South Bay Salt Pond Restoration Project

Draft Adaptive Management Plan

Lynne Trulio
July 13, 2005
Stakeholder Forum

South Bay Salt Pond Restoration Project

Topics covered…

- **Science Team Activities**
- **Visions of the Restored South Bay**
- **Draft AMP:**
  - **Science Sections**
  - **Institutional Structure**
- **Schedule for AMP**

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Recent Science Team Activities

- **Workshops**
  - Sediment Dynamics 1, 2 & 3
  - 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—in review**
- **Draft Adaptive Management Plan—in review**
- **Advise PMT** on monitoring and studies to conduct in the short and long-term

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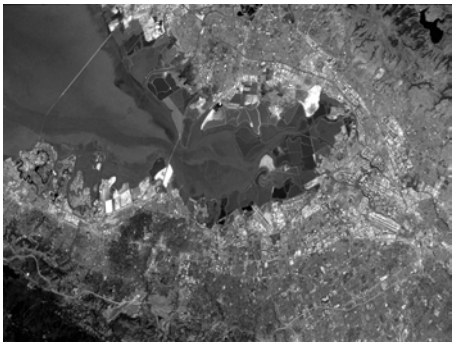
Project Alternatives as Landscape Visions

- ISP Operation (No Action)
- 50% full tidal action (tidal marsh)/ 50% managed pond
- 75% tidal action/ 25% managed pond
- 90% tidal action/ 10% managed pond

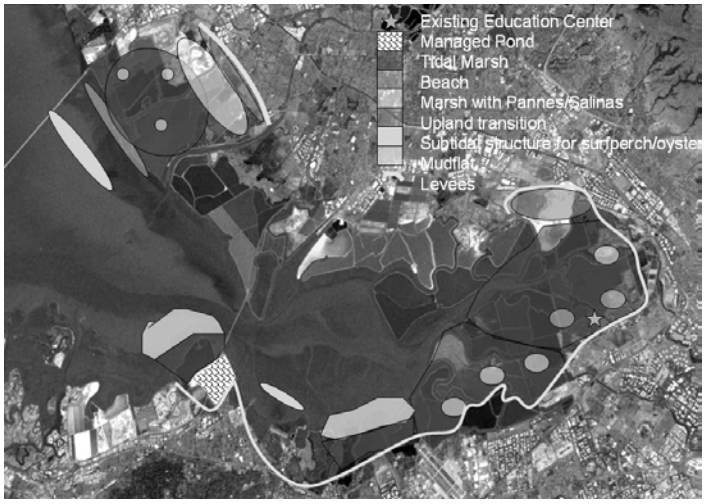
Charette Landscape Visions

Charette Goals:

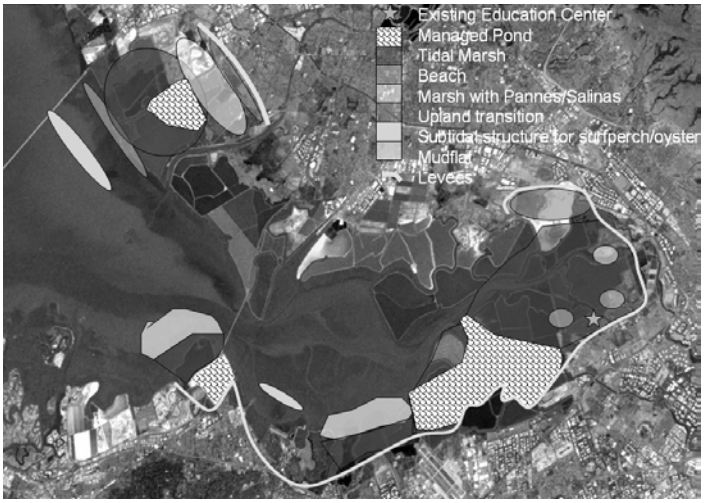
- **Develop a vision for 2050**
- **Identify key uncertainties**
- **Target areas for** early action



