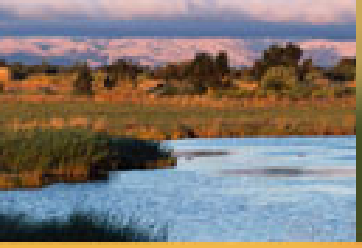


South Bay Salt Pond Restoration Project

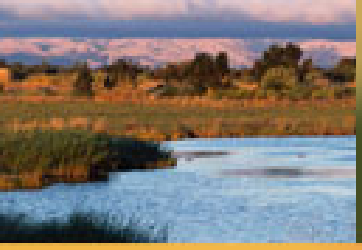
Draft Adaptive Management Plan

Lynne Trulio

June 14, 2005

Topics covered…

- Science Team Activities
- Draft Adaptive Management Plan:
  - Science Sections
  - Institutional Structure
- Schedule for AMP

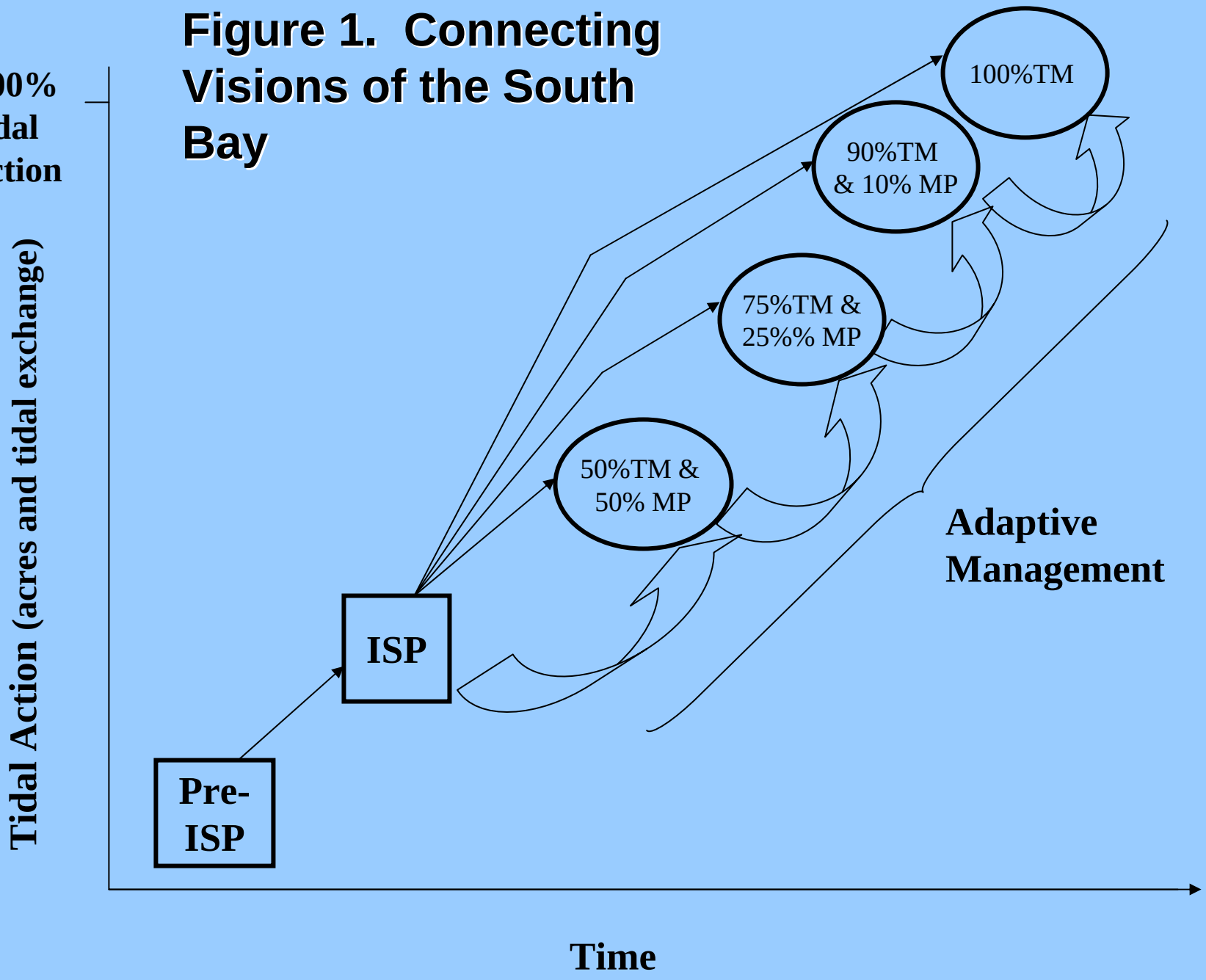


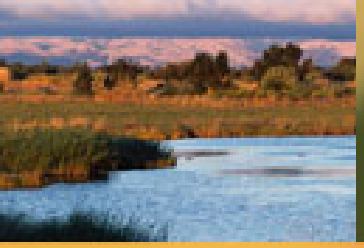
South Bay Salt Pond Restoration Project

Science Team Activities

- **Workshops**
  - Sediment Dynamics 1 & 2
  - Birds and their Habitats 1 & 2
  - Fish and their Habitats 1
- **Science Syntheses**--Posted on the Project Website under *Science Team* on *Science* page
- **Draft Scientific Basis of POs**
- **Draft Adaptive Management Plan**
- **Advise PMT** on monitoring and studies to conduct in the short and long-term

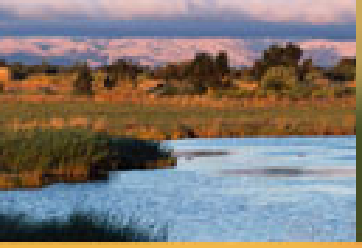
Figure 1. Connecting Visions of the South Bay





There are many uncertainties…

- Bird use of tidal marsh and managed habitats, MeHg, *Spartina alterniflora* and other problem species
- **We cannot know the final configuration**
