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Jack Mackerel MSE: questions and tasks for SC14

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¹Generative AI tools assisted with document organization, editing, and formatting. The authors retain responsibility for the scientific content and conclusions.

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Purpose

The MSE has advanced from the broad SCW17 design to a common 500-draw comparison of eight candidate management procedures (CMPs) under a main operating model (OM) and nine alternative OMs. This paper helps SC14 decide whether the scientific work is sound, agree how candidates should be judged, and give the guidance needed to complete the CMPs for annual use.

The Scientific Committee is asked to:

1. agree that the MSE provides a sound basis for completing the jack mackerel management procedure;
2. agree the minimum biological performance requirements and the practical requirements for annual use;
3. identify a provisional shortlist for final comparative evaluation;
4. advise on index use and the treatment of difficult alternative cases; and
5. recommend completion of the operational specifications and formal exceptional-circumstances protocol before Commission selection or adoption.

What the analysis establishes

The MSE tests complete catch-advice rules by simulating how each rule performs over time. It includes related errors among five abundance indices, dynamic reference points, alternative productivity and recruitment conditions, selectivity uncertainty, stock-structure hypotheses, movement, and alternative annual TAC-change limits.

The current comparison contains hockey-stick (HS) and power-ramp (PR) configurations. All eight cases were refined using the same 500 model runs, which represent uncertainty in the assessment, toward an approximately 60% mean probability of dynamic Kobe-green status during 2041–2050. This common tuning objective makes their trade-offs more comparable; it is not, by itself, a complete set of minimum biological performance requirements.

The analysis demonstrates differences in catch, biological condition, stability, and responsiveness. It does not demonstrate that one CMP dominates all objectives and alternative cases. MP43 and MP44 are the main cases. MP29 and MP32 retain the earlier annual-increase setting for comparison, and MP45–MP48 provide additional annual-limit comparisons. These roles do not constitute a short list.

Questions for SC14

Table 1: Questions and tasks for SC14.

Question for SC14	Information now available	Choice still required	SC14 task
Is the MSE scientifically sound?	Simulation tests that repeatedly apply each CMP over time, the main OM, a set of alternative OMs, treatment of the five indices, and external review	Whether the remaining limitations prevent the work from advancing	Agree that the work can advance, or identify corrections that must be made first
What constitutes acceptable biological performance?	Dynamic Kobe measures and results from the main and alternative OMs	Acceptable biological risk, including the chance of low biomass or overfishing in each stock component and difficult OM	Agree the minimum biological performance requirements
Which CMPs should advance?	A common 500-draw comparison of HS and PR candidates	The desired balance among catch, stability, response to decline, and remaining risk	Select a provisional short list from the CMPs that meet those requirements

Question for SC14	Information now available	Choice still required	SC14 task
How should two-stock risk be treated?	Tests with and without movement and under alternative productivity and model assumptions	Which cases are plausible enough to affect the choice, the geographic coverage, and whether regional protection is needed	Give clear guidance rather than rely only on later monitoring
Is further allocation analysis needed for this MSE paper?	The CMP allocation method and the fixed-split tests are already documented	The author's response explains how these results answer the review comments	Treat the analytical allocation work as complete unless SC14 identifies a specific new scientific question
Is annual application ready?	Current CMP pages, data template, annual workflow, and record of sources and changes	Units, cut-off dates, missing or revised data, rounding, fallback, verification, and responses to exceptional circumstances	Require completion before adoption

How candidates will be considered

The evaluation has three steps.

Step 1: review biological performance and readiness for annual use

For each CMP, report whether it meets criteria agreed by SC14 for:

- probability of remaining above the biomass limit, including the highest single-year risk and the probability of crossing the limit at any time;
- overfishing risk;
- component-level performance in relevant two-stock OMs;
- feasibility under low catch and binding effort constraints; and
- ability to produce repeatable annual advice without untested analyst judgment.

The relationship between the COMM8 objectives and the later K60 tuning target is not treated as already resolved. COMM8 included time-specific biomass objectives, including a high-probability requirement above a biomass limit, whereas K60 is the common 2041–2050 dynamic Kobe-green tuning target used to make the current CMPs comparable. SC14 is asked to decide which requirements apply in screening and whether K60 supplements or replaces any earlier objective. Failure of a difficult OM need not automatically exclude a CMP, but accepting that risk should be an explicit decision supported by an assessment of the OM's plausibility and consequences.

The [complete CMP-by-OM and stock-component decision table](#) reports dynamic Kobe-green probability, biomass and overfishing risks, catch, and IACC for all 112 CMP/OM/stock combinations. In om23, northern dynamic Kobe-green probability is only 0.9–2.9% across the eight CMPs. SC14 should record whether that legacy model/configuration sensitivity is decisive, a concern requiring additional work or protection, or non-decisive because of its assessed plausibility.

Step 2: performance under alternative assumptions

Describe each candidate as acceptable, of concern, or unacceptable under every OM. Show the two stock components separately. Give particular attention to the movement case, in which a combined indicator may mask a declining southern component, and to the om23 assessment/configuration case.

Step 3: management trade-offs

Among candidates that meet the requirements in the first two steps, compare catch, stability, responsiveness, low-catch frequency, and other agreed objectives. Weighted scorecards may illustrate preferences and sensitivity to weights, but should not replace raw outcomes or determine biological acceptability.

Interpretation of HS and PR configurations

The focal HS and PR cases are complete CMP configurations, not a controlled test of HCR shape alone: they differ in target catch, tuned trigger, and the way the indicator is converted to advice. Conclusions should therefore concern the performance of complete configurations. A matched conceptual comparison can still illustrate rule shape when all other settings are held constant.

At least one HS and one PR candidate may need to remain under consideration until SC14 expresses its preference between relative stability and stronger responsiveness. The shortlist should explain why its members advance, why other variants do not, and whether apparently similar candidates add useful information.

Two-stock and movement results

The two-stock tests connect biological stock structure, movement, regional indices, and the geographic interpretation of the results. Separate northern and southern monitoring is valuable, but an exceptional-circumstances protocol cannot by itself remove a vulnerability already demonstrated in an OM.

SC14 should advise whether the results require a rule to protect a regional stock component, separate component indicators, or a clear decision that a difficult OM should not determine selection. The fixed catch splits are tests of the CMP under different assumptions. No further allocation analysis is required for this paper; the author's response addresses the reviewer's interpretation of those tests.

Requirements before Commission adoption

A shortlisted CMP should not be described as ready for annual use until two independent analysts can calculate identical advice from the same annual data. The final specification should define:

- official data series, providers, units, calculations, and cut-off dates;
- index reference periods and treatment of missing, late, or revised data;
- the prior-advice value, annual-change limits, units, and rounding;
- treatment of differences between advice and realized catch;
- effort constraints, fallback calculations, and independent sign-off; and
- exceptional-circumstances indicators, thresholds, review steps, authority, and possible responses.

The final saved version should link the exact code and simulation runs to the CMP settings, papers, CMP list, tables, figures, downloads, and Slick file. An automatic check should confirm that the important numbers agree everywhere.

Advice requested from SC14

The Scientific Committee agrees that the MSE provides a sound basis for completing the jack mackerel management procedure; agrees the minimum biological performance requirements and practical requirements for annual use recorded in its report; identifies a provisional shortlist for final evaluation; provides guidance on index use and the treatment of difficult alternative cases; and recommends completion of the instructions for annual use, final saved results and code, and exceptional-circumstances protocol before a CMP is presented to the Commission for selection or adoption.

The [technical paper](#) provides the supporting results and methods. The [response to the review](#) records the answer to each finding.