Charette Vision 1



Charette Vision 2



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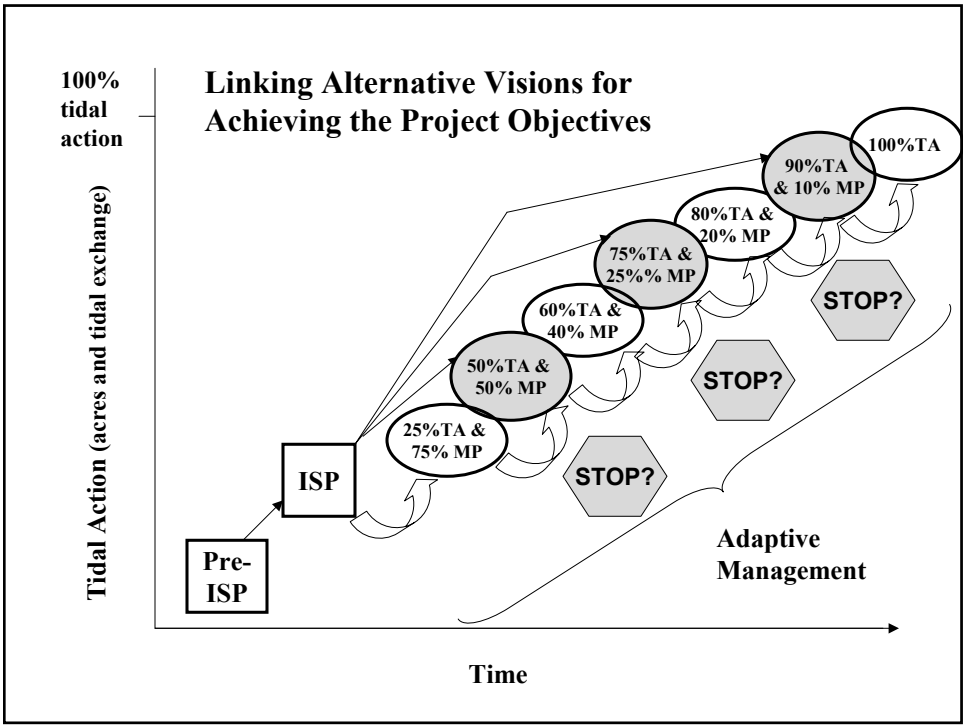
Project Challenges

- Balancing tidal marsh species recovery with migratory/nesting bird habitat
- MeHg and tidal marsh restoration
- Balancing public access and wildlife
- Tidal marsh/pond habitats and mosquitoes
- *Spartina* and invasive species control



Two things to avoid:

- Undertaking irreversible actions that move the Project to far toward tidal marsh—i.e., carefully plan each Phase to the limits of our knowledge.
- Implementing Project actions that preclude reaching a full or nearly full tidal marsh—i.e., small projects that short-circuit more complete tidal marsh restoration.

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There are many uncertainties…

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

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Draft Adaptive Management Plan

- **First draft now available—**
  Seeking comments!
- AMP Focuses on:
  - Science: Monitoring and Applied Studies
  - Institutional: Organizational Structures and Processes

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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 for fail" (Light and Blann 2003).

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What adaptive management is NOT

AM is NOT…

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

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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





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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**

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.

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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)

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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

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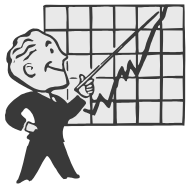
Monitoring Parameters



- **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**

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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
  - Need to 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

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Key Uncertainties for Applied Studies
(from the ST and Charette)

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

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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.**

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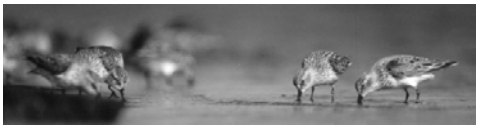
Applied Studies Program

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.



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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.