- ***Adaptive Management***—Will tell us how far along the tidal action continuum we can go and still reach the Project Objectives.

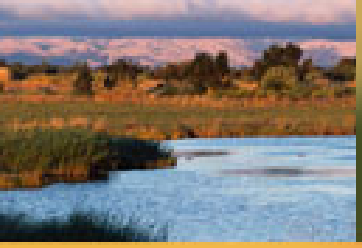


South Bay Salt Pond Restoration Project

Draft Adaptive Management Plan

- **First draft now available—**
  Seeking comments!

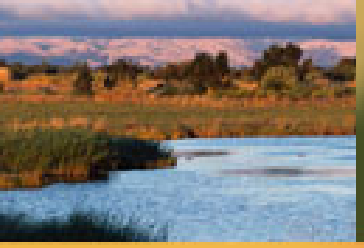
- **AMP Focuses on:**
  - Science: Monitoring and Applied Studies
  - Institutional: Organizational Structures and Processes



South Bay Salt Pond Restoration Project

What is adaptive management?

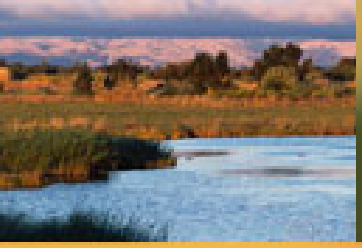
- A **cyclic process** for learning from management decisions and applying that knowledge to future decisions;
- Essential in systems with much **uncertainty**;
- Views all **management actions** as experiments
- **Collects data** through monitoring and applied studies (research)
- A **planned approach** to reliably learn why policies (or critical components of policies) succeed or fail" (Light and Blann 2003).



What adaptive management is NOT

Adaptive Management is NOT…

- Trial and error;
- Simply changing management direction in the face of failed policies;
- A well-developed system or an easily implemented approach to management.



