

# Improving the effectiveness and efficiency of monitoring for environmental flows

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## Background

- The alarming decline in biodiversity worldwide has prompted the urgent need for the global development of Environmental Flow Programs (E-Flows).
- E-flow represents water releasing from a dam or weir to maintain downstream river health, and the health of the environment.
- Effective monitoring is essential to ensure the success of E-Flows projects.
- The decision-making process in monitoring projects is closely intertwined with human actions and perspectives, and there are different mindsets between scientists, managers, and other collaborating stakeholders.
- Understanding the human aspect is crucial for enhancing decision-making and, consequently, improving the effectiveness and efficiency of monitoring efforts.

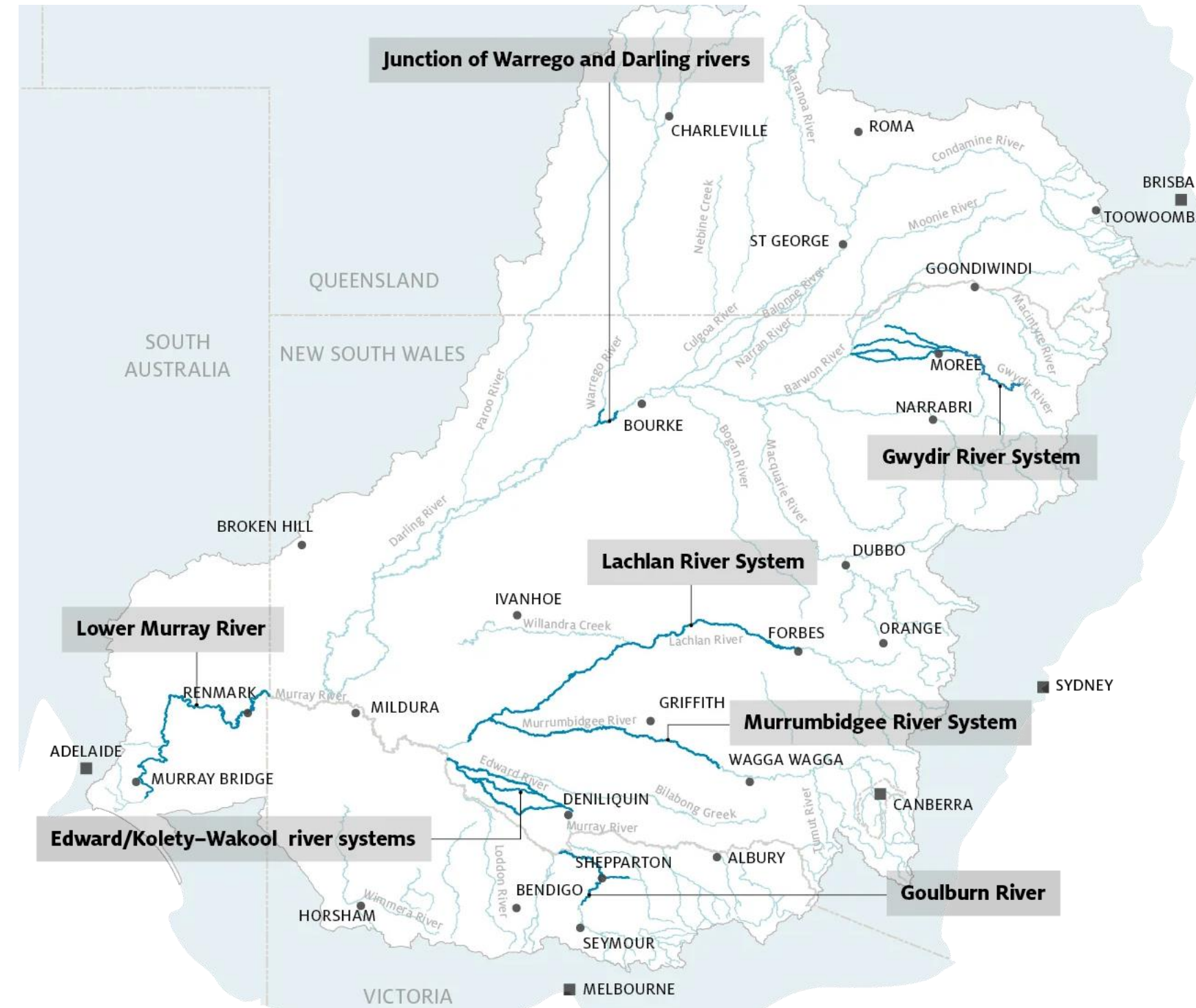
## Methods



16 Semi-structured Interview



60 Online survey



## Case Study: Flow-Monitoring, Evaluation and Research (Flow-MER, 2019-now)

- World largest E-flows monitoring program across Murray-Darling Basin, AU
- Two main components
  - Monitoring and targeted research across local scale
  - Evaluation and research at the Basin-scale
- Main monitoring themes: fish, birds, vegetation, river ecosystem, etc.

