



**SCIENTIFIC COUNCIL INTERSESSIONAL MEETING: 3LN REDFISH MSE**

**30 January 2025, via Webex**

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## Report of the Scientific Council Intersessional Meeting: 3LN Redfish MSE January 2025.

30 January 2025, via Webex

Chair: Diana González-Troncoso

Rapporteur: NAFO Secretariat

### 1. Opening

The meeting was opened by the Scientific Council Chair, Diana González-Troncoso (European Union) at 08:04 hours (UTC/GMT -4 hours) on Thursday, 30 January 2025.

The Chair welcomed representatives from Canada, the European Union, Japan, the Russian Federation and the United States of America. A full participants list is presented in Appendix I.

### 2. Quick review of 3LN redfish MSE (up to January 2025) and SC recommendations

An update on the progress of the 3LN redfish MSE to date was presented, including the exploration of different models and the MSE Team's conclusion on the feasibility of continuing the process going forward. The update also included the Scientific Council recommendation from the January 2024 meeting to prioritize the operating models (OMs) based on the survey-based age-structured catch at length (SURBA) model. The SURBA models have a flexible framework for simulating episodic recruitment as is seen in this redfish stock (SCS Doc. 24/02). There was no additional progress on this work at the June 2024 Scientific Council meeting as a result of workload issues. At the June 2024 meeting, the Scientific Council proposed an extended workplan, and noted that the workplan for this process should remain flexible due to the many challenges with 3LN redfish, including the episodic nature of the recruitment in this stock and the novelty of the work that is in progress to address this (SCS Doc. 24/16 Revised).

### 3. Environmental explorations to inform OMs

Andrea Perreault (Canada) presented the results of the dynamic factor analysis (DFA) for 3LN redfish survey indices. Using the MARSS package in R to fit various DFA models, the objective of the analysis was to identify if common trends exist in the 3LN redfish survey time series; identify if there are relationships between these trends and ocean climate, ecosystem and/or exploitation indicators; and assess if the results can be integrated into a pre-existing model (ACL/SURBA) to help explain/reduce process variance. Combinations of a number of trends (1, 2, 3) and explanatory variables were fit, and the best fitting model was selected using AICc, inspection of residuals and model fit to the data. It was noted that the 3L EU-Spain index was excluded from the analysis after preliminary model fits showed that the index was relatively noisy and the models tended to attribute most of the underlying variability to this series. Sensitivity analyses that fit models separately to the juvenile and adult indices, and models that fit to truncated and longer times series were also explored. Overall, two common trends were identified in the 3LN redfish indices with CIL (lagged ten years) and spring bottom temperatures (lagged three years) as covariates. However, it was noted that it remains unclear how to best incorporate these covariates into the current models due to the fact that their significance varies across/among time series and that there is uncertainty in which mechanisms are driving these processes.

### 4. Progress on ACL (age-structured catch-at-length) models

Andrea Perreault (Canada) presented an update to the 3LN redfish operating models. The model prioritized for continued development at the January 2024 SC meeting was the SURBA model. This model is a state-space age structured catch-at-length model that is used to model recruitment and internally converts numbers at age to numbers at length via a stochastic growth model. Issues that were flagged with the model fit to the data at the January 2024 meeting were large process error variances, conflicts between survey and commercial length compositions and unusual patterns in survey residuals at the oldest and youngest ages. In order to try to address these issues, the following updates were integrated into the model: using the design-based survey CVs ( $\sqrt{\text{var}/\text{mean}}$ ) as known inputs; assuming that the recruitment deviations are from a contaminated distribution; adding aggregated commercial landings; and the addition of a model formulation that included process errors.

After running various combinations of updated models, the Team concluded that the uncertainty around the model estimates are still high and that the current model formulation does not appear to have captured underlying population processes well. Further exploration of these models could be considered; however the noisy input data and the gaps in the current understanding of the nature of the stock continue to create large uncertainties in estimates of population processes.

