2021 Webinars: Ecosystem Management and Restoration Research Program
Brief Overview and Guide to Developing Monitoring and Adaptive Management Plans

Webinar Logistics:

- The webinar will begin at 1:00 PM CDT.
- To access the audio select “Call Me” – this is the preferred option to reduce feedback.
- If you are unable to connect via the “Call Me” feature,
  - Dial: 1-844-800-2712
  - Access: 199 565 7227#
Webinar Instructions

- All lines are muted.
- Submit questions or comments in the Chat Box to "Everyone".
- The webinar is being recorded and will be shared following the meeting.
Presenters

Dr. Brook Herman is a Research Ecologist and the acting Program Manager of the Ecosystem Management and Restoration Research Program at the USACE’ Environmental Laboratory. She primarily develops integrative and interdisciplinary ecological models and monitoring and adaptive monitoring plans in support of USACE planning projects. She also spent 9 years as a planner in the Chicago District before joining the Environmental Laboratory.

Ms. Darixa Hernandez-Abrams is a Research Ecologist with the U.S. Army Corps of Engineers- Engineer Research and Development Center (USACE-ERDC). She works with integrating ecological modeling to restoration and planning work, improving ecological modeling practices, assessing environmental effects of Corps projects, and water quality monitoring.

Mr. Brian Zettle is a Senior Biologist/Tribal Liaison and Special Programs Manager at the USACE Tribal Nations Technical Center of Expertise (TNTCX). He has been with the USACE for over 18 years, many of those as a planner in the Mobile District where he developed and implemented monitoring and adaptive management plans in support of USACE CW projects.

Dr. Michael Porter is a Fishery Biologist at the Albuquerque District. He works on the Rio Grande with the endangered Rio Grande Silvery Minnow and ecosystem restoration. He is a member of the Environmental Research and Review Group for the Ecosystem Management and Restoration Research Program.

Mr. Andrew Loschiavo is currently acting as the Senior Environmental Specialist at USACE South Atlantic Division, overseeing environmental review and compliance for the Division. Prior to this detail, he served as the Restoration and Resources Section Chief of the Environmental Branch at Jacksonville District in support of the Everglades restoration program. He has over 20 years experience working on natural resource conservation and restoration with USACE and NOAA.
Brief Overview and Guide to Developing Monitoring and Adaptive Management Plans

Dr. Brook Herman
Ms. Darixa Hernandez-Abrams
Mr. Brian Zettle
Mr. Andrew LoSchiavo
Dr. Michael Porter

Distribution A: Approved for public release.
Monitoring and Adaptive Management Training Efforts: Overview of Team and Ongoing Efforts

• Funding: Ecosystem Management and Restoration Research Program (EMRRP)
• Technical Note: Brief Overview and Quick Guide to Developing a Monitoring and Adaptive Management Plan

Team:
• Brook Herman and Darixa Hernandez-Abrams – Environmental Laboratory
• Michael Porter – Albuquerque District
• Brian Zettle – Tribal Nations Tech Center of Expertise (TNTCX)
• Andrew LoSchiavo – Jacksonville District
• Nate Richards and Greg Miller – Eco-PCX
Monitoring and Adaptive Management Policy

- **Section 1161 of the WRDA 2016:**
  ...when conducting a feasibility study for a project for ecosystem restoration, the recommended project includes a plan for monitoring the success of the ecosystem restoration.

The monitoring plan should include (selected):

- monitoring activities to be conducted
- criteria that determine ecosystem success
- estimated cost and duration of monitoring
- a contingency (adaptive management) plan for taking corrective actions in cases in which monitoring demonstrates that restoration measures are not achieving ecological success in accordance with criteria described in the monitoring plan.

- 2009 Implementation Guidance for Section 2036(a) of the WRDA 2007 and Section 1040 of WRDA 2014 – Mitigation for Fish and Wildlife and Wetland Losses
Fundamentals of Monitoring and Adaptive Management

- Adaptive management is a tool for flexible decision-making that allows adjustments in management actions to be made as a result of obtaining more knowledge through monitoring. Adaptive management allows for more effective decision-making as project benefits may be enhanced while uncertainty is reduced through obtaining scientific knowledge in a “learning by doing” risk management strategy.

- Fischenich et al. (2019) define adaptive management as “a formal science-based approach to risk management that permits implementation of actions despite uncertainties. Knowledge gained from monitoring and evaluating results is used to adjust and direct future decisions.”
Monitoring and Adaptive Management Plan Considerations

- **Step 1:**
  - **Planning Phase:**
    - Determine Need for Plan
    - 1st Draft of Plan
    - Baseline data collection aligned or in support of Plan
    - Conceptual Ecological Model – important components, success criteria, thresholds, triggers

**QUESTIONS**

Is the future adjustment of management actions or the decisions based on new information from monitoring possible?

If No, adaptive management is not possible
If Yes, continue with questions

Is the managed system well understood and are management outcomes readily predictable?

Do the participant agree on the most effective design and operations to achieve goals and objectives?

Are the project/program goals and objectives understood and agreed upon?

