formal declaration within the Convention itself, with references made to small island developing states, subsistence and artisanal fishing. Protection of rights is also extended to dependent territories, such as French Polynesia and American Samoa. Furthermore, WCPFC has an explicit relationship with the Pacific Islands Forum Fisheries Agency, which represents the interests of the independent island States in the region. These interests demonstrably protect their people's traditional rights to these resources. The recent performance review identified the ambiguity in the Convention concerning consistent management throughout oceanic, territorial and archipelagic waters and a lack of criteria for allocating fishing quotas as legal issues to resolve.

Stated objectives and management measures are consistent with Principle 1. WCPFC also has demonstrable objectives consistent with MSC Principle 2 under its principles for conservation and management (Article 5). This includes consideration of the impacts of fishing, other human activities and environmental factors on species belonging to the same ecosystem as the target stocks, protection of biodiversity, and measures to minimize waste, effects of lost fishing gear, pollution, and by-catch.

WCPFC has an intention and has a management system that observes the legal rights created explicitly or established by custom for people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2. Therefore the international management system meets the requirement for SG60 and SG80. The WCPFC considers common allocation principles such as historical participation, the rights of Coastal States and the rights of developing States, but are not yet formally part of the allocation process. At the present time, this does not yet meet SG100.

All SG60 and SG80 were met, and 2 out of 3 SG100 were met.

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P.3.1.2 Consultation, roles and responsibilities

3.1.2.a Roles and responsibilities		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **generally understood**.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for key areas** of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for all areas** of responsibility and interaction.

WCPFC is itself an organization set up to define roles and responsibilities for its parties and co-operating non- parties. Functions, roles and responsibilities are explicitly defined at the international level. The Parties themselves may vary in their ability to perform their role, but the roles and responsibilities are nevertheless explicitly defined at least at the national level for key areas. Key areas include providing catch and monitoring data to the Secretariat, taking part in various meetings sharing information and making decisions, meeting the requirements for conservation and other recommendations for WCPFC and applying appropriate levels of control and surveillance.

WCPFC co-operates with all relevant organizations in the region, which are the Pacific Community (Oceanic Fisheries Programme), Pacific Islands Forum Fisheries Agency (FFA), the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC), Secretariat for the Pacific Regional Environment Programme (SPREP), Indian Ocean Tuna Commission (IOTC), Inter-American Tropical Tuna Commission (IATTC), Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), Commission for the Conservation of Southern Bluefin Tuna (CCSBT), Agreement for the Conservation of Albatross and Petrels (ACAP) and North Pacific Anadromous Fish Commission (NPAFC). There is a Memorandum of Understanding which clearly lays out the type and level of co-operation between these organizations. There are, in particular, shared responsibilities between RFMOs, mainly WCPFC, IOTC, IATTC and CCSBT, which are addressed.

With respect to implementing management controls, providing monitoring data and scientific research, tasks are allocated, coordinated and monitored through WCPFC and its annual meetings. This system broadly works. Organizations and individuals involved in the management process in those cases limited to Contracting Parties will be well-defined for key areas.

Roles and responsibilities are not necessarily well understood in all areas, however. WCPFC has had a number of problems with flag States that have not applied appropriate controls to all their vessels, and it appears that not all vessels understand their responsibilities and in some cases there appear to be conflicts between requirements for confidentiality and the responsibilities to provide information necessary for management, which need to be resolved. This includes members not submitting timely data. The Regional Observer Programme (ROP), despite being overall successful, also has allegations of inappropriate behaviour towards observers on vessels, suggesting fishing entities do not fully understand or comply with their responsibilities. Although most data are available to the Pacific Community (Oceanic Fisheries Programme) (SPC-OFP), which is responsible for stock assessment, not all these data have been entered and made available to the Commission. While these problems are not in key areas in the sense that they do not prevent WCPFC completing its primary tasks, they nevertheless undermine its overall effectiveness and increase risks to sustainability. For example, while stock assessments provide estimates of stock status up to the current year, the Scientific Committee noted that the incomplete submission of data increases

uncertainty in the assessments and encouraged all members to provide data in accordance with the WCPFC data rules. Hence although the fisheries meet the SG80, they do not meet SG100.

This PI would also have to be evaluated for each fishery. Overall, in this case the members (CCMs) are considered and for WCPFC their roles and responsibilities are clearly laid out and understood. This may not be true within nations and flag States for particular fisheries.

3.1.2.b Consultation processes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The management system includes consultation processes that **obtain relevant information** from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that **regularly seek and accept** relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that **regularly seek and accept** relevant information, including local knowledge. The management system demonstrates consideration of the information and **explains how it is used or not used.**

WCPFC holds a meeting every year, after the annual meetings of the three specialist committees, which are the Scientific Committee, Technical and Compliance Committee, and the Northern Committee. The work of the Commission is assisted by a Finance and Administration Committee. Information derived from the members and the inputs from the specialist working groups is used by decision-makers and such consideration forms the basis for the decisions of the WCPFC. “Local knowledge” at the international level is assumed to refer to national information and experience.

The management system demonstrates consideration of the information obtained. The scientific reports state exactly what information is being used, how it is used, and justification is provided for all information which is rejected. This is best practice and meets SG100. However, information used by management other than the scientific information is not so clearly reported. Although much of this information can be inferred from various sources, it is not necessarily clear how different sources of information are weighted. This includes information on compliance, economics and social issues.

For example, WCPFC tuna management measures CMM-2015-01 attempt to restrict fishing effort and therefore fishing mortality on skipjack, bigeye, yellowfin and albacore. However, limits are vague, and public information may not be available that clearly justifies the limits applied when the decision was made. They appear to be based on scientific advice with the aim of conserving stocks, and based on the precautionary principle. However, the lack of precision avoids the need to explain how the decision balances the needs of conservation with economic development in the region, which would admittedly become complicated with so many stakeholders. Better practice for this might be to test various decision rules through simulation and choose one which meets the criteria developed from management policy. Evidence for this type of approach is not available for the main WCPFC management decisions. Therefore, these fisheries do not meet SG100 because the management system cannot demonstrate in all cases consideration of all the information or explain how it uses such information in decisions.

3.1.2.c Participation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The consultation process **provides opportunity** for all interested and affected parties to be involved.	The consultation process provides **opportunity and encouragement** for all interested and affected parties to be involved, and **facilitates** their effective engagement.

Consultation occurs at several levels within the management system. Consultation at the international level is formalised, and there are well-developed mechanisms for the seeking and using of appropriate information. At the national and fishery level, whether there is an opportunity for interested parties to be involved in management, would need to be evaluated.

The opportunity to become Member or Co-operating Non-member is open to all. The membership of relevant nations is high and there is a high level of participation. In particular, the small island nations are well represented through the Pacific Islands Forum Fisheries Agency.

The Commission may be joined by any government or international organization that can also be a signatory to the United Nations Convention on the Law of the Sea (1982) and that has a fishing interest in the area. Interested NGOs have an opportunity to observe at meetings, with requirements that are not overly onerous.

The Commission includes 25 small island developing states and territories for which special provision is made through the Convention text and Resolution 2008-01. In addition, there are a number of initiatives to develop the capacity of relevant nations to meet their responsibilities and fully participate in the management system. These activities of WCPFC are supported through the Special Requirements Fund (SRF) that was established for the purposes identified in the Convention Article 30: recognition of the special requirements of developing States. There is also a joint UNDP-WCPFC project with important East Asian nations developing capacity for the collection of fishery data. This includes capacity to collect, maintain and analyse relevant data, and hence participate in, and contribute to WCPFC activities.

A number of stocks and fisheries are shared with IOTC, IATTC and CCSBT. There are memoranda of understanding (MOU) that governs the co-operation between these RFMOs. The MOUs establish and maintain consultation, cooperation and collaboration in respect of matters of common interest including the exchange of data and information, scientific research (including Pacific-wide stock assessments) and conservation and management measures for fleets, stocks and species of mutual interest. The Secretariats often have representatives at each other's meetings, as well as specific consultative meetings where appropriate.

Therefore, there is sufficient evidence that, at the international level, WCPFC meets SG80 and SG100. In addition, a fishery will need to demonstrate similar representative links from grass-roots to national level and attendance at WCPFC meetings. Lack of consultation, the opportunity for consultation or encouragement to take those opportunities within a particular fishery could prevent the fishery meeting SG80 or SG100.

All SG60 and SG80 were met, and 1 out of 3 SG100 were met.

