Management Strategy Evaluation
Client Guide

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What is Management Strategy Evaluation (MSE)?

A framework for evaluating fishery management procedures

KEY COMPONENTS OF AN MSE

OPERATING MODEL +

MANAGEMENT PROCEDURE (MP) +

PERFORMANCE METRICS

OPERATING MODEL (OM)

A mathematical model used to simulate a representation of the fishery system and its monitoring programs.

MANAGEMENT PROCEDURE (MP)

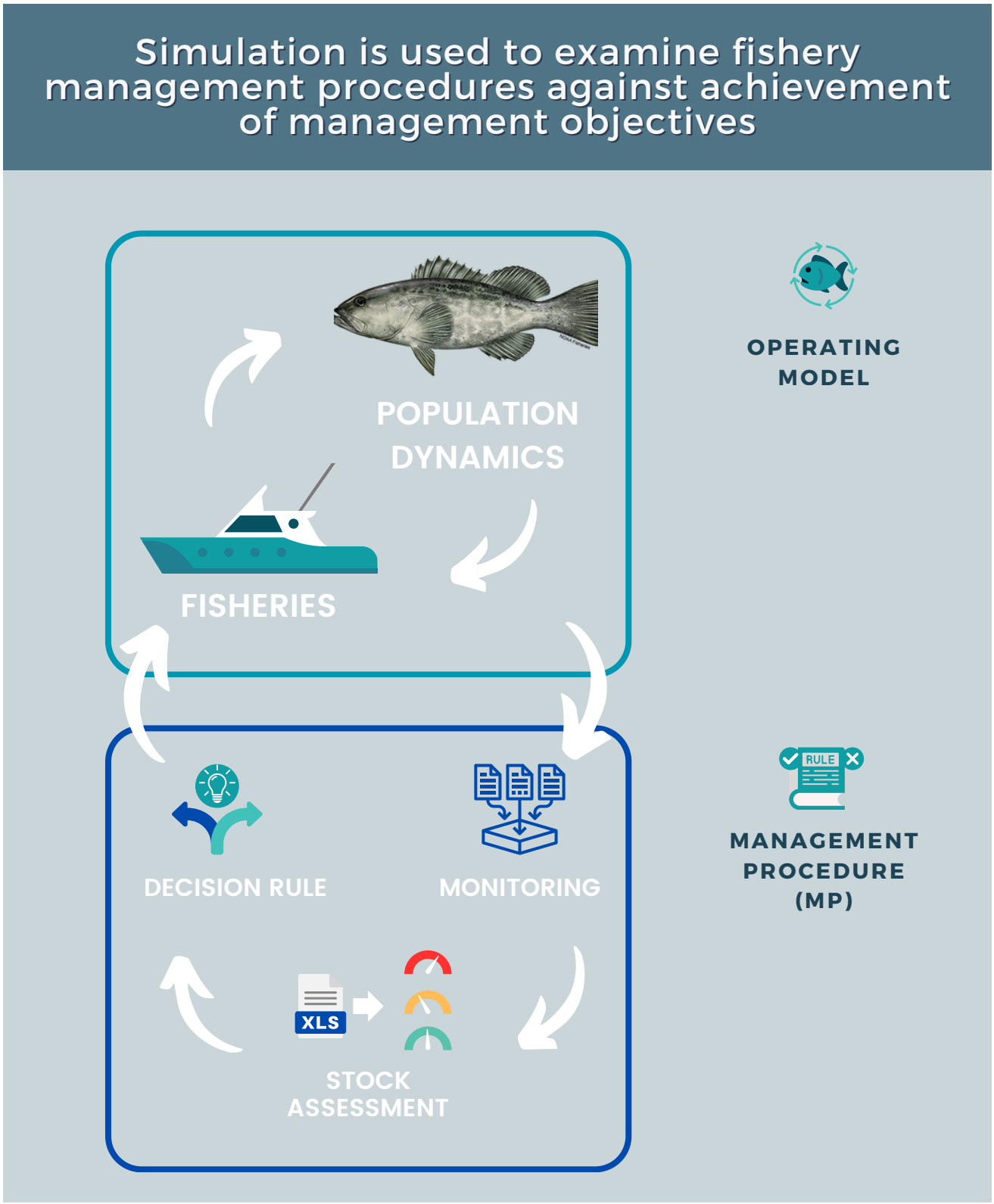
A pre-agreed process defining how a fishery will be managed, with the primary role being to take fishery information and return a management recommendation.