**ADAPTIVE MANAGEMENT IS NOT NEEDED**

**ADAPTIVE MANAGEMENT MAY IMPROVE SUCCESS POTENTIAL**
## Monitoring and Adaptive Management Plan Considerations

**Step 1:**
- **Planning Phase:**
  - 1st Draft of MAMP
  - **Risk and Uncertainty (Risk Register)**
  - Hypothesized Performance

<table>
<thead>
<tr>
<th>ID number</th>
<th>Date of entry</th>
<th>Date of entry was modified</th>
<th>Name(s) of person(s) assessing the task</th>
<th>Action</th>
<th>Risk and its cause</th>
<th>Consequence</th>
<th>Evidence for consequence rating</th>
<th>Consequence rating</th>
<th>Confidence rating</th>
<th>Risk Rating</th>
<th>Risk Management Options</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO-1</td>
<td>07-Nov</td>
<td>16-Nov</td>
<td>Brook</td>
<td>Identify the action you propose to take (i.e., things you will do or not do) in order to accomplish the strategy and develop the information identified in the decision management plan. Briefly identify the risk associated with the action you are taking, i.e., considering the entry in column D, what can go wrong and how can it happen?</td>
<td>Study delayed going through CWRB without model certification, HQ will delay. Delayed certification will extend schedule and cost of study.</td>
<td>Medium</td>
<td>Study will not be allowed to go to CWRB without model certification, HQ will delay. Delayed certification will extend schedule and cost of study.</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>1. Start coordinating with ECO-PCX, Nate Richards, asap. At the least schedule a phone call to discuss the models and get her understanding of how much time and cost it would be to get these certified. 2. While the charette determined it likely to get a timely approval of the OH-FQA model, for the ecosystem structure model in addition to seeking its approval should also try to find a comparable model that is already approved.</td>
<td>Undertake risk management option.</td>
</tr>
</tbody>
</table>
Typical Feasibility Study Report Schedule (36 Months)

1. SCOPING
   - ALTERNATIVES MILESTONE
   - Vertical Team concurrence on Array of Alternatives

2. ALTERNATIVE FORMULATION & ANALYSIS
   - TENTATIVELY SELECTED PLAN (TSP) MILESTONE
   - Vertical Team concurrence on TSP

3. FEASIBILITY-LEVEL ANALYSIS
   - AGENCY DECISION MILESTONE
   - Agency Endorses Recommended Plan

4. REPORT APPROVAL
   - DIVISION ENGINEER TRANSMITTAL LETTER
   - Release for State & agency Review

5. FINAL REPORT APPROVAL

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PROBLEMS & OPPORTUNITIES
EXISTING CONDITIONS
STAKEHOLDER ENGAGEMENT
OBJECTIVES & CONSTRAINTS
FOCUSED ARRAY OF ALTERNATIVES

All these pieces are critical to development of the Draft MAMP. Don’t wait – Start early!

First 90 Days!!

US Army Corps of Engineers • Engineer Research and Development Center
### Typical Feasibility Study Report Schedule (Scoping Stage)

<table>
<thead>
<tr>
<th>PROBLEMS &amp; OPPORTUNITIES</th>
<th>EXISTING CONDITIONS</th>
<th>STAKEHOLDER ENGAGEMENT</th>
<th>OBJECTIVES &amp; CONSTRAINTS</th>
<th>FOCUSED ARRAY OF ALTERNATIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is Formal Section 7 Consultation likely? Start discussing Plan with USFWS immediately as it will be an RPM.</td>
<td>Consider contingency plans formulated during Risk Register development as adaptive management opportunities.</td>
<td>Employ collaborative adaptive management during scoping charettes and agency coordination.</td>
<td>Identify uncertainties that can be addressed through adaptive management when developing Conceptual Ecological Model (CEM).</td>
<td>Start developing monitoring metrics when identifying or developing benefits models.</td>
</tr>
</tbody>
</table>
Monitoring and Adaptive Management Plan Considerations

• Step 1:
  • Design Phase (PED):
    - 2nd Draft of Plan, based on approved plan and design specifications
    - Data collection plan (for baseline) may be implemented during PED to address uncertainties in planning process (risk and uncertainty register), i.e., T&E species, etc.
Monitoring and Adaptive Management Plan Considerations

• Step 2:
  • Implementation (Construction) Phase:
    • Integrate Aspects of Plan into contract:
      – Data collection
      – Initial Adaptive Management Options (contingencies)
        » Execute when needed during contract
Monitoring and Adaptive Management Plan Considerations

• Step 3:
  • Monitoring Phase (up to 10 years cost shared):
    ► Final Plan (integrate as-builts if needed)
  
  ► Implement Monitoring Plan - consistent Data Collection throughout Project Phases (may be new contract)
  
  ► Overlaps with O&M Phase - Non-federal Sponsor takes over management
  
  ► Integrate Plan into ORRR&M Manuel
  
  ► Regular Evaluations (Yearly Milestones)
Monitoring and Adaptive Management Plan Considerations