South Bay Salt Pond Restoration Project

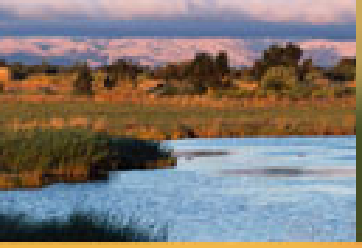
California Department of Fish & Game

Coastal Conservancy

U.S. Fish & Wildlife Service

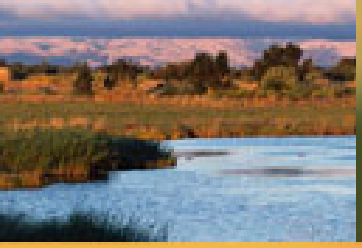
Adaptive Management is based on…

- Thorough understanding of the system
- Predictions of system response to change
- Monitoring to assess response
- Study to improve predictions and understand unexpected responses



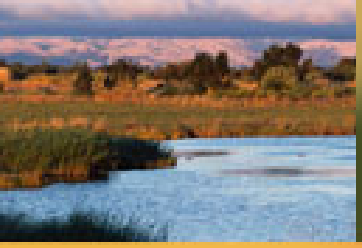
Draft AMP: Science Sections

- **Rationale for Adaptive Management**—Grounds Adaptive Management in the Landscape Visions; Appendix 1
- **Scientific Background**—Summary of ecosystem expectations and current monitoring
- **Restoration Targets, Monitoring, Applied Studies**—the overall Project; Appendix 2 & 3
- **Phase 1 Monitoring and Applied Studies**



Draft AMP: Institutional Sections

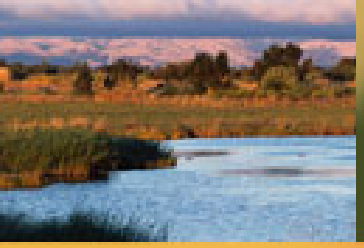
- Adaptive Management Decision Making—Structures and functions; Appendix 4
- Decision Making and Implementation—Operation of the structure
- Public Involvement and Transparency
- Data Management and Reporting
- Funding Considerations



South Bay Salt Pond Restoration Project

Science Section

- **Restoration Targets**—aka, success criteria or performance standards
- **Monitoring** to assess progress toward targets and early warning—parameters and protocols
- **Applied Studies** to reduce uncertainties—focus on MeHg, bird use, sediments, problem species.

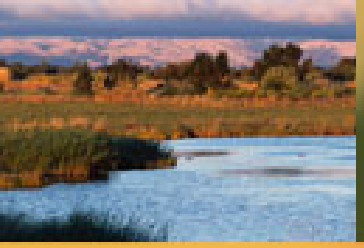


Definition of Restoration Targets

- From literature, field data, modeling, compliance
- Essential for planning: measurable targets for assessing whether Project Objectives have been met; assessed through monitoring (SWS 2003)
- Need final and interim targets; must incorporate ranges of natural variability
- Targets are moving and will evolve as our knowledge of the system increases (NRC 2003)

Draft Restoration Targets

- Some draft final targets for 50-year project and no interim targets yet (Table 4 in *Draft AMP*)
- Targets need to be developed with PMT, Science Team, Consultant Team, Stakeholders, regulators, other experts
- PO 1A: Draft Clapper Rail Target (Weiss, pers. comm.)
  - 1500-2500 rails in winter
  - Density of 0.5 – 1.0 birds/2.5 acres (ha)
  - 3 subpopulations of 500+ birds in winter
  - Ranges of natural variability needed



