

Integrating Social, Economic and Biological Information in the Management of Data-poor Fisheries

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The Challenge

- Fisheries management is a complex undertaking.
- Fisheries managers have to choose best management measures to promote disparate and even conflicting legislative mandates.
- This choice involves a myriad of biophysical, social and economic data sources, both quantitative and qualitative.
- Even the best available data can have considerable uncertainty associated with it.
- Disparate data must be evaluated and integrated in some manner and uncertainty must be taken into account.

A Framework for Making Wicked Decisions

- 1) Frame the issue in a way that makes sense to managers, scientists, fisherman and stakeholders.
- 2) Identify possible actions that can be taken to address the identified fisheries management issues.
- 3) Assess relative economic, social and ecological costs and benefits of different actions using a structured evaluation framework.
- 4) Prioritize management measures and actions for the fishery.

Bayesian Based Multi Criteria Analysis

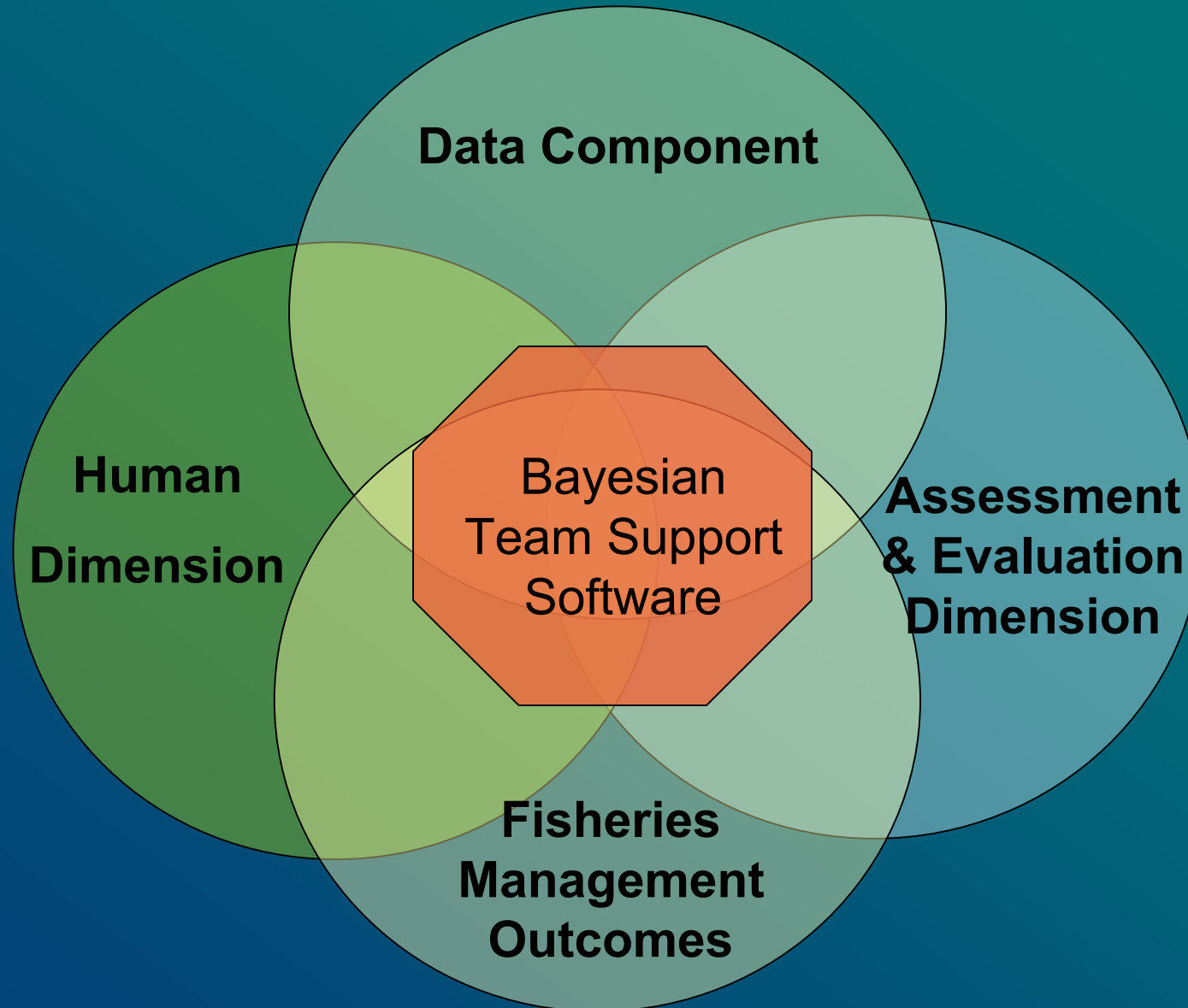
- Designed to overcome the challenge of multiple criteria, incommensurate units, the occurrence of both qualitative and quantitative information.
- Attempts to select the most desirable alternative out of a series of alternatives.
- Selection is based on performance against biological, social and economic criteria including intangibles, represented in their own dimensions.

Bayesian Based Multi Criteria Analysis

Bayesian approach allows:

- Explicit evaluation of the uncertainty inherent in the data and available information.
- Evaluation of the *marginal value of information* that indicates whether or not the problem is ready for a decision, and if not where further information gathering effort and/or discussion of issue is required.

MCA for Fisheries Management



Application: Managing Adverse Impacts of Fishing on the Marine Environment

Case studies based on U.S. West Coast fisheries:

- Bycatch of yelloweye rockfish.
- Managing impacts on Essential Fish Habitat.

Three workshops involving 26 agency, council members and stakeholders active in the Pacific Fisheries Management Council Process.

Goals

1. Assist West Coast fishery stakeholders to evaluate different management approaches to issues.
2. Determine how well the use of a Bayesian-based MCA does or does not work.

Feedback on the Approach

This ... (is) an excellent tool for decision making. In fisheries the problem is everyone is dug in with their opinion. This tool moves you off your position by just the exercise of identifying options and criteria. I could use this tool in my work.

Feedback

Contributed to constructive discussion of the management alternatives by workshop participants (mean score 4.08/5).

Allowed for uncertainty to be incorporated into the decision process (mean score 3.69).

Allowed for social, economic and biological information to be incorporated in the assessment (score 3.81).

Helped to create common ground among participants (score 3.32).

Has the potential to improve stakeholder discussions about other contentious fisheries management issues (score 3.54).

Benefits of Approach

Integrates biological, social and economic information measured in incommensurate units.

Engages managers and stakeholders in the decision process increasing the probability of stakeholder buy-in for the decisions made.

Explicitly takes into account uncertainty when evaluating alternative management strategies.

Makes the selection of management strategies analytically robust, inclusive and transparent.

Key Applications in West Coast Context

Refinement of management options based on the marginal value of information indicating whether or not the problem is ready for a decision, and if not where further effort is required.

The analysis of tradeoffs among potentially conflicting decision criteria to better inform the deliberations of agencies and commission and council members.