South Bay Salt Pond Restoration Project

Notes from
Datagaps Workshop Break-Out Sessions
held on March 25, 2003

April 17, 2003

California Coastal Conservancy
U.S. Fish and Wildlife Service
California Department of Fish and Game

Overview

On March 25, 2003, the California Coastal Conservancy, U.S. Fish and Wildlife Service, and California Department of Fish and Game hosted a one-day South Bay Salt Ponds data gaps workshop. Approximately 75 scientists, from public agencies, universities, and private firms, attended the workshop. (See Attendance List).

The purpose of the data gaps workshop was to identify technical information that is required to accomplish the long-term restoration planning effort, and to determine whether there is information that is missing and must be collected before the appropriate planning decisions can be made. The overall questions we hoped to answer as a result of the data gaps workshop were the following:

1. Is the available information on South San Francisco Bay and the associated salt ponds adequate to plan and assess the impacts of restoration and enhancement of the salt ponds?
2. If the existing information is not sufficient, what additional information is required to make each specific decision? How should that information be collected and how would it be used in the planning process?

To provide a context for the data gaps workshop the project management team identified the major decisions that will need to be made for the long-term planning effort. For each major decision, we also identified the associated specific decisions, with key questions as subcategories. The specific decisions were grouped into: fish and wildlife/other biological factors, contaminants/water quality, and physical processes.

The one-day workshop consisted of a one-hour overview of the project and the major decisions, followed by break-out sessions organized according to the three topics. (See Agenda). Within each breakout session, we asked for feedback on the following:

1. Is the list of specific decisions complete for the specified area of interest? (If not, what other decision(s) will need to be made?)
2. Which specific decisions can be made based on existing data? (Note: information on existing studies available to the project management team is provided in the attached bibliographical database summary.)
3. What are the remaining data gaps? Which data are essential to the decision-making process, and must be collected now, which data can be collected as part of the adaptive management process, and which data address bigger issues beyond the South Bay Salt Pond Restoration Project?
4. Given that funding is not unlimited, what are the highest priority data gaps now and for the next several years?

A. Fish and Wildlife/Other Biological Factors Break-Out Session

1. Specific Decisions

Original Text

Specific Decision #1. Determine the specific restoration recommendation for each pond (managed pond, tidal pond, seasonal wetland, panne habitat, etc.) and the optimal design features.

Specific Decision #2. Determine the types of species and habitat uses that need to be accommodated in the South Bay.

Specific Decision #3. Determine how to minimize short-term and long-term impacts of restoration on wildlife.

Specific Decision #4. Determine the management approach to minimize impacts of introduced species, especially Spartina alterniflora, on restoration.

Specific Decision #5. Determine the management strategy for introduced predators, especially with respect to at-risk species.

Specific Decision #6. Determine how to consider the short-term and long-term habitat functions of the remaining Cargill salt ponds be considered in the restoration design.

Specific Decision #7. Determine required project modifications, if any, to minimize mosquito populations.

Discussion

Specific Decision #2
Do we want to define the number of birds or other wildlife that we want to achieve? Add numbers to this decision.

Specific Decision #4
Consider or add: how to implement and manage project (and design) in the presence of introduced species, where control is not possible.

Specific Decision #5
Add "opportunistic" native predators, such as striped skunk.

Specific Decision #7
Add: and potential disease outbreaks, address public health issues.

Additional Specific Decisions:

Determine how to account for water discharges in the South Bay.

Determine how to optimize long term monitoring and adaptive management and data needs for baseline.

Determine how to minimize short-term and long-term impacts of public use on wildlife

Determine how to incorporate adjacent plans and restoration efforts into this planning process, e.g. NASA 200+ acres.

Revised Text

Specific Decision #1. Determine the specific restoration recommendation for each pond (managed pond, tidal pond, seasonal wetland, panne habitat, etc.) and the optimal design features.

