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An Evaluation of the Sustainability of Global Tuna Stocks Relative to Marine Stewardship Council Criteria

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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 includes MSC criteria which are embodied in the following 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 the MSC issues are comparable for global tuna stocks, the MSC scoring system was used to evaluate nineteen stocks of tropical tunas[1] throughout the world and to evaluate the management systems of the Regional Fishery Management Organizations (RFMOs) associated with these stocks. Since the goal was to assess the commonality of the tuna stock, no evaluation was made for the fishery specific ecosystem criteria. 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 1.1 – 1st May 2010; http://www.msc.org/).
Table 1 summarizes the findings of this evaluation.
Of the 19 stocks of tropical and temperate tunas, 5 achieved a passing score for Principle 1. Note that failure was not usually due to the poor status of the stock, but rather the failure of there not being target and limit reference points and well-defined harvest control rules in place. None of the 19 stocks met these MSC requirements.
Additionally, the RFMOs also had similar weaknesses but these varied between RFMO (Table 1).
While a future client tuna fishery will be evaluated on the merits related to all three MSC Principles, the scoring clearly outlines a template for actions to improve the management of the 19 tuna stocks through the RFMOs.

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

Table 1. Assessment of Global Tuna Stocks Using MSC P1 and P3 (RFMO) Criteria

P1-Atlantic Ocean ICCAT

Component	PI No.	Performance Indicator (PI)	Yellowfin Score	Bigeye Score	Western Skipjack Score	Eastern Skipjack Score	North Albacore Score	South Albacore Score	Med Albacore Score
Outcome	1.1.1	Stock status	70	80	80	80	70	70	60
	1.1.2	Reference points	75	75	75	75	75	75	65
	1.1.3	Stock rebuilding	75				80	75	
Management	1.2.1	Harvest strategy	80	80	70	70	80	80	50
	1.2.2	Harvest control rules & tools	60	60	60	60	60	60	50
	1.2.3	Information & monitoring	80	80	65	75	80	80	50
	1.2.4	Assessment of stock status	85	85	80	80	80	80	80
Weighted Principle-level scores									
		Stock rebuilding required?	**Yes**	**No**	**No**	**No**	**Yes**	**Yes**	**No**
		P1 Score:	**74.8**	**76.9**	**73.1**	**74.4**	**75.0**	**74.2**	**<60, P1 Fails**

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	90	80	100	80	80	100	80	100
	1.1.2	Reference points	75	75	75	75	75	75	75	75
	1.1.3	Stock rebuilding								
Management	1.2.1	Harvest strategy	75	60	70	80	80	85	80	80
	1.2.2	Harvest control rules & tools	60	60	60	60	60	60	60	60
	1.2.3	Information & monitoring	80	80	80	80	80	80	80	80
	1.2.4	Assessment of stock status	90	90	85	95	95	85	85	85
Weighted Principle-level scores										
		Stock rebuilding required?	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**
		P1 Score:	**79.4**	**75.0**	**80.6**	**78.1**	**78.1**	**82.5**	**76.9**	**81.9**

P1-Indian Ocean

Component	PI No.	Performance Indicator (PI)	Yellowfin Score	Bigeye Score	Skipjack Score	Albacore Score
Outcome	1.1.1	Stock status	90	90	100	70
	1.1.2	Reference points	75	75	75	75
	1.1.3	Stock rebuilding				
Management	1.2.1	Harvest strategy	80	80	80	60
	1.2.2	Harvest control rules & tools	60	60	60	60
	1.2.3	Information & monitoring	80	80	80	65
	1.2.4	Assessment of stock status	90	80	85	60
Weighted Principle-level scores						
		Stock rebuilding required?	**No**	**No**	**No**	**No**
		P1 Score:	**80.0**	**78.8**	**81.9**	**66.9**

PI < 60 or Principle <80: Principle Fails
60 ≤ PI < 80: Condition Needed
PI or Principle≥80: Passing Score
Unscored
Rebuilding Required
Rebuilding Not Required

P3 by RFMO

Component	PI No.	Performance Indicator (PI)	ICCAT Score	WCPFC Score	IATTC Score	IOTC Score
Governance and Policy	3.1.1	Legal & customary framework	75	85	85	80
	3.1.2	Consultation, roles &	75	85	85	70
	3.1.3	Long term objectives	60	100	100	60
	3.1.4	Incentives for sustainable	80	80	80	80
Fishery specific management system	3.2.1	Fishery specific objectives	60	80	80	60
	3.2.2	Decision making processes	90	80	80	90
	3.2.3	Compliance & enforcement	75	80	80	70
	3.2.4	Research plan	90	90	90	90
	3.2.5	Management performance	90	70	70	90
Weighted Principle-level scores						
		P3 Score:	**76.8**	**83.8**	**83.8**	**76.3**

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Foreword

One of the primary objectives of ISSF is to improve tuna fisheries so that they are sustainable, as measured by standards developed from the Food and Agriculture Organization's (FAO) Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries (available from www.fao.org).

The Marine Stewardship Council (MSC) is a global certification program with standards developed from the FAO guidelines and compliant with ISEAL specifications. To date, close to 200 fisheries, including several tuna fisheries, have been certified against the MSC standards. ISSF has been actively involved as a stakeholder in the tuna fishery certifications since 2011.

Through our involvement with MSC tuna fishery certifications, we have observed that there are often significant inconsistencies between assessments conducted by the Conformance Assessment Bodies (CAB) that are 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 are 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.

We decided to ask two experienced assessors to score 19 stocks against the MSC standards using the very same indicators of sustainability and the guideposts provided by the MSC to make scoring consistent. 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 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). Thus, 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, we hope that this exercise will:

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

It is important to note two caveats. First, the document is work in progress. It needs to be modified to reflect the latest MSC Certification Requirements (v. 1.3, which become effective in March, 2013) and to reflect the latest management measures adopted by two RFMOs in late 2012. Second, the scores for some of the Principle 1 scoring issues are given on the basis of recent final assessments of tuna fisheries. In particular, for most cases the RFMOs have not adopted any specific harvest control rules or limit and target reference points, and it is questionable whether even a score of 60 (a passing grade with conditions for future improvement) is justifiable. Nevertheless, several recent tuna assessments have resulted passing scores in these situations. ISSF hopes that this issue will be addressed in the very near future.

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 provide any comments and suggestions you may have.

Susan S. Jackson
President, ISSF

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 1.1 – 1st May 2010; http://www.msc.org/). Note that P1 relates to the status of the stocks of fish that are being targeted by a specific fishery, recognizing that other fisheries may be targeting or impacting the same stock of fish. Principle 2 relates to the performance of the specific fishery relative to ecological impacts, in particular discarding. 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.

The report is organized by major oceans: the Atlantic/Mediterranean, Pacific and Indian Oceans; and by the relevant RFMOs for these Oceans: the International Commission for the Conservation of Atlantic

Tunas (ICCAT), the Inter-American Tropical Tuna Commission (IATTC), the Western and Central Pacific Fisheries Commission and the Indian Ocean Tuna Commission (Table 2).

Table 2. Participation in Tuna RFMOs (updated 7/2012)

Key: M=Member; C=Cooperating non-Member; P=Participating Territory

Country	IATTC	ICCAT	IOTC	WCPFC	CCSBT
Albania		M			
Algeria		M			
American Samoa				P	
Angola		M			
Australia			M	M	M
Barbados		M			
Belize	M	M	M	C	
Brazil		M			
Canada	M	M		M	
Cape Verde		M			
China, People's Republic of	M	M	M	M	
Chinese Taipei	M	C		M	M
Colombia	M	C			
Comoros			M		
Cook Islands	C			M	
Costa Rica	M				
Côte d'Ivoire		M			
Croatia		M			
Curacao		C			
Denmark					
Ecuador	M			C	
Egypt		M			
El Salvador	M			C	
Equatorial Guinea		M			
Eritrea			M		
European Union	M	M	M	M	C
Fiji				M	
France	M		M	M	
French Polynesia				P	
Gabon		M			
Ghana		M			
Guam				P	
Guatemala	M	M			
Guinea Rep.		M	M		
Guyana, Cooperative Republic of		C			
Honduras		M			
Iceland		M			
India			M		
Indonesia			M	C	M
Iran, Islamic Republic			M		
Japan	M	M	M	M	M
Kenya			M		

Country	IATTC	ICCAT	IOTC	WCPFC	CCSBT
Kiribati	M			M	
Korea, Republic of	M	M	M	M	M
Korea, Democratic People's Republic				C	
Libya		M			
Madagascar			M		
Malaysia			M		
Maldives			M		
Marshall Islands, Republic of				M	
Mauritius			M		
Mauritania		M			
Mexico	M	M		C	
Micronesia, Federated States of				M	
Morocco		M			
Mozambique			M		
Namibia		M			
Nauru				M	
New Caledonia				P	
New Zealand				M	M
Nicaragua	M	M			
Nigeria		M			
Niue				M	
Northern Mariana Islands, Commonwealth of the				P	
Norway		M			
Oman			M		
Pakistan			M		
Palau				M	
Panama	M	M		C	
Papua New Guinea				M	
Peru	M				
Philippines		M	M	M	C
Russia		M			
St. Pierre and Miquelon (France)		M			
Samoa				M	
São Tomé and Príncipe		M			
Senegal		M	C	C	
Seychelles			M		
Sierra Leone		M	M		
Solomon Islands				M	
South Africa		M	C		C
Spain					
Sri Lanka			M		
St. Kitts and Nevis				C	
St. Vincent and The Grenadines		M			
Sudan			M		
Suriname		C			
Syria		M			
Tanzania			M		
Thailand			M	C	

Country	IATTC	ICCAT	IOTC	WCPFC	CCSBT
Tokelau				P	
Tonga				M	
Trinidad and Tobago		M			
Tunisia		M			
Turkey		M			
Tuvalu				M	
Ukraine					
United Kingdom (Overseas Territories)		M	M		
United States of America	M	M		M	
Uruguay		M			
Vanuatu	M	M	M	M	
Venezuela	M	M			
Vietnam			C	C	
Wallis and Futuna				P	

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)	--[1]	North Pacific ALB[1]	ALB
South Atlantic Albacore (ALB)	--[1]	South Pacific ALB[1]	
Mediterranean Albacore (ALB)			

[1] Pacific albacores are managed jointly

Scores for P1 were given to each of these 19 stocks using the MSC Default Assessment Tree (http://www.msc.org/). MSC evaluations have already occurred for several of the tuna stocks. Similarly, scores for P3 were given for each of the RFMOs. We were cognizant of scorings from previous certification evaluations and in some cases drew on them heavily. However, we recognize that the MSC Standards have evolved within the last two years and have undergone some important changes. In addition, the fisheries themselves may also have changed. Therefore, it was inappropriate to adhere to previous scores for all evaluations.

The document is organized by each Ocean, tuna stock, P1 Performance Indicators. This is followed by the P3 Performance Indicators for each RFMO. MSC guidelines for scores, the justifications for scores and the scores, themselves, are denoted. 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 Guideposts	80 Guideposts	100 Guideposts

Principle 1

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.

ATLANTIC OCEAN

Atlantic Yellowfin

1.1 Management Outcomes

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

60 Guideposts	80 Guideposts	100 Guideposts
It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.

The best estimate of stock size indicates that the stock is approximately 96% of the B_{MSY} level in 2006, 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.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

Based on the 2011 assessment which considers catch, size and effort since the 1950s, it is likely that the stock was below the maximum sustainable yield (MSY) level in 2010 (85% B_{MSY}), while fishing mortality rate was about 87% of F_{MSY}. Therefore, the stock as of 2010 was rebuilding to take it back to the target level (above MSY), although the stock status was determined to be lower than the previous assessment in 2007.

Since the last stock assessment, the total catch has remained below the estimated MSY (114 200 - 155 100t), varying between 99 619t in 2007 up to 118 871t in 2009. In theory, the stock size is likely to be increasing, but this would need to be confirmed through on-going monitoring.

The stock meets the SG60 and 1 out of 2 SG80.
Score 1.1.1: 70

References

ICCAT (2008) Report of the 2008 ICCAT Yellowfin and Skipjack Stock Assessments Meeting (Florianópolis, Brazil – July 21 to 29, 2008). English version. SCRS/2008/016.

ICCAT (2011) Report of the 2011 ICCAT Yellowfin Tuna Stock Assessment Session (San Sebastian, Spain,

Sept. 5 to 12, 2011).
ICCAT (2011) 8.1 Yellowfin Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1. English version.

1.1.2 Reference Points: Limit and target reference points are appropriate for the stock.

60 Guideposts	80 Guideposts	100 Guideposts
Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	

The reference points are estimated based on MSY and appropriate for tuna stocks. MSY is estimated as part of the stock assessment and will depend in part on the selectivity of the fishery. The estimate will depend upon the stock assessment model used. Two basic stock assessments were used for yellowfin: age structured VPA and a logistic production model. VPA tended to give a more skewed estimate of MSY at lower biomass levels than the logistic model, but also estimated the maximum sustainable yield at a lower value. The B_{MSY} estimates were combined from these models to form a single probability for B_{MSY} which was used to provide management advice. Combining the estimates in this way should provide a reasonably precautionary indication of the state of the stock.

60 Guideposts	80 Guideposts	100 Guideposts
	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues.

There is no specific limit point accepted by the management authority. The trigger point (MSY) is set above the level at which there is an appreciable risk of impairing reproductive capacity and therefore there is an implied limit below this point. The default 50% B_{MSY} is assumed here for purposes of defining stock status. However, the lack of a well-defined point indicates that the SG80 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

The intention implied by the scientific advice and management response is to maintain the stock at or above the MSY level. Therefore, although no target reference point is defined, the target region is effectively defined as the biomass just above the MSY level, which meets the SG80.
A more precise definition justified through scientific analysis and research would be necessary before the SG100 could be met. For example, no guidance is available on how far above B_{MSY} the stock should be maintained, based on acceptable risk for example. Neither is there any reference to the ecological role of the stock.

The scoring issue related to low trophic species (*for low trophic level species, the target reference point takes into account the ecological role of the stock*.) is **not** considered for tuna because it is not a low trophic level species.

The stock meets all SG60 and 2 out of 3 SG80.

Score 1.1.2: 75

Condition: A well-defined and justified limit reference point must be recognized by the management authority.

References

ICCAT (2008) Report of the 2008 ICCAT Yellowfin and Skipjack Stock Assessments Meeting (Florianópolis, Brazil – July 21 to 29, 2008). English version. SCRS/2008/016.

ICCAT (2011) Report of the 2011 ICCAT Yellowfin Tuna Stock Assessment Session (San Sebastian, Spain, Sept. 5 to 12, 2011).

Restrepo V.R. (2009) Red, Green and Yellow: Thoughts on Stock Status and the ICCAT Convention Objectives. Collect. Vol. Sci. Pap. ICCAT, 64(7): 2663-2673. SCRS/2008/172.

1.1.3 Stock Rebuilding: Where the stock is depleted, there is evidence of stock rebuilding.

60 Guideposts	80 Guideposts	100 Guideposts
Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place.	Where stocks are depleted rebuilding strategies are in place.	Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the specified timeframe.

The stock is depleted (defined as the biomass below the MSY level) and a strategy is being applied. 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. There is no TAC in place to limit catches of yellowfin, but a TAC on bigeye tuna will effectively limit fishing effort on yellowfin. Limiting fishing mortality to a level which will allow recovery of bigeye should also allow recovery of yellowfin.

Based on the simulation modeling and at the current levels of catch, the stock should rebuild by 2018 (>60% probability). 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 the projection. Catches have remained well below 130 000t, which suggests the stock should have risen above B_{MSY} since 2006. This was based on a model projection, but was not confirmed through the most recent stock assessment. The stock recovery is not strongly supported by the available abundance indices, and there is no clearly defined time frame, so the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
A rebuilding timeframe is specified for the depleted stock that does not exceed the shorter of 30 years of 3 times its generation time. For cases where 3 generations is less than 5 years, the rebuilding timeframe is up to 5 years.	A rebuilding timeframe is specified for the depleted stock that does not exceed the shorter of 20 years of 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 depleted stock.

No rebuilding time frame is specified by the management authority, but projections by scientists run from 2011 to 2025. As a result, it is assumed that rebuilding is specified to be 10 years or less. Based on age at first maturity the generation time should be between 5-10 years. Assuming 110 000t catch or less, the projections indicated that the stock should rebuild (> B_{MSY}) by 2020 with a probability exceeding 70%. This meets the SG80.

There is no evidence that the catch is being limited so that the shortest practicable rebuilding time frame would be reached. As indicated in PI 1.2.1, yellowfin recovery is dependent on the harvest strategy to protect bigeye, so the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place to determine whether they are effective in rebuilding the stock within a specified timeframe.	There is evidence that they are rebuilding stocks, or it is highly likely based on simulation modelling or previous performance that they will be able to rebuild the stock within a specified timeframe.	

Based on the previous 2007 assessment, the projection beyond 2008 would be highly likely to lead to stock size rising above B_{MSY} by 2011, effectively 3 years after the rebuilding would begin. This was mostly driven by catches significantly lower than some in the time series which led to the stock depletion. However, this projection was not supported by 2011 stock assessment and the recovery, if any, is not confirmed by the available abundance indices. Therefore, while monitoring is in place meeting the SG60, it has not yet provided evidence that the stock are rebuilding, suggesting rebuilding is not occurring or is too slow to detect.

The stock meets all SG60 and 2 out of 3 SG80.

Score 1.1.3: 75

Condition (1.1.1 & 1.1.3): A clear rebuilding plan needs to be implemented which will result in an increase in stock size to the target region, including reaching appropriate milestones within the period of certification.

References

ICCAT (2011) Report of the 2011 ICCAT Yellowfin Tuna Stock Assessment Session (San Sebastian, Spain, Sept. 5 to 12, 2011).

ICCAT (2011) 8.1 Yellowfin Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1. English version.

1.2 Harvest Strategy (Management)

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

60 Guideposts	80 Guideposts	100 Guideposts
The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.

ICCAT's objective is embedded in the preamble of its Convention finalized 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 organization, 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 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 external review panel found that the objectives of ICCAT appeared to be met for 4 of the 14 stocks examined (29%), which included bigeye and yellowfin tuna. However, changes were made to the seasonal closure without reference to scientific advice, rendering this management action less effective. This has since 2008 been corrected, 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 the 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 the SG100.

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

In the case of the yellowfin stock, the fishing mortality is constrained by controls primarily intended to limit fishing mortality on bigeye tuna. The assessment showed that the yellowfin stock is overfished or fully exploited, but model projections indicated that catches, at about the 2006 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. Although a stock assessment was undertaken for bigeye in 2010, the last stock assessment for yellowfin was 2008.
Monitoring is in place and the available evidence indicates that the harvest strategy should achieve its objectives, meeting the SG80. However, there has been no recent evaluation of the stock status 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 wider context of the fishery, so the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place that is expected to determine whether the harvest strategy is working.		The harvest strategy is periodically reviewed and improved as necessary.

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. 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, although the fishery clearly meets the SG60, it does not meet the SG100.
The stock meets all SG60 and SG80, but does not meet any SG100.

Score 1.2.1: 80

References

ICCAT (2007) Basic Texts. International Commission for the Conservation of Atlantic Tunas. 5th Revision. Madrid, Spain.
ICCAT (2009) Report of the Independent Performance Review of ICCAT.
ICCAT (2011) Report of the 2011 ICCAT Yellowfin Tuna Stock Assessment Session (San Sebastian, Spain, Sept. 5 to 12, 2011).
ICCAT (2011) Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, October 3-7, 2011.
ICCAT (2011) 8.1 Yellowfin Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period

2010-11. Part I Vol. 1. English version.
Restrepo V.R. (2009) Red, Green and Yellow: Thoughts on Stock Status and the ICCAT Convention Objectives. Collect. Vol. Sci. Pap. ICCAT, 64(7): 2663-2673. SCRS/2008/172.

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules in place

60 Guideposts	80 Guideposts	100 Guideposts
Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the trigger point (MSY). 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. However, this is not well-defined and it is 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. The fact that appropriate action would be taken if the stock came under increased pressure is presumed, but not assured.

60 Guideposts	80 Guideposts	100 Guideposts
	The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules take into account a wide range of uncertainties.

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

60 Guideposts	80 Guideposts	100 Guideposts
There is some evidence that tools used to implement harvest control rules 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 harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

The current level of control, mainly through limits on fishing capacity and a bigeye tuna catch limit, 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 2008 stock assessment, effective effort in 2006 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 for TAC 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. The tools appear to have been effective in controlling exploitation, meeting the 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, the SG80 is not met.

All SG60 were met, but none of the SG80.

Score 1.2.2: 60

Condition: The fishery must put in place a well-defined harvest control rule that reduce the exploitation rate as risks to impairing recruitment increases.

References

ICCAT (2008) Report of the 2008 ICCAT Yellowfin and Skipjack Stock Assessments Meeting (Florianópolis, Brazil – July 21 to 29, 2008). English version. SCRS/2008/016.

ICCAT (2009) Report of the Independent Performance Review of ICCAT.

ICCAT (2011) 8.1 Yellowfin Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1. English version.

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

60 Guideposts	80 Guideposts	100 Guideposts
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 is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Although data have been generally poor and ICCAT has had considerable problems in maintaining accurate data in its database, there have been significant improvements over time. For yellowfin tuna, the data were sufficient for a stock assessment with several approaches possible. 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, although these have not been directed at yellowfin. 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.

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 the SG100.

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

Monitoring indices are adequate for the current harvest control rule. Indicators of stock abundance mainly consist of standardized catch-per-unit-effort indices. Given the large areas of ocean and dispersal of the species, dedicated surveys are not an option for this type of fishery. Two abundance indices are available for the entire time series covering the majority range of the stock. The Japanese and Chinese Taipei's longline indices account for the longest time series and majority of the catch. The 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 the 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 the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	There is good information on all other fishery removals from the stock.	

ICCAT has put considerable effort in getting countries to record and report catches. The current level of reporting is far from perfect given the number of small countries involved and difficulties in monitoring small vessels and activities in oceanic waters well away from the coast. This illustrates the on-going problems ICCAT faces with the contracting parties. Nevertheless, catches are recorded increasingly well with decreasing IUU fishing activity, and data are sufficiently well recorded for the stock assessment and for assessing the level of control sought by ICCAT over landed catches. This meets the SG80. Note that this is in contrast to the Mediterranean fisheries, where information provision to ICCAT appears currently inadequate.
The stock meets all SG60 and SG80, but does not meet any SG100.
Score 1.2.3: 80

References

ICCAT (2008) Report of the 2008 ICCAT Yellowfin and Skipjack Stock Assessments Meeting (Florianópolis, Brazil – July 21 to 29, 2008). English version. SCRS/2008/016.
ICCAT (2009) Report of the Independent Performance Review of ICCAT.
ICCAT (2011) 8.1 Yellowfin Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1. English version.

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

60 Guideposts	80 Guideposts	100 Guideposts
The assessment estimates stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.

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, VPA, production models, Multifan-CL and Bayesian biomass dynamics models). The main advice is obtained from a relatively simple, but robust, virtual population analysis model and a production model, which makes use of the estimated catch-at-age.
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 the SG80, but not the 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, could lead to an improved assessment meeting the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
The major sources of uncertainty are identified.	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.

Although the assessments undertaken include fully stochastic (Bayesian) and sampling simulation or “bootstrap” methods, these results are reported along with other assessment approaches, also accounting for structural errors in this assessment. The working group was unable to choose between two structures for the catch-at-age model used for management advice, and therefore combined the estimates from both together with results from a production model. Point estimates are combined from stochastic simulations of the selected models to represent final density functions for the values of interest. This takes account of uncertainty and treats the results in a probabilistic way, meeting the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

Alternative software has been applied to the available data, although this falls short of a rigorous exploration of alternative hypotheses and approaches to assessment. An age-structured population (VPA) and production model are being used as the main source of management advice. The VPA has

been fitted with many different configurations in terms of data used and assumptions made in the model. The other 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 not been tested against many alternative hypotheses, so whether it is robust is not clear. This does not meet the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock assessment is subject to peer review.	The assessment has been internally and externally peer reviewed.

The stock assessment is subject to review through a working group process. SCRS meet annually and review models, data and research on the main tuna species, as well as other species within ICCAT jurisdiction. Although external review of the management system has taken place, there is no external technical review of the stock assessments. The SG80 is met, but without external review the SG100 is not.

The fishery meets all SG60 and SG80, and 1 out of 4 SG100.

Score 1.2.4: 85

References

ICCAT (2008) Report of the 2008 ICCAT Yellowfin and Skipjack Stock Assessments Meeting (Florianópolis, Brazil – July 21 to 29, 2008). English version. SCRS/2008/016.

ICCAT (2011) Report of the 2011 ICCAT Yellowfin Tuna Stock Assessment Session (San Sebastian, Spain, Sept. 5 to 12, 2011).

ICCAT (2011) 8.1 Yellowfin Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1. English version.

Overall Score: 74.8

Atlantic Bigeye

1.1 Management Outcomes

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

60 Guideposts	80 Guideposts	100 Guideposts
It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.

The best estimate of stock size indicates that the stock is approximately 100% of the B_{MSY} level in 2009, 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 the SG80, however it does not meet the SG100. There is considerable uncertainty as to where recruitment would be impaired and the point estimate of current biomass is not high enough (i.e. not above the MSY level) to meet the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock is at or fluctuating	There is a high degree of certainty that

	around its target reference point.	the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

Based on the 2010 assessment which considers catch, size and effort since the 1950s, it is likely that the stock is around the maximum sustainable yield (MSY) level in 2009, while fishing mortality rate is about 95% of F_{MSY}. Catches are currently at an appropriate level to allow the stock to continue to rise above the MSY level. The stock has only recently recovered to the MSY level, and was recently below it. The stock will only meet the SG100 if it continues to rise and remains close to or above the MSY level for the next five years.

The fishery meets the SG60 and SG80, but does not meet any SG100.

Score 1.1.1: 80

References

FCI (2010) St Helena pole & line and rod & line tuna fisheries for albacore, bigeye, yellowfin and skipjack tuna. Public Certification Report. October 2010. Food Certification International.

ICCAT (2008) Report of the 2007 ICCAT Bigeye Tuna Stock Assessment Session. Madrid, Spain - July 5 to 12, 2007. SCRS/2007/013 Collect. Vol. Sci. Pap. ICCAT, 62(1): 97-239

ICCAT (2009) 8.2 Bigeye Tuna Executive Summary ICCAT Report 2008-2009. Report for Biennial Period 2008-09. Part I Vol. 1. English version.

ICCAT (2010) Report of the 2010 ICCAT Bigeye Tuna Stock Assessment (Pasaia, Gipuzkoa, Spain, July 5-9, 2010)

ICCAT (2011) Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, October 3-7, 2011.

1.1.2 Reference Points: Limit and target reference points are appropriate for the stock.

60 Guideposts	80 Guideposts	100 Guideposts
Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	

The reference points are estimated based on MSY and are appropriate for tuna stocks. MSY is estimated as part of the stock assessment and reported within the management system. The relation of the stock relative to MSY is reported as part of the determination of stock status.

60 Guideposts	80 Guideposts	100 Guideposts
	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues.

Although there is no specific limit point, there is a limit region defined below the trigger reference point. The trigger is set above the level at which there is an appreciable risk of impairing reproductive capacity

and therefore there is an implied limit below this point. The default 50% B_{MSY} is assumed here for purposes of defining stock status. However, the lack of a well-defined point indicates that the 80 guidepost is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

The intention implied by the scientific advice and management response is to maintain the stock at or above the MSY level. Therefore, although no target reference point is defined, the target region is effectively defined as the biomass above the MSY level. This meets the SG80. However, a more precise definition justified through scientific analysis and research would be necessary before the higher guidepost could be met.

The scoring issue related to low trophic species (for low trophic level species, the target reference point takes into account the ecological role of the stock) is **not** considered for tuna because it is not a low trophic level species.

The fishery meets all SG60 and 2 out of 3 SG80.

Score 1.1.2: 75

Condition: A well-defined and justified limit reference point must be recognized by the management authority.

References

ICCAT (2008) Report of the 2007 ICCAT Bigeye Tuna Stock Assessment Session. Madrid, Spain - July 5 to 12, 2007. SCRS/2007/013 Collect. Vol. Sci. Pap. ICCAT, 62(1): 97-239

ICCAT (2010) Report of the 2010 ICCAT Bigeye Tuna Stock Assessment (Pasaia, Gipuzkoa, Spain, July 5-9, 2010).

Restrepo V.R. (2009) Red, Green and Yellow: Thoughts on Stock Status and the ICCAT Convention Objectives. Collect. Vol. Sci. Pap. ICCAT, 64(7): 2663-2673. SCRS/2008/172.

1.1.3 Stock Rebuilding: Where the stock is depleted, there is evidence of stock rebuilding.

Because the stock is not considered as depleted, this performance indicator is not scored.

1.2 Harvest Strategy (management)

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

60 Guideposts	80 Guideposts	100 Guideposts
The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.

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 external review panel found that the objectives of ICCAT appeared to be met for 4 of the 14 stocks examined (29%), which included bigeye and yellowfin tuna. However, it is noticeable that recent changes appear to have been made to the seasonal closure without reference to scientific advice, rendering this management action less effective. The external review panel indicated that they thought more effective measures were needed to deal with the catch of small bigeye tuna. The designed aspect of the strategy to change overall selectivity therefore cannot be given full credit.

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

In the case of the bigeye stock, the present TAC is 85 000t, but recent catches were below the TAC level. The assessment showed that the bigeye stock is not overfished, and catches between 70-80 000t will result in the stock being likely (>70%) to be above the MSY level. For catches around 90 000t, this remains likely (>60%), although the risk of overfishing would increase.

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. It has yet to be shown that the management system can maintain stock at the target level ($B>B_{MSY}$, $F<F_{MSY}$)

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place that is expected to determine whether the harvest strategy is working.		The harvest strategy is periodically reviewed and improved as necessary.

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. Also the stock assessment reports best estimates of biomass, which indicates whether management is achieving its objectives or not. 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, although the fishery clearly meets the SG60, it does not meet the SG100.

The fishery meets all SG60 and SG80, but does not meet any SG100.
Score 1.2.1: 80

References

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

ICCAT (2009) Report of the Independent Performance Review of ICCAT.

ICCAT (2009) 8.2 Bigeye Tuna Executive Summary ICCAT Report 2008-2009. Report for Biennial Period 2008-09. Part I Vol. 1. English version.

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Restrepo V.R. (2009) Red, Green and Yellow: Thoughts on Stock Status and the ICCAT Convention Objectives. Collect. Vol. Sci. Pap. ICCAT, 64(7): 2663-2673. SCRS/2008/172.

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules in place

60 Guideposts	80 Guideposts	100 Guideposts
Generally understood harvest control rules are in place that are consistent with the harvest	Well defined harvest control rules are in place that are consistent with the harvest strategy and	

strategy and which act to reduce the exploitation rate as limit reference points are approached.	ensure that the exploitation rate is reduced as limit reference points are approached.	

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the trigger point (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 recent recovery of the stock to above the MSY level. This recovery has recently been achieved. However, this is not well-defined and the TAC has not been adjusted in response to changes in the stock status. The fact that it would be if the stock came under increased pressure is presumed, but not assured. In addition, setting the TAC at the MSY level is probably overoptimistic and arguably not very precautionary as it does not account for error. The current TAC is set at 85 000t, but no decision has been made for 2011 yet.

60 Guideposts	80 Guideposts	100 Guideposts
	The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules take into account a wide range of uncertainties.

No well-defined harvest control has been selected.

60 Guideposts	80 Guideposts	100 Guideposts
There is some evidence that tools used to implement harvest control rules 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 harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

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. If current catches continue, the stock should continue to increase.

There are various weaknesses preventing higher scores under this performance indicator. The TAC is shared among many countries and control is not precise. The practice of allowing the carry forward of uncaught allocations in all fisheries effectively decreases the control over fishing mortality. ICCAT has had significant problems in implementing appropriate management measures in Atlantic bluefin tuna, indicating a higher risk should apply to all species under its auspices.

All SG60 were met, but none of the SG80.
Score 1.2.2: 60
Condition: The fishery must put in place a well-defined harvest control rule that reduce the exploitation rate as risks to impairing recruitment increase.

References

ICCAT (2009) 8.2 Bigeye Tuna Executive Summary ICCAT Report 2008-2009. Report for Biennial Period 2008-09. Part I Vol. 1. English version.

ICCAT (2008) Report of the 2007 ICCAT Bigeye Tuna Stock Assessment Session. Madrid, Spain - July 5 to 12, 2007. SCRS/2007/013 Collect. Vol. Sci. Pap. ICCAT, 62(1): 97-239
ICCAT (2009) Report of the Independent Performance Review of ICCAT.
ICCAT (2010) Report of the 2010 ICCAT Bigeye Tuna Stock Assessment (Pasaia, Gipuzkoa, Spain, July 5-9, 2010).

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

60 Guideposts	80 Guideposts	100 Guideposts
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 is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Although data have been generally poor and ICCAT has had considerable problems in maintaining accurate data in its database, 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. Sources of errors in data collection are being investigated, leading to further directed research to reduce them. Further evidence of on-going improvement is the new length weight relationship based on the evaluation of observer data for the Chinese Taipei fleet.

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

While far from perfect, monitoring indices are adequate for the harvest strategy. Indicators of stock abundance mainly consist of standardised catch-per-unit-effort indices. Given the large areas of ocean and dispersal of the species, dedicated surveys are not an option for this type of fishery. A single consistent index is not available for the entire time series, but the combined indices do appear to provide a consistent picture of the changes in abundance that have occurred. This year, two new indices of relative abundance and updated indices of those previously used were made available to the Committee for use in the assessment, 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 external review panel recommended, among other things, that efforts continue to be made to improve the timeliness and accuracy of fisheries data, and therefore this is likely to be an on-going process.

60 Guideposts	80 Guideposts	100 Guideposts
	There is good information on all other fishery removals from the stock.	

ICCAT has put considerable effort in getting countries to record and report catches. The current level of reporting is far from perfect given the number of small countries involved and difficulties in monitoring small vessels and activities in oceanic waters well away from the coast. This illustrates the ongoing 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.

Although there has been an apparent strong decrease of the so-called 'IUU' bigeye catch, the Working Group was concerned that unreported catches from the Atlantic might have been poorly estimated and may be continuing, but available statistical data are insufficient to investigate this fully. This could have implications if these catches turn out to have been underestimated as has occurred with Atlantic bluefin tuna. Overall, data are sufficient to meet the 80 guideposts. Problems exist, but are being addressed and do not increase the risk for the assessment and management of the stock sufficiently to suggest a lower score.

The fishery meets all SG60 and SG80, but does not meet any SG100.
Score 1.2.3: 80

References

ICCAT (2008) Report of the 2007 ICCAT Bigeye Tuna Stock Assessment Session. Madrid, Spain - July 5 to 12, 2007. SCRS/2007/013 Collect. Vol. Sci. Pap. ICCAT, 62(1): 97-239.
ICCAT (2009) 8.2 Bigeye Tuna Executive Summary ICCAT Report 2008-2009. Report for Biennial Period 2008-09. Part I Vol. 1. English version.
ICCAT (2009) Report of the Independent Performance Review of ICCAT.
ICCAT (2010) Report of the 2010 ICCAT Bigeye Tuna Stock Assessment (Pasaia, Gipuzkoa, Spain, July 5-9, 2010).

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

60 Guideposts	80 Guideposts	100 Guideposts
The assessment estimates stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.

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, VPA, production models, Multifan-CL and Bayesian biomass dynamics models). The main advice is obtained from relatively simple, but robust, production models. Although this ignores the limited size composition data, it also does not have to account for potential errors in this source of information.

60 Guideposts	80 Guideposts	100 Guideposts
The major sources of uncertainty are identified.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.

Stock assessment methods which have been used report uncertainty in estimates of stock status and other values of interest. Most also can report information in a probabilistic way. The main advice is obtained from biomass dynamics models which are fitted either in a Bayesian framework (BSP) or using a “bootstrap” re-sampling scheme (ASPIC). Results have been reported probabilistically for a range of scenarios and structural assumptions.

60 Guideposts	80 Guideposts	100 Guideposts
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

Alternative software has been applied to the available data, although this falls short of a rigorous exploration of alternative hypotheses and approaches to assessment. The simplest model, the biomass dynamics model, is being used as the main source of management advice. Importantly, this ignores the available size composition data and projections based on this model will be poor if selectivity changes in the fishery. The other 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 partially met the 100 guidepost, but has not met all the higher score requirements.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock assessment is subject to peer review.	The assessment has been internally and externally peer reviewed.

The stock assessment is subject to review through a working group process. SCRS meet annually and review models, data and research on the main tuna species as well as other species within ICCAT jurisdiction. Although external review of the management system has taken place, there is no external technical review of the stock assessments. Given the large number of countries and scientists involved in the assessments, it is not clear that external review is necessary however although this is specified by the MSC process.

The fishery meets all SG60 and SG80, and 1 out of 4 SG100.

Score 1.2.4: 85

References ICCAT (2008) Report of the 2007 ICCAT Bigeye Tuna Stock Assessment Session. Madrid, Spain, July 5 to 12, 2007. SCRS/2007/013 Collect. Vol. Sci. Pap. ICCAT, 62(1): 97-239

ICCAT (2009) 8.2 Bigeye Tuna Executive Summary ICCAT Report 2008-2009. Report for Biennial Period 2008-09. Part I Vol. 1. English version.

ICCAT (2010) Report of the 2010 ICCAT Bigeye Tuna Stock Assessment (Pasaia, Gipuzkoa, Spain, July 5-9, 2010)

Western Atlantic Skipjack

1.1 Management Outcomes

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

60 Guideposts	80 Guideposts	100 Guideposts
It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.

The best estimate of the Western Atlantic skipjack stock size indicates that the stock is most likely above the B_{MSY} level in 2006, 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 the SG80. Should indicate if any changes in exploitation rate since 2006

However, there is considerable uncertainty over the information used in the stock assessment. As a result it is not possible to state that there is a high degree of certainty recruitment is not impaired so that the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

Based on the 2008 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 2006. Therefore, based on the available information, the stock appears to be within its target region, well above B_{MSY}, and has been since data has been recorded for this fishery. This meets the 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 the SG100 is not met.
The fishery meets all the SG60 and SG80, but none of the SG100.
Score 1.1.1: 80

References

ICCAT (2008) Report of the 2008 ICCAT Yellowfin and Skipjack Stock Assessments Meeting (Florianópolis, Brazil – July 21 to 29, 2008). English version. SCRS/2008/016.
ICCAT (2011) 8.3 Skipjack Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1.

1.1.2 Reference Points: Limit and target reference points are appropriate for the stock.

60 Guideposts	80 Guideposts	100 Guideposts
Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	

The reference points are estimated based on MSY and appropriate for tuna stocks. The estimate will depend upon the stock assessment model used. The stock assessments used a production model, which are often more precautionary as they depend on total biomass rather than just spawning stock biomass. Given that skipjack is a short-lived species, total biomass based production models should, if other assumptions are met, provide a reasonable basis for estimating skipjack reference points. This meets the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues.

There is no specific limit point accepted by the management authority. The trigger point (MSY) is set above the level at which there is an appreciable risk of impairing reproductive capacity and therefore there is an implied limit below this point. The default 50% B_{MSY} is assumed here for purposes of defining stock status. However, the lack of a well-defined point indicates that the SG80 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

The intention implied by the scientific advice and management response is to maintain the stock at or above the MSY level. Therefore, although no target reference point is defined, the target region is effectively defined as the biomass just above the MSY level, which meets the SG80.
A more precise definition justified through scientific analysis and research would be necessary before the SG100 could be met. For example, no guidance is available on how far above B_{MSY} the stock should be maintained, based on acceptable risk for example. Neither is there any reference to the ecological role of the stock.
The scoring issue related to low trophic species (*for low trophic level species, the target reference point takes into account the ecological role of the stock*) is **not** considered for tuna because it is not a low trophic level species.
The fishery meets all SG60 and 2 out of 3 SG80.
Score 1.1.2: 75

Condition: A well-defined and justified limit reference point must be recognised by the management authority.

References

ICCAT (2008) Report of the 2008 ICCAT Yellowfin and Skipjack Stock Assessments Meeting (Florianópolis, Brazil – July 21 to 29, 2008). English version. SCRS/2008/016.

Restrepo, V.R. (2009) Red, Green and Yellow: Thoughts on Stock Status and the ICCAT Convention Objectives. Collect. Vol. Sci. Pap. ICCAT, 64(7): 2663-2673. SCRS/2008/172.

1.1.3 Stock Rebuilding: Where the stock is depleted, there is evidence of stock rebuilding.

The stock is not depleted and therefore this performance indicator is not scored.

1.2 Harvest Strategy (management)

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

60 Guideposts	80 Guideposts	100 Guideposts
The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.

ICCAT's objective is embedded in the preamble of its Convention finalized 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 organization, provides a forum where the various countries exploiting tunas can work together to implement the strategy to meet this objective.

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. Currently catches are estimated to be below MSY, but above the replacement yield so the biomass should decline. 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 (eg 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 be 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. The fisheries meet the SG60, but without clear evidence for a coordinated harvest strategy directed at Western skipjack, the SG80 cannot be met.

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

In the case of the Western skipjack stock, the fishing mortality is constrained by fishery capacity and availability of bait. The assessment showed that the skipjack stock is very unlikely to be overfished, but the stock will continue to decline towards the MSY level. Monitoring of catches and fishing effort and size composition is in place. Evidence exists that the current constraints on fishing mortality are probably adequate to maintain the stock above B_{MSY}. This meets the 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 the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place that is expected to determine whether the harvest strategy is working.		The harvest strategy is periodically reviewed and improved as necessary.

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. 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, although the fishery clearly meets the SG60, it does not meet the SG100.
The fishery meets all SG60 and 1 out of 2 SG80.
Score 1.2.1: 70

References

ICCAT (2007) Basic Texts. International Commission for the Conservation of Atlantic Tunas. 5th Revision. Madrid, Spain.
ICCAT (2008) Report of the 2008 ICCAT Yellowfin and Skipjack Stock Assessments Meeting (Florianópolis, Brazil – July 21 to 29, 2008). English version. SCRS/2008/016.
ICCAT (2009) Report of the Independent Performance Review of ICCAT.
ICCAT (2011) 8.3 Skipjack Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period. 2010-11. Part I Vol. 1.
ICCAT (2011) Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, October 3-7, 2011.
Restrepo V.R. (2009) Red, Green and Yellow: Thoughts on Stock Status and the ICCAT Convention Objectives. Collect. Vol. Sci. Pap. ICCAT, 64(7): 2663-2673. SCRS/2008/172.