## Summary

- This project aims to evaluate if the E-flow programs works for managers and biophysical scientists, hence improving the overall project efficiency and effectiveness. It is crucial for optimizing resource allocation in biodiversity conservation under a changing climate.
- Good communication can promote a shared understanding of the project's goals and objectives. Objectives play a pivotal role in project monitoring, necessitating additional focus on aligning them with the monitoring process.

## Discussion

- The spatial representativeness of monitoring sites might not fully capture the overall characteristics of the riverine ecosystem.
- The issue of adaptive monitoring raised, pressing a need for adaptive management. This entails regular reviews and adjustment to the monitoring project.
- Basin-scale objectives are vague, and it is urgent to enhance the alignment of objective setting with monitoring design in a more efficient and effective manner.

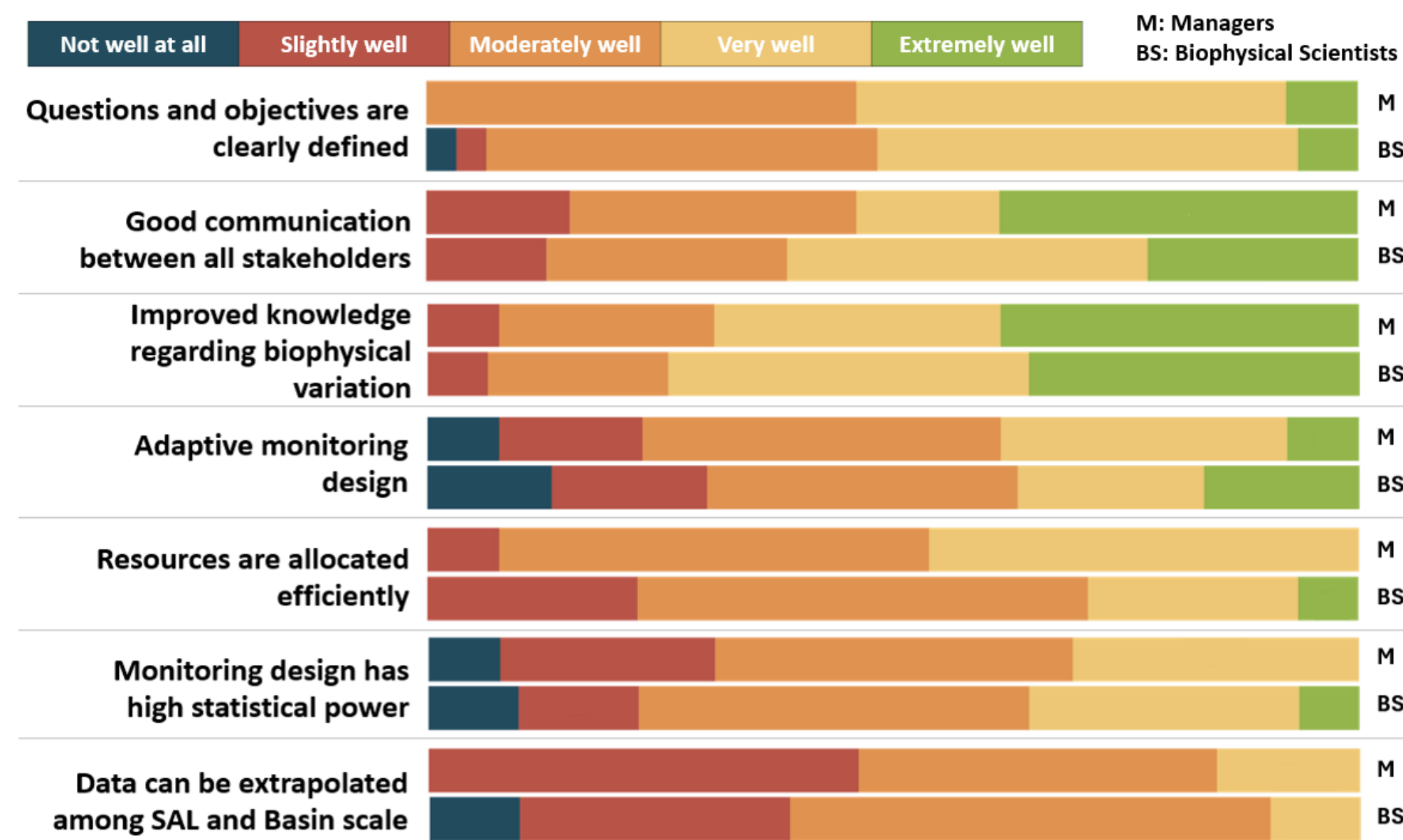
## Recommendation – Objective Hierarchy to better align the objective setting to the monitoring practices

