Technical developments in the MSE modelling framework

WCPFC-SC14-2018/MI-IP-02

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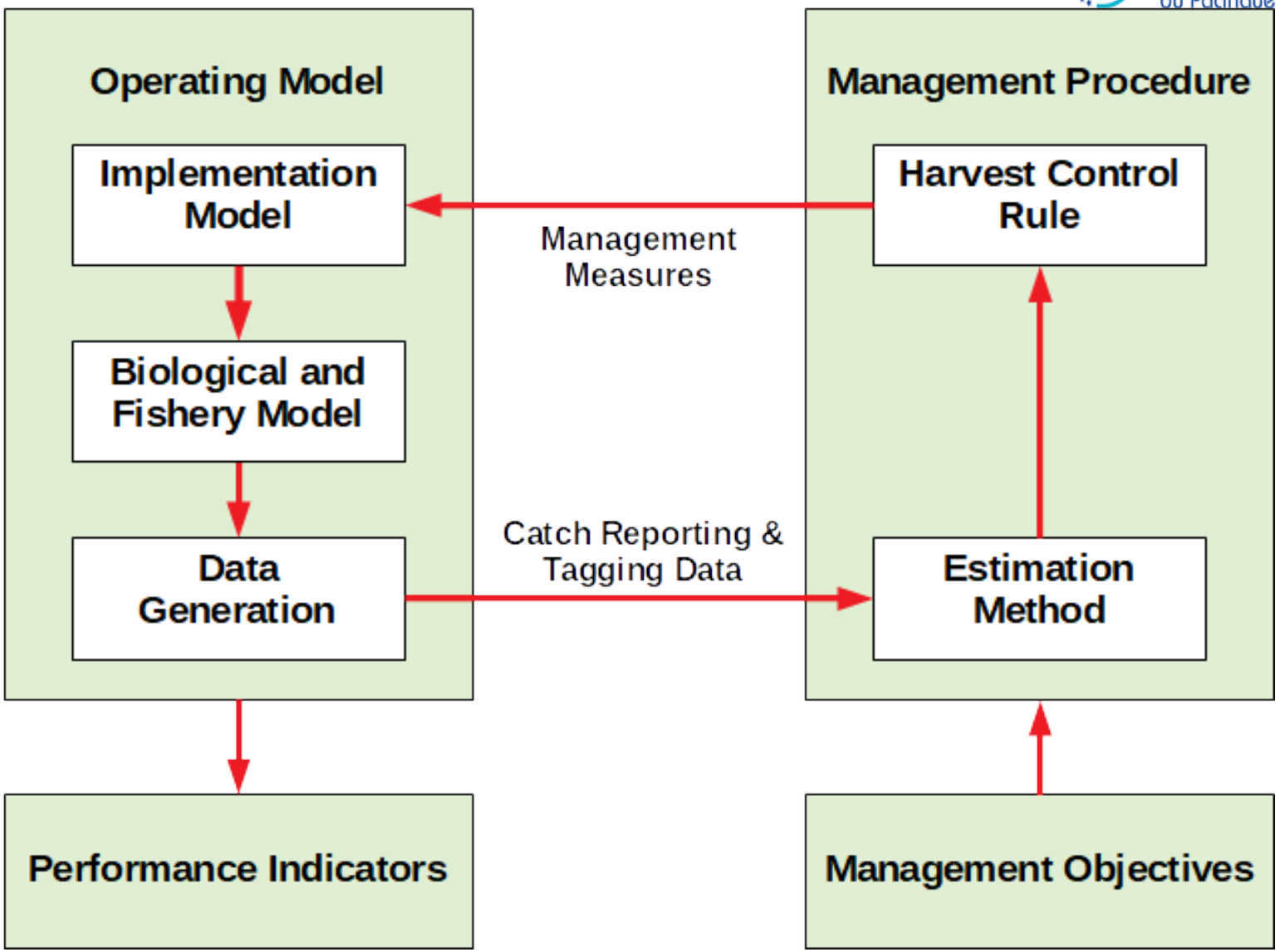
14th Regular Session of the Scientific Committee
9th-16th August
Busan, Republic of Korea