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules in place

60 Guideposts	80 Guideposts	100 Guideposts
Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the trigger point (MSY). 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. The fact that appropriate action would be taken if the stock came under increased pressure is presumed, but not assured.

60 Guideposts	80 Guideposts	100 Guideposts
	The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules take into account a wide range of uncertainties.

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

60 Guideposts	80 Guideposts	100 Guideposts
There is some evidence that tools used to implement harvest control rules 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 harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

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 the 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, the SG80 is not met.

All SG60 were met, but none of the SG80.
Score 1.2.2: 60
Condition: The fishery must put in place a well-defined harvest control rule that reduce the exploitation rate as risks to impairing recruitment increases.

References

ICCAT (2008) Report of the 2008 ICCAT Yellowfin and Skipjack Stock Assessments Meeting (Florianópolis, Brazil – July 21 to 29, 2008). English version. SCRS/2008/016.
ICCAT (2009) Report of the Independent Performance Review of ICCAT.

ICCAT (2011) 8.3 Skipjack Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1.

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

60 Guideposts	80 Guideposts	100 Guideposts
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 is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

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.

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 over time.

It should be noted that interest in this fishery by ICCAT appears limited. Judging from Commission reports, by far the greatest interest and therefore resources appears to involve bluefin tuna, so skipjack, particularly the Western stock, is rather presumed to look after itself. This is most clearly seen in the relatively poor information available on this stock. Improved data collection would require more initiative from the main flag states exploiting this resource i.e. Brazil and Venezuela.

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

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

Fishery removals are monitored at a level consistent with the harvest control rule. However, the abundance monitoring indices are very imprecise. There are only three indicators of stock abundance, all of which are likely to be poor indices, as it is likely that their effort measurement may not be entirely appropriate, there are likely to have been catchability changes within the time series, and indices may suffer from localized abundance effects which may not apply to the whole stock. Available indices show

some conflicting trends. Given the large areas of ocean and dispersal of the species, scientific surveys are not an option for this type of fishery. Although abundance monitoring is undertaken with sufficient frequency, meeting the SG60, they are not sufficiently accurate to support the target level of harvest implied in ICCAT (i.e. maintaining the stock at or just above MSY), which does not meet the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	There is good information on all other fishery removals from the stock.	

ICCAT has put considerable effort in getting countries to record and report catches. 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. This meets the SG80. Note that this is in contrast to the Mediterranean fisheries, where information provision to ICCAT appears currently inadequate.

The fishery meets all SG60 and 1 out of 3 SG80.

Score 1.2.3: 65

References

ICCAT (2008) Report of the 2008 ICCAT Yellowfin and Skipjack Stock Assessments Meeting (Florianópolis, Brazil – July 21 to 29, 2008). English version. SCRS/2008/016.

ICCAT (2009) Report of the Independent Performance Review of ICCAT.

ICCAT (2011) 8.3 Skipjack Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1.

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

60 Guideposts	80 Guideposts	100 Guideposts
The assessment estimates stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.

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 biomass dynamics 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 were due to problems with the data rather than the assessment methods themselves (see PI 1.2.3). Need to note that no assessment since 2006/08 and confirm that this generic text actually applies to skipjack

The assessment attempts to account for some features of the species biology and the fishery, but the most reliable approaches remain broadly generic, meeting the SG80, but not the 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 the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
The major sources of uncertainty are identified.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.

The assessments undertaken include fully stochastic (Bayesian) methods, and these results are reported along with other assessment approaches, and used as the main basis for the advice. 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 the SG80, but the quantitative probabilities that could be generated are not reported and not used, so that the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

Alternative software has been applied to the available data, although this falls short of a rigorous exploration of alternative hypotheses and approaches to assessment. Most of these assessments were exploratory and only preliminary results were available. There are recommendations to continue work on developing improved statistical models. Overall, the stock assessment has not been tested against many alternative hypotheses, so whether it is robust is not clear. This does not meet the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock assessment is subject to peer review.	The assessment has been internally and externally peer reviewed.

The stock assessment is subject to review through a working group process. SCRS meet annually and review models, data and research on the main tuna species as well as other species within ICCAT jurisdiction. Although external review has taken place of the management system, there is no external technical review of the stock assessments. The SG80 is met, but without external review the SG100 is not. Given the large number of countries and scientists involved in the assessments, it is not clear that external review is necessary however.

The fishery meets all SG60 and SG80, but no SG100.

Score 1.2.4: 80

References

ICCAT (2008) Report of the 2008 ICCAT Yellowfin and Skipjack Stock Assessments Meeting (Florianópolis, Brazil – July 21 to 29, 2008). English version. SCRS/2008/016.

ICCAT (2011) 8.3 Skipjack Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1.

Overall Score: 73.1

Eastern Atlantic Skipjack

1.1 Management Outcomes

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

60 Guideposts	80 Guideposts	100 Guideposts
It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.

The best estimate of the Eastern Atlantic skipjack stock size indicates that the stock is most likely above the B_{MSY} level in 2006, 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 the SG80.
However, there is considerable uncertainty over the information used in the stock assessment. As a result it is not possible to state that there is a high degree of certainty recruitment is not impaired so that the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

Based on the 2008 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 2006. Therefore, based on the available information, the stock appears to be within its target region, well above B_{MSY}, and has been since data has been recorded for this fishery. This meets the 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 the SG100 is not met.
The fishery meets all the SG60 and SG80, but none of the SG100.
Score 1.1.1: 80

References

ICCAT (2011) 8.3 Skipjack Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1.
ICCAT (2008) Report of the 2008 ICCAT Yellowfin and Skipjack Stock Assessments Meeting (Florianópolis, Brazil – July 21 to 29, 2008). English version. SCRS/2008/016.

1.1.2 Reference Points: Limit and target reference points are appropriate for the stock.

60 Guideposts	80 Guideposts	100 Guideposts
Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	

The reference points are estimated based on MSY and appropriate for tuna stocks. The estimate will depend upon the stock assessment model used. The stock assessments used a production model, which are often more precautionary as they depend on total biomass rather than just spawning stock biomass.

Given that skipjack is a short-lived species, total biomass based production models should, if other assumptions are met, provide a reasonable basis for estimating skipjack reference points. This meets the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues.

There is no specific limit point accepted by the management authority. The trigger point (MSY) is set above the level at which there is an appreciable risk of impairing reproductive capacity and therefore there is an implied limit below this point. The default 50% B_{MSY} is assumed here for purposes of defining stock status. However, the lack of a well-defined point indicates that the SG80 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

The intention implied by the scientific advice and management response is to maintain the stock at or above the MSY level. Therefore, although no target reference point is defined, the target region is effectively defined as the biomass just above the MSY level, which meets the SG80.
A more precise definition justified through scientific analysis and research would be necessary before the SG100 could be met. For example, no guidance is available on how far above B_{MSY} the stock should be maintained, based on acceptable risk for example. Neither is there any reference to the ecological role of the stock.
The scoring issue related to low trophic species (*for low trophic level species, the target reference point takes into account the ecological role of the stock*) is **not** considered for tuna because it is not a low trophic level species.
The fishery meets all SG60 and 2 out of 3 SG80.
Score 1.1.2: 75
Condition: A well-defined and justified limit reference point must be recognized by the management authority.

References

ICCAT (2008) Report of the 2008 ICCAT Yellowfin and Skipjack Stock Assessments Meeting (Florianópolis, Brazil – July 21 to 29, 2008). English version. SCRS/2008/016.
Restrepo V.R. (2009) Red, Green and Yellow: Thoughts on Stock Status and the ICCAT Convention Objectives. Collect. Vol. Sci. Pap. ICCAT, 64(7): 2663-2673. SCRS/2008/172.

1.1.3 Stock Rebuilding: Where the stock is depleted, there is evidence of stock rebuilding.

The stock is not depleted and therefore this performance indicator is not scored.

1.2 Harvest Strategy (management)

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

60 Guideposts	80 Guideposts	100 Guideposts
The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.

ICCAT's objective is embedded in the preamble of its Convention finalized 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 organization, provides a forum where the various countries exploiting tunas can work together to implement the strategy to meet this objective.

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 MSY. Currently catches are estimated to be below MSY, and are constrained by controls on bigeye bycatch.

With the aim of protecting juvenile bigeye tuna, French and the Spanish boat owners voluntarily decided to apply a moratorium for fishing under floating objects between November and the end of January for the 1997-1998 and 1998-1999 periods, and a similar moratorium was then extended by the Commission to January 2005. This moratorium has been shown to reduce skipjack catches, although it also coincides with reductions in fishing effort.

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 achieve management objectives, meeting the 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 the SG80.

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

In the case of the Eastern skipjack stock, the assessment showed that the skipjack stock is very 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}. This meets the 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 the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place that is expected to determine whether the harvest strategy is working.		The harvest strategy is periodically reviewed and improved as necessary.

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. 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, although the fishery clearly meets the SG60, it does not meet the SG100.
The fishery meets all SG60 and 1 out of 2 SG80.
Score 1.2.1: 70

References

ICCAT (2007) Basic Texts. International Commission for the Conservation of Atlantic Tunas. 5th Revision. Madrid, Spain.
ICCAT (2008) Report of the 2008 ICCAT Yellowfin and Skipjack Stock Assessments Meeting (Florianópolis, Brazil – July 21 to 29, 2008). English version. SCRS/2008/016.
ICCAT (2009) Report of the Independent Performance Review of ICCAT.
ICCAT (2011) 8.3 Skipjack Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1.
ICCAT (2011) Report of the Standing Committee on Research and Statistics (SCRS). Madrid, Spain, October 3-7, 2011.
Restrepo V.R. (2009) Red, Green and Yellow: Thoughts on Stock Status and the ICCAT Convention Objectives. Collect. Vol. Sci. Pap. ICCAT, 64(7): 2663-2673. SCRS/2008/172.

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules in place

60 Guideposts	80 Guideposts	100 Guideposts
Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the trigger point (MSY). 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. The fact that appropriate action would be taken if the stock came under increased pressure is presumed, but not assured.

60 Guideposts	80 Guideposts	100 Guideposts
	The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules take into account a wide range of uncertainties.

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

60 Guideposts	80 Guideposts	100 Guideposts
There is some evidence that tools used to implement harvest control rules 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 harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

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 the SG60. This evidence is limited to observing the results, and therefore the SG80 is not met.

All SG60 were met, but none of the SG80.
Score 1.2.2: 60
Condition: The fishery must put in place a well-defined harvest control rule that reduce the exploitation rate as risks to impairing recruitment increase.

References

ICCAT (2008) Report of the 2008 ICCAT Yellowfin and Skipjack Stock Assessments Meeting (Florianópolis, Brazil – July 21 to 29, 2008). English version. SCRS/2008/016.

ICCAT (2009) Report of the Independent Performance Review of ICCAT.
ICCAT (2011) 8.3 Skipjack Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1.

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

60 Guideposts	80 Guideposts	100 Guideposts
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 is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

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. The working group appears to believe, among other things, that the Eastern stock comprises of a series of sub-stocks for which the structure is not well understood.

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

Fishery removals are monitored at a level consistent with the harvest control rule. However, the abundance monitoring indices are very imprecise. 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. There were a number of abundance indices available from bait boats and purse seine catch and effort, but there would be some concerns over the way effort was measured. The 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 a harvest control rule for this stock (see PI 1.2.2). Therefore, the fisheries meet the 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 the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	There is good information on all other fishery removals from the stock.	

ICCAT has put considerable effort in getting countries to record and report catches. The current level of reporting is far from perfect given the number of small countries involved and difficulties in monitoring small vessels and activities in oceanic waters well away from the coast. This illustrates the ongoing 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 the SG80.
The fishery meets all SG60 and 1 out of 3 SG80.

Score 1.2.3: 75

References

ICCAT (2008) Report of the 2008 ICCAT Yellowfin and Skipjack Stock Assessments Meeting (Florianópolis, Brazil – July 21 to 29, 2008). English version. SCRS/2008/016.
ICCAT (2009) Report of the Independent Performance Review of ICCAT.
ICCAT (2011) 8.3 Skipjack Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1.

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

60 Guideposts	80 Guideposts	100 Guideposts
The assessment estimates stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.

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 biomass dynamics 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 were due to problems with the data rather than the assessment methods themselves (see PI 1.2.3).
The assessment attempts to account for some features of the species biology and the fishery, but the most reliable approaches remain broadly generic, meeting the SG80, but not the 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, could lead to an improved assessment meeting the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
The major sources of uncertainty are identified.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.

The assessments undertaken include fully stochastic (Bayesian) methods, and these results are reported along with other assessment approaches. 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 the SG80, but the quantitative probabilities that could be generated are not reported and not used, so that the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

Alternative software has been applied to the available data, although this falls short of a rigorous exploration of alternative hypotheses and approaches to assessment. Most of these assessments were exploratory and only preliminary results were available. There are recommendations to continue work on developing improved statistical models. Overall, the stock assessment has not been tested against many alternative hypotheses, so whether it is robust is not clear. This does not meet the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock assessment is subject to peer review.	The assessment has been internally and externally peer reviewed.

The stock assessment is subject to review through a working group process. SCRS meet annually and review models, data and research on the main tuna species as well as other species within ICCAT jurisdiction. Although external review has taken place of the management system, there is no external technical review of the stock assessments. The SG80 is met, but without external review the SG100 is not. Given the large number of countries and scientists involved in the assessments, it is not clear that external review is necessary however.

The fishery meets all SG60 and SG80, but no SG100.

Score 1.2.4: 80

References

ICCAT (2008) Report of the 2008 ICCAT Yellowfin and Skipjack Stock Assessments Meeting (Florianópolis, Brazil – July 21 to 29, 2008). English version. SCRS/2008/016.

ICCAT (2011) 8.3 Skipjack Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1.

Overall Score: 74.4

North Atlantic Albacore

1.1 Management Outcomes

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

60 Guideposts	80 Guideposts	100 Guideposts
It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.

The best estimate of stock size indicates that the stock was approximately 62% of the B_{MSY} level (95% confidence interval= 45-79%) in 2007, 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 (B_{MSY} = 38% B_0) with estimates suggesting that there is approximately a 90% probability of being above this level (Probability (X<50%) = 1 - Cumulative Normal(X=50%, Mean=62%, Standard deviation = 8.76%) = 91%).

60 Guideposts	80 Guideposts	100 Guideposts
	The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

Based on the 2009 assessment which considers catch, size and effort since the 1950s, it is likely that the stock was below the maximum sustainable yield (MSY) level in 2007, while fishing mortality rate was about 104% of F_{MSY}. Since 2007, catches have been between 21991 and 15364t, below the estimated MSY of 29000t, so the stock can be expected to have increased. It is likely that the stock has increased in size, but this would need to be confirmed through a stock assessment.

The fishery meets the SG60 and 1 out of 2 SG80.

Score 1.1.1: 70

References

ICCAT (2010) Report of the 2009 ICCAT Albacore Stock Assessment Session. Madrid, Spain - July 13 to 18, 2009. SCRS/2009/015 Collect. Vol. Sci. Pap. ICCAT, 65(4): 1113-1253 (2010).

ICCAT (2011) 8.4 Albacore Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1. English version.

1.1.2 Reference Points: Limit and target reference points are appropriate for the stock.

60 Guideposts	80 Guideposts	100 Guideposts
Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	

The reference points are estimated, based on MSY and appropriate for tuna stocks. MSY is estimated as part of the stock assessment and will depend in part on the selectivity of the fishery. The estimate will depend upon the stock assessment model used. Age-structured models were used (VPA and Multifan-CL), which estimated selectivity from age and size composition data.

60 Guideposts	80 Guideposts	100 Guideposts
	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues.

There is no specific limit point accepted by the management authority. The trigger point (MSY) is set above the level at which there is an appreciable risk of impairing reproductive capacity and therefore there is an implied limit below this point. B_{MSY} is 38% B_0, and therefore the default 50% B_{MSY} is assumed here for purposes of defining stock status. However, the lack of a well-defined point indicates that the SG80 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

The intention implied by the scientific advice and management response is to maintain the stock at or above the MSY level. Therefore, although no target reference point is defined, the target region is effectively defined as the biomass just above the MSY level, which meets the SG80.

A more precise definition justified through scientific analysis and research would be necessary before the SG100 could be met. For example, no guidance is available on how far above B_{MSY} the stock should be maintained, based on acceptable risk for example. Neither is there any reference to the ecological role of the stock.

The scoring issue related to low trophic species (*for low trophic level species, the target reference point takes into account the ecological role of the stock*) is **not** considered for tuna because it is not a low trophic level species.

The fishery meets all SG60 and 2 out of 3 SG80.

Score 1.1.2: 75

Condition: A well-defined and justified limit reference point must be recognised by the management authority.

References

ICCAT (2010) Report of the 2009 ICCAT Albacore Stock Assessment Session. Madrid, Spain - July 13 to 18, 2009. SCRS/2009/015 Collect. Vol. Sci. Pap. ICCAT, 65(4): 1113-1253 (2010).

Restrepo V.R. (2009) Red, Green and Yellow: Thoughts on Stock Status and the ICCAT Convention Objectives. Collect. Vol. Sci. Pap. ICCAT, 64(7): 2663-2673. SCRS/2008/172.

1.1.3 Stock Rebuilding: Where the stock is depleted, there is evidence of stock rebuilding.

60 Guideposts	80 Guideposts	100 Guideposts
Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place.	Where stocks are depleted rebuilding strategies are in place.	Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the specified timeframe.

The stock is depleted (defined as the biomass below the MSY level) and a strategy is being applied. This is to limit catches to a level which will allow recovery. The TAC was set just above the best estimate for the replacement yield. However, no adjustment has been made presumably because catches have so far remained well below this level. With recovery, the replacement yield should increase and approach the MSY. Therefore, the current approach seems at least adequate, given the level of monitoring.
The TAC was set for 2008 and 2009 at 30200t [Rec. 07-02] which is above the MSY of 29000t. Nevertheless the stock was expected to increase due to a strong year class entering the fishery. The TAC was set for 2010 and 2011 at 28000t [Rec. 09-05]. Based on the projections, the stock should climb above MSY (50% probability) in 2017.
In practice, catches have demonstrably remained below the MSY, and well below the catch required to rebuild the stock above B_{MSY} based on the projection. Catches have remained well below 28000t in 2008 and 2009. The estimates based on the model projection need to be confirmed through a stock assessment. The stock recovery is not strongly supported by the available abundance indices, and there is no clearly defined time frame, so the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
A rebuilding timeframe is specified for the depleted stock that does not exceed the shorter of 30 years of 3 times its generation time. For cases where 3 generations is less than 5 years, the rebuilding timeframe is up to 5 years.	A rebuilding timeframe is specified for the depleted stock that does not exceed the shorter of 20 years of 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 depleted stock.

No rebuilding time frame is specified by the management authority, but projections by scientists run from 2006 to 2020, with a TAC adopted which indicates the stock should recover by 2017. As a result, it is assumed that rebuilding is specified to take around 8 years assuming that rebuilding starts in 2009. It should be noted that the stock has effectively been depleted since 1970, but rebuilding was not successful during this time. Based on age at first maturity the generation time should be between 5-10 years, so this would be around one generation. From 2006 to 2009 landings have been 36989t, 21991t, 20449t and 15364t. Overall this meets the SG80, assuming the rebuilding program started in 2009 or thereabouts and low catches continue. The policy of carrying over quota makes this less certain. There is no real evidence that the catch was limited in order that the shortest practicable rebuilding time frame would be reached, so the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place to determine whether they are effective in rebuilding the stock within a specified timeframe.	There is evidence that they are rebuilding stocks, or it is highly likely based on simulation modelling or previous performance that they will be able to rebuild the stock within a specified timeframe.	

The projection based on the 2009 stock assessment and catches beyond 2009 at levels observed in 2008 and 2009 would be likely to lead to stock size rising above B_{MSY} by 2014, effectively 5 years after the rebuilding would begin. This was driven by catches significantly lower than some in the time series which led to the original stock depletion and apparent slow rebuilding before the current significant reduction in catch. This recovery is within the specified time frame. The available evidence suggests that the SG80 is met.

The fishery meets all SG60 and SG80, but does not meet any SG100.

Score 1.1.3: 80

References

ICCAT (2010) Report of the 2009 ICCAT Albacore Stock Assessment Session. Madrid, Spain - July 13 to 18, 2009. SCRS/2009/015 Collect. Vol. Sci. Pap. ICCAT 65(4): 1113-1253 (2010).

ICCAT (2011) 8.4 Albacore Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1. English version.

1.2 Harvest Strategy (management)

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

60 Guideposts	80 Guideposts	100 Guideposts
The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.

ICCAT's objective is embedded in the preamble of its Convention finalized 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 organization, 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. 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. This meets the 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 the SG100.

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

The assessment showed that the northern albacore stock is overfished or fully exploited. The present TAC is 28000t. The 2009 assessment showed that the northern albacore stock is overfished, but model projections indicated that catches, at or below 28000t, will recover the stock. The observed catches after 2006 have been even lower than this, so that the biomass should be increasing.
The Scientific Committee considered that the current management regulations are sufficient for the recovery of the northern albacore stock based on model projections. In 2007, the Commission recommended [Rec. 09-05] adopting a catch limit of 28000t until 2011. The management advice from the 2009 stock assessment states that "The current assessment indicates TAC in the future should be **less than** 28,000 t to promote stock rebuilding", which has not been strictly adhered to by the ICCAT recommendation. In practice, the lack of adjustment to the TAC has been justified as actual catches have remained below the replacement yield for a number of years.
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.
The last stock assessment for northern albacore was 2009. In addition, the track record for this fishery is not good. In retrospect, the stock has been repeatedly depleted and maintained below B_{MSY} since 1970. The new strategy appears to have improved on this, but this will need to be confirmed.
Monitoring is in place and the available evidence indicates that the harvest strategy should achieve its objectives, meeting the 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 the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place that is expected to determine whether the harvest strategy is working.		The harvest strategy is periodically reviewed and improved as necessary.

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. 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, although the fishery clearly meets the SG60, it does not meet the SG100.
The fishery meets all SG60 and SG80, but does not meet any SG100.
Score 1.2.1: 80

References

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

ICCAT (2009) Report of the Independent Performance Review of ICCAT.
ICCAT (2010) Report of the 2009 ICCAT Albacore Stock Assessment Session. Madrid, Spain - July 13 to 18, 2009. SCRS/2009/015 Collect. Vol. Sci. Pap. ICCAT, 65(4): 1113-1253 (2010).
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ICCAT (2011) 8.4 Albacore Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1. English version.
Restrepo V.R. (2009) Red, Green and Yellow: Thoughts on Stock Status and the ICCAT Convention Objectives. Collect. Vol. Sci. Pap. ICCAT, 64(7): 2663-2673. SCRS/2008/172.

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules in place

60 Guideposts	80 Guideposts	100 Guideposts
Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the trigger point (MSY). 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. The fact that 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, the SG60 is met, but not the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules take into account a wide range of uncertainties.

It is not possible to evaluate the harvest control in relation to uncertainties, because it has not been defined well enough to do so. The 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. In addition, setting the TAC at the MSY level is probably over-optimistic and arguably not very precautionary as it does not account for error. This may require a downward revision to a more realistic expectation of long term average catch from this stock.

60 Guideposts	80 Guideposts	100 Guideposts
There is some evidence that tools used to implement harvest control rules 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 harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

The current level of control has resulted in sustainable catch levels for northern albacore. If current catches continue the recovery could be very rapid. This amounts to some evidence that the harvest control rules are appropriate and effective, meeting the 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, the SG80 is not met.
All SG60 were met, but none of the SG80.
Score 1.2.2: 60
Condition: The fishery must put in place a well-defined harvest control rule that reduce the exploitation rate as risks to impairing recruitment increase.

References
ICCAT (2009) Report of the Independent Performance Review of ICCAT.
ICCAT (2010) Report of the 2009 ICCAT Albacore Stock Assessment Session. Madrid, Spain - July 13 to 18, 2009. SCRS/2009/015 Collect. Vol. Sci. Pap. ICCAT, 65(4): 1113-1253 (2010).
ICCAT (2011) 8.4 Albacore Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1. English version.

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

60 Guideposts	80 Guideposts	100 Guideposts
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 is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Although data have been generally poor and ICCAT has had considerable problems in maintaining accurate data in its database, there have been significant improvements over time. There was adequate information on stock structure, productivity and the fleets to allow a full stock assessment to be completed. Furthermore, there is evidence that ongoing research is planned to improve information and therefore the stock assessment indicating ongoing 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 the SG100.

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

Monitoring indices are adequate for the current harvest control rule. Indicators of stock abundance consist of standardized catch-per-unit-effort indices. Given the large areas of ocean and dispersal of the species, dedicated surveys are not an option for this type of fishery. A single consistent index was not available for the entire time series, although Chinese Taipei longliner indices covered 1967-2008, which was a considerable time period. The combined indices appear to provide a consistent picture of the changes in abundance that have occurred, although there are some anomalies. 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 the 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 the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	There is good information on all other fishery removals from the stock.	

ICCAT has put considerable effort in getting countries to record and report catches. The current level of reporting is far from perfect given the number of small countries involved and difficulties in monitoring small vessels and activities in pelagic waters well away from the coast. This illustrates the ongoing 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 the SG80. Note that this is in contrast to the Mediterranean fisheries, where information provision to ICCAT appears currently inadequate.
The fishery meets all SG60 and SG80, but does not meet any SG100.
Score 1.2.3: 80

References

Davies, C.A., D. Brophy, P. Megalofonou, E. Gosling, N. Griffin, B. Leroy and N. Clear (2008) Age Estimation In Calcified Calcareous Structures; Preliminary Findings Of An Inter-Laboratory Comparison SCRS/2007/102 Collect. Vol. Sci. Pap. ICCAT, 62(3): 899-910.

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Lee, L.K. and S-Y. Yeh. 2007. Age and growth of South Atlantic albacore – a revision after the revelation of otolith daily ring counts. Collect. Vol. Sci. Pap. ICCAT, 60(2): 443-456.

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

60 Guideposts	80 Guideposts	100 Guideposts
The assessment estimates stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.

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 VPA, Stock Synthesis and Multifan-CL). An updated VPA model is used to assess the North Atlantic albacore stock. The stock assessment has not been carried out frequently considering it is rebuilding from below the MSY level. However, this frequency is still consistent with the current harvest control rule.
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, but the approach remains broadly generic, meeting the SG80, but not the SG100. The main assessment model remains a VPA rather than Stock Synthesis or Multifan-CL both of which should be able to model the data and biology of the species more accurately. Improved information on the biology from, for example, tagging studies, could lead to an improved assessment meeting the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
The major sources of uncertainty are identified.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.

The main assessment is not stochastic, although data resampling techniques allow estimates of uncertainty and can report results in a probabilistic way. The alternative exploratory methods (Multifan-CL and Stock Synthesis) do allow full probabilistic evaluation, but were rejected by the assessment due to the problems with documentation. They are effectively “black box” stock assessments unless scientists very familiar with the methods are present. However, it is not clear that consideration of risk is included in management decision making. No explicit reference is made to levels of risk in scientific advice and tables use predominantly the maximum likelihood estimates for the Northern albacore assessment. Therefore, the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

Alternative software has been applied to the available data, although this falls short of a rigorous exploration of alternative hypotheses and approaches to assessment. New approaches have not resulted in a fundamental change to the method used. The results of the preliminary Multifan-CL runs were viewed by the working group as the most likely replacement, but considered further work on the fitting procedure was required. 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 the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock assessment is subject to peer review.	The assessment has been internally and externally peer reviewed.

The stock assessment is subject to review through a working group process. SCRS meet annually and review models, data and research on the main tuna species as well as other species within ICCAT jurisdiction. Although external review has taken place of the management system, there is no external technical review of the stock assessments. Given the large number of countries and scientists involved in the assessments, it is not clear that external review is necessary however.

The fishery meets all SG60 and SG80, but no SG100.

Score 1.2.4: 80

References

ICCAT (2011) 8.4 Albacore Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1. English version.

ICCAT (2010) Report of the 2009 ICCAT Albacore Stock Assessment Session. Madrid, Spain - July 13 to 18, 2009. SCRS/2009/015 Collect. Vol. Sci. Pap. ICCAT, 65(4): 1113-1253 (2010).

Rademeyer, R.A., D.S. Butterworth and A.J. Penney (2004) A Bayesian Assessment of the South Atlantic population of albacore which explicitly models changes in targeting. Collect. Vol. Sci. Pap. ICCAT, 56(4): 1360-1390.

Overall Score: 75.0

South Atlantic Albacore

1.1 Management Outcomes

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

60 Guideposts	80 Guideposts	100 Guideposts
It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.

The best estimate of stock size indicates that the South Atlantic albacore stock was approximately 88% of the B_{MSY} level (95% confidence interval= 55-159%) in 2009, 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.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

Based on the 2011 assessment which considers catch, size and effort since the 1950s, it is likely that the stock was below the maximum sustainable yield (MSY) level in 2009, while fishing mortality rate was about 107% of F_{MSY}. Since 2005, catches have been between 18 891t and 24 452t, well below the estimated MSY of 28000t (95% Confidence interval: 23 296t and 98 371t). This is more pessimistic than previous assessments. Therefore, while recent catches have been at an appropriate level to allow the stock to rise above the MSY level, catches have exceeded prudent levels in the past and the stock requires some rebuilding to take it back to the target level.

The fishery meets the SG60 and 1 out of 2 SG80.

Score 1.1.1: 70

References

ICCAT (2008) Report of the 2007 ICCAT Albacore Stock Assessment Session. Madrid, Spain - July 5 to 12, 2007. SCRS/2007/015 Collect. Vol. Sci. Pap. ICCAT, 62(3): 697-815.

ICCAT (2011) 8.4 Albacore Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1. English version.

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

1.1.2 Reference Points: Limit and target reference points are appropriate for the stock.

60 Guideposts	80 Guideposts	100 Guideposts
Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	

The reference points are estimated, based on MSY and appropriate for tuna stocks. MSY is estimated as part of the stock assessment and will depend in part on the selectivity of the fishery. The estimate will depend upon the stock assessment model used. An age-structured production model was used which

estimated selectivity from age and size composition data, but predominantly tracked biomass through catch and abundance indices.

60 Guideposts	80 Guideposts	100 Guideposts
	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues.

There is no specific limit point accepted by the management authority. The trigger point (MSY) is set above the level at which there is an appreciable risk of impairing reproductive capacity and therefore there is an implied limit below this point. B_{MSY} is 28% B_0, and therefore the default 50% B_{MSY} is assumed here for purposes of defining stock status. However, the lack of a well-defined point indicates that the SG80 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate *with* similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

The intention implied by the scientific advice and management response is to maintain the stock at or above the MSY level. Therefore, although no target reference point is defined, the target region is effectively defined as the biomass just above the MSY level, which meets the SG80.
A more precise definition justified through scientific analysis and research would be necessary before the SG100 could be met. For example, no guidance is available on how far above BMSY the stock should be maintained, based on acceptable risk for example. Neither is there any reference to the ecological role of the stock.
The scoring issue related to low trophic species (*for low trophic level species, the target reference point takes into account the ecological role of the stock*) is **not** considered for tuna because it is not a low trophic level species.
The fishery meets all SG60 and 2 out of 3 SG80.
Score 1.1.2: 75
Condition: A well-defined and justified limit reference point must be recognized by the management authority.

References

ICCAT(2008) Report of the 2007 ICCAT Albacore Stock Assessment Session. Madrid, Spain - July 5 to 12, 2007. SCRS/2007/015 Collect. Vol. Sci. Pap. ICCAT, 62(3): 697-815.
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Restrepo V.R. (2009) Red, Green and Yellow: Thoughts on Stock Status and the ICCAT Convention Objectives. Collect. Vol. Sci. Pap. ICCAT, 64(7): 2663-2673. SCRS/2008/172.

1.1.3 Stock Rebuilding: Where the stock is depleted, there is evidence of stock rebuilding.

60 Guideposts	80 Guideposts	100 Guideposts
Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place.	Where stocks are depleted rebuilding strategies are in place.	Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the specified timeframe.

The stock is depleted (defined as the biomass below the MSY level) and a strategy is being applied. This is to limit catches to a level which will allow recovery. The TAC is currently just above the best estimate for the replacement yield. However, no adjustment has been made presumably because catches have so far remained well below this level. With recovery, the replacement yield should increase and approach the MSY. Therefore, the current approach seems at least adequate, given the level of monitoring. Catches have demonstrably remained below the MSY, and well below the catch required to rebuild the stock above B_{MSY} based on the projection. Based on this projection the stock should already have been rebuilt above MSY. Catches have remained well below 30000t, which suggests the stock is very likely to have risen well above B_{MSY}. This is based on a model projection and therefore needs to be confirmed through a stock assessment. The stock recovery is not strongly supported by the available abundance indices, and there is no clearly defined time frame, so the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
A rebuilding timeframe is specified for the depleted stock that does not exceed the shorter of 30 years of 3 times its generation time. For cases where 3 generations is less than 5 years, the rebuilding timeframe is up to 5 years.	A rebuilding timeframe is specified for the depleted stock that does not exceed the shorter of 20 years of 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 depleted stock.

No rebuilding time frame is specified by the management authority, but projections by scientists were run from 2010 to 2023. As a result, it is assumed that rebuilding is specified to be 10 years or less. Based on age at first maturity the generation time should be between 5-10 years. Assuming 25000t catch or less, the projections indicated that the stock may be rebuilt (> B_{MSY}) before 2020. From 2006 to 2010 landings have been 24452t, 20269t, 18891t, 22828t and 18900t, which have below the new TAC set in 2010. Overall, this meets the SG80, since projections suggest the stock, if overfished, should increase back towards the target. There is no evidence that the catch was limited in order that the shortest practicable rebuilding time frame would be reached, so the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place to determine whether they are effective in rebuilding the stock within a specified timeframe.	There is evidence that they are rebuilding stocks, or it is highly likely based on simulation modelling or previous performance that they will be able to rebuild the stock within a specified timeframe.	

The projection based on the stock assessment and catches beyond 2008 below the MSY would be highly likely to lead to stock size rising above B_{MSY} by 2009, effectively 2 years after the rebuilding would begin. This was mostly driven by catches significantly lower than some in the time series which led to the original stock depletion. This recovery is within the specified time frame. Considering all scenarios

considered by the stock assessment, there is 54% probability for the stock to be both overfished and experiencing overfishing. Under the new TAC (24000t), the models indicate only a 43% probability that the stock will increase to above B_{MSY} by 2020. Although catches may well remain below this, on balance, the evidence that the stock will recover under the current management plan is not assured. Therefore, available evidence suggests that the SG80 is not met, mainly because the uncertainty is very high and monitoring is not accurate enough nor the TAC precautionary to compensate for this uncertainty.
The fishery meets all SG60 and 2 out of 3 SG80.
Score 1.1.3: 75

References
ICCAT (2008) Report of the 2007 ICCAT Albacore Stock Assessment Session. Madrid, Spain - July 5 to 12, 2007. SCRS/2007/015 Collect. Vol. Sci. Pap. ICCAT, 62(3): 697-815.
ICCAT (2011) 8.4 Albacore Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1. English version.
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1.2 Harvest Strategy (management)

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

60 Guideposts	80 Guideposts	100 Guideposts
The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.

ICCAT's objective is embedded in the preamble of its Convention finalized 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 organization, 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. 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. This meets the 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 the SG100.

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

The assessment showed that the southern albacore stock is overfished or fully exploited. The present TAC is 29900t, but recent catches were below the TAC level. The assessment showed that the southern albacore stock is overfished, but model projections indicated that catches at or below 24000t will recover the stock. The observed catches since 2006 have been even lower than this, so it is likely that the biomass should be increasing.
The Scientific Committee considered that the current management regulations are sufficient for the recovery of the southern albacore stock based on model projections. In 2007, the Commission recommended [Rec. 07-03] adopting a catch limit of 29 900t until 2011. This is the lower 80 percentile of the estimated MSY, but was just above the replacement yield of 29 000t, which is not appropriate in a rebuilding plan. In practice, the lack of adjustment to the TAC has been justified as actual catches have remained below the replacement yield for a number of years.
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.
Monitoring is in place and the available evidence indicates that the harvest strategy should achieve its objectives, meeting the SG80. However, there has been no recent evaluation of the stock status 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 wider context of the fishery, so the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place that is expected to determine whether the harvest strategy is working.		The harvest strategy is periodically reviewed and improved as necessary.

Monitoring is adequate to determine whether the harvest strategy is working. The strategy consists of limiting catches at around the 2005 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. 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, although the fishery clearly meets the SG60, it does not meet the SG100.
The fishery meets all SG60 and SG80, but does not meet any SG100.
Score 1.2.1: 80

References

ICCAT (2007) Basic Texts. International Commission for the Conservation of Atlantic Tunas. 5th Revision. Madrid, Spain.
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Restrepo V.R. 2009. Red, Green and Yellow: Thoughts on Stock Status and the ICCAT Convention Objectives. Collect. Vol. Sci. Pap. ICCAT, 64(7): 2663-2673. SCRS/2008/172.

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules in place

60 Guideposts	80 Guideposts	100 Guideposts
Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the trigger point (MSY). 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. However, this is not well-defined and in the case of southern albacore, catches were required below the catch limit to ensure recovery. The fact that 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, the SG60 is met, but not the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules take into account a wide range of uncertainties.

It is not possible to evaluate the harvest control in relation to uncertainties, because it has not been defined well enough to do so. In addition, setting the TAC at the MSY level is probably overoptimistic and arguably not very precautionary as it does not account for error. This may require a downward revision to a more realistic expectation of long term average catch from this stock.

60 Guideposts	80 Guideposts	100 Guideposts
There is some evidence that tools used to implement harvest control rules 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 harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

The current level of control has resulted in sustainable catch levels for southern albacore. If current catches continue the recovery could be very rapid, which is expected. This amounts to some evidence that the harvest control rules are appropriate and effective, meeting the 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, the SG80 is not met.

All SG60 were met, but none of the SG80.

Score 1.2.2: 60

Condition: The fishery must put in place a well-defined harvest control rule that reduce the exploitation rate as risks to impairing recruitment increase.

References

ICCAT(2008) Report of the 2007 ICCAT Albacore Stock Assessment Session. Madrid, Spain - July 5 to 12, 2007. SCRS/2007/015 Collect. Vol. Sci. Pap. ICCAT, 62(3): 697-815.

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

60 Guideposts	80 Guideposts	100 Guideposts
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 is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

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

The working group has recommended studies on fecundity and maturity and a tagging program. 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 new growth model available for the southern albacore stock in 2007.

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 the SG100.

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

Monitoring indices are adequate for the current harvest control rule. Indicators of stock abundance mainly consist of standardized catch-per-unit-effort indices. Given the large areas of ocean and dispersal of the species, dedicated surveys are not an option for this type of fishery. A single consistent index is not available for the entire time series, but the combined indices do appear to provide a consistent picture of the changes in abundance that have occurred. Recommendations have included improved size composition coverage and CPUE standardization.
This accuracy and coverage of the monitoring program is adequate for the limited current harvest control rule (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 the 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 the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	There is good information on all other fishery removals from the stock.	

ICCAT has put considerable effort in getting countries to record and report catches. The current level of reporting is far from perfect given the number of small countries involved and difficulties in monitoring small vessels and activities in 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 the SG80. Note that this is in contrast to the Mediterranean fisheries, where information provision to ICCAT appears currently inadequate.

The fishery meets all SG60 and SG80, but does not meet any SG100.

Score 1.2.3: 80

References

Davies, C.A., D. Brophy, P. Megalofonou, E. Gosling, N. Griffin, B. Leroy and N. Clear (2008) Age Estimation In Calcified Calcareous Structures; Preliminary Findings Of An Inter-Laboratory Comparison SCRS/2007/102 Collect. Vol. Sci. Pap. ICCAT, 62(3): 899-910.

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

60 Guideposts	80 Guideposts	100 Guideposts
The assessment estimates stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.

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 ASPM and Multifan-CL). An updated Age Structured Production Model (ASPM) is used to assess the South Atlantic albacore stock, which is fitted to the available data using a Bayesian (probabilistic) approach.
The stock assessment has not been carried out frequently considering it is rebuilding from below the MSY level. However, this frequency is still consistent with the current harvest control rule.
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. There is evidence that the growth model has been revised based on updated information.
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 the SG100. Improved information on the biology from, for example, tagging studies, could lead to an improved assessment meeting the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
The major sources of uncertainty are identified.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.

The main ASPM assessment used is stochastic (Bayesian) and reports results in a probabilistic way. This suggests that risk could be taken into account in assessing the stock, but it is not clear that consideration of risk is included in management decision making. No explicit reference is made to levels of risk in scientific advice and tables use predominantly the median estimates for the Southern albacore assessment. Therefore, the SG100 is only partially met.

60 Guideposts	80 Guideposts	100 Guideposts
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

Alternative software has been applied to the available data, although this falls short of a rigorous exploration of alternative hypotheses and approaches to assessment. Despite the ASPM having been updated in 2004, new approaches have not resulted in a fundamental change to the approach. The results of the preliminary Multifan-CL runs were viewed by the working group as unsatisfactory for various reasons. Alternative methods have been looked at in linking size to age, 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 the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock assessment is subject to peer review.	The assessment has been internally and externally peer reviewed.

The stock assessment is subject to review through a working group process. SCRS meet annually and review models, data and research on the main tuna species as well as other species within ICCAT jurisdiction. Although external review has taken place of the management system, there is no external technical review of the stock assessments. Given the large number of countries and scientists involved in the assessments, it is not clear that external review is necessary however.

The fishery meets all SG60 and SG80, but no SG100.

Score 1.2.4: 80

References

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Rademeyer, R.A., D.S. Butterworth and A.J. Penney (2004) A Bayesian Assessment of the South Atlantic population of albacore which explicitly models changes in targeting. Collect. Vol. Sci. Pap. ICCAT, 56(4): 1360-1390.

Overall Score: 74.2

Mediterranean Albacore

The Mediterranean albacore stock was assessed for the first time in 2011. Broadly, two assessment approaches were carried out based on size composition and biomass dynamics. While neither assessment was considered very reliable, the assessments based on size composition were used to provide advice.