PI 3.1.2 : 85

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P.3.1.3 Longterm objectives

3.1.3.a Objectives		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Long term objectives to guide decision-making, consistent with MSC fisheries standard and the precautionary approach, are **implicit** within management policy.	**Clear** long term objectives that guide decision-making, consistent with MSC fisheries standard and the precautionary approach, are **explicit** within management policy.	**Clear** long term objectives that guide decision-making, consistent with MSC fisheries standard and the precautionary approach, are **explicit** within **and required by** management policy.

The WCPFC Convention provides clear, long-term objectives that guide decision making under Principle 1. The long-term objectives for each stock are clear enough that the science-based advice and management of these stocks can be evaluated. The WCPFC Convention has an explicit provision regarding the precautionary approach and ecosystem based management which forms part of the MSC Principles and Criteria

Protection for all resources within the same ecosystem is provided for, consistent with Principle 2. The overall objective of the Convention is stated in Article 2 as “The objective of this Convention is to ensure, through effective management, the long-term conservation and sustainable use of highly migratory fish stocks in the western and central Pacific Ocean in accordance with the 1982 Convention and the Agreement.” Much more detail is provided under Articles 5-8, which provides the principles which should be used in making decisions and therefore defines the objectives very clearly. This includes measures to protect all species belonging to the same ecosystem as the target stocks, to reduce bycatch, develop more “environmentally safe” fishing gears and apply the precautionary approach, all of which meet requirements under Principle 2.

The overall objectives are well enough defined so that the level of risk which the Commission is taking can be assessed externally from the available information. Whether, in the view of an independent body, this is consistent with the precautionary approach as required by its own Convention, can be determined. Note that the members are required to apply the precautionary approach rather than the Commission, but this should make little difference in practice.

While it appears to be a requirement, in practice it is less clear that the precautionary approach is applied in practice across all policy. Stock assessments in 2010, 2011 and 2014 indicate that bigeye fishing mortality exceeded levels consistent with MSY. While precautionary reference points have been set, there has not been a corresponding precautionary action that has reduced exploitation levels.

Overall, clear explicit objectives incorporating the precautionary approach and ecosystem-based management in the policy meet the MSC Principles and Criteria, and defined, meeting SG80. However, it is not yet clear that the precautionary approach is applied in practice across all policy for all stocks, so SG100 is not met.

All SG60 and SG80 were met, and 0 out of 1 SG100 were met.

PI 3.1.3 : 80

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3.2 Fishery Specific Management System

P.3.2.1 Fishery-specific objectives

3.2.1.a Objectives		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **implicit** within the fishery-specific management system.	**Short and long term objectives,** which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **explicit** within the fishery-specific management system.	**Well defined and measurable short and long term objectives**, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **explicit** within the fishery-specific management system.

The WCPFC Convention offers guidance and principles on which the management plans might be based. This includes objectives which not only apply to target stocks, but also the ecosystem.

However, these principles are relatively general and covered under PI 3.1.3. These objectives have been used in developing scientific advice.

Each conservation measure has an objective, which can be inferred or is stated explicitly as in the case of bigeye. Bigeye and yellowfin are considered together since they are generally caught at the same time both by purse seine and longline.

There were a number of actions adopted in 15-01 which refine the overall goals of management: the Fishing Mortality Rate (F) for skipjack will be maintained at a level no greater than F_{MSY}, i.e. $F/F_{MSY} \leq 1$; the fishing mortality rate for bigeye tuna will be reduced to a level no greater than F_{MSY}, i.e. $F/F_{MSY} \leq 1$. This objective shall be achieved through step by step approach through 2017; yellowfin fishing mortality rate is not greater than F_{MSY}, i.e. $F/F_{MSY} \leq 1$; albacore is to maintain the albacore fleet at most recent historical levels (2002-5). There's also now a threshold reference point skipjack of 50% of the unexploited spawning stock.

The objectives are not stated explicitly, but easily inferred from the text. The CMM-2010-05 for South Pacific albacore states that fishing effort should not be increased "in the Convention Area south of 20°S above current 2005 levels or recent historical (2000-2004) levels." However, in this case the stock is in good condition, so risks to the fishery, should this general objective be met, are very low. Similarly, provisions for swordfish (CMM-2009-03) and other species are designed to maintain current exploitation with the objective for sustainable use, but do not address fisheries development. For CMM addressing bycatch, such as turtles (CMM-2008-03), the objective is to minimize bycatch in the relevant fisheries and return live bycatch if possible alive. These objectives would need to be assessed through the regional observer program.

Because the conservation measures contain reasonably explicit and specific intentions and objectives, and also allow for evaluation of the performance against these objectives, the fisheries meet SG80.

However, although broadly measurable, they are not necessarily well-defined particularly in relation to achieving MSC P&C. For skipjack there is now an explicit target set out in 15-06. For bigeye and yellowfin it is also relatively clear, for albacore less so. But for most fisheries, 100 wouldn't be met because there is not a full suite of well-defined and measurable objectives for P2 – although of course it depends on the specifics of the fishery.

Objectives may be somewhat vague with respect to determining precise status using reference points, for example, and allowing for unspecified qualifications. Certain resolutions and conservation measures might be presumed to achieve MSC objectives, but it is not certain. A higher score might be possible should WCPFC develop reference points directly linked to proscribed management action, as would be applied through a harvest control rule, for example. This would need to be evaluated for each specific fishery when undergoing MSC assessment.

The scientific advice is based on MSC Principles 1 and 2, because these objectives are implicit in the management of each stock, meeting SG60. In addition, effectively explicit objectives are provided through the conservation and management measures. In most cases, this should meet SG80. However, with the qualifications, it may not be possible to determine whether these are consistent with the requirements of MSC Principles 1 and 2, since they are related to the conservation measure itself rather than the stocks, species or ecosystem. Therefore, SG100 cannot be met. Note that for individual fisheries operating in an EEZ, other objectives may also be applied, particularly for Principle 2, which may change this score.

All SG60 and SG80 were met, and 0 out of 1 SG100 were met.

PI 3.2.1 : 80

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P.3.2.2 Decision-making processes

3.2.2.a Decision-making processes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There are **some** decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are **established** decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	

Decision-making processes are in place, which are established, responsive and largely transparent. These are very clearly defined in the Convention (Article 20) and Rules of Procedure. Information used for decision-making is published. Decisions are made by consensus and if necessary by voting (75% majority) and such decisions are binding on members. There is no opting out procedure, but members may require an independent review of a decision to ensure it is consistent with the Convention and management objectives. Some decisions, such as the allocation of fishing rights, must be carried out using consensus. Conservation and Management Measures are binding, but resolutions are non-binding. All management measures apply equally inside EEZ and on high seas. Flag states enforce management measures on their own vessels and coastal States within their own EEZ.

Decision-making processes are in place, and they result in measures and strategies to achieve objectives, which meet SG80. The result of the decision-making is primarily addressed elsewhere (PI 1.1.1, 1.2.1, 1.2.2).

3.2.2.b Responsiveness of decision-making processes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Decision-making processes respond to **serious issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to **serious and other important issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to **all issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.

Each member has one vote (Rules of Procedure Rule 21). All decisions and other official actions of the Commission are taken by consensus or 75% majority vote of all of the Convention members (Rule 22). Some decisions require consensus, but these are not those on which sustainability of the fishery depends. The majority voting system has not yet had to be invoked.

The decision-making is transparent and transparency is a requirement of the Convention (Article 21). WCPFC ostensibly resolves most disputes at its annual meetings by consensus. While the outcome of such decisions is transparent as it is published as a resolution from the annual meetings, and initial positions and the information used for the basis of the decision is available (as technical reports provided to the meeting or as proposals for resolutions from some Parties), exactly how a decision is reached is not necessarily obvious. However, this degree of transparency is adequate to show a mis-match between the information being provided and the decision being made. Much of the discussion at the meeting is also reported. The system makes sure that all Commission members are fully informed of the issues under consideration and are able to participate in informed decision-making.

The decision-making is adaptive in that decisions are evaluated by the various specialist meetings and feedback is provided to the Commission. The Commission can be shown to react appropriately. Whether this will always be timely is less clear, but, given the international context, response times are probably “best practice”.

Overall the decision-making is adequate for the stocks being considered. It can be shown that it deals with serious and important issues in a transparent, timely and adaptive manner meeting SG80. The decision-making processes appear to address all issues but not successfully in all cases, and therefore the fishery does not meet SG100.

3.2.2.c Use of precautionary approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	Decision-making processes use the precautionary approach and are based on best available information.	

