

## A check of operating model predictions from the viewpoint of the management procedure implementation in 2013

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### Summary

In this document, recent aerial survey (AS) index and longline CPUE index values are compared to the projection results that were obtained from operating models (OMs) for the implementation of management procedure (MP) in the context of the calculation of the next TAC for 2015-2017. The updated AS index value for 2012 is still outside the 95% probability interval predicted using base case OM, but for 2013 this index is close to the median value predicted by that OM. The most recent two years' longline CPUE values are also within that OM's predicted 95% probability envelope. Hence these results do not provide any information to support the existence of exceptional circumstances for the SBT stock at this time. Nevertheless, further consideration of the low AS index value in 2012 is desirable to better understand the characteristics of this index and consequent MP performance, and to explain this to the Extended Commission (EC).

## 1. Introduction

The management procedure (MP) which CCSBT introduced in 2011 to decide the total allowance catch (TAC) of southern bluefin tuna (SBT) (the “Bali procedure”) needs two types of stock indices for the input data for the MP: the Japanese longline CPUE index and the Australian aerial survey (AS) index. As these indices both impact the TAC calculation, we need to monitor them carefully to check whether or not either indicate the existence of “exceptional circumstances”. The Extended Scientific Committee (ESC) is required as an annual task to (1) review stock and fishery indicators, and any other relevant data or information on the stock and fishery; and (2) on the basis of this, determine whether there is evidence for exceptional circumstances. If the ESC agrees that exceptional circumstances exist, then the ESC needs to (1) determine the severity of the exceptional circumstances, and (2) on the base of the severity, formulate advice to the Extended Commission (EC) on the action to be taken under the associated “meta-rule”.

One of the key criteria to determine the existence of exceptional circumstance is “a scientific aerial survey (AS) or CPUE result outside the range for which the MP was tested”, where the “range” is defined as the “95% probability intervals for projections for the index in question made using the reference set of the operating models during the testing of the MP” (CCSBT 2012). The indices for the 2012 season were examined in this context during the previous ESC (Kurota et al. 2012; CCSBT 2012). In this document, using the same criterion, the OM projections that were computed in 2011 are compared with the latest observed values for the longline CPUE and AS indices, which have been updated and exchanged in 2013.

## 2. Methods

Projections which were rerun by the authors using the latest projection program (sbtprojv120) were compared to the most recent observations that have become available under the data exchange in 2013. The focus here is on two indices: (1) the scientific AS index for 2012 and 2013, and (2) LL1 (mainly consisting of Japanese longline data) CPUE for 2011 and 2012. These comparisons were made using existing results for the “MP3\_2035\_3000\_inc” scenario, which were projection results using MP3 (the Bali procedure) under the specifications of a tuning year of 2035 and a maximum TAC change of 3000t, with a 3000t TAC increment during first period. This is “Base case” scenario for the MP tuning.

In this document, the result of a robustness trial is also examined in addition to the base case regarding the lower AS value observed in 2012 (Eveson et al. 2012). This is the “high\_aerial\_cv”, trial which assumes higher variation (cv=0.5) for the AS index (CCSBT 2010) and can result in a low AS index (Kurota et al. 2012). The following table summarizes the scenarios and indices considered in this document.

| Scenario (trial)/Indices | 2012-2013 AS indices | 2011-2012 LL CPUE |
|--------------------------|----------------------|-------------------|
| Base                     | X                    | X                 |
| High aerial CV           | X                    |                   |

### 3. Results

#### 3.1. Scientific aerial survey index

The AS index value for 2012, which was re-standardized by GLMs after the data update in 2013, still shows a substantial decrease from that of 2011. However, the value of the index for 2013 has increased back to 2010-2011 levels. The unscaled index values were 101.2 and 255.7 for 2012 and 2013 respectively (AU\_AerialSurvey\_9313.xls of 2013 data exchange), while the OM predictions made in 2011 for the base case were 256.3 and 243.3 respectively [with probability intervals of 118.4-547.4 and 101.8-551.3 for 2.5-97.5% ranges for 2012 and 2013 respectively] (Fig. 1). In other words, the AS value for 2012 was outside the 95% range for the base case, but the value for 2013 was close to the predicted median value under the OM.

For the high\_aerial\_cv scenario, however, the observed value for 2012 is located within the 95% probability interval for the prediction [84.5-727.2] (Fig. 2). It is therefore evident that the robustness trial included the possibility that the AS index could drop to as low a level as observed for 2012 in the short term.