• Steps 4-5:
  • Evaluate and Adjust if Necessary:
    ▶ Compare monitoring results with hypotheses, success criteria
      - Adaptive management may be triggered by an event (e.g., storm, flood, etc.) or by an undesired trend in monitoring.
      - Data collected must be aligned with success criteria and should account for early warnings (e.g., presence/absence of invasive species) and indicators of longer term success (e.g., understory coverage of slow growing tree species).
    ▶ Compare results with model predictions and conduct data analysis
    ▶ Communicate Results to Non-federal Partner(s)
    ▶ Adaptive management options should already be described and ready to be implemented as part of the ORRR&M manual.
Monitoring and Adaptive Management Plan Considerations

- **Steps 4-5:**
  - Results of Evaluations (1X per year or every number of years):
    - **Complete (5A)** – Ecological Success Criteria has been met, MAM may cease
    - **Adjust (5B)** – undesired trends or signals, execute adaptive management options to address trends, may need to adjust MAMP to account for site changes
    - **Continue (5C)** – trends are following successful recovery, continue to monitoring until criteria are met (sometimes criteria is a trend over time, i.e., less than 10% cover of invasive for 3 consecutive years)
Monitoring and Adaptive Management Post-Construction

- Project Outcomes?
  - Evaluation of Recovery:

  Trends are following successful recovery trajectory

  Monitoring and Adaptive Management

  Ecological success achieved?
  - MAM complete
    - NFS continues O&M of non-structural elements for 10 yrs.
    - USACE inspects bi-annually
  - yes
  - no

  Project outcomes achieving ecological benefits?
  - yes
  - MAM continues cost-shared for 10 yrs.
    - or until ecological success is achieved
  - no

  Change to the original design?
  - yes
  - USACE and NFS determine PACR
    - New contract is developed
  - no
    - NFS makes adjustments through O&M

  Trends indicate undesirable trajectory
Monitoring and Adaptive Management Post-Construction

- Ecological Success Achieved?

Project Construction Complete

- Monitoring and Adaptive Management
  - Ecological success achieved?
    - yes
      - MAM complete
      - NFS continues O&M of non-structural elements for 10 yrs.
      - USACE inspects bi-annually
    - no
      - Project outcomes achieving ecological benefits?
        - yes
          - USACE and NFS determine PACR
          - New contract is developed
        - no
          - Change to the original design?
            - yes
              - NFS makes adjustments through O&M
            - no
Monitoring and Adaptive Management Post-Construction

- Change to Original Design?

  Project Construction Complete

  Monitoring and Adaptive Management

  Ecological success achieved?

  yes

  yes

  MAM complete
  • NFS continues O&M of non-structural elements for 10 yrs.
  • USACE inspects bi-annually

  no

  no

  Project outcomes achieving ecological benefits?

  yes

  yes

  MAM continues cost-shared for 10 yrs.
  • or until ecological success is achieved

  no

  no

  Change to the original design?

  yes

  yes

  USACE and NFS determine PACR
  • New contract is developed

  no

  no

  NFS makes adjustments through O&M

  yes
Outline of Sections

1. Introduction
2. Guidance
   - List of relevant policies and guidance documents.
3. General Monitoring Objectives
4. Project Description
   - Project Location
   - Project Objectives
   - Description of Problems or Trends
   - Restoration Design Overview (NED Mitigation or NER Plan)
   - Project Objectives
   - Key Risk and Uncertainties
   - Hypothesized Performance
5. Monitoring Components or Elements
   - Biological Components
   - Non-biological Components
   - Triggers and Success Criteria
6. Monitoring Design
7. Overview of Success Criteria and Project Objectives
8. Data Management and Storage
9. Monitoring Responsibilities
10. Monitoring Tasks, Schedule and Costs
11. Reporting
12. Adaptive Management (Contingency Options)
13. Operations, Maintenance, Repair, Rehabilitation and Replace Plan (OMRR&R)
14. References
Monitoring and Adaptive Management Training Efforts: Overview of Team and Ongoing Efforts

- Video Training Library – short descriptions of past MAMP projects

- Team:
  - Brook Herman and Darixa Hernandez-Abrams – Environmental Laboratory
  - Michael Porter – Albuquerque District
  - Brian Zettle – Tribal Nations Tech Center of Expertise (TNTCX)
  - Andrew LoSchiavo – Jacksonville District
  - Nate Richards and Greg Miller – Eco-PCX
QUESTIONS?

Dr. Brook Herman

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Questions & Answers

Please post any questions to the “CHAT”.

Missed past webinars?

June 15th
Topic: Model to Assess Species and Habitat Migration Due to Climate Change
Speakers: Dr. Jacob Jung & Ms. Christina Saltus

June 29th
Topic: Monitoring Ecological Restoration with Imagery Tools
Speaker: Dr. Kristofer Lasko

August 17th
Topic: Review of Research into Ecosystem Goods and Services in USACE Decision-making
Speakers: Ms. Elizabeth Murray, Dr. Charles Theiling, & Dr. Lisa Wainger

POSTED: