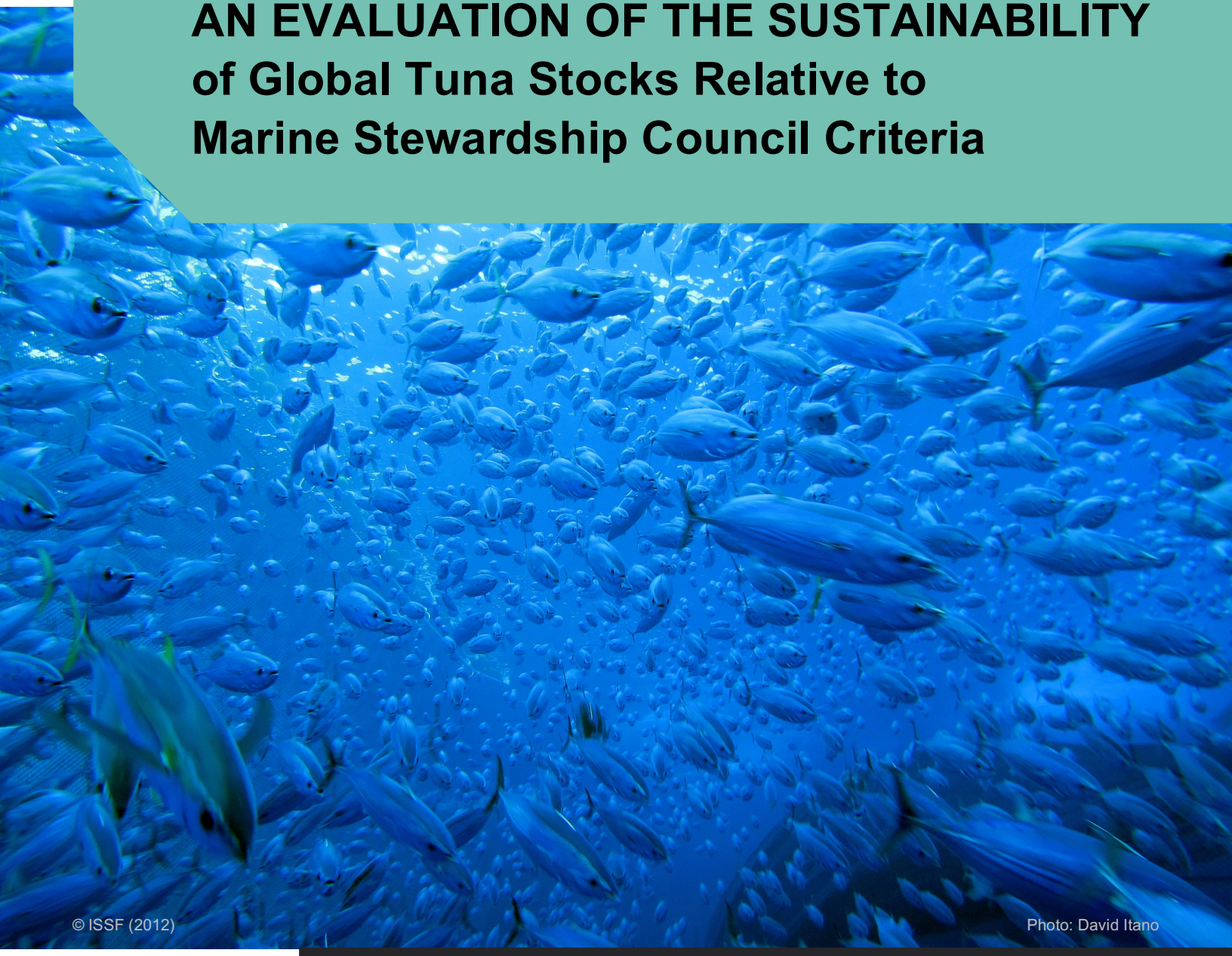
ISSF INTERNATIONAL SEAFOOD SUSTAINABILITY FOUNDATION

ISSF Technical Report 2016-19

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



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Topic Categories: Tuna stock status, harvest strategy, RFMOs, MSC

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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; https://www.msc.org).

Table 1 summarizes the findings of this evaluation.

Of the 19 stocks of tropical and temperate tunas, 11 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 to poor status of the stock, and 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.

While a future client tuna fishery will be evaluated on the merits related to all three MSC Principles, the scoring clearly outlines actions needed 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

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	60
	1.1.2	Stock Rebuilding	90	60					50
Management	1.2.1	Harvest Strategy	80	60	70	60	80	80	50
	1.2.2	Harvest Control Rules and Tools	60	60	60	60	60	60	50
	1.2.3	Information and Monitoring	80	80	65	75	80	80	50
	1.2.4	Assessment of Stock Status	95	95	85	75	95	85	75
Weighted Principle-level Scores									
	Stock Rebuilding Required?		Yes	Yes	No	No	No	No	Yes
		P1 Score	79.2	69.2	73.3	71.7	85.8	77.5	< 60

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	50	100	70	70	80	100	100
	1.1.2	Stock Rebuilding		50		90	90			
Management	1.2.1	Harvest Strategy	70	60	70	85	85	80	80	70
	1.2.2	Harvest Control Rules and Tools	60	50	60	80	80	80	60	60
	1.2.3	Information and Monitoring	80	80	90	80	80	80	90	80
	1.2.4	Assessment of Stock Status	100	90	95	90	90	80	100	95
Weighted Principle-level Scores										
	Stock Rebuilding Required?		No	Yes	No	Yes	Yes	No	No	No
		P1 Score	85.0	< 60	85.8	82.5	82.5	80.0	88.3	84.2

P1 - Indian Ocean

Component	PI No.	Performance Indicator (PI)	Yellowfin Score	Bigeye Score	Skipjack Score	Albacore Score
OutCome	1.1.1	Stock Status	70	90	90	100
	1.1.2	Stock Rebuilding	60			
Management	1.2.1	Harvest Strategy	60	80	80	60
	1.2.2	Harvest Control Rules and Tools	60	60	75	60
	1.2.3	Information and 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	70.0	81.7	84.2	80.0

	PI < 60 or Principle < 80: Principle Fails
	60 ≤ PI <80: Condition Needed
	PI or Principle ≥80: Passing Score
	Unscored
	Rebuilding Required
	Rebuilding Not Required
	*Using Default MSC Weighting

P3 by RFMO

Component	PI No.	Performance Indicator (PI)	ICCAT Score	WCPFC Score	IATTC Score	IOTC Score
Governance	3.1.1	Legal and customary framework	75	95	80	80
and policy	3.1.2	Consultation, roles and responsibilities	75	85	85	75
	3.1.3	Long term 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	Management performance evalua	90	90	90	100
Weighted Principle-level Scores						
		P3 Score	84.2	84.6	82.7	81.0

Foreword

The primary objective 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, over 300 fisheries, including 13 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 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 or in the establishment of tuna Fishery Improvement Projects (FIPs);
- Give a "snapshot" of the current status of the stocks and the strengths and weaknesses of RFMOs.
- Prioritize our projects and advocacy efforts for those initiatives that will improve low PI scores.

This document has been updated three times since the initial version, adapting it to new MSC standards and to changing stock status and management situations. We have noted, with satisfaction, that the document has been taken into consideration in recent Full Assessments of tuna fisheries against the MSC standards, or in 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). We believe that this has helped improve consistency in new assessment 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 Joe Powers and Paul Medley and 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

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 Guidelines 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.

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). 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 Membership in Tuna RFMOs (December 2014). M=Member, C=Cooperating non-Member, P=Participating Territory): 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 2014).
M=Member, C=Cooperating non-Member, P=Participating Territory

Country	IATTC	ICCAT	IOTC	WCPFC	Country	IATTC	ICCAT	IOTC	WCPFC
Albania		M			Mauritania		M		
Algeria		M			Mauritius			M	
American Samoa				P	Mexico	M	M		C
Angola		M			Morocco		M		
Australia			M	M	Mozambique			M	
Barbados		M			Namibia		M		
Belize	M	M	M	C	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		
China	M	M	M	M	Niue				M
Chinese Taipei	M	C	*[1]	M	Norway		M		
Colombia	M				Oman			M	
Comoros			M		Pakistan			M	
Cook Islands				M	Palau				M
Costa Rica	M				Panama	M	M		C
Cote d'Ivoire		M			Papua New Guinea				M
Croatia					Peru	M			
Curacao		M			Philippines		M	M	M
Djibouti			C		Russia		M		
Ecuador	M			C	St. Pierre and Miquelon (France)		M		
Egypt		M			Samoa				M
El Salvador	M	M		C	Sao Tome and Principe		M		
Equatorial Guinea		M			Senegal		M	C	
Eritrea			M		Seychelles			M	
European Union	M	M	M	M	Sierra Leone		M	M	
Fiji				M	Solomon Islands				M
France	M		M	M	Somalia			M	
French Polynesia				P	South Africa		M	C	
Micronesia, Fed. States				M	Sri Lanka			M	
Gabon		M			St. Kitts and Nevis				
Ghana		M			St. Vincent & the Grenadines		M		
Guam				P	Sudan			M	

Country	IATTC	ICCAT	IOTC	WCPFC	Country	IATTC	ICCAT	IOTC	WCPFC
Guatemala	M	M			Suriname		C		
Guinea Rep.		M	M		Syria		M		
Guinea Bissau		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
Korea, Dem. P. Rep.				C	Uruguay		M		
Liberia	C	M			Vanuatu	M	M	M[2]	M
Libya		M			Venezuela	M	M		
Madagascar			M		Vietnam				C
Malaysia			M		Wallis and Futuna				P
Maldives			M		Yemen			M	
Marshall Islands				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.

[2]In December 2014, Vanuatu has notified IOTC of its intention to withdraw its membership.

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 ALB1		ALB
South Atlantic Albacore (ALB)	South Pacific ALB1		
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. This is the first time MSC CR version 2.0 has been applied 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 to MSC CR 2.0

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. These were incorporated into the previous version of this document and carried over to this version.

Additionally, there have been continued evolution of MSC scoring over the last year which provides further guidance for fisheries certification scoring in general and for tuna fisheries specifically. In particular, there has been further guidance on appropriate standards for scoring performance indicators relative to harvest strategies (1.2) in regards to the interpretation of when strategies or rules are “available” or are “generally understood”. Also, since several tuna stocks around the world have undergone certification evaluation by multiple fisheries. This means that Principle 1 scores for these fisheries are largely duplicated. MSC has developed efforts to harmonize those scores to make them consistent when addressing P1 criteria for the same stock. In this document, we are cognisant of those efforts and have attempted to accommodate them as appropriate. Of course, status of stock determinations change continually with new data, new assessments and new findings. Therefore, any evaluation provides a snapshot at that particular time with the data available. Subsequent MSC evaluations should adapt to our findings based on new information at that time.

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.

ICCAT Stocks

1.1 OUTCOME

1.1.1 Stock Status: The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing.

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.

Atlantic Bigeye

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 SG 80.

Atlantic Yellowfin

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, meeting SG80 (SA2.2.1).

Eastern Atlantic Skipjack

The best estimate of the Eastern Atlantic skipjack stock size (2014 assessment) indicates that the stock is 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 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. 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.

Western Atlantic Skipjack

The best estimate of the Western Atlantic skipjack stock size (2014 assessment) indicates that the stock is 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.

North Atlantic Albacore

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). Results also indicate that F/F_{MSY}=0.54 (0.35-0.72). Therefore, the stock is highly likely to be above the level where recruitment would be impaired, meeting SG80.

None of the bootstrap analyses of uncertainty of current biomass were shown to be below 50% of B_{MSY} indicating a high degree of certainty that recruitment is not being impaired. Therefore, SG100 is met.

South Atlantic Albacore

The median estimate of stock size indicates that the South Atlantic albacore stock was approximately 10% higher than the B_{MSY} level (80% confidence interval= 0.51 to1.80) in 2014, 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.

Mediterranean Albacore

The SCRS concluded (2011 stock assessment; the next is not due until 2020) that the ratio of F_{2010}/F_{MSY} is less than or equal to 1, and therefore overfishing is probably not occurring. However, SCRS also concluded that the ratio of B/B_{MSY} cannot be estimated with the available data, and therefore it is not known if the stock is overfished. The assessment used to determine the status of the stock in relation to F_{MSY} takes an average of the size composition repeated over a number of years, so that the status is determined on the ratio of smaller to larger fish. The presence of a relatively high proportion of larger fish suggests the stock is likely to be above the point where recruitment is impaired, meeting SG60. The reliability of the methods and data to develop this determination is dealt with elsewhere.

The stock status is poorly known, but there is no evidence that the stock is overfished with respect to recruitment and on balance SG60 is met. However, this determination is not rigorous and doubt remains as to the past, present and future recruitment for this stock. It is not therefore "highly likely" to be above any point where recruitment might be impaired.

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.

Atlantic Bigeye

In the previous assessment (2010) 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 1950's. 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 is 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 analyses indicated that there was also greater than an 80% probability that B/B_{MSY} is less than 1. Therefore, the stock is not fluctuating around a level consistent with MSY and hence SG80 and SG100 are not met.

Atlantic Yellowfin

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 104,513t in 2012 and 96,994t in 2014. Although preliminary estimates of 2015 catches are 108,910t, this value remains below the estimated MSY.

Although there are model trajectories in the 2016 assessment that indicate $B>B_{MSY}$ since 2011, the median indicates a slow trajectory of recovery to B_{MSY}. Therefore, it cannot be said that the stock is fluctuating around B_{MSY}.

Eastern Atlantic Skipjack

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.

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.

Western Atlantic Skipjack

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. 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.

North Atlantic Albacore

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). Results also indicate that F/F_{MSY}=0.54 (0.35-0.72). Maximum sustainable yield is estimated as 37,000 t while catches since 2011 have fluctuated around 25,000t and never exceeded 26,700t. 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.

South Atlantic Albacore

The median estimate of stock size indicates that the South Atlantic albacore stock was approximately 10% higher than the B_{MSY} level (80% confidence interval= 0.51 to 1.80) in 2014. Additionally, F/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 led 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.

Mediterranean Albacore

The state of the stock in relation to any target is not known, so it is not possible to determine where the stock is in relation to target levels. Therefore, SG80 is not met.

Scoring for 1.1.1

Atlantic Bigeye: All SG60, but no SG80are met. 60
Atlantic Yellowfin: All SG60 and 1 out of 2 SG80 are met. 70
Eastern Atlantic Skipjack: All SG60 and SG80, but no SG100, are met. 80
Western Atlantic Skipjack: All SG60 and SG80, but no SG100, are met. 80
North Atlantic Albacore: All SG60, SG80 and SG100 are met. 100
South Atlantic Albacore: All SG60 and SG80 are met. 80
Mediterranean Albacore: All SG60, but no SG80, are met. 60

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Thunnus alalunga http://www.fishbase.org/.

1.1.2 Stock Rebuilding: Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe.

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.

Atlantic Bigeye

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. However, projections indicated that catches at the current TAC level (65,000 t) would have 49 % chances of achieving 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. However, recent (2014-2015) catches were more than 65,000 t. The probability may be improved by the additional measures (*i.e.* FAD moratorium) agreed by the Commission in Rec. 15-01 and implemented in 2016. The rebuilding time frame of 2028 is within the 20 years or 2 times the approximation 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) This Arguments have been made that generation times might be in the order of 4-5 years. 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.

Atlantic Yellowfin

The stock is slightly depleted, as the 2014 median biomass is 95% of B_{MSY}, and a strategy is being applied to achieve the B_{MSY} goal. 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. Limiting fishing mortality to a level which will allow recovery of bigeye should also allow recovery of yellowfin.

Based on simulation modelling and at the current levels of catch, the stock should rebuild by 2017 (>60% probability) if catches remain at or below 110000t, which has so far been the case since 2010. Maintaining catch levels at the current 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.

This meets SG60 for a specified time horizon.

The recent reduction in yellowfin catches from the 2001 high and subsequent recovery of yellowfin stock to just below the MSY reference point would suggest that the current strategy should be working, although it is primarily directed at bigeye tuna. Therefore, the current approach seems at least adequate, given the level of monitoring. The attempts to reduce small bigeye tuna catches are considered in PI 1.2.1.

Catches have demonstrably remained below the MSY estimate, and below the catch required to rebuild the stock above B_{MSY} based on projections. Catches have remained well below 130 000t since 2006, which suggests the stock should have risen above B_{MSY}. This was based on a model projection, but has not yet been confirmed through stock assessment. The stock recovery is not strongly supported by the available abundance indices and there remain uncertainty in the assessment. Therefore, SG100 is not met.

Mediterranean Albacore

If PI 1.1.1 is scored lower than SG80, PI 1.1.2 must be scored (CR2.0 GSA2.3).

The stock is not highly likely to be above the PRI, and its status in relation to MSY is not known. Therefore, it is not known whether rebuilding is required, or not, or if rebuilding is required how long it would take. Therefore SG60 is not achieved.

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**.

Atlantic Bigeye

No rebuilding time frame is specified by the management authority, but projections indicated that catches at the current TAC level (65,000 t) would have 49 % chances of achieving Convention Objectives by 2028. A rebuilding time frame of 2016-2028 is within the 20 years or 2 times the approximate generation time of 6 years. Additional measures (*i.e.* FAD moratorium) agreed by the Commission in Rec. 15-01 and implemented in 2016 indicate an attempt at recovery. The progress of the recovery will be monitored through catch monitoring and a planned new assessment in 2020. 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. Simulations of future stock status suggest that the median stock size will be around the MSY level, 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.

Atlantic Yellowfin

No rebuilding time frame is specified by the management authority, but projections by scientists which were run in 2016 extended from 2017 to 2024 As a result, it is assumed that rebuilding is specified to be 10 years or less.

Based on the simulation modelling projections, exploitation rates or previous quotas, maintaining catch levels at the current 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.This meets SG100 as being highly likely.

Mediterranean Albacore

As for 1.1.2a, because the stock status in relation to MSY is not known, monitoring is currently inadequate to determine whether any rebuilding strategies, if required, would be effective. Therefore, SG60 is not achieved.

Scoring for 1.1.2

Atlantic Bigeye: All SG60, but no SG80are met. 60
Atlantic Yellowfin: All SG60 and SG80, and one SG100, are met. 90
Mediterranean Albacore: The SG60s are not met. Fail

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1.2 HARVEST STRATEGY (MANAGEMENT)

1.2.1 Harvest Strategy: There is a robust and precautionary harvest strategy in place.

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.

Atlantic Bigeye

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 reduce bycatch of small bigeye 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 and time closure has not worked and therefore its impact on reducing juvenile catches of big eye 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.

Although there have been significant changes in the average size of bigeye tuna caught since 2004 by certain fleets, it still cannot be ascertained whether these changes were the result of spatial closures.

Constant TAC projections under the current TAC (65,000 t) predict increasing biomass over the projection period. There is just a probability of 49% 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. The designed aspect of the strategy to change overall selectivity therefore cannot be given full credit. Otherwise, given that some control has been demonstrated at limiting catches, the harvest strategy may be expected to achieve objectives in the longer term. For these reasons the assigned score for this indicator is SG60 and not SG80.

Atlantic Yellowfin

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 and to reduce bycatch of small bigeye 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 changes were made to the seasonal closure without reference to scientific advice, rendering this management action less effective. Nevertheless, actions taken since 2008 have worked to improve status, but the designed aspect of the strategy to change overall selectivity can only be given limited credit. A more finely tuned strategy may be difficult to design due to the relatively blunt nature of international controls.

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 and monitor the stocks. The reliance is on responding to detected problems rather than designing an approach to optimize the fisheries across the various stocks.

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.

Eastern Atlantic Skipjack

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.

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.

Although a side-effect of controls on bigeye tuna catches, the harvest strategy appears effective 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. While this is expected to be true, a more directed feedback and control is required to meet SG80.

