Proposed amendments to the Fisheries Act: A case for Management Procedures and Management Strategy Evaluation as best practice for fisheries science and management in New Zealand

In this submission we provide a fisheries science perspective on aspects of Part 1 of the proposed amendments to the Fisheries Act, focussing mainly on the use of management procedures. Dragonfly Data Science is a fisheries science provider for Fisheries New Zealand, and for international fisheries management organisations, such as Regional Fisheries Management Organisations (RFMOs). We also provide research services to the New Zealand fishing industry, and to environmental organisations. Our fisheries science team regularly contributes to advancing best practice in fisheries science; participating in international workshops, and providing consultancy to improve the science and management process in New Zealand and internationally (e.g., Neubauer et al. 2023, Neubauer 2024). Beyond fisheries science; we regularly provide science to conservation organisations and agencies (e.g., Department of Conservation), especially in the context of protected species captures and marine reserve science. We are known to give independent science advice and maintain a reputation for analytic rigour and scientific best-practice.

Do you support the proposal?

Dragonfly Data Science strongly supports the proposal for a more responsive and robust fisheries management system through the development and implementation of Management Procedures, as outlined in Part 1 of the proposed amendments to the Fisheries Act. We suggest that allowing for the regulated use of management procedures across stocks represents scientific best-practice, will significantly lower risk, and improve certainty for all sectors that stocks are managed sustainably in accordance with the Fisheries Act. We believe that the aims of the other proposed amendments (multi-year catch decisions, and low-information stocks) can be met by implementing a Management Procedure framework.

Do you agree with the problem/issue?

We agree with the overall premise of part 1 of the proposed changes. New Zealand's fisheries are a vital resource, providing economic, social, and cultural benefits. Sustainable

management is crucial to ensure these benefits for current and future generations. Fisheries management in New Zealand has traditionally relied on single-species stock assessments, which are only possible for a relatively small number of high-value stocks. These assessments are, for the most part, only updated every few years for management advice. This approach is inefficient and usually carries unnecessary levels of risk to the long-term sustainability of stocks (Butterworth 2007), especially given increased climate-driven variability and changes to our marine ecosystem. Management Procedures and Management Strategy Evaluation offer a robust and adaptive framework that can more efficiently respond to unforeseen changes in the environment and fish stocks—a key requirement for the management of natural resources in variable environments and under scientific uncertainty.

Suggestion: Definition of Management Procedures

The consultation document equates Management Procedures with harvest control rules; however, a more common definition is that a Management Procedure or harvest strategy is a pre-agreed set of rules that specify how fishing will be managed based on available data. It encompasses the entire management cycle, including data collection, stock assessment, decisions via Harvest Control Rules(e.g., setting Total Allowable Catch (TAC)), and implementation. A well-defined Management Procedure specifies which data will be collected, how it will be analysed (e.g., using a particular assessment model or indicator), and how that analysis will translate into management actions (e.g., a total allowable commercial catch (TACC) adjustment) using a harvest control rule. A Harvest Control Rule is therefore only one aspect of a Management Procedure, and omitting other aspects (data collection, specific analytic methods to be applied) of Management Procedures from its definition can lead to problems with its application. Notably, procedures to check and respond to exceptional circumstances should be required to form part of the Management Procedure.

The Commission for the Conservation of Southern Bluefin Tuna (CCSBT) provides a good example of how to address exceptional circumstances. The CCSBT's "Cape Town Procedure" (CCSBT, 2013) outlines a process for evaluating exceptional circumstances in the context of the CCSBT Management Procedure. The key elements of a robust exceptional circumstances provision include:

- **Clear triggers:** Define specific, measurable indicators that will trigger the exceptional circumstances clause (e.g., a rapid decline in stock biomass below a pre-defined limit).
- **Pre-agreed response:** Specify the actions that will be taken if the exceptional circumstances clause is triggered (e.g., a temporary moratorium on fishing, a significant reduction in TAC).

- **Review process:** Establish a mechanism for reviewing the exceptional circumstances response and for determining when it is appropriate to return to the normal Management Procedure. Additional data (such as new information from data not previously considered) should be presented and incorporated to decide if exceptional circumstances apply.
- **Transparency and stakeholder involvement:** Ensure that the exceptional circumstances process is transparent, and that stakeholders are involved in the decision-making.

Are there benefits that have not been identified for the options?

The adoption of Management Procedures and Management Strategy Evaluation represents *best* practice for fisheries science and management in New Zealand. While the consultation document points to some examples of Management Procedures used in New Zealand, and outlines some of its benefits, it does not provide a broader context. We feel it is important to point out that Management Procedures are largely accepted as scientific best practice in the fisheries science community. These approaches are aligned with the requirements of the Marine Stewardship Council (MSC) Fisheries Standard[1], and are also deeply-rooted in the principles of precautionary fisheries management as articulated by the Food and Agriculture Organization (FAO 1995, 1996).

The development of management procedures and Management Strategy Evaluation simulation testing was pioneered by the International Whaling Commission (Punt & Donovan 2007). Since then, it has become recognised best practice internationally for fisheries management, especially since the 1998 ICES Symposium on Confronting Uncertainty in the Evaluation and Implementation of Fisheries-Management Systems (see Punt et al 2016 and references therein).

Many RFMOs, responsible for managing highly migratory and EEZ-straddling fish stocks, have increasingly moved toward the use of Management Procedures and Management Strategy Evaluation. The International Commission for the Conservation of Atlantic Tunas (ICCAT) has developed Management Procedures for several species, including bluefin tuna (e.g., Hillary et al. 2019). The Western and Central Pacific Fisheries Commission (WCPFC) and Indian Ocean Tuna Commission (IOTC) have also made significant progress in adopting harvest strategies for key tuna stocks. These developments reflect a growing international recognition of the value of Management Procedures in achieving sustainable fisheries management and improved certainty for stakeholders.

