CCSBT-ESC/0609/26

Consideration of requirements for monitoring and data validation for stock assessment and management procedures in light of independent catch reviews.

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Prepared for the CCSBT 7th Meeting of the Stock Assessment Group (SAG7) and the 11th Meeting of the Extended Scientific Committee (SC11), 4-8 September, and12-15 September

Abstract

The two independent reviews have introduced considerable uncertainty in the data that underlies southern bluefin tuna (SBT) stock assessment and potential management procedures. This paper proposes a range of monitoring and data validation measures to reduce the level of uncertainty in the SBT assessments and potential management procedures. Proposed measures include exchanging historical fine scale logbooks and observer data, market and fleet research, independent at sea data verification, centralised VMS, international port monitoring, stereo video and a catch documentation scheme.

Introduction

During 2006 two independent reviews were completed to determine if there were anomalies in the Australian surface fishery or Japanese market data (Lou et al. 2006; Fushimi et al. 2006). The reviews have introduced considerable uncertainty in the data that underlies southern bluefin tuna (SBT) stock assessment and potential management procedures. This paper proposes a range of monitoring and data validation measures to reduce the level of uncertainty in the SBT assessments and potential management procedures.

Proposed Monitoring and Data Validation Requirements

Fine scale logbook data

Logbooks have been implemented for decades in some Commission for the Conservation of Southern Bluefin Tuna (CCSBT) member's fishing fleets. High resolution logbook (1x1 by month) data for all vessels operating in all SBT statistical areas should be exchanged monthly. Data confidentiality provisions should also be developed for access to logbook data at higher resolution.

High resolution historical logbook data should also be exchanged to enable the most informed analysis of historical and future CPUE and, as a result, SBT stock assessment and MPs.

Observer data

Fisheries observers have been deployed on SBT fishing vessels since the 1990s under the EFP, RTMP, Australian Joint Venture, New Zealand Joint Venture and the SRP. Observer data collected by all CCSBT members should be exchanged at the resolution it was collected while at sea (set by set). Fine scale historical observer data may assist historical CPUE analysis and, as a result, stock assessment and MPs. For confidentiality purposes the vessel and crew names can be excluded.

Economics, Fishing Operations and Compliance information

Separate in-depth reports are required on the development of all SBT fleets, markets and compliance regimes over the history of the fishery. The reports should provide a chronology of changes to economics, fishing operations and compliance activities that will assist interpreting the changing dynamics of SBT fleets and therefore CPUE. Specific details should be provided when non-compliance was noted. The reports are to be updated annually as an attachment to the members season reports.

Historical VMS data for all fleets

Electronic vessel monitoring systems are common place in a number of CCSBT member's fleets. Historical VMS data should be exchanged.

Market and fleet research

The Independent review of Japanese southern bluefin tuna market data anomalies has provided a clear indication of unreported catch of SBT. To enable informed SBT stock assessment, greater detail is required on the following items.

- The quantity of unreported catch (weight and numbers) that was taken during operations where effort has already been reported to the CCSBT and the proportion caught in areas 4-9 in months 4-9.
- Details of where and when the remainder of the unreported catch was caught and the level of effort used to catch the SBT.
- The proportion of SBT sold in/outside the auction market has potentially changed over time. A detailed understanding of past and future in/out of auction ratios is required for accurate stock assessment.
- Detailed analysis of the present and historical time lag between capture and sale of SBT.
- Clarification from the Commission on the level of double counting.
- It will be important to have independent monitoring of Japanese market statistics in 2006 and the future to ensure unreported capture of SBT does not continue.

Independent at sea verification of CPUE

The Independent review of Japanese market anomalies has cast substantial doubt on the adequacy of historical and current monitoring of SBT fishing operations. Preliminary analysis of the impact of unreported SBT catch on the SBT stock assessment indicated that an accurate CPUE series is required to provide accurate stock status advice. Independent at-sea verification of CPUE through international observers and electronic monitoring is the most accurate and direct solution. The level of coverage must be large enough to provide scientifically appropriate confidence in the estimates of CPUE.

International observer programme

An independent international observer program should be developed with a high level of coverage for all fleets. Initially coverage should be targeted to verify LL1 CPUE in core areas (4-9) in core months (4-9) with lower coverage in marginal fishing areas (1,2,11) and in core areas in marginal months (10-3). Individual voyage reports and all data should be available to members of the Extended Commission.

Electronic monitoring

Electronic monitoring of longline operations with a system that combines digital cameras, drum monitors and GPS has been successfully trialled in Canada and Australia. The system is substantially cheaper to run than at sea observers and also less intrusive. A combination of electronic monitoring and at-sea observers can provide an independent verification of CPUE with reduced costs and deployment issues (Attachment A). The system should estimate when and where fishing occurs, effort, SBT numbers and individual SBT lengths. All analysed data should be made available to all members of the Extended Commission.

Stereo video (100% Coverage on farm transfers)

In response to the Australian farm review, Australia should implement stereo video monitoring farm transfers in the surface fishery as soon as possible. All analysed data should be made available to all members of the Extended Commission. Australia should also ensure SBT are fed during towing operations.