Introduction

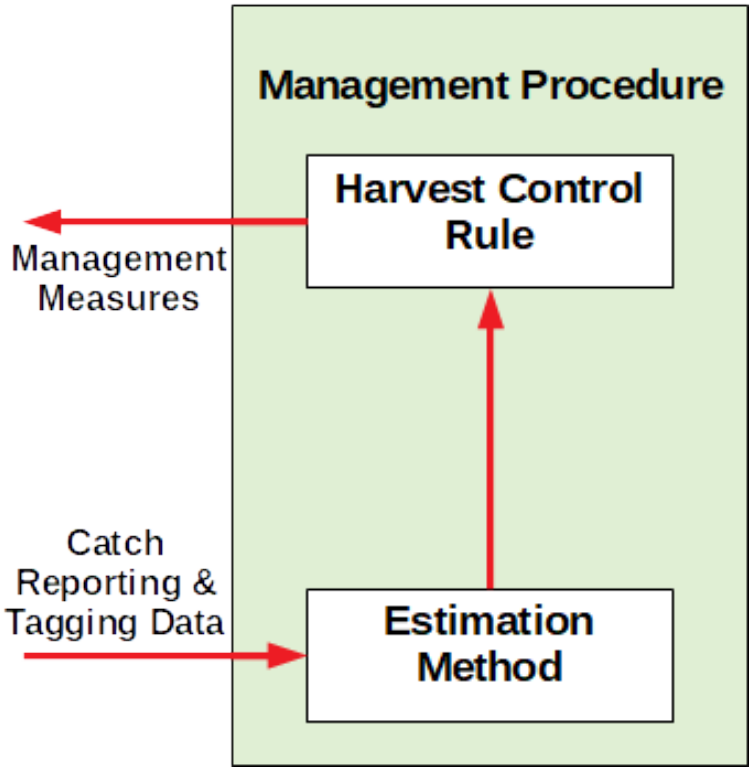
- Harvest strategy approach applies an evidence and risk-based approach to setting harvest levels;
- Focuses on achieving long-term fishery objectives;
- Operational component is a Management Procedure (MP) - harvest level based on stock status;
- MP should be tested before implementation (achieve objectives?);
- Simulation analysis for testing MPs - Management Strategy Evaluation (MSE);
- Implementation of the MSE framework is still under development.

MSE framework



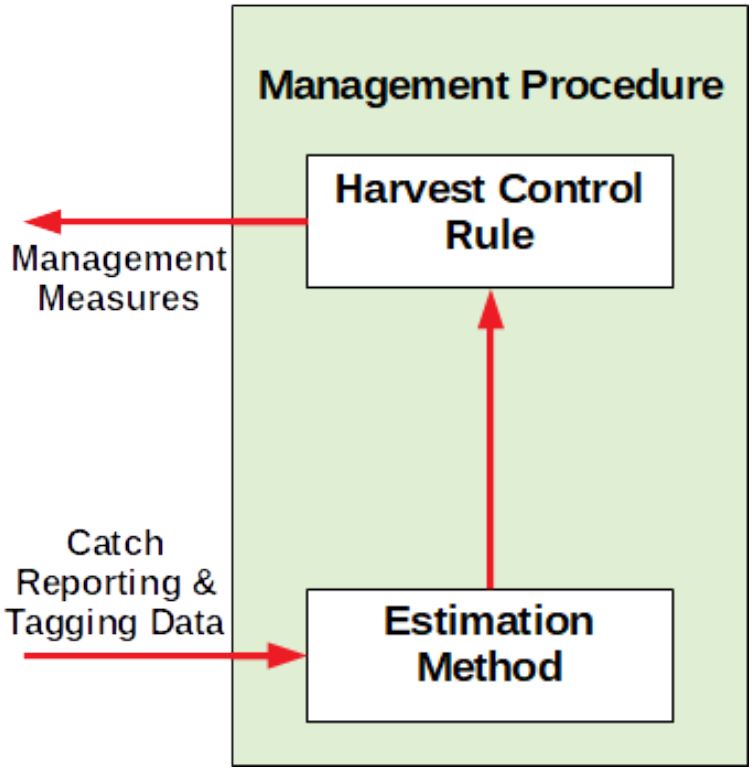
Management procedure

- Simulates the management system including monitoring (e.g. tagging data), analysis method (e.g. stock assessment) and the formulation of management actions (harvest control rule);
- Selection of an MP is through evaluating its performance in meeting management objectives and robustness to uncertainty;
- Performance is measured using the agreed performance indicators (see **SC14-MI-WP-04**).