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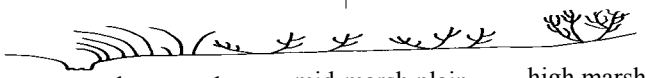
Applied Studies Program

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

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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

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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?

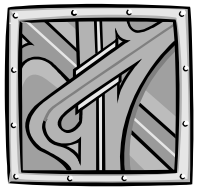

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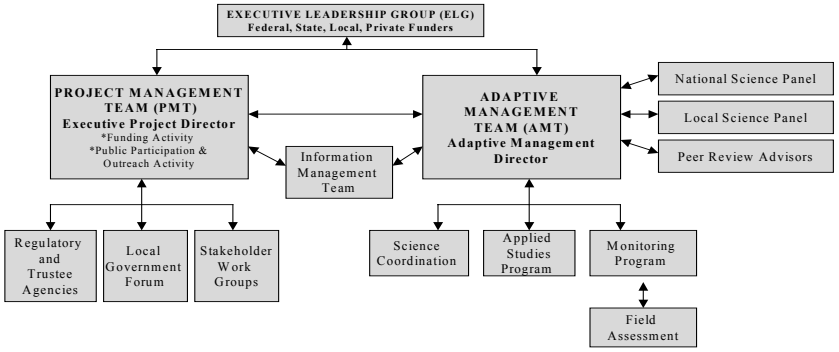
FIGURE 3. ADAPTIVE MANAGEMENT ORGANIZATIONAL STRUCTURE
For the South Bay Salt Pond Restoration Project



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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

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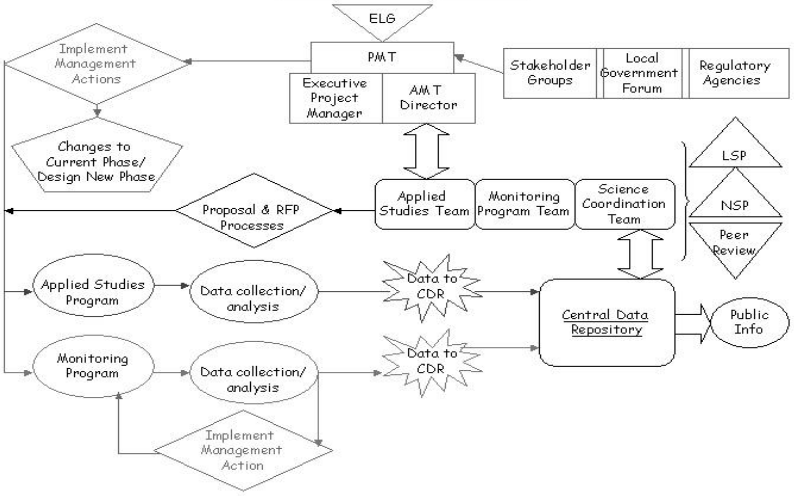
Figure 4. Adaptive Management Data Collection & Decision-making Process



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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**

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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

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

Schedule for AMP Development

(follows Project Alternatives Report process)

- **Science Team Discussion: July 11**
- **Stakeholder Forum Discussion: July 13**
- **Comments Due: August 15**
- **Second Draft to NSP: October 28**
- **NSP Review: November 7-8**
- **Comments Due: December 15**
- **Final AMP for Project Alternatives Report and Phase 1: January 15, 2006**
- **Establish Adaptive Management Team ASAP to begin AMP implementation**

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Upcoming Science Team Activities

- **Future Workshops**
  - Pond Ecology and Management—August 17, 2005
  - Trophic Levels—Mid-September 2005
  - Bird Workshop 3—Mid-October
  - Social Dynamics—Fall 2005
- **New Science Syntheses**
  - Pond Ecology and Management
  - Social Dynamics
- **Revise Draft AMP and Scientific Basis of POs**

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Thanks to…

- **Deborah Clark**—research & assistance drafting AMP Institutional section
- **Science Team**--Syntheses, comments on AMP, developing studies and all their hard work!