



North Pacific Fisheries Commission

NPFC-2022-SSC BFME03-WP07 (Rev 1)

Small Working Group on NPA and SA - Summary for 2022

by

Kota Sawada (Lead of the SWG NPA-SA)

Oceanic Resources Group, Fisheries Resources Institute,
Japan Fisheries Research and Education Agency, Japan

December 2022

This paper may be cited in the following manner:

Sawada, K. 2022. Working Group on NPA and SA - Summary for 2022. NPFC-2022-SSC BFME03-WP07 Rev 1. 4 pp. Available at <https://www.npfc.int/>

Working Group on NPA and SA - Summary for 2022

Kota Sawada (Lead of the SWG NPA-SA)
Oceanic Resources Group, Fisheries Resources Institute,
Japan Fisheries Research and Education Agency, Japan

The Small Working Group on North Pacific Armorhead and Splendid Alfonsino (SWG NPA-SA) held three online meetings in 2022 (April 22nd, June 24th and October 6th). By SSC BFME02, the group was tasked with five items as follows:

1. Continue joint work on life history based approach to stock assessment
2. Define spatial resolution of shared data for data template
3. Continue work on the fish ID guide
4. Update species summaries
5. CPUE standardization

Progress on those tasks is summarized below.

1. Continue joint work on life history based approach to stock assessment

After reviewing the shared data (see task 2) the SWG NPA-SA started analyses of:

- A. Monthly changes in length potentially for length-based analyses for NPA
- B. Relationship between fecundity and fatness to evaluate fecundity changes for NPA
- C. Growth curve for SA
- D. Maturity ogive for SA
- E. Evaluation of spatial variation in life history for SA

The presentations and documents reporting the progress of those analyses available on the NPFC Collaboration website.

1-A. Monthly changes in length potentially for length-based analyses for NPA

Libin Dai (China) led the analyses and concluded that:

- The length frequency distribution of NPA lacks small fish individuals, which will undermine the fitting of growth curve
- It is hard to determine a single set of growth parameters for subsequent Per-Recruit analysis due to the wide range of estimates and large uncertainty as well as high sensitivity to search conditions
- Therefore, it is not recommended estimating the growth of NPA from length frequency distribution

The SWG NPA-SA agreed that estimating the growth of NPA from length frequency distribution is not recommended.

1-B. Relationship between fecundity and fatness to evaluate fecundity changes for NPA

Chris Rooper (Canada) led the analyses and concluded that:

- The fatness ratio is not linearly related to log-transformed gonad weight and peak fatness is not correlated with the highest gonad weight. Peak gonad weight is associated with a fatness ratio of ~0.27
- As the fatness ratio declines from its peak at ~0.27, the gonad weight decreases
- Fish size is a good predictor of gonad weight for NPA in this data set. Fecundity increases almost linearly with fish length

The SWG NPA-SA noted that the last conclusion that fish size is a good predictor of gonad weight for NPA may require further analysis as NPA do not grow after the settlement.

1-C. Growth curve for SA

Hyejin Song (Korea) led the analysis and concluded that:

- The von Bertalanffy growth function was fitted
- It is recommended to calculate growth curves to see the differences in seamounts, years, countries etc. using likelihood method by TMB (Template Model Builder) in R

The SWG NPA-SA recommended to use TMB for fitting models to data

1-D. Maturity ogive for SA

Bungo Nishizawa (Japan) led the analysis and concluded that:

- Seasonal pattern of GSI was unclear
- Monthly variation of maturation stages showed matured fish occurred between March through December with intense spawning period observed in July
- FL₅₀ was in the range 257 – 361 mm with high variability depending on the subsets of data used for estimation (macroscopic vs. microscopic analysis, macroscopic 5 stages vs. 6 stages, trawl vs. gillnet)
- Further analysis is needed to estimate more reliable FL₅₀ value to manage SA stock in the Emperor Seamounts

The SWG NPA-SA suggested that temporal and spatial variation should be considered to evaluate the effect of location and year.

1-E. Evaluation of spatial variation in life history

Vladimir Kulik (Russia) led the analysis and concluded that:

- Growth curve and maturity ogive differ significantly by location
- The data include some outcasts and there is a need to agree on the rules to filter them out

The SWG NPA-SA note the possible use of different spatial aggregations (small sample size for some seamounts) and possible confounding effects (e.g. gear and season). It was also note that density dependent effect may be considered as a factor in future analyses.

2. Define spatial resolution of shared data for data template

The SWG NPA-SA agreed to use seamount names as a spatial resolution for the data template to analyze spatial variations in life history (see 1-E). Then the SWG NPA-SA reviewed discrepancies in the shared data and agreed to:

- aggregate Kammu and Yuryaku seamounts into Milwaukee
- convert standard length (SL) and total length (TL) into fork length (FL) using the following equations
 - NPA: $SL = 0.90 FL$, $SL = 0.88 TL$, $FL = 0.97TL$ (newly estimated)
 - SA: $SL = 0.91 FL$, $SL = 0.77 TL$, $FL = 0.84TL$ (Shotton 2016)
- conduct separate analyses for different methods to assess maturity

The SWG NPA-SA noted the difference of measurement resolutions and the lack of age data for NPA in shared data.

3. Continue work on the fish ID guide

The SWG NPA-SA reviewed the draft fish ID guide and suggested to add English names and FAO 3-letter codes, to make sure the picture and its title listing in the same column of same page and to make scale bars clear for some pictures. Apart from those suggestions, the SWG NPA-SA endorsed the guide.

The SWG NPA-SA discussed the addition of species distribution maps. Recognizing significant time and effort for this addition, the SWG NPA-SA agreed that it was not necessary at this time but might be a possible future task.

The SWG NPA-SA requested Secretariat to edit the fish ID guide including layout to avoid blank space.

4. Update species summaries

The SWG NPA-SA reviewed and endorsed the updates species summaries on NPA and SA.

5. CPUE standardization

The SWG NPA-SA discussed how to proceed with this task and agreed to conduct CPUE standardization separately by Members based on their own data and submit standardized CPUEs to the SWG NPA-SA. The SWG NPA-SA encouraged to continue discussion on methodology and framework for CPUE standardization taking into account, *inter alia*, best practices of other SC's subsidiary bodies.

The SWG NPA-SA re-affirmed that CPUE standardization is a low priority task and agreed to focus on life history based approach to stock assessment.

References

Shotton R (2016) Global review of alfonsino (*Beryx* spp.), their fisheries, biology and management. FAO Fish Aquac Circ 1084:1–165