PERFORMANCE METRICS

Statistics that summarize different aspects of the results of MSE to illuminate how well an MP achieves some or all of the fishery management objectives.

Punt et al. 2016; Miller et al. 2019; Walter III et al. 2023

How does MSE work?



What challenges are facing your fishery?

MSE can help to navigate many challenges facing fisheries management

MANAGEMENT

What conflicts persist among stakeholders?

How do regional or transboundary fish stocks complicate management?

IMPLEMENTATION

What barriers exist to modifying management practices?

How can buy-in from stakeholders be improved?

PRIORITIZATION

What strategies are in place to prioritize resources across fisheries?

How can culturally important fisheries receive sufficient attention?

DATA LIMITATIONS

Are monitoring programs sufficient to support decision-making?

How can persistent data gaps or reliability issues be remedied?

UNCERTAINTY

How are uncertainties in the fishery system delaying or impeding decision-making?

Which types of uncertainties are most persistent?

COMMUNICATION

How can constructive dialogue among stakeholders and scientists be promoted?

How can MSE help address these challenges?

Evaluation of management procedures (MPs) prior to real-world implementation

MSE exists at the interface of science and policy.

MSE leads to informed policy choices.

MSE connects data collection to analysis and decision-rules.

MSE reveals whether these connected parts work effectively.

MSE is a form of trade-off analysis.

Understanding trade-offs is central to successful fishery management.

MSE is an opportunity for collaboration.

MSE enables collaboration between scientists and stakeholders.

MSE is an opportunity for stakeholder engagement.

Engagement fosters trust, transparency, and inclusion.

MSE elevates values-based decision-making.

Values inform management preferences.

Stakeholder considerations

Key considerations and limitations to ensure effective outcomes

DEFINING OBJECTIVES

A key challenge in MSE is defining what is important and acceptable to all stakeholders. Investment in identifying stakeholder values, cultural considerations, and agency concerns should not be overlooked.

STAKEHOLDER REPRESENTATION

Deciding who to involve in the MSE process is critical. Facilitators should ensure the process remains inclusive and diverse, encouraging meaningful contributions from all stakeholders.

ROLES OF PARTICIPANTS

The roles and expectations of each participant (i.e., scientists, stakeholders, Indigenous peoples, and academia) should be clearly defined and understood.

EFFECTIVE COMMUNICATION

Constructive dialogue among stakeholders and scientists is key to MSE success. Use clear, accessible language, minimize technical jargon, and bridge knowledge gaps using visual aids and interactive tools.

THE SOONER THE BETTER

Early and ongoing involvement integrates diverse perspectives, local ecological knowledge, and otherwise unforeseen concerns.

Goethel et al. 2019; Hofmann et al. 2019

Managing expectations

Establishing clear expectations, scope of work, limitations, and expected outcomes

ACKNOWLEDGE LIMITATIONS

MSE has technical constraints and is not a universal solution for addressing resource management issues. Focus on what is achievable.

SET REALISTIC TIMEFRAMES

MSE timeframes are similar to stock assessments but can involve added complexity. Experts can scope projects to prioritize key challenges.

SET CLEAR EXPECTATIONS

It is important to clearly define the scope of the MSE to all parties involved and discuss timeframes, technical capacity expectations, and data sharing arrangements.

Establishing clear expectations from the start of the MSE process fosters ownership, acceptance, and success.