The WCPFC Convention requires that the members of the Commission, directly and through the Commission, apply the precautionary approach, as described in Article 6 and Annex II. Specifically, the Convention requires that Commission be more cautious when information is uncertain, unreliable or inadequate and does not use the absence of adequate scientific information as a reason for postponing or failing to take conservation and management measures. In addition, the Convention proposes that cautious conservation and management measures are applied to

exploratory fisheries until there are sufficient data to allow stock assessment as well as to fisheries adversely affected by natural phenomenon on an emergency basis. In all cases, decisions are required to be based on the best scientific information available, and the Commission makes adequate provision for this to be achieved.

Evidence that WCPFC is attempting to apply the precautionary approach is found in the limitations on expansion of various fisheries, such as Southern Pacific Albacore, pending further development of management plans, even where the stock is evaluated to be above the MSY level. Evidence of an ability to apply precaution is much less clear in the bigeye fishery, where bycatch issues are preventing the fishery meeting its targets.

Overall, WCPFC decision-making processes are based on the best available information and the precautionary approach, meeting SG80.

3.2.2.d Accountability and transparency of management system and decision making process		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some information on the fishery's performance and management action is generally available on request to stakeholders.	**Information on the fishery's performance and management action is available on request**, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	Formal reporting to all interested stakeholders **provides comprehensive information on the fishery's performance and management actions** and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.

Recommendations from research, monitoring, evaluation and performance review are published formally. Likewise, reports of the plenary sessions of meetings are published formally and are publicly available. This reporting represents good practice. While some groups may believe that how all information is used in the decision making is not reported, it is difficult to see how the current system could be improved in this respect. Even where doubt is expressed as to how a decision is reached, all information available for the decision making is published, allowing any stakeholder to draw their own conclusions, and there is frequent feedback from NGOs, scientists and other stakeholders.

However, while reports are available, it is not clear that they represent all information that is used. There is no formal, detailed explanation linking the information provided to the decision that results. The decisions are presented in the resolutions as results, with minimal justification. The decision-making process is not wholly transparent to stakeholders.

With detailed formal public reporting of decisions and information on which those decisions are based, the WCPFC fisheries do meet SG80. However, this falls short of a formal justification that can be clearly linked to all information available, so SG100 is not met.

3.2.2.e Approach to disputes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.

WCPFC (the Commission) is not subject to any court challenges as of 2017. It does not indicate any disrespect or defiance of the law through repeated violations. There is no evidence that other entities flout the law, with the notable exception of particular fishing companies and fishing vessels, which are listed on the IUU fishing list. Therefore, excluding these, WCPFC and its members meet the SG60.

Given that there are no current outstanding judicial disputes and there are no outstanding international disputes, the management system meets SG80. By resolving disputes through WCPFC meetings (being members of WCPFC and agreeing to abide by WCPFC provisions), the members have avoided legal disputes. However, issues facing WCPFC which could lead to challenges are just now coming to the forefront. Thus, there is no evidence yet of proactive actions, so SG100 is not met.

Specific fisheries undergoing certification will operate under national management systems, which would have to be considered in certifying that fishery. In most cases, it is likely that a suitable legal system will exist to deal with significant disputes between stakeholders, but this should be verified.

All SG60 and SG80 were met, and 0 out of 3 SG100 were met.

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P.3.2.3 Compliance and enforcement

3.2.3.a MCS implementation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring, control and surveillance **mechanisms** exist, and are implemented in the fishery and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance **system** has been implemented in the fishery and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A **comprehensive** monitoring, control and surveillance system has been implemented in the fishery and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.

WCPFC's strategies to improve compliance with its requirements and procedures revolve mainly around vessel registration, but include catch and effort monitoring and diplomatic and other pressures applied to nation states. In addition, in certifying a particular fishery, the MSC assessment will need to consider the particular performance of the responsible nation state.

There have been a number of positive developments since 2006 which apply to all RFMOs: a legally binding instrument on Port State Measures to prevent, deter and eliminate illegal, unreported or unregulated (IUU) fishing ("Port State Measures Agreement"); the work of FAO to develop a global record of fishing vessels and to develop criteria to assess the performance of flag States; the second meeting of the five RFMOs dealing with highly migratory fish stocks in San Sebastian, Spain, and the follow-up work already under way.

Management controls are implemented using Conservation and Management Measures and Resolutions. "Resolutions" are non-binding statements and recommendations addressed to members of the Commission and Cooperating non-members, whereas Conservation and Management Measures (CMM) describe binding decisions.

Most information on compliance comes from port monitoring, observer programs and the vessel monitoring systems. The WCPFC has established a regional scientific and enforcement program with a regional observer program coordinated by the Commission (CMM 2007-01), but also with the participation of sub-regional and national programs (similar to CCAMLR). The Commission's regional observer program objective is to achieve 5% coverage of the effort in each fishery by 30 June 2012 for vessels operating in high seas areas. The Technical and Compliance Committee reported in 2010 that longline vessel coverage varies widely in 2009, whereas purse-seine coverage for multilateral programs for 2009 was approximately 20%, with 100% observer coverage for purse-seine vessels commencing in January 2010. Since 2010, observer coverage for purse seiners has been 100%. In the same way as for most tuna RFMOs, observers are required to monitor the transshipments at sea (CMM 2006-06). There are also at-sea inspections carried out which are reported to WCPFC, but these are relatively rare.

All vessels over 24m length catching tuna within the region must have VMS (CMM 2014-02). Other requirements include measures to reduce bycatch mortality of seabirds (CMM 2007-04), sea turtles (CMM 2008-03) and sharks (CMM 2010-07). Bycatch of seabirds is not thought significant in the tropical fisheries, and therefore are of lower priority (depending on the fishery being certified). Bycatch of shark species is significant depending on the gear used, and WCPFC intends to implement the FAO International Plan of Action for the Conservation and Management of Sharks (IPOA Sharks) through CMM 2010-07 and subsequent actions for specific species of sharks.

WCPFC, like most of the RFMOs managing tuna and tuna-like species, uses its vessel registers to establish a 'positive lists' and identify IUU vessels, information which is shared with other RFMOs (CMM 2010-06). This record is based on information submitted by parties and cooperating non-

parties. Importantly, vessels not entered into the record are deemed to be unauthorized to fish for, retain on board, transship or land tuna and tuna-like species. Similarly, there is a shared IUU vessel list. The main weakness of these lists is that they do not indicate whether a vessel is active in any particular ocean.

In 2006 a combined list of all vessels included on the authorized lists of the five tuna RFMOs was established and published on the Internet (http://tuna-org.org/). It includes information from the authorized lists maintained by the CCSBT, IATTC, WCPFO, ICCAT and IOTC authorized list. In addition, the website contains links to the IUU vessel lists of each RFMO. This information sharing should improve enforcement.

A problem among many fisheries management systems, and tuna is no exception, is monitoring transshipment to prevent illegal catch entering the legal market. As well as the observer program for transshipments, which is being implemented, WCPFC is also developing a Catch Documentation Scheme which should reduce the opportunities for IUU fishing and complement the vessel register. Port State Measures have been implemented to an extent, but significant gaps remain. However, these initiatives are in the process of being fully implemented.

Further control is possible through third party states. Some States have taken action to make it a violation of their domestic laws for their nationals to engage in activities that conflict with the fisheries laws of other countries. Perhaps the most powerful example is the Lacey Act in the United States of America, which is directed at the illicit trade in illegally caught fish and wildlife. United States prosecutors have used the Lacey Act's provisions to deal with importations of illegally caught fish. In Guam and American Samoa, important ports for offloading tuna, the Lacey Act has been used to deal with violations of the laws of a number of Pacific island states.

Below the international level, the fishery being certified will depend upon the performance of the flag state and vessels within the unit of certification. Many of the conservation and enforcement measures established by RFMOs put clear obligations on parties as the flag states. But there are also some measures directed at masters of fishing vessels, or even the fishing vessel itself. Typical examples are regulations for bycatch, minimum fish sizes and time and area restrictions. These latter can be enforced more easily for larger vessels using VMS.

Ultimately, it is the flag State that is responsible to the relevant RFMO for any failure to ensure that its measures are implemented and for the resulting violations of those measures by that State's vessels. Problems persist over the general failure of certain flag States to exercise effective jurisdiction and control over their vessels. These States include both members and non-members of RFMOs. While there have been recommendations to monitor flag state performance in this regard, this has not yet been done.