#### 3.2. Longline CPUE index

Both of observed longline CPUE series (w0.8, w0.5, and the average of their values) for 2011 and 2012 (JP\_CoreVesselCPUE\_6912.xls of 2013 data exchange) are within the 95% probability intervals [0.42-1.27 in 2011 and 0.50-1.60 in 2012] for the base case OM prediction made in 2011 (Fig. 3).

#### 3.3. Spawning biomass and catch in the OM projections

The projected spawning biomass and catch trajectories under the base case and the high\_aerial\_cv scenario are almost identical. In the high\_aerial\_cv scenario, the spawning biomass is expected to rebuild above 20% of pre-exploitation level with a 69.6% probability in 2035. This probability is almost of the same as the tuning value (70%) for base case (Fig. 4).

### 4. Discussion

The ESC 17<sup>th</sup> meeting held in 2012 did not consider that the low AS value for 2012 had triggered exceptional circumstances in terms of the meta-rule process. The AS index as updated in 2013 still

shows a low value for 2012, but its value for 2013 is close to the OM's predicted median value. These results show that there is no new information from these surveys that would support the existence of exceptional circumstances in SBT stock at this time. Additionally, the most recent two years' longline CPUE values provide no justification for declaring that exceptional circumstances exist.

Based on these results, new TAC for 2015-2017 fishing seasons may be recommended in 2013 using the Bali Procedure without invoking the meta-rule. Nevertheless, regardless of the meta-rule process, the ESC will need to comment upon the recent trends of the indices used for the MP in their management advice to the EC. Thus further consideration for the low AS value for 2012 would be advisable to understand the characteristics of the AS index particularly once more detailed analyses of the environmental and fishery data become available (CCSBT 2012).

## 5. References

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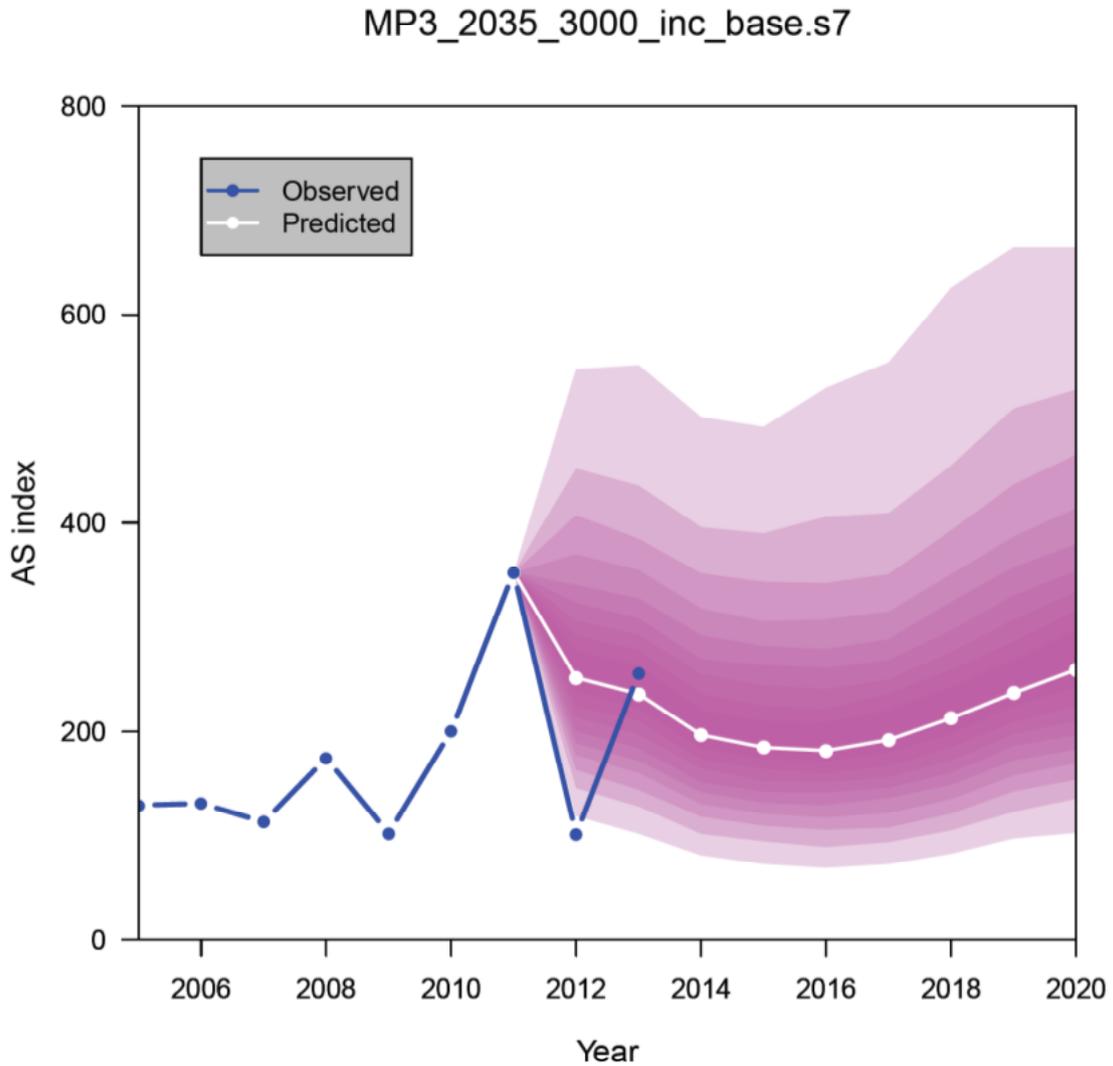