Although a stock assessment was carried out for Mediterranean albacore in 2011, its conclusions were not definitive and the stock is therefore a candidate for the Risk-Based Framework (RBF) which forms part of MSC Fisheries Assessment methodology version 2. The RBF was intended for small scale fisheries where they may be unable to carry out scientific stock assessments due to limitations of costs or technical capacity. Neither of these apply in this case. Total reported catches since 1985 have varied between 1349t and 7893t and the majority of catches are taken by surface longline, which is a fully commercial gear. ICCAT has demonstrated an ability to conduct stock assessments with most other stocks, but in this case it is the lack of data which has prevented the necessary research.

Nevertheless, it is possible to propose using the RBF to test whether the risks to the stock are low enough that a scientific assessment is unnecessary to determine that the state of the stock is not overfished. For this reason, reference is made to the RBF methodology below in assessing Mediterranean albacore.

RBF consists of two risk levels (Scale Intensity Consequence Analysis (SICA), and Productivity-Susceptibility Analysis (PSA)). The SICA was designed for use with stakeholder participation, where stakeholders (fishers, industry, NGO representatives and so on) provide information on what they believe are the main risks among the fishing activities. It was not possible to carry out this activity in this case. Using this methodology, it was presumed that the impact of fishing on the target population (albacore) would be considered “high risk”, and the next level (PSA) would need to be considered. PSA is covered in this assessment.

Under the RBF, performance indicators 1.1.2 and 1.1.4 are scored 80 by default, but 1.2.1 and 1.2.2 are scored normally. Performance indicator 1.2.3 (information) is scored in relation to the information necessary for the RBF, harvest strategy and harvest control rule.

1.1 Management Outcomes

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

60 Guideposts	80 Guideposts	100 Guideposts
It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.

The SCRS concluded that the ratio of $F_{current}/F_{MSY}$ in 2010 is less than or equal to 1, and therefore overfishing is probably not occurring. However, SCRS also concluded that the ratio of $B_{current}/B_{MSY}$ cannot be estimated with the available data, and therefore it is not known if the stock is overfished. However, 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. Basically, 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 the 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 the 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 our judgment that it is not therefore “highly likely” to be above any point where recruitment might be impaired.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

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 the SG80 is not met.

No Risk Based Framework
The fishery meets the SG60, but no SG80.
Score 1.1.1: 60

Risk Based Framework
From the available information, albacore was determined to be relatively highly productive, and therefore robust to fishing mortality (Table 1).
The RBF methodology is very sensitive to the Susceptibility. Score any one attribute with a 2 (medium risk) and the fishery would pass with a condition, and score any two attributes with a 2 and the fishery would pass. Any values for any attribute below 3 would need to be argued carefully and with evidence to support the risk level (Table 2 & 3).
Availability
To score below three, a significant proportion (70%) of the population would need to be shown to be unfished. For example, if only 30% or less of the Mediterranean was available to longline gear, this could be considered medium risk. It is apparent that fishing occurs over the Mediterranean, and it is suspected that gaps in areas may be more likely due to poor reporting rather than a lack of fishing activity.
Encounterability
Habitat is clearly pelagic, so that there is high overlap with longline as these are set in these areas. The overlap for depth may be less clear. If the longlines are set to catch albacore, overlap will be high as they will be set to maximize the encounters between albacore and the gear. If albacore is caught as a bycatch while targeting bluefin, it is possible overlap could be lower. However, this would need to be demonstrated by showing that albacore were most abundant in depths where hooks were not placed (following the same approximate proportions as for availability). This is not apparent from the available information.
Post-Capture Mortality
The fish are retained catch, so mortality is 100%.
Selectivity
Hooks are designed to capture tunas, so selectivity in terms of hook size, and ability to retain the catch is high risk. If albacore is the target species, gear is very unlikely to be designed to allow the fish to escape capture.
Other Gears
Gears targeting albacore include surface longlines for albacore, troll lines and gillnets and, mainly in the western Mediterranean, baitboats and rod and reel. Albacore are also caught in purse seine. The RBF under Principle 1 would apply to the whole stock, including all gear types, so the scores here would be unaffected even if an alternative gear was being assessed as the unit of certification. If the albacore was

being assessed under Principle 2, it would not be the target species and would not be certified (i.e. the catch will not be eligible to carry the MSC label), but then scores could be different to those given here.

Table 3. PSA Productivity attributes and scores (Table B4.2. from FAM v2).

Productivity Risk	Low productivity (3)	Medium productivity (2)	High productivity (1)	Albacore tuna	Score
Average age at maturity	>15 years	5-15 years	<5 years	50% mature 2-3 years old	1
Average maximum age	>25 years	10-25 years	<10 years	Males 10 years Females 11 years	2
Fecundity	<100 eggs per year	100-20,000 eggs per year	>20,000 eggs per year	2-3 million eggs / yr	1
Average maximum size	>300 cm	100-300 cm	<100 cm	L_{∞}=94cm	1
Average size at maturity	>200 cm	40-200 cm	<40 cm	50% of mature fish at 62-66 cm	2
Reproductive strategy	Live bearer	Demersal egg layer	Broadcast spawner	Multiple or batch spawners. Pelagic eggs	1
Trophic Level	>3.25	2.75-3.25	<2.75	4.31 (s.e. 0.73)	3
				Average	1.57

All information was obtained from the ICCAT Manual (2010) and from www.Fishbase.org.

Table 4. PSA Susceptibility attributes and scores (from MSC FAM v2).

Susceptibility Risk	Low (1)	Medium (2)	High (3)	Mediterranean Albacore	Score
Availability: Overlap of species range with fishery	<10% overlap	10-30% overlap	>30% overlap	Overlap high	3
Encounterability: Habitat and depth check (scores vary by fishery)	Low overlap with fishing gear	Medium overlap with fishing gear	High overlap with fishing gear	Overlap high	3
Selectivity	See Table 3 below				3
Post-capture mortality (scores vary by fishery)	Evidence of post-capture release and survival	Released alive	Retained species, or majority dead when released	Catch is retained	3
			Average (geometric)		3

Table 5. Selectivity attribute scores for hooks: Scores for hook susceptibility may be assigned using the categories (from Table B4.4 in MSC FAM v2). If there are conflicting answers, e.g. Low on point 1 but medium on point 2, the higher risk score shall be used. Similar selectivity tables would need to be developed for other gears being considered in the certification.

Low Susceptibility	Medium Susceptibility	High Susceptibility	Albacore Surface Longline	Score
1. Does not eat bait (e.g. diet specialist), filter feeder (e.g. basking shark), small mouth (e.g. sea horse).	1. Large species, with adults rarely caught, but juveniles captured by hooks.	1. Bait used in the fishery is selected for this type of species, and is a known diet preference, or important in wild diet.	Bait suitable for albacore	High
2. Species with capacity to break line when hooked (e.g. large toothed whales, and sharks).	2. Species with capacity to break snood when being landed.	2. Species unable to break snood when being landed	Wire snoods used?	High
3. Selectivity known to be low from selectivity analysis/experiment (e.g. <33% of fish encountering gear are selected)	3. Selectivity known to be medium from selectivity analysis/experiment (e.g. 33-66% of fish encountering gear are selected).	3. Selectivity known to be high from selectivity analysis/experiment (e.g. >66% of fish encountering gear are selected)	Unknown	High
			Numerical score	3

Overall score combining Productivity and Susceptibility scores = 3.39 (Table 4).
PSA score: 3.39 > 3.18 (High Risk reference point). Therefore the fishery is high risk and fails requirements on the stock status performance indicator (PI 1.1.1 MSC Score < 60).

References

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

ICCAT(2010) ICCAT Manual 2.1.4: Albacore (1st Edition 2010).

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

ICCAT (2011) 8.4 Albacore Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1. English version.

1.1.2 Reference Points: Limit and target reference points are appropriate for the stock.

No Risk Based Framework

60 Guideposts	80 Guideposts	100 Guideposts
Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	

Generic limit and target reference points are available for the stock from the ICCAT basic texts, consistent with other stocks. The reference points would be based on MSY and would be appropriate for tuna stocks. However, MSY has not been estimated because out of the available data. An F_{MSY} proxy used for status in relation to fishing mortality is the natural mortality rate (i.e. current fishing mortality greater than natural mortality would be considered overfishing). This or a lower proxy would be appropriate if used with an additional reference point in relation to abundance which does not currently exist. Therefore, while generic reference points exist, meeting the SG60, the reference point related to abundance has not been estimated and so the SG80 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues.

There is no specific limit point accepted by the management authority. The trigger point (MSY) would be set above the level at which there is an appreciable risk of impairing reproductive capacity and therefore there is an implied limit below this point. However, the lack of a well-defined point indicates that the SG80 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

The intention implied by the scientific advice and management response for other stocks is to maintain the stock at or above the MSY level. Therefore, although no target reference point is defined, the target region is effectively defined as the biomass just above the MSY level, which meets the SG80.
A more precise definition justified through scientific analysis and research would be necessary before the SG100 could be met. For example, no guidance is available on how far above B_{MSY} the stock should be maintained, based on acceptable risk for example. Neither is there any reference to the ecological role of the stock.
The scoring issue related to low trophic species (*for low trophic level species, the target reference point takes into account the ecological role of the stock*) is **not** considered for tuna because it is not a low trophic level species.

The fishery meets all SG60 and 1 out of 3 SG80.
Score 1.1.2: 65
Condition: Reference points (MSY or surrogate) must be estimated. A well-defined and justified limit reference point must be recognized by the management authority.

Risk Based Framework
Under the RBF, reference points are defined within the methodology and an automatic score of 80 is awarded.
Score 1.1.2 (RBF): 80

References
ICCAT (2010) Report of the 2010 ICCAT Mediterranean Albacore Data Preparatory Meeting. Madrid, Spain – June 28 to July 2, 2010.
ICCAT (2011) 8.4 Albacore Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1. English version.
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Restrepo V.R. (2009) Red, Green and Yellow: Thoughts on Stock Status and the ICCAT Convention Objectives. Collect. Vol. Sci. Pap. ICCAT, 64(7): 2663-2673. SCRS/2008/172.

1.1.3 Stock Rebuilding: Where the stock is depleted, there is evidence of stock rebuilding.

The stock does not require rebuilding, so this performance indicator is not scored.

1.2 Harvest Strategy (management)

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

60 Guideposts	80 Guideposts	100 Guideposts
The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.

The current harvest strategy is not expected to achieve management objectives for this stock, so the SG60 is not met. The strategy appears to be a *laissez-faire* approach, with no management cycle of feedback and control necessary to ensure a sustainable fishery. 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, a strategy may be developed which would allow the SG60 and SG80 to be met.

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

It is not possible to state that the current harvest strategy is likely to work, so the fishery does not meet the 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.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place that is expected to determine whether the harvest strategy is working.		The harvest strategy is periodically reviewed and improved as necessary.

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 is 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 stock status and therefore 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 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 the SG60. There is no evidence yet that it will respond appropriately to such evaluations, so the SG100 has not been met.

The fishery meets 1 out of 3 SG60.
Score 1.2.1: <60 (FAIL)
Condition: A harvest strategy must be developed which ensures fishery objectives are met and yet is appropriate for the available information.

References

ICCAT (2007) Basic Texts. International Commission for the Conservation of Atlantic Tunas. 5th Revision. Madrid, Spain.
ICCAT (2009) Report of the Independent Performance Review of ICCAT.
ICCAT (2010) Report of the 2010 ICCAT Mediterranean Albacore Data Preparatory Meeting. Madrid, Spain – June 28 to July 2, 2010.
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Restrepo, V.R. (2009) Red, Green and Yellow: Thoughts on Stock Status and the ICCAT Convention Objectives. Collect. Vol. Sci. Pap. ICCAT, 64(7): 2663-2673. SCRS/2008/172.

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules in place

60 Guideposts	80 Guideposts	100 Guideposts
Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the trigger point (MSY). 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. The fact that appropriate action would be taken if it was detected that the stock was overfished, is assumed but not assured. Seeing that the harvest control rules are generally understood rather than well defined, the SG60 is met, but not the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules take into account a wide range of uncertainties.

It is not possible to evaluate the harvest control in relation to uncertainties, because it has not been defined well enough to do so. Indeed, the current status of the fishery as “data poor” and the subsequent increased risks to the fishery are not taken into account at all.

60 Guideposts	80 Guideposts	100 Guideposts
There is some evidence that tools used to implement harvest control rules 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 harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

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

Only 1 out of 2 SG60 were met.
Score 1.2.2: <60 (FAIL)
Condition: The fishery must put in place a well-defined harvest control rule that reduce the exploitation rate as risks to impairing recruitment increases.

References

ICCAT (2009) Report of the Independent Performance Review of ICCAT.
ICCAT (2010) Report of the 2010 ICCAT Mediterranean Albacore Data Preparatory Meeting. Madrid, Spain – June 28 to July 2, 2010.
ICCAT (2011) 8.4 Albacore Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1. English version.

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

60 Guideposts	80 Guideposts	100 Guideposts
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 is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Genetic studies suggest this stock is separated from the North Atlantic stock, and therefore needs to be managed separately. Mediterranean albacore data were reviewed in 2010 and as a result, deficiencies and a lack of information were identified in statistics from major fleets. It was concluded that in order to assess the status of this stock, the CPCs should provide revised and complete data for this purpose. 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 exists (estimates of total catch, mortality, growth), but are incomplete. The fisheries do meet the SG60, but with data insufficient to meet the default ICCAT harvest strategy, the SG80 is not met.

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

Fishery removals are incomplete and there does not appear to be any acceptable indicator monitoring stock abundance. Complete catch and effort from the main longline fisheries are likely to be required to meet the 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, the SG60 would be the best guidepost that any fishery could attain.

60 Guideposts	80 Guideposts	100 Guideposts
	There is good information on all other fishery removals from the stock.	

In general, the Mediterranean catches are highly uncertain. Estimated albacore catches, mainly by Italy and Greece, are still minor (less than 4,000 t) and do not show any significant trend over time. However, there is a lack of information concerning reported catches by many nations in recent years. The trend of fishing effort of the various gears fishing for albacore in the Mediterranean Sea is still not possible to estimate, due to short time series and inadequate coverage of artisanal gears. Information on size composition of the catch is also very limited.
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 the SG80 could not be met.

The fishery meets 1 out of 2 SG60.
Score 1.2.3: <60 (FAIL)
Condition: Information and data must be sufficient to support a harvest strategy.

References

ICCAT (2009) Report of the Independent Performance Review of ICCAT.
ICCAT (2010) Report of the 2010 ICCAT Mediterranean Albacore Data Preparatory Meeting. Madrid, Spain – June 28 to July 2, 2010.
ICCAT (2011) 8.4 Albacore Tuna Executive Summary ICCAT Report 2010-2011. Report for Biennial Period 2010-11. Part I Vol. 1. English version.
ICCAT (2011) The 2011 ICCAT South Atlantic and Mediterranean Albacore Stock Assessment Sessions (Madrid, Spain July 25-29, 2011).

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

60 Guideposts	80 Guideposts	100 Guideposts
The assessment estimates stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.

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 and are appropriate for the stock, meeting the SG60 and 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 the SG100 is not fully met.

60 Guideposts	80 Guideposts	100 Guideposts
The major sources of uncertainty are identified.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.

The main sources of uncertainty in the data have been identified and clearly reviewed and reported. All assessments took account of uncertainty in one way or another. The Bayesian Surplus Production (BSP)

model even evaluated stock status probabilistically, meeting the 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. This meets the SG60 and SG80, but not the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

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 and scenarios before the SG100 could be met.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock assessment is subject to peer review.	The assessment has been internally and externally peer reviewed.

The stock assessment is subject to review through a working group process. SCRS meet annually and review models, data and research on the main tuna species as well as other species within ICCAT jurisdiction. Although external review has taken place of the management system, there is no external technical review of the stock assessments.

No Risk Based Framework

Overall, the stock assessment approach is adequate. In practice, it was only partially successful, but we have assigned this failure to the lack of accurate data (PI 1.2.3) rather than the stock assessment.

The fishery meets all SG80, but no SG100.

Score 1.2.4: 80

Risk Based Framework

Under the RBF, the stock assessment forms part of the methodology and an automatic score of 80 is awarded.

Score 1.2.4: 80

References

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

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

Overall Score: <60.0

PACIFIC OCEAN

Western Pacific Yellowfin

1.1 Management Outcomes

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

60 Guideposts	80 Guideposts	100 Guideposts
It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.

The most recent assessment uses the stock assessment model and software known as Multifan-CL. The yellowfin tuna model is age (28 age-classes) and spatially structured (6 regions) and the catch, effort, size composition and tagging data used in the model are classified by 24 fisheries and quarterly time periods from 1952 through 2010. 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.

Current (2006-2010) spawning biomass relative to spawning biomass at MSY ($SB_{current}/SB_{MSY}$) was estimated at 1.47 with a range resulting from the range of model alternatives of 1.34-1.83. SB_{2010}/SB was 1.25 with a range of 1.02-1.62. $F_{current}/F_{MSY}$ was 0.77 (0.71-0.90) but F has been increasing. Additionally, it was estimated that SB_{MSY} occurs at about 27% of SB_0 whereas $SB_{current}/SB_0$ is about 39%.

There were strong temporal trends in the estimated recruitment series. Initial recruitment was relatively high but declined during the 1950s and 1960s. Recruitment remained relatively constant during the 1970s and 1980s, declined steadily from the early 1990s and then recovered somewhat over the last decade. Recent recruitment is estimated to be lower than the long-term average (approximately 85%). Thus, it is highly likely that the stock is above the point where recruitment would be impaired and there is a high degree of certainty, which meets SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

While there has been no formal adoption of a target reference point by the WCPFC, the implicit target is to maintain biomass above that which would produce MSY. As discussed above, there are some model outcomes that are approximately equal to SB_{MSY}, meeting the SG80.

The stock meets 1 of 2 SG 100.

Score 1.1.1: 90

References

Langley, A., S. Hoyle and J. Hampton (2011) Stock assessment of yellowfin tuna in the western and central Pacific Ocean. 9-17 August 2011. Pohnpei, Federated States of Micronesia. WCPFC-SC7-2011/SA- WP-03.

WCPFC (2011) Seventh Regular Session of the Scientific Committee. Pohnpei, Federated States of Micronesia 9-17 August 2011. Summary Report.

1.1.2 Reference Points: Limit and target reference points are appropriate for the stock.

60 Guideposts	80 Guideposts	100 Guideposts
Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	

The Commission has not formally adopted target or limit reference points, but has endorsed work designed to enable the Scientific Committee to recommend provisional limit reference points to the Commission for target species. In the absence of formally adopted reference points, B_{MSY} and F_{MSY} are taken as constituting implicit target and limit reference points. The current WCPFC practice is that the Scientific Committee issues an agreed statement on the current status of the stock, management advice and implications, which is forwarded to the WCPFC annual session for consideration of any management measures recommended.

Management advice (and the implications of that advice) is regularly provided with respect to indicators of fishing mortality and biomass relative to MSY levels i.e. $F_{current}$ / F_{MSY}, $B_{current}$ / B_{MSY} and $SB_{current}$ /SB_{MSY}. These currently serve as proxy or default target reference points for the WCPFC, which has yet to develop formal reference points for the management of WCPO stocks.

A formal limit reference point has not been determined, but given that this species has an estimated B_{MSY}/B_0 of about 0.27 this suggests that limit reference points should be slightly below this. The advice currently does not provide advice on stock performance relative to this LRP, but appropriate parameters e.g. $B_{current}/B_0$ have been estimated and are available. This meets SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues.

There is no specific limit point accepted by the management authority. The trigger point (MSY) is set above the level at which there is an appreciable risk of impairing reproductive capacity and therefore there is an implied limit below this point. The default 50% B_{MSY} is assumed here for purposes of defining stock status. However, the lack of a well-defined point indicates that the SG80 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

The intention implied by the scientific advice and management response is to maintain the stock at or above the MSY level. Therefore, although no target reference point is defined, the target region is effectively defined as the biomass just above the MSY level, meeting the SG80.

A more precise definition justified through scientific analysis and research would be necessary before the SG100 could be met. For example, no guidance is available on how far above BMSY the stock should be maintained, based on acceptable risk for example. Neither is there any reference to the ecological role of the stock.
The scoring issue related to low trophic species (*for low trophic level species, the target reference point takes into account the ecological role of the stock*) is **not** considered for tuna because it is not a low trophic level species.
The fishery meets all SG60 and 2 out of 3 SG80.
Score 1.1.2: 75
Condition: A well-defined and justified limit reference point must be recognized by the management authority.

References
Langley, A., S. Hoyle and J. Hampton (2011) Stock assessment of yellowfin tuna in the western and central Pacific Ocean. 9-17 August 2011. Pohnpei, Federated States of Micronesia. WCPFC-SC7-2011/SA- WP-03.
WCPFC (2011) Seventh Regular Session of the Scientific Committee. Pohnpei, Federated States of Micronesia 9-17 August 2011. Summary Report.

1.1.3 Stock Rebuilding: Where the stock is depleted, there is evidence of stock rebuilding.
This performance indicator is not scored because the stock is not depleted.

References
Langley, A., S. Hoyle and J. Hampton (2011) Stock assessment of yellowfin tuna in the western and central Pacific Ocean. 9-17 August 2011. Pohnpei, Federated States of Micronesia. WCPFC-SC7-2011/SA- WP-03.
WCPFC (2011) Seventh Regular Session of the Scientific Committee. Pohnpei, Federated States of Micronesia 9-17 August 2011. Summary Report.

1.2 Harvest Strategy (Management)

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

60 Guideposts	80 Guideposts	100 Guideposts
The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.

The harvest strategy of the WCPFC is to maintain populations of tunas and tuna-like fishes at levels that will permit maximum sustainable yield (MSY).
The current strategy relevant to yellowfin is to limit catches through effort controls (WCPFC CMM-2008-01). That management measure provides detailed actions to be taken by member states on vessel days at sea, FAD closures and other actions. The relationship of the stock's status with determinations of appropriate measures is however unclear, but the yellowfin's stock status is considered to be not overfished and not undergoing overfishing. Currently catches are estimated to be near MSY, but above

the replacement yield so the biomass may decline toward a B_{MSY} level in the future. The implied strategy does not appear to be responsive to stock status, so the SG80 is not met.

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

In the case of the Western 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. Evidence exists that the current constraints on fishing mortality are probably adequate to maintain the stock above B_{MSY}. The harvest strategy has not been well-defined and has not been evaluated, meeting the SG80, but not the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place that is expected to determine whether the harvest strategy is working.		The harvest strategy is periodically reviewed and improved as necessary.

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. 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, although the fishery clearly meets the SG60, it does not meet the SG100.

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. 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 (WCPFC Project 57). Although the implied harvest strategy is reasonable, there is inadequate information available to indicate what improvements might be possible. Therefore, although the stock meets the SG60, it does not meet the SG100.

The fishery meets all SG60 and 1 out of 2 SG80.

Score 1.2.1: 75

References

Langley, A., S. Hoyle and J. Hampton (2011) Stock assessment of yellowfin tuna in the western and central Pacific Ocean. 9-17 August 2011. Pohnpei, Federated States of Micronesia. WCPFC-SC7-2011/SA- WP-03.

WCPFC (2011) Seventh Regular Session of the Scientific Committee. Pohnpei, Federated States of Micronesia 9-17 August 2011. Summary Report.

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules in place

60 Guideposts	80 Guideposts	100 Guideposts
Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the trigger point (MSY). That the WCPFC would take appropriate action should the stock came under increased pressure is presumed, but not assured, only meeting the SG80. The Scientific Committee through the WCPFCs Project 57 has initiated scientific efforts to define options, but this is in the development stage.

60 Guideposts	80 Guideposts	100 Guideposts
	The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules take into account a wide range of uncertainties.

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

60 Guideposts	80 Guideposts	100 Guideposts
There is some evidence that tools used to implement harvest control rules 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 harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

The current level of control, mainly through access rights and licensing, has resulted in sustainable catch levels for yellowfin 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 appear to have been effective in controlling exploitation either by happenstance or design, but detailed information on capacity controls are currently being implemented.

All SG60 were met, but none of the SG80.

Score 1.2.2: 60

Condition: The fishery must put in place a well-defined harvest control rule that reduce the exploitation rate as risks to impairing recruitment increase.

References

Langley, A., S. Hoyle and J. Hampton (2011) Stock assessment of yellowfin tuna in the western and central Pacific Ocean. 9-17 August 2011. Pohnpei, Federated States of Micronesia. WCPFC-SC7-2011/SA- WP-03.

WCPFC (2011) Seventh Regular Session of the Scientific Committee. Pohnpei, Federated States of Micronesia 9-17 August 2011. Summary Report.

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

60 Guideposts	80 Guideposts	100 Guideposts
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 is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Sufficient information (on stock structure, stock productivity, fleet composition), is available to monitor and assess stock status including; 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 a very high level of observer coverage (100% since 2010), port sampling and transshipment monitoring.
There is good information on all other fishery removals from the stock, except for Indonesia. However there are a number of ongoing initiatives to strengthen data collection from small member state fisheries. This meets SG80.
While the range of data is wide, sufficiently supporting the stock assessment, 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 the SG100 is not met.

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

Fishery removals and stock abundance are monitored at a level that is sufficient for the current harvest strategy and assessment, meeting the SG80. However, there is no well-defined harvest control rule. Additionally, recent agreed management actions, which have yet to be fully implemented, may require additional information.
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 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.

60 Guideposts	80 Guideposts	100 Guideposts
	There is good information on all other fishery removals from the stock.	

Catches are measured and monitored well enough for stock assessment and a suitable harvest control rule, meeting the SG80. Although monitoring of catches in some areas is far from perfect, these do not pose an unacceptable risk to the harvest strategy.

The fishery meets all SG60 and SG80, but does not meet any SG100.

Score 1.2.3: 80

References

Langley, A., S. Hoyle and J. Hampton (2011) Stock assessment of yellowfin tuna in the western and central Pacific Ocean. 9-17 August 2011. Pohnpei, Federated States of Micronesia. WCPFC-SC7-2011/SA- WP-03.

WCPFC (2011) Seventh Regular Session of the Scientific Committee. Pohnpei, Federated States of Micronesia 9-17 August 2011. Summary Report.

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

60 Guideposts	80 Guideposts	100 Guideposts
The assessment estimates stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.

The most recent assessment uses the stock assessment model and software known as Multifan-CL. The yellowfin tuna model is age and spatially structured (6 regions) and the catch, effort, size composition and tagging data used in the model are classified by 24 fisheries and quarterly time periods from 1952 through 2010. 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.

60 Guideposts	80 Guideposts	100 Guideposts
The major sources of uncertainty are identified.	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.

Alternative model structures for Multifan-CL 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. Probabilistic results are reported, but not in a form which can be easily used in decision-making.

60 Guideposts	80 Guideposts	100 Guideposts
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

While the assessment and its alternatives provides results that are robust to general determinations of stock status, it is unclear whether it will be robust to harvest control rules that might be implemented in the future. This does not meet the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock assessment is subject to peer review.	The assessment has been internally and externally peer reviewed.

The assessment is subject to internal peer review through the WCPFC SC. In addition, the assessment was subject to an external peer review in 2009.

The stock meets all SG80, and two of four of SG100.

Score 1.2.4: 90

References

Langley, A., S. Hoyle and J. Hampton (2011) Stock assessment of yellowfin tuna in the western and central Pacific Ocean. 9-17 August 2011. Pohnpei, Federated States of Micronesia. WCPFC-SC7-2011/SA- WP-03.

WCPFC (2011) Seventh Regular Session of the Scientific Committee. Pohnpei, Federated States of Micronesia 9-17 August 2011. Summary Report.

Haddon, M. Maguire, J.J. (2010) Independent reviews of 2009 yellowfin stock assessment. www.cie.org.

Overall Score: 79.4

Western Pacific Bigeye

1.1 Management Outcomes

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

60 Guideposts	80 Guideposts	100 Guideposts
It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.

Recruitment is estimated to have been high during 1995–2005 relative to previous decades. However, biomass has experienced large declines over several decades. The decline has stopped in the latest years due to the higher recruitment. Current (2006-2009) spawning biomass relative to SB_{MSY} is 1.37 (range 0.61 to 2.06) and appears to be declining. Current fishing mortality rates are about 46% higher than F_{MSY}. Therefore, the stock is undergoing overfishing and is approaching an overfished state. Current yield is about 84% higher than MSY. Therefore, these catches are not sustainable. While SB is declining, recruitment is in a period of high levels. Therefore, it is highly likely that it is above the point where recruitment would be impaired, meeting the SG80, but with the stock declining and the delay in stock updates, there is not a high degree of certainty this is the case.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

The 2011 assessment indicates that SB is slightly above SB_{MSY}, and therefore within the implied target region of WCPFC, meeting the SG80. However, there is not a high degree of certainty, so the SG100 is not met.

The stock meets all SG80, but none of the SG100.

Score 1.1.1: 80

References

Davies, N., S. Hoyle, S. Harley, A .Langley, P. Kleiber, and J. Hampton (2011) Stock assessment of bigeye tuna in the central and western Pacific Ocean. 9-17 August 2011. Pohnpei, Federated States of Micronesia. WCPFC-SC7-2011/SA- WP-02

WCPFC (2011) Seventh Regular Session of the Scientific Committee. Pohnpei, Federated States of Micronesia 9-17 August 2011. Summary Report.

1.1.2 Reference Points: Limit and target reference points are appropriate for the stock.

60 Guideposts	80 Guideposts	100 Guideposts
Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the	Reference points are appropriate for the stock and can be estimated.	

species category.		

The implied reference point used for Western Pacific bigeye is based on MSY. This is a generic limit and target reference point, using reasonable practice appropriate for the stock. It has been estimated in the stock assessment. Because the implied reference points exist, this meets SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues.

There is no specific limit reference point. The default 50% B_{MSY} may be assumed. The bigeye experience where the stock is approaching an overfished state does not bode well for the future. Therefore, it cannot be argued that the implied limit is effective in removing an appreciable risk of repairing reproductive capacity. The lack of a well-defined point indicates that the SG80 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

The intention implied by the scientific advice and management response is to maintain the stock at or above the MSY level. Therefore, although no target reference point is defined, the target region is effectively defined as the biomass above the MSY level. This meets the SG80. However, the status of the stock in which the stock is approaching an overfished state, does not imbue confidence.
The scoring issue related to low trophic species (for low trophic level species, the target reference point takes into account the ecological role of the stock) is **not** considered for tuna because it is not a low trophic level species.
The fishery meets all SG60 and 2 out of 3 SG80.
Score 1.1.2: 75
Condition: A well-defined and justified limit reference point must be recognized by the management authority.

References

Davies, N., S. Hoyle, S. Harley, A .Langley, P. Kleiber, and J. Hampton (2011) Stock assessment of bigeye tuna in the central and western Pacific Ocean. 9-17 August 2011. Pohnpei, Federated States of Micronesia. WCPFC-SC7-2011/SA- WP-02

WCPFC (2011) Seventh Regular Session of the Scientific Committee. Pohnpei, Federated States of Micronesia 9-17 August 2011. Summary Report.

1.1.3 Stock Rebuilding: Where the stock is depleted, there is evidence of stock rebuilding.

The stock is not depleted (defined as the biomass below the MSY level) therefore this Performance Indicator is not scored

1.2 Harvest Strategy (management)

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

60 Guideposts	80 Guideposts	100 Guideposts
The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.

The harvest strategy is implied to be one of maintaining the Western Pacific bigeye at a level that can support MSY. However, current overfishing and the fact that the stock is approaching an overfished state indicate that this strategy has not been responsive to the status. The WCPFC has agreed to management measure CMM 2008-01 which (among other things) is designed to reduce fishing mortality. The Scientific Committee has recommended a 32% reduction in fishing mortality to alleviate overfishing. However, it is not yet clear that that measure has reduced fishing mortality stated in its objectives since data for 2009 and 2010 are incomplete and estimates of fishing mortality in the final year of the model (2010) are particularly uncertain. Therefore, the SG80 is not met.

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

The 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, meeting the SG60. Given the status of the stock and the discussion above, the harvest strategy is not meeting its objectives. There was no pre-agreement on how to react to stock changes (picked up by PI 1.2.2 below). 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.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place that is expected to determine whether the harvest strategy is working.		The harvest strategy is periodically reviewed and improved as necessary.

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. There is no evidence of any formal review of the harvest strategy. The meets the SG60, but does not meet the SG100.

The fishery meets all SG60 and none of the SG80.

Score 1.2.1: 60

References

Davies, N., S. Hoyle, S. Harley, A .Langley, P. Kleiber, and J. Hampton (2011) Stock assessment of bigeye tuna in the central and western Pacific Ocean. 9-17 August 2011. Pohnpei, Federated States of Micronesia. WCPFC-SC7-2011/SA- WP-02

WCPFC (2011) Seventh Regular Session of the Scientific Committee. Pohnpei, Federated States of Micronesia 9-17 August 2011. Summary Report.

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules in place

60 Guideposts	80 Guideposts	100 Guideposts
Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the trigger point (MSY). That the WCPFC would take appropriate action should the stock came under increased pressure is presumed, but not assured, meeting the SG60, but not the SG80. Indeed the lack of response prior to management measure WCPFC-2008-01 is an example of the need for a control rule.

The Scientific Committee through the WCPFCs Project 57 has initiated scientific efforts to define options, but this is in the development stage.

60 Guideposts	80 Guideposts	100 Guideposts
	The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules take into account a wide range of uncertainties.

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

60 Guideposts	80 Guideposts	100 Guideposts
There is some evidence that tools used to implement harvest	Available evidence indicates that the tools in use are appropriate	Evidence clearly shows that the tools in use are effective in achieving the

control rules are appropriate and effective in controlling exploitation.	and effective in achieving the exploitation levels required under the harvest control rules.	exploitation levels required under the harvest control rules.

The current level of control, mainly through access rights and licensing, has resulted in sustainable catch levels for yellowfin 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 appear so far to have been only partially effective in controlling exploitation, but a better evaluation should become with further analysis. This merits a score of at best of SG60, and if not conservation measures are not found effective may lead to outright failure.

All SG60 met, but no SG80 therefore scores 60.

Score 1.2.2: 60

References

Davies, N., S. Hoyle, S. Harley, A .Langley, P. Kleiber, and J. Hampton (2011) Stock assessment of bigeye tuna in the central and western Pacific Ocean. 9-17 August 2011. Pohnpei, Federated States of Micronesia. WCPFC-SC7-2011/SA- WP-02

WCPFC (2011) Seventh Regular Session of the Scientific Committee. Pohnpei, Federated States of Micronesia 9-17 August 2011. Summary Report.

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

60 Guideposts	80 Guideposts	100 Guideposts
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 is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Sufficient information (on stock structure, stock productivity, fleet composition), is available to monitor and assess stock status including; tagging data, 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 a very high level of observer coverage (100% planned since 2010), port sampling and transshipment monitoring.

There is good information on all other fishery removals from the stock. However there are a number of ongoing initiatives to strengthen data collection from small member state fisheries.

While the range of data is wide, sufficiently supporting the stock assessment, it is not clear the data collection systems will support the detail of the management that has recently been implemented, meeting the SG80.

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

Fishery removals and stock abundance are monitored at a level that is sufficient for the current harvest strategy and assessment, meeting the SG80. However, there is no 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 (see 1.2.1).

While the data are adequate for a suitable harvest control rule, uncertainties in data are significant and not necessarily fully understood, so the 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.

60 Guideposts	80 Guideposts	100 Guideposts
	There is good information on all other fishery removals from the stock.	

Catches are measured and monitored well enough for stock assessment and a suitable harvest control rule, meeting SG80. Although monitoring of catches in some areas is far from perfect, these do not pose an unacceptable risk to the harvest strategy.

The fishery meets all SG60 and SG80, but does not meet any SG100.

Score 1.2.3: 80

References

Davies, N., S. Hoyle, S. Harley, A .Langley, P. Kleiber, and J. Hampton (2011) Stock assessment of bigeye tuna in the central and western Pacific Ocean. 9-17 August 2011. Pohnpei, Federated States of Micronesia. WCPFC-SC7-2011/SA- WP-02

WCPFC (2011) Seventh Regular Session of the Scientific Committee. Pohnpei, Federated States of Micronesia 9-17 August 2011. Summary Report.

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

60 Guideposts	80 Guideposts	100 Guideposts
The assessment estimates stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.

The most recent assessment of bigeye tuna in the WCPO was conducted in 2011 using the Multifan-CL software. The bigeye tuna model is age and spatially structured (6 regions) and the catch, effort, size composition and tagging data used in the model are classified by 25 fisheries and quarterly time periods from 1952 to 2010. 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 the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
The major sources of uncertainty are identified.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.

The assessment evaluates uncertainty in terms of alternative model structures and addresses uncertainty in data and observations, meeting SG80. However, although the uncertainty is reported, it is not presented in a way that can be used decision making; for example in making clear risk-based decisions.

60 Guideposts	80 Guideposts	100 Guideposts
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

The assessment has not been shown to be robust to key status criteria such as those outlined in the independent review. These assumptions can change the perception of the status of the stock, so SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock assessment is subject to peer review.	The assessment has been internally and externally peer reviewed.

The assessment is subject to internal peer review through the WCPFC SC and an external peer review was completed. A pre-assessment workshop held in April 2011 and the independent external review published in 2012.

The stock meets all SG80, and two of four of SG100.

Score 1.2.4: 90

References

Davies, N., S. Hoyle, S. Harley, A .Langley, P. Kleiber, and J. Hampton(2011) Stock assessment of bigeye tuna in the central and western Pacific Ocean. 9-17 August 2011. Pohnpei, Federated States of Micronesia. WCPFC-SC7-2011/SA- WP-02

WCPFC (2011) Seventh Regular Session of the Scientific Committee. Pohnpei, Federated States of Micronesia 9-17 August 2011. Summary Report.

Ianelli, J, Mark Maunder, M, Punt, and A.E. (2012) Independent Review of 2011 WCPO Bigeye Tuna Assessment. WCPFC-SC8-2012/SA-WP-01.

Overall: 75.0

Western Pacific Skipjack

1.1 Management Outcomes

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

60 Guideposts	80 Guideposts	100 Guideposts
It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.

Skipjack stock assessments have been carried out using Multifan-CL modeling of the population dynamics of the stock and the fisheries operating on it, using maximum 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 three spatial regions in the current assessment. It uses catch, effort, size composition, and tagging data in the model, grouped into 18 fisheries (a change from the 17 fisheries used in the previous (2010) assessment) and quarterly time periods from 1972 through 2010. These fisheries, or fleets, are modeled with respect to their selectivity by size, areas fished and standardized catch per effort.

With the changes to the assessment model described above, the major conclusions were that the stock is neither overfished nor in an overfished state and the assessment continues to provide a very high level of confidence that the skipjack stock remains highly productive. 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, meeting the SG100. These conclusions are considered robust, within the statistical uncertainty of the current estimates. The current (2006-2009) value of F/F_{MSY} is 0.37 (ranging between 0.22 and 0.53), but there is negligible probability that $F>F_{MSY}$. $B_{current}$ is estimated at 0.79 B_0 and MSY is now estimated at 1.503 million t. This is about equal to the current catch level. It appears likely that significant increases in effort would result in only minor increases in catch.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

$B_{current}/B_{MSY}$ has been greater than 2.0 for nearly all of the past two decades, meeting the SG100.

The fishery meets all the SG100.
Score 1.1.1: 100

References

Hoyle, S., P. Kleiber, N. Davies, A. Langley, and J. Hampton (2011) Stock assessment of the skipjack tuna in the western and central Pacific. 9-17 August 2011. Pohnpei, Federated States of Micronesia. WCPFC-SC7-2011/SA-WP-04.

WCPFC (2011) Seventh Regular Session of the Scientific Committee. Pohnpei, Federated States of Micronesia 9-17 August 2011. Summary Report.

1.1.2 Reference Points: Limit and target reference points are appropriate for the stock.

60 Guideposts	80 Guideposts	100 Guideposts
Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	

The Commission has not formally adopted target or limit reference points, but has endorsed work designed to enable the Scientific Committee to recommend provisional limit reference points to the Commission for target species. In the absence of formally adopted reference points, the UNFSA Annex II provisions, incorporated in the Convention, are taken as constituting implicit target and limit reference points,. As noted above, the current WCPFC practice is that the Scientific Committee issues an agreed statement on the current status of the stock, management advice and implications, which is forwarded to the WCPFC annual session for consideration of any management measures recommended. Management advice (and the implications of that advice) is regularly provided with respect to indicators of fishing mortality and biomass relative to MSY levels i.e. $F_{current}$ / F_{MSY}, $B_{current}$ / B_{MSY} and $SB_{current}$ /SB_{MSY}. These currently serve as proxy or default target reference points for the WCPFC, which has yet to develop formal reference points for the management of WCPO stocks.
A formal limit reference point has not been determined, but given that this species has an estimated B_{MSY}/B_0 of about 0.3 this suggests that limit reference points should be slightly below this. The advice currently does not provide advice on stock performance relative to this LRP, but appropriate parameters, e.g. $B_{current}/B_0$, have been estimated and are available. This meets the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues.

There is no specific limit point accepted by the management authority. The trigger point (MSY) is set above the level at which there is an appreciable risk of impairing reproductive capacity and therefore there is an implied limit below this point. The default 50% B_{MSY} is assumed here for purposes of defining stock status. However, it remains that there is not a well-defined limit reference point. The SG80 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate *w*ith similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

The intention implied by the scientific advice and management response is to maintain the stock at or above the MSY level. Therefore, although no target reference point is defined, the target region is effectively defined as the biomass just above the MSY level, which meets the SG80.
A more precise definition justified through scientific analysis and research would be necessary before the SG100 could be met. For example, no guidance is available on how far above B_{MSY} the stock should be maintained, based on acceptable risk for example. The Scientific Committee through the WCPFCs Project 57 has initiated scientific efforts to define options.
The scoring issue related to low trophic species (*for low trophic level species, the target reference point takes into account the ecological role of the stock*) is **not** considered for tuna because it is not a low trophic level species.
The stock meets all SG60 and 2 out of 3 SG80 for this Performance Indicator.
Score 1.1.2: 75
Condition: A well-defined and justified limit reference point must be recognized by the management authority.

References

Hoyle, S., P. Kleiber, N. Davies, A. Langley, and J. Hampton (2011) Stock assessment of the skipjack tuna in the western and central Pacific. 9-17 August 2011. Pohnpei, Federated States of Micronesia. WCPFC-SC7-2011/SA-WP-04.

WCPFC (2011) Seventh Regular Session of the Scientific Committee. Pohnpei, Federated States of Micronesia 9-17 August 2011. Summary Report.