MAINTAIN TRUST

Reiterate the project scope, anticipated outcomes, and stakeholder needs to ensure consistency and focus.

Build trust through mutual knowledge sharing and clear communication of purpose.

ENCOURAGE LONG-TERM THINKING

Focus on short-term and long-term performance of management strategies. Allow for consideration of both immediate and future goals.

Butterworth 2007; Kolody et al. 2008; Rochet and Rice 2009; Goethel et al. 2019

Scientist roles & responsibilities in MSE

The MSE process consists of three categories: scoping, technical, and evaluation

Category	MSE steps	Scientist roles
Scoping 	1 Identify the participants	Choose modeling and subject matter experts to form the technical team for the MSE.
	2 Identify objectives and performance metrics	Assist in facilitating workshops and describing the process and performance metrics.
	3 Identify uncertainties	Present key uncertainties to managers and stakeholders for review and input.
Technical 	4 Develop operating models (OMs)	Develop analytical tools and be prepared to provide plain language descriptions of general details. Provide technical expertise to parameterize models aligned with the system and strategies under evaluation.
Scoping 	5 Identify candidate management procedures (MPs)	Provide guidance on the range of options that can be tested within the available time and resources.
Technical 	6 Simulation test each MP	Conduct analyses and provide status updates periodically.
Evaluation 	7 Summarize performance	Develop summaries and graphics in collaboration with managers and stakeholders.
	8 Adopt selected management approach	Answer questions and re-evaluate results as needed to clarify quantitative trade-offs among management actions.

Goethel et al. 2019

Manager & stakeholder roles in MSE

The MSE process consists of three categories: scoping, technical, and evaluation

Category	MSE steps	Manager & stakeholder Roles
Scoping 	1 Identify the participants	Work with outreach coordinators to ensure a diverse, representative group of participants.
	2 Identify objectives and performance metrics	Participate in workshops to provide feedback on objectives and performance metrics.
	3 Identify uncertainties	Provide feedback on uncertainties and make recommendations if key factors are missing.
Technical 	4 Develop operating models (OMs)	Evaluate the general configuration of operating and implementation models and engage in discussions and Q&A sessions with scientists.
Scoping 	5 Identify candidate management procedures (MPs)	Propose a set of realistic management strategies to be evaluated.
Technical 	6 Simulation test each MP	Provide feedback when scientists face challenges or need to adjust methods or assumptions.
Evaluation 	7 Summarize performance	Collaborate with scientists to create useful and relevant formats for presenting results.
	8 Adopt selected management approach	Weigh trade-offs and implement the desired management action that meets performance criteria and satisfies all parties.

Goethel et al. 2019

Varieties of MSE

FULL STAKEHOLDER-DRIVEN MSE

Full stakeholder-driven MSE involves collaboration between stakeholders and analysts, requiring clear and unambiguous management objectives and aiming to produce actionable management decisions.

Why needed?	
Complex or difficult policy decisions	• When a policy decision is challenging, complex, or has significant societal implications.
Stakeholder conflicts	• To clarify conflicting objectives transparently (helps decision-makers understand societal trade-offs).
Disenfranchised stakeholders	• When stakeholders have previously been excluded from the management process or lack representation.
Scientific Uncertainty	• When uncertainties can substantially impact the effectiveness of management measures to achieve the stated objectives.
Time commitment	• Highly resource intensive, requiring at least a 6 to 36 month time commitment.

INTERMEDIATE MSE

Intermediate MSE offers a middle ground. Useful for balancing stakeholder input with cost-efficiency, refining existing strategies, or exploring potential improvements.

Time commitment	• Varies depending on the extent of stakeholder engagement and the complexity of the analysis.

DESK MSE

Desk MSE is cost-effective and carried out with minimal stakeholder input. Useful for exploratory research, when management objectives are already defined, and where system uncertainties are well defined. This approach provides valuable insights, without the immediate intention of informing management advice

Time commitment	• Typically 2 to 12 months, depending on complexity.

Walter III et al. 2023

Further reading

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