International Vessel Monitoring System (100% coverage)

Vessel Monitoring Systems such as IMARSAT-C have been implemented in most SBT fleets. The International review of Japanese market anomalies reported significant inadequacies with the Japanese VMS including regular malfunctions. International VMS systems are currently functioning in other regional fisheries management organisations including CCAMLR with success. To ensure all SBT vessels are operating in accordance with CCSBT restrictions, an international VMS should be implemented in the CCSBT with simultaneous reporting to flag states and the CCSBT Secretariat. All vessels should depart port with a functioning VMS. If the VMS malfunctions at sea the problem must be rectified immediately or the vessel returns to port. Coverage must include the targeted SBT fleet and vessels in marginal areas (eg. area 2).

International port monitoring (random sampling of landings)

Port monitoring is a fundamental of effective fisheries management and has to date been controlled by individual CCSBT member countries. The Independent review of Japanese southern bluefin tuna market data anomalies provides compelling evidence of a lack of effective port monitoring in Japan. An international port monitoring program should be developed and run by the CCSBT to ensure that the number and weight of SBT landed is accurately monitored and can be compared to member allocations.

Catch Documentation Scheme(100% Coverage)

The CCSBT implemented a TIS in 2000 which requires all SBT traded between countries to be accompanied with a statistical document. The TIS was unable to detect the Japanese market anomaly as it does not cover domestic landings of SBT. It is clear that the CCSBT must adopt a Catch Documentation Scheme that is coordinated by the CCSBT Secretariat. The CDS must ensure that all SBT can be tracked from the point of capture to the point of sale irrespective of whether the fish are traded or landed domestically.

References

Lou, X., Hidaka, T., Bergin, A. and Kageyama, T. (2006). Independent review of Japanese southern bluefin tuna market data anomalies. Report for the Commission for the Conservation of Southern Bluefin Tuna.

Fushimi, H., Yamakawa, T., O'Neil, T. and Battaglene, S. (2006). Independent review of Australian SBT Farming operations anomalies. Report for the Commission for the Conservation of Southern Bluefin Tuna

Attachment A

EM Video Systems for Japanese longliners

Japanese long line vessels

These vessels present a special set of circumstances that we need to understand. The average Japanese long line vessel might not return back to a home port for up to 18 months. However there is an expectation that most would attempt to return to Japan within 12 months. This means we have to understand that an EM Video System might have to store data and imagery for a period of up to 18 months before there is an opportunity to retrieve that data and imagery.

Catch monitoring

For catch monitoring I would again recommend an Archipelago system with the following features.

I would suggest three cameras, the first with a good view of the tuna door. The second with a wide angle view of the work deck and the third mounted out board with a view of the starboard rail from the hauler to a point alongside the wheelhouse. With that sort of camera arrangement I would have a high level of confidence that we would be able to capture most of the incidents of interest.

The cameras would again be triggered by a hydraulic sensor and a rotation counter at the main hauler.

If we assume a modest frame capture rate of one frame per second we are going to have a significant quantity of imagery if you assume that the average haul will take between twelve and eighteen hours with about thirteen and a half hours as an average. At those rates the new systems from Archipelago would fill up in about a month.

The question become how do we extend that capability?

My first suggestion is that with a simple geo fencing parameter the system can quietly log away recording events and locations but the video capture is only activated if the vessel is within specifically defined boundaries. For example if our concerns were to monitor southern bluefin tuna operations in the South East Indian Ocean we might set this parameter as 30 to 45 south and between 80 to 120 east. There could well be other areas where geo fences might be applicable.

The average vessel that operates in this region might be there for three or four months. This still leaves us with a problem that the hard drive would fill in about a month.

As the Archipelago uses a windows XP operating system I feel it would be easy to shift out to a multi drive server the imagery on a weekly or monthly basis.

With a remote communications capability the data files might be recovered each time the vessel makes a port call be it Cape Town or wherever and in that way you would

have the ability to understand the number and volume of the video files that are on the system.

The analysis time required would vary with region and target species.

I have experience with the Japanese fleet in the South East Indian Ocean and there the catch rates are very low and the analysis for a whole nights fishing might be achieved in 90 to 120 minutes. Equally I have been on fishing operations in the Coral Sea off Australians east coast and there the frequency of fish is much greater and I could well imagine that analysis might take 5 or 6 hours for a nights fishing. Depending on location and target species I believe that analysis time will vary between 12 and 50% of actual hauling time.

Vessel Costs

In general of terms each system costs about $10,000 Australian.
There would be additional costs for the multi drive backup server.

Conclusions

There would be the reasonable expectation that the EM systems would deliver high quality data related to the spatial and temporal fishing effort of the longline fleet.

The timeliness of the data is a possible issue and there should be efforts made to retrieve the data and imagery when the vessels make port calls at places such as Cape Town, Mauritius, Hawaii etc. It would also allow for a more continuous flow of data to the analysts.