1.1.3 Stock Rebuilding: Where the stock is depleted, there is evidence of stock rebuilding.

The stock is not depleted (defined as the biomass below the MSY level) therefore this Performance Indicator is not scored

1.2 Harvest Strategy (management)

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

60 Guideposts	80 Guideposts	100 Guideposts
The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.

The harvest strategy of the WCPFC is to maintain populations of tunas and tuna-like fishes at levels that will permit maximum sustainable yield (MSY).
The current strategy relevant to skipjack is to limit catches to sustainable levels, meeting the SG60. There is currently no specific regulation in effect for skipjack tuna. Because the skipjack 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. Currently catches are estimated to be near MSY, but above the replacement yield (biomass is much greater than B_{MSY}). The biomass may decline toward a B_{MSY} level in the future. There appears to be no strategy to manage this for the skipjack stock.

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

In the case of the Western Pacific skipjack stock, the fishing mortality has not been excessive but appears to be growing. The assessment showed that the skipjack stock is extremely 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 are probably adequate to maintain the stock above B_{MSY}. This meets the SG80. However, the harvest strategy has not been evaluated and therefore does not meet SG100.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place that is expected to determine whether the harvest strategy is working.		The harvest strategy is periodically reviewed and improved as necessary.

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. 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 (WCPFC Project 57).
The fishery meets all SG60 and 1 out of 2 SG80.
Score 1.2.1: 70

References

Hoyle, S., P. Kleiber, N. Davies, A. Langley, and J. Hampton (2011) Stock assessment of the skipjack tuna in the western and central Pacific. 9-17 August 2011. Pohnpei, Federated States of Micronesia. WCPFC-SC7-2011/SA-WP-04.

WCPFC (2011) Seventh Regular Session of the Scientific Committee. Pohnpei, Federated States of Micronesia 9-17 August 2011. Summary Report.

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules in place

60 Guideposts	80 Guideposts	100 Guideposts
Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the trigger point (MSY). That the WCPFC would take appropriate action should the stock came under increased pressure is presumed, but such action is not assured, meeting the SG60, but not the SG80.
The Scientific Committee through the WCPFCs Project 57 has initiated scientific efforts to define options, but this is in the development stage.

60 Guideposts	80 Guideposts	100 Guideposts
	The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules take into account a wide range of uncertainties.

It is not possible to evaluate the harvest control in relation to uncertainties, because it has not been defined well enough to do so, not meeting the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
There is some evidence that tools used to implement harvest control rules 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 harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

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.
All SG60 were met, but none of the SG80.
Score 1.2.2: 60
Condition: The fishery must put in place a well-defined harvest control rule that reduce the exploitation rate as risks to impairing recruitment increases.

References
Hoyle, S., P. Kleiber, N. Davies, A. Langley, and J. Hampton (2011) Stock assessment of the skipjack tuna

in the western and central Pacific. 9-17 August 2011. Pohnpei, Federated States of Micronesia. WCPFC-SC7-2011/SA-WP-04.

WCPFC (2011) Seventh Regular Session of the Scientific Committee. Pohnpei, Federated States of Micronesia 9-17 August 2011. Summary Report.

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

60 Guideposts	80 Guideposts	100 Guideposts
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 is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Sufficient information (on stock structure, stock productivity, fleet composition) is available to monitor and assess stock status including; 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 a very high level of observer coverage (100% since 2010), port sampling and transshipment monitoring. This meets SG80.
There is good information on all other fishery removals from the stock, except for Indonesia. However there are a number of ongoing initiatives to strengthen data collection in Indonesia, Philippines and Vietnam. While the range of data is wide, sufficiently supporting the stock assessment, it is not clear the data collection systems will support the detail of the management that has recently been implemented, not meeting the SG100.

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

Fishery removals and stock abundance are monitored at a level that is sufficient for the current harvest strategy and assessment. However, there is no defined harvest control rule. Additionally, recent agreed-upon management actions which have yet to be fully implemented may require additional information. 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. 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.

60 Guideposts	80 Guideposts	100 Guideposts
	There is good information on all other fishery removals from the stock.	

All catches on this stock are monitored adequately for the stock assessment, meeting the SG80 met.
The fishery meets all SG80 and none of SG100.
Score 1.2.3: 80

References

Banks, R., L. Clark, T. Huntington, T. Lewis and A. Hough (2011) MSC Assessment Report for PNA Western and Central Pacific Skipjack Tuna (*Katsuwonus pelamis*) unassociated and log set purse seine Fishery, Intertek Moody Marine, Derby DE21 6BF, UK.

Hoyle, S. ,P. Kleiber, N. Davies, A. Langley, and J. Hampton (2011) Stock assessment of the skipjack tuna in the western and central Pacific. 9-17 August 2011. Pohnpei, Federated States of Micronesia. WCPFC-SC7-2011/SA-WP-04.

WCPFC. 2011. Seventh Regular Session of the Scientific Committee. Pohnpei, Federated States of Micronesia 9-17 August 2011. Summary Report.

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

60 Guideposts	80 Guideposts	100 Guideposts
The assessment estimates stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.

Skipjack stock assessments have been carried out using MULTIFAN-CL modeling of the population dynamics of the stock and the fisheries operating on it, using maximum 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 three spatial regions in the current assessment. It uses catch, effort, size composition, and tagging data in the model, grouped into 18 fisheries (a change from the 17 fisheries used in the previous (2010) assessment) and quarterly time periods from 1972 through 2010. These fisheries, or fleets, are modeled 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 the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
The major sources of uncertainty are identified.	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.

Alternative model structures for Multifan-CL 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. While probability based estimates are reported, these are not in a form which can be used directly in decision-making.

60 Guideposts	80 Guideposts	100 Guideposts
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

Alternative model structures for Multifan-CL have been applied to the available data and results are reported as a range of outcomes resulting from the model structures. This is useful but falls short of a rigorous exploration of alternative hypotheses and approaches to assessment. While the assessment and its alternatives provides results that are robust to general determinations of stock status, it is unclear whether it will be robust to harvest control rules that might be implemented in the future. This meets SG80 but not meet the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock assessment is subject to peer review.	The assessment has been internally and externally peer reviewed.

The assessment is subject to internal peer review through the WCPFC SC. The WCPFC is also beginning to apply an external peer review process but this has not been applied to this assessment.

The stock meets all SG80, and one of four of SG100.

Performance Indicator Score: 85

References

Hoyle, S., P. Kleiber, N. Davies, A. Langley, and J. Hampton (2011) Stock Assessment of the skipjack tuna in the western and central Pacific. 9-17 August 2011. Pohnpei, Federated States of Micronesia. WCPFC-SC7-2011/SA-WP-04.

WCPFC (2011) Seventh Regular Session of the Scientific Committee. Pohnpei, Federated States of Micronesia 9-17 August 2011. Summary Report.

Overall Score: 80.6

Eastern Pacific Yellowfin

1.1 Management Outcomes

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

60 Guideposts	80 Guideposts	100 Guideposts
It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.

Yellowfin tuna are distributed across the Pacific Ocean. Movement of tagged yellowfin tuna is generally limited to hundreds of kilometers in most cases and exchange between the EPO and the WCPO appears to be limited. This is consistent with the fact that longline CPUE trends differ among areas. It is likely that there is a continuous stock throughout the Pacific Ocean, with exchange of individuals at a local level, although there is some genetic evidence for local isolation. Movement rates of this species between the EPO and the western Pacific cannot be estimated with currently available tagging data.
Recent EPO yellowfin assessments use an integrated statistical age-structured stock assessment model (Stock Synthesis Version 3) to assess the tuna stock. The status of the stock of yellowfin in the EPO results in estimates of spawning biomass, yield per recruit, MSY and other parameters.
The current (2012) assessment indicates that recent fishing mortality rates are lower than those corresponding to the MSY (F is approximately 90% of F_{MSY}). The recent levels of spawning biomass are estimated to be at SSB_{MSY}. Thus, the stock is considered fully exploited and no longer undergoing overfishing.
There have been two, and possibly three, different productivity regimes, and the levels of MSY and the biomasses corresponding to the MSY may differ among the regimes, increasing the uncertainty with the assessment of this stock. However, it is still "highly likely" that the stock is above the point where recruitment would be impaired, meeting the SG80 is met, but not the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

Although a target reference point has not been formally defined, an MSY target is implied by the IATTC Convention. Additionally the scientific advice is structure around estimates relative to MSY.
The recent fishing mortality rates on EPO yellowfin are lower than those corresponding to the MSY (F is approximately 90% of F_{MSY}). The spawning biomass has recently been determined to be around the level corresponding to MSY. Thus, the stock is no longer considered overfished and no longer undergoing overfishing, meeting the SG80. The period of overfishing (relative to F_{MSY}) was relatively short in duration (approximately five years in the mid-2000s). Nevertheless, the stock is not considered to be fluctuating around its target reference point over recent years, so the SG100 is not met.
Score 1.1.1: 80

References

IATTC (2011) Tunas and Billfishes in the Eastern Pacific Ocean in 2010. Fishery Status Report No. 9.

1.1.2 Reference Points: Limit and target reference points are appropriate for the stock.

60 Guideposts	80 Guideposts	100 Guideposts
Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	

The IATTC has yet to develop formal reference points for the management of EPO stocks, but has endorsed work designed to enable the scientific recommendations relative to provisional limit reference points for target species. The current practice is that the scientific advice is reflected in a statement on the current status of the stock, management advice and implications, which is forwarded to the IATTC annual session for consideration of any management measures recommended.
Management advice (and the implications of that advice) is regularly provided with respect to indicators of fishing mortality and biomass relative to MSY levels i.e. $F_{current}$ / F_{MSY}, $B_{current}$ / B_{MSY} and $SB_{current}$ /SB_{MSY}. These currently serve as proxy or default target reference points.
A formal limit reference point has not been determined, but given that this species has an estimated B_{MSY}/B_0 of about 0.26, the limit reference points should be below this. The advice currently does not provide advice on stock performance relative to this LRP, but appropriate parameters, e.g. $B_{current}/B_0$, have been estimated and are available. This meets the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues.

For EPO yellowfin there is no specific limit formally defined by the management authority. MSY is accepted as a target, but there is no limit. If a limit were to be implied then presumably it would be at or below the MSY target. Note that SSB_{MSY} is estimated to occur at 26% of the unfished state. Therefore an implied limit would be at or below this level. The default MSC guidance is a limit of 50% SSB_{MSY}.
However, the lack of a well-defined limit indicates that the SG80 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

The intention implied by the scientific advice and management response is to maintain the stock at or above the MSY level. Therefore, although no target reference point is defined, the target region is effectively defined as the biomass just above the MSY level, which meets the SG80.
A more precise management definition justified through scientific analysis and research would be necessary before the SG100 could be met. For example, no guidance is available on how far above B_{MSY} the stock should be maintained, based on acceptable risk for example.

The scoring issue related to low trophic species (*for low trophic level species, the target reference point takes into account the ecological role of the stock*) is **not** considered for tuna because it is not a low trophic level species.
The stock meets all SG60 and 2 out of 3 SG80.
Score 1.1.2: 75
Condition: A well-defined and justified limit reference point must be recognized by the management authority.

References
IATTC. 2011. Tunas and Billfishes in the Eastern Pacific Ocean in 2010. Fishery Status Report No. 9.

1.1.3 Stock Rebuilding: Where the stock is depleted, there is evidence of stock rebuilding.

The stock is not depleted (defined as the biomass below the MSY level) therefore this Performance Indicator is not scored

1.2 Harvest Strategy (management)

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

60 Guideposts	80 Guideposts	100 Guideposts
The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.

The harvest strategy is implied through IATTC's objectives 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 used as an implied target.
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 yellowfin SSB has declined below SSB_{MSY} and that the Commission has passed a recent resolution (C-11-01-Tuna-conservation-2011-2013) which limits fishing effort through specifying 62 days of no fishing per year (mitigated by allowing a 30 day trip if there is an observer on board). Additionally, a closed fishing area was established. However, it is unclear the linkage of these actions with assessment results and the expected outcomes of the management actions to curtail mortality. Nevertheless, this is a harvest strategy response to the state of the stock, meeting the SG80.

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

The implied harvest strategy is not well-defined and has not been evaluated. There is evidence that the period of overfishing has ended and the stock is recovering. However, the stock remains in an overfished condition and thus, the strategy is not fully evaluated as being clearly able to maintain stocks at target levels, meeting the SG80, but not the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place that is expected to determine whether the harvest strategy is working.		The harvest strategy is periodically reviewed and improved as necessary.

The implied 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. There is no evidence of any formal review of the harvest strategy. Although the harvest strategy is reasonable, there is inadequate information available to indicate what improvements might be possible. The SG60 is met, but not SG100.

The fishery meets all SG80, but none of the SG100.

Score 1.2.1: 80

References

IATTC (2011) Tunas and Billfishes in the Eastern Pacific Ocean in 2010. Fishery Status Report No. 9.

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules in place

60 Guideposts	80 Guideposts	100 Guideposts
Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the trigger point (MSY). There is clear evidence of intention to reduce effort in the face of depletion as indicated by C-11-01-Tuna-conservation-2011-2013. But there is not a linkage of these actions with predicted outcomes in terms of either status or fishing mortality rates. However, the scope of actions which might be taken in the future is not well defined. It is presumed that appropriate action would be taken if the stock came under increased pressure, but not assured. This meets the SG60, but not the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules take into account a wide range of uncertainties.

It is not possible to evaluate the harvest control in relation to uncertainties, because it has not been defined well enough to do so. This does not meet SG80.

60 Guideposts	80 Guideposts	100 Guideposts
There is some evidence that tools used to implement harvest control rules 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 harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

The current level of control, mainly through limits on effort (closing 62 days per year and a closed area) are expected to limit EPO yellowfin at or below current fishing mortality rates. Evidence for the effectiveness of these controls is indicated by predictions of stock recovery within 5 years at current fishing mortality rates. However, the fishing mortality is constrained by controls intended to limit fishing mortality on bigeye tuna, as well. Evidence is therefore limited as to controls which might be needed in the future, and the ability of contracting parties to apply these controls. This clearly meets the SG60, but there is no strong evidence that current tools are sufficient to implement a sustainable harvest control rule.

All SG60 were met, but none of the SG80.

Score 1.2.2: 60

Condition: The fishery must put in place a well-defined harvest control rule that reduce the exploitation rate as risks to impairing recruitment increases.

References

IATTC (2011) Tunas and Billfishes in the Eastern Pacific Ocean in 2010. Fishery Status Report No. 9.

IATTC (2012) Status of yellowfin tuna in the Eastern Pacific Ocean in 2011 and outlook for the future. SAC-03-05.

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

60 Guideposts	80 Guideposts	100 Guideposts
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 is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

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

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.
These data are sufficient for stock assessments to monitor status and to monitor catches and mortality rates to support a harvest strategy. There is a long history of biological and environmental research on EPO YFT. However, information is not comprehensive enough to meet the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and fishery 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.

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. 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.

60 Guideposts	80 Guideposts	100 Guideposts
	There is good information on all other fishery removals from the stock.	

There has been an IATTC observer program since 1993. Additionally, the United States has had an observer program from the 1970s. Observer coverage has allowed discards of YFT to be estimated, as well as estimates of bycatch of other species. This meets the SG80.
The fishery meets all SG80 and 1 of 2 SG100.
Score 1.2.3: 90

References

IATTC (2011) Tunas and Billfishes in the Eastern Pacific Ocean in 2010. Fishery Status Report No. 9.

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

60 Guideposts	80 Guideposts	100 Guideposts
The assessment estimates stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.

An integrated statistical age-structured stock assessment model (Stock Synthesis Version 3.20b) 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. The catch data for the surface fisheries have been updated, and new data added for 2010. New or updated longline catch and catch composition data were available from several longline fleets for 2007-2009, as well as additions of 2010 data for all components of the fishery.
The assessment is appropriate for the stock and for the implied harvest control rule, and is evaluating stock status relative to reference points, taking into account the biology and distribution of yellowfin. This meets SG 100.

60 Guideposts	80 Guideposts	100 Guideposts
The major sources of uncertainty are identified.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.

The assessment reports trends and projections of quantities with confidence intervals. Therefore, estimation uncertainty is being evaluated. Additionally, model uncertainty is being 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 can be computed, but they are not part of the current format for scientific advice (Fishery Status Reports). This meets SG80 but not SG100.

60 Guideposts	80 Guideposts	100 Guideposts
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

The software (SS3) which has been applied has been tested on many stocks worldwide. Additionally, SS3 provides considerable flexibility in modifying model structure based on diagnostics such as degree of fit to key data sources (catch at size, indices of abundance, etc). Exploratory analyses during the original assessment with this software established appropriate spatial and fishery strata. In the current assessment the robustness of scientific advice is evaluated through alternative hypotheses about productivity through the stock recruitment relationship and by testing sensitivity of parameters (steepness, mortality rates). This meets SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock assessment is subject to peer review.	The assessment has been internally and externally peer reviewed.

The stock assessment is subject to review through internal review processes and periodic external review processes. Model structure, data and research are examined for each assessment. This meets SG100.
The fishery meets all SG80 and 3 of 4 SG100.
Score 1.2.4: 95

References
IATTC (2011) Tunas and Billfishes in the Eastern Pacific Ocean in 2010. Fishery Status Report No. 9.

Overall Score: 78.1

Eastern Pacific Bigeye

1.1 Management Outcomes

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

60 Guideposts	80 Guideposts	100 Guideposts
It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.

Bigeye tuna are distributed across the Pacific Ocean, but the bulk of the catch is made closer to the eastern and western shelf areas. Purse-seine catches of bigeye are substantially lower close to the western boundary (150ºW) of the EPO; longline catches are more continuous, but relatively low between 160ºW and 180º. 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. This is consistent with the fact that longline CPUE trends differ among areas. It is likely that there is a continuous stock throughout the Pacific Ocean, with exchange of individuals at local levels. The assessment is conducted as if there were a single stock in the EPO, and there is limited exchange of fish between the EPO and the western and central Pacific Ocean. Its results are consistent with results of other analyses of bigeye tuna on a Pacific-wide basis. In addition, analyses have shown that the results are insensitive to the spatial structure of the analysis.

Recent EPO BET assessments have used an integrated statistical age-structured stock assessment model (Stock Synthesis Version 3) to assess the tuna stock. The status of the stock of bigeye in the EPO results in estimates of spawning biomass, yield per recruit, MSY and other parameters.

The results of this assessment indicate a recent recovery trend for bigeye tuna in the EPO (2005-2010), subsequent to IATTC tuna conservation resolutions initiated in 2004. However, under the current levels of fishing mortality, recent spikes in recruitment are predicted not to sustain this increasing trend.

There was a period of above-average annual recruitment in 1994-1998, followed by a period of below-average recruitment in 1999-2000. The recruitments were above average from 2001 to 2006, and were particularly high in 2005 and 2006, but have been low in more recent years and the stock is expected to decline further.

The current (2012) assessment indicates recent fishing mortality rates are estimated to be slightly below the level corresponding to MSY (about 8% less) and recent levels of spawning biomass are estimated to be above SSB_{MSY}, approximately 12% higher.

These interpretations are highly sensitive to the assumptions made about the steepness parameter of the stock recruitment relationship, the average size of the older fish, the assumed levels of natural mortality for adult bigeye, and the historic period of the bigeye exploitation used in the assessment. The results are more pessimistic if a stock-recruitment relationship is assumed, if a higher value is assumed for the average size of the older fish, if lower rates of natural mortality are assumed for adult bigeye, and if only the late period of the fishery (1995-2009) is included in the assessment. All of these alternative assumptions were tested in the assessment.

It is highly likely that the stock is above where recruitment would be impaired, yet there is not a high degree of certainty. This meets SG80 but not SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

Although a target reference point has not been formally defined, an MSY target is implied by the IATTC Convention. Additionally the scientific advice is structure around estimates relative to MSY.
The current status indicates that fishing mortality rates on EPO bigeye are about 10% higher than those corresponding to the MSY. However, the rates have fluctuated around F_{MSY} since about 2004.
Fishing mortality is approximately 90% of F_{MSY}. The recent levels of spawning biomass are below those corresponding to the MSY after undergoing a 3-4 year period where SSB was less than SSB_{MSY}. Thus, the stock appears to be fluctuating around the MSY reference point. However there is not a high degree of certainty of this. The SG80 is met, but not SG100.
The fishery meets all the SG80, but none of the SG100.
Score 1.1.1: 80

References
IATTC (2011) Tunas and Billfishes in the Eastern Pacific Ocean in 2010. Fishery Status Report No. 9.
IATTC (2012) Status of bigeye tuna in the eastern Pacific Ocean in 2011 and outlook for the future. SAC-03-06.

1.1.2 Reference Points: Limit and target reference points are appropriate for the stock.

60 Guideposts	80 Guideposts	100 Guideposts
Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	

The IATTC has yet to develop formal reference points for the management of EPO stocks, but has endorsed work designed to enable the scientific recommendations relative to provisional limit reference points for target species. The current practice is that the scientific advice is reflected in a statement on the current status of the stock, management advice and implications, which is forwarded to the IATTC annual session for consideration of any management measures recommended.
Management advice (and the implications of that advice) is regularly provided with respect to indicators of fishing mortality and biomass relative to MSY levels i.e. $F_{current}$ / F_{MSY}, $B_{current}$ / B_{MSY} and $SB_{current}$ /SB_{MSY}. These currently serve as proxy or default target reference points.
A formal limit reference point has not been determined, but given that this species has an estimated B_{MSY}/B_0 of about 0.26. This suggests that limit reference points should be at or below this. The advice currently does not provide advice on stock performance relative to this LRP, but appropriate parameters, e.g. $B_{current}/B_0$, have been estimated and are available. This meets SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues.

For EPO BET there is no specific limit formally defined by the management authority. MSY is accepted as a target, but there is no limit. If a limit were to be implied then presumably it would be at or below the MSY target. Note that SSB_{MSY} is estimated to occur at around 20% of the unexploited state. Therefore an implied limit would be at or below this level. The default MSC guidance is a limit of 50% SSB_{MSY}. However, the lack of a well-defined limit indicates that the SG80 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

The intention implied by the scientific advice and management response is to maintain the stock at or above the MSY level. Therefore, although no target reference point is defined, the target region is effectively defined as the biomass just above the MSY level, which meets the SG80.
A more precise definition justified through scientific analysis and research would be necessary before the SG100 could be met. For example, no guidance is available on how far above B_{MSY} the stock should be maintained, based on acceptable risk for example. Neither is there any reference to the ecological role of the stock.
The scoring issue related to low trophic species (*for low trophic level species, the target reference point takes into account the ecological role of the stock*) is **not** considered for tuna because it is not a low trophic level species.
Score 1.1.2: 75
Condition: A well-defined and justified limit reference point must be recognized by the management authority.

References
IATTC (2011) Tunas and Billfishes in the Eastern Pacific Ocean in 2010. Fishery Status Report No. 9.

1.1.3 Stock Rebuilding: Where the stock is depleted, there is evidence of stock rebuilding.

The stock is not depleted (defined as the biomass below the MSY level) therefore this Performance Indicator is not scored

1.2 Harvest Strategy (management)

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

60 Guideposts	80 Guideposts	100 Guideposts
The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.

The harvest strategy is implied through IATTC's objectives 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 used as an implied target.
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 bigeye SSB is above SSB_{MSY} after undergoing a short period of being below. The Commission has passed a recent resolution (C-11-01-Tuna-conservation-2011-2013) which limits fishing effort through specifying 62 days of no fishing per year (mitigated by allowing a 30 day trip if there is an observer on board). Additionally, a closed fishing area was established. However, it is unclear the linkage of these actions with assessment results and the expected outcomes of the management actions to curtail mortality. Nevertheless, this is a harvest strategy response to the state of the stock, meeting the SG80.

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

The implied harvest strategy is not well-defined and has not been evaluated. But there is evidence that the stock is capable of meeting the MSY objectives. The results of the stock assessment indicate a recovery, subsequent to IATTC tuna conservation resolutions initiated in 2004, but sustained by some good recruitment. However, the strategy is not fully evaluated as being clearly able to maintain stocks at target levels. This meets the SG80, but not SG100.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place that is expected to determine whether the harvest strategy is working.		The harvest strategy is periodically reviewed and improved as necessary.

The implied 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. There is no evidence of any formal review of the harvest strategy. Although the harvest strategy is reasonable, there is inadequate information available to indicate what improvements might be possible. The SG60 is met, but not the SG100.
The fishery meets all SG60 and SG80, but none of the SG100.
Score 1.2.1: 80

References

IATTC. 2011. Tunas and Billfishes in the Eastern Pacific Ocean in 2010. Fishery Status Report No. 9.

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules in place

60 Guideposts	80 Guideposts	100 Guideposts
Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the trigger point (MSY). There is clear evidence of intention to reduce effort in the face of depletion as indicated by C-11-01-Tuna-conservation-2011-2013. There is not linkage of these actions with predicted outcomes in terms of either status or fishing mortality rates. However, the scope of actions which might be taken in the future is not well-defined. It is presumed that appropriate action would be taken if the stock came under increased pressure, but not assured. This meets SG60, but not SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules take into account a wide range of uncertainties.

It is not possible to evaluate the harvest control in relation to uncertainties, because it has not been defined well enough to do so. This does not meet SG80.

60 Guideposts	80 Guideposts	100 Guideposts
There is some evidence that tools used to implement harvest control rules 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 harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

The current level of control, mainly through limits on effort (closing 62 days per year and a closed area) are expected to limit EPO bigeye at or below current fishing mortality rates. Evidence for the effectiveness of these controls is indicated by predictions of stock recovery within 5 years at current fishing mortality rates. Controls which might be needed in the future have not been evaluated for effectiveness and the ability of contracting parties to apply these controls. At best, this meets the SG60, but not the SG100.

All SG60 were met, but none of the SG80.

Score 1.2.2: 60

Condition: The fishery must put in place a well-defined harvest control rule that reduce the exploitation rate as risks to impairing recruitment increases.

References

IATTC. 2011. Tunas and Billfishes in the Eastern Pacific Ocean in 2010. Fishery Status Report No. 9.

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

60 Guideposts	80 Guideposts	100 Guideposts
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 is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Sufficient information (on stock structure, stock productivity, fleet composition), is available to monitor and assess stock status including reporting and size-frequency sampling by each fleet and catch-per-unit-effort data from these fleets.
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, but in general there is good information on fishery removals from the stock.
These data are sufficient for stock assessments to monitor status and to monitor catches and mortality rates to support a harvest strategy. There is a long history of biological and environmental research on EPO bigeye, but available data falls short of being comprehensive with gaps in the information for some fleets. Overall, this meets the SG80, but not the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and fishery 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.

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. 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.

60 Guideposts	80 Guideposts	100 Guideposts
	There is good information on all other fishery removals from the stock.	

There has been an IATTC observer program since 1993. Additionally, the United States has had an observer program from the 1970s. Observer coverage has allowed discards of bigeye to be estimated, as well as estimates of bycatch of other species. This meets the SG80.

The fishery meets all SG80, but no SG100.

Score 1.2.3: 80

References

IATTC (2011) Tunas and Billfishes in the Eastern Pacific Ocean in 2010. Fishery Status Report No. 9.

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

60 Guideposts	80 Guideposts	100 Guideposts
The assessment estimates stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.

An integrated statistical age-structured stock assessment model (Stock Synthesis Version 3.20b) was used in the assessment. The stock assessment requires a substantial amount of information. Data on retained catch, discards, catch per unit of effort (CPUE), and age-at-length data and size compositions of the catches from several different fisheries have been analyzed. Assumptions regarding processes such as growth, recruitment, movement, natural mortality, and fishing mortality, have also been made and sensitivities evaluated. Catch and CPUE for the surface fisheries have been updated to include new data for 2010.

The assessment is appropriate for the stock and for the implied 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 SG 100.

60 Guideposts	80 Guideposts	100 Guideposts
The major sources of uncertainty are identified.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.

The assessment reports trends and projections of quantities with confidence intervals. Therefore, estimation uncertainty is being evaluated. Additionally, model uncertainty is being evaluated through alternative hypotheses about productivity through the stock recruitment relationship and by testing sensitivity of parameters. Especially sensitive are assumptions made about the steepness parameter of the stock recruitment relationship, the average size of the older fish, the assumed levels of natural mortality for adult bigeye, and the historic period of the bigeye exploitation used in the assessment. All of these alternative assumptions were tested in the assessment.

However, probabilistic statements of status are not given in summary reports. 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.

60 Guideposts	80 Guideposts	100 Guideposts
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

The software (SS3) which has been applied has been tested on many stocks worldwide. Additionally, SS3 provides considerable flexibility in modifying model structure based on diagnostics such as degree of fit to key data sources (catch at size, indices of abundance, etc). Exploratory analyses during the original assessment with this software established appropriate spatial and fishery strata. In the current assessment the robustness of scientific advice is evaluated through alternative hypotheses about productivity through the stock recruitment relationship and by testing sensitivity of parameters (steepness, mortality rates). This meets SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock assessment is subject to peer review.	The assessment has been internally and externally peer reviewed.

The stock assessment is subject to review through internal review processes and periodic external review processes. Model structure, data and research are examined for each assessment. This meets SG100.

The fishery meets 3 of 4 SG100 for 1.2.4.
Score 1.2.4: 95

References

IATTC. 2011. Tunas and Billfishes in the Eastern Pacific Ocean in 2010. Fishery Status Report No. 9.

Overall Score: 78.1

Eastern Pacific Skipjack

1.1 Management Outcomes

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

60 Guideposts	80 Guideposts	100 Guideposts
It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.

The last full assessment of EPO skipjack was done in 2011 using four methods; 1) fishery and biological indicators; 2) analysis of tag data; 3) a length structured stock assessment model; 4) a Spatial Ecosystem and Population Dynamic Model (SEAPODYM).
Yield-per-recruit analysis in the previous assessment could not identify maximum sustainable without a stock-recruitment relationship, which remains undefined. As the stock assessments and reference point for skipjack are uncertain, alternative methods were used to assess the stock in addition to the indicators that were previously used to assess the stock in 2004.
Eight data- and model-based indicators were updated and used to evaluate relative status. These include: the purse-seine catch, which has been increasing since 1985, and has fluctuated around it highest level since 2003, but declined in 2010; and a standardized effort indicator of exploitation rate, which has been increasing since about 1991 to above its upper reference level, but has been declining since 2009. The average weight of skipjack has been declining since 2000, and in 2009 was below the lower reference level, but increased slightly in 2010 and 2011. These all suggest an increase in fishing mortality until a recent decline 2009-2011.
The main concern with the skipjack stock is the continuously increasing exploitation rate. The exploitation rate has likely been increasing over the past 20 years, and has fluctuated at high levels since 2003, but declined in 2010 as effort has declined. Additionally, the data- and model-based indicators have yet to detect any adverse consequence to the stock of this increase, which was also the conclusion of the 2004 assessment. In the 2004 assessment Spawning Biomass Ratios (SBRs) were found to fluctuate around a value of 0.5 or more (with large variations) from 1995-2003. Since 2003 the biomass indicators have shown no trend. Indicators have also shown that recruitment is highly variable but that the stock has been in a period of high average recruitment since the mid-1990s. It is reasonable to argue that current SBRs are at a similar level, indicating low impact of fishing on biomass and recruitment. The tagging analysis for regions with good data and the SEAPODYM analysis do not provide any further information which would indicate a credible risk to the stock.
Overall, there is enough confidence in the assessment to indicate that this fishery meets the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

Although a target reference point has not been formally defined, an MSY target is implied by the IATTC Convention. Additionally the scientific advice is structure around estimates relative to MSY.
However, in the case of EPO skipjack, direct estimates of MSY-related quantities cannot be determined. Instead, surrogates for these quantities were determined by developing reference levels for various indicators based upon historical values. Currently stock indicators are fluctuating around the surrogate

target reference points over the last decade or so. Fishing mortality has been increasing but there has been no detected impact on biomass. So, the SG100 is met.
The fishery meets all the SG100.
Score 1.1.1: 100

References
Maunder, M. (2012) Status of Skipjack Tuna in the Eastern Pacific Ocean in 2011. Scientific Advisory Committee 3, Document 7a.

1.1.2 Reference Points: Limit and target reference points are appropriate for the stock.

60 Guideposts	80 Guideposts	100 Guideposts
Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	

The IATTC has yet to develop formal reference points for the management of EPO stocks, but it has endorsed work designed to enable the scientific recommendations relative to provisional limit reference points for target species. The current practice is that the scientific advice is reflected in a statement on the current status of the stock, management advice and implications, which is forwarded to the IATTC annual session for consideration of any management measures recommended. The implied target consistent with objectives of the IATTC is to maintain stocks at levels that can support MSY.
In the case of EPO skipjack, MSY-related quantities cannot be estimated with current data, therefore surrogate target reference points were created based upon the historical record of skipjack indicators. While the target is defined in this way, there is no limit specification. The implied limit using MSC criteria would be 50% SSB_{MSY} or loosely 50% of the surrogate targets. These are appropriate and can be estimated, meeting the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues.

There is no specific limit point accepted by the management authority. The trigger point (MSY) is set above the level at which there is an appreciable risk of impairing reproductive capacity and therefore there is an implied limit below this point. B_{MSY} is 28% B_0, and therefore the default 50% B_{MSY} is assumed here for purposes of defining stock status. However, the lack of a well-defined point indicates that the fishery cannot meet the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

As noted above, surrogate measures of status indicate the stock is maintained at a level consistent with SSB_{MSY}.

A more precise definition justified through scientific analysis and research would be necessary before the SG100 could be met. For example, no guidance is available on how far above B_{MSY} the stock should be maintained, based on acceptable risk for example. Neither is there any reference to the ecological role of the stock. This meets SG80.

The scoring issue related to low trophic species (*for low trophic level species, the target reference point takes into account the ecological role of the stock*) is **not** considered for tuna because it is not a low trophic level species.

The fishery meets all SG60 and 2 out of 3 SG80.

Score 1.1.2: 75

Condition: A well-defined and justified limit reference point must be recognized by the management authority.

References

IATTC (2011) Tunas and Billfishes in the Eastern Pacific Ocean in 2010. Fishery Status Report No. 9.

Maunder, M and S. Harley (2004) Status of skipjack tuna in the eastern tropical Pacific Ocean in 2003 and outlook for 2004. IATTC Stock Assessment Report 5.

1.1.3 Stock Rebuilding: Where the stock is depleted, there is evidence of stock rebuilding.

The stock is not depleted (defined as the biomass below the MSY level) therefore this Performance Indicator is not scored

1.2 Harvest Strategy (management)

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

60 Guideposts	80 Guideposts	100 Guideposts
The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.

The harvest strategy is implied through IATTC's objectives 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 used as an implied target. Additionally 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. The Commission has passed a recent resolution (C-11-01-Tuna-conservation-2011-2013) which limits fishing effort through specifying 62 days of no fishing per year (mitigated by allowing a 30 day trip if there is an observer on board). Additionally, a closed fishing area was established. The impetus of these measures is more related to bigeye and yellowfin. Nevertheless, they may have some impact on skipjack. However, it is unclear the linkage of these actions with assessment results and the expected outcomes of the management actions to curtail mortality. Thus, this can be construed as a harvest strategy response to the state of the stock meeting the SG80 but not the SG100.

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

The implied harvest strategy is not well-defined and has not 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 the SG80 but not SG100.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place that is expected to determine whether the harvest strategy is working.		The harvest strategy is periodically reviewed and improved as necessary.

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. 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, although the fishery clearly meets the SG60, it does not meet the SG100.

The fishery meets all SG60 and SG80, but does not meet any SG100.

Score 1.2.1: 80

References

IATTC (2011) Tunas and Billfishes in the Eastern Pacific Ocean in 2010. Fishery Status Report No. 9.

Maunder, M and S. Harley (2004) Status of skipjack tuna in the eastern tropical Pacific Ocean in 2003 and outlook for 2004. IATTC Stock Assessment Report 5.

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules in place

60 Guideposts	80 Guideposts	100 Guideposts
Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the trigger point (MSY). There is clear evidence of intention to reduce effort in the face of depletion as indicated by C-11-01-Tuna-conservation-2011-2013. There is not linkage of these actions with predicted outcomes in terms of either status or fishing mortality rates. However, the scope of actions which might be taken in the future is not well-defined. It is presumed that appropriate action would be taken if the stock came under increased pressure, but not assured. This meets SG60, but not SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules take into account a wide range of uncertainties.

It is not possible to evaluate the harvest control in relation to uncertainties, because it has not been defined well enough to do so. This does not meet SG80.

60 Guideposts	80 Guideposts	100 Guideposts
There is some evidence that tools used to implement harvest control rules 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 harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

The current level of control is mainly passive without direct measure affecting skipjack. The broader tuna conservation measure (closing 62 days per year and a closed area) are expected to indirectly impact skipjack . There is some evidence through historical indicators that the current passive control has been effective. But controls which might be needed in the future have not been evaluated for effectiveness and the ability of contracting parties to apply these controls. At best, this meets only the SG60, not the SG80.

All SG60 were met, but none of the SG80.

Score 1.2.2: 60

Condition: The fishery must put in place a well-defined harvest control rule that reduce the exploitation rate as risks to impairing recruitment increases.

References

IATTC (2011) Tunas and Billfishes in the Eastern Pacific Ocean in 2010. Fishery Status Report No. 9.

Maunder, M and S. Harley (2004) Status of skipjack tuna in the eastern tropical Pacific Ocean in 2003 and outlook for 2004. IATTC Stock Assessment Report 5.

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

60 Guideposts	80 Guideposts	100 Guideposts
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 is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Sufficient information (on stock structure, stock productivity, fleet composition), is available to monitor and status through a suite of indicators.
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.
These data are sufficient for stock assessments to monitor status and to monitor catches and mortality rates to support a harvest strategy. However, the data are limited relative to direct estimates of SSB and recruitment and productivity. This meets SG80, but not SG100.

60 Guideposts	80 Guideposts	100 Guideposts
Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and fishery 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.

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. 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.

60 Guideposts	80 Guideposts	100 Guideposts
	There is good information on all other fishery removals from the stock.	

There has been an IATTC observer program since 1993. Additionally, the United States has had an observer program from the 1970s. Observer coverage has allowed discards of skipjack to be estimated, as well as estimates of bycatch of other species. Removal monitoring is adequate to implement the harvest strategy, meeting the SG80.
The fishery meets all SG60 and SG80, but does not meet any SG100.
Score 1.2.3: 80

References

IATTC (2011)Tunas and Billfishes in the Eastern Pacific Ocean in 2010. Fishery Status Report No. 9.
Maunder, M and S. Harley (2004) Status of skipjack tuna in the eastern tropical Pacific Ocean in 2003 and outlook for 2004. IATTC Stock Assessment Report 5.

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

60 Guideposts	80 Guideposts	100 Guideposts
The assessment estimates stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.

The last full assessment of EPO skipjack was done in 2004 using an age-structured catch-at-length analysis (A-SCALA). Since then data- and model-based indicators have been used to monitor the status of the stock since the last full assessment and to compare to that assessment. Yield-per-recruit analyses are also periodically done. Eight data- and model-based indicators were used to evaluate relative status since the last full assessment. The major features of the biology and distribution of the fishery and population are accounted for in the assessment model, meeting the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
The major sources of uncertainty are identified.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.

The assessment reports trends 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.

60 Guideposts	80 Guideposts	100 Guideposts
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

The assessment has been not been tested and shown to be robust. Many alternative hypotheses exist without formal evaluation. It has been suggested that this stock assessment (and management) would benefit from a full Management Strategy Evaluation which would help to rigorously explore assessment approaches and couple them with management evaluation in the context of harvest control rules. This does not meet SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock assessment is subject to peer review.	The assessment has been internally and externally peer reviewed.

The stock assessment is subject to review through internal review processes where model structure, data and research are examined for the assessment. There is no evidence of external peer review for this stock, of whether the indicators are sufficient for the harvest strategy. This only meets SG80.
The fishery meets all SG80 and 1 of 4 SG100.
Score 1.2.4: 85

References
IATTC. 2011. Tunas and Billfishes in the Eastern Pacific Ocean in 2010. Fishery Status Report No. 9.
Maunder, M and S. Harley. 2004. Status of skipjack tuna in the eastern tropical Pacific Ocean in 2003 and outlook for 2004. IATTC Stock Assessment Report 5.

Overall Score: 82.5

North Pacific Albacore

1.1 Management Outcomes

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

60 Guideposts	80 Guideposts	100 Guideposts
It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.

North Pacific albacore stock was assessed in 2011 using the SS3 modelling framework. This marked a change from traditional VPA approaches. Nevertheless, the change resulted in little difference between biomass trend from the two models and change in biomass scale was attributed to changes in growth rate data rather than to the models, themselves. Therefore, the SS3 results were utilized for management advice.

North Pacific albacore stock is considered to be healthy at current levels of recruitment and fishing mortality, meeting the SG80. Currently the stock is in a regime of high biomass and recruitment, although biomass has been declining.

Current $F_{2006\text{-}2008}$ is about 71% of FSSB-ATHL (Average of 10 lowest SSBs). Thus, it was concluded that overfishing is not occurring and that the stock likely is not in an overfished condition. However, recruitment is a key driver of the dynamics in this stock and a more pessimistic recruitment scenario in the future increases the probability that the stock will not achieve the management objective of remaining above SSB-ATHL threshold with a probability of 50%. Thus, if future recruitment declines about 25% below average historical recruitment levels due either to environmental changes or other reasons, then the impact of $F_{2006\text{-}2008}$ on the stock is unlikely to be sustainable.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

The stock is expected to fluctuate around the long-term median SSB (≈405,000 t) in the foreseeable future given average historical recruitment levels and constant fishing mortality at $F_{2006\text{-}2008}$.This has been used as a surrogate for a target reference point when providing management advice. However, the assessment data have not allowed a credible estimate of MSY to be made. Therefore, while the stock is probably fluctuating around its target, there is no high degree of certainty that this is the case. This meets the SG80, but not the SG100.

The stock meets all the SG80 and meets none of the SG100.

Score 1.1.1: 80

References

ISC (2011) Stock assessment of albacore in the North Pacific Ocean in 2011. Report of the Albacore Working Group Stock Assessment Workshop. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean.4-11 June, 2011. Shizuoka, Japan. WCPFC-SC7-2011/SA-WP-10.

1.1.2 Reference Points: Limit and target reference points are appropriate for the stock.

60 Guideposts	80 Guideposts	100 Guideposts
Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	

The reference points have been computed based upon surrogates over a range of SPRs, on SSB-ATHL, and commonly computed fishing mortality reference points. Currently the SSB is greater than the SSB associated with these surrogates and less than the fishing mortalities associated with these surrogates. However, no estimate of F_{MSY} or a surrogate of it is yet available. Nevertheless, appropriate reference points are available to guide management, meeting the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues.