Western Atlantic Skipjack

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. 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.

North Atlantic Albacore

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 2014-2016 of 28 000 t [Rec. 13-05], but included several provisions that allow the catch to exceed this level, but it does not appear that this has happened in recent years 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. 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 meet SG100.

South Atlantic Albacore

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 level above which stock projections indicate that biomass will continue to increase, demonstrating that the strategy is responsive to the status of the stock. This meets SG80. However, the strategy is 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 meet SG100.

Mediterranean Albacore

The current harvest strategy is not expected to achieve management objectives for this stock, so SG60 is not met. The strategy appears to be a laissez-faire approach, with no management cycle of feedback and control yet established. The current default reference point, MSY, is not estimated and not known. It is therefore not possible to assess whether the observed catches maintain the stock above or below this level. However, with the attempt at stock assessments in 2011 and accompanying advice and another stock assessment planned for the future, a strategy may 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.

Atlantic Bigeye

In the case of the bigeye stock, the TAC established in 2016 is 65 000t, but recent catches in 2014 and 2015 were above 65,000 t. The assessment showed that the bigeye stock is overfished and suffering overfishing. Projections indicated that catches at the current TAC level (65,000 t.) would have 49 % chances 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.

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 86000t in 2011 to 68000t in 2014, so some control is being implemented and catches have been approaching the required target. 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.

Atlantic Yellowfin

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 is overfished or fully exploited, but model projections indicated that catches, at about the current (2014) level, will recover the stock to above the MSY level.

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 planned for 2021 which suggests the re-evaluation of management performance is around every 4-5 years.

Available evidence in stock assessments and projection indicates that the harvest strategy should achieve its objectives, meeting SG80. However, the most recent evaluation of the stock status was unable to confirm the current expectations, and more broadly, the harvest strategy has only been considered 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.

Eastern Atlantic Skipjack

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}. However, current catches are about 209,000 t, whereas the scientific advice suggests that MSY is in excess of previous estimates of (143-170,000 t) but is very uncertain. So perhaps currents catches are below MSY. But the evidence of a strategy to achieve this is not there. Therefore, does not meet SG80.

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

Western Atlantic Skipjack

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 current catches are approximately 20,000 t, 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.

North Atlantic Albacore

An assessment conducted in 2016 which included data through 2014 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). Results also indicate that F/F_{MSY}=0.54 (0.35-0.72). 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 occurred.

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 (picked up by PI 1.2.2 below). In addition, the track record for this fishery was intermittent. In retrospect, the stock was depleted and maintained below B_{MSY} since 1970. However, the new strategy appears to have resolved this.

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.

South Atlantic Albacore

The median estimate of stock size indicates that the South Atlantic albacore stock was approximately 10% higher than the B_{MSY} level (80% confidence interval= 51-180%) in 2014, 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. Additionally, F/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 led to stock recovery whereby the stock is at or fluctuating around B_{MSY}.

The Commission has shown a willingness to reduce the TAC in line with scientific advice. Furthermore, overall biomass appears to have increased in recent years, which has reversed a previous long term decline. Monitoring is in place and the available evidence indicates that the harvest strategy should achieve 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 (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. 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.

Mediterranean Albacore

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. No management recommendations were made by the Scientific Committee, apart from improving the data to the extent that a stock assessment can be carried out. Any limits on the fishing activities directed at this stock are based on social or economic controls, or other factors which do not appear to be 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.		

Atlantic Bigeye

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 assessment reports best estimates of biomass and biomass trend, which indicates whether management is achieving its objectives or not. Therefore, the fishery clearly meets SG60.

Atlantic Yellowfin

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 current level or lower. Data are collected to estimate these quantities. Also the stock assessment reports best estimates of biomass and biomass trend, which indicates whether management is achieving its objectives or not. Therefore, the fishery clearly meets SG60.

Eastern Atlantic Skipjack

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.

Western Atlantic Skipjack

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.

North Atlantic Albacore

Monitoring is adequate to determine whether the harvest strategy is working. The strategy consists of limiting catches at or below the MSY. 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. The fishery clearly meets SG60.

South Atlantic Albacore

Monitoring is adequate to determine whether the harvest strategy is working. The strategy consists of limiting catches at or below MSY at a level that led to stock recovery to MSY. 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. The fishery clearly meets SG60.

Mediterranean Albacore

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 stock assessment carried out in 2011 attempted to use the available information to evaluate the performance of the current harvest strategy. The tentative conclusion of this was that the current exploitation was probably less than MSY, and therefore the strategy, such as it is, is probably working. 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.

Atlantic Bigeye

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. Therefore, the fishery does not meet SG100.

Atlantic Yellowfin

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. Therefore, the fishery does not meet SG100.

Eastern Atlantic Skipjack

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. Therefore, the fishery does not meet SG100.

Western Atlantic Skipjack

There is no evidence of any formal review of the harvest strategy. The Performance Review could not evaluate whether the skipjack fisheries were achieving their objectives, and there is inadequate information available to indicate what improvements might be possible. Therefore, the fishery does not meet SG100.

North Atlantic Albacore

There is no evidence of any formal review of the harvest strategy. However, the Commission is currently actively developing a harvest control rule for this stock, so an external review at this time would be premature. Nevertheless, the fishery does not meet SG100.

South Atlantic Albacore

There is no evidence of any formal review of the harvest strategy. Although the harvest strategy is reasonable, there is as yet inadequate information available to indicate what improvements might be possible. The fishery does not meet SG100.

Mediterranean Albacore

There is no evidence yet that management will respond appropriately to evaluations of the strategy, so SG100 has not been met.

Scoring for 1.2.1

Atlantic Bigeye: All SG60 are met, but no SG80. 60
Atlantic Yellowfin: All SG60 and SG80, but no SG100, are met. 80
Eastern Atlantic Skipjack: All SG60 and no SG80 are met. 60
Western Atlantic Skipjack: All SG60 and 1 out of 2 SG80 are met. 70
North Atlantic Albacore: All SG60 and SG80, but no SG100, are met. 80
South Atlantic Albacore: All SG60 and SG80, but no SG100, are met. 80
Mediterranean Albacore: Only 1 out of 3 SG60 are met. fail

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1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules (HCRs) in place.

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.

Atlantic Bigeye

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. For example, how catches are set taking

into account various uncertainties is not defined. The HCR is not tested in projections as it is too vague. 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 past 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 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 is declining as a result. Adjustments in the TAC and management measures if the stock came under increased pressure areavailable, but these actions are not assured. Effects of 15-01 are not yet shown in the fishery, but the intention was that this would address some of the management issues. This does not meet SG60.

Atlantic Yellowfin

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 catch relate to the target catch for bigeye or what would be done if a higher fishing mortality could be directed at yellowfin.

Eastern Atlantic Skipjack

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 clear evidence of intention to reduce harvest in the face of depletion; 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 and it is not clear how levels of catch relate to the target catch for bigeye or what would be done if a higher fishing mortality could be directed at skipjack.

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.

Western Atlantic Skipjack

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 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. Whether appropriate action would be taken if the stock came under increased pressure is presumed, but not assured.

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. It will be important to ensure the HCR is consistent with modern definitions of reference points, for example. 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.

North Atlantic Albacore

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. 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 harvest control rules are generally understood rather than well defined, SG60 is met, but not SG80.

It should, however, be noted that the Commission has made significant progress in developing a harvest control rule. 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]), but no limit or threshold (trigger) points have been agreed. 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 Recs 15-04 and 15-07, have tasked SCRS with evaluating candidate HCRs through the MSE process in 2016.

South Atlantic Albacore

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 clear evidence of intention to reduce harvest in the face of depletion and the TAC has been reduced in response to scientific advice to encourage recovery. However, this is not well-defined and in the case of southern albacore, catches may be required further below the catch limit to ensure recovery. Whether appropriate action would be taken in future if the stock came under increased pressure is presumed, but not assured. 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.

Although HCR development has been taking place for the northern albacore stock, similar progress does not appear to have been made yet for the southern albacore stock, and it may take longer for this scoring issue to meet SG80.

Mediterranean Albacore

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 (dealt with in PI 1.2.1 and 1.2.3). 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 available, 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.

Atlantic Bigeye

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. However, analysis indicated catches at this level would have about a 50-50 chance of maintain the stock at MSY levels. Setting the TAC at this MSY level may be overoptimistic and arguably is not very precautionary.

Atlantic Yellowfin

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

Eastern Atlantic Skipjack

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

Western Atlantic Skipjack

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.

North Atlantic Albacore

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.

South Atlantic Albacore

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 stock assessment does report probabilistic outcomes for various fixed catches and fishing mortalities. If the HCR is assumed to be maintaining the current TAC beyond 2016, the current HCR is not likely robust to the various uncertainties. Therefore, SG80 is not achieved.

Mediterranean Albacore

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. Indeed, the current status of the fishery is “data poor” and the subsequent increased risks to the fishery are not taken into account at all.

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.

Atlantic Bigeye

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 being met. As demonstrated by the implementation of a seasonal closed area, controls other than a TAC are available to control fishing mortality. If current catches continue, the stock could decrease.

There are various weaknesses preventing higher scores under this performance indicator. The TAC is shared among many countries and control is not precise. Recent catches (2014-15) appear to have been above the TAC of 65,000 t implemented in 2016, so this control swill be tested. 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 in Atlantic bluefin tuna, indicating a higher risk should apply to all species under its auspices.

Atlantic Yellowfin

The current level of control, mainly through limits on fishing capacity and a bigeye tuna 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. 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 closed areas and seasons. 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 rises to the current TAC level, it is not clear that yellowfin catches would still maintain the biomass at the target level. Therefore, SG80 is not met.

Eastern Atlantic Skipjack

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. It is however apparent that there has so far perhaps been relatively little pressure to go after 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. This evidence is limited to observing the outcomes, so that not all available controls have been tested, and therefore SG80 is not met.

Western Atlantic Skipjack

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.

North Atlantic Albacore

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 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. ICCAT has had significant problems in implementing appropriate management measures in Atlantic bluefin tuna, indicating a higher risk should apply to all species under its auspices. Therefore, SG80 is not met. SCRS has begun testing candidate HCR using management strategy evaluations, which could provide adequate evidence to meet SG80 taking into account uncertainties such as those identified above.

South Atlantic Albacore

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 harvest control rules 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. ICCAT has had significant problems in implementing appropriate management measures in Atlantic bluefin tuna, indicating a higher risk should apply to all species under its auspices. Therefore, SG80 is not met.

Mediterranean Albacore

There appears to be no effective control over this fishery, at least by ICCAT. Therefore, SG60 is not met.

Scoring for 1.2.2

Atlantic Bigeye: All SG60, but no SG80, are met. 60
Atlantic Yellowfin: All SG60, but no SG80, are met. 60
Eastern Atlantic Skipjack: All SG60, but no SG80, are met. 60
Western Atlantic Skipjack: All SG60, but no SG80, are met. 60
North Atlantic Albacore: All SG60, but no SG80, are met. 60
South Atlantic Albacore: All SG60, but no SG80, are met. 60
Mediterranean Albacore: Not all SG60 are met. Fail

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1.2.3 Information / monitoring: Relevant information is collected to support the harvest strategy.

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.

Atlantic Bigeye

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 a good stock assessment could not be carried out. 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 implement and evaluate a seasonal closure to reduce catches of small bigeye.

Furthermore, there is evidence that on-going research is planned to improve the information available; therefore, the stock assessment indicating on-going development of data collection is adequate to detect and remove problems. The working group has recommended studies on fecundity and maturity and a tagging programme was initiated in 2016. 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. These recent improvements result in GG80 being met. But the assess ent is not comprehensive. Nor is the suite of information fully supportive of the strategy. SG100 is not met

Atlantic Yellowfin

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. 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 2016, although these

have not been directed at yellowfin. This demonstrates the evolution of the data 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, 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 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.

Eastern Atlantic Skipjack

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 panel was 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. 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 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. Collectively, these are the reasons SG80 is not met.

Western Atlantic Skipjack

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 panel was 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. 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 attempt stock assessments based on catch and fishing effort data and size composition data.

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.

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.

North Atlantic Albacore

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 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.

South Atlantic Albacore

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 various studies particularly on population structure and catchability. 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.

While information is sufficient, meeting 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. There may be some mixing with the Indian Ocean stock. 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.

Mediterranean Albacore

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.

Considering the incomplete fishing statistics for Mediterranean albacore and the lack of knowledge on the lifecycle and the biological population parameter, the stock can be classified as data poor. There is no provision for data poor fisheries under ICCAT. Therefore the current default ICCAT harvest strategy is probably not appropriate (covered under PI 1.2.1). Some data exist (estimates of total catch, mortality, growth), but are incomplete. The fisheries do not meet SG60, because data are insufficient to meet the default ICCAT harvest strategy.

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.

Atlantic Bigeye

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 most recent 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. 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.

Atlantic Yellowfin

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 2008 external review panel recommended, among other things, that efforts continue to be made to improve the timeliness and accuracy of fisheries data.

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.

Eastern Atlantic Skipjack

Fishery removals are monitored at a level consistent with the harvest control rule. However, 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). 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. 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 do not meet SG100.

Western Atlantic Skipjack

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.

North Atlantic Albacore

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.

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. Therefore, the fisheries do not meet SG100.

South Atlantic Albacore

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 (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. Therefore, the fisheries do not meet SG100.

Mediterranean Albacore

Fishery removals are incomplete and there does not appear to be any acceptable indicator for monitoring stock abundance. A minimum of complete catch and effort from the main longline fisheries are likely to be required to meet

SG60. While catch and effort data exist, SCRS concluded that it was unreliable as an index of abundance, although a longer time series may help determine whether this is true. With only one stock assessment cycle having been completed, it is not possible to determine monitoring is being undertaken with sufficient frequency yet. It might be argued that current data are adequate for RBF as long as total removals are recorded (i.e. these can be guaranteed to be low enough to be low risk). With total catches being unreliable, SG60 is not met for these reasons.

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.	

Atlantic Bigeye

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 is one of the on-going problems ICCAT faces with the contracting parties. Nevertheless, catches are recorded increasingly accurately with decreasing IUU fishing activity, and data are sufficiently well recorded for the stock assessment and for assessing the level of control sought by ICCAT over landed catches.

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. Overall, data on total removals form the stock from all significant sources is sufficient for SG80 to be met.

Atlantic Yellowfin

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 is one of the on-going problems ICCAT faces with the contracting parties. Nevertheless, catches are recorded increasingly accurately with decreasing IUU fishing activity, and data are sufficiently well recorded for the stock assessment and for assessing the level of control sought by ICCAT over landed catches.

The catch data are sufficient for the harvest strategy, meeting SG80.

Eastern Atlantic Skipjack

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

Western Atlantic Skipjack

ICCAT has put considerable effort in getting countries to record and report catches. Catches are recorded increasingly well with decreasing IUU fishing activity, and data are sufficiently well recorded for the stock assessment and for assessing the level of control sought by ICCAT over landed catches. Skipjack catches appear to be recorded accurately enough across all fisheries and are not the limiting factor on assessing this stock. Note that this is in contrast to the Mediterranean fisheries, where information provision to ICCAT appears currently inadequate.

Although incomplete, catch information is sufficient to allow a stock assessment to be undertaken, meeting SG80.

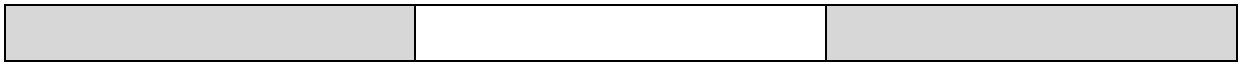
North Atlantic Albacore

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 pelagic 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 for the stock assessment and for assessing the level of control sought by ICCAT over landed catches. This meets SG80. Note that this is in contrast to the Mediterranean fisheries, where information provision to ICCAT appears currently inadequate.

South Atlantic Albacore

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

Mediterranean Albacore



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.

Unreported catches are likely to make assessments using the RBF methodology difficult. In particular, unless the all fishery activities are recorded, it will not be possible to score availability, encounterability or selectivity at anything else but high risk. In addition, lack of this basic information would make the RBF itself unreliable and therefore SG80 could not be met.

Scoring for 1.2.3

Atlantic Bigeye: All SG60 and SG80, but no SG100, are met. 80
Atlantic Yellowfin: All SG60 and SG80, but no SG100, are met. 80
Eastern Atlantic Skipjack: All SG60 and 2 out of 3 SG80 are met. 75
Western Atlantic Skipjack: All SG60 and 1 out of 3 SG80 are met. 65
North Atlantic Albacore: All SG60 and SG80, but no SG100, are met. 80
South Atlantic Albacore: All SG60 and SG80, but no SG100, are met. 80
Mediterranean Albacore: All SG60 are not met. fail

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1.2.4 Assessment of stock status: There is an adequate assessment of the 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.

Atlantic Bigeye

Various stock assessment models and software are applied. All 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 stock synthesis and production models). The main advice is obtained from the combination of these models which includes the limited size composition data. The new methods now being applied now allow estimation of sources of uncertainty. 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 effort has gone into evaluating growth, steepness, Natural mortality rate and other parameters. Thus, SG100 is is met.

Atlantic Yellowfin

Various stock assessment models and software were applied in the most recent assessment which occurred in 2016. All methods and model structures were generic, but were 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 stock synthesis, VPA, age-aggregated and age-specific production models). These 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. 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, tagging studies, are leading to an improved assessment Fishery data is separated out into fleets and standardised, and some effort has gone into evaluating growth, steepness, Natural mortality rate and other parameters. Thus, SG100 is is met.

Eastern Atlantic Skipjack

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.

Western Atlantic Skipjack

Various stock assessment models and software are applied. All 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 (catch only production model, Multifan-CL and Bayesian and non-Bayesian biomass dynamics models, length-based models). The main advice is 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 attempts 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.

North Atlantic Albacore

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). Multifan-CL is used as the base case assessment for the North Atlantic albacore stock. Building on the modelling done in the past, the 2016 assessment focused on BioDyn modelling methods (production model based)

The stock assessment was not 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.

The assessment attempts to account for some features of the species biology and the fishery. The main assessment model can account for a wide range of biological characteristics of the stock. Although not all life history characteristics are well understood, the assessment does make use of what is known, meeting SG100.

South Atlantic Albacore

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 BioDyn dynamic 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 BSP).

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, could lead to an improved assessment meeting SG100.

Mediterranean Albacore

Two stock assessments appropriate for data-poor fisheries were undertaken in 2011, and in addition a yield-per-recruit analysis was used to estimate appropriate fishing mortality-based reference points. These approaches are appropriate for this stock given the information available, meeting SG80. However, the methods are generic, and do not account for features such as recruitment, or other sources of uncertainty in the population dynamics which might be addressed

through a full catch-at-age model. Specific attributes of the fishery, notably changes in selectivity, are accounted for. However, overall 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.	

Atlantic Bigeye

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

Atlantic Yellowfin

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

Eastern Atlantic Skipjack

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 2015 was around 209000t. 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 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 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 does not meet SG80.

Western Atlantic Skipjack

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.

North Atlantic Albacore

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.

South Atlantic Albacore

The dynamic surplus production stock assessments can be used to estimate the MSY reference point, and this is used to determine stock status. This meets SG80.

Mediterranean Albacore

Two stock assessments appropriate for data-poor fisheries were undertaken in 2011, and in addition a yield-per-recruit analysis was used to estimate appropriate fishing mortality-based reference points. These approaches attempt to estimate stock status relative to reference points, meeting SG60. The reference points relevant to the species are not well estimated, so stock status cannot be precisely determined, so SG80 is not 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.