Specific Decision #2. Determine the types of species, population numbers, population viability, and habitat uses that need to be accommodated in the South Bay.

Specific Decision #3. Determine how to minimize short-term and long-term impacts of restoration on wildlife.

Specific Decision #4. Determine the management approach to minimize impacts of introduced species, especially Spartina alterniflora, on restoration.

Specific Decision #5. Determine the management strategy for predators, especially with respect to at-risk species.

Specific Decision #6. Determine how to consider the short-term and long-term habitat functions of the remaining Cargill salt ponds, and other adjacent projects, in the restoration design.

Specific Decision #7. Determine required project modifications, if any, to minimize mosquito populations and potential for disease outbreaks.

Specific Decision #8. Determine how to minimize short-term and long-term impacts of public use (access and recreation) on wildlife.

Specific Decision #9. Determine how to account for water discharges in the South Bay in the restoration design process.

2. Target Species

Use Goals Species!

California clapper rail, salt marsh harvest mouse, Alameda song sparrow, salt marsh yellowthroat, snowy plover, California least tern, wandering shrew, California vole, burrowing owl, bay shrimp, brine shrimp, Wilson's phalarope, heron colonies, western pond turtle, steelhead, Chinook, long jaw mudsucker.

3. Data Gaps *(Ranked in each category with most essential first, based upon votes)*

Specific Decision #1

1. (10 essential ("essn.") now; 3 essn. later) Assess results of existing marsh restoration and learn from successes/failings both in South Bay and in other areas.

2. (8 essn. now; 2 essn. later) Studies to determine how to manage restoration if Spartina or hybrids become widely established.

3. (7 essn. now) Species/area relationships for at-risk or target species (song sparrow, COYE, not just California clapper rail). San Jose and PRBO have some information.

4. (6 essn. now; 1 essn. later) Importance of specific plant species (native and invasive) to target wildlife species.

5. (6 essn. now; 1 essn. later) Studies to determine how to manage/design tidal marsh incorporating salt pannes, uplands, salinas, etc.

6. (3 essn. now; 1 essn. later) What is impact of invasive species (changes from 1 species to another) on other ecosystem functions, e.g. hydrology and sedimentation.

7. (1 essn. now;1 essn. later) Need information on reproductive success for target species in relation to species/area relationships.

8. (1 essn. now; 1 essn. later) Identify places around the South Bay where natural transitions can be captured, e.g. willow thickets.

9. (1 essn. now) How to manage isolated ponds over long-term at certain salinities.

10. (1 essn. now) Groundwater rise in South Bay and model to determine impact on restoration project.

11. (1 essn. now) How to minimize alien plant diversity – maximize native population especially in transition zones.

12. (1 essn. now) Managed ponds – target salinities in ponds and time of year these salinities achieved for specific groups of species.

13. (2 essn. later) Determine range of endangered species and the abundance of endangered species within habitats.

14. (2 essn. later) What will happen to tidal flats from restoration? Gather information to model how birds will respond.

15. (1 essn. later) Does wandering shrew (and maybe some other "Goals Report" species) still exist in the South Bay?

16. Wildlife response to scenarios of allocation of wildlife/juxtaposition of ponds to marsh (1/3 to 2/3).

17. Channel characteristics to optimize for target species and community.

18. Cargill operation plan.

19. How do the landfills impact predators?

20. Impact of existing landscape on pond restoration.

21. Model/study researching salt ponds into specific types of marsh.

Specific Decision #2

22. (7 essn. now; 3 essn. later) Lack bird species contribution of bay species to global population. Total population needed to help prioritize.

23. (6 essn. now; 2 essn. later) What are carrying capacities of the various ponds for various target species?

24. (5 essn. now; 3 essn. later) What are characteristics of effective corridors for target species (birds and mammals)?

25. (3 essn. now; 2 essn. later) How will anadromous fish use restored marshes for migration corridors?