Consolidated landings and other data should be submitted annually to WCPFC as required. The accuracy and timeliness of these submissions will need to be checked for each fishery in the unit of certification. If a flag state does not enforce the WCPFC's recommendations and requirements such that MCS is compromised, those vessels will not meet SG60 and will not be eligible for certification.

Therefore, at the international level, monitoring control and surveillance mechanisms exist, and have been implemented in these fisheries. In all cases considered here, they have been demonstrated to be effective where they are applied, meeting SG60 and SG80. Given that a number of initiatives are still in the process of being implemented, there is an argument that SG80 is not yet met until they are shown to be effective. However, the main enforcement system is already operational, and these developments should be continuous in fisheries monitoring, control and surveillance systems. Whether they are effective in a particular unit of certification will need to be determined.

At the international level, the system is not comprehensive and cannot be demonstrated to have the ability to consistently enforce relevant management measures. Evidence exists of gaps in port state

control, compliance in all resolutions and so on, which should prevent most fisheries meeting SG100, unless they are operating within another framework (e.g. within an EEZ with strong MCS).

3.2.3.b Sanctions		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, **are consistently applied** and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and **demonstrably** provide effective deterrence.

Conservation measures are set by WCPFC, but enforcement is carried out by the national authorities. The blacklisting of non-member vessels (IUU lists) has become a widespread practice among all RFMOs including WCPFC.

There are no trade sanctions against nation states, although theoretically these may be possible. Sanctions are only applied to fishing entities, such as IUU vessels and vessels that are detected as being non-compliant with resolutions. WCPFC notifies Flag States of non-compliant vessels, which the Flag States should order to withdraw from Commission Area. These sanctions appear to be applied consistently.

On the whole, sanctions appear to be applied among countries consistent with their involvement in WCPFC. IUU fishing continues to be a problem, although tightening of Port State Controls and implementing a Catch Documentation Scheme should further reduce this problem. Given the very large potential fishing area, eliminating all IUU fishing will be difficult. However, access to the very large area has been very effectively controlled through co-operation among coastal states and a very effective vessel register. This prevents significant IUU fishing occurring across much of the Pacific, although IUU does occur. A formal compliance monitoring system is being developed, while the Technical and Compliance Committee discusses compliance issues based on available information of infringements from observers and other sources. Sanctions are then agreed, such as exclusion of vessels and so on, and reported in the same way.

Sanctions to deal with non-compliance certainly exist and there is evidence that they are applied, meeting SG60. Further evidence of sanctions will be needed in particular cases, as sanctions are enforced by the flag state. Limited evidence suggests that sanctions are probably an effective deterrent, which meets the SG80, but does not meet SG100. This scoring will also depend on the specifics of the fishery in question.

3.2.3.c Compliance		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Fishers are **generally thought** to comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	**Some evidence exists** to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a **high degree of confidence** that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.

The WCPFC has a permanent working group on compliance that reviews and monitors compliance with WCPFC management measures. The working group also recommends measures to promote

compatibility among the national fisheries management measures, addressing matters related to compliance with fisheries management measures, analyse information on compliance and report the findings to the WCPFC, which will in turn inform the members and non-members. An annual report is produced as part of the compliance review, which reports observed infringements.

Not all fisheries comply and clearly there is some non-compliance by some vessels as reported by the Technical and Compliance Committee. However, reporting on compliance is not as complete, at least in the public, as other RFMOs. This may be because WCPFC only came into existence in 2004, so these procedures are still in development.

Compliance of fishers appears adequate in the fisheries considered here, which meets SG80. While issues have been identified, they do not appear very widespread or systematic. However, there are sufficient gaps in information to prevent there being high degree of confidence that fishers in most fisheries comply, making it difficult to meet SG100. In addition, SPC have made repeated complaints that some CPCs provide only aggregated data, which meets reporting requirements but is less useful for stock assessments. Note that any fishery would not meet SG60 if they were not providing catch data (WCPFC requires such data even if the flag state does not) or contravening other resolutions.

3.2.3.d Systematic non-compliance		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is no evidence of systematic non-compliance.	

There is no evidence of systematic non-compliance. Non-compliance with conservation measures appears mostly opportunistic or possibly down to ignorance of the resolutions and/or the lack of sanctions. Non-compliance is not systematic and does not threaten the sustainability of the fishery, there having been a significant reduction in non-compliance over the last decade.

All SG60 and SG80 were met, and 0 out of 3 SG100 were met.

PI 3.2.3 : 80

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P.3.2.4 Monitoring and management performance evaluation

3.2.4.a Evaluation coverage		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There are mechanisms in place to evaluate **some** parts of the fishery-specific management system.	There are mechanisms om place to evaluate **key** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **all** parts of the fishery-specific management system.

WCPFC has in place mechanisms to evaluate all parts of the management system as demonstrated by the various committees and working groups that meet regularly and report their findings to the Commission. Additionally, there was a 2012 performance review. This meets the requirements for SG100 are met.

3.2.4.b Internal and/or external review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The fishery-specific management system is subject to **occasional internal** review.	The fishery-specific management system is subject to **regular internal** and **occasional external** review.	The fishery-specific management system is subject to **regular internal and external** review.

WCPFC is subject to regular internal review as demonstrated by the various committees and working groups that meet regularly and report their findings to the Commission. This meets the requirements for SG100 for the “regular internal” review. In addition, the WCPFC completed an external performance review in 2012, originally proposed in 2007. The RFMO meets SG80 with respect to “occasional external” review, but there is no evidence yet that this will be regular, so SG100 is not met.

All SG60 and SG80 were met, and 1 out of 2 SG100 were met.

PI 3.2.4 : 90

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Inter-American Tropical Tuna Commission

3.1 Governance and Policy

P.3.1.1 Legal and/or customary framework

3.1.1.a Compatibility of laws or standards with effective management		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There is an effective national legal system and a **framework for cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and **organised and effective cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and **binding procedures governing cooperation with other parties** which delivers management outcomes consistent with MSC Principles 1 and 2.

Fishing for tuna and tuna like species, both on the high seas and in zones of national jurisdiction, is governed by the Antigua Convention of 2003, which brings up to date the provisions of the previous 1949 Convention between the United States of America and the Republic of Costa Rica for the establishment of an Inter-American Tropical Tuna Commission. The Commission was established under the Convention and is tasked to co-ordinate scientific research and to make recommendations designed to maintain populations of tuna at levels which will permit maximum sustainable yield. The Antigua Convention entered into force on 27 August 2010.

The Antigua Convention explicitly recognizes the United Nations Convention on the Law of the Sea (UNCLOS) of 1982, the Rio Declaration on Environment and Development and Agenda 21 (1992), the Johannesburg Declaration and Plan of Implementation adopted by the World Summit on Sustainable Development (2002), the FAO Code of Conduct for Responsible Fisheries (1995), including the 1993 FAO Compliance Agreement and International Plans of Action adopted by FAO within the framework of the Code of Conduct, and the 1995 UN Fish Stocks Agreement (UNFSA). The Convention clearly intends to form part of the implementation of these international agreements within its area of jurisdiction. Its provisions are consistent with MSC Principles and Criteria (MSC P&C).

The Convention provides an effective framework for co-operation among the parties which exploit tuna stocks that are within the jurisdiction of the convention, meeting SG80. However, the procedures are only binding to the extent that they can be agreed among the parties. Decisions are made by consensus and therefore co-operation is effectively not binding, so SG100 is not met. The national legal system would be a determining factor in this scoring issue.

3.1.1.b Resolution of disputes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The management system incorporates or is subject by law to a **mechanism** for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a **transparent mechanism** for the resolution of legal disputes which is **considered to be effective** in dealing with most issues and that is appropriate to the context of the UoA.	The management system incorporates or is subject by law to a **transparent mechanism** for the resolution of legal disputes that is appropriate to the context of the fishery and has been **tested and proven to be effective.**

There are three mechanisms for dealing with legal disputes at the international level. Firstly, disputes can be dealt with at the IATTC annual meetings of the Parties through consultation and conciliation. Secondly, technical disputes might be resolved by an appropriately composed expert or technical panel. Thirdly, disputes might be resolved through either the International Court of Justice (ICJ) or the International Tribunal for the Law of the Sea. The first two mechanisms are arguably the main overall purpose of IATTC.

IATTC (the Commission) is not subject to any court challenges as of 2017. It does not indicate any disrespect or defiance of the law through repeated violations. There is no evidence that other entities flout the law, with the notable exception of particular fishing companies and fishing vessels, which are listed on the IUU fishing list.

