Reconsidering the Use of Maximum Sustainable Yield in Fisheries Management

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Research Objectives
- Shed light on the scientific and political shortcomings of MSY
- Evaluate the use and implementation of three policy alternatives: Ecosystem-Based Management, Maximum Economic Yield, Multispecies Maximum Sustainable Yield
- Against two evaluative criteria: Effectiveness - As a measure of stock health, Equity - Socioeconomic indicators of fishermen
- Recommend the leading alternative of ecosystem-based management in conjunction with increasing use of social sciences

Problem Statement
The concept of Maximum Sustainable Yield (MSY) was developed as a result of post World War II politics and the technological advances that allowed for long-distance fishing. MSY is limited to single species management and ignores the fact that species interact through biological processes in addition to technical interactions. The level of fishing that leads to the MSY of prey species depends upon the level of fishing that is imposed on prey, predators, and competitors.

Assumptions made for MSY
- That scientists were able to estimate existing stock levels
- That scientists could recognize when stocks have reached maximum sustainable levels
- That governments would act to curtail fishing when MSY was reached
- That scientists could identify the levels at which recovery was sufficient to permit fishing to resume

Methodology
This study is a comparative analysis of the different alternatives to MSY presented. Articles were reviewed and analyzed against different criteria and how they would contribute to the goals of this study. Levels and units of analysis are provided in Table 1. Data and information were collected from various levels of government, academia, NGOs, and nonprofits.

Integrating Social Sciences
- Social sciences can help to alleviate cognitive biases surrounding MSY and EBM.
- Promote the translation of scientific findings to policy and management practice as this involves individual awareness, acceptance, and adoption.
- It is widely accepted that trade-offs are a key feature of EBM. Trade-offs play on the cognitive bias of loss aversion which leads to dissatisfaction of the whole process. Social scientists can navigate this barrier.
- Embracing disciplines that are not traditionally mainstream in fisheries science, such as cognitive psychologists, behavioral scientists, economists, political scientists, will allow for a smoother transition to the uptake of EBM as a policy alternative.

Dual Process Theory
- Type 1 Thinking
  - Reflexive or intuitive
  - Rapid autonomic scans
  - Draws on heuristic rules, impulses, intuition
  - Based on experiences
- Type 2 Thinking
  - Analytical
  - Requires cognitive effort
  - Algorithmic, reflective, deliberate processing
  - Based on consequences

This can provide insight into why fisheries scientists and policy makers persist with focus on single species approaches rather than engaging with ecosystem-based approaches.