Monitoring Parameters

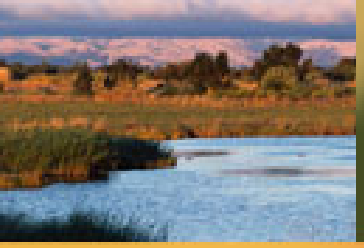
- **Functions of monitoring**:
  - Characterize baseline conditions
  - Assess progress toward targets
  - Track regulatory compliance
  - Look for early signs of problems
- **Monitoring parameters**: metrics that directly assess progress toward restoration targets meet other monitoring functions
- **Parameters should assess**:
  - Short and long term changes
  - Changes at small and large scales
  - Changes at different ecological levels of organization

South Bay Salt Pond Restoration Project

Monitoring Parameters

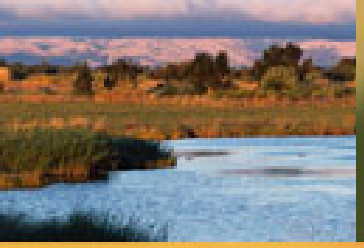
- PO 1A: Draft Clapper Rail Target (Weiss, pers. comm.)
  - 1500-2500 rails in winter
  - Density of 0.5 – 1.0 birds/2.5 acres (ha)
  - 3 subpopulations of 500+ birds in winter
  - Ranges of natural variability needed

- Draft Clapper Rail Monitoring Parameters (for ex. Zedler, 2001)
  - # rails in winter
  - Chicks fledged/nest
  - Acres of tidal marsh/ transition habitat
  - Channel density/extent
  - Habitat connectivity
  - Density of vegetation
  - Nutrient levels in marshes
  - Density of prey
  - Hg levels in prey
  - Predation rates on rails



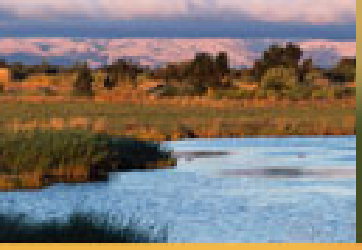
Monitoring and Applied Studies During Planning

- Monitoring:
  - Assess compliance, baseline & changing conditions before and after ISP
  - Coordinate with existing programs to streamline data collection
  - Use innovative data collection methods
- Studies:
  - See the Applied Studies Program for hypotheses to be tested during planning (ISP) and during Phase 1
  - Develop + test Hos on pond ecology and management



Applied Studies

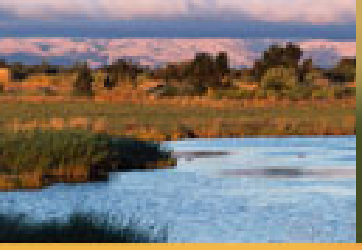
- **Applied Studies**—undertaken to address tractable questions and provide data for use by managers in decision making (Walters 1997)
- **Test hypotheses or research questions**
- **Primary Function**--Reduce key uncertainties associated with achieving the Project Objectives
  - Increase knowledge of important processes
  - Address how management actions will perform
  - Develop or improve predictive models
- **Applied Studies Program**--Addresses Key Uncertainties; Appendix 2 and 3



South Bay Salt Pond Restoration Project

Key Uncertainties for Applied Studies

- Mercury
- Sediment Dynamics/Mudflats
- Bird Use of Changing Habitats
- Invasive and Problem Species
- Benefits to Non-Avian Species
- Social Dynamics
- Large-scale Factors



South Bay Salt Pond Restoration Project

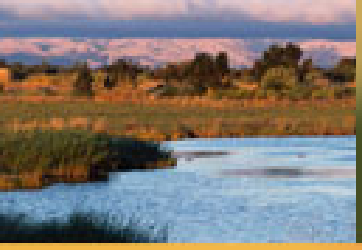
Applied Studies Program

Process to Develop Studies

* Develop knowledge base
* Identify most important uncertainties
* Articulate hypotheses

From the Applied Studies Program

- *Science Synthesis*: Managing salt ponds to protect bird populations (Warnock 2005)
- *Key uncertainty*: Can the pre-ISP number and diversity of migratory and breeding shorebirds and waterfowl be supported in a reduced Project Area?
- *Ho*: Managing water levels in ponds so that they are dry in summer and wet in winter will not attract breeding snowy plovers and foraging migratory shorebirds.