26. (3 essn. now) Clapper rail/salt marsh harvest mouse data gap in extreme south bay (and other mammalian, amphibian species)

27. (3 essn. now) Existing conditions: impact on subtidal and establishment of baseline conditions for subtidal habitat.

28. (2 essn. now) What are characteristics of high tide refugia for target species to escape predators (and distance considerations)?

29. (7 essn. later) How do estuarine fish use South Bay habitats?

30. Habitat needs for bird's adequate yielding/reproductive success/dispersal.

Specific Decision #3

31. (5 essn. now; 1 essn. later) How will tidal restoration and sediment movement affect tidal flats?

32. (5 essn. now) Define long-term and short-term impacts of restoration – what are they?

33. (4 essn. now; 1 essn. later) Water movement effecting islands in ponds.

34. (4 essn. now; 1 essn. later) Bird diet/food habit studies on salt ponds and tidal marsh (and seasonality).

35. (4 essn. now) Species interrelationships/interdependency/interlinkages for survival and adaptation to changing habitats.

36. (3 essn now; 4 essn. later) Different species resilience. Ranking species resilience adapting to restoration. Which species find adequate habitat elsewhere?

37. (2 essn. now; 4 essn. later) How will California Gulls (that will be displaced by restoration) affect other (e.g. target) species?

38. (2 essn. now) What are impacts of the interim management?

39. (1 essn. now; 3 essn. later) How will tempo (phasing) of restoration affect target species?

40. (1 essn. now; 1 essn. later) How elevated salinities affect fish migration in the bay (in general).

41. (1 essn. now) Food resources of medium salinity salt ponds – how to maintain this habitat value.

42. (1 essn. later) Displaced wildlife during restoration from salt pond to tidal marsh – shorebirds, diving ducks, gulls.

43. (1 essn. later) Source and sink habitats for endangered species – identifying what are sources and sinks – their causes.

44. Baseline of the proportion of varying salinity ponds.

Specific Decision #4

45. (1 essn. now; 1 essn. later) What species may benefit from invasive species?

46. (2 essn. later) Physical characteristics/changes to slow spread of invasive species.

47. (2 essn. later) Need more information on impacts of invasive species on target species, e.g. pepperweed, salsola.

48. Manipulation of water control and salinities on control of endangered species and tidal range.

49. Assess invade-ability of non-natives/potential new species.

Specific Decision #5

50. (6 essn. now; 2 essn. later) Assess effects of predators on target species (mainly gulls and corvids).

51. (5 essn. now; 1 essn. later) What are characteristics of tidal marsh habitats that minimize predation?

52. (3 essn. now; 1 essn. later) Assess effects of PG&E towers and landfills on California gulls and corvids. (Need to know more about how predators are using manmade structures).

53. (1 essn. now) What is population of striped skunks and what effect will restoration have on their populations?

54. (2 essn. later) What buffer designs/transition designs most protect target species from predators – distance, size.

55. (1 essn. later) Quantify levels of predation that target species can live with and quantify effect of predation on tidal salt marsh species.

56. Which predators are most successful/important/cause most impact to target species?

57. How effective are large-scale trapping efforts in protecting target species?

Specific Decision #6

58. How will wildlife respond to Cargill's salt managed ponds?

59. What will be the conditions to Cargill's new Corps permit with respect to mitigating wildlife impacts?

60. How many Cargill ponds will be batch ponds, managed for salt ponds, etc.

61. Economic projections – How long will salt production by Cargill in South Bay be a viable operation?

Specific Decision #7

62. (6 essn. now; 1 essn. later) What are successful models/marsh restorations that have not increased mosquito population?

63. (1 essn. now; 1 essn. later) Water control structures: appropriate design and long term sustainability of mosquito control.

64. Impact of mosquito control programs on other species.

65. Effects of mosquitoes on other wildlife (non-human).

66. Long-term management plans for water discharge into Bay.

67. Reuse of water; effect on groundwater – change on chemistry and surface.

New Specific Decision #8 (Long-term impacts of human use)

68. (2 essn. now; 4 essn. later) Response distances of target wildlife to human disturbance.

