

Proposed Monitoring Concepts for the Channel Deepening Project

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Monitoring Defined

- ❖ Compliance - determines whether the actions proposed were carried out in the manner expected
- ❖ Effectiveness - determines whether the expected outcomes, impacts, and/or improvements occurred
- ❖ Investigation (Validation Monitoring) - tests the basic assumptions used in predicting impacts and/or gathers further data in areas of uncertainty

Suggested Criteria for Selecting Monitoring Options (by SEI Panel)

- The options should be able to -
 - ! relate to salmonid biology/life history
 - ! detect a change with some measure of statistical power
 - ! detect a project impact (direct and indirect)
 - ! provide feedback to management
 - ! test developed hypotheses

Suggested Criteria for Selecting Monitoring Options (by SEI Panel)

- ✿ The options should be able to -
 - ! test assumptions made about the project
 - ! relate to the regulatory basis for the ESA decision on the project
 - ! contribute to new knowledge
 - ! clarify risk and uncertainty
 - ! be connected to the conceptual model for estuary ecosystem function
 - ! be cost effective

Scale, Duration, and Timing of Monitoring

Scale

! Geographic extent of effort (Bonneville Dam to 5 miles out in the ocean)

! What actions/items will be monitored?
(dependent upon results of effects analysis and discussions regarding risk/uncertainty)

Scale, Duration, and Timing of Monitoring

☞ Duration

! What length of time will each action/item be monitored?

Scale, Duration, and Timing of Monitoring

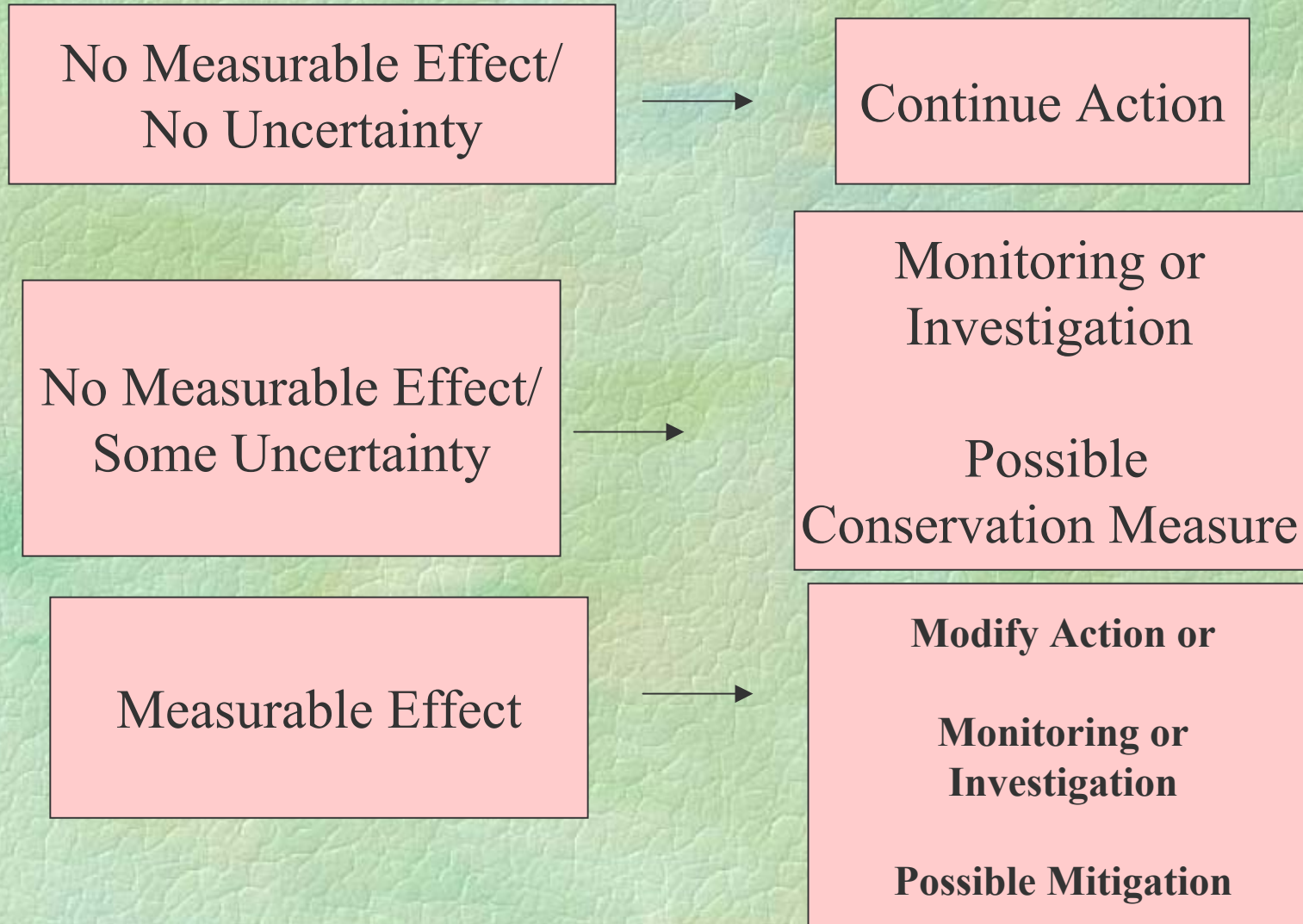
Timing

! When will the time that each action/item to be monitored begin and end?

