

# Implementing an Adaptive Management Framework for Monitoring Programs

Delta Independent Science Board

August 12, 2022

## DRAFT OUTLINE:

Proposed Journal: *Environmental Monitoring and Assessment*

### A. Importance of monitoring and its various purposes (from MER)

- What is monitoring? Define
- Different types of monitoring (Table 1 MER)
- Define science
- Questions of relevance differ for decision makers and scientists
- Introduce adaptive management (briefly- will be explained below)
- Discussion of Monitoring Frameworks

### B. Fundamental challenges to implementing monitoring programs (from MER)

- Coordination, communication within, across and with stakeholders, funding, decision points, adjusting to changing drivers, conditions, goals, identifying purpose and goals, sunseting, transparency

### C. An Adaptive Management Framework for Monitoring (from MER a large section)

- Literature review of adaptive management and monitoring framework
- What it is – complete description of each of the processes
- The science of Adaptive Monitoring
- Key advantages of the approach
- 5 best practices for implementation

### D. Linkages of Adaptive Monitoring to Adaptive Management (some is new)

- Monitoring is a fundamental component of Adaptive Management. Changes in the adaptive management goals could lead directly to changes in the monitoring program but it would be directly linked to changes in management goals and trigger the adaptive monitoring process.

### **E. The role(s) of science (largely new)**

- Basic understanding of drivers and expected ecosystem responses which allows monitoring to be targeted on fundamental processes or factors
- Setting decision triggers
- New technologies/tools
- information on uncertainty
- Identify time, space and parameter scales

### **F. Challenges to implementation (largely new) – the fear factors**

- Funding, loss of good programs, leadership, stakeholder engagement
- “Fear” of flexibility; “adaptability” can threaten the idea of also maintaining the long-term monitoring
- Association of a greater cost with adaptive monitoring (as a result of changes/flexibility)
- Fear of loss of authority; if it changes enough, the people in charge may change
- Where does the input (to change the program) come from, and what value does it have?
- Fear of loss of stability or predictability
- Process can solidify good programs, identify authorities and be more cost effective

### **G. The important of Decision triggers in implementation (mostly new)**

- More thorough explanation of decision triggers; definitions, different types, value, etc.
- relies on deviations from expectations and thresholds, but can also be advances in technology
- how to create a good decision trigger for monitoring/management?
- For adaptive management:
  - For adaptive management it is essential to identify your response variable and set a threshold level to trigger a change/re-evaluation of the management effort or (more likely) an initiation of a management action
  - Examples of decision triggers in successful management programs
- For adaptive monitoring:
  - Relies on improved understanding of the ecosystem and conceptual model
  - Decision triggers are usually changes in the ecosystem which can alter monitoring goals. “What level of change would trigger a change in monitoring effort or focus and how is this evaluated?”
  - Also applies to changes in management goals and changes in technology

- Clear decision triggers for re-evaluating monitoring programs are explicitly defined even less commonly than triggers for adaptive management
  - Incorporating extreme climatic events (ECEs) into monitoring/modeling (see Zabin et al., 2022)
  - Effects of climate change or “surprises” rarely accounted for in monitoring programs (Wiens et al., 2017)

#### **G. Stakeholder Engagement (mostly new)**

- Definition of “stakeholder”, and appropriate use of terms
- How to actually interact with and involve the various types of stakeholders/Tribes/communities/managers?
- Communication and the importance of language (Gagnon et al., 2022)
- Important aspects of stakeholder engagement (Kliskey et al., 2021)
- Implementation depends on what type of party you are dealing with (e.g., manager vs. Indigenous Tribe)

#### **H. Leadership and governance (possible) [Section on Adaptive Governance and role in successfully implementing monitoring programs]**

- Some of this would be new, some would be pulled from governance section in MER
  - Governance can change the ability of monitoring programs to be flexible if they are not set up to facilitate flexible programs
  - Sometimes federal funding is not designed to be collaborative (i.e. used across multiple agencies, etc.)

#### **I. Implementation examples**

- Fish monitoring for fisheries management
- Invasive species monitoring

#### **J. Conclusions: first steps for implementation (a lot from MEP)**

- requires leadership and decision-making authority
- Flexibility in funding,
- complete transparency
- Recommendations on how to make the process, data, and results accessible (e.g., FAIR (Wilkinson et al., 2016) and CARE principles for data governance)
- It’s crucial to develop and maintain partnerships between scientists, resource managers, and policy-makers- adaptive monitoring can’t successfully happen without these connections (Lindenmayer et al., 2011)