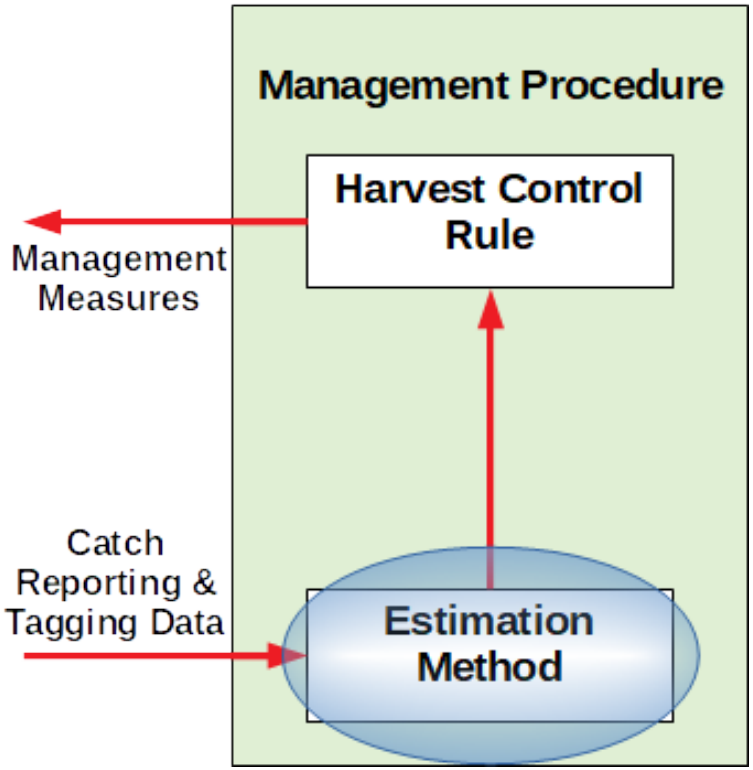
Management procedure

- MPs developed under the WCPFC harvest strategy approach for tuna stocks will be WCPO wide, excluding archipelagic waters;
- Managers will need to consider whether the MP will apply to all regions and fisheries in the WCPO, or whether the MP will specifically relate to sub-sets of fisheries (e.g. purse seines).



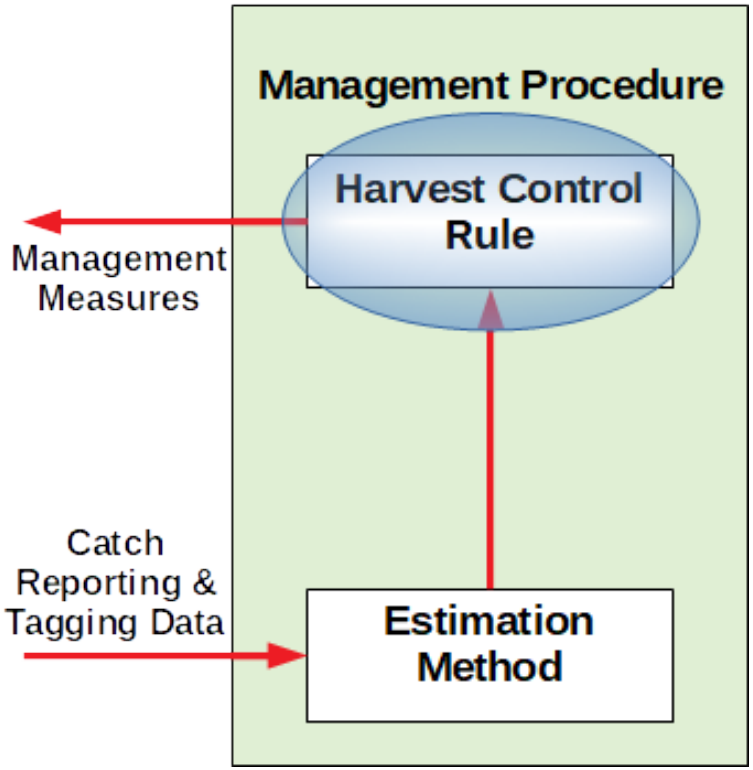
Estimation method

- Analysis method that assesses change in stock status;
- Model-based (stock assessment, e.g. MULTIFAN-CL), or empirical (e.g. CPUE);
- For example, for skipjack this will probably be a stock assessment that estimates $SB/SB_{F=0}$;
- Least well developed component.

