

WCPFC14 Summary Report Attachment K

Candidate performance indicators and monitoring strategies commensurate with candidate management objectives

Table1. Revised candidate management objectives for the **southern longline fishery** and proposed performance indicators and monitoring strategies for the purpose of the evaluation of harvest control rules.

Objective Type	Objective Description	Performance Indicators	Monitoring Strategy	ISW-8 Comment
Biological	Maintain albacore (and SWO, YFT & BET) biomass at or above levels that provide stock sustainability throughout their range.	Probability of $SB_{recent} / SB_{F=0} > 20\%$ as determined from the MSE.	Probability of $SB_{recent} / SB_{F=0} > 20\%$ in the long-term as determined from the reference set of MSE operating models (updated and reconditioned periodically, as appropriate).	Supported: ISG-8 noted the new definition of 'recent' to now include the last 4 years in the definition. Some discussion as to exactly how this will be calculated, e.g. final year of the model time-frame or over some time period.
Economic	Maximise economic yield from the fishery.	Predicted effort relative to E_{MEY} (to take account of multi-species considerations, BET and other spp; may be calculated at the individual fishery level). B_{MEY} and F_{MEY} may also be considered at a single species level.	Observed effort in the fishery relative to E_{MEY} .	Supported ISG8 noted that MEY can be difficult to calculate and will be dependent on availability of economic data. As such, the PI will likely be modelled in a similar manner as the economic indicators described in working paper ST-WP-08. In turn, relative economic performance, rather than maximising economic yields, may be appropriate.
	Maximise catch	Average expected catch. (may also be calculated at the assessment region level)	Observed catch information	Supported ISG-8 noted that catch will be modelled by the 'fleet' and region structure included in the MSE operating model.
	Maintain acceptable CPUE.	Average deviation of predicted CPUE from reference period levels.	Observed CPUE data from the longline fishery	Supported ISG-8 noted that CPUE will be modelled by the 'fleet' and region structure included in the MSE operating model
	Maximise SIDS revenues from resource rents.	Average value of SIDS/non-SIDS catch	Observed proportion of SIDS-effort/catch to total effort/catch in SIDS waters from log-sheet or VMS data.	Supported ISG8 noted that implementation of this PI will be dependent on the ability to separate SIDS and non-SIDS fleets in the MSE operating model.
	Catch stability.	Average annual variation in catch.	Observed variation in catch as estimated from logsheet and other data	Supported ISG-8 again noted that catch will be modelled by the 'fleet' and region structure included in the MSE operating model

Objective Type	Objective Description	Performance Indicators	Monitoring Strategy	ISW-8 Comment
	Effort predictability	Effort variation relative to reference period level (may also be calculated at the assessment region level).	Observed effort levels from log-sheet or VMS data	Supported Based on effort from the harvest strategy model for the modelled fleets.
	Maintain ALB, BET, YFT, SWO stock sizes around the TRP (where adopted)	Probability of and deviation from $SB_{recent} / SB_{F=0} > X$ in the short-medium- long-term as determined from MSE (may also be calculated at the assessment region level).	Current median adult biomass, as determined from the reference set of operating models.	Supported ISG-8 noted that this will be a direct outcome of the Harvest Strategy Work Plan
Social	Food security in developing states (import replacement)	As a proxy: Average proportion of CCMS-catch to total catch for fisheries operating in specific regions.	Ratio of locally marketed fish to imported fish products.	Supported ISG8 noted that due to the often fine-spatial scale of these PIs as opposed to the broader scale of fishery impacts being modelled in the MSE operating model that it would be difficult to implement these PIs at the required region scale for some CCMS at this stage.
	Avoid adverse impacts on small scale fishers.	As a proxy: Average catch for small-scale fisheries.	Monitoring of fisheries in CCMS	
	Maintain/develop domestic fishery	Levels of effort and catch in domestic fishery.	Monitoring of fisheries catch and effort in CCMS	
	Human resource development	Employment – though use catch of domestic catch as proxy.	Employment in the fishing sector monitored via number of domestic vessels and resulting catch in domestic fishery.	
Ecosystem	Minimise catch of non-target species.	Expected catch of other species	Ratio of target species catch to catch of non-target species based on bycatch data from observer program	Supported Noted use of proxy bycatch ratio information.

Note:

The Management Objective “Optimise Capacity” (and related performance indicators and monitoring strategies) which had been included in Table 2 of SC13-MI-WP-02 was considered to be encompassed by the Management Objective “Optimise Economic Yield from the Fishery” which was already included in the Economic Section of Table 1.

Table 2. Candidate management objectives for the **tropical longline fishery** and proposed performance indicators and monitoring strategies for bigeye and yellowfin tuna for the purpose of evaluation of HCRs. Final column notes the comments made by the SC13 ISW-8.