The limit is based upon the average of the ten years of lowest SSB and the F associated with that SSB level. This corresponded to a period of lower recruitment. Since both SSB and recruitment have been higher over the last decade or so, the implication is that the limit of SSB-ATHL has not impaired recruitment. However, the evidence with respect to recruitment is weak in this case and the limit cannot be considered as a level above an appreciable risk. Therefore, a limit reference meeting the SG80 has not yet been defined.

60 Guideposts	80 Guideposts	100 Guideposts
	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

The stock is expected to fluctuate around the long-term median SSB (~405,000 t) in the foreseeable future given average historical recruitment levels and constant fishing mortality at $F_{2006\text{-}2008}$.This has been used as a surrogate for a target reference point when providing management advice. The

assessment data have not allowed a credible estimate of MSY to be made, but surrogate has the same intent meeting the SG80. It has not been demonstrated that the target is precautionary enough to meet the SG100.

The stock meets all the SG60 and 2 out of 3 SG80.

Score 1.1.2: 75

Condition: A well-defined and justified limit reference point must be recognized by the management authority.

References

ISC (2011) Stock assessment of albacore in the North Pacific Ocean in 2011. Report of the Albacore Working Group Stock Assessment Workshop. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean.4-11 June, 2011. Shizuoka, Japan. WCPFC-SC7-2011/SA-WP-10.

1.1.3 Stock Rebuilding: Where the stock is depleted, there is evidence of stock rebuilding.

Because the stock is not considered as being depleted, this performance indicator is not scored.

1.2 Harvest Strategy (management)

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

60 Guideposts	80 Guideposts	100 Guideposts
The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.

The implied 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 implied harvest strategy is to maintain stock levels at or above the biomass which would produce MSY. 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 steepness. Nevertheless, the observed biomass trends have been maintained above earlier levels. Therefore, the implied strategy has worked toward maintaining the stock, meeting the SG80. However, the strategy is "implied." It is unclear whether this passive harvest strategy will be responsive. Also, the designed aspect of the strategy is limited, failing the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
The harvest strategy is likely to work based on prior experience or plausible argument.	The harvest strategy may not have been fully tested but monitoring is in place and 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.

As noted above, the implied harvest strategy is likely to work based upon the prior history of the stock's dynamics. This provides evidence that the stock increased after a period of low recruitment with

concomitant changes in fishing mortality. The meets the SG80, but the strategy has not been fully evaluated and evidence that objectives will be met remains limited.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place that is expected to determine whether the harvest strategy is working.		The harvest strategy is periodically reviewed and improved as necessary.

Monitoring is adequate to determine whether the harvest strategy is working, meeting the SG60. Catch, CPUE and growth sampling have been adequate to support the assessment but there are limitations. The stock assessment reports estimates of biomass, which indicates whether management is achieving its objectives or not. 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, so the SG100 is not met.

The stock meets all the SG80 and meets none of the SG100.
Score 1.2.1: 80

References

ISC (2011) Stock assessment of albacore in the North Pacific Ocean in 2011. Report of the Albacore Working Group Stock Assessment Workshop. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean.4-11 June, 2011. Shizuoka, Japan. WCPFC-SC7-2011/SA-WP-10.

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules in place

60 Guideposts	80 Guideposts	100 Guideposts
Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	

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. There is evidence of intention to reduce harvest should depletion occur. Currently, broad resolutions to limit increases in effort have been made within the RFMOs (e.g. WCPFC CMM-2005-03), 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, meeting the SG60, but not the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The selection of the harvest control rules takes into account	The design of the harvest control rules take into account a wide range of

	the main uncertainties.	uncertainties.

No harvest control has been selected, so the SG80 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
There is some evidence that tools used to implement harvest control rules 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 harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

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). This demonstrates some evidence of appropriate controls being applied that should meet objectives, at best meeting the 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 the SG80 is not met.

All SG60 were met, but none of the SG80.
Score 1.2.2: 60
Condition: The fishery must put in place a well-defined harvest control rule that reduce the exploitation rate as risks to impairing recruitment increases.

References

ISC (2011) Stock assessment of albacore in the North Pacific Ocean in 2011. Report of the Albacore Working Group Stock Assessment Workshop. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean.4-11 June, 2011. Shizuoka, Japan. WCPFC-SC7-2011/SA-WP-10.

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

60 Guideposts	80 Guideposts	100 Guideposts
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 is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery 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 data are reasonably informative containing relevant information on the spatial distribution of catches, size frequencies, from numerous fleets, and alternative growth and mortality models.

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 CAN troll, USA troll and pole-and-line fisheries, and the JPN PL fisheries. Longline fisheries tend to catch less than 50% of north Pacific albacore by weight and generally catch larger and older albacore. The major longline fisheries are the JPN and TWN LL fisheries. Total annual catches of albacore in the north

Pacific Ocean peaked in 1976 at about 126,000 t, declined to the lowest level in 1991 at about 37,000 t, then increased to a second peak in 1999 at about 125,000 t. Catches in the stock assessment were treated as known with negligible error.
These data have been sufficient to conduct assessments and to evaluate the implied harvest strategy of maintain stocks at or above the biomass SSB-ATHL. Stock structure data are limited, but are consistent with North Pacific Ocean-wide stock. This meets SG80, but information is not comprehensive enough to meet the SG100.

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

Monitoring indices from several fleets' standardized CPUE data are adequate for the implied harvest strategy. Indicators of stock abundance mainly consist of standardised catch-per-unit-effort indices. 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 2011. The data do not presently allow the implied harvest control rule to be monitored with a high degree of certainty, meeting the SG80, but not the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	There is good information on all other fishery removals from the stock.	

Overall, catch data are sufficient to meet the SG80. While some problems exist, they are being addressed and do not increase the risk for the assessment and management of the stock.
The fishery meets all SG60 and SG80, but none of the SG100.
Score 1.2.3: 80

References

ISC (2011) Stock assessment of albacore in the North Pacific Ocean in 2011. Report of the Albacore Working Group Stock Assessment Workshop. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean.4-11 June, 2011. Shizuoka, Japan. WCPFC-SC7-2011/SA-WP-10.

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

60 Guideposts	80 Guideposts	100 Guideposts
The assessment estimates stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the

	points.	species and the nature of the fishery.

North Pacific albacore stock was assessed in 2011 using the SS3 modelling framework. This marked a change from traditional VPA approaches. Nevertheless, the change resulted in little difference between biomass trend from the two models and the change in biomass scale was attributed to changes in growth rate data and estimates rather than to the models, themselves. Therefore, the SS3 results were utilized for management advice.

Sixteen fisheries were defined on the basis of gear, location, season, and the unit of catch (numbers or weight). Analysis revealed strong seasonal differences in the size of fish caught (and hence temporally varying selectivity) in two fisheries, which resulted in the decision to split these fisheries further into seasonal fisheries. Annual indices of relative abundance were developed for eight fisheries. Catch was treated as known with negligible error.

These data have been sufficient to conduct assessments and to evaluate the implied harvest strategy of maintain stocks at or above the biomass SSB-ATHL. Stock structure data are limited, but are consistent with North Pacific Ocean-wide stock. Overall, the assessment is high quality and able to take account of major features of the biology and the data available, meeting the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
The major sources of uncertainty are identified.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.

Stock assessment methods which have been used report uncertainty in estimates of stock status. 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 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 fishing mortality versus SSB at time and projections of the probability of exceeding reference points for alternative catch levels, respectively). This meets the SG80. However, importantly probabilistic information has not be carried through to management advice, so the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

Application of SS3 to North Pacific Albacore has been relatively recent. Therefore, there have been some implications of model structure which have not been rigorously explored, so the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock assessment is subject to peer review.	The assessment has been internally and externally peer reviewed.

The stock assessment of North Pacific albacore was most recently conducted using SS3 for the first time by the ISC. The workshop in which this was done constitutes an "internal" review, although participants included scientists representing nations, RFMOs and industry, meeting the SG80. External reviews have occurred in the past. Nevertheless, it would be necessary for a future external review of the new assessment and methodology to meet the SG100.

The fishery meets all SG60 and SG80, and 1 out of 4 SG100.

Score 1.2.4: 85

References

ISC (2011) Stock assessment of albacore in the North Pacific Ocean in 2011. Report of the Albacore Working Group Stock Assessment Workshop. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean.4-11 June, 2011. Shizuoka, Japan. WCPFC-SC7-2011/SA-WP-10.

Overall Score: 76.9

South Pacific Albacore

1.1 Management Outcomes

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

60 Guideposts	80 Guideposts	100 Guideposts
It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.

The most recent assessment determined that overfishing is not occurring and the stock is not in an overfished state. Estimates of SSB/SSB_{MSY} variable between model configurations, but all indicate that the stock is well above the MSY reference point. The SSB/SSB_{MSY} in 2009 was 2.25. There is no indication that current levels of catch are not sustainable or that recruitment is threatened, meeting the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

The credible range of the current exploitation rate (mean 2007-2009F/F_{MSY} estimates vary but all are well below the MSY level (F/F_{MSY} for 2007-09 was 0.26), and the biomass has been well above the MSY level over recent years. The Scientific Committee (SC) of the WCPFC has indicated that there was still uncertainty regarding the sustainability of the south Pacific albacore stock and the SC recommended in 2008 that catches of south Pacific albacore remain at current levels. While their language is precautionary, it appears that this stock has never been reduced to B_{MSY} and remains well above the level the target level, meeting the SG100.

The stock meets all SG100.

Score 1.1.1: 100

References

Hoyle, S., Langley, A. and Hampton, J. (2008) Stock Assessment of Albacore Tuna in the South Pacific Ocean. Scientific Committee Fourth Regular Session, 11-22 August 2008, Port Moresby, Papua New Guinea, WCPFC-SC4-2008/SA-WP-8.

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Hoyle, S (2011) Stock Assessment of Albacore Tuna in the South Pacific Ocean. WCPFC-SC7-2011.

1.1.2 Reference Points: Limit and target reference points are appropriate for the stock.

60 Guideposts	80 Guideposts	100 Guideposts
Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the	Reference points are appropriate for the stock and can be estimated.	

species category.		

The reference points are estimated based on MSY and are appropriate for tuna stocks. MSY is estimated within the stock assessment and reported to the management system. The relation of the stock relative to MSY is reported as part of the determination of stock status. There are two central reference points B_{MSY} and F_{MSY} which are estimated within the stock assessment. The assessment uses the dimensionless $B_{current}/B_{MSY}$ and $F_{current}/F_{MSY}$ to determine status. The MSY levels, on which management reference points are implicitly defined, take account of the knowledge of the biology of the stock. Where uncertainty exists (such as with the stock recruitment relationship steepness), precautionary values have been used. The reference points are adequate for evaluating the stock status meeting the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues.

There is **no** specific limit reference point set above the level at which there is an appreciable risk of impairing reproductive capacity. Although implied by MSY estimates and stock evaluation, without a formally defined limit reference point the risks of impairing reproductive capacity have not been adequately recognized by the management authority (primarily WCPFC). B_{MSY} is defined and this therefore defines a limit region which management has the objective of avoiding. Using an implicit reference point, it is possible to assess whether recruitment is put at risk and therefore define the region within which this point would be defined (i.e. less than or equal to SB_{MSY}). However, there is insufficient evidence that any limit reference point, implicitly or explicitly, has been adequately recognized by the management authority (primarily WCPFC).
The Scientific Committee is conducting research and a review, which is aimed at establishing limit reference points for tuna stocks in the future. Funds were allocated in 2008 with high priority to run a technical workshop to consider suitability of MSY-based reference points as default limit reference points and how they may be implemented (Project 57). The lack of reference points has been noted by WCPFC and reference points were reviewed as part of the Scientific Committee meeting in 2009. Therefore, although the management authority appears to have recognized this short-coming, the SG80 was not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, meeting the SG80. The target reference region is to maintain biomass at, or above, that required for MSY. This is consistent with the MSC requirement,

but without a clearer definition of how much higher than MSY and without explicitly taking into account uncertainty, the SG100 cannot be met.
All SG60 and 2 out of 3 SG80 were met.
Score: 75
Condition: A well-defined and justified limit reference point must be recognized by the management authority.

References

Campbell, R. (2009) The use of Reference Points in Fisheries Management: A short review. Scientific Committee Fifth Regular Session,10-21 August 2009 Port Vila, Vanuatu. WCPFC-SC5-2009/ME-IP-01
Harley, S.J., Hoyle, S.D., Hampton, J., Kleiber, P. (2009) Characteristics of Potential Reference Points for Use in WCPFC Tuna Stock Assessments WCPFC-SC5-2009/MEWP-02.
Hoyle, S., Langley, A. and Hampton, J. (2008) Stock Assessment of Albacore Tuna in the South Pacific Ocean. Scientific Committee Fourth Regular Session, 11-22 August 2008, Port Moresby, Papua New Guinea, WCPFC-SC4-2008/SA-WP-8.
Hoyle, S. and Davies, N. (2009) Stock Assessment of Albacore Tuna in the South Pacific Ocean. Scientific Committee Fifth Regular Session, Port Vila, Vanuatu, 10-21 August 2009. WCPFC-SC5-2009/SA-WP-6.
Hoyle, S (2011). Stock Assessment of Albacore Tuna in the South Pacific Ocean. WCPFC-SC7-2011.
WCPFC (2008a). Approaches for identification of appropriate reference points and implementation of MSE within the WCPO: an overview and response to issues from SC 4.
WCPFC5-2008/12. Fifth Regular Session of the WCPFC. 8-12 December 2008. Busan, Republic of Korea. (http://wcpfc.org).
WCPFC (2008b). Summary Report. The Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. Scientific Committee. Fourth Regular Session, 11-22 August 2008, Port Moresby, Papua New Guinea.

1.1.3 Stock Rebuilding: Where the stock is depleted, there is evidence of stock rebuilding.

Because the stock is not considered as being depleted, this performance indicator is not scored.

1.2 Harvest Strategy (management)

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

60 Guideposts	80 Guideposts	100 Guideposts
The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.

Management of the albacore stock throughout the South Pacific is a responsibility of the Western and Central Pacific Fisheries Commission (WCPFC). Stock assessments are carried out on a biannual or annual basis, which is relatively frequent given the longevity of the species and current level of exploitation. A stock assessment has been repeated annually over the last few years, 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 stock assessment is completed after a pre-assessment workshop which reviews the assessment and guides development. 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 appropriate 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.
At its second annual meeting the WCPFC passed a Conservation and Management Measure (this is a binding measure that all parties must abide by) stating 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. The SG80 is met.

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

Countries undertake to control catches mainly through effort limits and limits on capacity (i.e. number of vessels targeting albacore). 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. The SG80 is met, but without fuller evaluation the SG100 cannot be met.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place that is expected to determine whether the harvest strategy is working.		The harvest strategy is periodically reviewed and improved as necessary.

Monitoring is in place and assessments, review of status and public reports are being made to allow evaluation. This is adequate given the state of the stock, and meets the SG60. There has been, as yet, no evidence of review or improvements in the overall harvest strategy, so the SG100 is not met.
All SG60 and SG80, but no SG100 were met.
Score 1.2.1: 80

References

Campbell, R. (2009) The use of Reference Points in Fisheries Management: A short review. Scientific Committee Fifth Regular Session,10-21 August 2009 Port Vila, Vanuatu. WCPFC-SC5-2009/ME-IP-01

Hampton, J. and Harley, S. (2009) Assessment of the potential implications of application of CMM-2008-01 for bigeye and yellowfin tuna. WCPFC-SC5-2009/GN-WP-17
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Hoyle, S (2011). Stock Assessment of Albacore Tuna in the South Pacific Ocean. WCPFC-SC7-2011.
Ministry of Fisheries Draft fisheries plan for Highly Migratory Species June 2009
MRAG (2009) Final Report on Independent Review of the Commission's Transitional Science Structure and Functions. WCPFC-SC5-2009/GN-WP-7
Preece, A., Kolody, D., Davies, C. and Hartog, J. (2009) Management strategy evaluation for Australia's east coast tuna and billfish fishery: progress update. WCPFC-SC5-2009/SA- WP-8
WCPFC (2005) Conservation and Management Measure For South Pacific Albacore. Conservation and Management Measure-2005-02
WCPFC-SC (2009a) Summary Report (Draft). Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. Scientific Committee. Fifth Regular Session. Port Vila, Vanuatu. 10–21 August 2009.
WCPFC-SC (2009b) New Zealand. Annual Report to the Commission. Part 1: Information on Fisheries, Research, and Statistics. WCPFC-SC5-AR/CCM-15

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules in place

60 Guideposts	80 Guideposts	100 Guideposts
Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	

The harvest control rule is generally understood as reducing harvest when the stock approaches or falls below the MSY point. 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} benchmarks. 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 the SG60, but until the HCR is well-defined it cannot meet the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules take into account a wide range of uncertainties.

No well-defined harvest control has been selected, so the SG80 cannot be met.

60 Guideposts	80 Guideposts	100 Guideposts
There is some evidence that tools used to implement harvest control rules 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 harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

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. This is exemplified by the Conservation and Management Measure WCPFC-CMM-03 which went into place on Feb 16, 2006. 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. Catches in 2007 and 2008 were below the 2005 levels.

Albacore catch is sustainable and the current advice is to maintain the harvest at that level appears to have been successful, although it is not clear that there is any pressure to increase catches. 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 2007 bigeye catch for the Pacific Ocean (225 006t) is slightly less than the average level for the past ten years.

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}. 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 the SG80.

All SG60 were met, but none of the SG80.

Score 1.2.2: 60

Condition: The fishery must put in place a well-defined harvest control rule that reduce the exploitation rate as risks to impairing recruitment increases.

References

Campbell, R. (2009) The use of Reference Points in Fisheries Management: A short review. Scientific Committee Fifth Regular Session,10-21 August 2009 Port Vila, Vanuatu. WCPFC-SC5-2009/ME-IP-01

Hoyle, S., Langley, A. and Hampton, J. (2008) Stock Assessment of Albacore Tuna in the South Pacific Ocean. Scientific Committee Fourth Regular Session, 11-22 August 2008, Port Moresby, Papua New Guinea, WCPFC-SC4-2008/SA-WP-8.

Hoyle, S (2011). Stock Assessment of Albacore Tuna in the South Pacific Ocean. WCPFC-SC7-2011.

Preece, A., Kolody, D., Davies, C. and Hartog, J. (2009) Management strategy evaluation for Australia's east coast tuna and billfish fishery: progress update. WCPFC-SC5-2009/SA- WP-8

WCPFC (2008b) Approaches for identification of appropriate reference points and implementation of MSE within the WCPO: an overview and response to issues from SC 4. WCPFC5-2008/12. Fifth Regular Session of the WCPFC. 8-12 December 2008. Busan, Republic of Korea. (http://wcpfc.org).

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

60 Guideposts	80 Guideposts	100 Guideposts
Some relevant information	Sufficient relevant information	A comprehensive range of information

related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.	(on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

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. A total of 30 "fleets" were defined for the assessment based on nationality, spatial location and time, with additional groupings based on temporal changes. Catch, effort and size composition data are complete for the fleets in the assessment. A limited amount of tag data was also available, but there are insufficient data to support the explicit spatial modeling available in MFCL. 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 the SG100, is met.

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

Catch data from all fleets are relatively complete and sufficient for the stock assessment. The abundance indices are primarily obtained from catch and effort data, particularly from the many longline fleets operating across the region, giving relatively long time series of information. Cohorts recruiting to specific fisheries are evident in catch length distributions making the data very informative on recruitment to the fishery. This meets the SG80. However not all information is available to the assessment, and the uncertainties with abundance indices used is not fully understood, so the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	There is good information on all other fishery removals from the stock.	

Catches appear to be reported at an acceptable level of accuracy for the stock assessment, meeting the 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.

The fishery meets all SG60 and SG80, but does not meet any SG100.

Score 1.2.3: 80

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

60 Guideposts	80 Guideposts	100 Guideposts
The assessment estimates stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.

The methodology used for the assessment is based on the software MULTIFAN-CL (MFCL), which is software that implements a size-based, age- and spatially-structured population model. Parameters of the model are estimated by maximizing an objective function consisting of likelihood (data) and "prior" information. MFCL was specifically developed to take advantage of the tuna fishery data available from the region. The assessment method should be able to support all appropriate reference points and harvest control rules (see PI 1.1.2 and 1.2.2). While the assessment method was derived in a different way to other methods fitting age structured models (it was derived from ideas in modal progression in length frequency data), the model and software produce equivalent results to other age structured stock assessment methods. The assessment has shown significant improvements over the last 3 years and many problems identified previously have been solved through an improved model and treatment of the data.

The model structure does not fully account for all features of the fishery. A limited ability to model how catchability and selectivity change over time and a single sex, single stock model do not quite fit the population dynamics. Changing selectivity through time has been suggested as a reason for increasing mean length of fish observed in longline fisheries, but MFCL does not have the facility to model this. The differences between the sexes and changes in sex ratios are not modeled directly. A stock-recruitment relationship has not been estimated. The assessment assumes a Beverton and Holt model and a relatively precautionary steepness of 0.75. In all cases, "work-arounds" have been found to allow MFCL to account for these differences in a precautionary way without modeling them directly. With the model being account for the available data and important features of the tuna biology, it meets the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
The major sources of uncertainty are identified.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.

The 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.

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. An "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 the SG80, it does not allow probabilities to be used in decision-making, so the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

The assessment has been tested, but not yet shown to be robust. 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. The cumulative effect of the most recent changes was to reduce the biomass estimates and raise the fishing mortality estimates compared to previous assessments. Model diagnostics indicate that some sources of bias have been removed, but that some problems remain. Therefore, the SG100 is not yet met.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock assessment is subject to peer review.	The assessment has been internally and externally peer reviewed.

The stock assessment has been developed and continues to be used by the SPC. The method has been well-documented and published in peer-review journals. The assessment is conducted by several scientists at the SPC and then presented to and reviewed by a pre-assessment workshop, the WCPFC Scientific Committee, meeting the SG80. The WCPFC is considering independent external review, but the approach will depend on costs. Without an external review, the SG100 cannot be met.

The fishery meets all SG60 and SG80, and 1 out of 4 SG100.

Score: 85

References

Fournier, D.A., Hampton, J. and Sibert, J.R. (1998) MULTIFAN-CL: a length-based, age-structured model for fisheries stock assessment, with application to South Pacific albacore, *Thunnus alalunga.* Can. J. Fish. Aquat. Sci. 55: 2105- 2116.

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Overall Score: 81.9

INDIAN OCEAN

Indian Ocean Yellowfin

1.1 Management Outcomes

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

60 Guideposts	80 Guideposts	100 Guideposts
It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.

The stock assessment in 2011 suggested that the stock was not overfished (SSB_{2009}/SB_{MSY}=1.61 with estimates ranging from 1.47 to 1.78) and overfishing was not occurring (F_{2009}/F_{MSY}=0.84 with estimates ranging from 0.63 to 1.10). Spawning stock biomass in 2009 was estimated to be 35% (31–38%) of the unfished levels. However, estimates of total and spawning stock biomass show a marked decrease over the last decade, accelerated in recent years by the high catches of 2003–2006. Recent reductions in effort and, hence, catches have halted 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 SSB_{2009}/SB_{MSY} is relatively high indicating there is a high degree of certainty that the stock is above the point where recruitment would be impaired. Thus, this meets SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

Based on the 2011 assessment, it is likely that the stock biomass is above that which would produce MSY, while the fishing mortality rate is approaching F_{MSY}. There is a small probability that fishing mortality rates have exceeded F_{MSY} in recent years. However, catches are currently at an appropriate level to allow the stock to be maintained above the B_{MSY}. Nevertheless, there is not a "high degree of certainty" that fishing mortalities have been below a target reference point. Therefore, the stock does not attain SG100.

The stock meets all the SG60 and SG80 and meets one of the SG100.

Score 1.1.1: 90

References

IOTC (2011) Report of the Thirteenth Session of the IOTC Working Party on Tropical Tunas, Lankanfinolhu, Republic of Maldives, 16–23 October 2011. IOTC–2011–WPTT13–R[E].

1.1.2 Reference Points: Limit and target reference points are appropriate for the stock.

60 Guideposts	80 Guideposts	100 Guideposts
Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	

The reference points are estimated based on MSY and are appropriate for tuna stocks. MSY is estimated within the stock assessment and reported to the management system. The relation of the stock relative to MSY is reported as part of the determination of stock status, meeting the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues.

Although the IOTC has yet to adopt a specific limit reference point, management advice is provided relative to MSY as a target. The default 50% B_{MSY} is assumed here for purposes of defining stock status. However, the lack of a well-defined point indicates that the SG80 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

The intention implied by the scientific advice and management response is to maintain the stock at or above the MSY level. Therefore, although no target reference point is defined, the target region is effectively defined as the biomass above the MSY level. This meets the SG80. However, a more precise definition justified through scientific analysis and research would be necessary before the SG100 could be met.

The scoring issue related to low trophic species (for low trophic level species, the target reference point takes into account the ecological role of the stock.) is **not** considered for tuna because it is not a low trophic level species.

The fishery meets all SG60 and 2 out of 3 SG80.

Score 1.1.2: 75

Condition: A well-defined and justified limit reference point must be recognized by the management authority.

References

IOTC (2011) Report of the Thirteenth Session of the IOTC Working Party on Tropical Tunas, Lankanfinolhu, Republic of Maldives, 16–23 October 2011. IOTC–2011–WPTT13–R[E].

1.1.3 Stock Rebuilding: Where the stock is depleted, there is evidence of stock rebuilding.

Because the stock is not considered as being depleted, this performance indicator is not scored.

1.2 Harvest Strategy (Management)

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

60 Guideposts	80 Guideposts	100 Guideposts
The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.

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 implied harvest strategy is to maintain stock levels at or above the biomass which would produce MSY. 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, meeting the SG80. However, the strategy is "implied." It is unclear whether the harvest strategy will be fully effective, and therefore, the designed aspect of the strategy to change overall selectivity cannot be given full credit and the SG100 is not met.

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

In the case of the yellowfin, the present catch is below MSY. The assessment indicates that the yellowfin stock is not overfished, it can be argued that current controls on fishing are in place and have been effective in limiting exploitation levels, meeting the SG80. There is yet to be evidence given that the harvest strategy will work, preventing a higher score. 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. It has yet to be shown that the management system can maintain stock at the target level ($B>B_{MSY}$, $F<F_{MSY}$), so the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place that is expected to determine whether the harvest strategy is working.		The harvest strategy is periodically reviewed and improved as necessary.

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. 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, although the fishery clearly meets the SG60, it does not meet the SG100.

The fishery meets all SG60 and SG80, but does not meet any SG100.
Score 1.2.1: 80

References

IOTC (2011) Report of the Thirteenth Session of the IOTC Working Party on Tropical Tunas, Lankanfinolhu, Republic of Maldives, 16–23 October 2011. IOTC–2011–WPTT13–R[E].

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules in place

60 Guideposts	80 Guideposts	100 Guideposts
Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the trigger point (MSY). 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. However, this is not well-defined, so only the SG80 is met. The event that catches would be reduced if the stock came under increased pressure is presumed, but not assured. In addition, setting the TAC at the MSY level is probably overoptimistic and arguably not very precautionary as it does not account for error.

60 Guideposts	80 Guideposts	100 Guideposts
	The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules take into account a wide range of uncertainties.

No harvest control has been selected, so the SG80 cannot be met.

60 Guideposts	80 Guideposts	100 Guideposts
There is some evidence that tools used to implement harvest control rules 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 harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

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. There is some evidence that some IOTC members have controlled their own catches in an effective manner, meeting the SG80. Nevertheless, there are as of yet no harvest control rules at the IOTC level and, thus, no evidence that the tools are effective, preventing the SG100 being met.

All SG60 were met, but none of the SG80.

Score 1.2.2: 60

Condition: The fishery must put in place a well-defined harvest control rule that reduce the exploitation rate as risks to impairing recruitment increases.

References

IOTC (2011) Report of the Thirteenth Session of the IOTC Working Party on Tropical Tunas, Lankanfinolhu, Republic of Maldives, 16–23 October 2011. IOTC–2011–WPTT13–R[E].

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

60 Guideposts	80 Guideposts	100 Guideposts
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 is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Yellowfin data in the Indian Ocean are reasonably informative containing relevant information on the spatial distribution of catches, size frequencies, from numerous fleets, tagging data and alternative growth and mortality models. These data have been sufficient to conduct assessments and to evaluate the implied harvest strategy of 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 the SG80. Nevertheless, there are limitations to the data such that one cannot conclude that a comprehensive range of information exists and is available, failing the SG100.

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

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

60 Guideposts	80 Guideposts	100 Guideposts
	There is good information on all other fishery removals from the stock.	

IOTC has put considerable effort into the reporting and recording of 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. Nevertheless, catches are recorded 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 the SG80. While some problems exist, they are being addressed and do not increase the risk for the assessment and management of the stock.

The fishery meets all SG60 and SG80, but does not meet any SG100.

Score 1.2.3: 80

References

IOTC (2011) Report of the Thirteenth Session of the IOTC Working Party on Tropical Tunas, Lankanfinolhu, Republic of Maldives, 16–23 October 2011. IOTC–2011–WPTT13–R[E].

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

60 Guideposts	80 Guideposts	100 Guideposts
The assessment estimates stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.

The primary assessment tool for Indian Ocean yellowfin is Multifan-CL which incorporates multiple fisheries, gears, growth and selectivity models and spatial variability. 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 us e of the available data, meeting the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
The major sources of uncertainty are identified.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.

Stock assessment methods which have been used report uncertainty in estimates of stock status. 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 the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

Application of Multifan-CL 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 prevent the assessment meeting the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock assessment is subject to peer review.	The assessment has been internally and externally peer reviewed.

The stock assessment of yellowfin was primarily conducted by a contracted assessment scientist. 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 the SG80 but not the SG100.

The fishery meets all SG60 and SG80, and 2 out of 4 SG100.
Score 1.2.4: 90

References

IOTC (2011) Report of the Thirteenth Session of the IOTC Working Party on Tropical Tunas, Lankanfinolhu, Republic of Maldives, 16–23 October 2011. IOTC–2011–WPTT13–R[E].

Overall Score: 80.0

Indian Ocean Bigeye

1.1 Management Outcomes

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

60 Guideposts	80 Guideposts	100 Guideposts
It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.

The assessment advice given by the Working Party in 2011 suggested that the stock was not overfished (SSB_{2009}/SB_{MSY} = 1.20 with estimates ranging from 0.88 to 1.68) and overfishing was not occurring (F_{2009}/F_{MSY}=0.79 with estimates ranging from 0.50 to 1.22). Spawning stock biomass in 2009 was estimated to be 34% (26–40%) of the unfished levels. These were based upon Stock Synthesis 3 (SS3) results from a previous WP meeting using data to 2009. An alternative ASPM model using data to 2010 was presented as well. Those results were similar to the SS3. The ASPM approach fixed steepness and results were somewhat less optimistic the lower the steepness value. Catches in 2010 (72000 t) were lower than MSY values and catches in 2009 (102 000t) were at the lower range of MSY estimates. The mean catch over the 2008-2010 period was 94 000t which is lower than the estimated MSY.
Recent declines in longline effort have lowered the fishing mortality. 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 SSB_{2009}/SB_{MSY} is relatively high indicating there is a high degree of certainty that the stock is above the point where recruitment would be impaired. Thus, this meets SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

Based on the 2011 assessment, it is likely that the stock biomass is above that which would produce MSY, while the fishing mortality rate is approaching F_{MSY}. There is some probability that fishing mortality rates have exceeded F_{MSY} in recent years. However, catches are currently at an appropriate level to allow the stock to be maintained above the B_{MSY}, meeting the SG80. Nevertheless, there is not a "high degree of certainty" that fishing mortalities have been below a target reference point. Therefore, the stock does not attain SG100.
Summary for 1.1.1: the stock meets all the SG60 and SG80 and meets one of the SG100.
Score: 90

References
IOTC (2011) Report of the Thirteenth Session of the IOTC Working Party on Tropical Tunas, Lankanfinolhu, Republic of Maldives, 16–23 October 2011. IOTC–2011–WPTT13–R[E].

1.1.2 Reference Points: Limit and target reference points are appropriate for the stock.

60 Guideposts	80 Guideposts	100 Guideposts
Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	

The reference points are estimated based on MSY and are appropriate for tuna stocks. MSY is estimated within the stock assessment and reported to the management system. The relation of the stock relative to MSY is reported as part of the determination of stock status, meeting the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues.

Although the IOTC has yet to adopt a specific limit reference point, management advice is provided relative to MSY as a target. The default 50% B_{MSY} is assumed here for purposes of defining stock status. However, the lack of a well-defined point indicates that the SG80 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

The intention implied by the scientific advice and management response is to maintain the stock at or above the MSY level. Therefore, although no target reference point is defined, the target region is effectively defined as the biomass above the MSY level. This meets the SG80. However, a more precise definition justified through scientific analysis and research would be necessary before the higher guidepost could be met.

The scoring issue related to low trophic species (for low trophic level species, the target reference point takes into account the ecological role of the stock) is **not** considered for tuna because it is not a low trophic level species.

The fishery meets all SG60 and 2 out of 3 SG80.

Score: 75

Condition: A well-defined and justified limit reference point must be recognised by the management authority.

References

IOTC (2011) Report of the Thirteenth Session of the IOTC Working Party on Tropical Tunas, Lankanfinolhu, Republic of Maldives, 16–23 October 2011. IOTC–2011–WPTT13–R[E].

1.1.3 Stock Rebuilding: Where the stock is depleted, there is evidence of stock rebuilding.

Because the stock is not considered as being depleted, this performance indicator is not scored.

1.2 Harvest Strategy (management)

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

60 Guideposts	80 Guideposts	100 Guideposts
The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.

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 implied harvest strategy is to maintain stock levels at or above the biomass which would produce MSY. 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 bigeye and other tropical tunas, meeting the SG80. However, the strategy is "implied." and it is unclear whether the harvest strategy will be fully responsive. Therefore, the designed aspect of the strategy to change overall selectivity cannot be given full credit, preventing meeting the SG100.

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

In the case of the bigeye, the present catch is below MSY. The assessment showed that the stock is not overfished, indicating that overall controls on the exploitation has been adequate so far. This meets the SG80. There is yet to be evidence given that the harvest strategy will work, preventing a higher score. 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. It has yet to be shown that the management system can maintain stock at the target level ($B>B_{MSY}$, $F<F_{MSY}$), so the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place that is expected to determine whether		The harvest strategy is periodically reviewed and improved as necessary.

the harvest strategy is working.		

Monitoring is adequate to determine whether the harvest strategy is working. The different parts of the strategy include increasing the mean size and holding catches at around 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. 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, although the fishery clearly meets the SG60, it does not meet the SG100.

The fishery meets all SG60 and SG80, but does not meet any SG100.

Score 1.2.1: 80

References

IOTC (2011) Report of the Thirteenth Session of the IOTC Working Party on Tropical Tunas, Lankanfinolhu, Republic of Maldives, 16–23 October 2011. IOTC–2011–WPTT13–R[E].

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules in place

60 Guideposts	80 Guideposts	100 Guideposts
Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the trigger point (MSY). 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 the SG60. However, this is not well-defined and therefore the SG80 is not met. The event that catches would be reduced if the stock came under increased pressure is presumed, but not assured. In addition, setting the TAC at the MSY level is probably overoptimistic and arguably not very precautionary as it does not account for error.

60 Guideposts	80 Guideposts	100 Guideposts
	The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules take into account a wide range of uncertainties.

No well-defined harvest control has been selected, so the SG80 cannot be met.

60 Guideposts	80 Guideposts	100 Guideposts
There is some evidence that tools used to implement harvest control rules 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 harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

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. There is some evidence that some IOTC members have controlled their own catches in an effective manner, meeting the SG60. Nevertheless, there are as of yet no harvest control rules at the IOTC level and, thus, no evidence that the tools are effective, so the SG80 cannot be met.
All SG60 were met, but none of the SG80.
Score 1.2.2: 60
Condition: The fishery must put in place a well-defined harvest control rule that reduce the exploitation rate as risks to impairing recruitment increases.

References

IOTC (2011) Report of the Thirteenth Session of the IOTC Working Party on Tropical Tunas, Lankanfinolhu, Republic of Maldives, 16–23 October 2011. IOTC–2011–WPTT13–R[E].

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

60 Guideposts	80 Guideposts	100 Guideposts
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 is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Bigeye data in the Indian Ocean are reasonably informative containing relevant information on the spatial distribution of catches, size frequencies, from numerous fleets, tagging data and alternative growth and mortality models. These data have been sufficient to conduct assessments and to evaluate the implied harvest strategy of maintain stocks at or above the biomass that would produce MSY, meeting the SG80. Some environmental data are used as covariates in CPUE standardization. Stock structure data are limited. Nevertheless, there are limitations to the data such that one cannot conclude that a comprehensive range of information exists and is available, so the SG100 cannot be met.

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

Monitoring indices from several fleets' standardized CPUE and from tagging data are adequate for the harvest strategy. Indicators of stock abundance mainly consist of standardised catch-per-unit-effort indices. A single consistent index is not available for the entire time series, but the combined indices do appear to provide some picture of the change in abundance that has occurred. Overall, data are sufficient for stock assessment and for an appropriate harvest control rule, meeting the SG80. However, the data do not presently allow the implied harvest control rule to be applied with a high degree of certainty, so the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	There is good information on all other fishery removals from the stock.	

IOTC has put considerable effort into the reporting and recording of 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. Nevertheless, catches are recorded 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 the SG80.

The fishery meets all SG60 and SG80, but does not meet any SG100.

Score 1.2.3: 80

References

IOTC (2011) Report of the Thirteenth Session of the IOTC Working Party on Tropical Tunas, Lankanfinolhu, Republic of Maldives, 16–23 October 2011. IOTC–2011–WPTT13–R[E].

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

60 Guideposts	80 Guideposts	100 Guideposts
The assessment estimates stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.

The assessment models used for Indian Ocean BET are Stock Synthesis 3 (SS3) and an Age Structured Production Model (ASPM). Multiple fisheries, gears, and selectivity models have examined. Alternative model have been explored. This meets the SG80. However, there are remaining difficulties with key productivity parameters which could change the perception of stock status. This suggests that while the software would most likely allow the model to capture the main features of the stock and fishery, the most recent stock assessment configuration has not achieved this yet and the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
The major sources of uncertainty are identified.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.

Stock assessment methods which have been use report uncertainty in estimates of stock status. Uncertainties have been examined as alternative model 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 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 fishing mortality versus SSB at time and projections of the probability of exceeding reference points for alternative catch levels, respectively). However, given the type of uncertainties in the model, it is not possible for the assessment to provide probabilistic management advice suitable to take account of risk. Therefore, the SG80 is met, but not the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

Recent assessments have given alternative results between models which have not yet been fully explored. This adds to the assessment uncertainty which will need to assimilated into the advice or resolved. Thus, the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock assessment is subject to peer review.	The assessment has been internally and externally peer reviewed.

The stock assessment of bigeye 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 the SG80, but not the SG100.

The fishery meets all SG60 and SG80, and none of the SG100.

Score: 80

References

IOTC (2011) Report of the Thirteenth Session of the IOTC Working Party on Tropical Tunas, Lankanfinolhu, Republic of Maldives, 16–23 October 2011. IOTC–2011–WPTT13–R[E].

Overall Score: 78.8

Indian Ocean Skipjack

1.1 Management Outcomes

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

60 Guideposts	80 Guideposts	100 Guideposts
It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.

The weighted results suggest that the stock is not overfished ($B>B_{MSY}$) and that overfishing is not occurring (catch < MSY). Spawning stock biomass was estimated to have declined by approximately 47% in 2009 from unfished levels.
A stock assessment was conducted in 2011 using Stock Synthesis 3 (SS3) and suggested that the stock was not overfished (SSB_{2009}/SB_{MSY}=2.56 with estimates ranging from 1.09 to 5.83) and overfishing was not occurring ($Catch_{2009}$/MSY=0.81 with estimates ranging from 0.54 to 1.16). Spawning stock biomass in 2009 was estimated to be 53% (29–70%) of the unfished levels. 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 have halted and may have reversed 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 SSB_{2009}/SB_{MSY} is relatively high indicating there is a high degree of certainty that the stock is above the point where recruitment would be impaired. Thus, this meets SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

Based on the SS3 assessment, there is a low risk of exceeding MSY-based reference points by 2020 if catches are maintained at the current levels or below 2006–2010 average of 489 385t (<20 % risk that $B_{2019} < B_{MSY}$ and 30% risk that C_{2019}>MSY - proxy of $F > F_{MSY}$).
Hence there is a “high degree of certainty” that the stock has been above the MSY reference points in recent years. Thus, this meets SG100.
The stock meets all the SG100.
Score 1.1.1: 100

References
IOTC (2011) Report of the Thirteenth Session of the IOTC Working Party on Tropical Tunas, Lankanfinolhu, Republic of Maldives, 16–23 October 2011. IOTC–2011–WPTT13–R[E].

1.1.2 Reference Points: Limit and target reference points are appropriate for the stock.

60 Guideposts	80 Guideposts	100 Guideposts
Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	

The reference points are estimated based on MSY and are appropriate for tuna stocks. MSY is estimated within the stock assessment and reported to the management system. The relation of the stock relative to MSY is reported as part of the determination of stock status, meeting the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues.

Although the IOTC has yet to adopt a specific limit reference point, management advice is provided relative to MSY as a target. The default 50% B_{MSY} is assumed here for purposes of defining stock status. However, the lack of a well-defined point indicates that this SG80 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

The intention implied by the scientific advice and management response is to maintain the stock at or above the MSY level. Therefore, although no target reference point is defined, the target region is effectively defined as the biomass above the MSY level. This meets the SG80. However, a more precise definition justified through scientific analysis and research would be necessary before the SG100 could be met.

The scoring issue related to low trophic species (or low trophic level species, the target reference point takes into account the ecological role of the stock) is **not** considered for tuna because it is not a low trophic level species.

The fishery meets all SG60 and 2 out of 3 SG80.

Score: 75

Condition: A well-defined and justified limit reference point must be recognised by the management authority.

References
IOTC (2011) Report of the Thirteenth Session of the IOTC Working Party on Tropical Tunas, Lankanfinolhu, Republic of Maldives, 16–23 October 2011. IOTC–2011–WPTT13–R[E].