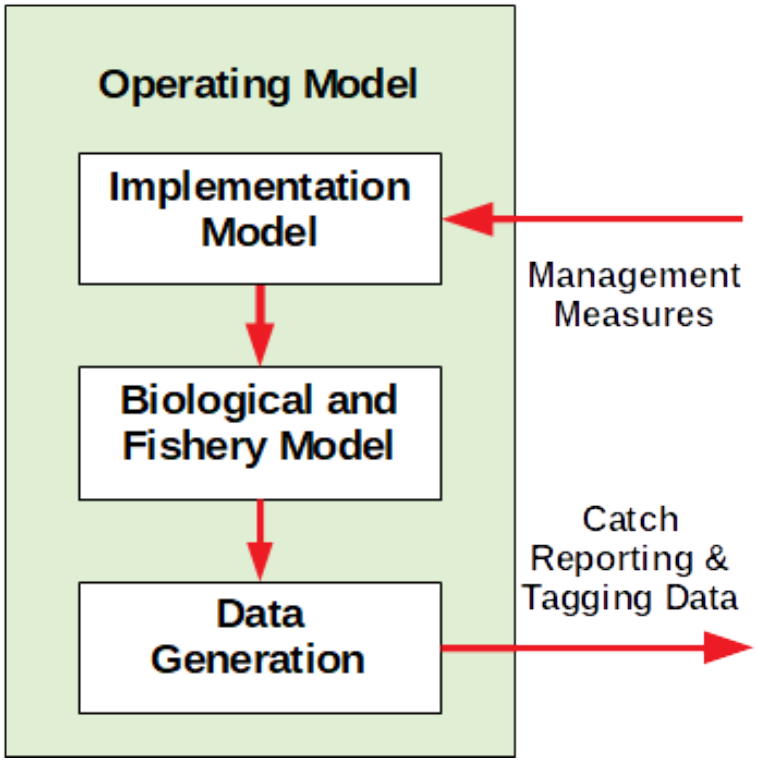


Harvest control rule

- Agreed rule that describes how fishing opportunities are intended to be controlled by management in relation to an indicator of stock status;
- For example, for skipjack the input will probably be estimated $SB/SB_{F=0}$ and the output is overall catch or effort;
- Key element of the harvest strategy approach that is iteratively developed with stakeholders.