Figure 1. The scientific aerial survey (AS) index (blue line; 2005-2013) and the future index as projected in 2011 for 2012 to 2020 for the “base case” OM scenario (reference set), where the white line with its points is the median projected AS index, and the shades of purple represent percentiles from 2.5% to 97.5% in increments of 5%.

MP3\_2035\_3000\_inc\_highaerialcv.s7

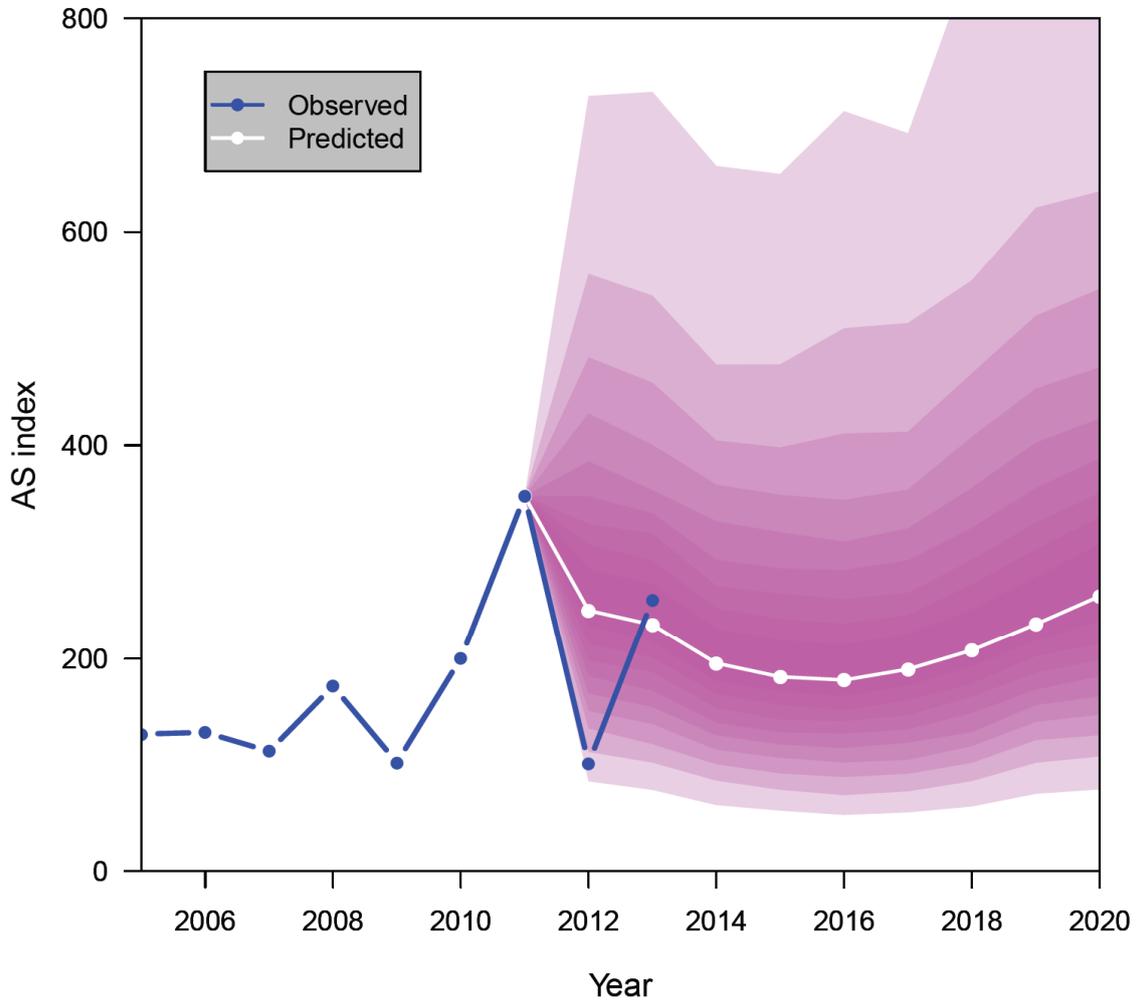


Figure 2. The scientific aerial survey (AS) index (blue line; 2005-2013) and the future index as projected in 2011 for 2012 to 2020 for the “high aerial cv” scenario, where the white