Due to time constraints, there were no further updates on the surplus production models; however updates requested by the reviewers at the 2023 Scientific Council June meeting (SCS Doc. 23/18) were implemented. As in the SURBA model, large process error estimates were required to fit the data well. Additionally, the surplus production models do not capture the episodic nature of redfish recruitment and therefore may not provide a representative perspective of the stock if projected forward with no further interventions.

## 5. Team perspective on feasibility of MSE going forward

The MSE Team concluded that the available results indicate that an MSE process for 3LN redfish may not be feasible given the available data and current understanding of the stock. All stock assessment models explored were not suitable for use in an MSE framework (high uncertainty in population estimates and/or missing important underlying population processes). Even in the simplest case (e.g. a data limited MSE), trying to project forward based on life history traits would be very uncertain given lack of species breakdown in the survey and catch data and limited understanding of maturity/growth processes. The MSE Team proposed the following three topics for discussion:

- Identifying a way forward for giving 3LN redfish advice. The stock was assessed in June 2024 using an index-based assessment and advice was given for two years.

- Providing research recommendations based on issues identified in the MSE process.

- Scientific Council to develop a screening process to determine early on whether or not a stock is a suitable candidate for an MSE. The issues that have been identified (noisy data, limited understanding of important processes, mixed stock) were all known before beginning the MSE.

## 6. Discussions

Discussions about the way to move forward took place within the Scientific Council.

First, the Scientific Council noted that model outputs showed large errors in the estimation of population processes which raises questions about the plausibility of the models and their ability to project forward. As such, the Scientific Council agreed that moving forward with an MSE at this stage may not be worth the time and capacity required given the results shown. Specifically, harvest control rules (HCRs) tested with these operating models would not be expected to meet performance objectives, even with very low removal levels. It was agreed that carrying out simulation testing of example HCRs would be helpful in demonstrating the challenges with moving forward with the MSE.

Second, it was suggested that a viable way forward would be to produce a HCR that complies with the revised Precautionary Approach Framework (PAF) based on the simulations that were completed in 2024 for the testing of the PAF. It was agreed that this work would be best completed during the 2025 June Scientific Council meeting, as in person discussions would better facilitate the progress on this work.

Third, in the short term, the current survey-based approach could continue to be used to provide advice when needed.

It was also noted that the Designated Expert position for 3LN redfish will be vacant from the end of February onward, and therefore a new DE will be required to conduct the monitoring/assessment work for June 2025 and to lead future 3LN redfish assessment work, including the suggested ways forward above.

It is uncertain at this time if an additional RBMS meeting would be required in April 2025 to progress in this matter. The co-Chair of WG-RBMS, Fernando González-Costas (European Union), agreed to discuss the results of the meeting with the other co-Chair, Ray Walsh (Canada); they would determine if an additional meeting would be required.

**7. Other matters**

Adolfo Merino (European Union) announced that he is leaving NAFO for another position during February 2025. The Scientific Council congratulated him on his new position and thanked him for all his work done within the group and his unfailing good disposition. The SC will certainly miss him.

**8. Adjournment**

The Scientific Council Chair thanked the MSE Team for their hard work on the project and presenting the results to date. The meeting adjourned at 12:02 hours.

## APPENDIX I. LIST OF PARTICIPANTS, JANUARY 2025

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**APPENDIX II. AGENDA**

**Scientific Council Intersessional Meeting: 3LN Redfish MSE**

**30<sup>th</sup> January 2025, via WebEx.**

**One day meeting, 8:00 – 13:00 hours (UTC -4)**

**Agenda**

1. Opening
2. Quick review of 3LN redfish MSE (up to January 2025) and SC recommendations
3. Environmental explorations to inform OMs
4. Progress on ACL models
5. Team perspective on feasibility of MSE going forward
6. Discussions
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8. Adjournment