Atlantic Bigeye

Stock assessment methods which have been used report uncertainty in estimates of stock status and other values of interest. Most also can report information in a probabilistic way. Management advice was developed using a joint distribution of the results of seven models (ASPIC Cluster 1; ASPM- Clusters 1 and 2, VPA Clusters 1 and 2, SS Clusters 1 and 2) which were weighted equally. Additional uncertainties in growth, age-slicing, mortality, index selection and data weighting were explored in sensitivity runs. SG100 is met.

Atlantic Yellowfin

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. 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 (ASPIC Cluster 1; ASPM-Clusters 1 and 2, VPA Clusters 1 and 2, SS Clusters 1 and 2) which were weighted equally. Additional uncertainties in growth, age-slicing, mortality, index selection and data weighting were explored in sensitivity runs. This takes account of uncertainty and treats the results in a probabilistic way, meeting SG100.

Eastern Atlantic Skipjack

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.

Western Atlantic Skipjack

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 not 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.

North Atlantic Albacore

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. Decision tables are provided for various target fishing mortality and TAC levels, with probabilities that targets will be reached for projected years. Because there is clear evidence that consideration of risk is provided for management decision making, SG100 is met.

South Atlantic Albacore

The BSP model 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 can effectively be 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 is explicitly probabilistic. Therefore, SG100 is met.

Mediterranean Albacore

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 Bayesian Surplus Production (BSP) model even evaluated stock status probabilistically, meeting SG100. However, this model was rejected and not used for scientific advice. The length-based methods dealt with uncertainty through accounting for observation error and qualitatively in discussion of scenarios, alternative selectivity and so on. The uncertainty was assessed, which led to a rejection of the assessment model. This meets SG60 and SG80, but not 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.

Atlantic Bigeye

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. 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 (ASPIC Cluster 1; ASPM-Clusters 1 and 2, VPA Clusters 1 and 2, SS Clusters 1 and 2) which were weighted equally. Additional uncertainties in growth, age-slicing, mortality, index selection and data weighting were explored in sensitivity runs. Overall, the stock assessment has met SG100.

Atlantic Yellowfin

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. 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 (ASPIC Cluster 1; ASPM-Clusters 1 and 2, VPA Clusters 1 and 2, SS Clusters 1 and 2) which were weighted equally. Additional uncertainties in growth, age-slicing, mortality, index selection and data weighting were explored in sensitivity runs. The assessment methods are used to provide indications of uncertainty by providing a range of possible results. There are recommendations to continue work on developing improved statistical models. Overall, the stock assessment has been tested against many alternative hypotheses, and results appear to be robust. This meets SG100.

Eastern Atlantic Skipjack

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.

Western Atlantic Skipjack

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.

North Atlantic Albacore

Alternative software has been applied to the available data in past assessments, and this has resulted in a fundamental change to methods currently in use. In 2016 the BioDyn methods acknowledge what might be reasonably expected for the available data. However, further evidence would be required on how what hypotheses have been considered and tested to meet SG100.

South Atlantic Albacore

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 have not been exhaustive. There are recommendations to continue work on developing improved statistical models. Overall, the stock assessment has only partially met SG100.

Mediterranean Albacore

The assessments were tested to an extent, but not shown to be robust. One assessment was rejected and the other gave an incomplete picture of the stock and fishery. Opportunities to test alternative hypotheses and assessment approaches are limited with the available data. Nevertheless, 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.

Atlantic Bigeye

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.

Atlantic Yellowfin

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. External review of the most recent (2016) assessment by the attendance of an external expert at the assessment meeting. Reports of findings are pending. It is planned that the Working Group on Stock Assessment Methods will have invited experts and external reviewers. SG80 and SG100 are met.

Eastern Atlantic Skipjack

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.

Western Atlantic Skipjack

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.

North Atlantic Albacore

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.

South Atlantic Albacore

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. Although external review has taken place of the management system, there is no external technical review of the stock assessments, so SG80, but not SG100, is met.

Mediterranean Albacore

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. Although external review has taken place of the management system, there is no external technical review of the stock assessments, so SG80, but not SG100, is achieved.

Scoring for 1.2.4

Atlantic Bigeye:
All SG60 and SG80 are met, and 3 out of 4 SG100 are met. 95
Atlantic Yellowfin:
All SG60 and SG80 are met, and 3 out of 4 SG100 are met. 95
Eastern Atlantic Skipjack: All SG60 and 3 out of 4 SG80 are met. 75
Western Atlantic Skipjack:
All SG60 and SG80 are met, and 1 out of 4 SG100 are met. 85
North Atlantic Albacore:
All SG60 and SG80 are met, and 3 out of 4 SG100 are met. 95
South Atlantic Albacore:
All SG60 and SG80 are met, and 1 out of 4 SG100 are met. 85
Mediterranean Albacore:
All SG60 and 3 out of 4 SG80 are met. 75

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IOTC Stocks

1.1 OUTCOME

1.1.1 Stock Status: The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing.

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.

Indian Ocean Bigeye

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 with estimates ranging from 0.49 to 0.1.03). 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 $B_{2015}/B_{Unfished}$ 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.

Indian Ocean Yellowfin

The stock assessment in 2016 updated the 2015 assessment using several models: BBPM, SCAA, SS3. Stock status is based on the SS3 model formulation. The stock status is overfished and subject to overfishing where:

SSB_{2015}/SSB_{MSY} = 0.89 (0.79-0.99); F_{2015}/F_{MSY} = 1.11 (0.86-1.36); SSB_{2015}/SSB_{1950} = 0.29 Note parentheses enclose 80% CIs. There have been large catches over the last few years (408,000t in 2015; the average over last 5 years was 390,000t). This is a resulted in larger fishing mortality rates the situation where the stock remained below B_{MSY}. The 2016 update provides slightly more of an optimistic status than that of 2015. Recent lower recruitment is driving the current projections.

These results indicate that there is an 80% chance that B/B_{MSY} is greater than 0.79. The default criteria for being overfished is B/B_{MSY}=0.5. Therefore, it is not only likely (70%chance) that this criterion is being achieved (meeting SG60), but it is also highly likely (80% chance, meeting SG60). While the probability of B< ½ B_{MSY} was not directly calculated, it

can be inferred that the probability that B> ½ B_{MSY} is in excess of 80%. However, the estimated depletion of 0.29 is not much different than the default of 20%. Additionally, current recruitment has been in a lower interval. Therefore, SG100 is not met.

Indian Ocean Skipjack

The last stock assessment in 2014 suggested that the stock was not overfished (B_{2013}>B_{MSY}) and that overfishing is not occurring (Average Catch 2009-2013 < MSY). Spawning stock biomass was estimated to have declined to 58%B_0 in 2013 (80% confidence interval range 53%–62%).The stock remained well above the estimated biomass at MSY (B_{2013}/B_{MSY}=1.59 with 80% confidence interval 1.13 to 2.14). However, estimates of total and spawning stock biomass show a decrease over the last decade, accelerated by the high catches of 2003–2006. Recent reductions in effort and hence catches may have reduced the decline. This implies that the stock 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. Additionally, the point estimate of B_{2013}/B_{MSY} and B_{2013}/B_0 are relatively high indicating there is a high degree of certainty that the stock is above the point where recruitment would be impaired. A depletion of 58% is much higher than the agreed upon limit of 28% established in 16-02. Applying an appropriate adjustment to the 80%CI, considering just the lower tail, and assuming the estimate is approximately normal, there is a 95% probability B_{2013}/B_0 > 51%. Thus, this meets SG100.

Indian Ocean Albacore

The IOTC's Working Party on Temperate Tunas in 2016 reported on albacore assessments that were done using a variety of models, but used the Stock Synthesis v3 (SS3) and ASPIC for the final advice. The SS3 analyses suggested that biomass has declined to about 37% of the unexploited level (28-46%). The assessment results suggest biomass is around the MSY level (B_{2014}/B_{MSY} = 1.8; 80% CI 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) Although the probability that B > ½ B_{MSY} was not directly calculated, based upon the 80% CI, there is still a high degree of certainty that it is. Thus, SG100 is met.

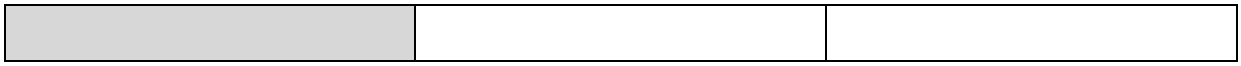
1.1.1.b Stock status in relation to achievement of Maximum Sustainable Yield (MSY).		
60 Guidepost	**80 Guidepost**	**100 Guidepost**
	The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent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

Indian Ocean Bigeye

Based on the 2016 assessment, it is likely that the stock biomass is above that which would produce MSY, while the fishing mortality rate is below F_{MSY}: B_{2015}/B_{MSY} = 1.29, with estimates ranging from 1.07 to 1.51 and F_{2015}/F_{MSY}=0.76 with estimates ranging from 0.49 to 0.1.03. Spawning stock biomass in 2015 was estimated to be 38% of the unfished levels

The 80% CI indicates that there is an 80% probability that B/B_{MSY} >1.07. From this results it can be inferred that the probability that $B>B_{MSY}$ is not greater than 95%. Thus, it is highly likely that B_{MSY} goal is being achieved (meeting SG80), but not with a high degree of certainty (95%), so SG100 is not achieved.

Indian Ocean Yellowfin



The stock assessment in 2016 used 3 models: BBPM, SCAA, SS3. Stock status is based on the SS3 model formulation. The stock status is overfished and subject to overfishing where:

SSB_{2015}/SSB_{MSY} = 0.89 (0.79-0.99); F_{2015}/F_{MSY} = 1.11 (0.86-1.36); SSB_{2015}/SSB_{1950} = 0.29 Note parentheses enclose 80% CIs. There have been large catches over the last few years (408,000t in 2015; the average over last 5 years was 390,000t). This is a resulted in larger fishing mortality rates the situation where the stock remained below B_{MSY}. The 2016 update provides slightly more of an optimistic status than that of 2015. Recent lower recruitment is driving the current projections.

SG80 is not met.

Indian Ocean Skipjack

The last stock assessment in 2014 suggested that the stock was not overfished ($B_{2013}>B_{MSY}$) and that overfishing is not occurring (Average Catch 2009-2013 < MSY). Spawning stock biomass was estimated to have declined to 58%B_0 in 2013 (80% confidence interval range 53%–62%).The stock remained well above the estimated biomass at MSY (B_{2013}/B_{MSY}=1.59 with 80% confidence interval 1.13 to 2.14). Since there is somewhat more than an 80% chance that $B>_{BMSY}$ this meets the highly likely criterion and 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. This is inferred from the 80% probability of the ratio being 1.13, so it is not expected that the probability of a ratio of 1.0 would be as high as 95%. SG100 is not met.

Indian Ocean Albacore

The assessment results suggest biomass is around the MSY level (B_{2014}/B_{MSY} = 1.8; 80% CI 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) Although the probability that $B > B_{MSY}$ was not directly calculated, based upon the 80% CI, there is still a high degree of certainty that it is. Thus, SG100 is met.

Scoring for 1.1.1

Indian Ocean Bigeye: All SG60, SG80 and 1 of 2 SG100 are met. 90
Indian Ocean Yellowfin: All SG60 and 1 of 2 SG80 are met. 70
Indian Ocean Skipjack: All SG60, SG80 and 1 of 2 SG100 are met. 90
Indian Ocean Albacore: All SG100 met. 100

References

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

1.1.2 Stock Rebuilding: Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe.

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.

Indian Ocean Yellowfin

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. 8 years falls within the two-generation limitation on recovery. Resolution 16/01 established an interim plan for rebuilding the Indian ocean yellowfin tuna stock in the IOTC area of competence. This plan

details yellowfin tuna catch limits by gear that shall come into force from 1st January 2017. These catch limits, if applied, will likely result in catches higher than those recommended by the SC to rebuild the stock. However, catches suggested by 16/01 could plausibly recover the stock with 10-12 years This meets SG 60 but not SG100.

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**.

Indian Ocean Yellowfin

Resolution 16/01 is to be implemented in 2017 (after this writing), therefore it cannot be shown to be effective as of yet. However, catch monitoring and stock assessments are planned such that rebuilding can be evaluated. This meets SG60.

Scoring for 1.1.2

Indian Ocean Yellowfin: All SG60 and no SG80 or SG100 are met. 60

References

1.2 HARVEST STRATEGY (MANAGEMENT)

1.2.1 Harvest Strategy: There is a robust and precautionary harvest strategy in place.

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.

Indian Ocean Bigeye

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. Resolution 15-10 sets interim reference points.

This basic harvest strategy is understood. The stock is 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 with estimates ranging from 0.49 to 0.1.03). 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 events suggest that the harvest strategy has been responsive thus far to the status, meeting SG80. However, it is unclear whether the harvest strategy is in any way designed to achieve objectives in the management actions that are taken, preventing meeting SG100.

Indian Ocean Yellowfin

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. B_{MSY} has also been established as an interim threshold reference point

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.

Subsequently, stock was estimated to be at 66% B_{MSY} suggesting that the previous strategy did not work. Therefore, 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. 8 years falls within the two-generation limitation on recovery. Resolution 16/01 established an interim plan for rebuilding the Indian ocean yellowfin tuna stock in the IOTC area of competence. This plan details yellowfin tuna catch limits by gear that shall come into force from 1st January 2017. These catch limits, if applied, will likely result in catches higher than those recommended by the SC to rebuild the stock. However, catches suggested by 16/01 could plausibly recover the stock with 10-12 years which is fulfilling management objectives to attain B_{MSY}. This meets SG 60 but not SG80 or SG100.

Indian Ocean Skipjack

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.

Resolution 16-02, established a biomass limit reference point, B_{lim}, of 20% of unfished spawning biomass5 (i.e. $0.2B_0$); whereas, the biomass target reference point, Btarg, shall be 40% of unfished spawning biomass (i.e. $0.4B_0$). Additionally, 16-02 established a control rule whereby the fishing mortality rate is proportionally reduced as biomass declines from $0.4B_0$ to $0.1B_0$.

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 skipjack and other tropical tunas. A harvest control rule was established for skipjack through Resolution 16/02 meeting SG80. However, it is unclear as yet how the harvest strategy will be implemented. Therefore, the designed aspect of the strategy to change overall selectivity cannot be given full credit and SG100 is not met.

Indian Ocean Albacore

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 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. However, 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. Although reductions in fishing effort have 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. Catches were reduced in 2011-2013, but increased again in 2014 (2011=33633 t; 2012=33352 t; 2013=32624 t; 2014=40,233 t; 2015=35068 t) with mean catches fluctuating around 36,855 Catches remain above the likely MSY and it is not clear that reductions were due to any particular management action. The SG60 is only met on the basis that some reduction is achieved in the short term, otherwise the harvest strategy will lose credibility. Continued increases in

exploitation level, which would be inconsistent with stated management aims, would lead to failure to meet SG60. Therefore, there is significant doubt that the harvest strategy will be fully effective, 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.

Indian Ocean Bigeye

In the case of the bigeye, the fishing mortality is below the MSY level. The assessment showed that the stock is not overfished, indicating that overall levels of exploitation are sustained, but this may depend on the current situation. Testing is provided by short term projections of the expected mortality. 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 if 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.

Indian Ocean Yellowfin

As in comment in IO YFT 1.2.1.a, Resolution 16/01 established an interim plan for rebuilding the Indian ocean yellowfin tuna stock in the IOTC area of competence. This plan details yellowfin tuna catch limits by gear that shall come into force from 1st January 2017. These catch limits, if applied, will likely result in catches higher than those recommended by the SC to rebuild the stock. However, catches suggested by 16/01 could plausibly recover the stock with 10-12 years to B_{MSY} objectives. This meets SG 60, but SG80 is not met because 16-01 has not yet been implemented.

Indian Ocean Skipjack

The present catch is below MSY. Testing is provided by 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, meeting SG80. There is some evidence that the harvest strategy will work as long as current situation remains the same where access to some areas is prevented by piracy, for example. A Harvest Control

Rule was established through 16/02 and is now being implemented. However, until more planned components of the system are in place and these are tested at least through simulation based on a realistic assessment on the control that can be applied in the international fishery, the fishery cannot be considered fully evaluated, so SG100 is not met.

Indian Ocean Albacore

The assessment results suggest biomass is around the MSY level (B_{2014}/B_{MSY} = 1.8; 80% CI 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)

The stock is thus 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 cap on catches. 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.		

Indian Ocean Bigeye

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 current level or lower. 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.

Indian Ocean Yellowfin

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 current level or lower. 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.

Indian Ocean Skipjack

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 current level or lower. 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.

Indian Ocean Albacore

Monitoring is adequate to determine whether the harvest strategy is working. Data are collected to estimate quantities of the strategy, inparticular the fleets' catch. Also, the stock assessment reports 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.

Indian Ocean Bigeye

There is no evidence of any formal review of the harvest strategy. The harvest strategy is a default one which is needs to be fleshed out with adequate information to suggest improvements. The fishery does not meet SG100.

Indian Ocean Yellowfin

There is no evidence of any formal review of the harvest strategy. Specifically, the Scientific Committee suggested that the recent drop in catches may be due in part to increased piracy in the Northwest India Ocean. This is not part of the harvest strategy and has reduced pressure on the stock, but also suggests that the stock has yet to be tested. The fishery does not meet SG100.

Indian Ocean Skipjack

There is no evidence of any formal review of the harvest strategy; the HCR has only just been developed and has not yet been implemented. The fishery does not meet SG100.

Indian Ocean Albacore

There is no evidence of any formal review of the harvest strategy. The strategy is ad hoc and has not been fleshed out with adequate information to suggest improvements. The fishery does not meet SG100.

Scoring for 1.2.1

Indian Ocean Bigeye: All SG60 and SG80, but no SG100, are met. 80
Indian Ocean Yellowfin: All SG60 but no SG80 are met. 60
Indian Ocean Skipjack: All SG60 and SG80, but no SG100, are met. 80
Indian Ocean Albacore: All SG60, but no SG80, are met. 60

References

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Resolution 16/02 http://iotc.org/cmm/resolution-1602-harvest-control-rules-skipjack-tuna-iotc-area-competence

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules (HCRs) in place.

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.

Indian Ocean Bigeye

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. Controls, including indirect effects, limit fishing effort and catches through various conservation measures (see the Compendium of Active CMM for 2016).

However, there is an interim decision framework with reference points (Resolution 15/10) for all tunas and swordfish. 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 Kobe 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 and available HCR, meeting 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.

Indian Ocean Yellowfin

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 through Resolution 16/01 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).

However, there is an interim decision framework with reference points (Resolution 15/10) for all tunas and swordfish. 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 Kobe plot, are in place, well-defined and are consistent with SG80. 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, although there is evidence for the on-going development of an HCR.

Indian Ocean Skipjack

A well-defined HCR has recently been established through Resolution 16/02 which reduces the target fishing intensity below the biomass target reference point ($40\%B_0$) linearly to zero (except for subsistence fisheries) at a safety limit (B_{safety}; $10\%B_0$ or half of the limit reference point). The HCR is as yet to be formally implemented so it is not clear how the target fishing intensity is to be achieved, but some controls are already available, through various conservation measures (see the Compendium of Active CMM for 2016). Thus, a well-defined HCR is in place which should be able to avoid the PRI and maintain the stock around the agreed target level, consistent with B_{MSY}, meeting the requirements of SG80.

The HCR has not yet been implemented so cannot be evaluated with confidence as of yet. The stock has almost always been above the target level. But, there is no reason to suppose that this will change. But, given the preliminary nature of the HCR, it cannot be said that that the stock is expected in a statistical sense to fluctuate around the target. Therefore, SG100 is not met.

Indian Ocean Albacore

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).

However, there is an interim decision framework with reference points (Resolution 15/10) for all tunas and swordfish. 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 Kobe 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 and available HCR, meeting 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.

Indian Ocean Bigeye

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 management strategy evaluations which have been initiated and are ongoing.

Indian Ocean Yellowfin

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.