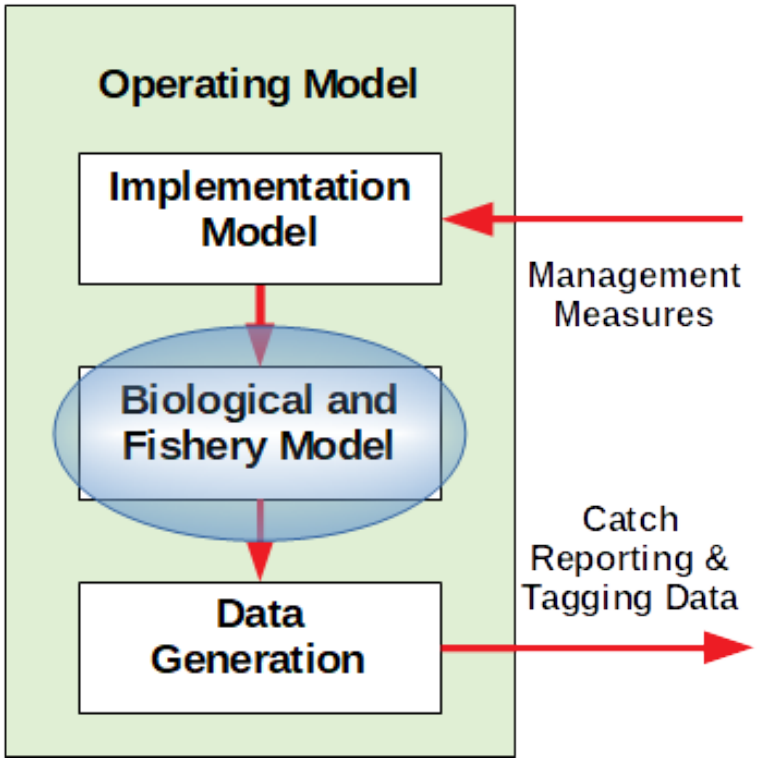


Operating model



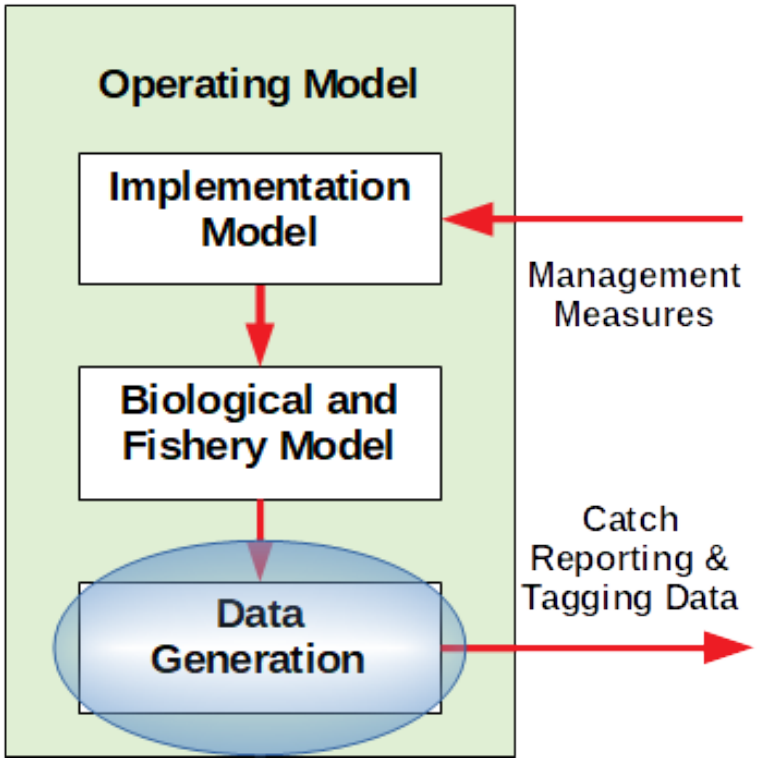
- Represents the biological resource as well as the fisheries that operate on it;
- Considers contrasting hypotheses about the dynamics of those populations and fisheries, e.g. biological productivity;
- Includes models for generation of data and implementation of management regulations;
- See **SC14-MI-WP-03** for more information.

Biological and fishery model



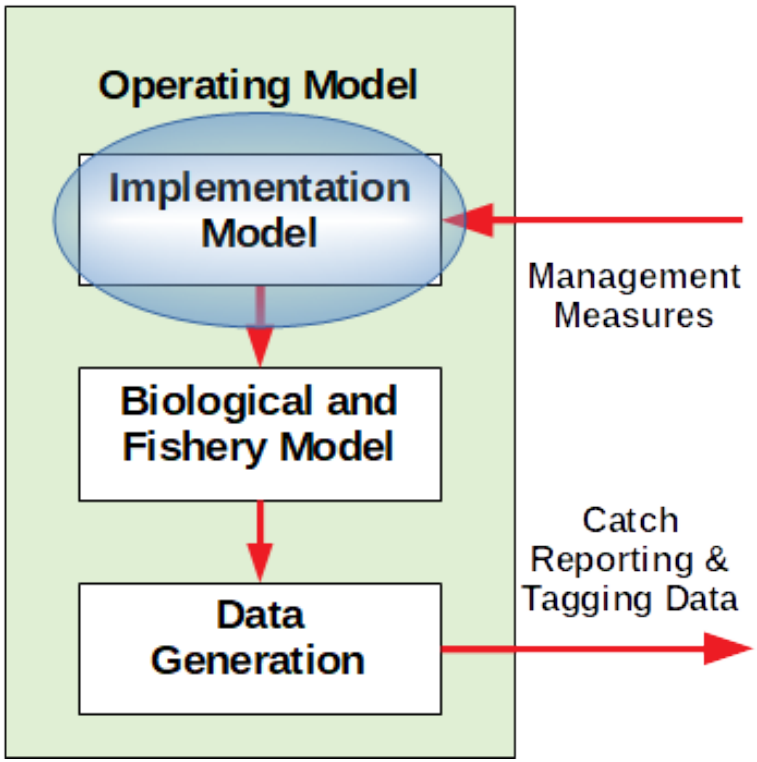
- Projects biological stocks and associated fisheries into the future based on a range of conditions: catchability, growth rates, selectivity, recruitment, natural mortality etc.;
- Expert consultation workshop on MSE (WCPFC-SC12-2016) considered MULTIFAN-CL to be an appropriate tool for the biological and fishery model.