Objective Type	Objective Description	Performance Indicators	Monitoring Strategy	ISW-8 Comment
Biological	Maintain YFT, BET (and SWO) biomass at or above levels that provide stock sustainability throughout their range.	Probability of $SB_{recent}/SB_{F=0} > 20\%$ as determined from the MSE.	Probability of $SB_{recent}/SB_{F=0} > 20\%$ in the long-term as determined from the reference set of MSE operating models (updated and reconditioned periodically, as appropriate).	Supported: ISG-8 noted the new definition of ‘recent’ to now include the last 4 years in the definition. Some discussion as to exactly how this will be calculated, e.g. final year of the model time-frame or over some time period. PNA members requested the inclusion of SKJ.
Economic	Maximise economic yield from the fishery.	Predicted effort relative to E_{MEY} (to take account of multi-species considerations including impacts on PS fisheries; may be calculated at the individual fishery level). B_{MEY} and F_{MEY} may also be considered at a single species level.	Observed effort in the fishery relative to E_{MEY} .	Supported ISG8 noted that MEY can be difficult to calculate and will be dependent on availability of economic data. As such, the PI will likely be modelled in a similar manner as the economic indicators described in working paper ST-WP-08
	Minimize impacts from upstream fisheries, including the tropical purse seine fishery	MSY of BET and YFT	Monitoring changes and expected changes in MSY	WCPFC14 addition
	Maintain acceptable CPUE.	Average deviation of predicted CPUE from reference period levels.	Observed CPUE maintained at or greater than specified levels.	Supported ISG-8 noted that CPUE will be modelled by the ‘fleet’ and region structure included in the MSE operating model.
	Increase fisheries-based development within developing states economies	Amount and proportional contribution of SIDS fleet catch/catch in SIDS waters	Amount and value of product (exported or catches) from SIDS	Supported ISG8 noted that implementation of this PI will be dependent on the ability to separate SIDS and non-SIDS fleets in the MSE operating model.
	Optimize fishing effort	E_{MEY} (as for Maximise economic yield) or some other economic measure Effort consistent with specified level.	Annual monitoring through logbooks and VMS	Supported ISG-8 noted that effort will be modelled by the ‘fleet’ and region structure included in the MSE operating model

Objective Type	Objective Description	Performance Indicators	Monitoring Strategy	ISW-8 Comment
	Maximise SIDS revenues from resource rents.	Average value of SIDS/non-SIDS catch	Observed proportion of SIDS-effort/catch to total effort/catch in SIDS waters from log-sheet or VMS data.	Supported ISG8 noted that implementation of this PI will be dependent on the ability to separate SIDS and non-SIDS fleets in the MSE operating model.
	Catch stability [Stability and continuity of market supply]	Average annual variation in catch.	Observed variation in catch from log-sheet data	Supported ISG-8 again noted that catch will be modelled by the 'fleet' and region structure included in the MSE operating model
	Effort predictability	Effort variation relative to reference period level (may also be calculated at the assessment region level).	Observed effort levels from log-sheet or VMS data	Supported Based on effort from the harvest strategy model for the modelled fleets
	Maintain BET, YFT (and ALB &SWO) stock sizes around the TRP (where adopted)	Probability of and deviation from $SB/SB_{F=0} > X$ in the short- medium- long-term as determined from MSE (may also be calculated at the assessment region level).	Current median adult biomass, as determined from the reference set of operating models.	Supported ISG-8 noted that this will be a direct outcome of the Harvest Strategy Work Plan
Social	Food security in developing states (import replacement) [affordable protein for coastal communities]	As a proxy: Average proportion of CCMs-catch to total catch for fisheries operating in specific regions.	Ratio of locally marketed fish to imported fish products.	Supported ISG8 noted that due to the often fine-spatial scale of these PIs as opposed to the broader scale of fishery impacts being modelled in the MSE operating model that it would be difficult to implement these PIs at the required region scale for some CCMS at this stage.
	Employment opportunities	As a proxy: Average proportion of CCMs-catch to total catch for fisheries operating in specific regions	Numbers employed in fishing and processing sector relative to some target	
	Maintain/develop domestic fishery	Ratio of domestic catch to total catch	Monitoring of fisheries in CCMs	
	Human resource development	As a proxy: Ratio of domestic catch to total catch	Monitoring of fisheries in CCMs	
	Avoid adverse impacts on small scale fishers.		Monitoring of fisheries in CCMs	
Ecosystem	Minimise catch of non-target species.	Expected catch of other species based on observer data	Ratio of target species catch to catch of non-target species from observer program	Supported Noted use of proxy bycatch ratio information
	Minimise fishery impact on the ecosystem	Similar to previous PI. As a proxy use the expected catch of other species based on observer data	Ratio of target species catch to catch of non-target species	Supported Noted use of proxy bycatch ratio information