IATTC has a dispute resolution procedure within the Antigua Convention (Article XXV). The procedure is not prescriptive but strongly encourages resolution of disputes among its Parties and provides for a technical panel to be convened should it be necessary. The annual meetings provide an opportunity to resolve such disputes informally. However, there is no formal resolution procedure should this fail.

21 IATTC contracting parties (in 2017), who along with observers and five (in 2017) co-operating non-contracting parties, have representatives at meetings. In accordance with the Convention, the Commission holds a regular meeting every year. The Commission can, on the basis of scientific evidence and of other relevant information, adopt recommendations and resolutions with the objective of maintaining IATTC stocks around MSY. Negotiations on these occur both at technical and political levels. Recommendations and Resolutions are proposed by members of the IATTC Commission, and are presented to the Commission for adoption at the annual meeting.

This system is transparent in that it makes sure that all members are fully informed of the issues under consideration and are able to participate in informed discussion. Independent observers, including NGO and IGOs, are present at such meetings and would observe any resolutions and justifications that are presented. It should be noted that although observers are allowed to make presentations to members, this is only available if members and the chairperson do not object. Disputes resolved in this way would still not necessarily be entirely transparent in the sense that how a resolution is reached may not be fully reported.

Non-parties to the convention can apply to become Co-operating Non-Parties, which implement the measures and requirements set by IATTC, even if not becoming a full member of the Commission.

There is no “opt out” to resolutions, but resolutions do require consensus, so Parties can essentially apply a veto to decisions even if they are not present at the meeting. No explanation is required, but meetings do report discussion. There is no system of arbitration or conciliation where differences arise among parties over recommendations.

It is, at least in theory, possible for international disputes to be resolved through the International Court of Justice (ICJ) or through the International Tribunal for the Law of the Sea (ITLOS) if they cannot be resolved in more efficient ways. This has been used by CPCs in other RFMOs (e.g. WCPFC: ITLOS Cases Nos 3 & 4 between New Zealand, Australia and Japan), but so far no cases have taken place among IATTC members over issues relevant to tuna conservation. This recourse is most likely to be used by States which have ratified the UNFSA, in which such a provision is made. Therefore, where a fishery is not under the jurisdiction of a State which has ratified UNFSA, it may be questioned how effective this option would be. For States which have ratified UNFSA, it is likely this mechanism would be transparent and effective, meeting SG80. However, it has not been tested and proven effective yet, and therefore could not meet SG100.

The presence of observers and the requirement that decisions are made in plenary makes the process transparent. In IATTC, observers to the meetings are governed by Annex 2 of the Convention and by Rule 13 of the rules of procedure. As long as the NGO can meet the various time requirements, and can submit adequate information justifying their presence, they may participate in meetings unless at least one-third of the members of the Commission object in writing. This makes the observer status reasonably accessible to interested groups.

There are explicit and transparent decision-making and dispute resolution mechanisms defined and in place, meeting SG60. However, the system cannot be considered fully effective with consensus decision-making process, and the lack of a formal dispute mechanism should consensus system fail. A better system would allow some sort of majority voting or arbitration which might prevent necessary conservation measures being stalled by a single party. There are no outstanding disputes among members for the fisheries considered here, but no disputes have been referred to ICJ/ITLOS. Overall, available evidence suggests the system is meeting SG80. The effectiveness of the other informal IATTC mechanisms is unclear, and it possible that many disputes are in abeyance rather than resolved. These issues would prevent these fisheries meeting SG100.

3.1.1.c Respect for rights		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The management system has a mechanism to **generally respect** the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to **observe** the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to **formally commit** to the legal rights created explicitly or established by custom on people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.

Legal rights of people dependent on fishing for food or livelihood are protected through national interests of Parties to the Convention. The Convention deals with the rights of a State's access to resources rather than individuals. It is therefore likely that most weight would be given to national provisions for legal rights in a fishery when it is being assessed.

Stated objectives and management measures are consistent with Principle 1. IATTC also has demonstrable objectives consistent with MSC Principle 2 in the IDCP (International Dolphin Conservation Program), which aims to eliminate dolphin mortality (ETP species) as part of purse seine operations, and in other conservation measures which protect the ecosystem.

Among States, IATTC allocates fishing rights broadly based on a Party's track record in the fishery. Bigeye catch limits have been applied to national fleets based on past catches. Overall limits on capacity and effort are based on past levels, although such levels may not be precisely determined.

The overall limits on fishing activity and the way these limits are distributed among nations should allow nations to protect traditional fishing rights.

Smaller vessels and more artisanal gears are excluded from many measures. Pole-and-line, troll, and sport fishing vessels, and purse-seine vessels less than 182 metric tons carrying capacity and longline vessels less than 24m length are exempt from various measures designed to limit fishing activity on bigeye and yellowfin tuna stocks. Furthermore, purse-seine vessels with between 182 and 272 metric tons carrying capacity are provided for higher fishing effort provided that they carry an observer for the International Dolphin Conservation Program (AIDCP). These exemptions are clearly designed to protect some artisanal fleet.

IATTC has an intention and has a management system that observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2. Therefore the international management system meets the requirement for SG60 and SG80. While IATTC has demonstrated the intention to develop and implement methods to allow a fair distribution and mechanisms to achieve this objective, such mechanisms are not formal commitments. As a result, this does not meet SG100.

All SG60 and SG80 were met, and 0 out of 3 SG100 were met.

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P.3.1.2 Consultation, roles and responsibilities

3.1.2.a Roles and responsibilities		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **generally understood**.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for key areas** of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for all areas** of responsibility and interaction.

IATTC is itself an organisation set up to define roles and responsibilities for its contracting parties and co-operating non-contracting parties.

Functions, roles and responsibilities are explicitly defined at the international level. The performance of the Secretariat is sound and well regarded as both efficient and effective by the Parties. The Parties themselves may vary in their ability to perform their role, but the roles and responsibilities are nevertheless explicitly defined at least at the national level for key areas. Key areas include providing catch and monitoring data to the Secretariat, taking part in various meetings sharing information and making decisions, meeting the requirements for conservation and other recommendations for IATTC and applying appropriate levels of control and surveillance.

IATTC is closely linked to the International Dolphin Conservation Program, which is a separate agreement specifically created to apply the “dolphin safe” label. There is clear differentiation between responsibilities, but co-operation increases the efficiency of both programs. For example, IDCP includes the objective “To ensure the long-term sustainability of the tuna stocks in the Agreement Area, as well as that of the marine resources related to this fishery, taking into consideration the interrelationship among species in the ecosystem, with special emphasis on, inter alia, avoiding, reducing and minimizing bycatch and discards of juvenile tunas and non-target species.” In addition, there are shared responsibilities between WCPFC and IATTC, which recognized the need to cooperate with one another to achieve conservation and management of stocks. There is a Memorandum of Understanding which clearly lays out the type and level of co-operation.

With respect to implementing management controls, providing monitoring data and scientific research, tasks are allocated, co-ordinated and monitored through IATTC and its annual meetings. This system broadly works. Organisations and individuals involved in the management process in those cases limited to Contracting Parties will be well-defined for key areas.

Roles and responsibilities are not necessarily well understood in all areas, however IATTC has had a number of problems with Flag States that have not applied appropriate controls to all their vessels, and may not fully understand their responsibilities. This includes Flag States not submitting timely data and not in the correct form, and so on. Some problems in providing basic data on vessels and catches are likely due to a lack of understanding of requirements which appear to be complex or a lack of technical capacity in the responsible institutions. While these problems are not in key areas in the sense that they do not prevent IATTC completing its primary tasks, they nevertheless undermine its overall effectiveness and increase risks to sustainability. For example, stock assessments can only be completed up to the end of the available data series, which in these cases mean stock status estimates are generally a year behind the current year. Hence although the fisheries meet the SG80, they do not meet SG100.

3.1.2.b Consultation processes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The management system includes consultation processes that **obtain relevant information** from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that **regularly seek and accept** relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that **regularly seek and accept** relevant information, including local knowledge. The management system demonstrates consideration of the information and **explains how it is used or not used.**

IATTC holds a meeting every year, and specialist working groups (comprising scientists from the contracting parties) convene technical meetings on an annual basis. Information derived from the CPCs and the inputs from the specialist working groups is used by decision-makers and such consideration forms the basis of the management advice provided by IATTC. “Local knowledge” at the international level is assumed to refer to national information and experience.

The management system demonstrates consideration of the information obtained. The scientific reports state exactly what information is being used, how it is used, and justification is provided for all information which is rejected. This is best practice and meets SG100. However, information used by management other than the scientific information is not so clearly reported. Although much of this information can be inferred from various sources, it is not necessarily clear how different sources of information are weighted. This includes information on compliance, economics and social issues.