Indian Ocean Skipjack

An HCR was established through 16-02 and is just now being implemented. There are a number of uncertainties in the HCR including the role of the minimum threshold (10% of B_0) at which catches are set to zero; the role of subsistence fishing if thresholds are exceeded; and exactly how the target rates are to be implemented. At this stage, SG80 is not met.

Indian Ocean Albacore

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.

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.

Indian Ocean Bigeye

A level of control to respond to excess fishing pressure has not been demonstrated partially because biomass has remained above that which would produce MSY. 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, although Resolution 14/02 has replaced Resolution 12/13 for tropical tunas, removing previous management controls despite there being evidence that intervention may be required. 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), meeting SG60. Nevertheless, there are as yet no harvest control rules at the IOTC level and, thus, limited evidence that the available tools would be effective, preventing SG80 being met.

Indian Ocean Yellowfin

A level of control to respond to excess fishing pressure was adopted (Resolution 16/01) but that is to be implemented in 2017 and therefore has not been demonstrated. This was adopted to respond to the status of the stock being 89% of that which would produce MSY. The tools that the IOTC have available include TACs, area access and other measures. But through 16-01 the IOTC implemented allocation mechanisms for both TACs and access agreements for CPCs and gear types. The Scientific Committee has initiated the process of control rule development. 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), meeting SG60. Nevertheless, there are as yet no harvest control rules at the IOTC level and, thus, limited evidence that the available tools would be effective, preventing SG80 being met.

In the case of yellowfin, the stock has declined and based on projections in the previous assessment was likely to be below its target point during the next few years. The most recent assessment indicated that this indeed 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 likely catches which are above scientific advice but still likely to rebuild the stock (eventually). The details of implementation afre not known as of yet. On that basis it can be said that tools are available and shortly to be in use (implementation 2017) and there is some evidence that they will work based on projections. But there is not necessarily a lot of evidence as yet of likely success. Therefore, SG80 is met but not SG80.

Indian Ocean Skipjack

The HCR defined in Resolution 16/02 has not yet been implemented, and hence the tools which will be used remain unclear. There may be no immediate need for tools to be put in place, since biomass has remained above that which would produce MSY. 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. 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 could

most likely control exploitation rates if required (although this has not been required so far). SG60 is met. However, tools are not yet 'in place' for the implementation of the HCR, so SG80 is not met.

Indian Ocean Albacore

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. 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), meeting SG60. Because tools are 'available' rather than 'in place', SG80 cannot be met.

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 are available to implement a HCR, they have yet to demonstrate they can reduce fishing mortality. Furthermore, if there is no appropriate response soon, it will become increasingly difficult to argue that tools are, in reality, available to reduce the exploitation level and the SG60 will not be met. Furthermore, failure of one stock to apply such controls could lead to failures in others as a lack of response undermines confidence that such tools are "available".

Scoring for 1.2.2

Indian Ocean Bigeye: All SG60, but no SG80, are met. 60
Indian Ocean Yellowfin: All SG60, but no SG80, are met. 60
Indian Ocean Skipjack: All SG60 and 1 of 3 SG80, are met. 75
Indian Ocean Albacore: All SG60, but no SG80, are met. 60

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Resolution 16/02 http://iotc.org/cmm/resolution-1602-harvest-control-rules-skipjack-tuna-iotc-area-competence

1.2.3 Information / monitoring: Relevant information is collected to support the harvest strategy.

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.

Indian Ocean Bigeye

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 mortality models. Environmental factors, such as ENSO cycle, are monitored and some environmental data are available as covariates in CPUE standardization, and this includes which is not directly relevant to the current harvest strategy. These data have been sufficient to conduct assessments and to evaluate the harvest strategy of maintaining stocks at or above the biomass that would produce MSY, 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.

Indian Ocean Yellowfin

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.

Indian Ocean Skipjack

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.

Indian Ocean Albacore

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 are insufficient to support the current harvest strategy which is directed at relatively high target high levels of exploitation. Additionally, it is 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.

Indian Ocean Bigeye

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. 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. Only the Japanese longline data were used in the 2013 assessment, however, as it was felt to provide the most consistent index of abundance. The Working Party on Tropical

Tunas noted on-going significant problems with the available data, 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 the harvest control rule to be applied with a high degree of certainty, so SG100 is not met.

Indian Ocean Yellowfin

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.

Indian Ocean Skipjack

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. 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. The Scientific Committee expressed concerns on the ability of both the available CPUE and to reflect the dynamics of the stock and have requested further investigation. These series drive the skipjack stock assessment results, but may not be good indices of abundance. Data are sufficient for the application of a precautionary harvest control rule which has been implemented through 16/02, so SG80 is met. However, the data do not presently allow the harvest control rule with a high degree of certainty, so SG100 is not met.

Indian Ocean Albacore

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.	

Indian Ocean Bigeye

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.

Indian Ocean Yellowfin

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.

Indian Ocean Skipjack

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.

Indian Ocean Albacore

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.

Scoring for 1.2.3

Indian Ocean Bigeye: All SG60 and SG80, but no SG100, are met. 80
Indian Ocean Yellowfin: All SG60 and SG80, but no SG100, are met. 80
Indian Ocean Skipjack: All SG60 and SG80, but no SG100, are met. 80
Indian Ocean Albacore: All SG60 and 2 out of 3 SG80 are met. 75

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1.2.4 Assessment of stock status: There is an adequate assessment of the 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.

Indian Ocean Bigeye

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 are state of the art which integrate the available data relevant to the biology and fisheries. Thus, SG100 is met.

Indian Ocean Yellowfin

The primary assessment tool for stock status is based on the SS3 model formulation. BBPM and SCAA also applied. Alternative model structures have been explored to take advantage of the available data and to evaluate the impact of uncertainties. Major features of tuna biology are taken into account and the model is able to make use of the available data, including tagging, meeting SG100.

Indian Ocean Skipjack

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. Nevertheless, the assessment models are state of the art which integrate the available data relevant to the biology and fisheries. Thus, SG100 is met

Indian Ocean Albacore

The assessment tools for Indian Ocean albacore cover a spectrum from the complexity of Stock Synthesis v3 (SS3) to the simplicity of ASPIC production model. Both SS3 and ASPIC were considered to offer useful scientific advice. Therefore, appropriate models have been identified and used for the stock assessment, meeting SG80, but it has not been clearly demonstrated that these have taken proper account of the biology or the 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.	

Indian Ocean Bigeye

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.

Indian Ocean Yellowfin

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.

Indian Ocean Skipjack

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.

Indian Ocean Albacore

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.

Indian Ocean Bigeye

Stock assessment methods which have been used report uncertainty in estimates of stock status. Uncertainties have been examined as alternative model configurations and the stock status associated with these alternatives have been evaluated. While weightings among configurations are not statistically rigorous, they represent a consensus of the experts on their relative importance. 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.

Indian Ocean Yellowfin

Stock assessment methods which have been used report uncertainty in estimates of stock status. Uncertainties have been examined as alternative model structures and the stock status associated with these alternatives have been evaluated in a probabilistic manner by weighting of the alternatives. While these weightings are not statistically rigorous they represent a consensus of experts on relative importance. These probabilities have been carried through the Kobe plots and Kobe strategy matrix (phase diagram of F versus SSB at time and projections of the probability of exceeding reference points for alternative catch levels, respectively). The use of probability in the management advice allows risk to be taken into account in the decision making, meeting SG100.

Indian Ocean Skipjack

Stock assessment methods which have been used report uncertainty in estimates of stock status. Uncertainties have been examined as alternative model configurations. The stock status associated with alternatives have been evaluated in a probabilistic manner by weighting of the alternatives. While these weightings are not statistical rigorous they represent a consensus of experts on relative importance. These probabilities have been carried through the Kobe plots and Kobe strategy matrix: phase diagram of F versus SSB at time and projections of the probability of exceeding reference points for alternative catch levels, respectively. A decision table is provided to help assess risk. Because the assessment not only takes into account uncertainty, it provides probabilistic output suitable for decision-making, SG100 is met.

Indian Ocean Albacore

The SS3 assessment, and to a lesser extent ASPIC, produces probabilistic output, which is carried forward to management decision making in a Kobe strategy matrix. The strategy matrix evaluates stock status 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.

Indian Ocean Bigeye

The assessment based on SS3 has been tested and the range of plausible models has been evaluated, showing that the assessment is robust. 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.

Indian Ocean Yellowfin

Application of BBPM, SCAA, SS3 (particularly of SS3) to Indian Ocean yellowfin has been relatively recent. Therefore, there have been some implications of model structure which have not been rigorously explored yet. This prevents the assessment meeting SG100.

Indian Ocean Skipjack

Application of SS3 to skipjack has been relatively recent. Therefore, there have been many implications of model structure which have not yet been rigorously explored. SG100 is not met.

Indian Ocean Albacore

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 (developed for Pacific tuna), Bayesian biomass dynamics, 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 Working Party was unable to decide between the two modelling extremes (SS3 vs ASPIC), which suggest that neither was considered robust at this stage of development, so 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.

Indian Ocean Bigeye

The stock assessment of bigeye was reviewed through the Working Party for Tropical Tunas of the IOTC's Scientific Committee. Additionally, outside experts were invited to participate in the Working Party meetings. However, the structure of the WP meeting limited the degree of both external and internal review. Additionally, bigeye tuna was a lower priority for this review and subsequent meetings of the Working Party would need to focus on the bigeye assessment. Levels of review are adequate to meet SG80, but not SG100.

Indian Ocean Yellowfin

The stock assessment of yellowfin was primarily conducted by contracted assessment scientists. The assessment was reviewed through the Working Party for Tropical Tunas of the IOTC's Scientific Committee. Additionally, outside experts were invited to participate in the Working Party meetings. However, the structure of the WP meeting limited the degree of both external and internal review. The review was adequate to meet SG80, but not SG100.

Indian Ocean Skipjack

The stock assessment of skipjack was primarily conducted by IOTC scientists. The assessment was reviewed through the Working Party for Tropical Tunas of the IOTC's Scientific Committee. Additionally, outside experts were invited to participate in the Working Party meetings. This meets SG80. However, the structure of the WP meeting limited the degree of both external and internal review, so SG100 was not met.

Indian Ocean Albacore

The stock assessment of albacore was reviewed through the Working Party on Temperate Tunas of the IOTC's Scientific Committee. There is evidence from the WP report that the stock assessment has been subject to rigorous internal review, but nor external review. Levels of review are adequate to meet SG80, but not SG100.

Scoring for 1.2.4

Indian Ocean Bigeye:

All SG60 and SG80 are met, and 2 out of 4 SG100 are met. 90

Indian Ocean Yellowfin:

All SG60 and SG80 are met, and 2 out of 4 SG100 are met. 90

Indian Ocean Skipjack:

All SG60 and SG80 are met, and 2 out of 4 SG100 are met. 90

Indian Ocean Albacore:

All SG60 and SG80 are met, and 1 out of 4 SG100 are met. 85

References

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].

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

WCPFC Stocks

1.1 OUTCOME

1.1.1 Stock Status: The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing.

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.

Western Pacific Bigeye

Biomass has experienced large declines over several decades. The spawning stock was estimated by the 2014 assessment to have been relatively stable during the 1950s, declined rather rapidly through to the mid-1970s and has been undergoing a slow continual decline since. Compared to the unexploited state, the spawning stock was estimated to be most likely 16% B0 (range across four alternative models 14%-18%). The limit reference point of 20%B0 is taken here to be the PRI. Projected median spawning biomass depletion of bigeye in 2016 was B2015/B0 = 0.17 indicating not much change from previous analyses. It was also noted that short-term stochastic projections using only the reference case model are likely to underestimate uncertainty in projected stock status. Therefore, it is not likely that it is above the point where recruitment would be impaired, so SG60 is not met.

Western Pacific Yellowfin

According to the 2014 assessment, initial recruitment was relatively high but declined during the 1950s and 1960s. Estimated recruitment remained relatively constant from the 1980s. There is no clear stock-recruitment relationship, with different levels of assumed steepness for the SR model giving the same recruitment estimates.

The Commission has formally adopted a limit reference point ($20\%B_0$) which is here treated as the PRI. This PRI is consistent with the default MSC PRI for stocks of medium productivity.

The spawning stock estimate $B_{2012}/B_0 = 38\%$ is well above the limit reference point of $20\%B_0$ (range 35-40% across all four alternative models). Because the stock is well above, and the estimated range excludes the precautionary limit reference point, SG100 is met.

Western Pacific Skipjack

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.

Western Pacific Bigeye

The estimates of spawning biomass for 2012 are below the level that will support the MSY. SB_{2012}/SB_{MSY} = 77% for the base case model, with a range 62%-96% across all four alternative models. This is a significant change in the perceived stock status compared to the 2011 assessment. Therefore, the 2014 assessment indicated that spawning biomass is below B_{MSY}, and therefore below the target region of WCPFC, which fails to meet SG80.

It should be noted that the adopted limit reference point (20% B_0) is now very close to the estimated B_{MSY} from the analytical assessment. It is not clear that they are consistent. The analytical estimate of B_{MSY} may not be sufficiently precautionary, so that year-to-year variation in the stock assessment could result in the stock periodically being below the limit reference point even when it is fluctuating around the B_{MSY} point.

Western Pacific Yellowfin

Fishing mortality has generally been increasing through time, but for the reference case $F_{2008\text{-}11}$ is estimated to be 0.72 times the fishing mortality that will support the MSY. Across the four models (base case and six sensitivity models) $F_{2008\text{-}11}/F_{MSY}$ ranged from 0.51 to 0.90. This indicates that overfishing is not occurring for the WCPO yellowfin tuna stock, however latest catches are close to or exceed the MSY by up to 4%.

The estimate of spawning biomass for 2012 are above the level that will support the MSY: SB_{2012}/SB_{MSY} = 1.24 (range 1.05-1.51 across allalternative models). The Scientific Committee in Aug 2016 noted that the results of the updated short-term projections using actual catch and effort levels in 2013-2015 indicated that the projected median spawning biomass depletion ($SB/SB_{F=0}$) of yellowfin showed an increasing trend since 2012. The Committee also noted that the projected

median spawning biomass depletion of yellowfin in 2016 was $SB_{2015}/SB_{F=0}$ = 0.49. Based on this assessment (which indicates stock improvement relative to the previous assessment), there is a high degree of certainty that the stock is above the MSY level, so SG100 is met.

Western Pacific Skipjack

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.

Scoring for 1.1.1

Western Pacific Bigeye: The SG60 is not met. Fail
Western Pacific Yellowfin: All SG60, SG80 and SG100 are met. 100
Western Pacific Skipjack: All SG60, SG80 and SG100 are met. 100

References

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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

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1.1.2 Stock Rebuilding: Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe.

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.

Western Pacific Bigeye

CMM 2015-01 aims to reduce fishing mortality to $F \leq F_{MSY}$ by the end of 2017. The catch limits applied to the longline fishery are planned to reduce catches by around 14% over the period 2014-2017. In addition, limits have been placed on purse seine fishing effort and these measures are likely to reduce the juvenile bigeye catch, but by how much is unclear. The fishing mortality was estimated to be significantly above the MSY level in 2012, and it is unclear by how much current measures will reduce fishing mortality or whether they will be entirely successful. Unless exploitation levels are successfully reduced, the stock will not rebuild to score PI1.1.1 at SG80. The implication of specifying an F reduction is that the stock will eventually recover. However, there are no specifications for the timeframe for biomass to recover, so SG60 is not yet 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**.

Western Pacific Bigeye

There have been significant recent improvements in the available data and the stock assessment. In addition, a precautionary limit reference point has been adopted for this stock, which should help guide rebuilding strategy. The level of monitoring is sufficient to determine whether rebuilding strategies will be effective, meeting SG60.

Fishing mortality has generally been increasing through time, and the average fishing mortality 2008-11 ($F_{2008-11}$) is estimated to be 1.57 F_{MSY}, with $F_{2008-11}/F_{MSY}$ ranged from 1.27 to 1.95 across four alternative models. This is similar to the 32% reduction from 2006-2009 levels recommended from the 2011 assessment. There is no evidence yet of a successful reduction in catch levels since the late 1990s. It remains unclear whether the planned reduction to 2017 will be sufficient to initiate rebuilding. Therefore, the monitoring indicates that the current strategy will not be effective at rebuilding the stock, so SG80 is not met.

Scoring for 1.1.2

Western Pacific Bigeye: Only 1 out of 2 SG60 are met. Fail

References

Harley, S., N. Davies, J. Hampton, S. McKechnie. 2014. Stock assessment of bigeye tuna in the central and western Pacific Ocean. WCPFC-SC10-2014/SA-WP-01

WCPFC. 2016. Twelfth Regular Session of the Scientific Committee. Bali, Indonesia, 3-11 August 2016. Summary Report CMM-2015-01 Conservation and Management Measure for bigeye, yellowfin and skipjack tuna in the Western and Central Pacific Ocean https://www.wcpfc.int/doc/cmm-2015-01/conservation-and-management-measure-bigeye-yellowfin-and-skipjack-tuna-western-and

1.2 HARVEST STRATEGY (MANAGEMENT)

1.2.1 Harvest Strategy: There is a robust and precautionary harvest strategy in place.

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.

Western Pacific Bigeye

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). No target reference point has been agreed for WP bigeye; this is due to be agreed in 2017 according to the workplan for CMM 14-06. Since B_{MSY} is close to the agreed LRP, it does not make much sense to consider this as a management target; in the meantime, a precautionary approach would be to consider that the specific target is for biomass to reach a level at which there is a low probability of the LRP being breached – since SC2012 were

asked to advise on this. A specific commitment to long-term sustainable fisheries management was adopted at the Western and Central Pacific Fisheries Commission in 2014, but has not been implemented yet. This commitment applies across all fisheries within the commission.

The harvest strategy seeks to maintain the Western Pacific bigeye at a level that can support MSY. The harvest strategy (CMM-2015-01) 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 from which most of the fishing mortality is derived. The catch limits are planned to reduce catches by around 14% over the period, and it is not clear that this will be sufficient to initiate rebuilding required here within a reasonable timeframe. Simulations suggest that if the catch reductions are achieved and recruitment remains around the 2002-2011 level, the risk that the stock will be below the limit reference point is reduced to 4%. However, current levels of fishing and the current stock state indicate that the harvest strategy has so far not been responsive to state of the stock over a number of years. At its 2015 meeting, the WCPFC adopted a workplan for developing and implementing a HS approach that includes TRP, HCR and other elements. But until such actions are is able to show responsiveness to the scientific advice with clear improvements in stock status, SG80 cannot be met.

Western Pacific Yellowfin

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, Additionally, at its 2015 meeting, the WCPFC adopted a workplan for developing and implementing a HS approach that includes TRP, HCR and other elements.

The harvest strategy (CMM-2015-01) states that the fishing mortality rate for yellowfin tuna will be maintained at a level no greater than F_{MSY} (i.e. $F/F_{MSY} \leq 1$). 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 limits on catches for longline not to increase from current levels. Catch limits are planned to reduce bigeye catches by around 14% over 2014-2017, which could also decrease longline catches of yellowfin.

There was a dramatic decline in the MSY in the 1970s following the increased development of those fisheries that catch younger yellowfin, principally the small-fish fisheries in the west equatorial region. This suggests that the selectivity is not optimal with respect to yield and fishery may be subject to vulnerable to “growth overfishing”.

The new management measures, and more specific controls on the bigeye fishery such as the management system of limiting vessel days in response to stock status can be expected to eventually meet management objectives. This is demonstrated by the current fishing mortality rate being less than F_{MSY}. This meets SG60. But 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. It is not yet clear that the strategy is responsive to stock status or that all its components are working together effectively, so SG80 is not met.

Western Pacific Skipjack

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). At its 2015 meeting, the WCPFC adopted a workplan for developing and implementing a HS approach that includes TRP, HCR and other elements. This commitment applies across all fisheries within the commission.