South Bay Salt Pond Restoration Project

Applied Studies Program

Process to Develop Studies:

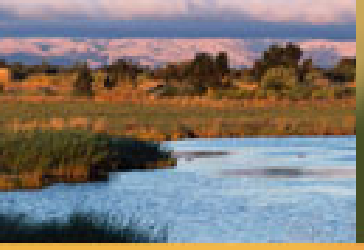
* Develop applied study to address hypotheses

* Clearly state management actions that will be affected by study results

From the Applied Studies Program

- *Study Design*: Appendix 3 for Eden Landing Ponds 10/11, 14/15/16 or 8A

- *Action 1*: If plover nesting and productivity is not within acceptable ranges, then other nesting sites and/or methods to encourage nesting will need to be sought.



South Bay Salt Pond Restoration Project

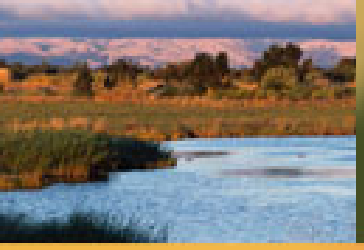
Applied Studies Program

Process to Develop Studies

* Develop knowledge base
* Identify most important uncertainties
* Articulate hypotheses

From the Applied Studies Program

- *Science Synthesis*: Assisting the recovery of special status and other indicator species: Plants (Callaway 2005)
- *Key uncertainty*: How can restoration actions be configured to maximize benefits to non-avian species both on-site and in adjacent waterways?
- *Ho*: Self-sustaining populations of rare high marsh plant species cannot be established.



South Bay Salt Pond Restoration Project

Applied Studies Program

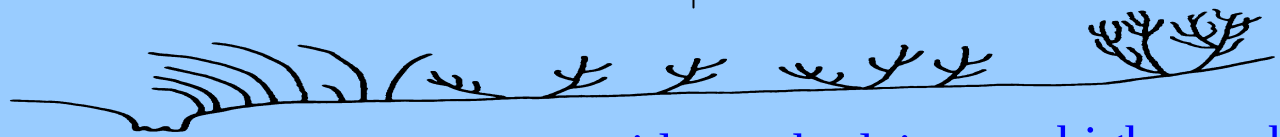
Process to Develop Studies:

* Develop applied study to address hypotheses

* Clearly state management actions that will be affected by study results

From the Applied Studies Program

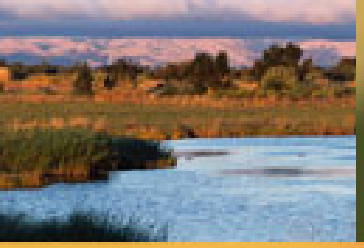
- *Study Design*: Study limiting factors to growth and reproduction for 4 rare high marsh species.
- *Action 1*: If experimental plant treatments are successful, include plantings as part of future Project phases.