Proposed Pathways for the Channel Deepening Project

- ✿ Habitat Forming Processes
- ✿ Habitat Types
- ✿ Habitat Specific Primary Productivity
- ✿ Food Web
- ✿ Growth
- ✿ Survival

Effects Analysis Endpoints



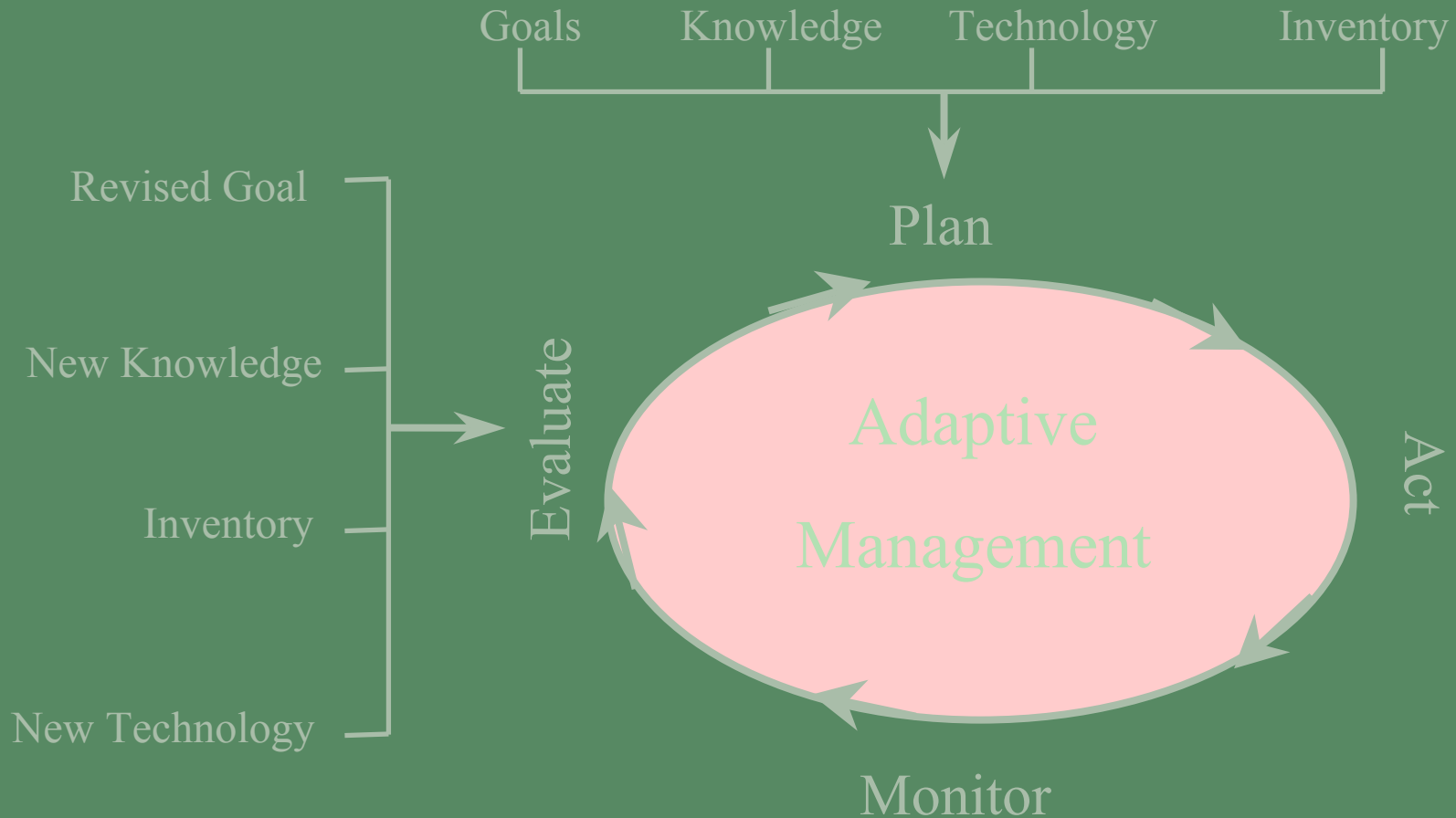
Monitoring Scenarios



Adaptive Management: Defined

- ❧ The process of adjusting management actions and directions in light of new information about the project, the ecosystem in which it occurs, and progress toward ecosystem goals
- ❧ When new information becomes available, a decision is made whether and how to adjust the strategy and actions

Adaptive Management



Adaptive Management Approach: Benefits

- ❖ Adaptive Management provides feedback between monitoring and management
- ❖ Adaptive management allows for uncertainties in a project's outcome by building in sufficient options to compensate for the range of predicted outcomes
- ❖ Adaptive management recognizes the limits of knowledge and experience, and moves resource management toward ecosystem goals in the face of uncertainty

Monitoring/Adaptive Management Framework

- ❧ **Institutional framework** with authority and flexibility required
- ❧ Establishment of an “**inter-disciplinary team**” to periodically review the information produced from the monitoring program and develop/implement a set of management recommendations, as appropriate
- ❧ The information review could include a “**decision-tree**” to determine how monitoring results will be used

Monitoring in the Lower Columbia River and Estuary: Building on Other Programs

- ❧ Federal Columbia River Power System (FCRPS) Hydropower Biological Opinion
- ❧ Portland District of the Corps General Investigation Study (Lower Columbia River Ecosystem Study)
- ❧ Lower Columbia River Estuary Partnership
- ❧ On-going research efforts
- ❧ Local efforts on individual projects