The harvest strategy (CMM-2015-01) 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 equal to 50% of the equilibrium spawning biomass that would be expected in the absence of fishing under current (most recent 10 years of the current assessment, excluding the last year) environmental conditions ($50\%SB_{current, F=0}$). 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, and more specific controls on the bigeye fishery, can be expected to meet management objectives in the short term, as they limit purse seine activities. This meets SG60. Specific management measures are 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. It is not yet clear 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.

Western Pacific Bigeye

The general approach to management is likely to work in the long term as capacity and effort controls should lead to a limit on fishing mortality such that the risk of $B<B_{lim}$ is reduced to an appropriate level, meeting SG60. Overall, there is no evidence for an overall catch reduction yet, although longline catches have been reducing in recent years. New management measures are expected to limit and reduce bigeye fishing mortality. However, given the status of the stock and the discussion above, there is no clear evidence that the harvest strategy is achieving its objectives. It has yet to be shown that the management system can maintain stock at the target level ($B>B_{MSY}$, $F<F_{MSY}$), which does not meet SG80.

Western Pacific Yellowfin

In the case of the Western Pacific yellowfin stock, the fishing mortality has not been excessive but appears to be growing. The assessment showed that the stock is not undergoing overfishing and is not overfished. Monitoring of catches and fishing effort and size composition is in place and catches have been reasonably stable for the last 10 years. Projections of the current level of exploitation indicate that it was very unlikely (<1%) that the stock would fall below the limit reference point by 2032, or that fishing mortality will increase above F_{MSY} levels. Assuming low recent recruitment continued it was very unlikely (<10%) that the yellowfin stock would fall below B_{MSY}. Therefore, evidence exists that the current constraints on fishing mortality are probably adequate to maintain the stock above B_{MSY}. Overall, the harvest strategy has not been well-defined and has not been fully evaluated, so it meets SG80, but not SG100.

Western Pacific Skipjack

In the case of the Western Pacific skipjack stock, the fishing mortality has not been beyond the MSY level, although it appears to be growing, and the stock is very unlikely to be overfished. The stock biomass is above the MSY level and fluctuating around the target. Monitoring of catches and fishing effort and size composition is in place. Ten year projections of the current level of exploitation indicate that in 2025, median $SB/SB_{F=0}$ was estimated to be 0.49 (target 0.5), and there was zero risk of the stock falling below the limit reference point. Therefore, evidence exists that the current constraints on fishing mortality are probably adequate to maintain the stock above B_{MSY}. This meets SG80. 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 and 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.		

Western Pacific Bigeye

Monitoring is adequate to determine whether the harvest strategy is working. 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. Also, the stock assessment reports best estimates of biomass, which indicates whether management is achieving its objectives or not. This meets SG60.

Western Pacific Yellowfin

Monitoring is adequate to determine whether the harvest strategy is working. The different parts of the strategy include holding catches at around current level or lower. 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.

Western Pacific Skipjack

Monitoring is adequate to determine whether a 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, 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.

Western Pacific Bigeye

There is no evidence of any formal review of the bigeye harvest strategy, so this does not yet meet SG100. There is stated intention to evaluate the current strategy as it progresses, but this falls short of a formal review, although it may still lead to improvements as rebuilding progresses.

Western Pacific Yellowfin

There has not been a formal review of the harvest strategy by the WCPFC, although the Scientific Committee has initiated efforts to provide the scientific options for a harvest strategy. Although the harvest strategy is reasonable, there is inadequate information available to indicate what improvements might be possible. There is stated intention to evaluate the current strategy as it progresses, but this falls short of a formal review, although it may still lead to improvements. Therefore, it does not meet SG100.

Western Pacific Skipjack

There is no evidence of any formal review of the skipjack harvest strategy, so this does not yet meet SG100. There is stated intention to evaluate the current strategy as it progresses, but this falls short of a formal review, although it may still lead to improvements as rebuilding progresses.

Scoring for 1.2.1

Western Pacific Bigeye: All SG60, but no SG80, are met. 60
Western Pacific Yellowfin: All SG60 and 1 out of 2 SG80 are met. 70
Western Pacific Skipjack: All SG60 and 1 out of 2 SG80 are met. 70

References

CMM-2015-01 Conservation and Management Measure for bigeye, yellowfin and skipjack tuna in the Western and Central Pacific Ocean https://www.wcpfc.int/doc/cmm-2015-01/conservation-and-management-measure-bigeye-yellowfin-and-skipjack-tuna-western-and

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WCPFC. 2016. Twelfth Regular Session of the Scientific Committee. Bali, Indonesia, 3-11 August 2016. Summary Report.

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules (HCRs) in place.

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.

Western Pacific Bigeye

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. Any action being taken was not pre-agreed. Indeed the slow response of management measures to the scientific advice indicates a lack of a well-defined HCR. This does not meet SG60. The Scientific Committee has been working to define options. At its 2015 meeting, the WCPFC adopted a workplan for developing and implementing a HS approach that includes TRP, HCR and other elements. Therefore, HCRs are still in the development stage.

Western Pacific Yellowfin

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. Any action being taken was not pre-agreed. Indeed, the slow response of management measures to the scientific advice indicates a lack of a well-defined HCR. However, the status of the stock remains in a good condition (B_{2012}/B_0 = 38%). Current mortality rates are expected to maintain the stock in this good condition. Thus, this indicates that an implied HCR is available. This meets SG60, but not SG80. At its 2015 meeting, the WCPFC adopted a workplan for developing and implementing a HS approach that includes TRP, HCR and other elements. Therefore, HCRs are still in the development stage.

Western Pacific Skipjack

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. Any action being taken was not pre-agreed. Indeed the level of response of management measures to the scientific advice indicates a lack of a well-defined HCR. However, the status of the stock

remains in a good condition and current mortality rates are expected to maintain the stock in this good condition. Thus, this indicates that an implied HCR is available. This meets SG60, but not SG80. However, at its 2015 meeting, the WCPFC adopted a workplan for developing and implementing a HS approach that includes TRP, HCR and other elements. Additionally, CMM-2015-06 established an interim target equal to 50% of the equilibrium spawning biomass that would be expected in the absence of fishing under current (most recent 10 years of the current assessment, excluding the last year) environmental conditions ($50\%SB_{current, F=0}$). Therefore, HCRs are still in the development stage.

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.

Western Pacific Bigeye

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.

Western Pacific Yellowfin

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.

Western Pacific Skipjack

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.

Western Pacific Bigeye

The primary interest is in reducing bigeye exploitation, through limiting effort and catches. There is some evidence that longline catches can be reduced. Juvenile fishing mortality is high, but has not increased overall since the late 1990s, whereas adult fishing mortality shows an increasing trend even over the most recent years. Evidence that the current level of control is adequate is partial at best, although there are clearly more tools available in reducing effort and catches. Conservation measures continue to be ineffective. This does not meet SG60.

Western Pacific Yellowfin

The current level of control, mainly through access rights and licensing, has resulted in sustainable catch levels for yellowfin tuna, partly as a result of responses to protecting more vulnerable bigeye tuna. Therefore, the monitoring data suggest current levels of fishing effort are sustainable, but limits on fishing capacity and their relationship to quantities in the stock assessment are not clear. The tools used up till now appear to have been effective in controlling exploitation, but with clauses to allow fishery development, it is unclear how effective current measures will be. A process is, however, underway (see 14-06) to develop a better-defined HCR with associated tools. The workplan does not cover the full process but is due for review in 2017. With some evidence that tools have been effective so far, SG60 is met, but evidence is limited that they would be appropriate for a HCR required by SIa and SIb, so SG80 is not met.

Western Pacific Skipjack

The current level of control, mainly through access rights and licensing, has resulted in sustainable catch levels for skipjack tuna. Therefore, the monitoring data suggest current levels of fishing effort are sustainable. Limits on fishing capacity and their relationship to quantities in the stock assessment are not clear. The tools appear to have been effective in controlling exploitation either by happenstance or design, but detailed information on capacity controls was unavailable. There is some evidence current tools are adequate to limit harvest, meeting SG60. However, evidence is incomplete, particularly whether controls are sufficient for the timely reduction in fishing mortality.

Scoring for 1.2.2

Western Pacific Bigeye: All SG60 are not met. fail
Western Pacific Yellowfin: All SG60, but no SG80, are met. 60
Western Pacific Skipjack: All SG60, but no SG80, are met. 60

References

CMM-2013-01. Conservation and Management Measure for Bigeye, Yellowfin and Skipjack Tuna in the Western and Central Pacific Ocean. Conservation and Management Measure 2013-01. Commission Tenth Regular Session, Cairns, Australia, 2-6 December 2013.

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1.2.3 Information / monitoring: Relevant information is collected to support the harvest strategy.

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.

Western Pacific Bigeye

Sufficient information (on stock structure, stock productivity, fleet composition), is available to monitor and assess stock status including; tagging data, catch reporting and size-frequency sampling by each fleet and catch-per-unit-effort data

from these fleets. This is sufficient to support the harvest strategy as well as evaluate alternative management measures, such as seasonal area closures. The information is sufficient to develop and evaluate the harvest strategy, meeting SG80. However, while the range of data is wide, it is not clear that data collection is comprehensive. Although all the major fleets report adequate information, these data are not necessarily complete and there remains concern over the accuracy of some sources of data, so SG100 is not attained.

Western Pacific Yellowfin

Sufficient information (on stock structure, stock productivity, fleet composition), is available to monitor and assess stock status including; tagging data for stock identification, catch reporting and size-frequency sampling by each fleet, and catch-per-unit-effort data from these fleets.

Stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with likely and best practice HCRs, and indicators of catch and effort are available and monitored with sufficient frequency to support catch or effort-related HCRs. In addition, there is observer coverage for some fleets (targets 100% purse seine and 5% longliners), as well as port sampling and transshipment monitoring.

While the range of data is wide and sufficient for the harvest strategy, meeting SG80, it is not clear the data collection systems will support the detail of the management that has recently been implemented, particularly taking into poorer coverage in some countries, so SG100 is not met.

Western Pacific Skipjack

There is a comprehensive range of information (on stock structure, stock productivity, fleet composition) is available to monitor and assess stock status including; tagging data for stock identification, catch reporting and size-frequency sampling by each fleet and catch-per-unit-effort data from these fleets. In addition, there is an observer programme (100% coverage for purse seine since 2010), port sampling and transshipment monitoring. This information is being used to formulate management strategies. Given the current stock status and on-going improvements in data collection to support the harvest strategy, 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.

Western Pacific Bigeye

Fishery removals and stock abundance are monitored at a level that is sufficient for the current harvest strategy and assessment, meeting SG80. However, there is no well-defined harvest control rule. Additionally, recent agreed-upon management actions which have yet to be fully implemented may require additional information. There is also an issue over whether data are collected for analyses in a timely manner to allow evaluation of management controls, with a near 2 year delay between assessment and the latest stock estimate. In addition, there is an observer programme for some larger fleets (targets are 100% coverage for purse seine and 5% for longline), port sampling and transshipment monitoring.

While the data are adequate for a suitable harvest control rule, uncertainties in data are significant and not necessarily fully understood, so SG100 is not met. 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. For example, catchability may change by area or there may be “hyperstability”, where fishing activity will focus on areas of high abundance so that a decline in the overall stock is underestimated. Also, catches by some nations remain uncertain.

Western Pacific Yellowfin

Fishery removals and stock abundance are monitored at a level that is sufficient for the current harvest controls and assessment, meeting SG80. Current data can be used to generate abundance indices, catches, fishing effort, selectivity estimates, which are adequate to support the harvest control rule, meeting SG80.

While the data are adequate for a suitable harvest control rule, uncertainties in data are significant and not necessarily fully understood. The abundance indices depend on commercial fishing activities which may not be well understood and may change over time (e.g. “hyperstability”). Data are also clearer poorer from some fisheries, and while this is being addressed, these data remain a problem for the assessment. This prevents SG100 being met.

Western Pacific Skipjack

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.

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.	

Western Pacific Bigeye

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.

Western Pacific Yellowfin

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.

Western Pacific Skipjack

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.

Scoring for 1.2.3

Western Pacific Bigeye: All SG60 and SG80, but no SG100, are met. 80
Western Pacific Yellowfin: All SG60 and SG80, but no SG100, are met. 80
Western Pacific Skipjack: All SG60 and SG80, 1 of 2 SG100, are met. 90

References

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WCPFC. 2016. Twelfth Regular Session of the Scientific Committee. Bali, Indonesia, 3-11 August 2016. Summary Report

1.2.4 Assessment of stock status: There is an adequate assessment of the 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.

Western Pacific Bigeye

The most recent assessment of bigeye tuna in the WCPO was conducted in 2014 using the Multifan-CL software. The bigeye tuna model is age and spatially structured (9 regions) and the catch, effort, size composition and tagging data used in the model are classified by 33 fisheries and quarterly time periods from 1952 to 2012. 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.

Western Pacific Yellowfin

The most recent 2014 assessment uses the stock assessment model and software Multifan-CL (MFCL). The yellowfin tuna model is age and spatially structured (9 regions) and the catch, effort, size composition and tagging data used in the model are classified by 33 fisheries and quarterly time periods from 1952 through 2012. 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. Because the assessment makes good use of the available data and includes the ability to account for important factors in tuna biology, this meets SG100.

Western Pacific Skipjack

Skipjack stock assessments have been carried out using MULTIFAN-CL modelling of the population dynamics of the stock and the fisheries operating on it, using maximum posterior likelihood estimates to fit a range of parameters. The model is age and spatially structured, in the case of skipjack with 16 quarterly age-classes, and 5 spatial regions in the 2016 assessment. It uses catch, effort, size composition, and tagging data in the model, grouped into 23 fisheries and quarterly time periods from 1972 through 2015 These fisheries, or fleets, are modelled with respect to their selectivity by size, areas fished and standardized catch per effort. The assessment accounts for the major features of the species biology and the fishery, 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.	

Western Pacific Bigeye

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

Western Pacific Yellowfin

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

Western Pacific Skipjack

The stock assessments have been used to estimate MSY-related 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.

Western Pacific Bigeye

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. However, although the uncertainty is accounted for as probabilities, it is not presented in a way that can be used for decision making; for example in making clear risk-based decisions (e.g. “Kobe II matrices”). This prevents the fishery meeting SG100.

Western Pacific Yellowfin

Alternative model structures for MFCL have been applied to the available data and results are reported as a range of outcomes resulting from the model structures. This is useful for evaluating uncertainty relative to general determinations of stock status, which meets SG80.

The stock assessment addresses uncertainties and biases in input datasets (e.g. via stratification in space and time, and via CPUE standardisation using GLM). It also includes a detailed exploration of uncertainties in the model assumptions, via sensitivity analyses for various different model options (tag mixing, natural mortality, steepness, different treatment of the CPUE dataset). The model uses a statistical framework to estimate states and parameters conditional on a suite of structural assumptions and the data. The model outputs the best (Maximum Posterior Density) point estimates, along with estimates of uncertainty for desired parameters. The most recent assessment emphasizes the uncertainty in point estimates conditional on a broad range of alternative fixed assumptions, rather than the parameter estimation uncertainty estimated conditional on individual models. As a consequence, the probabilistic stock status statements do not have the classical probabilistic interpretation, but are actually expected to provide a broader and more realistic representation of uncertainty than classical approaches. Therefore SG100 is met.

Western Pacific Skipjack

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 now presented to assist risk-based decisions. Thus, 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.

Western Pacific Bigeye

Although the stock assessment process is rigorous, including reviews of data and models through pre-assessment workshops, it is not clear that a full range of possibilities have been considered. The most recent assessment in 2014 has not yet been shown to be robust, and it is not clear that all alternative hypotheses about this stock have been explored. SG100 is not yet met.

Western Pacific Yellowfin

The assessment and its alternatives provide results that are robust to general determinations of stock status, it is unclear whether these estimates will be accurate enough for the harvest control rules that might be implemented in the future. Evidence shows that the set of hypotheses that have been considered in sensitivity analyses, for example, cover all likely possibilities. This meets SG100.

Western Pacific Skipjack

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 to general determinations of stock status. Quantiles of management statistics were provided but these are not well determined. 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.

Western Pacific Bigeye

The assessment is subject to internal peer review through the WCPFC SC and preparatory workshops are 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. Although there has been no specific external review for the 2014, it incorporates recommendations from the 2012 external review. Overall this process meets the requirement for SG100.

Western Pacific Yellowfin

The assessment is subject to internal peer review through the WCPFC SC. In addition, the assessment was subject to an external peer review in 2009 and relevant guidance was used from the 2012 external review directed at bigeye. Overall, the assessment process is using external and internal review to improve the stock assessment, which attains SG100.

Western Pacific Skipjack

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.

Scoring for 1.2.4

Western Pacific Bigeye:

All SG60 and SG80 are met, and 2 out of 4 SG100 are met. 90

Western Pacific Yellowfin:

All SG60 and SG80 and SG100. 100

Western Pacific Skipjack:

All SG60 and SG80 are met, and 3 out of 4 SG100 are met. 95

References

Davies, N., Harley, S., J. Hampton, S. McKechnie. 2014. Stock assessment of yellowfin tuna in the central and western Pacific Ocean. WCPFC-SC10-2014/SA-WP-04

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WCPFC. 2016. Twelfth Regular Session of the Scientific Committee. Bali, Indonesia, 3-11 August 2016. Summary Report.

IATTC Stocks

1.1 OUTCOME

1.1.1 Stock Status: The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing.

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.

Eastern Pacific Bigeye

An updated assessment (2015) estimated an increase in biomass between 2005 and 2009 in response to management measures, followed by a decline in biomass that could be driven by below-average recruitment levels, coinciding with La Niña events. Subsequently, small increases in spawning biomass occurred for 2013-2015. Stock projections at the 2013-2015 average level of fishing mortality indicates that the spawning biomass relative to the unfished level will continue rebuilding and stabilize at about 0.22, above the level corresponding to MSY (0.21).

The biomass is estimated to be equal to that at MSY. The fishing mortality rate is 95% of that which would produce MSY.

IATTC interim limit reference points (LRP) have been proposed of 0.38 B_{MSY} and 1.6 F_{MSY}, which in the stock assessment model corresponded to a 50% reduction in recruitment from its average unexploited level based on a conservative steepness value (h = 0.75) for the Beverton-Holt stock-recruitment relationship. However, it is not clear that the IATTC LRP is precautionary enough for use as the MSC PRI required for this performance indicator, as the IATTC LRP is effectively 7.6% B_0. The default MSC PRI should be 75% B_{MSY} if B_{MSY} is estimated below 27% B_0 as in the base case assessment, or 50% B_{MSY} if above 27% B_0 as in the precautionary sensitivity analysis assessment (see MSC CR2.0 SA2.2.3). For either case, this suggests a default value of 15% B_0 for the PRI, rather than using the IATTC LRP. Note also that MSC guidance suggests this would apply to “some highly productive stocks”, but in this case the low B_{MSY} may be the result of selectivity patterns rather than productivity of the stock, so it is also unclear whether the analytical determination of MSY is consistent with the MSC definition. The base case assessment suggests that the stock is above this level, although the precautionary sensitivity analysis suggests the stock is on the MSC PRI. The net result suggests the stock is likely above MSC PRI, meeting SG60. But there is additional information where the most recent years of the time series of recruitment estimates are greater than that if there were no fishing, suggesting that the stock must be above the PRI. Recruitment has fluctuated without trend for the last two decades at a level higher than the long-term average. About 80% of the recruitments during the last two decades fell above the long-term average. These events support the conclusion that the current status has been highly likely to be above a level where recruitment is impaired. This supports a determination of SG80.