69. Are there site differences?

70. Are there differences between breeding areas versus feeding areas, or other life history parameters?

New Specific Decision #9 (How to account for water discharges in South Bay)

71. (3 essn. later) Need large-scale study on influx of freshwater into South Bay (growth of freshwaters species), effects on wildlife species (existing study limited to vegetation effects).

72. (1 essn. later) Assess which design features would decrease likelihood for botulism outbreaks.

73. Salinity gradients in creeks and sloughs (baseline) also seasonal and rainfall year variation.

74. Effects of other smaller scale dischargers (other than San Jose), e.g. stormwater, new projects that may be having local effects.

Miscellaneous Data Gaps

75. (7 essn. now; 6 essn. later) Ongoing baseline monitoring of organisms in the Bay – long-term monitoring.

76. (3 essn. now) Across 15,000 acres for salt pond restoration – establish which kinds of vegetation currently exist.

77. (1 essn. now) Population trends for target species and predators.

78. (2 essn. later) Mapping of tidal channels/vegetation ecoatlas, detailed through South Bay.

79. (1 essn. later) Effect on reproductive success of public access.

B. Physical Processes Break-Out Session

1. Specific Decisions

Original Text

Specific Decision #8. Determine the need for imported sediment for tidal restoration areas, if any, taking into account sea level rise, sediment supply and dynamics, subsidence, other projects in Bay. Determine potential sources of imported sediment, if imported sediment is required.

Specific Decision #9. Determine the impacts of tidal restoration be on hydrodynamics, geomorphology, and water quality of San Francisco Bay (including potential loss of mudflats, increased velocity, impacts on navigation, infrastructure, increased residence time), and how adverse impacts can be minimized.

Specific Decision #10. Determine which model(s) will be used to evaluate hydrodynamic and geomorphologic changes.

Specific Decision #11: Determine which levees will need improvements.

Specific Decision #12: Determine how the project will be integrated with flood management plans for creeks and rivers in the South Bay to achieve win-win situations.

Specific Decision #13: Determine whether and where are new levees required.

Specific Decision #14: Determine infrastructure constraints, and how these constraints will be addressed.

Discussion on Specific Decisions #8 and #9 (now #10 and #11)

1. Make a distinction between: how much sediment is needed (sediment deficit determination) and whether imported sediment is needed (import material analysis)

2. Incorporate idea of phasing of restoration – time related to sediment needs.

3. Specific Decision #9 – Need to analyze impacts to mudflats, erosion/mining for tidal restoration of ponds, loss of mudflats as ponds are restored. Decision 8 should follow 9; 8 (need for import material) could go away once 9 (sediment supply) is analyzed. Sediment deficit may not exist.

4. Need to determine expectations of tidal marsh restoration under different scenarios – natural sedimentation, imported sediment, combination, various configurations.

5. Dredge material constraints – movement of materials, depth of Bay/access for ships.

6. Significance of inorganic sediments – there are different contributions to elevation rise of organic versus inorganic sediments.

7. Basic question – how big are holes (ponds), what will happen to holes when you breach. Refer to BREACH study by CALFED.

8. Analyze redirected impacts of breaching. Decision on geomorphic goals and objectives – iterative process.

9. Need for flexibility – sediment supply changes over time, there are different estimates for sea level rise. Nature can throw a curve ball. Need adaptive management.

10. Subquestion of #9 – Impacts on currents, tidal datums – energy absorption around bay (as marshes restored) of waves.

11. Cost-Benefit Analyses:
    - Speed of restoration to tidal marsh vs. cost of importing sediment.
    - Sub-factor: cost of pond maintenance versus cost of dredge material – economic analysis.