Data generation



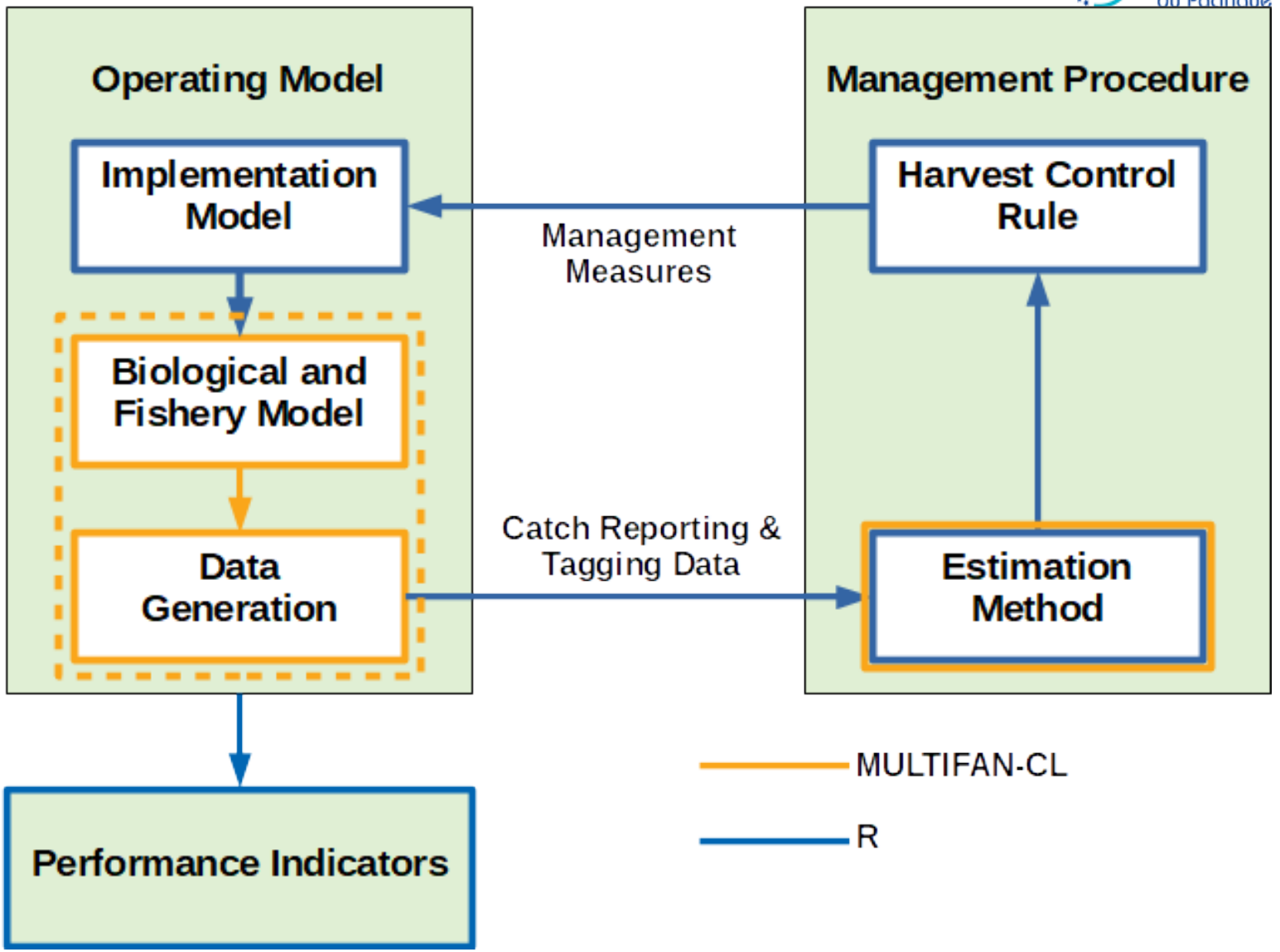
- Data generation component simulates data collection processes, including tag recaptures and catch data collection;
- Implemented as part of the MULTIFAN-CL biological and fishery model;
- See **SC14-MI-IP-03** for more information.

Implementation model



- Translates management decision from the MP into management actions for the biological and fishery model;
- Least well developed component;
- Managers will need to consider whether the MP will apply to all regions and fisheries in the WCPO, or whether the MP will specifically relate to sub-sets of fisheries (e.g. purse seines);
- Harvest strategy approach is not concerned with evaluating or deciding on different allocation strategies.

Implementation of components



Summary

- Implementation of the MSE framework is still under development;
- Able to link together the components to demonstrate how it will work;
- Components that are least well developed are the *Estimation method* and *Implementation model*.