However, there is uncertainty in a number of parameters such as a steepness. The assessment elucidated a number of these factors and evaluated their impact. The results indicate areas of uncertainty such that it cannot be said that there is a high degree of certainty that recruitment is not being impaired. Therefore, SG100 is not met.

Eastern Pacific Yellowfin

Recent EPO yellowfin assessments use an integrated statistical age-structured stock assessment model (Stock Synthesis v3) to assess the tuna stock. The stock assessment of yellowfin in the EPO results in estimates of spawning biomass, yield per recruit, MSY and other parameters.

The latest assessment indicates that recent fishing mortality rates (*F* for 2013-15) are at or slightly below the MSY level (F 98% of that whish would produce MSY. and the recent levels of spawning biomass (*S*) are estimated to be below that level (Srecent/SMSY = 95%) where Smsy is estimated to be 27% of S0. Recruitment during the last decade has fluctuated without trend at a level that is somewhat lower than the long-term average.

The default MSC guidance is a limit of 50% S_{MSY} (CR2.0 SA2.2.3), which is 13%$S_{0,}$, whereas the current level is about 26% of S_0. IATTC established an interim limit reference points (LRP) of 0.38 B_{MSY} and 1.6 F_{MSY}, neither of which are approached by current conditions.

Therefore, it is “highly likely” that the stock is above PRI, meeting SG80. However, the available evidence is insufficient to state this with a high degree of certainty due to the limited sensitivity runs, for example, and that recruitment levels over the last decade are lower than the long-term average so SG100 is not met.

Eastern Pacific Skipjack

The most recent stock assessment utilized alternative models with varying results. Therefore, the scientists focused on eight data- and model-based indicators were updated and used to evaluate relative status in 2014. These consist of catch, 2 CPUE indices, effort, average catch weight, exploitation rate, recruitment and biomass. The average weight of skipjack declined from 2000 to 2009 with the 2009 weight being below the reference level. It increased in subsequent years and then declined again in 2015. This suggests an increase in the fishing mortality rate with some stabilization recently. This conclusion is generally supported by the trajectory of effort and estimates of relative exploitation rate. Relative biomass in 2015 is at an all-time high. This appears to have been the result of a shift in recruitment to higher levels in the late 1990s; it is now fluctuating around that high level. Following the biomass increase, catches have risen to high levels. This suggests an overall increase in fishing mortality rate, but, fishing has appeared to level off recently.

In 2016, IATTC adopted HCR for tropical tunas based on the interim target and limit reference points adopted in 2014 (Resolution C-16-02). So effectively, limit reference points have been established. However, these are not well linked to the stock indicators, so it is hard to see how they can be implemented as part of the harvest strategy in practice.

However, indicators of recruitment suggest these have remained above the long-term average since 2000. None of the indicators detect any adverse consequences from current levels of exploitation, except smaller average weight, which is very unlikely to indicate any effect on 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.

Eastern Pacific Bigeye

The scientific advice is structured around estimates relative to MSY. This is consistent with the recently approved Resolution C-16-02, whereby in 2016, IATTC adopted HCR for tropical tunas based on the interim target and limit reference points adopted in 2014 (Resolution C-16-02).

The 2015 assessment indicates recent fishing mortality rates are estimated to be slightly below the level corresponding to MSY (F/F_{MSY}=95%), but 2015 levels of spawning biomass are estimated to be around 95% B_{MSY} for the base case model. However, as previously noted, it is not clear that B_{MSY} is consistent with MSC definitions, and in the base case no stock-recruitment relationship is assumed (i.e. h=1.0), which is not precautionary. For the more precautionary sensitivity analysis, the stock is determined to be 81% B_{MSY}, which is below the target level.

Thus, there is a significant chance that the stock is below the MSY reference point, so SG80 is not met.

Eastern Pacific Yellowfin

The scientific advice is structured around estimates relative to MSY. This is consistent with the recently approved Resolution C-16-02, whereby In 2016, IATTC adopted 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 also triggers the establishment of additional management measures to reduce fishing mortality and rebuild the stock.

The recent fishing mortality rates on EPO yellowfin are lower than those corresponding to the MSY (F is approximately 98% of F_{MSY}). The spawning biomass has recently been determined to be slightly below the level corresponding to MSY: S_{2015}=27%B_0 and S_{MSY}=27%S_0. Thus, the stock may be considered overfished thus not meeting SG80. A period of overfishing has occurred (relative to F_{MSY}), but was relatively short in duration (approximately five years in the mid-2000s). However, the stock cannot be considered to be fluctuating around its target reference point over recent years because S has been below S_{MSY} since 2010, while has been above F_{MSY} since 2007. In addition, sensitivity analyses suggest higher

exploitation and lower biomass levels are a reasonable possibility. The situation is borderline, but overall it is precautionary to say that the stock is not 'fluctuating around' the MSY level as yet. Hence, SG80 is not met

Eastern Pacific Skipjack

In 2016, IATTC adopted 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 also triggers the establishment of additional management measures to reduce fishing mortality and rebuild the stock. However due to the lack of a credible stock-recruitment relationship an estimate of MSY-related quantities cannot be made. As the stock assessments and reference point for skipjack are uncertain, alternative methods were used to assess the stock in 2012 in addition to the indicators that were previously used to assess the stock in 2004. These stock indicators have been maintained into 2014.

The main concern with the skipjack stock was the constantly increasing exploitation rate, but this has levelled off in recent years, and the indicators do not indicate any adverse consequence of exploitation rates so far. The average weight was below its lower reference level in 2009, which could be a consequence of overexploitation, but could also be caused by recent recruitments being greater than past recruitments or changes in selectivity. The tagging analysis for regions with good data and an alternative SEAPODYM model do not indicate a significant risk to the stock.

However, any continued decline in average length is a concern and, combined with levelling off of catch and CPUE, may indicate that the exploitation rate is approaching, or above, the level associated with MSY. Given the uncertainties with the available analyses, and at least one out of 8 indicators could indicate the stock is below the MSY level, the SG80 but not the SG100, is met.

Scoring for 1.1.1

Eastern Pacific Bigeye: All SG60 and 1 of 2 SG80. 70
Eastern Pacific Yellowfin: All SG60 and 1 of 2 SG80. 70
Eastern Pacific Skipjack: All SG60 and SG80, but no SG100, are met. 80

References

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1.1.2 Stock Rebuilding: Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe.

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.

Eastern Pacific Bigeye

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-year period). Projections in the stock assessment indicated that S/Smsy would stabilize at 0.22 under current fishing rates, while it is currently at 0.21. Thus, the stock is marginally below Smsy and is projected to recover quickly without changes in fishing rates. This meets SG60. The recovery time frame has not been specified but the current fishing rates can be related to the shortest practical timeframe; thus SG100 is met.

Eastern Pacific Yellowfin

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 5year period). The stock is only marginally below Smsy (Srecent/Smsy=0.95; Fmult=1.02) and is projected to recover quickly without changes in fishing rates. This meets SG60. The recovery time frame has not been specified but the current fishing rates can be related to the shortest practical timeframe; thus SG100 is 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**.

Eastern Pacific Bigeye

No rebuilding time frame is specified by the management authority, but projections indicated that no further actions to modify fishing will allow the stock to recover to S_{MSY} quickly. The trajectory of the spawning stock increase in the last few years is evidence of this conclusion. Thus, SG60 and SG80 are met. However, it is not 'highly likely'. Therefore, SG100 is not met.

Eastern Pacific Yellowfin

No rebuilding time frame is specified by the management authority, but projections indicated that no further actions to modify fishing will allow the stock to recover to Smsy quickly. The trajectory of the spawning stock increase in the last few years is evidence of this conclusion. Thus, SG60 and SG80 are met. However, it is not highly likely (e.g. a sensitivity analysis with a more precautionary h does not project recovery). Therefore, SG100 is not met.

Scoring for 1.1.2

Eastern Pacific Bigeye: All SG60, SG80 and 1 of 2 SG100. 90
Eastern Pacific Yellowfin: All SG60, SG80 and 1 of 2 SG100. 90

References

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1.2 HARVEST STRATEGY (MANAGEMENT)

1.2.1 Harvest Strategy: There is a robust and precautionary harvest strategy in place.

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.

Eastern Pacific Bigeye

The harvest strategy objective is to maintain stocks at a level that can support MSY. The status of the stock relative to MSY is monitored by the scientific staff of IATTC and is reported to the Commission. The Commission then can respond to the scientific information by developing resolutions for management actions to be implemented by the member states. Effectively, the MSY criterion has been used as the target for many years.

Bigeye tuna are distributed across the Pacific Ocean, but the bulk of the catch is made closer to the eastern and western shelf areas. Bigeye are not often caught by purse seiners in the EPO north of 10ºN, but a substantial portion of the longline catches of bigeye in the EPO is made north of that parallel. Bigeye tuna do not generally move long distances relative to other tunas and current information indicates minimal net movement between the EPO and the western and central Pacific Ocean. Based upon this information, management of Pacific Bigeye as separate stocks can be considered to be precautionary.

The assessment and management is conducted as if there were a single stock in the EPO. Analyses have shown that the results are insensitive to the spatial structure of the analysis and harvest strategies of Pacific-wide bigeye stocks are consistent.

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.

This is a harvest strategy that is responsive to the state of the stock, meeting SG80.

While this strategy is just being implemented, its effectiveness has not yet been demonstrated. Nevertheless, the harvest strategy was designed responsive to the state of the stock and to achieve stock management objectives. SG100 is met

Eastern Pacific Yellowfin

The harvest strategy objective is to maintain stocks at a level that can support MSY. The status of the stock relative to MSY is monitored by the scientific staff of IATTC and is reported to the Commission. The Commission then can respond to the scientific information by developing resolutions for management actions to be implemented by the member states. While formal targets and limits have not been adopted by the IATTC, the MSY criterion is effectively used as the target.

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.

This is a harvest strategy that is responsive to the state of the stock, meeting SG80.

While this strategy is just being implemented, its effectiveness has not yet been demonstrated. Nevertheless, the harvest strategy was designed responsive to the state of the stock and to achieve stock management objectives. SG100 is met

Eastern Pacific Skipjack

The harvest strategy objective is to maintain stocks at a level that can support MSY. The status of the stock relative to MSY is monitored by the scientific staff of IATTC and is reported to the Commission. The Commission then can respond to the scientific information by developing resolutions for management actions to be implemented by the member states. While formal targets and limits have not been adopted by the IATTC, the MSY criterion is effectively used as the target.

EPO skipjack relies on surrogate indicators rather than direct estimates of MSY-related quantities. The harvest strategy is responsive through the feedback advice to the Commission with which the Commission develops appropriate management actions. For example, current evidence indicates that EPO SKJ fluctuating around its surrogate reference level.

In 2016, IATTC adopted 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 also triggers the establishment of additional management measures to reduce fishing mortality and rebuild the stock. This meets SG80.

However, there are limitations on the determination of MSY standards. Indicators have been chosen to use as surrogates. Because of this and that the ability to achieve MSY or a more precautionary exploitation level has not been demonstrated as of yet, so 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.

Eastern Pacific Bigeye

The harvest strategy is now well-defined as was indirectly elucidated through Resolution C-16-02; but has not yet been in place long enough to have been evaluated. There is evidence that the stock is capable of meeting the MSY objectives as evidenced by the history of surrogate status indicators. However, the strategy is not fully evaluated as being clearly able to maintain stocks at target levels. This meets SG80, but not SG100.

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Eastern Pacific Yellowfin

The harvest strategy is now well-defined as was indirectly elucidated through Resolution C-16-02; but has not yet been in place long enough to have been evaluated. There is evidence that the stock is capable of meeting the MSY objectives as evidenced by the history of surrogate status indicators. However, the strategy is not fully evaluated as being clearly able to maintain stocks at target levels. This meets SG80, but not SG100.

Eastern Pacific Skipjack

The harvest strategy is now well-defined as was indirectly elucidated through Resolution C-16-02; but has not yet been in place long enough to have been evaluated. There is evidence that the stock is capable of meeting the MSY objectives as evidenced by the history of surrogate status indicators. However, the strategy is not fully evaluated as being clearly able to maintain stocks at target levels. This meets SG80, but not SG100.

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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.		

Eastern Pacific Bigeye

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.

Eastern Pacific Yellowfin

The harvest strategy is 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.

Eastern Pacific Skipjack

Monitoring is adequate to determine whether the harvest strategy is working. The strategy consists of limiting catches at around 2005 level or lower. Data are collected to estimate these quantities. Also the stock assessment reports best estimates of biomass and indicators are monitored annually, indicating broadly 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.

Eastern Pacific Bigeye

IATTC harvest strategies have evolved for over a decade. In this process, different methodologies have been tested to assess the status of the different stocks under the regulatory mandate of the Commission and to develop status indicators. The IATTC staff have periodically reviewed the methods so in that sense there have been reviews. Undoubtedly, this will continue when examining the strategy implied by 16-02.

There is not yet evidence of formal review of the harvest strategy. Although the harvest strategy is reasonable, there is inadequate information available to indicate what improvements might be possible, so SG100 is not met.

Eastern Pacific Yellowfin

IATTC harvest strategies have evolved for over a decade. In this process, different methodologies have been tested to assess the status of the different stocks under the regulatory mandate of the Commission and to develop status indicators. The IATTC staff have periodically reviewed the methods so in that sense there have been reviews. Undoubtedly, this will continue when examining the strategy implied by 16-02.

There is not yet evidence of formal review of the harvest strategy. Although the harvest strategy is reasonable, there is inadequate information available to indicate what improvements might be possible, so SG100 is not met.

Eastern Pacific Skipjack

IATTC harvest strategies have evolved for over a decade. In this process, different methodologies have been tested to assess the status of the different stocks under the regulatory mandate of the Commission and to develop status indicators. The IATTC staff have periodically reviewed the methods so in that sense there have been reviews. Undoubtedly, this will continue when examining the strategy implied by 16-02.

There is not yet evidence of formal review of the harvest strategy. Although the harvest strategy is reasonable, there is inadequate information available to indicate what improvements might be possible, so SG100 is not met.

Scoring for 1.2.1

Eastern Pacific Bigeye: All SG60 and SG80, and 1 of 3 SG100, are met. 85
Eastern Pacific Yellowfin: All SG60 and SG80, and 1 of 3 SG100, are met. 85
Eastern Pacific Skipjack: All SG60 and SG80, but no SG100, are met. 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 (USA). 09-13 May 2016. SAC-07-05a

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Minte-Vera, C.V., Aires-da-Silva, A. Maunder, M.N. 2016. Status of Yellowfin 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 (USA). 09-13 May 2016. SAC-07-05b

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules (HCRs) in place.

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.

Eastern Pacific Bigeye

In 2016, IATTC adopted 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 also triggers the establishment of additional management measures to reduce fishing mortality and rebuild the stock. This meets SG60, and SG80. SG100 is not met, because the MSY level is not particularly precautionary (see 1.1.1).

Eastern Pacific Yellowfin

In 2016, IATTC adopted 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 biomnass are approaching the corresponding limit reference point with a probability of 10% or greater, the HCR also triggers the establishment of additional management measures to reduce fishing mortality and rebuild the stock. This meets SG60, and SG80.

Eastern Pacific Skipjack

In 2016, IATTC adopted 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 also triggers the establishment of additional management measures to reduce fishing mortality and rebuild the stock. This meets SG60, and 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.

Eastern Pacific Bigeye

The control rule has now been adopted and it will now be possible to evaluate it as it is implemented. The HCR includes provisions to reduce fishing mortality if biomass is below reference points. In that sense the rule is robust to major uncertainties since the rule itself is defined to be precautionary. This meets SG80. But it is not demonstrated that it addresses a wide range of uncertainties or that there is evidence that it is robust to these uncertainties. SG100 is not met.

Eastern Pacific Yellowfin

The control rule has now been adopted and it will now be possible to evaluate it as it is implemented. The HCR includes provisions to reduce fishing mortality if biomass is below reference points. In that sense the rule is robust to major uncertainties since the rule itself is defined to be precautionary. This meets SG80. But it is not demonstrated that it addresses a wide range of uncertainties or that there is evidence that it is robust to these uncertainties. SG100 is not met.

Eastern Pacific Skipjack

The control rule has now been adopted and it will now be possible to evaluate it as it is implemented. The HCR includes provisions to reduce fishing mortality if biomass is below reference points. In that sense the rule is robust to major

uncertainties since the rule itself is defined to be precautionary. Howver, in thecase This meets SG80. But it is not demonstrated that it addresses a wide range of uncertainties or that there is evidence that it is robust to these uncertainties. 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.

Eastern Pacific Bigeye

With the advent of Resolution C-16-02 there is now evidence of an established set of tools) which are appropriate for achieving desired exploitation rates. C-16-02 implies that harvest will be limited based upon the rule and that fisheries will be managed within those limits. Available evidence, through existing management tools and their implementation over history, suggest these tools are appropriate and likely to be effective. This meets SG60 and SG80.

However, there is not enough experience yet with the HCR to conclude the efficacy. Therefore, SG100 is not met.

Eastern Pacific Yellowfin

With the advent of Resolution C-16-02 there is now evidence of an established set of tools) which are appropriate for achieving desired exploitation rates. C-16-02 implies that harvest will be limited based upon the rule and that fisheries will be managed within those limits. Available evidence, through existing management tools and their implementation over history, suggest these tools are appropriate and likely to be effective. This meets SG60 and SG80.

However, there is not enough experience yet with the HCR to conclude the efficacy. Therefore, SG100 is not met

Eastern Pacific Skipjack

With the advent of Resolution C-16-02 there is now evidence of an established set of tools) which are appropriate for achieving desired exploitation rates. C-16-02 implies that harvest will be limited based upon the rule and that fisheries will be managed within those limits. Available evidence, through existing management tools and their implementation over history, suggest these tools are appropriate and likely to be effective. This meets SG60 and SG80.

However, there is not enough experience yet with the HCR to conclude the efficacy. Therefore, SG100 is not met

Scoring for 1.2.2

Eastern Pacific Bigeye: All SG60 and SG80 are met. 80
Eastern Pacific Yellowfin: All SG60 and SG80 are met. 80
Eastern Pacific Skipjack: All SG60 and SG80 are met. 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 (USA). 09-13 May 2016. SAC-07-05a

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1.2.3 Information / monitoring: Relevant information is collected to support the harvest strategy.

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.

Eastern Pacific Bigeye

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 CPUE data from these fleets. There is a long history of biological and environmental research on EPO bigeye, and considerable environmental information that is not explicitly used in the harvest strategy. These data are sufficient to monitor status and to monitor catches 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 the SG80, but not SG100.

Eastern Pacific Yellowfin

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.

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 the SG80, but not SG100.

Eastern Pacific Skipjack

Sufficient information (on stock structure, stock productivity, fleet composition), is available to monitor and status through a suite of indicators, covering stock abundance and exploitation, which are regularly monitored at a level of accuracy and coverage consistent with the harvest strategy. Skipjack biology is reasonably well-understood, and there is considerable environmental data which is not directly used in the harvest strategy. 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.

Eastern Pacific Bigeye

Stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with best-practice harvest control rules. In addition, there is observer coverage which provides data for discard estimates. However, data from some fleets are incomplete, but in general there is good information on fishery removals from the stock.

Substantial amounts of information are collected for the stock assessment, including data on retained catches, discards, indices of abundance (CPUE), and the size compositions of the catches of the various fisheries. However, sampling and reporting of the catch and effort statistics from some fleets is limited and thus there is not a high degree of certainty about all information needed for a HCR. This meets SG80, but not SG100.

Eastern Pacific Yellowfin

Stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with likely and best practice HCRs, and indicators of catch and effort are available and monitored with sufficient frequency to

support catch or effort-related HCRs. In addition, there is observer coverage which provides data for discard estimates. However, data from some fleets are incomplete. In general, there is good information on fishery removals from the stock.