low marsh
Spartina foliosa

mid-marsh plain
Salicornia virginica

high marsh - upland transition
Suaeda californica



South Bay Salt Pond Restoration Project

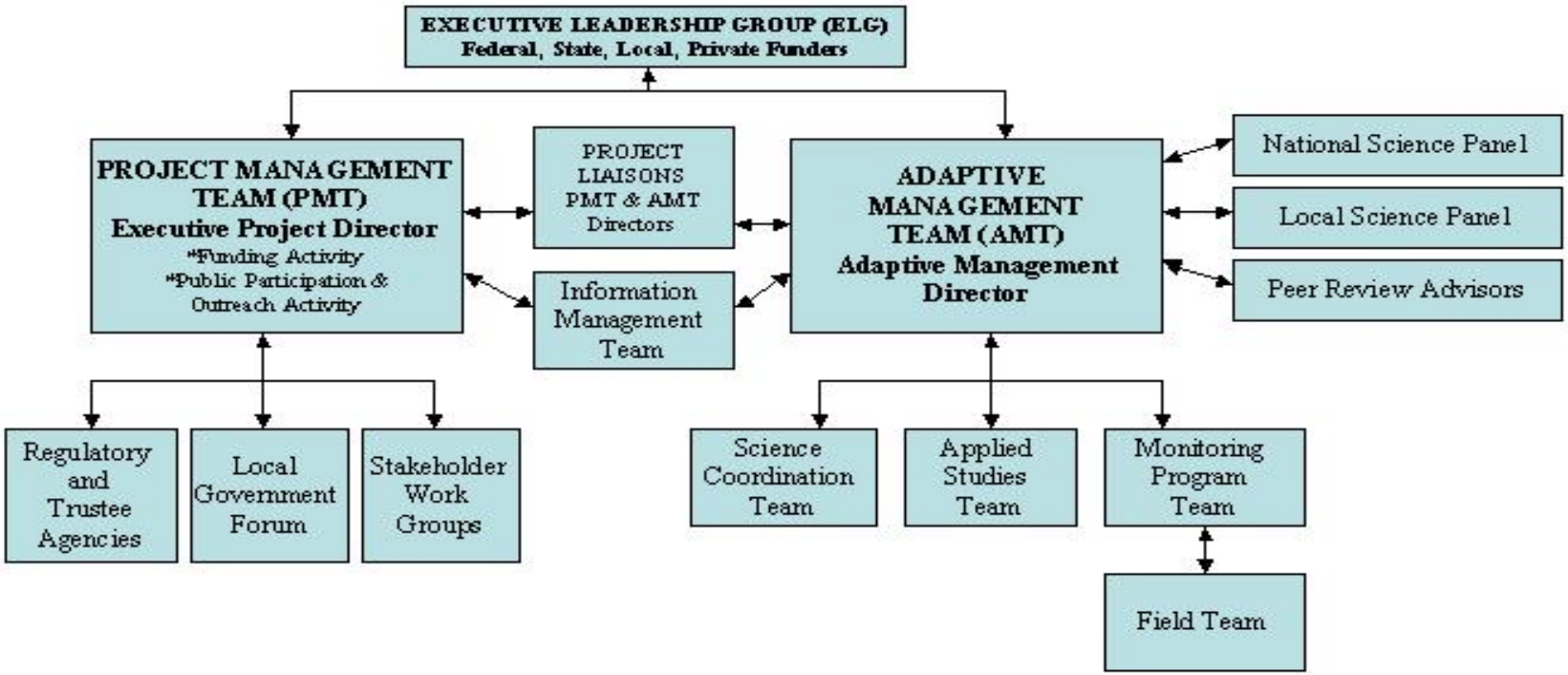
Institutional Structure Section

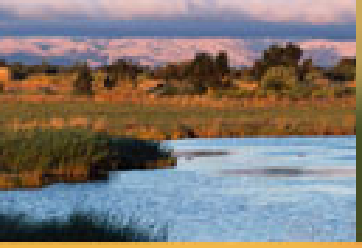
- Structures and processes for decision-making
- Completes the loop between developing data and applying that data to management
- Goals:
  - Generate and synthesize information
  - Convert information into effective decisions
  - Collaborate with the public on decision-making
  - Store and organize data

Institutional Structure and Processes

- **What organizational structure** will ensure project managers are informed of scientific results and public needs?
- **What processes** will ensure timely processing and management of information?
- **What information** will be fed back into the decision-making process?
- **What decision criteria** will be used to modify management actions?