line with its points is the median projected AS index, and the shades of purple represent percentiles from 2.5% to 97.5% in increments of 5%.

MP3\_2035\_3000\_inc\_base.s4

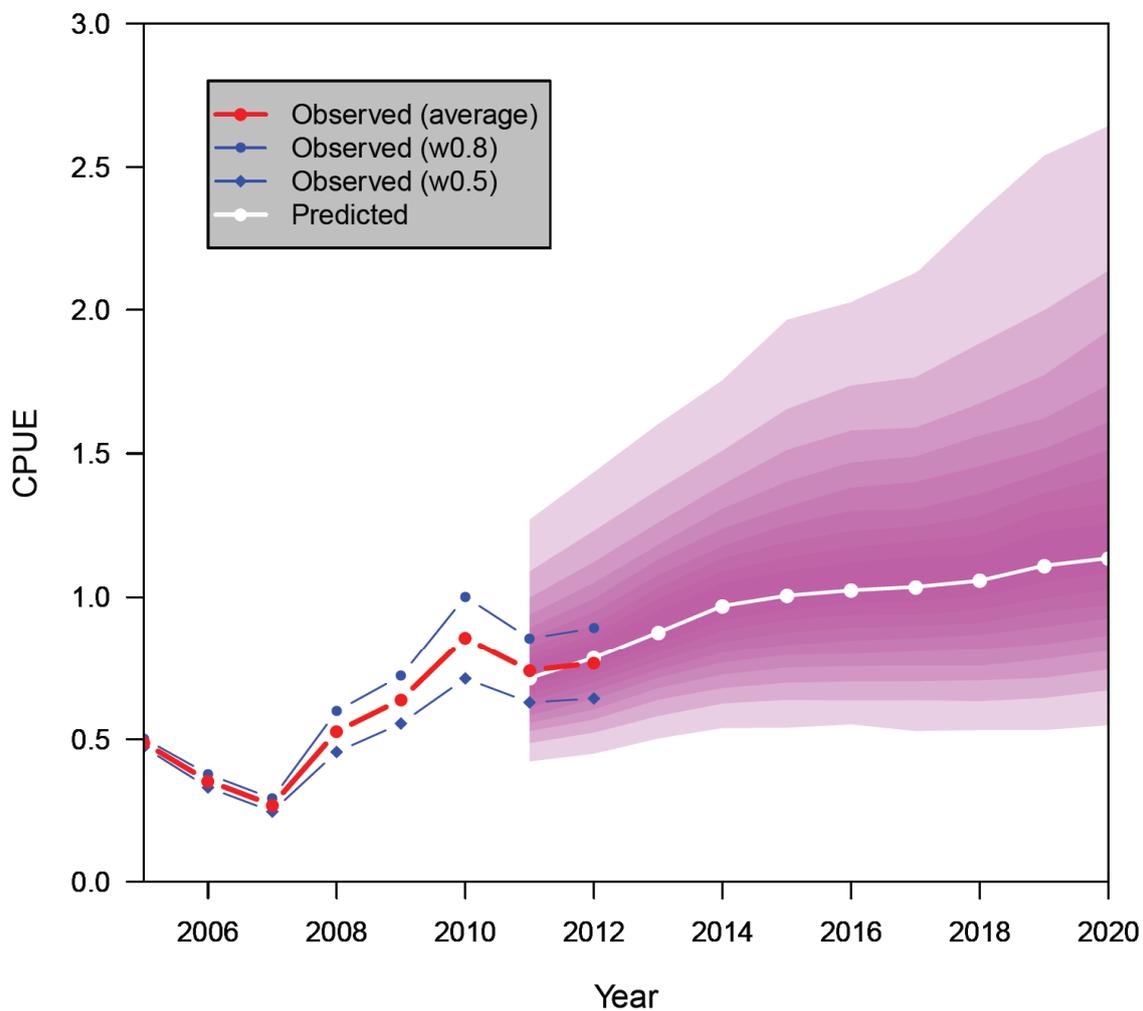


Figure 3. Historical longline CPUE series (2005-2012) of w0.5 and w0.8 (blue lines), the average of the two (thick red line) and the future index as projected in 2011 for 2011 to 2020 for the “base case” scenario (reference set), where the white line with its points is the median projected CPUE, and the shades of purple represent percentiles from 2.5% to 97.5% in increments of 5%.