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 which are sufficient for any appropriate HCR. However, sampling and reporting of the catch and effort statistics from some fleets is limited and thus there is not a high degree of certainty about all information needed for the HCR. This meets SG80, but not SG100.

Eastern Pacific Skipjack

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. These have been used to define stock status indicators which are used to provide management advice. However, sampling and reporting of the catch and effort statistics from some fleets is limited and thus there is not a high degree of certainty about all information needed for an HCR. This meets SG80, but not 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.	

Eastern Pacific Bigeye

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.

Eastern Pacific Yellowfin

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.

Eastern Pacific Skipjack

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.

Scoring for 1.2.3

Eastern Pacific Bigeye: All SG60 and SG80, but no SG100, are met. 80
Eastern Pacific Yellowfin: All SG60 and SG80, but no SG100, are met. 80
Eastern Pacific Skipjack: All SG60 and SG80, but no SG100, are met. 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 (USA). 09-13 May 2016. SAC-07-05a

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1.2.4 Assessment of stock status: There is an adequate assessment of the 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.

Eastern Pacific Bigeye

Recent EPO BET assessments have used an integrated statistical age-structured stock assessment model (Stock Synthesis v3) to assess the tuna stock. The most recent assessment was in 2015. The status of the stock of bigeye in the EPO results in estimates of spawning biomass, yield per recruit, MSY and other parameters.

This model is the same as that used in the previous full assessment conducted in 2013, which included several improvements, including significant improvements in the growth model and weighting among different data sources and rejection of some of the CPUE series not thought to represent abundance. The assessment is able to make use of all available data.

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 main features of the biology and distribution bigeye. This meets SG100.

Eastern Pacific Yellowfin

An integrated statistical age-structured stock assessment model (Stock Synthesis Version 3.23b) was used in the assessment. 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. Various data were updated for the new assessment in 2013, but the approach remains very similar to previous assessments. 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.

Eastern Pacific Skipjack

The last accepted full assessment of EPO skipjack was done in 2004 using an age-structured catch-at-length analysis (A-SCALA). It was generally believed this modelling approach provided unrealistic estimates for biomass and fishing mortality, so a simpler approach has been used since then. This consists of data- and simple model-based indicators, which have been used to monitor the status of the stock. The major features of the biology and distribution of the fishery and population were accounted for in the assessment model, but more recent assessments have depended on a simpler indicator based approach.

Eight data- and model-based indicators have been used to evaluate relative status since the last full assessment. These were updated and reported in 2014. Given the likely exploitation level and risk for this stock, this is appropriate and allows the implementation of harvest control rules, meeting SG80. However, it is not clear that the current method to monitor stock status is taking into account major features of the 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.	

Eastern Pacific Bigeye

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.

Eastern Pacific Yellowfin

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.

Eastern Pacific Skipjack

The primary monitoring method is now based on relative changes in 8 indicators. These have reference levels based on the 5th and 95th percentiles of historical values. Together these are used as proxy indicators of stock trends over time. The trends date back to the 1970s and suggest the stock status is stable. A number of indicators suggest improving status, although average weight has declined. A full stock assessment was conducted in 2012, but was rejected as did not provide a reliable assessment. Although generic historical reference points are used, there is no formal link to MSY or an MSY proxy, which is required by the MSC standard. This meets SG60, but not 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.

Eastern Pacific Bigeye

The assessment reports trends and projections of quantities with confidence intervals. Therefore, estimation uncertainty is being evaluated. Additionally, model uncertainty is being evaluated through alternative hypotheses about productivity through the stock recruitment relationship and by testing sensitivity of parameters. This has been done as the stock assessment has developed and improved. Especially sensitive are the assumptions made about the "steepness" parameter of the stock recruitment relationship, and the historic period of the bigeye exploitation used in the assessment. All of these alternative assumptions and others have tested in assessments.

However, probabilistic statements of status are not given in summary reports and are not explicitly used in decision-making. These can be computed, but they are not part of the current format for scientific advice (Fishery Status Reports). This meets SG80, but not SG100.

Eastern Pacific Yellowfin

The assessment reports trends and projections of quantities with confidence intervals. Therefore, estimation uncertainty is being evaluated. Additionally, model uncertainty has been evaluated through alternative hypotheses about productivity through the stock recruitment relationship and by testing sensitivity of parameters (steepness, mortality rates). However, probabilistic statements of status are not given in summary reports. These could be computed, but they are not part of the current format for scientific advice (Fishery Status Reports), so the uncertainty is not well reported. This meets SG80, but not SG100.

Eastern Pacific Skipjack

The assessment reports trends with confidence intervals. Therefore, estimation uncertainty is being evaluated. Additionally, model uncertainty is being evaluated through alternative hypotheses about productivity through the stock recruitment relationship and by testing sensitivity of parameters. Sensitive assumptions are noted and tested. However, a full assessment has not been conducted since 2004. Therefore, status determinations have been relying solely on the indicators. The infrequent full assessment is an additional source of uncertainty.

Probabilistic statements of status are not given in summary reports. It is unlikely they can be computed given the current data situation. This meets SG80, but not 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.

Eastern Pacific Bigeye

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 past assessments 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). With some issues having been resolved, the sensitivities for the most recent assessment were limited to one, making it difficult to claim that alternative hypotheses have been rigorously explored, failing SG100.

Eastern Pacific Yellowfin

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). However, reported sensitivity and uncertainty was very limited, so the robustness of results and full exploration of approaches was not clearly demonstrated, so SG100 is not met.

Eastern Pacific Skipjack

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. 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.

Eastern Pacific Bigeye

The stock assessment is subject to review through internal review processes and periodic external review processes. Model structure, data and research are examined for each assessment, the last published external review being from 2010. Although there has been no recent review published, the model is similar with improvements based on recommendations, meeting SG100.

Eastern Pacific Yellowfin

The stock assessment is subject to review through internal review processes and periodic external review processes. The last external review of its assessment of yellowfin tuna was held in October 2012. Model structure, data and research are examined for each assessment, and there has been a response to recommendations. This meets SG100.

Eastern Pacific Skipjack

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. This only meets SG80.

Scoring for 1.2.4

Eastern Pacific Bigeye

All SG60 and SG80 are met, and 2 out of 4 SG100 are met. 90

Eastern Pacific Yellowfin:

All SG60 and SG80 are met, and 2 out of 4 SG100 are met. 90

Eastern Pacific Skipjack:

All SG60 and SG80, but no SG100, are met. 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 (USA). 09-13 May 2016. SAC-07-05a

IATTC. 2016. Tunas, Billfishes and other pelagic species in the Eastern Pacific Ocean In 2015. Inter-American Tropical Tuna Commission. La Jolla, California, 2016

Maunder, M. 2014. Updated Indicators of Stock Status for Skipjack Tuna in the Eastern Pacific Ocean. Inter-American Tropical Tuna Commission Scientific Advisory Committee Fifth Meeting. La Jolla, California (USA). 12-16 May 2014. SAC-05-09a.

Maunder, M.N. and Harley, S.J. 2005. Status of skipjack tuna in the eastern Pacific Ocean in 2003 and outlook for 2004. Inter-Amer. Trop. Tuna Comm., Stock Assessment Report, 5: 109-167.

Minte-Vera, C.V., Aires-da-Silva, A. Maunder, M.N. 2016. Status of Yellowfin 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 (USA). 09-13 May 2016. SAC-07-05b

Sibert, J.R., Harley, S.J., Ianelli, J.N. Punt, A.E. 2012. External Review of IATTC Bigeye Tuna Assessment. 3-7 May 2010, La Jolla, California. IATTC Special Report 19.

IATTC/WCPFC Joint Stocks

1.1 OUTCOME

1.1.1 Stock Status: The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing.

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.

North Pacific Albacore

Estimates from the 2014 stock assessment of total stock biomass (age-1 and older) and female spawning biomass (SSB) show a long term decline from the early 1970s to 1990 followed by a recovery through the 1990s and subsequent fluctuations without trend in the 2000s. SSB was estimated the terminal year of the assessment (2012) and stock depletion is estimated to be 35.8% of unexploited SSB.

The International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC) believed that north Pacific albacore recruitment is influenced by changes in environmental conditions and the stock-recruitment relationship. There are apparent trends in recruitment, but these may not be easily linked to stock size. No limit reference point has been adopted and analytical MSY estimates appear low compared to MSC default values. Therefore, a value of $F_{20\%}$ is used as an approximate PRI here, which gives a median biomass around 54000t. This is well below the 2012 SSB estimate of approximately 110,000t, with 2012 fishing mortality also below the $F_{20\%}$. The scientific working group also stated that the stock is likely to be above any candidate reference points. Therefore, it appears that there is a high degree of certainty that the stock is above its PRI, meeting SG100.

South Pacific Albacore

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; recent levels of spawning potential are most likely above the level which will support the MSY, and above 20%SBF=0; recent levels of fishing mortality are lower than the level that will support the MSY. SSBlatest (2013) is 41% of SSB0 with sensitivities ranging from 37 to 55%. Fcurrent (2009-2012) is 39% of FMSY (30-59%).

Therefore, it appears that there is a high degree of certainty that the stock is above its PRI, meeting SG80SG100.

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.

North Pacific Albacore

The stock is expected to fluctuate around the long-term median SSB in the foreseeable future given average historical recruitment levels and constant fishing mortality at $F_{2010\text{-}2012}$. Current $F_{2010\text{-}2012}$ is about 72% of $F_{SSB\text{-}ATHL}$. $F_{SSB\text{-}ATHL}$ is defined as the fishing mortality that will maintain SSB above the average of the ten historically lowest estimated SSB levels with a probability of 50% during a 25-yr projection period, so fishing mortality below this level might be considered precautionary. SSB in 2012 was also estimated as above the median SSB expected with $F_{SSB\text{-}ATHL}$.

No target reference point has been selected. SSB at MSY was estimated to be around 50000t, which is at the lower end of reference points reviewed and close to $F_{20\%}$ used as a PRI above. The stock was estimated to be well above this point in 2012. It is unclear what would be an appropriate target in this stock consistent with a precautionary definition of MSY. The scientific working group conclude that there is little evidence that fishing has reduced SSB below reasonable candidate biomass-based reference points.

Given the relative good status of the stock, it seems likely it has been at or above any candidate MSY reference point, attaining SG100 with a high degree of certainty.

South Pacific Albacore

The conclusions of the assessment were that: current catch is either at or less than MSY; recent levels of spawning potential are most likely above the level which will support the MSY, and above 20%SBF=0; recent levels of fishing mortality are lower than the level that will support the MSY. SSBlatest(2013) is 41% of SSB0 with sensitivities ranging from 37 to 55%. Fcurrent(2009-2012) is 39% of FMSY (30-59%).The median estimate of MSY from the structural sensitivity analysis (76,800 t) was comparable to the recent levels of (estimated) catch from the fishery (average 2011-2015 77817t). Longline catch rates are declining, and catches over the last 10 years have been at historically high levels and are increasing. These estimates of stock status and trends are similar to the previous assessments of 2009 and 2012.

Precautionary “steepness” values of 0.65 and steepness of 0.95 are included in the sensitivity analyses to compare to the reference case of 0.8. Low MSY reference point values are more dependent model structural assumptions and are not necessarily precautionary target reference points.

Nevertheless, the average stock status 2009-2012 estimated relative to the unexploited state was $SB_{latest}/SB_{F=0}$ = 0.4.

Therefore, the current stock status is high and well above any precautionary MSY biomass reference point, so the SG100 is met.

Scoring for 1.1.1

North Pacific Albacore: All SG60, SG80 and SG100 are met. 100
South Pacific Albacore: All SG60, SG80 and SG100 are met. 100

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)

ISC. 2014. Stock assessment of albacore in the North Pacific Ocean in 2014. Report of the Albacore Working Group Stock Assessment Workshop. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean. 16 - 21 July 2014 Taipei, Taiwan. WCPFC-SC10-2014/SA-WP-12.

WCPFC SC12 Summary report of the Twelfth Regular Session of the Scientific Committee Bali, Indonesia 3-11 August 2016

1.1.2 Stock Rebuilding: Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe.

Scoring for 1.1.2

References

1.2 HARVEST STRATEGY (MANAGEMENT)

1.2.1 Harvest Strategy: There is a robust and precautionary harvest strategy in place.

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.

North Pacific Albacore

The harvest strategy for North Pacific albacore is that on the basis of scientific evidence, conservation and management measures will be employed to ensure the conservation of the stocks. Therefore, the harvest strategy is to maintain stock levels at or above the biomass which would produce MSY and to maintain effort below 2005 levels. However, the response of North Pacific albacore to oceanographic fluctuations has not allowed credible estimates of MSY to be made. Research on this has been recommended in the form of plausible priors on stock-recruitment "steepness" parameter, for which precautionary values have been tested.

Nevertheless, the observed biomass trends have been maintained above lower levels previously seen 1980s and 1990s. Therefore, the strategy has worked toward maintaining the stock and keeping fishing mortality at a precautionary level, meeting SG80. However, much of the strategy is "implied" rather than clearly defined, and it is unclear whether the harvest strategy will be fully responsive. There is also a lack of evidence that it is in any way designed, failing SG100.

South Pacific Albacore

Management of the albacore stock throughout the South Pacific is a responsibility of the Western and Central Pacific Fisheries Commission (WCPFC). Stock assessments have not been carried out on an annual basis, and the assessment has shown significant changes as it has been developed and improved. The countries responsible submit data for inclusion in the stock assessment, and compliance with this data provision is good, although uncertainties remain due to a lack of additional information required to interpret the basic data. The results from the assessment are reported to the annual Scientific Committee meeting which makes subsequent recommendations to the Commission. This in turn leads to conservation measures, which may be evaluated if required. The scientific advice produced from recent assessments has remained broadly the same.

Countries undertake to control catches mainly through effort limits and limits on capacity (i.e. number of vessels targeting albacore). Attempts are being made to estimate biomass which could lead to a national quota system based on catch or effort, or similar procedures. However, the current system is a long way from this, and management is currently conducted through a relatively crude control. Given the state of the stock, this is currently adequate. Catches 2010-2015 have fluctuated between 114000 to 143000t.

The current Conservation and Management Measure (this is a binding measure that all parties must abide by) adopted in CMM-2015-02 states that Commission Members, Cooperating Non-Members, and participating Territories (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. However, the measure specifically allows Pacific Islands to pursue a responsible level of development of their domestic albacore fisheries. An external review of the management process has been undertaken, which found the WCPFC management system was sound, but with a number of shortcomings which the authors addressed through recommendations. SG60 is met but 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.

North Pacific Albacore

As noted above, the harvest strategy is likely to work based upon the prior history of the stock's dynamics and trends in fishing mortality since implementation. This provides evidence that the stock increased after a period of low recruitment with concomitant changes in fishing mortality. The meets SG80, but the strategy has not been fully evaluated and evidence that objectives will be met remains limited, so SG100 is not met.

South Pacific Albacore

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. Given the state of the stock, currently evidence indicates controls are working and achieving conservation objectives. SG80 is met, but without fuller evaluation SG100 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.		

North Pacific Albacore

Monitoring is adequate to determine whether the harvest strategy is working, meeting SG60. Catch, CPUE and growth sampling have been adequate to support the assessment but there are limitations. The stock assessment reports estimates of biomass and fishing mortality in relation to reference points, which indicates whether management is achieving its objectives or not.

South Pacific Albacore

Monitoring is in place and stock assessments are conducted. Reviews of status and public reports are being made to allow evaluation. This is adequate given the state of the stock, and 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.

North Pacific Albacore

There has not been a formal review of the harvest strategy, although the Scientific Committee has initiated efforts to provide the scientific options for a harvest strategy. Although the harvest strategy is reasonable, there is inadequate information available to indicate what improvements might be possible. There is stated intention to evaluate the current strategy as it progresses, but this falls short of a formal review, although it may still lead to improvements. Therefore, it does not meet SG100.

South Pacific Albacore

There has not been a formal review of the harvest strategy. The harvest strategy is reasonable, there is adequate information available to indicate what improvements might be possible. There is stated intention to evaluate the current strategy as it progresses, but this falls short of a formal review, although it may still lead to improvements. Therefore, it does not meet SG100.

Scoring for 1.2.1

North Pacific Albacore: All SG60 and SG80, but no SG100, are met. 80
South Pacific Albacore: All SG60 and 1 of 2 SG80. 70

References

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. 2014. Stock assessment of albacore in the North Pacific Ocean in 2014. Report of the Albacore Working Group Stock Assessment Workshop. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean. 16 - 21 July 2014 Taipei, Taiwan. WCPFC-SC10-2014/SA-WP-12.

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)

WCPFC 2010. Conservation and Management Measure for South Pacific Albacore. Seventh Regular Session Honolulu, Hawaii, USA, 6-10 December 2010. CMM 2010-051

WCPFC, 2005. Conservation and Management Measure for North Pacific Albacore. CMM-2005-03.

WCPFC 2015. Conservation and Management Measure for South Pacific Albacore. CMM 2015-02

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules (HCRs) in place.

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.

North Pacific Albacore

There is no well-defined harvest control rule for North Pacific Albacore and therefore there is no specific plan of control if the stock size falls below a target trigger point represented by the median historical biomass. Nor is there an action specified if the biomass approaches the SSB-ATHL reference point. There is evidence of intention to reduce harvest should depletion occur (CMM-2005-03). Currently, broad resolutions to limit increases in effort have been made within the RFMOs (e.g. WCPFC CMM-2005-03, IATTC Resolutions C-05-02 and C-13-03), but it is unclear how this is to be implemented. The scope of what those actions might be is not defined. The event that catches and effort would be reduced if the stock came under increased pressure is presumed, but not assured and in that sense a rule is available, meeting SG60, but not SG80.

South Pacific Albacore

The harvest control rule is generally understood as reducing harvest when the stock approaches or falls below the maximum sustainable yield level and in that sense a rule is available. However, the precise point when action will be taken and exactly what action will be taken is not defined, but would be proposed by the Commission based on the advice of the Scientific Committee at the time. This would likely be similar to the advice currently given, which is based around controlling fishing effort and capacity. An example of this approach is provided for bigeye tuna which is more heavily exploited.

The scientific basis for decision making is well established and documented. The harvest control rules are currently based on B/B_{MSY} and F/F_{MSY} reference points. The overarching harvest control rule to maintain stocks at or above MSY has been established and codified by the Commissions. Thus, this harvest control rule is generally consistent with reference points from the assessment and the limitations of data that are inputs to the assessment, meeting SG60, but until the HCR is well-defined it cannot meet SG80. However, the WCPFC adopted a workplan for developing and implementing a harvest strategy approach that includes target reference points, harvest control rules and other elements. Therefore, the situation is expected to improve in the near future.

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.

North Pacific Albacore

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.

South Pacific Albacore

No well-defined harvest control has been selected, so SG80 cannot be met. Note also, the reference points are set at a low level for B/B_0, so evidence that the HCR is robust if based on these quantities would be required. Since the HCR is only 'available' its robustness cannot be determined.

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.

North Pacific Albacore

A level of control to respond to excess fishing pressure has not been demonstrated partially because biomass is currently in a regime of higher recruitment relative to previous decades. The relevant RFMOs have adopted a limit on increases in fishing effort (WCPFC CCM-2005-03; IATTC C-05-02). This demonstrates some evidence of appropriate controls being applied that should meet objectives, thus tools are available, at best meeting SG60. Nevertheless, there are as of yet no harvest control rules at the RFMO level and, thus, no clear evidence that the tools are effective, so SG80 is not met.

South Pacific Albacore

Tools, should they be needed, can be initiated through the IATTC and WCPFC. Currently, measures are in place in the Commissions to prevent increases of fishing effort on albacore, as defined by the Conservation and Management Measure WCPFC-CMM-2015-02. Comparable actions have been taken by IATTC and WCPFC for other species (such as yellowfin and bigeye tunas), and evidence exists that some control is being exerted over the exploitation of these stocks.