- Distinguishes between the different types of objectives.
- Drivers: critical environmental attributes
- Means objectives: intermediate indicators that necessary for achieving fundamental objectives
- Fundamental objectives: directly assess the success of the environmental management program

## Result

### What are the key characteristics of successful monitoring design, and how well Flow-MER is performing?

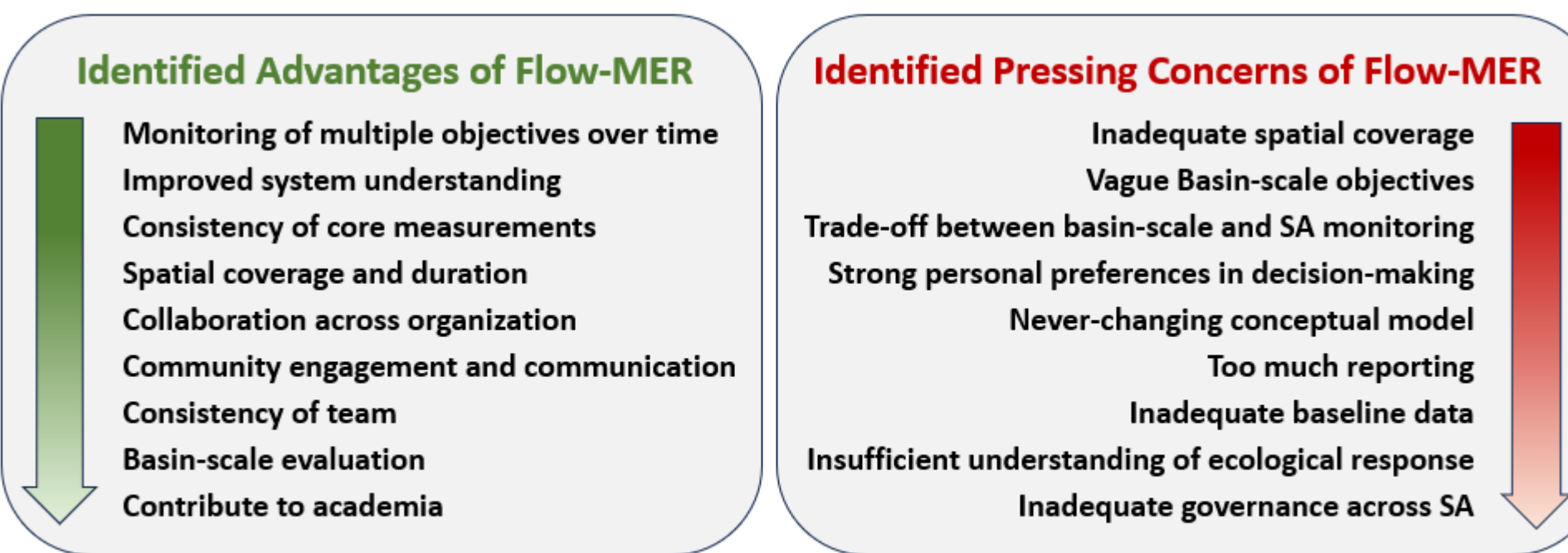
- The most important successful criteria is "Clear Objectives", but still 4% of biophysical scientists find the questions and objectives in Flow-MER to be poorly defined.
- A great number of participants perceive Flow-MER works extremely well in objective settings, good communication and improved knowledge regarding the ecosystem.
- Biophysical scientists and managers exhibit similar view in defining success and evaluating project's effectiveness. This can be regarded as a strong evidence of the successful communication in between.



