

Adaptive Management of Warner's Pond - Background

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1. Adaptive Management is a specific approach to pond management.
2. The Task Force recommended Adaptive Management as the selected alternative (i.e., as opposed to other pond management alternatives such as a large dredge program)
3. The NRC approved the recommendation for Adaptive Management
4. The Warner's Pond Management Committee was formed to implement the Adaptive Management program over a 5-year time frame (end 2030)
5. There are established procedures for the implementation of Adaptive Management of natural resources, developed by academics and researchers, institutionalized by the Department of Interior (DOI) and widely-implemented by federal, state and local conservation agencies and by non-profit conservators and land managers.
6. The DOI process is well-suited for Warner's Pond issues and for the Pond Management Committee to execute its charge.
7. The DOI process also supports Massachusetts guidance (e.g., the Draft Massachusetts Guide to Lake Management (MassGLM))

What is Adaptive Management?

Adaptive Management of Natural Resources (ref. U.S. Department of the Interior)

An adaptive approach involves:

- ✓ Exploring alternative ways to meet management objectives
- ✓ Predicting the outcomes of alternatives based on the current state of knowledge
- ✓ Implementing one or more of these alternatives
- ✓ Monitoring to learn about the impacts of management actions
- ✓ Using the results to update knowledge and adjust management actions
- ✓ Using structured, transparent decision making

*Adaptive management is **iterative and learning-based**—management actions are iteratively adapted based on observed outcomes.*

Adaptive Management Six Step Process

- 1. Define the Management Problem:** Stakeholder agreement about its scope, objectives, potential management actions and definition of management “success”.
- 2. Models:** Conceptual model that is a plausible representation of a dynamic natural resource system based on available information, captures uncertainty and predicts outcomes.
- 3. Define Management Objectives and Metrics:** Identify clear, measurable, and agreed-upon management objectives and metrics to guide decision making and evaluate management effectiveness over time. **Specific. Measurable. Achievable. Results-Oriented. Time-Fixed.**
- 4. Develop Management Alternatives:** Identify a range of possible management actions or strategies that could meet the objectives.
- 5. Design Monitoring Plan:** Provide data in adaptive management for: evaluating progress toward achieving objectives; determining management status; comparing observations to predictions; enhancing model
- 6. Implementation (Iterative):** **Select Management Alternative(s) ↔ Implement ↔ Monitor ↔ Assess ↔ Repeat**

Consistency with NRC and Task Force Expectations?

Warner's Pond Adaptive Management - Task Force Final Report expectations

The DOI Adaptive Management process is consistent with the stated objectives of the Task Force. Task Force requested:

- ✓ *Goals and Metrics*
- ✓ *An adaptive methodology*
- ✓ *Independent study design, monitoring and assessment*
- ✓ *A five-year implementation timeline to test and evaluate management approaches (ending in 2030)*
- ✓ *A comprehensive reevaluation and decision-making process*
- ✓ *Periodic reevaluation and decision-making processes - every two years*

How do we apply to the Committee charge for Warner's Pond Adaptive Management?

I. Warner's Pond Adaptive Management: Process

Pond Management Plan

- 1. Define the Management Problem:** Identify Stakeholders (NRC, Scouts, Recreation, other). Develop statement defining management problem and “success” outcomes.
- 2. Models:** Compile and review available data (1999 to current). Develop pond conceptual model. Committee review and consensus. Utilize Town resources for information management (ArcGIS).
- 3. Define Management Objectives:** Define specific pond management objectives with associated metrics and expected performance over 5 years (schedule from start of treatment).
- 4. Develop Management Alternatives:** Evaluate previous management activities and outcomes. Identify management alternatives.
- 5. Develop Draft Pond Management Plan including Monitoring Plan:** Retain Pond Management/Monitoring Consultant. Consultant review and recommendations. Select Management Alternative(s). Draft plan for NRC review and approval.

Pond Treatment
5-years (2030)

- 6. Specifications, Permitting and Procurement (Management Contractor(s)); Organize Volunteer Activities**
- 7. Implement Pond Management Activities; Monitor; Review and Adapt; Annual Reports, Final Report and Recommendation at 5 years**

II. Warner's Pond Adaptive Management: Decision-Making

Structured Decision-Making: Systematic, transparent process for making complex decisions where uncertainty, multiple stakeholders and extended implementation time frames apply.

Step 1: Define the Problem

Step 2: Identify Objectives (Fundamental Objectives; Means Objectives)

Step 3: Identify Alternatives

Step 4: Compare. Define and discuss benefits, costs, uncertainties; predict outcomes and consequences with each Alternative

Step 5: Decide. Consensus decision-making using simple ranking and rating system

Step 6: Document decision (basis, rationale, outcome)

Define → Objectives → Alternatives → Compare → Decide → Document

III. Adaptive Management – Pond Management Plan

Compliant with the MA 2025 Draft Lake Management Guide

Committee Process:

1. Define the Management Problem

2. Models

3. Define the Management Goals

4. Define the Management Alternatives

5. Pond Management Plan

6. Specifications, Permitting,
Procurement

7. Implementation: Treatment,
Monitoring, Adaptation,
Reporting

Warner's Pond Plan Chapters:

Statement of Problem

Watershed and Pond Characteristics, Conceptual Pond Model

Watershed Management Goals
Pond Management Goals

Past Pond Management Activities and Techniques

Past and On-going Watershed Management

Watershed Management Recommendations

Lake Management Recommendations

Predictive Outcome Modeling

Implementation Plan and QAPP

Implementation and Monitoring

Monitoring Management Outcomes

Appendix: Summary of Essential Background Information