1.1.3 Stock Rebuilding: Where the stock is depleted, there is evidence of stock rebuilding.

Because the stock is not considered as being depleted, this performance indicator is not scored.

1.2 Harvest Strategy (management)

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

60 Guideposts	80 Guideposts	100 Guideposts
The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.

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 implied harvest strategy is to maintain stock levels at or above the biomass which would produce MSY. 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, meeting the SG80. However, the strategy is "implied" and it is unclear whether the harvest strategy would be fully responsive. Therefore, the designed aspect of the strategy to change overall selectivity cannot be given full credit and the SG100 is not met.

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

The present catch is below MSY. The assessment has showed that the skipjack stock is not overfished, indicating that so far the harvest strategy has been effective in controlling exploitation on this stock, meeting the SG80. But, there is yet to be evidence given that the harvest strategy will work, preventing a higher score. 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. It has yet to be shown that the management system can maintain stock at the target level ($B>B_{MSY}$, $F<F_{MSY}$), so the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place that is expected to determine whether		The harvest strategy is periodically reviewed and improved as necessary.

the harvest strategy is working.		

Monitoring is adequate to determine whether the harvest strategy is working. The different parts of the strategy include increasing the mean size and holding catches at around 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. 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, although the fishery clearly meets the SG60, it does not meet the SG100.

The fishery meets all SG60 and SG80, but does not meet any SG100.

Score 1.2.1: 80

References

IOTC (2011) Report of the Thirteenth Session of the IOTC Working Party on Tropical Tunas, Lankanfinolhu, Republic of Maldives, 16–23 October 2011. IOTC–2011–WPTT13–R[E].

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules in place

60 Guideposts	80 Guideposts	100 Guideposts
Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the trigger point (MSY). 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 the SG60. However, this is not well-defined and does not meet the SG80. The event that catches would be reduced if the stock came under increased pressure is presumed, but not assured. In addition, setting the TAC at the MSY level is probably overoptimistic and arguably not very precautionary as it does not account for error.

60 Guideposts	80 Guideposts	100 Guideposts
	The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules take into account a wide range of uncertainties.

No harvest control has been selected, so the SG80 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
There is some evidence that tools used to implement harvest control rules 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 harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

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. There is some evidence that some IOTC members have controlled their own catches in an effective manner. Nevertheless, there are as of yet no harvest control rules at the IOTC level and, thus, no evidence that the tools are effective, preventing meeting the SG80.

All SG60 were met, but none of the SG80.

Score 1.2.2: 60

Condition: The fishery must put in place a well-defined harvest control rule that reduce the exploitation rate as risks to impairing recruitment increases.

References

IOTC (2011) Report of the Thirteenth Session of the IOTC Working Party on Tropical Tunas, Lankanfinolhu, Republic of Maldives, 16–23 October 2011. IOTC–2011–WPTT13–R[E].

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

60 Guideposts	80 Guideposts	100 Guideposts
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 is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

Skipjack data in the Indian Ocean are reasonably informative containing relevant information on the spatial distribution of catches, size frequencies, from numerous fleets, tagging data and alternative growth and mortality models. These data have been sufficient to conduct an initial assessment and to evaluate the implied harvest strategy of 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, the data are sufficient for the harvest strategy, meeting the SG80. Nevertheless, there are limitations to the data such that one cannot conclude that a comprehensive range of information exists and is available, so it does not meet the SG100.

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

Monitoring indices from several fleet's standardized CPUE and from tagging data are adequate for the harvest strategy. Indicators of stock abundance mainly consist of standardised catch-per-unit-effort indices. A single consistent index is not available for the entire time series, but the combined indices do appear to provide some picture of the change in abundance that has occurred. This is sufficient and consistent with the application of the current harvest control rule and could be used to develop a harvest control rule meeting the PI 1.2.2 requirements, so the SG80 is met. However, the data do not presently allow the implied harvest control rule with a high degree of certainty, so the SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	There is good information on all other fishery removals from the stock.	

IOTC has put considerable effort into the reporting and recording of 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. Nevertheless, catches are recorded 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 the SG80. While some problems exist, they are being addressed and do not increase the risk for the assessment and management of the stock.

The fishery meets all SG60 and SG80, but does not meet any SG100.

Score 1.2.3: 80

References

IOTC (2011) Report of the Thirteenth Session of the IOTC Working Party on Tropical Tunas, Lankanfinolhu, Republic of Maldives, 16–23 October 2011. IOTC–2011–WPTT13–R[E].

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

60 Guideposts	80 Guideposts	100 Guideposts
The assessment estimates stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.

The primary assessment tool for Indian Ocean skipjack is Stock Synthesis 3 (SS3) which incorporates multiple fisheries, gears, selectivity models and spatial variability. The 2011 assessment was the initial comprehensive assessment effort. While the results are very useful, there are unresolved uncertainties in basic productivity exemplified by the lack of good estimates of fishing mortality. The assessment approach is appropriate for the stock and for the current implied harvest control rule, meeting the SG80, but it is as yet unclear whether this model accounts adequately for the features of this fishery, so it does not meet the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
The major sources of uncertainty are identified.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.

Stock assessment methods which have been use 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 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, the SG100 is met.

60 Guideposts	80 Guideposts	100 Guideposts
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

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

60 Guideposts	80 Guideposts	100 Guideposts
	The stock assessment is subject to peer review.	The assessment has been internally and externally peer reviewed.

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 the SG80. However, the structure of the WP meeting limited the degree of both external and internal review, so the SG100 was not met.

The fishery meets all SG60 and SG80, and 1 out of 4 SG100.

Score 1.2.4: 85

References

IOTC (2011) Report of the Thirteenth Session of the IOTC Working Party on Tropical Tunas, Lankanfinolhu, Republic of Maldives, 16–23 October 2011. IOTC–2011–WPTT13–R[E].

Overall Score: 81.9

Indian Ocean Albacore

1.1 Management Outcomes

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

60 Guideposts	80 Guideposts	100 Guideposts
It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.

The IOTC's Working Party on Temperate Tunas in 2011 reported on albacore assessments that were done using Multifan-CL and the ASPIC production model. These analyses coupled with analyses of CPUE trends suggested longline-vulnerable biomass has declined to about 39% of the level observed in 1980. There were 20 years of moderate fishing before 1980, and the catch has more than doubled since 1980. Catches have increased substantially since the previous albacore assessment when there was considered to be a risk that $SB<SB_{MSY}$, so the risk will have increased further. It is considered likely that recent catches have been above MSY, recent fishing mortality exceeds F_{MSY} ($F_{2010}/F_{MSY} > 1$). While the assessment results indicate $B_{2010}/B_{MSY} \approx 1$ and is thus classified as not overfished, the implication is that there is a substantial probability (perhaps 50%) that $SB<SB_{MSY}$. Therefore, it is likely, but not highly likely that the stock is above the point where recruitment is impaired.
The WP commented that "maintaining or increasing effort will probably result in further declines in biomass, productivity and CPUE. The impacts of piracy in the western Indian Ocean has resulted in the displacement of a substantial portion of longline fishing effort into the traditional albacore fishing areas in the southern and eastern Indian Ocean. It is therefore unlikely that catch and effort on albacore will decline in the near future."
The available evidence indicates considerable risk to the stock status at current effort levels. The two primary sources of data that drive the assessment, total catches and CPUE, are highly uncertain and should be investigated further as a priority; current catches (average ≈41 000t over the last five years, ≈44 000t in 2010) likely exceed MSY (29 900t, range: 21 500–33 100t). Maintaining or increasing effort will probably result in further declines in biomass, productivity and CPUE.
Overall, this meets SG60, but not the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

The assessment results indicate $B_{2010}/B_{MSY} \approx 1$ and is thus classified as not overfished, but the implication is that there is a substantial probability (perhaps 50%) that $SB<SB_{MSY}$. Therefore an argument can be made that the stock is at or fluctuating around its target reference point, despite the uncertainty being large. This marginally fulfils the SG80.
The stock meets all the SG60 and one of the two SG80.
Score 1.1.1: 70

Condition: A revision and updating of the stock assessment is required and if the status has deteriorated, then a recovery plan is required.

References

IOTC (2011) Report of the Thirteenth Session of the IOTC Working Party on Tropical Tunas, Lankanfinolhu, Republic of Maldives, 16–23 October 2011. IOTC–2011–WPTT13–R[E].

1.1.2 Reference Points: Limit and target reference points are appropriate for the stock.

60 Guideposts	80 Guideposts	100 Guideposts
Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	

The reference points are estimated based on MSY and are appropriate for tuna stocks. MSY is estimated within the stock assessment and reported to the management system. The relation of the stock relative to MSY is reported as part of the determination of stock status, meeting the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues.

Although the IOTC has yet to adopt a specific limit reference point, management advice is provided relative to MSY as a target. The default 50% B_{MSY} is assumed here for purposes of defining stock status. However, the lack of a well-defined point indicates that the SG80 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

The intention implied by the scientific advice and management response is to maintain the stock at or above the MSY level. Therefore, although no target reference point is defined, the target region is effectively defined as the biomass above the MSY level. This meets the SG80. However, a more precise definition justified through scientific analysis and research would be necessary before the higher guidepost could be met.

The scoring issue related to low trophic species (for low trophic level species, the target reference point takes into account the ecological role of the stock.) is **not** considered for tuna because it is not a low trophic level species.

The fishery meets all SG60 and 2 out of 3 SG80.
Score 1.1.2: 75
Condition: A well-defined and justified limit reference point must be recognized by the management authority.

References
IOTC (2011) Report of the Third Session of the IOTC Working Party on Temperate Tunas, Busan, Republic of Korea, 20–22 September 2011. IOTC–2011–WPTm3–R[E].

1.1.3 Stock Rebuilding: Where the stock is depleted, there is evidence of stock rebuilding.

Because the stock is not considered as being depleted, this performance indicator is not scored. However, the stock is marginally overfished and a new assessment is required. The results could easily change the perception of status and thus this PI would come into play.

1.2 Harvest Strategy (management)

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

60 Guideposts	80 Guideposts	100 Guideposts
The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.

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 implied harvest strategy is to maintain stock levels at or above the biomass which would produce MSY. 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 albacore and other tunas, meeting the SG80. However, the strategy is "implied" and it is unclear whether the harvest strategy has been fully responsive. Therefore, the designed aspect of the strategy to change overall selectivity cannot be given full credit, so the SG100 is not met.

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

It is considered likely that recent catches have been above MSY, recent fishing mortality exceeds FMSY (F2010/FMSY > 1). While the assessment results indicate $B_{2010}/B_{MSY} \approx 1$ and is thus classified as not overfished, the implication is that there is a substantial probability (perhaps 50%) that $SB<SB_{MSY}$.

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. 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 is likely to work, meeting the SG80, the evidence that it will work is lacking, so the SG80 cannot be met.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring is in place that is expected to determine whether the harvest strategy is working.		The harvest strategy is periodically reviewed and improved as necessary.

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 estimates of biomass, which indicates whether management is achieving its objectives or not. 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, although the fishery clearly meets the SG60, it does not meet the SG100.

The fishery meets all SG60, but does not meet any SG 80 or SG100.

Score 1.2.1: 60

Condition: Establish and implement well-defined and justified harvest strategies recognised by the management authority.

References

IOTC (2011) Report of the Third Session of the IOTC Working Party on Temperate Tunas, Busan, Republic of Korea, 20–22 September 2011. IOTC–2011–WPTm3–R[E].

1.2.2 Harvest control rules and tools: There are well defined and effective harvest control rules in place

60 Guideposts	80 Guideposts	100 Guideposts
Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	

There is no well-defined harvest control rule and therefore there is no specific plan of control if the stock size falls below the trigger point (MSY). 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 the SG60. However, this is not well-defined, so the SG80 is not met. The event that catches would be reduced if the stock came under increased pressure is presumed, but not assured. In addition, setting the TAC at the MSY level is probably overoptimistic and arguably not very precautionary as it does not account for error.

60 Guideposts	80 Guideposts	100 Guideposts
	The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules take into account a wide range of uncertainties.

No harvest control has been selected, so the SG80 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
There is some evidence that tools used to implement harvest control rules 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 harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

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. There is some evidence that some IOTC members have controlled their own catches in an effective manner. Nevertheless, there are as of yet no harvest control rules at the IOTC level and, thus, no evidence that the tools are effective.

All SG60 were met, but none of the SG80.

Score 1.2.2: 60

Condition: The fishery must put in place a well-defined harvest control rule that reduce the exploitation rate as risks to impairing recruitment increases.

References

IOTC (2011) Report of the Third Session of the IOTC Working Party on Temperate Tunas, Busan, Republic of Korea, 20–22 September 2011. IOTC–2011–WPTm3–R[E].

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

60 Guideposts	80 Guideposts	100 Guideposts
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 is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.

There are two primary sources of data that drive the stock assessment: total catches and CPUE. These data are considered highly uncertain and should be investigated further as a priority. They are the only data available and do provide some basis for management advice and could support a very precautionary harvest strategy, meeting the SG60. However, these data are insufficient to support the current harvest strategy and resulting level of exploitation, so the SG100 is not met.

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

Monitoring indices from several fleet's standardized CPUE and from tagging data are adequate for the harvest strategy. Indicators of stock abundance mainly consist of standardised catch-per-unit-effort indices. A single consistent index is not available for the entire time series, but the combined indices do appear to provide some picture of the change in abundance that has occurred. External reviewers recommended extended use of tagging studies. Although data are limited, they are adequate to support the implied precautionary harvest control rule, so the SG60 is met. However, the data do not presently have adequate accuracy or coverage to carry out the stock assessment which the harvest strategy would seem to require, so the SG80 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
	There is good information on all other fishery removals from the stock.	

IOTC has put considerable effort into the reporting and recording of 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. Nevertheless, catches are recorded reasonably well, and data are sufficiently well recorded for a stock assessment and for assessing the level of control sought by IOTC over landed catches.
Overall, data are sufficient to meet the SG80. While some problems exist, they are being addressed and do not increase the risk for the assessment and management of the stock.
The fishery meets all SG60, and 1 out of 3 SG80.
Score 1.2.3: 65
Condition: Implement improvements to monitoring of catches

References
IOTC (2011) Report of the Third Session of the IOTC Working Party on Temperate Tunas, Busan, Republic of Korea, 20–22 September 2011. IOTC–2011–WPTm3–R[E].

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

60 Guideposts	80 Guideposts	100 Guideposts
The assessment estimates stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.

The assessment tools for Indian Ocean albacore cover a spectrum from the complexity of Multifan-CL to the simplicity of ASPIC. The assessments estimate stock status relative to reference points, meeting the SG60. However, none of the models have yet been identified as an appropriate assessment for the stock and harvest control rule. The lack of a best-fit model is due to the problems with interpreting data, which prevents the fishery meeting the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
The major sources of uncertainty are identified.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.

While uncertainties have been identified, meeting the SG60, they have not been adequately addressed in the assessments, so the SG80 is not met. This is demonstrated by the lack of a usable Kobe matrix to be produced from the stock assessment.

60 Guideposts	80 Guideposts	100 Guideposts
		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

Application of Multifan-CL to IO albacore has been relatively recent and the assessment has not been tested or shown robust. Alternative models have been used, but until an acceptable assessment is completed, the SG100 cannot be met. The WP recommended as a matter of urgency that a new assessment be performed in 2012.

60 Guideposts	80 Guideposts	100 Guideposts
	The stock assessment is subject to peer review.	The assessment has been internally and externally peer reviewed.

Outside experts were brought in for the initial Multifan-CL work. However, the stock assessment thus far has not been adequately determined to put through an internal review.

The fishery meets all SG60 and none of the SG80 or SG100.

Score 1.2.4: 60

Condition: Conduct a new assessment with external experts.

References

IOTC (2011) Report of the Third Session of the IOTC Working Party on Temperate Tunas, Busan, Republic of Korea, 20–22 September 2011. IOTC–2011–WPTm3–R[E].

Overall Score: 66.9

Principle 3

The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable

International Commission for the Conservation of Atlantic Tunas

3.1 Governance and Policy

The external Performance Review (ICCAT, 2009a) found that ICCAT had developed reasonably sound conservation and fisheries management practices, which, if fully implemented and complied with by Contracting Parties, Cooperating non-Contracting Parties, Entities and Fishing Entities (CPCs), should be effective in managing the fisheries under ICCAT's purview. The main issues that the review identified with ICCAT performance were related to the management of Atlantic bluefin stocks, which are outside the scope of this assessment. The Performance Review (PR) report stated that *"The judgement of the international community will be based largely on how ICCAT manages fisheries on bluefin tuna (BFT). ICCAT CPCs' performance in managing fisheries on bluefin tuna particularly in the eastern Atlantic and Mediterranean Sea is widely regarded as an international disgrace and the international community which has entrusted the management of this iconic species to ICCAT deserves better performance from ICCAT than it has received to date."*
With the other stocks under ICCAT jurisdiction, ICCAT demonstrates a clearer intention to apply sound conservation and fisheries management practices. However, its management of bluefin does demonstrate some weaknesses in the management systems that appear to have been exploited for short term gain. Where relevant, these weaknesses are considered in assessing the Principle 3 performance indicators (PI) for all stocks.

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 sustainable fisheries in accordance with MSC Principles 1 and 2;**
- **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.**

60 Guideposts	80 Guideposts	100 Guideposts
The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.		

Fishing for tuna and tuna like species, both on the high seas and in zones of national jurisdiction, is governed by the International Conventions on the Conservation of Atlantic Tuna (ICCAT) of 1966. The

Commission is established under the Convention and is tasked to co-ordinate scientific research and make recommendations designed to maintain populations of tuna at levels which will permit maximum sustainable yield. The Commission has adopted minimum permissible weight limits at which tuna may be caught and retained, overall catch limits for various species, time-area closures, gear regulations and schemes for international and port inspection. The basic texts of ICCAT were first issued in 1972. Revised and updated versions were issued in 1977, 1985, 2003 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.

27 out of 48 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 SG60.

60 Guideposts	80 Guideposts	100 Guideposts
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 fishery.	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective.

There are three mechanisms for dealing with legal disputes at the international level. Firstly, disputes can be dealt with at the annual meetings of the CPCs through consultation and conciliation. Secondly, technical disputes might be resolved by an appropriately composed expert or technical panel. Thirdly, disputes that remain unresolved might be resolved through either the International Court of Justice (ICJ) or the International Tribunal for the Law of the Sea. The first two mechanisms are arguably the main overall purpose of ICCAT.

ICCAT has no formal dispute resolution procedure within the convention, but the meetings provide an opportunity to resolve disputes informally. Such disputes are still considered legal in that they set out to resolve issues defined in the 1982 UN Law of the Sea Convention.
48 ICCAT contracting parties (in 2011), 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. For states which have ratified UNFSA, it is likely this mechanism would be transparent and effective, meeting the SG80. However, it has not been tested and proven effective yet, and therefore could not meet the 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 the 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 the 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 would prevent these fisheries meeting the SG100 even if the objections mechanism was improved.

60 Guideposts	80 Guideposts	100 Guideposts
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 binding judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements binding judicial decisions arising from legal challenges.

This PI does not address situations where CPCs and fishing entities do not meet their responsibilities, only whether they are complying with the law.
ICCAT (the Commission) is not subject to any court challenges as of 2011. 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.

60 Guideposts	80 Guideposts	100 Guideposts
The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom on people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.

ICCAT provides only for the rights of nations to fish resources. How these 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 the 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 the SG100.
The ICCAT fisheries meet all SG60, and 2 out of 3 SG80.
Score 3.1.1: 75
Condition: ICCAT needs to develop the objection procedure, so that permissible reasons for objection are limited to those not in conflict with MSC P&C, and a non-discriminatory method for timely resolution is provided that does not undermine the effectiveness of the decision-making.

References

Carleton, C., Medley, P., Southall, T., Gill (2010) St Helena pole & line and rod & line tuna fisheries for albacore, bigeye, yellowfin and skipjack tuna. 23/09/2010.
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gladius) Canadian Harpoon Fishery. 25/05/2010. MSC Public Certification Final Report.
ICCAT Ref 01-25.
ICCAT Rec. 2002-07 allocates bigeye quotas to Mexico, Libya and Morocco.
ICCAT (2009a) Report of the Independent Performance Review of ICCAT.
ICCAT (2009b) Report of the Working Group on the Future of ICCAT. Sapporo, Japan – August 31 to September 3, 2009.
JTRFMO (2009) The UN Fish Stocks Agreement (UNFSA) and Tuna RFMO Members. 2nd Joint Tuna RFMOs Meeting, San Sebastian, 2009. Paper submitted by the delegation of Norway.
Lodge, M.W., Anderson, D., Løbach, T., Munro, G., Sainsbury, K., Willock, A. (2010) Recommended Best Practices for Regional Fisheries Management Organizations Report of an independent panel to develop a model for improved governance by Regional Fisheries Management Organizations.
UNCLOS (1999) Signatory to the migratory stocks agreement – 1999

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.

60 Guideposts	80 Guideposts	100 Guideposts
Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction.

ICCAT is itself an organization set up to define roles and responsibilities for its contracting parties and co-operating non-contracting parties. These functions, roles and responsibilities are explicitly defined. Among ICCAT's responsibilities 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. Hence the fisheries do not meet the SG80 and SG100.
Although roles within ICCAT and among its CPCs are well defined, these are not necessarily 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, is picked up under other performance indicators.

60 Guideposts	80 Guideposts	100 Guideposts
The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used.

Much of the purpose of ICCAT is to regularly seek data, particularly the data monitoring fishing activity and catches. ICCAT holds a plenary meeting every two years, and specialist working groups of ICCAT (comprising scientists from the contracting parties) convene technical meetings on an annual basis. Information derived from the CPCs and the inputs from the specialist working groups is considered and such consideration forms the basis of the management advice provided by ICCAT. “Local knowledge” at the international level is assumed to refer to national information and experience.
The management system demonstrates consideration of the information obtained. The scientific reports state exactly what information is being used, how it is used, and justification is provided for all information which is rejected. This is best practice and meets the 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] replaced [Rec. 99-01]). 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]). Therefore, these fisheries do not meet the SG100 because the management system cannot demonstrate in all cases consideration of all the information or explain how it uses information in decisions.

60 Guideposts	80 Guideposts	100 Guideposts
	The consultation process provides opportunity for all interested and affected parties to be involved.	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.

Consultation occurs at several levels within the management system. Consultation at the international level is formalized, and there are well-developed mechanisms for the seeking and consideration of appropriate information. At the national and fishery level 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.
Therefore, there is sufficient evidence that, at the international level, ICCAT meets SG800 and SG100.
In addition, a fishery will need to demonstrate similar representative links from grass-roots to national level and attendance at ICCAT. Lack of consultation, the opportunity for consultation or encouragement to take those opportunities within a particular fishery could prevent the fishery meeting the SG80 or SG100.
All SG60 are met, and the ICCAT fisheries also meet 2 out of 3 SG80.
Score 3.1.2: 75
Condition: CPCs need to understand their roles and responsibilities better, either by providing more training and consultation, simplifying requirements or providing more support and appropriate tools. This applies mainly to developing countries which may otherwise struggle to meet their obligations, particularly providing data where institutional capacity is often lacking.

References

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Recommendation by ICCAT on Criteria for Attaining the Status of Cooperating Non-Contracting Party, Entity or Fishing Entity in ICCAT [03-20] http://www.iccat.int/Documents/Recs/compendiopdf-e/2003-20-e.pdf

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

60 Guideposts	80 Guideposts	100 Guideposts
Long-term objectives to guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are implicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy.

The ICCAT Basic Texts provide clear, long-term objectives that guide decision making under Principle 1. The long-term objectives for each stock are clear enough that the science-based advice and management of these stocks can be evaluated.
The 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.
The lack of explicit objectives incorporating the precautionary approach and ecosystem-based management has created weaknesses in the policy. It has been demonstrated that the policy can in the short to medium term depart from stated broad objectives within ICCAT, and has led to, at best interpretation, non-precautionary actions and delays to implementing provisions required to meet the MSC Principles and Criteria.
The required objectives are implicit rather than explicit, meeting the SG60 but not the SG80 or SG100.
Score 3.1.3: 60
Condition: Explicit objectives incorporating risk (precautionary approach) and ecosystem indicators need to be developed for ICCAT ideally within or as an addendum to its Convention.

References

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Mooney-Seus, M. L. Rosenberg, A. A. (2007) Regional Fisheries Management Organizations (RFMOs): Progress in Adopting Precautionary Approach and Ecosystem-Based Management. Prepared by Fort Hill Associates LLC For HTSPE, February 10, 2007.

3.1.4 Incentives for sustainable fishing: The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing

60 Guideposts	80 Guideposts	100 Guideposts
The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that negative incentives do not arise.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure that they do not contribute to unsustainable fishing practices.

ICCAT has no specific policies on incentives for sustainable practices. However, the conservation measures and policy statements do make it clear that these are of concern.

Becoming a co-operating non-contracting party or party of ICCAT itself carries benefits and provides for incentives for sustainability. The co-operation among members and orderly division of yield among the various parties removes the worst effects of “race to fish” and “tragedy of the commons” which otherwise might arise. This includes management of bycatch and other issues under Principle 2. ICCAT therefore provides for basic incentives for sustainable fishing consistent with MSC P&C, meeting the SG60.

Quotas are allocated among CPCs, which, with consistent allocation, develops a sense of ownership. However, allocation of quota is most often the main source of conflicts. Promoting a sense of ownership of quota may discriminate against countries wishing to develop resources within their EEZ.

In managing TAC, where CPC catch more than their allocation (“overage”), it is deducted from the next year’s quotas of that CPC with an additional penalty (25% of the overage). However, where catches are short of the quota, they may also carried over to future years. This policy is not good practice, but whether it creates a problem in a fishery depends upon on how it is administered. In a number of fisheries it is not allowed, and the practice seems likely to discontinue for all fisheries.

ICCAT has expressly limited fishing capacity in the main fisheries, and where it has seen such limits are warranted. Fishing capacity is a major incentive for overfishing. ICCAT has expressed the intention not to encourage IUU fishing in implementing its policies. This awareness demonstrates that it seeks to ensure that negative incentives do not arise.

An exception may arise for certain subsidies that meet the genuine aspirations of developing nations in terms of sustainable development, and the need for incentives, in addition to penalties. The emphasis to date in most RFMOs has been on the development of measures that deter vessels from engaging in activities which undermine the effectiveness of conservation and management measures of the RFMO, pending enforcement action by the flag State. ICCAT has not however established a range of positive

incentives to gain co-operation of non-CPCs engaged in the fishery. Incentives towards cooperation may be provided by the offer of substantive benefits or by policies aimed at encouraging participation. For example, the framework provisions of the CCSBT and NEAFC expressly foresee the possibility of "cooperation quota". There are clearly incentives for many countries to become members of ICCAT to influence outcomes and to protect or increase access to and trade in these resources. But for many others there may be little incentive if membership of ICCAT reduces access or trade in these resources. Overall, incentives for sustainable fishing are provided for, although they have not necessarily been fully developed. The incentives that do exist seek to promote objectives consistent with MSC principles. Also, ICCAT can be shown to actively avoid incentives for unsustainable fishing. This meets the SG80.

ICCAT has no regular review of incentives and does not explicitly consider how such incentives might be incorporated into the management system. This has prevented ICCAT being more proactive to problems before they have occurred. Given that international responses can be particularly slow, this has led to problems which have been more protracted than necessary. Therefore, the ICCAT fisheries do not meet the SG100.

At the national level for each fishery, it will be required that the national management system also provides appropriate incentives. Developing countries have reserved the right to apply positive incentives in developing their fisheries, as well as punitive measures to prevent unsustainable activities. Whether such "sustainable development" would be sustainable in reality would need to be considered in each case. Promoting higher fishing capacity without securing the allowable catches to justify this development should not meet the SG60.

The ICCAT fisheries meet the requirements of the SG60, SG80, but not the SG100.

Score 3.1.4: 80

References

ICCAT (2009a) Report of the Independent Performance Review of ICCAT.

ICCAT (2009b) Report of the Working Group on the Future of ICCAT. Sapporo, Japan – August 31 to September 3, 2009.

ICCAT (2011) Compendium Management Recommendations and Resolutions Adopted by ICCAT for the Conservation of Atlantic Tunas and Tuna-Like Species. http://www.iccat.int/Documents/Recs/ACT_COMP_2011_ENG.pdf

UN (2010) Review Conference on the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks New York, 24-28 May 2010. A/CONF.210/2010/7

3.2 Fishery-specific management system

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

60 Guideposts	80 Guideposts	100 Guideposts
Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery's 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's 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's management system.

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.
The objective is to maintain stocks above B_{MSY} while fishing at less than F_{MSY}. The amount of precaution applied, however, is not defined. Decisions appear to be based on the median estimates of the values of interest. This would imply a target stock size with 50-60% chance being above MSY level. Note that there is no explicit consideration of the information requirements for reducing risk.
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.
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.
The scientific advice is based on MSC Principles 1 and 2, because these objectives are implicit in the management of each stock, meeting the SG60. However, specific objectives consistent with the requirements of MSC Principles 1 and 2 are not stated explicitly, so the SG80 cannot be met.
For the ICCAT fisheries the SG60 is met, but SG80 is not met.
Score 3.2.1: 60
Condition: Clear fishery specific objectives are required that are consistent with both MSC Principle 1 and with MSC Principle 2.

References
ICCAT (2009a) Report of the Independent Performance Review of ICCAT.
ICCAT (2009b) Report of the Working Group on the Future of ICCAT. Sapporo, Japan – August 31 to September 3, 2009.

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.

60 Guideposts	80 Guideposts	100 Guideposts
There are informal decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	

Decision-making processes are in place, which are established, responsive and largely transparent. However, there are some weaknesses, which have been highlighted by the performance review.

Members can vote, but cooperating non-members are not entitled to take part in voting. For example, Chinese Taipei is a Co-operating Fishing Entity and has observer status only. Many decisions are obtained from consensus rather than majority voting.
ICCAT allows its parties to opt out of decisions. The 2006 UNFSA Review Conference recommended that States through RFMOs should ensure that post opt-out behaviour is constrained by rules to prevent opting-out parties from undermining conservation, clear processes for dispute resolution, and a description of alternative measures that will be implemented in the interim (UN, 2006, paragraph 32(f) of the Annex). ICCAT has not implemented these yet.
Despite this, decision-making processes are in place, and they do generally result in measures and strategies to achieve objectives, which meet the 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.

60 Guideposts	80 Guideposts	100 Guideposts
Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.

Article VIII of the Basic Texts sets out the procedure for dealing with recommendations, which should be made on the basis of scientific evidence and be designed to maintain tuna populations at levels that will permit the maximum sustainable catch. Recommendations may be made at the initiative of the Commission or by an appropriate Panel established with the approval of at least two-thirds of all the Contracting Parties. However, ICCAT (as well as NAFO, CCAMLR, NEAFC and SEAFO) permits a member to submit an objection, which can allow an objector to opt out of the recommendation. This follows a well-defined procedure.
If a CPC persists in objecting to a conservation recommendation, the recommendation will not be binding on that contracting party. The contracting party is **not** required to justify its objection and there are no limits placed upon when an objection might be acceptable or not. Under best practice, permissible reasons would be limited to any alleged incompatibility with the LOS Convention, UNFSA or the RFMO's constitutive texts, or alleged discrimination against the member concerned that cannot be justified. It is therefore currently possible that an objection in ICCAT could be incompatible with the MSC Principles and Criteria. A unilateral claim to increase or create a quota, for example, is incompatible with the object and purpose of ICCAT and undermines the conservation measures. Solutions such as the CPC seeking a review by an independent panel of the recommendation it is objecting to, as used by CCAMLR and WCPFC for example, is not available in ICCAT.
While the objections procedure is a weakness, it does not appear in practice to have been deleterious to the decision-making processes for the stocks considered here. Objections have been used primarily in response to quota allocation schemes. Eastern Atlantic bluefin tuna, which is outside the scope of this report, may not meet the SG60, since the objections procedure has undermined decisions on conservation in this case. The fact that such objections may unduly delay the resolution of disputes is addressed in PI 3.1.1.
The decision-making is transparent. ICCAT resolves most disputes at its annual meetings by consensus. While the outcome of such decisions is transparent and, we presume, initial positions and the information used for the basis of the decision is available, exactly how a decision is reached is not

necessarily obvious. However, this degree of transparency is adequate to show a gross mis-match between the information being provided and the decision being made. The system makes sure that all members are fully informed of the issues under consideration and are able to participate in informed decision-making. The annual calendar of meetings is crowded, with inter-sessional meetings of various scientific, compliance and technical sub-committees, so decision-making could become unclear. This may be an issue particularly for developing countries, whose capacity to attend and participate in meetings of technical committees is likely to be limited. For this reason, ICCAT ensures that final decisions and the adoption of management recommendations may be made only in plenary at the annual meeting.

The decision-making is adaptive in that decisions are evaluated by the various specialist meetings and feedback is provided to the Commission. The Commission can be shown to react appropriately. For example, following an evaluation in 2008 of the time-area closure intended to reduce the catch of undersize bigeye, appropriate adjustments were made by the Commission ([Rec 04-01] was replaced by [Rec 08-01]).

Overall the decision-making is adequate for the stocks being considered. It can be shown that it deals with serious and important issues in a transparent, timely and adaptive manner meeting the 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 the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	Decision-making processes use the precautionary approach and are based on best available information.	

Decision-making processes clearly attempt to use the best available information. A large number of meetings are conducted and reports written for the Commission which provide analyses and advice based on all the available information.

Although the precautionary approach is implicit rather than explicit in decision making processes, it can be demonstrated that it is used in practice under most circumstances. For example, various recommendations and resolutions have been made on the basis of the potential harm they might do, and have not been delayed while waiting for relevant research to be conducted. However, because the precautionary approach and its use are not defined explicitly, it is difficult to determine whether it is properly used in all decisions. This weakness is recognized (ICCAT 2009b) and being addressed.

Overall, ICCAT decision-making processes meet the 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.

60 Guideposts	80 Guideposts	100 Guideposts
	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 describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.

Recommendations from research, monitoring, evaluation and performance review are published formally. Likewise, reports of the plenary sessions of meetings are published formally and are publicly available. This formal reporting represents best practice. While some groups may believe that 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 the SG100.
All SG60 and SG80 are met, and 1 out of 2 SG100 are met.
Score 3.2.2: 90

References

ICCAT (2009a) Report of the Independent Performance Review of ICCAT.
ICCAT (2009b) Report of the Working Group on the Future of ICCAT. Sapporo, Japan – August 31 to September 3, 2009.
ICCAT (2010a) Proceedings of the 17th Special Meeting of the Commission. Report for Biennial Period, 2010-2011, Part I (2010), Vol. 1.
ICCAT (2010b) Report of the Standing Committee of Research and Statistics. Madrid, Spain, October 4-8, 2010. Report for Biennial Period, 2010-11. Part I (2010) Vol. 2
UN (2006) Report of the Review Conference on the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks. **New York,** 22-26 May 2006. A/CONF.210/2006/15

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

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring, control and surveillance mechanisms exist, are implemented in the fishery under assessment and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance system has been implemented in the fishery under assessment 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 under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.

ICCAT's strategies to improve compliance with its requirements and procedures revolve around vessel registration, catch monitoring and diplomatic and other pressures applied to nation states. In addition, in certifying a particular fishery, the MSC assessment will need to consider the particular performance of the responsible nation state.

A number of positive developments have taken place since 2006: a legally binding instrument on Port State Measures to prevent, deter and eliminate illegal, unreported or unregulated (IUU) fishing ("Port State Measures Agreement"); the work of FAO to develop a global record of fishing vessels and to develop criteria to assess the performance of flag States; the second meeting of the five RFMOs dealing with highly migratory fish stocks in San Sebastian, Spain, and the follow-up work already under way.
Most of the RFMOs managing tuna and tuna-like species use their vessel registers to establish 'positive lists'. ICCAT was the first RFMO to adopt such a measure, by establishing a record of large-scale fishing vessels authorized to operate within its area of competence. This record is based on information submitted by parties and cooperating non-parties. Importantly, vessels not entered into the record are deemed to be unauthorized to fish for, retain on board, transship or land tuna and tuna-like species. Parties to ICCAT are required to take a number of measures, among them prohibiting the transshipment and landing of tuna and tuna-like species by large-scale fishing vessels that are not entered into its record.
The main weakness of these lists is that they do not indicate whether a vessel is active in any particular ocean. Satellite based vessel monitoring systems are being introduced for vessels over 24 metres length. ICCAT adopted a recommendation requiring parties to implement VMS on vessels above 24 metres in length by no later than 1 July 2005 (later extended to 1 November 2005 and now implemented) and on vessels above 15 metres fishing for bluefin tuna from 1 January 2010.
In 2006 a combined list of all vessels included on the authorized lists of the five tuna RFMOs was established and published on the Internet (http://tuna-org.org/). It includes information from the authorized lists maintained by the CCSBT, IATTC, WCPFO, ICCAT and IOTC authorized list. In addition, the website contains links to the IUU vessel lists of each RFMO. This information sharing should improve enforcement.
ICCAT has established a port inspection scheme with minimum standards that guide inspectors as they monitor landings and transshipments, check compliance with ICCAT management measures, including quotas, and collect data and other information (ICCAT Recommendation 98-11 3).
A problem among many fisheries management systems, and tuna is no exception, is monitoring transshipment to prevent illegal catch entering the legal market. In 2005, ICCAT established a regional independent observer program for carrier vessels to monitor every transshipment operation involving large-scale tuna longline fishing vessels, which includes a record of vessels authorized to receive transshipment in the ICCAT area. Carrier vessels not entered on the record are deemed to be unauthorized to receive tuna or tuna-like species in transshipment operations. The flag State of the donor vessel is obliged to validate the statistical documents for the transshipped fish.
There is a statistical documentation program (SDP) for bluefin, bigeye and swordfish which is linked to information from observers. Criticisms of this have mainly centred on bluefin tuna which may be captured and then "farmed", delaying their entry to markets and providing opportunities for circumventing the scheme.
Further control is possible through third party states. Some States have taken action to make it a violation of their domestic laws for their nationals to engage in activities that conflict with the fisheries laws of other countries. Perhaps the most powerful example is the Lacey Act in the United States of America, which is directed at the illicit trade in illegally caught fish and wildlife. United States prosecutors have used the Lacey Act's provisions to deal with importations of illegally caught fish. In Guam and American Samoa, important ports for offloading tuna, the Lacey Act has been used to deal with violations of the laws of a number of Pacific island states.
Below the international level under direct ICCAT control, the fishery being certified will depend upon the performance of the flag state and vessels within the unit of certification. Many of the conservation and enforcement measures established by RFMOs put clear obligations on parties as the flag States. But

there are also some measures directed at masters of fishing vessels, or even the fishing vessel itself. Typical examples are regulations for bycatch, minimum fish sizes and time and area restrictions. Ultimately, it is the flag State that is responsible to the relevant RFMO for any failure to ensure that its measures are implemented and for the resulting violations of those measures by that State's vessels. Problems persist over the general failure of certain flag States to exercise effective jurisdiction and control over their vessels. These States include both members and non-members of RFMOs. While there have been recommendations to monitor flag state performance in this regard (e.g. UN, 2006, Annex, para. 61), 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 (ICCAT 2010 Annex 9 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 the 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 the SG60 and SG80. Whether, in a particular unit of certification, they are effective 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. There are constant references to problems with enforcement in particular fisheries and by some flag states, which should prevent any fishery meeting the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.

Conservation measures, including annual landings quotas are set by ICCAT, but enforcement is carried out by the national authorities. Although flag states are supposed to control the activities of their vessels, it is recognized that there a weakness 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, 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 2010 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 the SG60. However, evidence suggests that they are not an effective deterrent, which does not meet the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
Fishers are generally thought to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.

This performance indicator applies to fishers and therefore needs to consider the requirements of ICCAT when considering compliance. This would need to be addressed for each specific unit of certification.
There are numerous issues with non-compliance, although it is not always clear where or why they occur or who is responsible. The Performance Review indicated that there are so many rules and requirements, with many being difficult to understand, that some if not all CPCs struggled to comply with all requirements. The Performance Review found that CPCs have consistently failed to provide timely and accurate data and failed to implement monitoring, control and surveillance (MCS) arrangements on nationals and national companies. However, it also stated that "Most of the problems and challenges ICCAT faces would be simple to fix if CPCs developed the political will to fully implement and adhere to the letter and spirit of the rules and recommendations of ICCAT." This seems to place the blame on the national institutions rather than fishers. Nevertheless, the ultimate test is whether the fishers themselves comply with ICCAT provisions.
ICCAT has a Compliance Committee that monitors compliance with ICCAT recommendations. This Committee has the potential to address problems over implementation of ICCAT recommendations. The performance review found that the ICCAT standing committee and panel structure was sound and the committees provide timely advice, but had strong reservations on the performance of the Compliance Committee (CC).

ICCAT prepares and distribute 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 the 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 the 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).

60 Guideposts	80 Guideposts	100 Guideposts
	There is no evidence of systematic non-compliance.	

There is no evidence of systematic non-compliance. Non-compliance with conservation measures appears mostly opportunistic for the tuna species considered here. Non-compliance 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.
Score 3.2.3: 75
The fisheries meet all SG60 and 3 out of 4 SG80.
Condition: ICCAT needs to develop sanctions which it can show are an effective deterrence to non-compliance with its requirements and procedures.

References
ICCAT (2009a) Report of the Independent Performance Review of ICCAT.
ICCAT (2009b) Report of the Working Group on the Future of ICCAT. Sapporo, Japan – August 31 to September 3, 2009.
ICCAT (2009c) Report of the Inter-Sessional Meeting of the Conservation and Management Measures Compliance Committee (COC). Barcelona, Spain – March 24 to 27, 2009
ICCAT (2010a) Proceedings of the 17th Special Meeting of the Commission. Report for Biennial Period, 2010-2011, Part I (2010), Vol. 1. (Annex 9)
Lodge, M.W., Anderson, D., Løbach, T., Munro, G., Sainsbury, K., Willock, A. (2010) Recommended Best Practices for Regional Fisheries Management Organizations Report of an independent panel to develop a model for improved governance by Regional Fisheries Management Organizations.

3.2.4 Research plan: The fishery has a research plan that addresses the information needs of management.

60 Guideposts	80 Guideposts	100 Guideposts
Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.	A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.	A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.