Recent albacore catch have been sustainable and the current advice is to maintain the harvest at that level which appears to have been successful. However, in the case of bigeye tuna, where fishing mortality is considered to be above the MSY level, fishing mortality is being reduced at best only slowly and the lack of a well-defined harvest control rule is apparent.

The harvest control is consistent with the aims of the harvest strategy standard and indicates that the exploitation rate will be reduced once the stock approaches B_{MSY}. Therefore, it can be inferred that tools are available meeting SG60. However, the lack of a well-defined harvest control rule prevents assessment of how precautionary it is or whether current tools are adequate in applying the rule, so the performance indicator is unable to meet SG80.

Scoring for 1.2.2

North Pacific Albacore: All SG60, but no SG80, are met. 60
South Pacific Albacore: All SG60, but no SG80, are met. 60

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)

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. 2014. Stock assessment of albacore in the North Pacific Ocean in 2014. Report of the Albacore Working Group Stock Assessment Workshop. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean. 16 - 21 July 2014 Taipei, Taiwan. WCPFC-SC10-2014/SA-WP-12.

WCPFC 2010. Conservation and Management Measure for South Pacific Albacore. Seventh Regular Session Honolulu, Hawaii, USA, 6-10 December 2010. CMM 2010-051

WCPFC, 2005. Conservation and Management Measure for North Pacific Albacore. CMM-2005-03.

WCPFC 2015. Conservation and Management Measure for South Pacific Albacore. CMM 2015-02

1.2.3 Information / monitoring: Relevant information is collected to support the harvest strategy.

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.

North Pacific Albacore

North Pacific albacore data are reasonably informative containing relevant information on the spatial distribution of catches, size frequencies, from numerous fleets, and alternative growth and mortality models. Tagging and genetic studies have been carried out, which support North Pacific as a separate stock, but more detailed spatial structure within the North Pacific is uncertain.

More than 50% of the albacore harvested in the North Pacific Ocean since 1952 have been taken in surface fisheries that catch smaller, predominately juvenile albacore. The major surface fisheries are the Canadian troll, USA troll and pole-and-line fisheries, and the Japanese pole-and-line fisheries. Longline fisheries, mainly Japanese and Chinese Taipei, catch less than 50% of north Pacific albacore by weight and generally catch larger and older albacore. Total annual catches of albacore in the north Pacific Ocean peaked in 1976 at about 126000 t, declined to the lowest level in 1991 at about 37000 t, then increased to a second peak in 1999 at about 125000 t. Catches in the stock assessment were treated as known with negligible error. Other information on environment and ecosystem exists, although it may not be used directly in the stock assessment. The scientific working group identified the lack of sex-specific size data, the absence of updated estimates of important life history parameters (natural mortality, maturity), and the simplified treatment of the spatial structure of north Pacific albacore population dynamics are the most important uncertainties. This indicates certain data gaps and perhaps a lack of good understanding of stock structure prevents information being comprehensive. Nevertheless, the information is comprehensive enough to meet SG100.

South Pacific Albacore

There is a regional register of all vessels actively fishing in the region as well as domestic records of fishing vessels with EEZs held locally. Information, while largely complete, is not comprehensive across all vessels, but adequate to allow stratification of vessels into fleets with similar operational characteristics.

The 2012 south Pacific albacore tuna assessment considered several flag-related longline fisheries, but for simplification in the current (2015) assessment, a spatial structure was implemented which was not present in the 2012 assessment, allowing the assessment scientists to define a single fishery for each gear type in each region (where appropriate, e.g., surface fisheries were only included for the southern regions). So the current assessment included eight longline fisheries, and three each of driftnet and troll fisheries. This is an example of the breadth of fisheries information.

Overall, while there are data gaps, these do not relate to primary forms of catch and effort data used in the assessment, but to operational details of vessels. The SG80, but not 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.

North Pacific Albacore

While the management system will be able to tolerate some absence of data, all vessels that would be certified would be expected to comply with best practice in reporting their data.

The current harvest control rule requires a stock assessment to obtain accurate estimates of fishing mortality and biomass. Catch, including catch composition, data, and monitoring indices from several fleets' standardized CPUE data are adequate for this harvest control rule. 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, but this has not occurred as of 2014. Tagging that has been conducted has not been very informative, suggesting a larger well-designed (and expensive) programme would be required. The data do not presently allow the harvest control rule to be monitored with a high degree of certainty (particularly since 2005-03 does not specify clearly how effort should be measured), meeting SG80, but not SG100.

South Pacific Albacore

While the management system will be able to tolerate some absence of data, all vessels that would be certified would be expected to comply with best practice in reporting their data.

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 (Tremblay-Boyer et al., 2015b) and regional weights (Tremblay-Boyer et al.,2015a) and the analysis of longline size data (Scott and McKechnie, 2015). 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 is available to the assessment, 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.	

North Pacific Albacore

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.

South Pacific Albacore

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.

Scoring for 1.2.3

North Pacific Albacore: All SG60 and SG80, and 1 SG100, are met. 90
South Pacific Albacore: All SG60 and SG80, but no SG100, are met. 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)

ISC. 2014. Stock assessment of albacore in the North Pacific Ocean in 2014. Report of the Albacore Working Group Stock Assessment Workshop. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean. 16 - 21 July 2014 Taipei, Taiwan. WCPFC-SC10-2014/SA-WP-12.

1.2.4 Assessment of stock status: There is an adequate assessment of the 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

North Pacific albacore stock was assessed in 2014 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.

24 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 11 fisheries. Catch was treated as known with low error.

These data have been sufficient to conduct assessments and to evaluate the harvest strategy of maintaining stocks at or above the biomass SSB-ATHL. Stock structure data are limited, but are consistent with North Pacific Ocean-wide stock. However, some significant information is missing or poor (e.g. estimates of natural mortality), and there are opportunities to improve the assessment in future. Overall, the assessment is high quality and accounts for the data available. The assessment therefore meets SG100.

South Pacific Albacore

The assessment carried out in 2015 like the previous assessment in 2012 uses 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 partitions the population into 8 spatial regions (see Section 3.1) and 48 quarterly age-classes. The last age-class comprises a \plus group" in which mortality and other characteristics are assumed to be constant. The population is \monitored" in the model at quarterly time steps, extending through a time window of 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

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. The results are

sensitive to the growth model in particular, which is may be inaccurate. Nevertheless, the model structure takes into account major features and 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.	

North Pacific Albacore

The stock assessment has been used to estimate the MSY-related reference point. However, these are not well defined and depend upon assumptions about steepness and other parameters. Therefore, alternative surrogate status measures are suggested to evaluate stock status. This meets SG60.

South Pacific Albacore

The stock assessment has been used to estimate the MSY-related reference point. However, these are not well defined and depend upon assumptions about steepness and other parameters. Surrogate status measures are suggested to evaluate stock status. This meets SG60.

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.

North Pacific Albacore

Stock assessment methods which have been used, report uncertainty in estimates of stock status. Uncertainties have been examined as alternative model structures and the stock status associated with these alternatives have been evaluated. Probabilities have not been fully reported in the scientific advice and have not 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). The treatment of uncertainty meets SG80, and now reported probabilistic information allows attainment of SG100.

South Pacific Albacore

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.

North Pacific Albacore

There is sufficient evidence that the model structure has been explored extensively. Various sensitivity analyses are used to evaluate alternative assumptions and model structures. These are chosen presumably based on expert review during workshops. Diagnostics are presented and suggest the assessment is robust, so SG100 is met.

South Pacific Albacore

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, such that 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.

North Pacific Albacore

The original SS3 stock assessment of North Pacific albacore was externally reviewed in 2011. The workshop in which the stock assessment was done constitutes an "internal" review, although participants included scientists representing nations, RFMOs and industry, meeting SG80. External reviews also took place on the original 2011 assessment. The recommendations from these reviews, together with advances in understanding of growth, life history, catchability and selectivity, have been used to improve the stock assessment. Because there is evidence of internal and external review, and appropriate response to these, the fishery meets SG100.

South Pacific Albacore

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.

Scoring for 1.2.4

North Pacific Albacore: All SG60, 3 of 4 SG80, and all SG100, are met. 100
South Pacific Albacore: All SG60, 3 of 4 SG80, and 3 of 4 SG100 are met. 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)

ISC. 2014. Stock assessment of albacore in the North Pacific Ocean in 2014. Report of the Albacore Working Group Stock Assessment Workshop. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean. 16 - 21 July 2014 Taipei, Taiwan. WCPFC-SC10-2014/SA-WP-12.

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.

Regional Fisheries Management Organisations

3.1 GOVERNANCE AND POLICY

3.1.1 Legal and/or customary framework: The management system exists within an appropriate and effective legal and/or customary framework which ensures that it:

- **Is capable of delivering sustainability in the UoA(s)**
- **Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and**
- **Incorporates an appropriate dispute resolution 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 partie**s which delivers management outcomes consistent with MSC Principles 1 and 2.

International Commission for the Conservation of Atlantic Tunas

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 and 2005. 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 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.

Indian Ocean Tuna Commission

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.

Western and Central Pacific Fishery Commission

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 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.

A framework for the participation of fishing entities in the Commission which legally binds fishing entities to the provisions of the Convention, participation by territories and possessions in the work of the Commission, recognition of special requirements of developing States, and cooperation with other Regional Fisheries Management Organizations (RFMO) whose respective areas of competence overlap with the WCPFC reflect the unique geo-political environment in which the Commission operates.

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. Otherwise 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.

Inter-American Tropical Tuna Commission

Fishing for tuna and tuna like species, both on the high seas and in zones of national jurisdiction, is governed by 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, 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.**

International Commission for the Conservation of Atlantic Tunas

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.

51 ICCAT contracting parties (in 2016), 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. 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.

Indian Ocean Tuna Commission

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 not a 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.

Western and Central Pacific Fishery Commission

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 2016. 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 2016 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 the independent Pacific Island states, non-members the main external fishing nations seeking access. 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), 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. 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.

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 these fisheries are meeting both SG80 and SG100.

Inter-American Tropical Tuna Commission

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 2016. 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 2014), who along with observers and 4 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.

International Commission for the Conservation of Atlantic Tunas

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.

Indian Ocean Tuna Commission

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. 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.

Western and Central Pacific Fishery Commission

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 include 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 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. 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.

Inter-American Tropical Tuna Commission

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, 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.

Scoring for 3.1.1

International Commission for the Conservation of Atlantic Tunas:
All SG60 and 2 out of 3 SG80 are met. 75
Indian Ocean Tuna Commission:
All SG60 and SG80, but no SG100, are met. 80
Western and Central Pacific Fishery Commission:
All SG60 and SG80 are met, and 2 out of 3 SG100 are met. 95
Inter-American Tropical Tuna Commission:
All SG60 and SG80, but no SG100, are met. 80

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3.1.2 Consultation, roles and responsibilities: The management system has effective consultation processes that are open to interested and affected parties.

The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties.

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.

International Commission for the Conservation of Atlantic Tunas

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 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.

Indian Ocean Tuna Commission

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) resolutions defining data requirements may now be better defined. 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.

Western and Central Pacific Fishery Commission

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.

Inter-American Tropical Tuna Commission

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.**

International Commission for the Conservation of Atlantic Tunas

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.

Indian Ocean Tuna Commission

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.

Western and Central Pacific Fishery Commission

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.

Inter-American Tropical Tuna Commission

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. However, limits were often vague, and public information was not available that clearly justifies the limits applied when the decision was made. 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.

However, 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. Therefore, at this time the it is determined that SG 100 is not met. But, this should be re-evaluated during the 2017 year.

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.

International Commission for the Conservation of Atlantic Tunas

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 whether there is an opportunity for interested parties to be involved in management varies.

The opportunity to become 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 increases in membership over the last 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, 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.

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.

Indian Ocean Tuna Commission

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.

Western and Central Pacific Fishery Commission

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 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.

Inter-American Tropical Tuna Commission

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 Contracting Party or Co-operating Non-contracting Party is open to all, including non-states. There are in 2016 four 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.

Scoring for 3.1.2

International Commission for the Conservation of Atlantic Tunas:
All SG60 and 2 out of 3 SG80 are met. 75
Indian Ocean Tuna Commission:
All SG60 and 2 out of 3 SG80 are met. 75
Western and Central Pacific Fishery Commission:
All SG60 and SG80 are met, and 1 out of 3 SG100 are met. 85
Inter-American Tropical Tuna Commission:
All SG60 and SG80 are met, and 1 out of 3 SG100 are met. 85

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3.1.3 Long term objectives: The management policy has clear long-term objectives to guide decision-making that are consistent with MSC fisheries standard, and incorporates the precautionary approach.

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

International Commission for the Conservation of Atlantic Tunas

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 ICCAT Convention has no explicit provision regarding the precautionary approach or ecosystem based management which forms part of the MSC Principles and Criteria. There is evidence that these principles are being applied in fisheries management, but they remain implicit.

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, SG 100 is met.

Indian Ocean Tuna Commission

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 this writing, the implementation of the HCRs for the 2017 fishing season awaits. This prevents SG100 being met but this should be re-evaluated during 2017.

Western and Central Pacific Fishery Commission

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 that 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. 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 over 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.

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 Commission may be preferred 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.

Scoring for 3.1.3

International Commission for the Conservation of Atlantic Tunas:
SG100 is met. 100
Indian Ocean Tuna Commission:
All SG60 and SG80, but no SG100, are met. 80
Western and Central Pacific Fishery Commission:
All SG60 and SG80, but no SG100, are met. 80
Inter-American Tropical Tuna Commission:
All SG60 and SG80, but no SG100 are met. 80

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3.2 FISHERY SPECIFIC MANAGEMENT SYSTEM

3.2.1 Fishery-specific objectives: The fishery-specific management system has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2.

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.

International Commission for the Conservation of Atlantic Tunas

The ICCAT basic texts offers guidance and principles on which management plans might be based.

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, but not skipjack. These 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".

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 scientific advice is based on MSC Principles 1 and 2, because these objectives are implicit in the management of each stock, meeting SG60. However, specific objectives consistent with the requirements of MSC Principles 1 and 2 are not met for all stocks.

The ICCAT framework provides explicit objectives; however, there remains the question is the extent to which they are genuinely treated as objectives in the management of an individual stock. It may be argued that SG80 is met for those stocks where the P1 management framework is strongest, but not in all stocks. In aggregate the SG80 requirements are marginally met.

However, 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.

Indian Ocean Tuna Commission

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.

The amount of precaution to be applied is not well defined. Currently, decisions appear to be based on the median estimates of the values of interest. In the most recent Scientific Report, however, 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 or 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 now met.

Western and Central Pacific Fishery Commission

The WCPFC 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 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.

Inter-American Tropical Tuna Commission

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 cannot be met.

Scoring for 3.2.1

International Commission for the Conservation of Atlantic Tunas:
All SG60 and SG80 are met, but no SG100. 80
Indian Ocean Tuna Commission:
All SG60, but no SG80, are met.80
Western and Central Pacific Fishery Commission:
All SG60 and SG80, but no SG100, are met. 80
Inter-American Tropical Tuna Commission:
All SG60 and SG80, but no SG100, are met. 80

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3.2.2 Decision-making processes: The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives and has an appropriate approach to actual disputes in the fishery.

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.	

International Commission for the Conservation of Atlantic Tunas

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.

Indian Ocean Tuna Commission

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.

Western and Central Pacific Fishery Commission

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).

Inter-American Tropical Tuna Commission

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.

International Commission for the Conservation of Atlantic Tunas

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.

Indian Ocean Tuna Commission

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.

Western and Central Pacific Fishery Commission

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 processors appear to address all issues but not successfully in all cases, and therefore the fishery does not meet SG100.

Inter-American Tropical Tuna Commission

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 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 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.	

International Commission for the Conservation of Atlantic Tunas

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, 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.

Indian Ocean Tuna Commission

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.

Western and Central Pacific Fishery Commission

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.

Inter-American Tropical Tuna Commission

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.

International Commission for the Conservation of Atlantic Tunas

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 how all information 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 basis that quota allocation was unfair. They proposed their catch limits unilaterally on the basis of historical catch from a particular year. Even in this case a credible explanation is provided, albeit 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.

Indian Ocean Tuna Commission

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 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.

With detailed formal public reporting of decisions and all information on which those decisions are based, the IOTC fisheries meet SG100.

Western and Central Pacific Fishery Commission

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.

Inter-American Tropical Tuna Commission

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.

International Commission for the Conservation of Atlantic Tunas

ICCAT (the Commission) is not subject to any court challenges as of 2016. 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.

Indian Ocean Tuna Commission

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.

Western and Central Pacific Fishery Commission

WCPFC (the Commission) is not subject to any court challenges as of 2016 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 a suitable legal system will exist to deal with significant disputes between stakeholders, but this should be verified.

Inter-American Tropical Tuna Commission

IATTC (the Commission) is not subject to any court challenges as of 2016. 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.

Scoring for 3.2.2

International Commission for the Conservation of Atlantic Tunas:
All SG60 and SG80 are met, and 2 out of 3 SG100 are met. 95
Indian Ocean Tuna Commission:
All SG60 and SG80 are met, and 1 out of 3 SG100 are met. 85
Western and Central Pacific Fishery Commission:
All SG60 and SG80, but no SG100, are met. 80
Inter-American Tropical Tuna Commission:
All SG60 and SG80 are met, and 1 out of 3 SG100 are met. 85

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3.2.3 Compliance and enforcement: Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with.

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.

International Commission for the Conservation of Atlantic Tunas

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.

Indian Ocean Tuna Commission

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. 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.

Western and Central Pacific Fishery Commission

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).

Inter-American Tropical Tuna Commission

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-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.

International Commission for the Conservation of Atlantic Tunas

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.

Indian Ocean Tuna Commission

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.

Western and Central Pacific Fishery Commission

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.

Inter-American Tropical Tuna Commission

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.

International Commission for the Conservation of Atlantic Tunas

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.

Indian Ocean Tuna Commission

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.

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.

Western and Central Pacific Fishery Commission

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.

Inter-American Tropical Tuna Commission

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 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, 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.	

International Commission for the Conservation of Atlantic Tunas

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.

Indian Ocean Tuna Commission

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.

Western and Central Pacific Fishery Commission

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.

Inter-American Tropical Tuna Commission

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.

Scoring for 3.2.3

International Commission for the Conservation of Atlantic Tunas:
All SG60 and 3 out of 4 SG80 are met. 75
Indian Ocean Tuna Commission: All SG60 and 2 out of 4 SG80 are met. 70
Western and Central Pacific Fishery Commission:
All SG60 and SG80, but no SG100, are met. 80
Inter-American Tropical Tuna Commission:
All SG60 and SG80, but no SG100, are met. 80

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3.2.4 Monitoring and management performance evaluation: There is a system for monitoring and evaluating the performance of the fishery-specific management system against its objectives.

There is effective and timely review of the fishery-specific management system.

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 in 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.

International Commission for the Conservation of Atlantic Tunas

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.

Indian Ocean Tuna Commission

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.

Western and Central Pacific Fishery Commission

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.

Inter-American Tropical Tuna Commission

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

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.

International Commission for the Conservation of Atlantic Tunas

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.

Indian Ocean Tuna Commission

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.

Western and Central Pacific Fishery Commission

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.

Inter-American Tropical Tuna Commission

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.

Scoring for 3.2.4

International Commission for the Conservation of Atlantic Tunas: All SG60 and SG80 are met, and 1 out of 2 SG100 are met. 90

Indian Ocean Tuna Commission: All SG60, SG80 and SG100 are met. 100

Western and Central Pacific Fishery Commission: All SG60 and SG80 are met, and 1 out of 2 SG100 are met. 90

Inter-American Tropical Tuna Commission: All SG60 and SG80 are met, and 1 out of 2 SG100 are met. 90

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