FIGURE 3. ADAPTIVE MANAGEMENT ORGANIZATIONAL STRUCTURE
For the South Bay Salt Pond Restoration Project

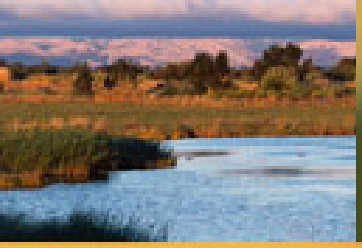




Institutional Structure Section

- Need two operating plans:
  - Detailed Plan for Adaptive Management Decision-Making
  - Science Plan for Adaptive Management

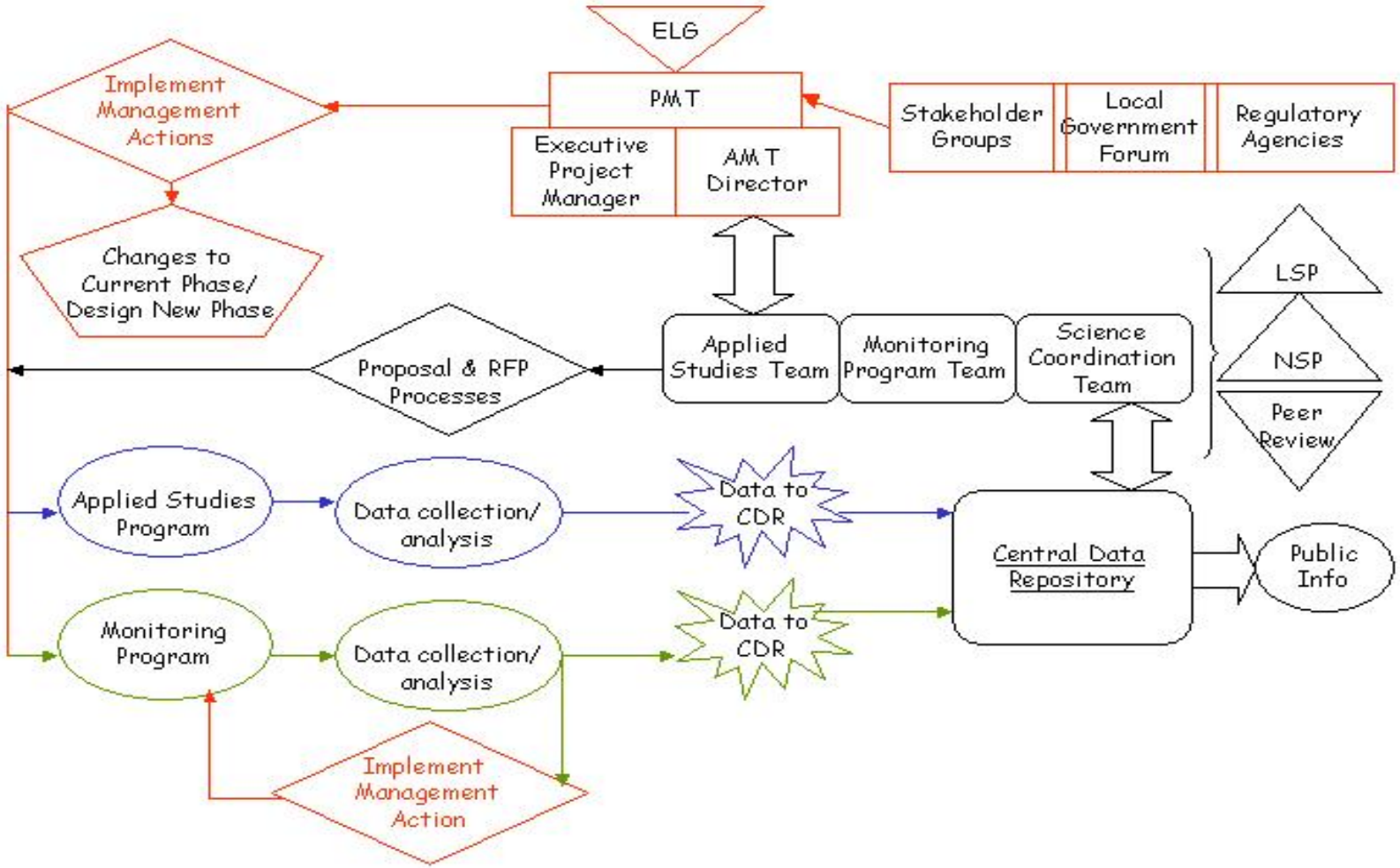
- Both will include reporting and program review requirements