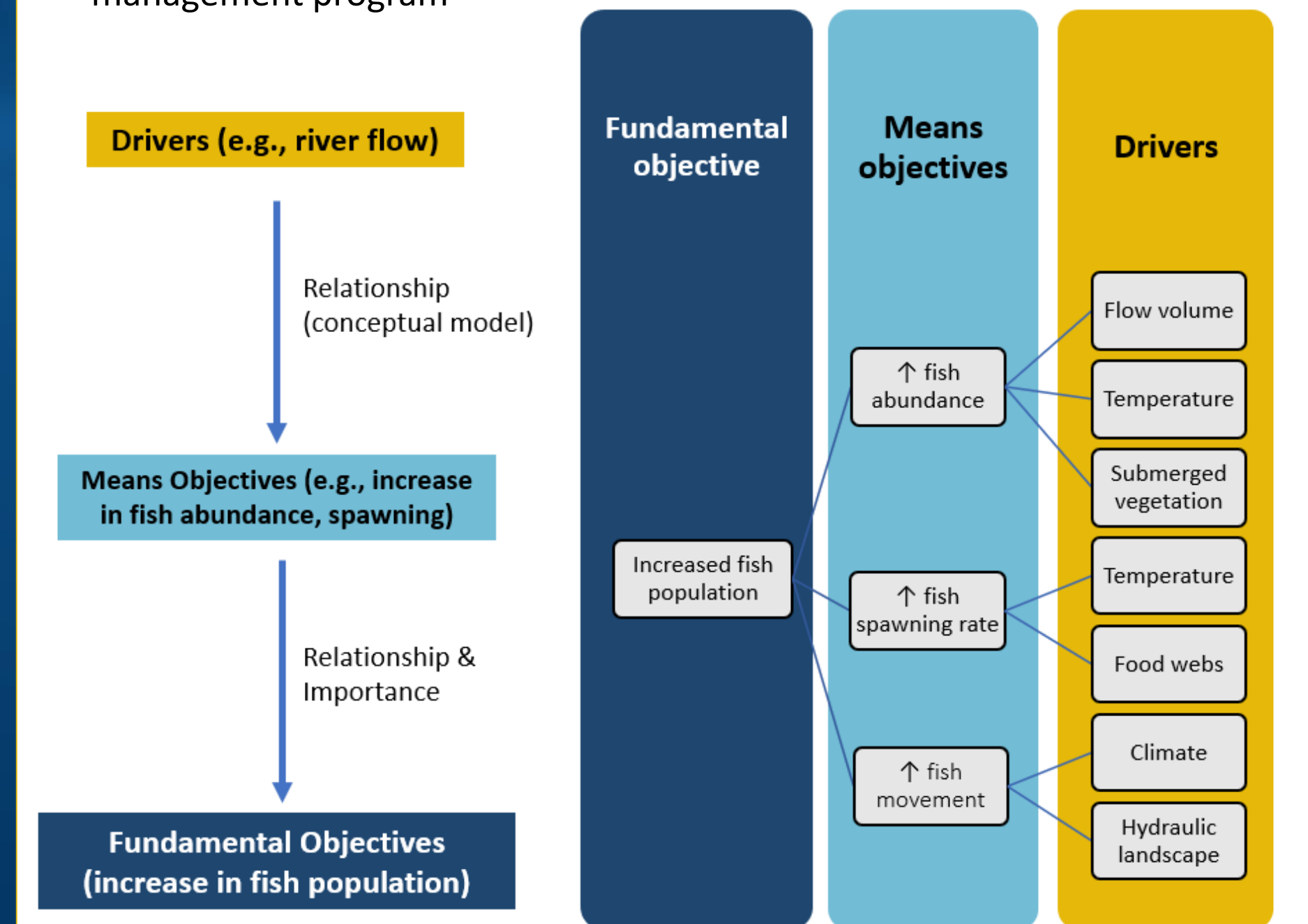
Distribution of performance rating for managers and biophysical scientists. Y-axis outlined each successful monitoring design criterion, arranged in order from the most important ones to the least.

### What is the most primary advantages and pressing concern for Flow-MER?

- Spatial coverage and duration are recognized as a dominant highlight. However, inadequate spatial coverage has been identified as the most pressing problem.
- The 2<sup>nd</sup> pressing concern pertains to the vague basin-scale objectives while monitoring multiple objectives stands as a strong feature.



Identified advantages (ranging from the strongest feature to the weakest) and pressing concerns (ranging from the most pressing concerns to the least) of Flow-MER



Objective Hierarchy consisting of 1) Drivers, 2) Means Objectives, 3) Fundamental objectives

## References

This poster summarized two unpublished journal papers of Dai et al..

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