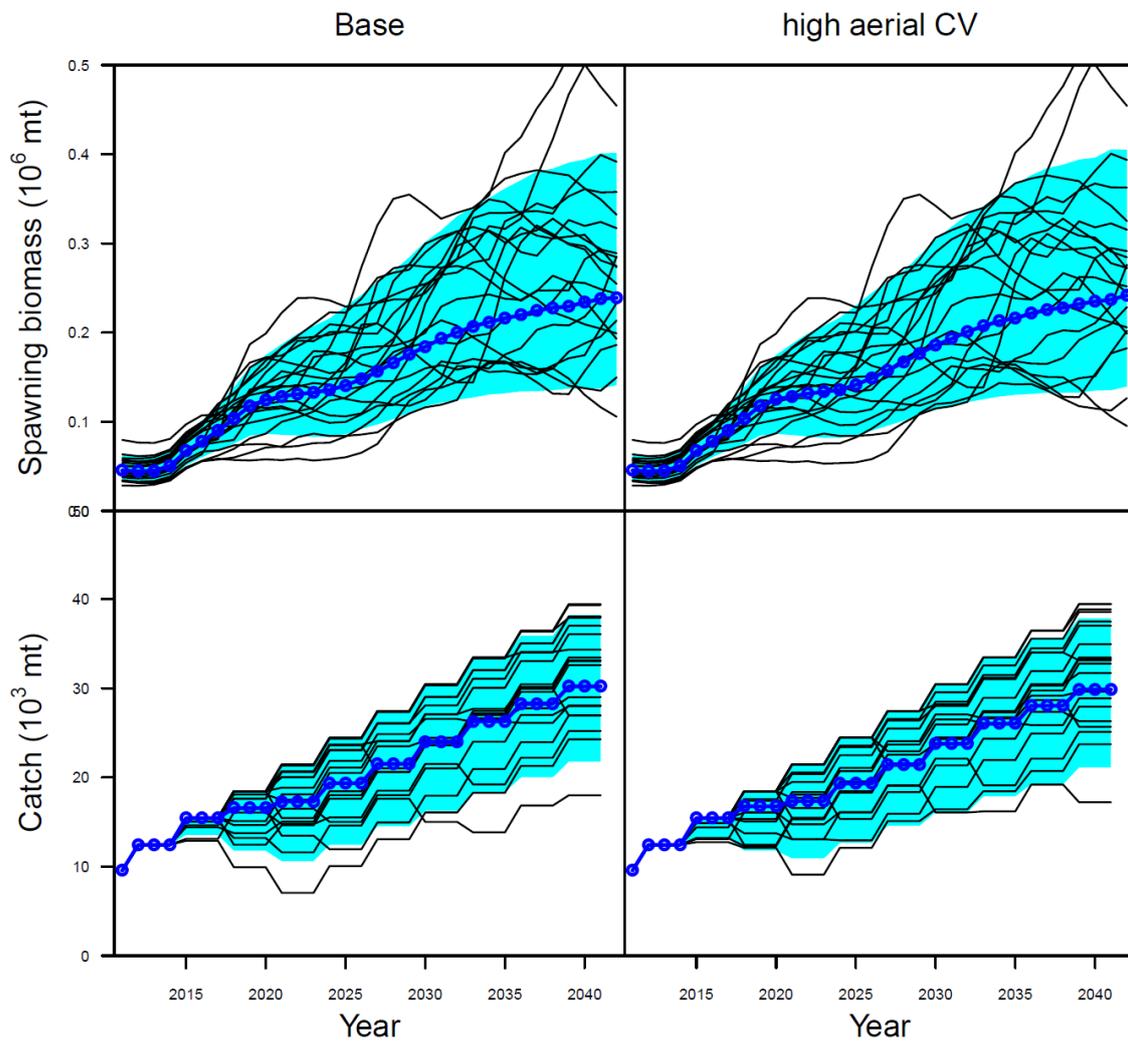


Figure 4. Worm plots (SSB and catch) for the Bali procedure for the “base case” OM (3000t increase in the first year) and “high aerial cv” scenario (robustness trial). The dark blue circles represent the median, the light blue shading covers the range from the 10th to the 90th percentiles, and the 20 black lines are a random sample consisting of 20 trajectories.