For example, IATTC tuna conservation resolution C-13-01 effectively restricted fishing effort and therefore fishing mortality on bigeye, yellowfin and skipjack. These were evaluated and found effective in maintaining stocks are a level around MSY or above. Then in 2016 C-16-02 adopted more precise specifications for harvest rules. This is a positive addition. While these were adopted in the latter half of 2016, they cannot be implemented until 2017 fishing seasons. C-17-01 and C-17-02 give clear fishing effort limits, but as yet (Nov 2017) no information on the evaluation of these measures has been available. SG100 is not met.

3.1.2.c Participation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The consultation process **provides opportunity** for all interested and affected parties to be involved.	The consultation process provides **opportunity and encouragement** for all interested and affected parties to be involved, and **facilitates** their effective engagement.

Consultation occurs at several levels within the management system. Consultation at the international level is formalised, and there are well-developed mechanisms for the seeking and using appropriate information. At the national and fishery level whether there is an opportunity for interested parties to be involved in management would need to be evaluated.

The opportunity to become a Contracting Party or Co-operating Non-contracting Party is open to all, including non-states. There are in 2017 five Co-operating Non-contracting Party. The membership has increased over the last decades and there is a high level of participation.

The Commission may be joined by any government that is a member of the United Nations (UN) and that is a member of a Specialized Agency of the United Nations. In addition, any inter-governmental economic integration organization constituted by States that have transferred to it competence over the matters governed by the IATTC Convention, such as the EU. The signed convention is held in Washington, USA. The Convention is open to accession by any State or regional economic integration organization (e.g. EU) that had already acceded to the previous 1949 Convention, has coastline in the Convention Area, has vessels fishing stocks covered by this Convention or is invited to accede on the basis of a decision by the Parties. Interested NGOs have an opportunity to observe at meetings, with requirements that are not overly onerous.

A special fund, which is administered by the IATTC has been created for strengthening the institutional capacity of developing countries for the sustainable development of fisheries for highly migratory species (Resolution C-14-03). The fund is used to develop technical and scientific capacity in developing countries so that they can comply with their obligations under the Antigua Convention. This includes capacity to collect, maintain and analyse relevant data, and to participate in all IATTC meetings. The 2016 performance review specifically recommends to continue to utilize the Capacity Building Fund for education and resource development.

A number of stocks are shared with WCPFC. There is a memorandum of understanding (MOU) that governs the co-operation between the two RFMOs. The MOU establishes and maintains consultation, cooperation and collaboration in respect of matters of common interest including the exchange of data and information, scientific research (including Pacific-wide stock assessments) and conservation and management measures for stocks and species of mutual interest. The Secretariats have representatives at each other's meetings where appropriate, as well as a specific WCPFC-IATTC consultative meeting. There is also an agreement over the endorsement of regional high-seas observers.

Therefore, there is sufficient evidence that, at the international level, IATTC meets SG80 and SG100.

In addition, a fishery will need to demonstrate similar representative links from grass-roots to national level and attendance at IATTC meetings. Lack of consultation, the opportunity for consultation or encouragement to take those opportunities within a particular fishery could prevent the fishery meeting SG80 or SG100.

All SG60 and SG80 were met, and 1 out of 3 SG100 were met.

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References

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P.3.1.3 Longterm objectives

3.1.3.a Objectives		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Long term objectives to guide decision-making, consistent with MSC fisheries standard and the precautionary approach, are **implicit** within management policy.	**Clear** long term objectives that guide decision-making, consistent with MSC fisheries standard and the precautionary approach, are **explicit** within management policy.	**Clear** long term objectives that guide decision-making, consistent with MSC fisheries standard and the precautionary approach, are **explicit** within **and required by** management policy.

The IATTC Convention provides clear, long-term objectives that guide decision making under Principle 1. The long-term objectives for each stock are clear enough that the science-based advice and management of these stocks can be evaluated. The IATTC Convention has an explicit provision regarding the precautionary approach and ecosystem based management which forms part of the MSC Principles and Criteria. Objectives with respect to ETP species are also provided by the IATTC Convention and more directly by the AIDCP.

Protection for all resources within the same ecosystem is provided for, consistent with Principle 2. In Article VII paragraph 1, the functions of the Commission provide for measures to protect all species belonging to the same ecosystem as the target stocks, to reduce bycatch (specifically co-ordinate with the AIDCP), develop more “environmentally safe” fishing gears and apply the precautionary approach, all of which meet requirements under Principle 2. In addition, the Convention explicitly requires that the Commission promote the application of the provisions under the FAO Code of Conduct, which includes the ecosystem approach to fisheries management as well as many of the same requirements as the MSC P&C.

This may not mean that short-term decisions are always consistent with the long term objectives considered here. For example, scientific staff have implied that stricter controls on the bigeye fishery than those adopted by the Commission may be preferred, in order to be consistent with the precautionary approach. However, the level of risk that the Commission is taking can be assessed externally from the available information. Whether, in the view of an independent body, this is consistent with the precautionary approach as required by its own Convention can be determined. Information, apart from the scientific advice, which the Commission may use in making its decision is not necessarily available. This potential lack of transparency is considered under PI 3.1.2 and 3.2.2.

Although the precautionary approach is in the Convention, it is less clear that it is applied in all policy. Reference points for bigeye do not appear to be particularly precautionary when taking into account significant uncertainties (although there may be evidence to support the values used), and precautionary action has not been taken to prevent the bigeye stock declining to current levels. In practice, there is no clear link between the convention and practical implementation of policy in all fisheries.

Overall, clear explicit objectives incorporating the precautionary approach and ecosystem-based management in the policy meet the MSC Principles and Criteria, and therefore SG80. It is not clear that the precautionary approach is a requirement across all areas of policy, so SG100 is not met.

All SG60 and SG80 were met, and 0 out of 1 SG100 were met.

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3.2 Fishery Specific Management System

P.3.2.1 Fishery-specific objectives

3.2.1.a Objectives		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **implicit** within the fishery-specific management system.	**Short and long term objectives,** which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **explicit** within the fishery-specific management system.	**Well defined and measurable short and long term objectives**, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **explicit** within the fishery-specific management system.

The IATTC Convention offers guidance and principles on which management plans might be based. This includes objectives which not only apply to target stocks, but also the ecosystem. However,

these objectives are relatively general and covered under PI 3.1.3. These objectives have been used in developing scientific advice.

There is a long term management plan to limit fishing capacity to sustainable levels. Objectives are clearly laid out and are measurable for purse seine at least. IATTC now has a closed vessel registry which should help prevent increases in capacity, if not reduce it.

Each conservation measure has an objective which is clearly stated, although in one case has not been easy to interpret (”Current levels” of effort specified in Resolution C-05-02 for albacore is not defined and effort is not routinely measured, although steps are being taken to resolve this in C-13-03). Otherwise, because the conservation measures contain explicit and specific intentions and objectives, and also allow for monitoring of the performance against these objectives, the fisheries meet SG80.

However, although broadly measurable, they are not necessarily well-defined, particularly in relation to achieving MSC P&C. Stock assessments are not available for all species (e.g. skipjack), and proxies for MSY have not been determined. Therefore, objectives may be somewhat vague with respect to determining precise status using reference points, for example. Certain resolutions and conservation measures might be presumed to achieve MSC objectives, but it is not certain. This would need to be evaluated for each specific fishery when undergoing MSC assessment.

The scientific advice is based on MSC Principles 1 and 2, because these objectives are implicit in the management of each stock, meeting SG60. In addition, explicit objectives are provided through the resolutions and recommendations, which determine the aim and intention of the conservation measures. In most cases, this meets SG80. However, these objectives are not stock specific and often cannot be determined to be entirely consistent with the requirements of MSC Principles 1 and 2, since they are related to the conservation measure rather than the stocks or species. Therefore SG100 is not met.

All SG60 and SG80 were met, and 0 out of 1 SG100 were met.

PI 3.2.1 : 80

References

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P.3.2.2 Decision-making processes

3.2.2.a Decision-making processes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There are **some** decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are **established** decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	

Decision-making processes are in place, which are established, responsive and largely transparent. Information used for decision-making is published. Decisions are made by consensus and there is no objection or opting out procedure. Resolutions are binding, but recommendations are non-binding. All management measures apply equally inside EEZ and on high seas. Parties enforce management measures within their own EEZ.