New Zealand has a history of incorporating elements of the Management Procedure

[1] https://www.msc.org/standards-and-certification/fisheries-standard

approach, particularly in the management of rock lobster, but also for other species, as outlined in the consultation document. Overall, the lack of a legislative framework for Management Procedures in New Zealand has meant that Management Procedures have not been able to be used in the general, internationally accepted way (i.e., to define management responses over a period of time based on a set of objectives). The application of Management Procedures to rock lobster fisheries has been generally successful, but has also highlighted some of the risks that need to be managed when applying management procedures, especially the potential for bias in performance indicators to lead to inappropriate decisions (e.g., deLestang et al. 2024). Learning from past experience to avoid unnecessary risk, and following international best practice will be critical to implementing a robust comprehensive framework for Management Procedures across New Zealand fisheries.

A key benefit from Management Procedures is that tradeoffs between risk and utilisation can be explicitly simulated using Management Strategy Evaluation. Management Strategy Evaluation is a simulation-based approach used to evaluate the performance of different candidate Management Procedures. It involves creating a virtual representation of the fishery system (including the fish stock, the fishing fleet, and the management process) and then testing how different Management Procedures perform under a range of scenarios, including potential biases in performance indicators for the Harvest Control Rules. These scenarios can incorporate various sources of uncertainty (e.g., in stock assessment, environmental variability, implementation errors). Management Strategy Evaluation allows managers to compare the likely consequences of different management approaches *before* they are implemented, identifying approaches that are most likely to achieve the desired management objectives (e.g., maintaining the stock above a target biomass level while maximising long-term yield).

By selecting and rigorously monitoring robust indicators, and by periodically evaluating and adapting Management Procedures through Management Strategy Evaluation, New Zealand can ensure that its fisheries management system is both effective and resilient, securing the long-term sustainability of its valuable marine resources for all stakeholders, now and in the future. The proactive and evidence-based nature of Management Procedures, tested under uncertainty using Management Strategy Evaluation, provides the strongest possible assurance of responsible and sustainable fisheries management.

Specific recommendations:

1. The proposed multi-year, phased decisions should be treated as agreed Management Procedures and be specified with appropriate monitoring and provisions for exceptional circumstances. Multi-year decisions are a type of

Management Procedure that specifies a multi-year adjustment under the expectation of population trends going forward. If these trends do not become reality, it makes sense to have a Management Procedure that adjusts the increases or decreases based on updated information in an agreed way. This approach is preferable to having to completely start anew by suspending the decision and needing to revise management, a process which typically takes a considerable period of time and contributes to risk, uncertainty, and inefficiency. We, therefore, recommend that specific provisions for multi-year catch adjustment be turned into provisions for management procedures.

2. Clear process and operational guidelines should be established for the development, testing, and implementation of Management Procedures to ensure best practice is followed. In addition, requirements for robustness testing and monitoring should be developed to ensure that assumptions inherent in performance indicators are thoroughly tested, and monitoring is put in place for potential departures from core assumptions.

3. Precautionary defaults should be defined and applied when exceptional circumstances are invoked as part of a Management Procedure. The goal of the precautionary defaults is to ensure sustainability while allowing for further data collection and for the development of appropriate science in order to resolve outstanding questions and formulate updated management advice.

4. We recommend that the management of low-information stocks is carried out through Management Procedures. These are an ideal mechanism for cost-effective monitoring and managing data-deficient stocks. Ultimately, all stocks, including low-information stocks, should be managed through a comprehensive Management Procedure framework.

5. We note the potential for other proposed changes in Part 1, such as higher ACE carry-over, to impact Management Procedures. If adopted, their impact on the performance of Management Procedures would need to be simulation-tested.

References

Butterworth, D. S. (2007). Why a management procedure approach? Some positives and negatives. ICES Journal of Marine Science, 64(4), 613-617.

de Lestang, S.; Haddon, M.; Hoyle, S. (2024). Review of Red Rock Lobster Stock Assessment Modelling and the Determination of Management Reference Points. New Zealand Fisheries Science Review 2024/01. 28 p

FAO (1995). *Code of Conduct for Responsible Fisheries*. Food and Agriculture Organization of the United Nations.

FAO (1996). *Precautionary approach to capture fisheries and species introductions*. FAO Technical Guidelines for Responsible Fisheries, No. 2. Food and Agriculture Organization of the United Nations.

Hillary R, Preece A, Davies C. 2019. Performance of a revised candidate Management Procedure using all 3 data sources. CCSBT-ESC/1909/16.

Johnston, S. J., & Butterworth, D. S. (2005). Evolution of operational management procedures for the South African west coast rock lobster and South African hake resources. *Bulletin of Marine Science, 76*(2), 487-511.

Neubauer, P., Kim, K., A'mar, T., & Large, K. (2023). Addressing uncertainty in WCPFC stock assessments: Review and recommendations from WCPFC Project 113.

Neubauer, P. (2024). Reporting WCPFC SC Status and Management Advice,24pages. WCPFC-SC20-2024/SA-WP-10-Rev1. Report to the WCPFC Scientific Committee.Twentieth Regular Session, 14–21 August 2024.

Punt, A. E., Butterworth, D. S., de Moor, C. L., De Oliveira, J. A., & Haddon, M. (2016). Management strategy evaluation: best practices. Fish and fisheries, 17(2), 303-334.