12. Additional Specific Decision needed to deal with managed pond enhancement and engineering required.

Discussion on Specific Decision #10 (now #13)

1. Major questions for modeling: design of our project; impacts on others. Need modeling for Restoration Plan and EIR/EIS – habitat evolution estimates and analyses of impacts on Bay.

2. Choice of models extends throughout project. Need to determine what aspects of hydrology/geomorphology you are interested in. Establish modeling protocol versus selecting models: boundary conditions (extend around SFO), time periods (20? years), large scale vs. small scale, hydrological/geomorphological. Identify needs for different grid sizes in different areas. Keep in mind that there will be changes in modeling capabilities over 5 year planning period (computing times, etc.)

3. Decision on model to use and data needed for model is iterative based on accuracy desired at decision points. You can spend a lot of money up front, but need to know objective of modeling. Alternative analysis – perhaps use 1D or 2D models, Design – perhaps use 3D. Modeling is iterative process. Do coarser modeling with conceptual alternatives and then spend money on 3D. Most of South Bay you could use 2D, but in sloughs (which are stratified) you need 3D. There will never be enough data for a calibrated/validated 3D model of entire South Bay. Need 3D modeling for treatment plant inputs and need to ties in their operations to modeling exercise, in order to

analyze residence time. Perhaps 1D model for tidal habitat alternatives and more detailed modeling for impacts to Bay outside the ponds. The model you choose depends upon need. Get modelers together to pick protocol. (Ideas for subcommittee of Technical Committee – Modeling Group; Physical Processes; Constructability; Empirical Examples).

4. Goals Report used a historical approach to develop goals, objectives, recommendations for restoration. Need to model to determine what Bay system is capable of supporting.

5. You need objectives in order to determine modeling needs – need to know habitat goals, impacts. There are however, givens (data) that no matter what objectives/scenarios/alternatives are developed are going to be needed.

6. Data collection for modeling: Phase data collection for modeling needs (iterative process). Data difficult to collect in the Bay (time and cost). Don't deploy expensive equipment during duck hunting season!

7. SFO example – now on 4th generation of modeling. 1st – coarse analysis of alternatives; next set of objectives/goals; more refined modeling; for EIS – refined, plus other impacts analyses.

8. Importance of actual habitat and wildlife use over physical objectives.

9. Key Data Gap – What happens when a levee gets breached? Delta, BREACH studies. How well do we know what happens? There are uncertainty, variables. What can you measure and predict? Performance criteria.

10. Modeling is iterative – even before a highly calibrated model, you can start on early alternatives. Modeling can help communicate what can work/can't work.

11. Modeling selection criteria – step back from any particular model and ask what is best for project. 1) objectives then 2) what model to use. Good graphical interface for presentations should be considered. SFO used 7 different models, some without good graphic interface.

12. Determine connection between initial stewardship and long-term restoration planning modeling. e.g. flushing time south of Dumbarton – Initial stewardship modeling.

Discussion on Specific Decisions #11, 12, 13, and 14 (now #14, 15, and 16)

1. Levees not the only question. Also when and where do we need water control structures?

2. Variations over years – El Ninos, etc.

3. Big infrastructure questions:
   - water management in ponds
   - City of San Jose – pollution control plants

Revised Text

Specific Decision #10. In an iterative manner, 1) determine if there is a sediment deficit by determining the sediment supply in the South Bay (taking into account sea level rise, sediment supply and dynamics, subsidence, and other projects in Bay); 2) determine how much sediment is needed for each restoration alternative in order to meet the project goals and objectives (habitat evolution, mix of tidal habitats, phasing of tidal restoration), and 3) determine the need for imported sediment for tidal restoration areas, if any. Determine potential sources and feasibility of importing sediment, if required. Conduct a cost-benefit analysis of speed of restoration (evolution rates to tidal marsh of individual ponds and phasing of tidal restoration over entire project area) versus costs of importing sediment, also taking into account the cost of on-going pond management versus sediment import.