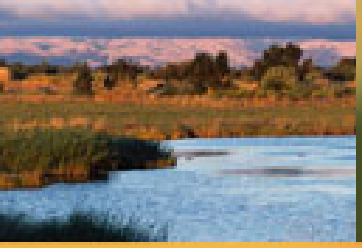


South Bay Salt Pond Restoration Project

Coastal Conservancy

Figure 4. Adaptive Management Data Collection & Decision-making Process

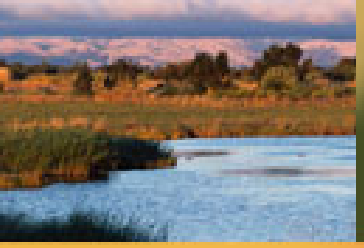




South Bay Salt Pond Restoration Project

Public Participation

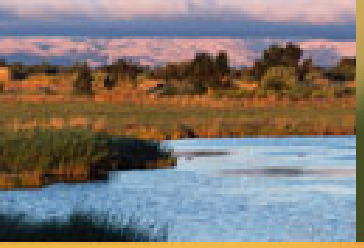
- Substantial stakeholder involvement is essential for support of program and stewardship
- Data and reports should be available to the public; include access to on-line monitoring
- Employ collaborative learning
- Focus social dynamics studies on integrating information and social expectations



South Bay Salt Pond Restoration Project

Data and Information Management

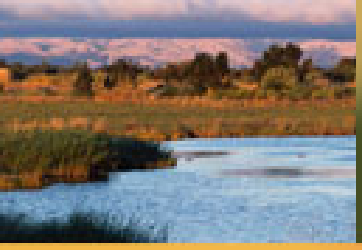
- Central Data Repository is essential to:
  - Store data and information
  - Perform basic analysis
  - Make information available to the PMT, AMT, public
- Types of information available:
  - General information—press releases, info summaries
  - Publications—reports, peer-reviewed articles
  - Maps-static and interactive
  - Raw Data—real-time monitoring, preliminary studies



South Bay Salt Pond Restoration Project

Lessons from other Processes

- Institutional structures must be flexible
- Managers must accept that management actions are experimental
- Uncertainty is inherent; admitting so is not a statement of weakness, but of reality
- Integrated monitoring programs are needed
- Monitoring and research info must help guide management decisions
- Systems should foster collaboration between managers, scientists & stakeholders

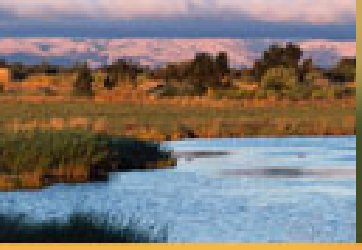


South Bay Salt Pond Restoration Project

Schedule for AMP Development

(follows Project Alternatives Report process)

- Science Team Discussion: July 11
- Stakeholder Forum Discussion: July 13
- Comments Due: August 1
- Second Draft: November 15
- Comments Due: December 15
- Final AMP for Project Alternatives Report and Phase 1: January 15, 2006
- Establish Adaptive Management Team in 2007 to begin AMP implementation



South Bay Salt Pond Restoration Project

Upcoming Science Team Activities

- **Workshops**
  - Sediment Dynamics 3—June 27
  - Trophic Levels—Summer 2005
  - Pond Ecology and Management—Summer 2005
  - Social Dynamics—Early Fall 2005
- **New Science Syntheses**
  - Pond Ecology and Management
  - Social Dynamics
- **Revise Draft AMP and Scientific Basis of POs**

Thanks to…

- **Deborah Clark**—research & assistance drafting AMP Institutional section

- **Science Team**--Syntheses, comments on AMP, developing studies and all their hard work!