The SCRS report (ICCAT-SCRS 2011) presents a review of the research activities of the Commission and national institutions. It includes routine and special research programs. This is sets out the research activities so that progress can be assessed against requirements of the MSC Principles 1 and 2. It should be noted that much of the ICCAT and member activities designated as "research" is actually routine data collection to develop improved monitoring for stock assessment and other purposes. However, as data collection is a priority task of RFMOs and an important source of uncertainty, this is reasonable as part of a strategic approach. Research at the national level may also be detailed, although any such research for tuna should be co-ordinated and reported through the RFMO which should oversee the research strategy. Therefore, while there is no single document defining a research plan, the planning and strategy is within the current reporting procedures of ICCAT, meeting the SG80.
Research does not include issues related to Principle 3 and is not comprehensive. The research and statistical tasks are focused on the most important areas required for management, which is a good strategy. However, there is a lack of evidence that the research program is coherent in the sense that the research activities are not clearly planned out with overall goals, objectives and activities which might otherwise enable national institutions to co-ordinate the program more effectively. The possible exceptions to this may be the Atlantic Wide Research Programme for Bluefin tuna (GBYP) and the Enhanced Research Program for Billfish, both of which are outside the scope of this report. Therefore, the ICCAT fisheries relevant to this report do not met the SG100 guidepost.

60 Guideposts	80 Guideposts	100 Guideposts
Research results are available to interested parties.	Research results are disseminated to all interested parties in a timely fashion.	Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available.

Research results are published routinely through SCRS regular report (ICCAT-SCRS 2011) as well as special reports and articles which have taken place through ICCAT over the years. These reports are published as PDF files through the ICCAT web site (www.iccat.int) and in some cases are available in paper form. Through 2010/11, around 182 scientific papers had been submitted at the various inter-sessional meetings, although not all of these were available from ICCAT. The SCRS report is available within weeks of the completion of the meeting. It provides updates on fishery statistics, stock assessments and special research programs. This level of dissemination is the best that could be expected from an international organization.
Further dissemination at national level would be up to national governments.
The ICCAT fisheries meet all SG60 and SG80, and 1 out of 2 SG100.
Score 3.2.4: 90

References
ICCAT (2010b) Report of the Standing Committee of Research and Statistics. Madrid, Spain, October 4-8,

3.2.5 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.

60 Guideposts	80 Guideposts	100 Guideposts
The fishery has in place mechanisms to evaluate some parts of the management system and is subject to occasional internal review.	The fishery has in place mechanisms to evaluate key parts of the management system and is subject to regular internal and occasional external review.	The fishery has in place mechanisms to evaluate all parts of the management system and is subject to regular internal and external review.

ICCAT has in place mechanisms to evaluate all parts of the management system and is subject to regular internal review. This is demonstrated by the various committees and working groups that meet regularly and report their findings to the Commission. An external performance review has been conducted and it has evaluated all parts of the management system.

While the reviews do meet the 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.

ICCAT meets the requirements for the SG60 and SG80, but only 1 out of 2 components of the SG100.
Score 3.2.5: 90

References

ICCAT (2009a) Report of the Independent Performance Review of ICCAT.

ICCAT (2009b) Report of the Working Group on the Future of ICCAT. Sapporo, Japan – August 31 to September 3, 2009.

Overall Score: 76.8

Western and Central Pacific Fishery Commission

3.1 Governance and Policy

The Western and Central Pacific Fisheries Commission (WCPFC) was established by the Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (WCPF Convention) which entered into force on 19 June 2004.
The Commission supports three subsidiary bodies; the Scientific Committee, Technical and Compliance Committee, and the Northern Committee, that each meet once during each year. The meetings of the subsidiary bodies are followed by a full session of the Commission. The work of the Commission is assisted by a Finance and Administration Committee.
As of 2012 (Table 2), the members of the Commission are Australia, China, Canada, Cook Islands, European Union, Federated States of Micronesia, Fiji, France, Japan, Kiribati, Korea, Republic of Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Philippines, Samoa, Solomon Islands, Chinese Taipei, Tonga, Tuvalu, United States of America, Vanuatu. Dependent territories of members are classified as "Participating Territories" and are American Samoa, Commonwealth of the Northern Mariana Islands, French Polynesia, Guam, New Caledonia, Tokelau and Wallis and Futuna. In addition, there are Cooperating Non-members consisting of Belize, Ecuador, El Salvador, Indonesia, Mexico, Senegal, Vietnam, Panama and Thailand.
By the end of 2011, no performance review of the WCPFC had been completed. Apart from affecting scoring under PI 3.2.5, this has reduced information available for other PI and may have reduced scores pending better information coming available.
The WCPFC website includes as a posting the binding Conservation and Management Measures (CMM) adopted by the WCPFC since 2005 that are still in effect. Many address technical issues related to the monitoring of catch, bycatch, sea turtles and vessel activities. CMMs that address targeted stocks (yellowfin, bigeye, skipjack) are noted, as well.

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 sustainable fisheries in accordance with MSC Principles 1 and 2;**
- **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.**

60 Guideposts	80 Guideposts	100 Guideposts
The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.		

Fishing for tuna and tuna like species, both on the high seas and in zones of national jurisdiction, is governed by the Convention for the Conservation and Management of Highly Migratory Fish Stocks in

the Western and Central Pacific Ocean (WCPF Convention). The Commission was established under the Convention and is tasked to co-ordinate scientific research and make recommendations designed to maintain populations of tuna and species sharing the same ecosystem same 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.

Table 6. Contracting Parties to WCPFC, indicating whether they have ratified UNFSA (1995).

Country	Ratification	Country	Ratification
Australia	Yes	European Union	Yes
Fed. States Micronesia	Yes	Canada	Yes
France	Yes	Chinese Taipei	No
China	No	Nauru	Yes
Japan	Yes	Kiribati	Yes
Rep. Marshall Is.	Yes	Niue	Yes
New Zealand	Yes	Papua New Guinea	Yes
Palau	Yes	Somoa	Yes
Philippines	No	Tonga	Yes
Solomon Islands	Yes	Vanuatu	No
Tuvalu	Yes	Cook Islands	Yes
United States	Yes	Korea	Yes
Cooperating Non-members			
Belize	Yes	Ecuador	No
El Salvador	No	Indonesia	Yes
Mexico	No	Panama	Yes
Senegal	Yes	Thailand	No
Vietnam	No		

9 out of 33 members and co-operating non-members to WCPFC have **not** ratified the UNFSA (Table 2). 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 the SG60.

60 Guideposts	80 Guideposts	100 Guideposts
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 fishery.	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective.

There are three mechanisms for dealing with legal disputes at the international level. Firstly, disputes can be dealt with at the WCPFC annual meetings of the members through consultation and conciliation. Secondly, disputes might be resolved by an appropriately composed review panel. Thirdly, disputes might be resolved through either the International Court of Justice (ICJ) or the International Tribunal for the Law of the Sea. The first two mechanisms are arguably the main overall purpose of all RFMOs including WCPFC.

WCPFC 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 2012 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, who along with observers, 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 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 the SG80. However, it has not been tested and proven effective yet, and therefore could not meet the SG100.
There are explicit and transparent decision-making and dispute resolution mechanisms defined and in place, meeting the 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 the SG80 and the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
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 binding judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements binding judicial decisions arising from legal challenges.

This PI does not address situations where members, non-parties and fishing entities do not meet their responsibilities, only whether they are complying with the law.
WCPFC (the Commission) is not subject to any court challenges as of 2011. 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, thus far issues facing WCPFC which could lead to challenges are just now coming to the forefront. Thus, there isn't evidence of there being proactive actions.
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.

60 Guideposts	80 Guideposts	100 Guideposts
The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom on people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.

Legal rights of people dependent on fishing for food or livelihood are protected through national interests of Parties to the Convention. The Convention deals with the rights of a State's access to resources and, in this case, explicitly protects access for subsistence and traditional resource use. This takes the form of a formal declaration within the Convention itself, with references made to small island developing States, subsistence and artisanal fishing. Protection of rights is also extended to dependent territories, such as French Polynesia and American Samoa. Furthermore, WCPFC has an explicit relationship with the Pacific Islands Forum Fisheries Agency, which represents the interests of the independent island States in the region. These interests demonstrably protect their people's traditional rights to these resources.

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 fishery meets all SG80 and 1 of 3 SG100.

Score 3.1.1: 85

References

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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.

60 Guideposts	80 Guideposts	100 Guideposts
Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction.

WCPFC is itself an organization set up to define roles and responsibilities for its parties and co-operating non- parties. Functions, roles and responsibilities are explicitly defined at the international level. The Parties themselves may vary in their ability to perform their role, but the roles and responsibilities are nevertheless explicitly defined at least at the national level for key areas. Key areas include providing catch and monitoring data to the Secretariat, taking part in various meetings sharing information and making decisions, meeting the requirements for conservation and other recommendations for WCPFC and applying appropriate levels of control and surveillance.

WCPFC co-operates with all relevant organization in the region, which are the Secretariat of 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 is 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 behavior towards observers on vessels, suggesting fishing entities do not fully understand or comply with their responsibilities. Although most data are available to the Secretariat of the Pacific Community (Oceanic Fisheries Programme), 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 the 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.

60 Guideposts	80 Guideposts	100 Guideposts
The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used.

WCPFC holds a meeting every year, after the annual meetings of the three specialist committees, which are the Scientific Committee, Technical and Compliance Committee, and the Northern Committee. The work of the Commission is assisted by a Finance and Administration Committee. Information derived from the members and the inputs from the specialist working groups is used by decision-makers and such consideration forms the basis for the decisions of the WCPFC. “Local knowledge” at the international level is assumed to refer to national information and experience.
The management system demonstrates consideration of the information obtained. The scientific reports state exactly what information is being used, how it is used, and justification is provided for all information which is rejected. This is best practice and meets the 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-2008-01 and CMM-2010-05 attempt to restrict fishing effort and therefore fishing mortality on 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 the SG100 because the management system cannot demonstrate in all cases consideration of all the information or explain how it uses such information in decisions.

60 Guideposts	80 Guideposts	100 Guideposts
	The consultation process provides opportunity for all interested and affected parties to be involved.	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.

Consultation occurs at several levels within the management system. Consultation at the international level is formalised, and there are well-developed mechanisms for the seeking and using appropriate information. At the national and fishery level whether there is an opportunity for interested parties to be involved in management would need to be evaluated.

The opportunity to become 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) 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 the SG80 or SG100.

All SG60 and SG80 are met, and the WCPFC also meets 1 out of 3 SG100.

Score3.1.2: 85

References

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WCPFC (2011) Active Conservation and Management Measures and Resolutions. www.wcpfc.int

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

60 Guideposts	80 Guideposts	100 Guideposts
Long-term objectives to guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are implicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy.

The WCPFC Convention provides clear, long-term objectives that guide decision making under Principle 1. The long-term objectives for each stock are clear enough that the science-based advice and management of these stocks can be evaluated. The WCPFC Convention has an explicit provision regarding the precautionary approach and ecosystem based management which forms part of the MSC Principles and Criteria.

Protection for all resources within the same ecosystem is provided for, consistent with Principle 2. The overall objective of the Convention is stated in Article 2 as “The objective of this Convention is to ensure, through effective management, the long-term conservation and sustainable use of highly migratory fish stocks in the western and central Pacific Ocean in accordance with the 1982 Convention and the Agreement.” Much more detail is provided under Articles 5-8, which provides the principles which should be used in making decisions and therefore defines the objectives very clearly. This includes measures to protect all species belonging to the same ecosystem as the target stocks, to reduce bycatch, develop more “environmentally safe” fishing gears and apply the precautionary approach, all of which meet requirements under Principle 2.

The overall objectives are well enough defined 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.

Overall, clear explicit objectives incorporating the precautionary approach and ecosystem-based management in the policy meet the MSC Principles and Criteria, and are required of the Commission, meeting the SG100.

The objectives are explicit, well-defined, and required by management policy, meeting the SG100. Score 3.1.3: 100

References

Mooney-Seus, M. L. Rosenberg, A. A. (2007) Regional Fisheries Management Organizations (RFMOs): Progress in Adopting Precautionary Approach and Ecosystem-Based Management. Prepared by Fort Hill Associates LLC For HTSPE, February 10, 2007.

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WCPFC (2011) Active Conservation and Management Measures and Resolutions. www.wcpfc.int

3.1.4 Incentives for sustainable fishing: The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing

60 Guideposts	80 Guideposts	100 Guideposts
The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that negative incentives do not arise.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure that they do not contribute to unsustainable fishing practices.

WCPFC has no specific policies on incentives for sustainable practices. However, the conservation measures and policy statements do make it clear that these are of concern.

Becoming a co-operating non-member or member of WCPFC itself carries benefits and provides for incentives for sustainability. The co-operation among members and orderly division of fishing rights among the various parties removes the worst effects of “race to fish” and “tragedy of the commons” which otherwise might arise. This includes management of bycatch and other issues under Principle 2. WCPFC therefore provides for basic incentives for sustainable fishing consistent with MSC P&C, meeting the SG60.

Overcapacity in WCPFC convention area is not seen as a big problem, per se, but there is concern such overcapacity might develop and encourage overfishing. Article 5(g) specifically calls on the Commission to take measures to prevent or eliminate over-fishing and excess fishing capacity. Resolution 2005-02 deals with perceived purse seine over-capacity which may have developed while the WCPFC Convention was being negotiated. However, it is recognized this concern is potentially in conflict with aspirations of small island states developing their own fishing industry, covered under PI 3.1.1. It can be shown that WCPFC, which is still a very young RFMO, is developing methods to define fishing capacity and find ways to achieve controls while allowing appropriate development.

Fishing rights are allocated among the members, which, with consistent allocation, should develop a sense of ownership. However, allocation of fishing rights is also most often the main source of conflicts, since coastal state development of fishing capacity is not necessary compatible with traditional fishing

rights. This is being actively addressed by the Commission, which is considering, for example, a trading scheme of fishing rights among its members.
The emphasis to date in most RFMOs, and WCPFC is no exception, has been on the development of measures that deter vessels from engaging in activities which undermine the effectiveness of conservation and management measures of the RFMO, pending enforcement action by the flag State. WCPFC has not however established a range of positive incentives to gain co-operation of non-members engaged in the fishery, although there is evidence that technical capacity-building is being provided to countries such as Indonesia to aid their participation. Incentives towards cooperation may be provided by the offer of substantive benefits or by policies aimed at encouraging participation. For example, the framework provisions of the CCSBT and NEAFC expressly foresee the possibility of "cooperation quota". Although not directly part of the WCPFC, it is worth noting that countries belong to the Forum Fisheries Agency in negotiating agreements for access, have used 'negotiation facilitators' to support co-operation among its members. This negotiation has led to allocation of access fees more equitably among members than would have resulted in bilateral access agreements. This directly promotes co-operation over sustainable management of the tuna resources over their whole range and not just where catchability is highest.
Overall, incentives for sustainable fishing are provided for, although they have not necessarily been fully developed. The incentives that do exist seek to promote objectives consistent with MSC principles. Also, WCPFC can be shown to be working to avoid incentives for unsustainable fishing. This meets the SG80. WCPFC has no regular review of incentives and does not explicitly consider how such incentives might be incorporated into the management system. Therefore, the WCPFC fisheries might only meet the SG100 if further evidence was available specific to the fishery concerned through national or other provisions.
At the national level for each fishery, it will be required that the national management system also provides appropriate incentives. Developing countries have reserved the right to apply positive incentives in developing their fisheries, as well as punitive measures to prevent unsustainable activities. Whether such "sustainable development" would be sustainable in reality would need to be considered in each case. Promoting higher fishing capacity without securing the allowable catches to justify this development should not meet the SG60.
This met the requirements of the SG80, but not the SG100.
Score 3.1.4: 80

References

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3.2 Fishery-specific management system

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

60 Guideposts	80 Guideposts	100 Guideposts
Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery's 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's 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's management system.

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. The CMM 2008-01 objectives are clearly defined and focused on bigeye which is the limiting factor in this fishery. The CMM aims to achieve a 30% reduction in bigeye fishing mortality. More generally, the CMM objectives are to maintain stocks at MSY, as qualified by relevant unspecified environmental and economic factors. It should be noted that although the measures adopted have not been effective and are under review, the objectives are stated clearly enough that such an evaluation is possible.

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 does 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 the SG80. However, although broadly measurable, they are not necessarily well-defined particularly in relation to achieving MSC P&C, with the possible exception of bigeye. 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 the SG60. In addition, effectively explicit objectives are provided through the conservation and management measures. In most cases, this should meet the 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 the SG100 cannot be met.
For the WCPFC the SG60 and SG80 is met, but SG100 is not met.
Score 3.2.1: 80

References
WCPFC (2004) Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. 19 June 2004.
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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.

60 Guideposts	80 Guideposts	100 Guideposts
There are informal decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	

Decision-making processes are in place, which are established, responsive and largely transparent. These are very clearly defined in the Convention (Article 20) and Rules of Procedure. Information used for decision-making is published. Decisions are made by consensus and if necessary by voting (75% majority) and such decisions are binding on members. There is no opting out procedure, but members may require an independent review of a decision to ensure it is consistent with the Convention and management objectives. Some decisions, such as the allocation of fishing rights, must be carried out using consensus. Conservation and Management Measures are binding, but resolutions are non-binding. All management measures apply equally inside EEZ and on high seas. Flag states enforce management measures on their own vessels and coastal states within their own EEZ.
Decision-making processes are in place, and they result in measures and strategies to achieve objectives, which meet the SG80. The result of the decision-making is primarily addressed elsewhere (PI 1.1.1, 1.2.1, 1.2.2).

60 Guideposts	80 Guideposts	100 Guideposts
Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.

Each member has one vote (Rules of Procedure Rule 21). All decisions and other official actions of the Commission are taken by consensus or 75% majority vote of all of the Convention members (Rule 22). Some decisions require consensus, but these are not those on which sustainability of the fishery depends. The majority voting system has not yet had to be invoked.

The decision-making is transparent and transparency is a requirement of the Convention (Article 21). WCPFC ostensibly resolves most disputes at its annual meetings by consensus. While the outcome of such decisions is transparent as it is published as a resolution from the annual meetings, and initial positions and the information used for the basis of the decision is available (as technical reports provided to the meeting or as proposals for resolutions from some Parties), exactly how a decision is reached is not necessarily obvious. However, this degree of transparency is adequate to show a mis-match between the information being provided and the decision being made. Much of the discussion at the meeting is also reported. The system makes sure that all Commission members are fully informed of the issues under consideration and are able to participate in informed decision-making.
The decision-making is adaptive in that decisions are evaluated by the various specialist meetings and feedback is provided to the Commission. The Commission can be shown to react appropriately. Whether this will always be timely is less clear, but, given the international context, response times are probably "best practice".
Overall the decision-making is adequate for the stocks being considered. It can be shown that it deals with serious and important issues in a transparent, timely and adaptive manner meeting the SG80. The decision-making processors appear to address all issues but not successfully in all cases, and therefore the fishery does not meet the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	Decision-making processes use the precautionary approach and are based on best available information.	

The WCPFC Convention requires that the members of the Commission, directly and through the Commission, apply the precautionary approach, as described in Article 6 and Annex II. Specifically, the Convention requires that Commission be more cautious when information is uncertain, unreliable or inadequate and does not use the absence of adequate scientific information as a reason for postponing or failing to take conservation and management measures. In addition, the Convention proposes that cautious conservation and management measures are applied to exploratory fisheries until there are sufficient data to allow stock assessment as well as to fisheries adversely affected by natural phenomenon on an emergency basis. In all cases, decisions are required to be based on the best scientific information available, and the Commission makes adequate provision for this to be achieved.
Evidence that WCPFC is attempting to apply the precautionary approach is found in the limitations on expansion of various fisheries, such as Southern Pacific Albacore, pending further development of management plans. 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 the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	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 describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.

Recommendations from research, monitoring, evaluation and performance review are published formally. Likewise, reports of the plenary sessions of meetings are published formally and are publicly available. This reporting represents good practice. While some groups may believe that how all information is used in the decision making is not reported, it is difficult to see how the current system could be improved in this respect. Even where doubt is expressed as to how a decision is reached, all information available for the decision making is published, allowing any stakeholder to draw their own conclusions, and there is frequent feedback from NGOs, scientists and other stakeholders.
However, while reports are available, it is not clear that they represent all information that is used. There is no formal, detailed explanation linking the information provided to the decision that results. The decisions are presented in the resolutions as results, with minimal justification. In an international context, it is very difficult to give full explanations for all decisions, since this might undermine co-operation.
With detailed formal public reporting of decisions and information on which those decisions are based, the WCPFC fisheries do meet the SG80. However, this falls short of a formal justification that can be clearly linked to all information available, so the SG100 is not met.
All SG60 and SG80 are met, and none of the SG100 are met.
Score 3.2.2: 80

References

Lodge, M.W., Anderson, D., Løbach, T., Munro, G., Sainsbury, K., Willock, A. (2010) Recommended Best Practices for Regional Fisheries Management Organizations Report of an independent panel to develop a model for improved governance by Regional Fisheries Management Organizations.

Mooney-Seus, M. L. Rosenberg, A. A. (2007) Regional Fisheries Management Organizations (RFMOs): Progress in Adopting Precautionary Approach and Ecosystem-Based Management. Prepared by Fort Hill Associates LLC For HTSPE, February 10, 2007.

UN (2006) Report of the Review Conference on the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 Dec 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks. New York, 22-26 May 2006. A/CONF.210/2006/15

WCPFC (2004) Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. 19 June 2004.

WCPFC (2006) Western and Central Pacific Fisheries Commission (WCPFC) Rules of Procedure. As adopted at the Inaugural Session, Pohnpei, Federated States of Micronesia, 9-10 December 2004

WCPFC (2010) Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. Seventh Regular Session. Honolulu, Hawaii, USA 6–10 December 2010 Summary Report.

WCPFC (2010) Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. Technical and Compliance Committee. Sixth Regular Session. 30 September–5 October 2010 Pohnpei, Federated States of Micronesia. Summary Report

3.2.2 Compliance and enforcement: Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with.

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring, control and surveillance mechanisms exist, are implemented in the fishery under assessment and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance system has been implemented in the fishery under assessment 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 under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.

WCPFC's strategies to improve compliance with its requirements and procedures revolve mainly around vessel registration, but include catch and effort monitoring and diplomatic and other pressures applied to nation states. In addition, in certifying a particular fishery, the MSC assessment will need to consider the particular performance of the responsible nation state.

There have been a number of positive developments since 2006 which apply to all RFMOs: a legally binding instrument on Port State Measures to prevent, deter and eliminate illegal, unreported or unregulated (IUU) fishing ("Port State Measures Agreement"); the work of FAO to develop a global record of fishing vessels and to develop criteria to assess the performance of flag States; the second meeting of the five RFMOs dealing with highly migratory fish stocks in San Sebastian, Spain, and the follow-up work already under way.

Management controls are implemented using Conservation and Management Measures and Resolutions. "Resolutions" are non-binding statements and recommendations addressed to members of the Commission and Cooperating non-members, whereas Conservation and Management Measures (CMM) describe binding decisions.

Most information on compliance comes from port monitoring, observer programs and the vessel monitoring systems. The WCPFC has established a regional scientific and enforcement program with a regional observer program coordinated by the Commission (CMM 2007-01), but also with the participation of sub-regional and national programs (similar to CCAMLR). The Commission's regional observer program objective is to achieve 5% coverage of the effort in each fishery by 30 June 2012 for vessels operating in high seas areas. The Technical and Compliance Committee reported in 2010 that longline vessel coverage varies widely in 2009, whereas purse-seine coverage for multilateral programs for 2009 was approximately 20%, with 100% observer coverage for purse-seine vessels commencing in January 2010. Since 2010, observer coverage for purse seiners has been 100%. In the same way as for most tuna RFMOs, observers are required to monitor the transshipments at sea (CMM 2006-06). There are also at-sea inspections carried out which are reported to WCPFC, but these relatively rare.

All vessels over 24m length catching tuna within the region must have VMS (CMM 2007-02). 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 and sea turtles are 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.

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 (e.g. UN, 2006, Annex, para. 61), 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 the 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 the 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 the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.

Conservation measures are set by WCPFC, but enforcement is carried out by the national authorities. The blacklisting of non-member vessels (IUU lists) has become a widespread practice among all RFMOs including WCPFC.
There no trade sanctions against nation states, although theoretically these may be possible. Sanctions are only applied to fishing entities, such 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 the 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.

60 Guideposts	80 Guideposts	100 Guideposts
Fishers are generally thought to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.

The WCPFC has a permanent working group on compliance that reviews and monitors compliance with WCPFC management measures. The working group also recommends measures to promote compatibility among the national fisheries management measures, addressing matters related to compliance with fisheries management measures, analyze 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 a result of WCPFC only coming into existence in 2004, so these procedures are still in development.
Compliance of fishers appears adequate in the fisheries considered here, which meets the 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 the SG100. In addition, 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.

60 Guideposts	80 Guideposts	100 Guideposts
	There is no evidence of systematic non-compliance.	

There is no evidence of systematic non-compliance. Non-compliance with conservation measures appears mostly opportunistic or possibly down to ignorance of the resolutions and/or the lack of sanctions. Non-compliance is not systematic and does not threaten the sustainability of the fishery, there having been a significant reduction in non-compliance over the last decade.
This fishery met all SG60 and SG80, but not the SG100.
Score 3.2.3: 80

References

Lodge, M.W., Anderson, D., Løbach, T., Munro, G., Sainsbury, K., Willock, A. (2010) Recommended Best Practices for Regional Fisheries Management Organizations Report of an independent panel to develop a model for improved governance by Regional Fisheries Management Organizations.
Tarasofsky, R, (2007) Enhancing the Effectiveness of Regional Fisheries Management Organizations through Trade and Market Measures. Chatham House, Energy, Environment and Development Programme EEDP BP 07/04
WCPFC(2009) Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. Third Intersessional Working Group. Regional Observer Programme. 17–20 March 2009 Guam, USA. Summary Report
WCPFC (2011) Active Conservation and Management Measures and Resolutions. www.wcpfc.int
Pew Environmental Group (2011) Closing the gap: Comparing Port State measures with the FAO Agreement on Port State Measures. www.PewEnvironment.org/IUUfishing. June 2011

3.2.4 Research plan: The fishery has a research plan that addresses the information needs of management.

60 Guideposts	80 Guideposts	100 Guideposts
Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.	A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.	A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.

WCPFC employ two scientific staff, but much of the research is actually carried out by third party organizations, such the Secretariat of the Pacific Community. Nevertheless, WCPFC co-ordinate such research through the Scientific Committee.
The Convention requires that the Scientific Committee recommend a research plan to the Commission. The first Strategic Research Plan was prepared as an adaptive research plan to support the Scientific

Committee's objective of providing the best available scientific advice. It had an initial period of five years, from 2007 to 2011. A new plan has been approved for 2012-2016.
The strategy covers four overall research and data collection priorities:

- Monitoring of fishing activities through the collection, compilation and validation of data from the fishery
- Monitoring and assessment of target stocks
- Monitoring and assessment of NTADS and of the pelagic ecosystems of the WCPO
- Evaluation of existing Conservation and Management Measures (CMMs) and of potential management options

Research includes issues related to Principle 3 in evaluation compliance and management performance. The research and statistical tasks are focused on the most important areas required for management, which is a good strategy. The research program is not planned out in the sense that overall goals, objectives and activities are defined which might otherwise enable national institutions to co-ordinate the program more effectively. Instead it just lists activities research and data collection activities, but it is possible to see the links between the WCPFC requirements and proposed research. Nevertheless, the research plans are not strategic documents; thus, SG100 is not met.

60 Guideposts	80 Guideposts	100 Guideposts
Research results are available to interested parties.	Research results are disseminated to all interested parties in a timely fashion.	Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available.

Research results are published through routine as well as special reports and articles reflecting research and monitoring which has taken place over the years. These reports are published as PDF files through the WCPFC web site (www.wcpfc.int). Information is reported through scientific articles on specific research topics, fishery status reports, and catch reports, as well as an annual report from the Commission and reports for each meeting. Information supplied to meetings, including research reviews or articles, is also published this way. However, not all information is made public, some being confidential to Members. This level of dissemination is the best that could be expected from an international organization, meeting the SG100.
Further dissemination at national level would be up to national governments.
This met all SG60, SG80 and one of the SG100.
Score 3.2.4: 90

References

WCPFC (2012) Web site: www.wcpfc.int
WCPFC(2011) Strategic Research Plan of the Scientific Committee 2012-2016 Attachment J: The Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. Scientific Committee. Seventh Regular Session. Pohnpei, Federated States of Micronesia. 9–17 August 2011 (Adopted version)
WCPFC(2011) Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. Scientific Committee. Seventh Regular Session Pohnpei, Federated States of Micronesia. 9-17 August 2011. Summary Report (Adopted version).

3.2.5 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.

60 Guideposts	80 Guideposts	100 Guideposts
The fishery has in place mechanisms to evaluate some parts of the management system and is subject to occasional internal review.	The fishery has in place mechanisms to evaluate key parts of the management system and is subject to regular internal and occasional external review.	The fishery has in place mechanisms to evaluate all parts of the management system and is subject to regular internal and external review.

WCPFC has in place mechanisms to evaluate all parts of the management system and 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 the SG80 and even arguably SG100 for the "regular internal" review.
The WCPFC has as yet not completed an external performance review, although a review was proposed in 2007. The contracting parties agreed to conduct review in 2011, but this agreement only appears to have been reached in November 2011. As of February 2012 no external review is publicly available. Because no external review is available, the RFMO does not meet the SG80 guidepost with respect to "occasional external" review.
This met the requirements for the SG60, but only 1 out of 2 components of the SG80.
Condition: WCPFC needs to complete an external performance review and make the review publicly available.
Score 3.2.5: 70

eferences
WCPFC (2011) Terms of Reference for the Performance Review of the Western and Central Pacific Fisheries Commission. Final March 30th 2011 (dated 18.11.2011).

Overall Score: 83.8

Inter-American Tropical Tuna Commission

3.1 Governance and Policy

The IATTC is governed by the Antigua Convention (2003). Each member of the Inter-American Tropical Tuna Commission (IATTC) is represented by up to four Commissioners, appointed by the respective government. The members of IATTC in 2011 are Belize, European Union, Nicaragua, Canada, France, Panama, China, Guatemala, Peru, Colombia, Japan, Chinese Taipei, Costa Rica, Kiribati, United States, Ecuador, Korea, Vanuatu, El Salvador, Mexico and Venezuela. The Cook Islands is a Cooperating non-Party to the Commission.
The IATTC also has significant responsibilities for the implementation of the International Dolphin Conservation Program (IDCP), and provides the Secretariat for that program. It is important to note that IDCP forms an important component of its activities and, for the purse seine tuna fishery, would form an important consideration in scoring ETP (PI 2.3) as well as appropriate PIs under Principle 3. Where appropriate, specific reference is made to this program.
The IATTC website includes as a posting the binding Conservation and Management Measures (CMM) adopted by the IATTC that are still in effect. Many address technical issues related to the monitoring of

catch, bycatch, sea turtles and vessel activities. CMMs that address targeted stocks (yellowfin, bigeye, skipjack) are noted, as well.

Unlike most other RFMOs, there has been as of 2011, no performance review of the IATTC. Apart from affecting scoring under PI 3.2.5, this has reduced information available for other PI and may have reduced scores pending better information coming available.

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 sustainable fisheries in accordance with MSC Principles 1 and 2;**
- **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.**

60 Guideposts	80 Guideposts	100 Guideposts
The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.		

Fishing for tuna and tuna like species, both on the high seas and in zones of national jurisdiction, is governed by 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 generally consistent with MSC Principles and Criteria (MSC P&C).

Table 7. Contracting Parties to IATTC, indicating whether they have ratified UNFSA (1995).

Country	Ratification	Country	Ratification
Belize	Yes	European Union	Yes
Nicaragua	No	Canada	Yes
France	Yes	Panama	Yes
China	No	Guatemala	No
Peru	No	Colombia	No

Japan	Yes	Chinese Taipei	No
Costa Rica	Yes	Kiribati	Yes
United States	Yes	Ecuador	No
Korea	Yes	Vanuatu	No
El Salvador	No	Mexico	No
Venezuela	No	Cook Islands (Cooperating non Party)	Yes

11 out of 22 CPCs (including a co-operating non-party) to IATTC have **not** ratified the UNFSA (Table 3). 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 IATTC-sanctioned fisheries should meet the SG60.

60 Guideposts	80 Guideposts	100 Guideposts
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 fishery.	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective.

There are three mechanisms for dealing with legal disputes at the international level. Firstly, disputes can be dealt with at the IATTC annual meetings of the Parties through consultation and conciliation. Secondly, technical disputes might be resolved by an appropriately composed expert or technical panel. Thirdly, disputes might be resolved through either the International Court of Justice (ICJ) or the International Tribunal for the Law of the Sea. The first two mechanisms are arguably the main overall purpose of IATTC.

IATTC 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 2011), who along with observers and one 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 the SG80. However, it has not been tested and proven effective yet, and therefore could not meet the 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 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 the 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 the 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 the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
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 binding judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements binding judicial decisions arising from legal challenges.

This PI does not address situations where CPCs and fishing entities do not meet their responsibilities, only whether they are complying with the law.

IATTC (the Commission) is not subject to any court challenges as of 2011. 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.

60 Guideposts	80 Guideposts	100 Guideposts
The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom on people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.

Legal rights of people dependent on fishing for food or livelihood are protected through national interests of Parties to the Convention. The Convention deals with the rights of a State's access to resources rather than individuals. It is therefore likely that most weight would be given to national provisions for legal rights in a fishery when it is being assessed.
Stated objectives and management measures are consistent with Principle 1. IATTC also has demonstrable objectives consistent with MSC Principle 2 in the IDCP, 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 sportfishing 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 fleets.
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 the SG100.

The IATTC fisheries meet all SG60 and SG80, and 1 out of 3 SG100.
Score 3.1.1: 85

References

IATTC (1949) Convention for the Establishment of an Inter-American Tropical Tuna Commission. Washington, 31 May 1949.
IATTC (1990) Inter-American Tropical Tuna Commission Rules of Procedure.
IATTC (2003) Inter-American Tropical Tuna Commission Convention for the Strengthening of the Inter-American Tropical Tuna Commission Established By The 1949 Convention Between The United States of America and the Republic of Costa Rica ("Antigua Convention"). June 2003.
IATTC (2010) Inter-American Tropical Tuna Commission. Minutes of the 81st Meeting. Antigua, Guatemala. 27 September-1 October 2010
IATTC (2011). Tunas and Billfishes in the Eastern Pacific Ocean In 2010. 82nd Meeting. La Jolla, California (USA). 4-8 July 2011. Iattc-82-05
IATTC (2011) Resolution C-11-01. Resolution on a Multiannual Program for the Conservation of Tuna in the Eastern Pacific Ocean in 2011-2013. Inter-American Tropical Tuna Commission 82nd Meeting, La Jolla, California (USA), 4-8 July 2011.
JTRFMO (2009) The UN Fish Stocks Agreement (UNFSA) and Tuna RFMO Members. 2nd Joint Tuna RFMOs Meeting, San Sebastian, 2009. Paper submitted by the delegation of Norway.
Lodge, M.W., Anderson, D., Løbach, T., Munro, G., Sainsbury, K., Willock, A. (2010) Recommended Best Practices for Regional Fisheries Management Organizations Report of an independent panel to develop a model for improved governance by Regional Fisheries Management Organizations.
Mooney-Seus, M. L. Rosenberg, A. A. (2007) Best Practices for High Seas Fisheries Management: Lessons Learned. Chatham House, Energy, Environment and Development Programme EEDP BP 07/03, May, 2007.
UNCLOS (1999) Signatory to the migratory stocks agreement – 1999

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

60 Guideposts	80 Guideposts	100 Guideposts
Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction.

IATTC is itself an organisation set up to define roles and responsibilities for its contracting parties and co-operating non-contracting parties.
Functions, roles and responsibilities are explicitly defined at the international level. The performance of the Secretariat is sound and well regarded as both efficient and effective by the Parties. The Parties themselves may vary in their ability to perform their role, but the roles and responsibilities are nevertheless explicitly defined at least at the national level for key areas. Key areas include providing

catch and monitoring data to the Secretariat, taking part in various meetings sharing information and making decisions, meeting the requirements for conservation and other recommendations for IATTC and applying appropriate levels of control and surveillance.
IATTC is closely linked to the International Dolphin Conservation Program, which is a separate agreement specifically created to apply the "dolphin safe" label. There is clear differentiation between responsibilities, but co-operation increases the efficiency of both programs. For example, IDCP includes the objective "*To ensure the long-term sustainability of the tuna stocks in the Agreement Area, as well as that of the marine resources related to this fishery, taking into consideration the interrelationship among species in the ecosystem, with special emphasis on, inter alia, avoiding, reducing and minimizing bycatch and discards of juvenile tunas and non-target species.*" In addition, there are shared responsibilities between WCPFC and IATTC, which recognized the need to cooperate with one another to achieve conservation and management of stocks. There is a Memorandum of Understanding which clearly lays out the type and level of co-operation.
With respect to implementing management controls, providing monitoring data and scientific research, tasks are allocated, co-ordinated and monitored through IATTC and its annual meetings. This system broadly works. Organisations and individuals involved in the management process in those cases limited to Contracting Parties will be well-defined for key areas.
Roles and responsibilities are not necessarily well understood in all areas, however. IATTC has had a number of problems with flag states that have not applied appropriate controls to all their vessels, and it appears that not all vessels 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 the SG100.
This PI would also have to be evaluated for each fishery. Overall, in this case the Parties (Nations) are considered and for IATTC their roles and responsibilities are clearly laid out and understood. This may not be true within nations and flag states for particular fisheries.

60 Guideposts	80 Guideposts	100 Guideposts
The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used.

IATTC holds a meeting every year, and specialist working groups (comprising scientists from the contracting parties) convene technical meetings on an annual basis. Information derived from the CPCs and the inputs from the specialist working groups is used by decision-makers and such consideration forms the basis of the management advice provided by IATTC. "Local knowledge" at the international level is assumed to refer to national information and experience.

The management system demonstrates consideration of the information obtained. The scientific reports state exactly what information is being used, how it is used, and justification is provided for all information which is rejected. This is best practice and meets the 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 resolutions C-04-09, C-06-02, and C-09-01 effectively restrict fishing effort and therefore fishing mortality on bigeye, yellowfin and skipjack. These have been evaluated and found effective in maintaining stocks are a level around MSY or above. However, limits are often vague, and public information may not be available that clearly justifies the limits applied when the decision was made. Better practice for this might be to test various decision rules through simulation and chose one which meets the criteria developed from management policy. Evidence for this type of approach is not available for the main IATTC management decisions. Therefore, these fisheries do not meet the SG100 because the management system cannot demonstrate in all cases consideration of all the information or explain how it uses such information in decisions.

60 Guideposts	80 Guideposts	100 Guideposts
	The consultation process provides opportunity for all interested and affected parties to be involved.	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.

Consultation occurs at several levels within the management system. Consultation at the international level is formalised, and there are well-developed mechanisms for the seeking and using appropriate information. At the national and fishery level whether there is an opportunity for interested parties to be involved in management would need to be evaluated.
The opportunity to become Contracting Party or Co-operating Non-contracting Party is open to all, including non-states. However, there is currently only one Co-operating Non-contracting Party (Cook Islands). 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 has been established, which is administered by the IATTC has been created for strengthening the institutional capacity of developing countries for the sustain-able development of fisheries for highly migratory species (Resolution C-11-11). 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.
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. 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 the SG80 or SG100.

All SG60 and SG80 are met, and the IATTC fisheries also meet 1 out of 3 SG100.

Score 3.1.2: 85

References

IATTC (1990) Inter-American Tropical Tuna Commission Rules of Procedure.

IATTC (2003) Inter-American Tropical Tuna Commission Convention for the Strengthening of the Inter-American Tropical Tuna Commission Established By The 1949 Convention Between The United States of America and the Republic of Costa Rica ("Antigua Convention"). June 2003.

IATTC (2010) Inter-American Tropical Tuna Commission. Minutes of the 81st Meeting. Antigua, Guatemala. 27 September-1 October 2010

IATTC (2011) Active IATTC and AIDCP Resolutions and Recommendations.

IATTC-WCPFC (2006) Memorandum of Understanding between the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean and the Inter-American Tropical Tuna Commission. IATTC-WCPFC MOU, June 2006.

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

60 Guideposts	80 Guideposts	100 Guideposts
Long-term objectives to guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are implicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy.

The IATTC Convention provides clear, long-term objectives that guide decision making under Principle 1. The long-term objectives for each stock are clear enough that the science-based advice and management of these stocks can be evaluated. The IATTC Convention has an explicit provision regarding the precautionary approach and ecosystem based management which forms part of the MSC Principles and Criteria. Objectives with respect to ETP species are also provided by the IATTC Convention and more directly by the AIDCP.

Protection for all resources within the same ecosystem is provided for, consistent with Principle 2. In Article VII paragraph 1, the functions of the Commission provide for measures to protect all species belonging to the same ecosystem as the target stocks, to reduce bycatch (specifically co-ordinate with the AIDCP), develop more "environmentally safe" fishing gears and apply the precautionary approach, all of which meet requirements under Principle 2. In addition, the Convention explicitly requires that the

Commission promote the application of the provisions under the FAO Code of Conduct, which includes the ecosystem approach to fisheries management as well as many of the same requirements as the MSC P&C.
This may not mean that short-term decisions are always consistent with the long term objectives considered here. For example, scientific staff have implied that stricter controls on the bigeye fishery than those adopted by 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.
Overall, clear explicit objectives incorporating the precautionary approach and ecosystem-based management in the policy meet the MSC Principles and Criteria, and are required of the Commission, meeting the SG100.
The objectives are explicit, well-defined, and required by management policy, meeting the SG100.
Score 3.1.3: 100

References:
IATTC (2003) Inter-American Tropical Tuna Commission Convention for the Strengthening of the Inter-American Tropical Tuna Commission Established By The 1949 Convention Between The United States of America and the Republic of Costa Rica ("Antigua Convention"). June 2003.
IATTC (2011) Inter-American Tropical Tuna Commission Fishery Status Report No. 9 Tunas And Billfishes In The Eastern Pacific Ocean In 2010. La Jolla, California, 2011
IATTC (2011) Active IATTC and AIDCP Resolutions and Recommendations.
Mooney-Seus, M. L. Rosenberg, A. A. (2007) Regional Fisheries Management Organizations (RFMOs): Progress in Adopting Precautionary Approach and Ecosystem-Based Management. Prepared by Fort Hill Associates LLC For HTSPE, February 10, 2007.
Mooney-Seus, M. L. Rosenberg, A. A. (2007) Best Practices for High Seas Fisheries Management: Lessons Learned. Chatham House, Energy, Environment and Development Programme EEDP BP 07/03, May, 2007.