IATTC requires that decisions are made through consensus; therefore members can in theory veto resolutions. Members can vote, but cooperating non-members are not entitled to take part in voting. While there is no evidence that a lack of consensus has prevented necessary conservation measures being adopted, it is possible that the requirement for consensus slows up decisions while protracted negotiations may take place. Various issues, for example, such as convening a technical working group to resolve the definition of "current effort" in C-05-02 and in convening a performance review, could be due to a lack of consensus. One performance review finding was that the consensus model of governance has limitations that impact the Commission's decision-making ability. Therefore, the Commission should consider establishing protocols for situations that would benefit from voting in a non-consensus model and take measures to improve meeting efficiency and decision-making.

Despite this, decision-making processes are in place, and they do generally result in measures and strategies to achieve objectives, which meet SG80. The result of the decision-making is primarily addressed elsewhere (PI 1.1.1, 1.2.1, 1.2.2).

3.2.2.b Responsiveness of decision-making processes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Decision-making processes respond to **serious issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to **serious and other important issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to **all issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.

Each national section has one vote (Rules of Procedure Rule III). All decisions, resolutions, recommendations, and other official actions of the Commission are taken only by a unanimous vote of all of the High Contracting Parties to the Convention (Rule IV). This allows some activities of the Commission to be blocked. In practice, this probably results in delays while a compromise is reached.

Consultation includes trying to ensure participants are aware of their responsibilities. Training workshops are provided to captains authorized to fish in IATTC waters. Meetings in 2012 include

AIDCP Seminars for fishermen and an ETP Captain's Training Workshop, which are required for inclusion in the list of qualified captains.

The decision-making is transparent. IATTC ostensibly resolves most disputes by consensus at its annual meetings. While the outcome of such decisions is transparent as it is published as a resolution from the annual meetings, and initial positions and the information used for the basis of the decision is available (as technical reports provided to the meeting or as proposals for resolutions from some Parties), exactly how a decision is reached is not necessarily obvious. However, this degree of transparency is adequate to show any mis-match between the information being provided and the decision being made. The system makes sure that all Commission members are fully informed of the issues under consideration and are able to participate in informed decision-making.

The decision-making is adaptive in that decisions are evaluated by the various specialist meetings and feedback is provided to the Commission. The Commission can be shown to react appropriately. Whether this will always be timely is less clear. With a requirement for consensus such decisions might be delayed to the extent of endangering a stock or fishery. However, no such delay has so far been observed. Nevertheless, one performance review finding was that the consensus model of governance has limitations that impact the Commission's decision-making ability. Therefore, the Commission should consider establishing protocols for situations that would benefit from voting in a non-consensus model and take measures to improve meeting efficiency and decision-making.

Overall the decision-making is adequate for the stocks being considered. It can be shown that it deals with serious and important issues in a transparent, timely and adaptive manner meeting SG80. It cannot be claimed that the decision-making deals with all issues. The decision-making process requiring consensus probably stops contentious issues from being raised wherever possible and therefore these may not be resolved. Therefore, the fishery does not meet SG100.

3.2.2.c Use of precautionary approach		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	Decision-making processes use the precautionary approach and are based on best available information.	

The IATTC Antigua Convention requires that the members of the Commission, directly and through the Commission, apply the precautionary approach, as described in the relevant provisions of the Code of Conduct and/or the 1995 UN Fish Stocks Agreement, for the conservation, management and sustainable use of fish stocks. Specifically, the Convention requires that Commission be more cautious when information is uncertain, unreliable or inadequate and does not use the absence of adequate scientific information as a reason for postponing or failing to take conservation and management measures.

Article VII of the Convention requires that the Commission adopts measures that are based on the best scientific evidence available to ensure the long-term conservation and sustainable use of the fish stocks covered by this Convention. The Commission is also tasked to determine whether, according to the best scientific information available, a specific fish stock covered by this Convention is fully fished or overfished and, on this basis, whether an increase in fishing capacity and/or the level of fishing effort would threaten the conservation of that stock.

This requirement to use the best scientific information available is clearly implemented. There is evidence from the large number of meetings that have been conducted and reports written for the Commission which provide analyses and advice based on all the available information.

Overall, IATTC decision-making processes are based on the best available information and the precautionary approach, meeting SG80.

3.2.2.d Accountability and transparency of management system and decision making process		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Some information on the fishery's performance and management action is generally available on request to stakeholders.	**Information on the fishery's performance and management action is available on request**, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	Formal reporting to all interested stakeholders **provides comprehensive information on the fishery's performance and management actions** and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.

Recommendations from research, monitoring, evaluation and performance review are published formally. Likewise, reports of the plenary sessions of meetings are published formally and are publicly available. This reporting represents good practice. While some groups may believe that how all information is used in the decision making is not reported, it is difficult to see how the current system could be improved in this respect. Even where doubt is expressed as to how a decision is reached, all information available for the decision making is published, allowing any stakeholder to draw their own conclusions, and there is frequent feedback from NGOs, scientists and other stakeholders.

However, while reports are available, it is not clear that they represent all information that is used. There is no formal, detailed explanation linking the information provided to the decision that results. The decisions are presented in the resolutions as results, with minimal justification.

With detailed formal public reporting of decisions and information on which those decisions are based, the IATTC fisheries meet SG80. However, this falls short of a formal justification that can be clearly linked to all information available, so SG100 is not met.

3.2.2.e Approach to disputes		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.

IATTC (the Commission) is not subject to any court challenges as of 2017. It does not indicate any disrespect or defiance of the law through repeated violations. There is no evidence that other entities flout the law, with the notable exception of particular fishing companies and fishing vessels, which are listed on the IUU fishing list. Therefore, excluding these, IATTC and its Parties meet the SG60.

Given that there are no current outstanding judicial disputes and that so far CPCs have avoided resorting to using international law to settle disputes, the management system meets SG80 and SG100. By resolving disputes through IATTC meetings (being members of IATTC and agreeing to abide by IATTC provisions), the Parties have pro-actively avoided legal disputes.

However, specific fisheries undergoing certification will operate under national management systems, which would have to be considered in certifying that fishery. In most cases, it is likely a suitable legal system will exist to deal with significant disputes between stakeholders, but this should be verified.

All SG60 and SG80 were met, and 1 out of 3 SG100 were met.

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P.3.2.3 Compliance and enforcement

3.2.3.a MCS implementation		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Monitoring, control and surveillance **mechanisms** exist, and are implemented in the fishery and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance **system** has been implemented in the fishery and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A **comprehensive** monitoring, control and surveillance system has been implemented in the fishery and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.

IATTC's strategies to improve compliance with its requirements and procedures revolve mainly around vessel registration, but include catch and effort monitoring and diplomatic and other pressures applied to nation states. In addition, in certifying a particular fishery, the MSC assessment will need to consider the particular performance of the responsible nation state.

There have been a number of positive developments since 2006 which apply to all RFMOs: a legally binding instrument on Port State Measures to prevent, deter and eliminate illegal, unreported or unregulated (IUU) fishing ("Port State Measures Agreement"); the work of FAO to develop a global record of fishing vessels and to develop criteria to assess the performance of flag States; the second meeting of the five RFMOs dealing with highly migratory fish stocks in San Sebastian, Spain, and the follow-up work already under way.

Most information on compliance comes from port monitoring and observer programs. The IATTC has the longest-established regional scientific and enforcement program and is unusual in that it has a regional observer program fully coordinated by the Secretariat, with its own observers, but also with the participation of national programs (similar to CCAMLR). There is 100% coverage for purse seiners above 363 t capacity, but IATTC has not established a regional longline observer program. However, some of its members do have national programs for longliners. In 2011, IATTC required that each member and cooperating non-Member (CPCs) ensure that, from 1 January 2013, at least 5% of the fishing effort made by its longline fishing vessels greater than 20 metres length overall carry a scientific observer (C-11-08). In the same way as for ICCAT and IOTC, observers monitor the transshipments at sea by large-scale tuna longline vessels (Resolution C-12-07) and checks that transshipped tuna quantities are consistent with the catch reported in the IATTC transshipment declaration. All carrier vessels receiving such transshipments at sea of tuna-like species from LSTLVs in the IATTC Area must have an IATTC observer on board.

Administered by the IATTC for the AIDCP, purse-seine vessels greater than 363 metric tons carrying capacity must carry an observer and has been mandatory since 2000. The main purpose of this observer program is to monitor the incidental catch of dolphins in the purse-seine fishery. The data collected form the basis for determining whether a Dolphin Mortality Limit (DML) has been exceeded, and is also used for scientific and research purposes, as well as for monitoring compliance with IATTC management and conservation measures. At least 50% of the observers on each Party's vessels must be IATTC observers; the remainder may be from the Party's national observer program. Not all vessels are monitored, smaller vessels being exempt from the observer program.