3.1.4 Incentives for sustainable fishing: The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing.

60 Guideposts	80 Guideposts	100 Guideposts
The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that negative incentives do not arise.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure that they do not contribute to unsustainable fishing practices.

IATTC has no specific policies on incentives for sustainable practices. However, the conservation measures and policy statements do make it clear that these are of concern.

Becoming a co-operating non-party or party of IATTC itself carries benefits and provides for incentives for sustainability. The co-operation among members and orderly division of fishing rights among the various parties removes the worst effects of "race to fish" and "tragedy of the commons" which otherwise might arise. This includes management of bycatch and other issues under Principle 2. IATTC therefore provides for basic incentives for sustainable fishing consistent with MSC P&C, meeting the SG60.

Importantly, IATTC has a capacity reduction program, which should result in a greater incentive for sustainable management. This implements the International Plan of Action for the Management of Fishing Capacity, which was adopted at the 23rd Session of the FAO Committee on Fisheries in February 1999. The plan provides clear objectives which can be used to monitor progress of the plan. The plan should explicitly result in incentives for achieving outcomes expressed by MSC Principles and should prevent negative incentives arising. The plan explicitly considers economic and other incentives and includes a regular review of management policy with respect to capacity.

Quotas and other fishing rights are allocated among the Parties, which, with consistent allocation, should develop a sense of ownership. However, allocation of quota and other fishing rights is most often the main source of conflicts. Promoting a sense of ownership of quota or fishing capacity may discriminate against countries wishing to develop resources within their EEZ.

An exception may arise for certain subsidies that meet the genuine aspirations of developing nations in terms of sustainable development, and the need for incentives, in addition to penalties. The emphasis to date in most RFMOs has been on the development of measures that deter vessels from engaging in activities which undermine the effectiveness of conservation and management measures of the RFMO, pending enforcement action by the flag State. IATTC has not however established a range of positive incentives to gain co-operation of non-Parties engaged in the fishery. Incentives towards cooperation may be provided by the offer of substantive benefits or by policies aimed at encouraging participation. For example, the framework provisions of the CCSBT and NEAFC expressly foresee the possibility of "cooperation quota".

Overall, incentives for sustainable fishing are provided for, although they have not necessarily been fully developed. The incentives that do exist seek to promote objectives consistent with MSC principles. Also, IATTC can be shown to actively avoid incentives for unsustainable fishing. This meets the SG80.

IATTC has no regular review of incentives and does not explicitly consider how such incentives might be incorporated into the management system, with the notable exception of fishing capacity. Therefore, the IATTC fisheries might only meet the SG100 if further evidence was available specific to the fishery concerned through national or other provisions.

At the national level for each fishery, it will be required that the national management system also provides appropriate incentives. Developing countries have reserved the right to apply positive incentives in developing their fisheries, as well as punitive measures to prevent unsustainable activities. Whether such "sustainable development" would be sustainable in reality would need to be considered in each case. Promoting higher fishing capacity without securing the allowable catches to justify this development should not meet the SG60.

The IATTC fisheries meet the requirements of the SG60, SG80, but not the SG100.
Score 3.1.4: 80

References

IATTC (2003) Inter-American Tropical Tuna Commission Convention for the Strengthening of the Inter-American Tropical Tuna Commission Established By The 1949 Convention Between The United States of America and the Republic of Costa Rica ("Antigua Convention"). June 2003.

IATTC (2005) Inter-American Tropical Tuna Commission Plan for Regional Management of Fishing Capacity. 73rd Meeting, Lanzarote (Spain), 20-24 June 2005

Lodge, M.W., Anderson, D., Løbach, T., Munro, G., Sainsbury, K., Willock, A. (2010) Recommended Best Practices for Regional Fisheries Management Organizations Report of an independent panel to develop a model for improved governance by Regional Fisheries Management Organizations.
UN (2010) Review Conference on the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks New York, 24-28 May 2010. A/CONF.210/2010/7

3.2 Fishery-specific management system

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

60 Guideposts	80 Guideposts	100 Guideposts
Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery's 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's 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's management system.

The IATTC Convention offers guidance and principles on which management plans might be based. This includes objectives which not only apply to target stocks, but also the ecosystem. However, these objectives are relatively general and covered under PI 3.1.3. These objectives have been used in developing scientific advice.
There is a long term management plan to limit fishing capacity to sustainable levels. Objectives are clearly laid out and are measurable for purse seine at least.
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). 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 the 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 the 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 the 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 the SG100 cannot be met.
For the IATTC fisheries the SG60 and SG80 is met, but SG100 is not met.
Score 3.2.1: 80

References

IATTC (2003) Inter-American Tropical Tuna Commission Convention for the Strengthening of the Inter-American Tropical Tuna Commission Established By The 1949 Convention Between The United States of America and the Republic of Costa Rica ("Antigua Convention"). June 2003.
IATTC (2005) Inter-American Tropical Tuna Commission Plan for Regional Management of Fishing Capacity. 73rd Meeting, Lanzarote (Spain), 20-24 June 2005
IATTC (2011) Inter-American Tropical Tuna Commission Fishery Status Report No. 9 Tunas And Billfishes In The Eastern Pacific Ocean In 2010. La Jolla, California, 2011
IATTC (2011) Active IATTC and AIDCP Resolutions and Recommendations.

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.

60 Guideposts	80 Guideposts	100 Guideposts
There are informal decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	

Decision-making processes are in place, which are established, responsive and largely transparent. Information used for decision-making is published. Decisions are made by consensus and there is no objection or opting out procedure. Resolutions are binding, but recommendations are non-binding. All management measures apply equally inside EEZ and on high seas. Parties enforce management measures within their own EEZ.
IATTC requires that decisions are made through consensus; therefore members can in theory veto resolutions. Members can vote, but cooperating non-members are not entitled to take part in voting. While there is no evidence that a lack of consensus has prevented necessary conservation measures being adopted, it is possible that the requirement for consensus slows up decisions while protracted negotiations may take place. Various issues, for example, such as convening a technical working group to resolve the definition of "current effort" in C-05-02 and in convening a performance review, could be due to a lack of consensus.
Despite this, decision-making processes are in place, and they do generally result in measures and strategies to achieve objectives, which meet the SG80. The result of the decision-making is primarily addressed elsewhere (PI 1.1.1, 1.2.1, 1.2.2).

60 Guideposts	80 Guideposts	100 Guideposts
Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.

The 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 a gross 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.
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 the 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 the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	Decision-making processes use the precautionary approach and are based on best available information.	

The IATTC Antigua Convention requires that the members of the Commission, directly and through the Commission, apply the precautionary approach, as described in the relevant provisions of the Code of Conduct and/or the 1995 UN Fish Stocks Agreement, for the conservation, management and sustainable use of fish stocks. Specifically, the Convention requires that Commission be more cautious when information is uncertain, unreliable or inadequate and does not use the absence of adequate scientific information as a reason for postponing or failing to take conservation and management measures.
Article VII of the Convention requires that the Commission adopts measures that are based on the best scientific evidence available to ensure the long-term conservation and sustainable use of the fish stocks covered by this Convention. The Commission is also tasked to determine whether, according to the best scientific information available, a specific fish stock covered by this Convention is fully fished or overfished and, on this basis, whether an increase in fishing capacity and/or the level of fishing effort would threaten the conservation of that stock.
This requirement to use the best scientific information available is clearly implemented. There is evidence from the large number of meetings that have been conducted and reports written for the Commission which provide analyses and advice based on all the available information.
Overall, IATTC decision-making processes are based on the best available information and the precautionary approach, meeting the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
	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 describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.

Recommendations from research, monitoring, evaluation and performance review are published formally. Likewise, reports of the plenary sessions of meetings are published formally and are publicly available. This reporting represents good practice. While some groups may believe that how all information is used in the decision making is not reported, it is difficult to see how the current system could be improved in this respect. Even where doubt is expressed as to how a decision is reached, all information available for the decision making is published, allowing any stakeholder to draw their own conclusions, and there is frequent feedback from NGOs, scientists and other stakeholders.
However, while reports are available, it is not clear that they represent all information that is used. There is no formal, detailed explanation linking the information provided to the decision that results. The decisions are presented in the resolutions as results, with minimal justification.
With detailed formal public reporting of decisions and information on which those decisions are based, the IATTC fisheries do meet the SG80. However, this falls short of a formal justification that can be clearly linked to all information available, so the SG100 is not met.
All SG60 and SG80 are met, but no SG100 are met.
Score 3.2.1: 80

References:

IATTC (1990) Inter-American Tropical Tuna Commission Rules of Procedure.
IATTC (2003) Inter-American Tropical Tuna Commission Convention for the Strengthening of the Inter-American Tropical Tuna Commission Established By The 1949 Convention Between The United States of America and the Republic of Costa Rica ("Antigua Convention"). June 2003.
IATTC (2010) Inter-American Tropical Tuna Commission. Minutes of the 81st Meeting. Antigua, Guatemala. 27 September-1 October 2010
Lodge, M.W., Anderson, D., Løbach, T., Munro, G., Sainsbury, K., Willock, A. (2010) Recommended Best Practices for Regional Fisheries Management Organizations Report of an independent panel to develop a model for improved governance by Regional Fisheries Management Organizations.
Mooney-Seus, M. L. Rosenberg, A. A. (2007) Regional Fisheries Management Organizations (RFMOs): Progress in Adopting Precautionary Approach and Ecosystem-Based Management. Prepared by Fort Hill Associates LLC For HTSPE, February 10, 2007.
UN (2006) Report of the Review Conference on the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks. New York, 22-26 May 2006. A/CONF.210/2006/15

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

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring, control and surveillance mechanisms exist, are implemented in the fishery under assessment and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance system has been implemented in the fishery under assessment 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 under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.

IATTC's strategies to improve compliance with its requirements and procedures revolve mainly around vessel registration, but include catch and effort monitoring and diplomatic and other pressures applied to nation states. In addition, in certifying a particular fishery, the MSC assessment will need to consider the particular performance of the responsible nation state.

There have been a number of positive developments since 2006 which apply to all RFMOs: a legally binding instrument on Port State Measures to prevent, deter and eliminate illegal, unreported or unregulated (IUU) fishing ("Port State Measures Agreement"); the work of FAO to develop a global record of fishing vessels and to develop criteria to assess the performance of flag States; the second meeting of the five RFMOs dealing with highly migratory fish stocks in San Sebastian, Spain, and the follow-up work already under way.

Most information on compliance comes from port monitoring and observer programs. The IATTC has the longest-established regional scientific and enforcement program and is unusual in that it has a regional observer program fully coordinated by the Secretariat, with its own observers, but also with the participation of national programs (similar to CCAMLR). There is 100% coverage for purse seiners above 363 t capacity, but IATTC has not established a regional longline observer program. However, some of its members do have national programs for longliners. In 2011, IATTC required that each member and cooperating non-Member (CPCs) ensure that, from 1 January 2013, at least 5% of the fishing effort made by its longline fishing vessels greater than 20 metres length overall carry a scientific observer (C-11-08). In the same way as for ICCAT and IOTC, observers monitor the transshipments at sea by large-scale tuna longline vessels (Resolution C-08-02) 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 vessels over 24m length catching tuna within the region must have VMS (Resolution C-04-06). 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-11-06). 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.
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.
A problem among many fisheries management systems, and tuna is no exception, is monitoring transshipment to prevent illegal catch entering the legal market. The IATTC observer program for transshipments at sea began in January 2009 with observers being placed aboard carrier vessels.
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 (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 the 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 the SG60 and SG80. Whether, in a particular unit of certification, they are effective 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 the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.

Conservation measures are set by IATTC, but enforcement is carried out by the national authorities. The blacklisting of non-member vessels (IUU lists) has become a widespread practice among all RFMOs including IATTC.
There no trade sanctions against nation states, although theoretically these may be possible. Sanctions are only applied to fishing entities, such 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 the SG60. Limited evidence suggests that they are probably an effective deterrent, which meets the SG80, but does not meet SG100.

60 Guideposts	80 Guideposts	100 Guideposts
Fishers are generally thought to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.

The IATTC has a permanent working group on compliance that reviews and monitors compliance with IATTC management measures. The working group also recommends measures to promote compatibility among the national fisheries management measures, addressing matters related to compliance with fisheries management measures, analyze 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 certification.
Compliance of fishers appears adequate in the fisheries considered here, which meets the 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 the SG100. In addition, any fishery would 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.

60 Guideposts	80 Guideposts	100 Guideposts
	There is no evidence of systematic non-compliance.	

There is no evidence of systematic non-compliance. Non-compliance with conservation measures appears mostly opportunistic or possibly down to ignorance of the resolutions and/or the lack of sanctions. Non-compliance is not systematic and does not threaten the sustainability of the fishery, there having been a significant reduction in non-compliance over the last decade.

Score 3.2.3: 80

The fisheries meet all SG60 and SG80, but not the SG100.

References:

IATTC (2009) Comparison of On-Board Observer Programs in Regional Fisheries Management Organizations. Agreement on the International Dolphin Conservation Program. 21st Meeting of the Parties La Jolla, California (USA). 5 June 2009. Document MOP-21-09.

IATTC (2011) Committee for the Review of Implementation of Measures Adopted by the Commission. 2nd Meeting. La Jolla, California (USA). 29-30 June 2011. COR-02-07 (REVISED)

IATTC (2011) Active IATTC and AIDCP Resolutions and Recommendations.

Pew Environmental Group (2011) Closing the gap: Comparing IATTC's port State measures with the FAO Agreement on Port State Measures. www.PewEnvironment.org/IUUfishing

Lodge, M.W., Anderson, D., Løbach, T., Munro, G., Sainsbury, K., Willock, A. (2010) Recommended Best Practices for Regional Fisheries Management Organizations Report of an independent panel to develop a model for improved governance by Regional Fisheries Management Organizations.

Tarasofsky, R, (2007) Enhancing the Effectiveness of Regional Fisheries Management Organizations through Trade and Market Measures. Chatham House, Energy, Environment and Development Programme EEDP BP 07/04

3.2.4 Research plan: The fishery has a research plan that addresses the information needs of management.

60 Guideposts	80 Guideposts	100 Guideposts
Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.	A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.	A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.

IATTC employ a full scientific staff, under the supervision of a director of investigations, to carry out all scientific research and analysis on behalf of the Commission. The work of the IATTC staff is divided into four research programs: Stock Assessment, Biology and Ecology, Data Collection and Database, Bycatch

and the International Dolphin Conservation Program (IDCP). The objectives are laid out and the overall strategy is made clear. Therefore, this program includes relatively comprehensive ecosystem monitoring and research. The research has the intention of providing reliable and timely information for the scientific advice.
The principal responsibilities of these programs are as follows:

- Stock assessment: determine tuna stock status, evaluate measures to prevent overfishing, excess fishing capacity, and to maintain or restore the harvested species to levels that will produce the maximum sustainable yield;
- Biology and ecosystem: carry out scientific research on the biology of fish stocks and associated or dependent species, and develop conservation and management measures for species belonging to the same ecosystem;
- Data collection and database: develop standards for the collection, verification, exchange, and reporting of data, establish a comprehensive program for data collection and monitoring, and in coordination with the IDCP, manage the on-board scientific observer program;
- Bycatch and IDCP: Develop measures to avoid, reduce and minimize waste, discards, catch by lost or discarded fishing gear, catch of non-target species, and impacts on associated or dependent species, in particular endangered species and dolphins associated with the tuna fishery.

Research does not include issues related to Principle 3 and is not comprehensive. The research and statistical tasks are focused on the most important areas required for management, which is a good strategy. However, there is a lack of evidence that the research program is coherent in the sense that the research activities are not clearly planned out with overall goals, objectives and activities which might otherwise enable national institutions to co-ordinate the program more effectively. Therefore, the IATTC research does not meet the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
Research results are available to interested parties.	Research results are disseminated to all interested parties in a timely fashion.	Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available.

Research results are published through routine as well as special reports and articles reflecting research and monitoring which has taken place over the years. These reports are published as PDF files through the IATTC web site (www.iattc.org) or as printed versions which can be ordered from there. Information is reported through scientific articles on specific research topics, fishery status reports, and catch reports, as well as an annual report from the Commission and reports for each meeting. Information supplied to meetings, including research reviews or articles, is also published this way. However, not all information is made public, some being confidential to Members, and some reports appear to be slow in being published. For example, the IATTC Commission report was available from 2008 in 2012. None of this delayed information appears to be critical research material however. This level of dissemination is the best that could be expected from an international organisation, meeting the SG100.
Further dissemination at national level would be up to national governments.
The IATTC fisheries meet all SG60 and SG80, and 1 out of 2 SG100.
Score 3.2.4: 90

References
IATTC (2012) Web site: www.iattc.org

IATTC (2011) Inter-American Tropical Tuna Commission Fishery Status Report No. 9 Tunas And Billfishes In The Eastern Pacific Ocean In 2010. La Jolla, California, 2011

3.2.5 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.

60 Guideposts	80 Guideposts	100 Guideposts
The fishery has in place mechanisms to evaluate some parts of the management system and is subject to occasional internal review.	The fishery has in place mechanisms to evaluate key parts of the management system and is subject to regular internal and occasional external review.	The fishery has in place mechanisms to evaluate all parts of the management system and is subject to regular internal and external review.

IATTC 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. This more than meets the requirements for the SG60 and SG100 for the "regular internal" review. However, The IATTC has as yet not carried out an external performance despite a general agreement by all five RFMOs responsible for tunas and tuna-like species held at their first joint meeting in Kobe, Japan in January 2007. This failure implies that the RFMO does not meet the SG80 guidepost with respect to "occasional external" review.

IATTC meets the requirements for the SG60, but only 1 out of 2 components of the SG100.
Condition: IATTC needs to conduct an external performance review.
Score: 70

References:

IATTC (2003) Inter-American Tropical Tuna Commission Convention for the Strengthening of the Inter-American Tropical Tuna Commission Established By The 1949 Convention Between The United States of America and the Republic of Costa Rica ("Antigua Convention"). June 2003.
IATTC (2009) Performance Reviews of Tuna Regional Fisheries Management Organizations. 80th Meeting, La Jolla, California (USA). 8-12 JUNE 2009. IATTC-80-13
IATTC (2010) Inter-American Tropical Tuna Commission. Minutes of the 81st Meeting. Antigua, Guatemala. 27 September-1 October 2010
IATTC (2011) Committee for the Review of Implementation of Measures Adopted by the Commission. 2nd Meeting. La Jolla, California (USA). 29-30 June 2011. COR-02-07 (REVISED)
IATTC (2011) Inter-American Tropical Tuna Commission Fishery Status Report No. 9 Tunas And Billfishes In The Eastern Pacific Ocean In 2010. La Jolla, California, 2011

Overall Score: 83.8

Indian Ocean Tuna Commission

3.1 Governance and Policy

In response to the expansion of the Indian Ocean tuna fisheries in the early 1980's, an agreement for the establishment of an Indian Ocean Tuna Commission was developed and approved in 1993, finally

entering into force in 1996. The Secretariat was established in Seychelles in 1998. Currently, IOTC includes 29 member States and three cooperating States.
Unlike the other tuna RFMOs, the IOTC was created within the framework of the UN Food and Agricultural Organization's (FAO) Constitution. In spite of the administrative links to FAO, the Commission is fully autonomous, both functionally and financially, as the budget is supported entirely by member contributions.
However, the link to the UN system places restrictions on the membership that affect the ability of IOTC to take effective conservation and management measures. For example, Chinese Taipei is currently one of the most important tuna harvesters in the region, but is not able to be a member or a cooperating party of IOTC, and, therefore cannot formally fulfil its obligations to cooperate with IOTC.
The IOTC is responsible for: keeping under review the conditions and trends of the stocks of tuna and tuna-like fishes of the Indian Ocean; encouraging, recommending, and coordinating research and development activities, including the transfer of technology and training, with due regard to the equitable participation of members, particularly the special needs of developing coastal states; adopting conservation and management measures to ensure the conservation of the stocks; keeping under review the economic and social aspects of the fisheries covered by the Convention bearing in mind the interests of developing coastal states.
The IOTC members elect an Executive Secretary who is responsible for the operation of the Secretariat. The Secretariat acts as technical facilitator of the IOTC process, including dealing with data collection, stock assessment and compliance issues. Most of the scientific work is conducted by national scientists and reviewed at a Scientific Committee, the body responsible for formulating scientific advice to the member States. On the basis of this advice, conservation and management measures are considered by members at the IOTC annual Session. If a measure is agreed to by, at least, two-thirds majority, it becomes binding on the members although there is an objection provision. The Commission is further assisted by a Compliance Committee that provides technical advice and monitoring on the level of enforcement and compliance by the member States.
In response to calls from the international community for a review of the performance of Regional Fisheries Management Organizations (RFMOs), the Indian Ocean Tuna Commission (IOTC) agreed in 2007 to implement a process of Performance Review. The IOTC formed a Review Panel, consisting of an independent legal expert, an independent scientific expert, six IOTC Members and a non-governmental organisation (NGO) observer, which concluded its report to the Commission in January 2009. The Panel's review was based on the criteria developed as a result of a joint meeting of tuna RFMOs, Kobe, Japan, 2007 and concentrated on the following issues:
Adequacy of the Agreement for the Establishment of the Indian Ocean Tuna Commission (IOTC Agreement) relative to current principles of fisheries management, Consistency between scientific advice and conservation and management measures adopted, Effectiveness of control measures established by the IOTC; and Efficiency and transparency of financial and administrative management.
The findings of the PRP were reported in Anonymous (2009) and are reiterated in the following summary.

KEY FINDINGS OF THE PERFORMANCE REVIEW PANEL

I. The legal framework of the IOTC Agreement:

The analysis of the legal text of the IOTC Agreement identified a series of gaps and weaknesses which can be summarized as follows:
The IOTC Agreement is outdated as it does not take account of modern principles for fisheries management. The absence of concepts such as the precautionary approach and an ecosystem-based approach to fisheries management are considered to be major weaknesses. The lack of clear delineation

of the functions of the Commission or flag State and port State obligations provide examples of significant impediments to the effective and efficient functioning of the Commission.
The limitation on participation to this RFMO, deriving from IOTC's legal status as an Article XIV Food and Agricultural Organisation of the United Nations (FAO) body, conflicts with provisions of United Nations Fish Stocks Agreement (UNFSA) and prevents major fishing players in the Indian Ocean from discharging their obligations to cooperate in the work of the Commission.
The IOTC relationship to FAO, most notably in the budgetary context, negatively affects the efficiency of the work of the Commission, with neither Members nor the Secretariat in full control of the budget. This also raises questions relating to the level of transparency in the Commission's financial arrangements.
The Panel recommends that the IOTC Agreement either be amended or replaced by a new instrument. The decision on whether to amend the Agreement or replace it should be made taking into account the full suite of deficiencies identified in the Review.

II. The criteria-based analysis of the performance of the Commission:
The analysis based on the Performance Review criteria highlighted numerous weaknesses in the workings of the Commission, of which the most important have been identified as:
High levels of uncertainty
The quantitative data provided for many of the stocks under the IOTC Agreement is very limited. This is due to lack of compliance, a large proportion of catches being taken by artisanal fisheries, for which there is very limited information, and lack of cooperation of non-Members of the IOTC. The data submitted to the Commission is frequently of poor quality. This contributes to high levels of uncertainty concerning the status of many stocks under the IOTC mandate.
Poor record of compliance and limited tools for addressing non-compliance
Low levels of compliance with IOTC measures and obligations are commonplace. The Commission to date has taken very limited action to remedy this situation – there are currently no sanctions/penalties for non-compliance in place. Moreover, the list of illegal, unreported and unregulated (IUU) vessels applies to non-Members only.
Special requirements of developing States
Many developing States are experiencing serious capacity/infrastructure constraints which impede their ability to comply with their obligations, especially in terms of data collection, reporting and processing. A number of developing States also lack appropriate scientific expertise and, even where such expertise is available, budgetary constraints limit their participation in Commission meetings, particularly those of the Scientific Committee and working parties.

In light of these findings, and in addition to the specific recommendations made against each of the criteria, the Review Panel draws the Commission's attention to the following overarching issues
Uncertainty
Addressing uncertainty in data and in the stock assessments is one of the most fundamental and urgent actions required to improve the performance of the Commission. This will require a variety of actions of which the most important are: application of scientific assessment methods appropriate to the data/information available, establishing a regional scientific observer programme to enhance data collection for target and non-target species, and improving data collection and reporting capacity of developing States. Also engaging non-Members actively fishing in the area is of critical importance to addressing uncertainty. Equally important are developing a framework to take action in the face of uncertainty in scientific advice and enhancement of functioning and participation in the Scientific Committee and subsidiary bodies.
Compliance

It is imperative to strengthen the ability of the Compliance Committee to monitor non-compliance and advise the Commission on actions which might be taken in response to non-compliance. Sanction mechanisms for non-compliance and provisions for follow-up on infringements should be developed. The Resolution on the establishment of the IUU list should be amended to allow for the inclusion of vessels flagged to Members.

Special requirements of developing States

Increased financial support for capacity building should be provided to developing States. The Commission should enhance already existing funding mechanisms to build developing States' capacity for data collection, processing and reporting, as well as technical and scientific capabilities. In this context, the possibility of establishing a special fund to facilitate participation in the Commission's work, including subsidiary groups should be considered. Strengthening the Secretariat's role/ability to undertake targeted capacity building should be explored.

The IOTC has formally adopted a resolution indicating their desire to address the issues in the PRP Report. Additionally, resolutions focused specific issues are currently being developed.

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 sustainable fisheries in accordance with MSC Principles 1 and 2;**
- **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.**

60 Guideposts	80 Guideposts	100 Guideposts
The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.		

The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries. As noted above, this is demonstrated by the IOTC framework created in 1998. The operating procedures (IOTC rules of procedures) are fully transparent and are posted on the IOTC website. This meets the SG60.

60 Guideposts	80 Guideposts	100 Guideposts
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 fishery.	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective.

There are three mechanisms for dealing with legal disputes at the international level. Firstly, disputes can be dealt with at the annual meetings of the CPCs through consultation and conciliation. Secondly,

technical disputes might be resolved by an appropriately composed expert or technical panel. Thirdly, disputes that remain unresolved might be resolved through either the International Court of Justice or the International Tribunal for the Law of the Sea. The first two mechanisms are arguably the main overall purpose of an RFMO in general and IOTC in particular.
IOTC has no formal dispute resolution procedure within the convention, but the meetings provide an opportunity to resolve disputes informally. Such disputes are still considered legal in that they set out to resolve issues defined in the 1982 UN Law of the Sea Convention.
The IOTC holds annual meetings at which they consider Resolutions for management measures and other technical actions. This system is transparent in that it makes sure that all members are fully informed of the issues under consideration and are able to participate in informed discussion. However disputes resolved in informal negotiations would not necessarily be entirely transparent. However, independent observers, including NGO and IGOs, are present at such meetings and would observe any resolutions and justifications that are presented.
The rules of procedure specify voting procedures for issues coming before the Commission including personnel matters. For example “Conservation and management measures binding on Members of the Commission must be adopted by a two-thirds majority of Members present and voting. Individual members objecting to a decision are not bound by it. If objections to a measure are made by more than one-third of the Members of the Commission, the other Members are not bound by that measure; but this does not preclude any or all of them from giving effect.” In fairness, the IOTC is relatively new and the major effort since its inception has been to establish catch and other data for scientific use and compliance. As such the management measures that have been adopted thus far have focused on this issue and the technical means to achieve it.
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 perceived other compliance problems. This meets SG80. However, it has not been tested and proven effective yet, and therefore could not meet the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
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 binding judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements binding judicial decisions arising from legal challenges.

This PI does not address situations where CPCs and fishing entities do not meet their responsibilities, only whether they are complying with the law.

There are no current outstanding judicial disputes and that 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.
However, specific fisheries undergoing certification will operate under national management systems, which would have to be considered in certifying that fishery.

60 Guideposts	80 Guideposts	100 Guideposts
The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom on people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.

IOTC provides only for the rights of nations to fish resources. How these distributed among groups within the nation state depends on national policy and legislation. 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. As a result, this does not yet meet the SG100.
The IOTC fisheries meet all SG80.
Score 3.1.1: 80

References

Anonymous (2009). Report of the IOTC Performance Review Panel: January 2009. Indian Ocean Tuna Commission. 56 pp.
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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.

60 Guideposts	80 Guideposts	100 Guideposts
Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction.

As noted the IOTC Rules of Procedure define roles and responsibilities for its contracting parties and co-operating non-contracting parties. Collectively it is the responsibility of CPCs and the Secretariat to ensure that CPCs understand their areas of responsibility and interaction. On the whole, it is successful in many areas, including providing basic catch data and catch sampling, implementing research programs and developing initial stock assessments and scientific advice.
The performance of the Secretariat is sound and well regarded as both efficient and effective by CPCs. The CPCs themselves vary in their ability to perform their role, but the roles and responsibilities are nevertheless explicitly defined at least at the national level for key areas. Key areas include providing catch and monitoring data to the Secretariat, taking part in various meetings sharing information and making decisions, meeting the requirements for conservation and other recommendations.
Roles and responsibilities are not well defined or well understood in many areas, however, IOTC has had problems with flag states that have not applied appropriate controls to their vessels, not submitting timely data and so on. 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 the SG80 and SG100.
Although roles within IOTC and among its CPCs are well defined, these are not necessarily understood by entities within nations. This would have to be evaluated for each fishery.

60 Guideposts	80 Guideposts	100 Guideposts
The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used.

Much of the purpose of IOTC is to regularly seek data, particularly the data monitoring fishing activity and catches. IOTC holds a annual plenary meetings, and specialist working groups of IOTCT (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 the 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 the SG100 because the management system cannot demonstrate in all cases consideration of all the information or explain how it uses information in decisions.

60 Guideposts	80 Guideposts	100 Guideposts
	The consultation process provides opportunity for all interested and affected parties to be involved.	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.

Consultation occurs at several levels within the management system. Consultation at the international level is formalized, and there are well-developed mechanisms for the seeking and consideration of appropriate information. At the national and fishery level whether there is an opportunity for interested parties to be involved in management varies.

The opportunity to become a CPC is open to all, including non-states. 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. 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.

IOTC facilitates effective engagement of its stakeholders. IOTC also provides training and support to States lacking the capacity in areas of data management and fisheries science, which facilitates effective and full involvement in its activities.

Therefore, there is sufficient evidence that, at the international level, IOTC meets SG80 and SG100.

All SG60 are met and 1 of 2 SG80 is met.

Score 3.1.2: 70

References

Anonymous (2009). Report of the IOTC Performance Review Panel: January 2009. Indian Ocean Tuna Commission. 56 pp.

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a model for improved governance by Regional Fisheries Management Organizations.

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

60 Guideposts	80 Guideposts	100 Guideposts
Long-term objectives to guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are implicit within management policy.	Clear long-term objectives that guide decision-making consistent with MSC Principles and Criteria and the precautionary approach, are explicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy.

The objective of the IOTC is "to promote cooperation among its Members with a view to ensuring, through appropriate management, the conservation and optimum utilisation of stocks covered by this Agreement and encouraging sustainable development of fisheries based on such stocks." Although specific objectives have not been specified, MSY is the implied objective by the Commission and the Scientific Committee. There is 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 Scientific Committee has formed the Working Party on Ecosystems and Bycatch which is addressing these issues.

The lack of explicit objectives incorporating the precautionary approach and ecosystem-based management has created weaknesses in the policy. It has been demonstrate in other management arenas that the policy can in the short to medium term depart from stated broad objectives non-precautionary actions and delays to implementing provisions required to meet the MSC Principles and Criteria.

The required objectives are implicit rather than explicit, meeting the SG60 but not the SG80 or SG100.
Score 3.1.3: 60
Condition: Explicit objectives incorporating risk (precautionary approach) and ecosystem indicators need to be developed for IOTC ideally within or as an addendum to its Convention.

References:

Anonymous (2009). Report of the IOTC Performance Review Panel: January 2009. Indian Ocean Tuna Commission. 56 pp.

FAO Council (1993).The Agreement for the Establishment of the Indian Ocean Tuna Commission. Hundred and Fifth Session in Rome on 25 November 1993. http://www.iotc.org/English/info/mission.php

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3.1.4 Incentives for sustainable fishing: The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing

60 Guideposts	80 Guideposts	100 Guideposts
The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that negative incentives do not arise.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure that they do not contribute to unsustainable fishing practices.

IOTC has no specific policies on incentives for sustainable practices. However, the conservation measures and policy statements do make it clear that these are of concern.
Becoming a co-operating non-contracting party or party of IOTC itself carries benefits and provides for incentives for sustainability. The co-operation among members and orderly division of yield among the various parties removes the worst effects of “race to fish” and “tragedy of the commons” which otherwise might arise. This includes management of bycatch and other issues under Principle 2. IOTC therefore provides for basic incentives for sustainable fishing consistent with MSC P&C, meeting the SG60.
IOTC is initiating negotiations on allocations and access rights with the goal of developing a sense of ownership. However, allocation often is the main source of conflict. Care must be taken to equitably allocate to distant water fleets with historical participation and to States wishing to develop resources within their EEZ.
Overall, incentives for sustainable fishing are provided for, although they have not necessarily been fully developed. The incentives that do exist seek to promote objectives consistent with MSC principles. Also, ICCAT can be shown to actively avoid incentives for unsustainable fishing. This meets the SG80.
All SG80 are met, but none of the SG100.
Score 3.1.4: 80

References:

Anonymous (2009). Report of the IOTC Performance Review Panel: January 2009. Indian Ocean Tuna Commission. 56 pp.
FAO Council (1993).The Agreement for the Establishment of the Indian Ocean Tuna Commission. Hundred and Fifth Session in Rome on 25 November 1993. http://www.iotc.org/English/info/mission.php
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3.2 Fishery-specific management system

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

60 Guideposts	80 Guideposts	100 Guideposts
Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery's 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's 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's management system.

The IOTC basic texts offers guidance and principles on which management plans might be based. The implied objective is MSY. The allocation negotiations are designed to proportion access and catches such that MSY and F_{MSY} are not exceeded. The amount of precaution applied, however, is not 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 is no explicit consideration of risks (for example, precautionary approach) and no explicit consideration of ecosystem-based management.
The scientific advice is based on MSC Principles 1 and 2, because these objectives are implicit in the management of each stock, meeting the SG60. However, specific objectives consistent with the requirements of MSC Principles 1 and 2 are not stated explicitly, so the SG80 cannot be met.
For the IOTC fisheries the SG60 is met, but SG80 is not met.

3.2.1: 60 Score

Condition: Clear fishery specific objectives are required that are consistent with both MSC Principle 1 and MSC Principle 2.

References:

Anonymous (2009). Report of the IOTC Performance Review Panel: January 2009. Indian Ocean Tuna Commission. 56 pp.
FAO Council (1993).The Agreement for the Establishment of the Indian Ocean Tuna Commission. Hundred and Fifth Session in Rome on 25 November 1993.
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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.

60 Guideposts	80 Guideposts	100 Guideposts
There are informal decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	

Decision-making processes are in place, which are established, responsive and largely transparent. However, there are some weaknesses, which have been highlighted by the performance review. Members can vote, but cooperating non-members are not entitled to take part in voting. Many 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 behavior 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.
Despite this, decision-making processes are in place, and they do generally result in measures and strategies to achieve objectives, which meet the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.

The Rules of Procedure set mechanisms for dealing with resolutions, which should be made on the basis of scientific evidence and be designed to maintain tuna populations at levels that will permit optimum utilization. Resolutions may be made at the initiative of the CPC to the Commission.

If a CPC persists in objecting to a conservation measure, the recommendation will not be binding on that contracting party. The contracting party is **not** required to justify its objection and there are no limits placed upon when an objection might be acceptable or not. Under best practice, permissible reasons would be limited to any alleged incompatibility with the LOS Convention, UNFSA or the RFMO's constitutive texts, or alleged discrimination against the member concerned that cannot be justified. It is therefore currently possible that an objection in IOTC could be incompatible with the MSC Principles and Criteria. A unilateral claim to increase or create a quota, for example, is incompatible with the object and purpose of IOTC and could undermine a conservation measure. Solutions such as the CPC seeking a review by an independent panel of the recommendation it is objecting to, as used by CCAMLR and WCPFC for example, is not available.
Objections have not as of yet appear in practice to be deleterious to the decision-making processes for the stocks considered here.
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 the 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 the SG100.

60 Guideposts	80 Guideposts	100 Guideposts
	Decision-making processes use the precautionary approach and are based on best available information.	

Decision-making processes clearly attempt to use the best available information. A large number of meetings are conducted and reports written for the Commission which provide analyses and advice based on all the available information.
Although the precautionary approach is implicit rather than explicit in decision making processes, it can be demonstrated that it is used in practice under most circumstances. For example, various recommendations and resolutions have been made on the basis of the potential harm they might do, and have not been delayed while waiting for relevant research to be conducted. However, because the precautionary approach and its use are not defined explicitly, it is difficult to determine whether it is properly used in all decisions. This weakness is recognized and being addressed.
Overall, IOTC decision-making processes meet the 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.

60 Guideposts	80 Guideposts	100 Guideposts
	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 describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.

Recommendations from research, monitoring, evaluation and performance review are published formally. Likewise, reports of the plenary sessions of meetings are published formally and are publicly available. This formal reporting represents best practice. While some groups may believe that 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 the SG100.
All SG60 and SG80 are met, and 1 out of 2 SG100 are met.
Score 3.2.2: 90

References

Anonymous (2009). Report of the IOTC Performance Review Panel: January 2009. Indian Ocean Tuna Commission. 56 pp.

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

60 Guideposts	80 Guideposts	100 Guideposts
Monitoring, control and surveillance mechanisms exist, are implemented in the fishery under assessment and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance system has been implemented in the fishery under assessment 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 under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.

IOTC's strategy to improve compliance started with the formation of a Compliance Committee which monitors the actions of the CPCs and has made resolutions for technical improvements. 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.
At the international level, monitoring control and surveillance mechanisms do not fully exist, and have yet to be implemented. This meets SG60 but not SG80.

60 Guideposts	80 Guideposts	100 Guideposts
Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.

Sanctions to deal with non-compliance exist and there is some evidence that they are applied. This is a function of the Compliance Committee. But as discussed by the PRP the actions have been limited. This meets SG60 but not SG80.

60 Guideposts	80 Guideposts	100 Guideposts
Fishers are generally thought to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.

This performance indicator applies to fishers and therefore needs to consider the requirements of IOTC when considering compliance. This would need to be addressed for each specific unit of certification.
There are numerous issues with non-compliance, although it is not always clear where or why they occur or who is responsible. The 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.
IOTC has a Compliance Committee that monitors compliance with recommendations. This Committee has the potential to address problems over implementation of IOTC recommendations. The performance review found that the committee structure was sound.

ICCAT prepares and distribute 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 program, assessing compliance of fishers with various Recommendations may be difficult.
Compliance of fishers typically appears adequate in the fisheries considered here, which meets the 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 the SG100. In addition, any fishery would not meet SG80 if they were not providing catch.

60 Guideposts	80 Guideposts	100 Guideposts
	There is no evidence of systematic non-compliance.	

There is no evidence of 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. 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. This fulfills SG80.
This meets all SG60 and 2 out of 4 SG80.
Score 3.2.3: 70
Condition: IOTC needs to develop sanctions which it can show are an effective deterrence to non-compliance with its requirements and procedures.

References

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3.2.4 Research plan: The fishery has a research plan that addresses the information needs of management.

60 Guideposts	80 Guideposts	100 Guideposts
Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.	A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.	A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.

The Scientific Committee presents a review of the research activities of the Commission and national institutions. It includes routine and special research programs. This is sets out the research activities so that progress can be assessed against requirements of the MSC Principles 1 and 2. It should be noted that much of the IOTC and member activities designated as "research" is actually routine data collection to develop improved monitoring for stock assessment and other purposes. However, as data collection is a priority task of RFMOs and an important source of uncertainty, this is reasonable as part of a strategic approach. Research at the national level may also be detailed, although any such research for tuna should be coordinated and reported through the RFMO which should oversee the research strategy. Therefore, while there is no single document defining a research plan, the planning and strategy is within the current reporting procedures of IOTC, meeting the SG80.

60 Guideposts	80 Guideposts	100 Guideposts
Research results are available to interested parties.	Research results are disseminated to all interested parties in a timely fashion.	Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available.

Research results are published routinely through The Scientific Committee Report as well as special reports and articles in support of the actions of the Committee. These reports are published as PDF files through the IOTC web site. The Scientific Committee report is available within days of the completion of the meeting. It provides updates on fishery statistics, stock assessments and special research programs. This level of dissemination is the best that could be expected from an international organization. This meets SG100. Further dissemination at national level would be up to national governments.

This meets all SG60 and SG80, and 1 out of 2 SG100.

Score 3.2.4: 90

References

Anonymous (2009). Report of the IOTC Performance Review Panel: January 2009. Indian Ocean Tuna Commission. 56 pp.

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3.2.5 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.

60 Guideposts	80 Guideposts	100 Guideposts
The fishery has in place mechanisms to evaluate some parts of the management system and is subject to occasional internal review.	The fishery has in place mechanisms to evaluate key parts of the management system and is subject to regular internal and occasional external review.	The fishery has in place mechanisms to evaluate all parts of the management system and is subject to regular internal and external review.

IOTC 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. As noted, the PRP was a formal external performance review that was conducted and it has evaluated all parts of the management system.
While the reviews do meet the 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.
ICCAT meets the requirements for the SG60 and SG80, but only 1 out of 2 components of the SG100.
Score 3.2.5: 90

References

Anonymous (2009). Report of the IOTC Performance Review Panel: January 2009. Indian Ocean Tuna Commission. 56 pp.
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Overall Score: 76.3

Table 1 given in the Executive Summary summarizes the findings of this evaluation.

Of the 19 stocks of tropical and temperate tunas, 5 achieved a passing score for Principle 1. Note that failure was not usually due the a poor status of the stock, but rather the failure of there being target and limit reference points in place and the lack of implemented harvest control rules in place. None of the 19 stocks met these MSC requirements.

Additionally, the RFMOs also had similar weaknesses but these varied between RFMO (Table 1).

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

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Version History

Version	Date	Content
1.0	Feb. 17 2013	19 Stocks First Complete draft for Comments