All member vessels over 24m length catching tuna within the region must, by 2016, have VMS (Resolution C-14-02). This is particularly important for time-area closure for bigeye. Other resolutions include measures to reduce bycatch mortality of dolphins, seabirds, sea turtles and sharks. These resolutions on bycatch of sharks and turtles have been effective, but there is some evidence that not all vessels comply with requirements.

IATTC, like most of the RFMOs managing tuna and tuna-like species, uses its vessel registers to establish a 'positive lists' and identify IUU vessels, information which is shared with other RFMOs (Resolutions C-15-01, C-11-05, C-14-01). This record is based on information submitted by parties and cooperating non-parties. Importantly, vessels not entered into the record are deemed to be unauthorized to fish for, retain on board, transship or land tuna and tuna-like species. Similarly, there is a shared IUU vessel list. The main weakness of these lists is that they do not indicate whether a vessel is active in any particular ocean.

In 2006 a combined list of all vessels included on the authorized lists of the five tuna RFMOs was established and published on the Internet (http://tuna-org.org/). It includes information from the authorized lists maintained by the CCSBT, IATTC, WCPFO, ICCAT and IOTC authorized list. In addition, the website contains links to the IUU vessel lists of each RFMO. This information sharing should improve enforcement.

IATTC has implemented some Port State Measures and since 2003 a Catch Documentation Scheme for bigeye tuna. Landings and transshipments are monitored and there are systems to check compliance with management measures, and collect data and other information. There are gaps, however, in implementing procedures across the region which include limited sharing of information on IUU fishing activities and a lack of regional measures against IUU vessels using ports and port facilities in the region.

Further control is possible through third party states. Some States have taken action to make it a violation of their domestic laws for their nationals to engage in activities that conflict with the fisheries laws of other countries. Perhaps the most powerful example is the Lacey Act in the United States of America, which is directed at the illicit trade in illegally caught fish and wildlife. United States prosecutors have used the Lacey Act's provisions to deal with importations of illegally caught

fish. In Guam and American Samoa, important ports for offloading tuna, the Lacey Act has been used to deal with violations of the laws of a number of Pacific island states.

Below the international level, the fishery being certified will depend upon the performance of the Flag State and vessels within the unit of assessment. Many of the conservation and enforcement measures established by RFMOs put clear obligations on parties as the Flag States. But there are also some measures directed at masters of fishing vessels, or even the fishing vessel itself. Typical examples are regulations for bycatch, minimum fish sizes and time and area restrictions. These latter can be enforced more easily for larger vessels using VMS.

Ultimately, it is the Flag State that is responsible to the relevant RFMO for any failure to ensure that its measures are implemented and for the resulting violations of those measures by that State's vessels. Problems persist over the general failure of certain Flag States to exercise effective jurisdiction and control over their vessels. These States include both members and non-members of RFMOs. While there have been recommendations to monitor Flag State performance in this regard (e.g. UN, 2006, Annex, para. 61), this has not yet been done.

Consolidated landings and other data should be submitted annually to IATTC as required. The accuracy and timeliness of these submissions will need to be checked for each fishery in the unit of certification. If a Flag State does not enforce the IATTC's recommendations and requirements such that MCS is compromised, those vessels will not meet SG60 and will not be eligible for certification.

Therefore, at the international level, monitoring control and surveillance mechanisms exist, and have been implemented in these fisheries. In all cases considered here, they have been demonstrated to be effective where they are applied, meeting SG60 and SG80. Whether they are effective in a particular unit of certification will need to be determined.

At the international level, the system is not comprehensive and cannot be demonstrated to have the ability consistently to enforce relevant management measures. Evidence exists of gaps in port state control, compliance in all resolutions and so on, which should prevent most fisheries meeting SG100, unless there are alternative and stronger coastal or Flag State MCS systems in place.

3.2.3.b Sanctions		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, **are consistently applied** and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and **demonstrably** provide effective deterrence.

Conservation measures are set by IATTC, but enforcement is carried out by the national authorities. The blacklisting of non-member vessels (IUU lists) has become a widespread practice among all RFMOs including IATTC.

There are no trade sanctions against nation states, although theoretically these may be possible. Sanctions are only applied to fishing entities, such as IUU vessels and vessels that are detected as being non-compliant with resolutions. The Director of IATTC notifies Flag States of non-compliant vessels, which the Flag States then order to withdraw from Commission Area. There is an indirect trade sanction through removal of the "dolphin safe" certification. These sanctions appear to be applied consistently.

On the whole, sanctions appear to be applied among countries consistent with their involvement in IATTC. IUU fishing continues to be a problem, although tightening the Port State Controls should reduce this problem. Bigeye is most affected, and has shown signs of recovery suggesting that controls, including those discouraging IUU fishing, are effective.

Some non-compliance has been detected by the observer programmes, which is used as the basis for routinely reviewing compliance. Some non-compliance appears persistent; having been initially reduced, it has not been eliminated and continues with no recent evidence of further decline. The reason for this non-compliance is unclear. However, seeing that this non-compliance is reported by observers on board, and there is little effort to hide these activities, the fishers in these cases are most likely unaware of their responsibilities. Overall, non-compliance is measured, it does not appear substantial and efforts are being undertaken to reduce it.

Sanctions to deal with non-compliance certainly exist and there is evidence that they are applied, meeting SG60. Limited evidence suggests that they are probably an effective deterrent, which meets the SG80, but does not meet SG100.

3.2.3.c Compliance		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
Fishers are **generally thought** to comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	**Some evidence exists** to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a **high degree of confidence** that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.

The IATTC has a permanent working group on compliance that reviews and monitors compliance with IATTC management measures. The working group also recommends measures to promote compatibility among the national fisheries management measures, addressing matters related to compliance with fisheries management measures, analyse information on compliance and report the findings to the IATTC, which will in turn inform the members and non-members. An annual report is produced as part of the compliance review, which reports observed infringements.

Not all fisheries comply and clearly there is some non-compliance by some vessels. Examples include non-compliance in treatment of ETP species bycatch and tuna discards. Because this performance indicator applies to fishers, it should be re-assessed for each specific unit of assessment.

Compliance of fishers appears adequate in the fisheries considered here, which meets SG80. While issues have been identified, they do not appear widespread or systematic. However, there are sufficient gaps in information to prevent there being high degree of confidence that fishers in most fisheries comply, SG100 is not met.

Furthermore, any fishery may not meet SG60 if they were not providing catch data (IATTC requires such data even if the flag state does not) or contravening other resolutions.

3.2.3.d Systematic non-compliance		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	There is no evidence of systematic non-compliance.	

There is no evidence of systematic non-compliance. Non-compliance with conservation measures appears mostly opportunistic or possibly down to ignorance of the resolutions and/or the lack of sanctions. Non-compliance is not systematic and does not threaten the sustainability of the fishery, there having been a significant reduction in non-compliance over the last decade.

All SG60 and SG80 were met, and 0 out of 3 SG100 were met.

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P.3.2.4 Monitoring and management performance evaluation

3.2.4.a Evaluation coverage		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
There are mechanisms in place to evaluate **some** parts of the fishery-specific management system.	There are mechanisms om place to evaluate **key** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **all** parts of the fishery-specific management system.

IATTC has in place mechanisms to evaluate all parts of the management system, meeting SG100. This is demonstrated by the various committees and working groups that meet regularly and report their findings to the Commission as well as a 2016 performance review of IACCT. In addition, there is an annual International Review Panel of IDCP, where, amongst other issues, the observer programmes are evaluated.

3.2.4.b Internal and/or external review		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
The fishery-specific management system is subject to **occasional internal** review.	The fishery-specific management system is subject to **regular internal** and **occasional external** review.	The fishery-specific management system is subject to **regular internal and external** review.

IATTC is subject to regular internal review. This is demonstrated by the various committees and working groups that meet regularly and report their findings to the Commission and which are published. This meets the requirements for SG100 for the “regular internal” review. The IATTC has carried out an external performance review in 2016 in general agreement with all five RFMOs responsible for tunas and tuna-like species held at their first joint meeting in Kobe, Japan in January 2007. This implies that the RFMO now meets SG80 with respect to “occasional external” review.

All SG60 and SG80 were met, and 1 out of 2 SG100 were met.

PI 3.2.4 : 90

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