Specific Decision #11: Determine the impacts of tidal restoration on hydrodynamics, geomorphology, and water quality of San Francisco Bay (including potential loss of mudflats, impacts on sediment budget, impacts to other projects in the Bay, increased velocity and scour, changes to currents and tides, impacts on navigation, impacts on infrastructure, increased residence time), and how adverse impacts can be minimized.

Specific Decision #12. Determine how enhanced ponds will be managed to meet project goals and objectives for managed pond habitat, including the engineering requirements of managed ponds, and how water will be circulated through managed ponds.

Specific Decision #13. To evaluate Specific Decisions 8, 9, and 10 (and other specific decisions), determine the modeling framework or protocol that will be used to evaluate alternatives for pond management and tidal restoration (and associated hydrodynamic and geomorphologic changes to the Bay) and establish an ongoing/iterative approach to modeling in connection with decision-making. Determine the goals and objectives for modeling over the planning, construction, and monitoring and adaptive management period, the decisions that will be addressed by modeling, and the required accuracy and breadth of modeling (such as processes and grid sizes) required at various decision points. Determine how physical models will be integrated with other models, such as habitat models.

Specific Decision #14. Determine which levees will need improvements, whether and where new levees are required, and whether and where other new infrastructure, such as water control structures, are required, in order to manage ponds and protect South Bay communities from tidal flooding.

Specific Decision #15. Determine how the project will be integrated with flood management plans for creeks and rivers in the South Bay to achieve win-win situations.

Specific Decision #16. Determine infrastructure constraints, and how these constraints will be addressed.

2. Data Gaps

Overall Thoughts

1. Modeling will identify physical processes that need to be studied. We should run with what we have. First results – feed back to what we data we need to collect. Could identify all desired data now, but some may turn out to be not so important.

2. Two overall sets of data: 1) supplemental data (processes known) and 2) Data beneficial to a greater understanding of the Bay.

3. Data Management Need – get core data sets, historical date, collected data all in one place. GIS component, QC component necessary.

Data Gaps *(designated as ongoing data collection and/or one-time data collection)*

Bathymetry and Topography

1. ONE-TIME - Bathymetry – who has it and how good is it?
   - Pond Bottoms
   - Bay and Sloughs
   - Borrow Ditches
   - Relict Channels – Mapping of historic channels, need detailed bathymetry
     - Mapping of historic slough channels; along with current aerial photos or LIDAR, and bathymetry measurements at a few points.
     - Do historic channels meet goals for habitat restoration?

2. ONE-TIME - Topography – LIDAR available for entire South Bay (needs to be purchased)
   - levees
   - landside of levees and ponds

3. ONE-TIME - Levee Condition

Hydrology, Suspended Sediment, Bed Sediment Data

4. Tidal Information/Datum – look at other data – geographic coverage?

5. ONGOING - Hydrology Data

- Port of Redwood City gage.
- Stage Data - Water Levels in Sloughs: phase, timing, enough to tie into Port of Redwood City's gage.
- Flow Date – Guadalupe (gage at tide limit and new gage at 101), Coyote (gage at tide limit –funding endangered), San Francisquito (gage at golf course), Charleston, Alameda, Stevens. Short Term gages?
- Current data for calibration
- Slough Areas – time series lacking in Alviso, Guadalupe, Coyote, Alameda Flood Control Channel.

6. ONGOING - Suspended Sediment Data – 1 gage at San Mateo Bridge/channel. Gage needed South of Dumbarton. Other locations for gages?
   - Need hydrologic and sediment data in sloughs

7. ONE-TIME/ONGOING - Bed sediment characteristics in salt ponds, sloughs.
   - Cores - flocculation characteristics, shear stress, geotechnical, organic content, grain size; Temporal characteristics also.
   - Lessons from A4:
     - Sediment more coarse than anticipated, accretion less than anticipated

Other Physical Data

8. ONGOING - Precipitation Data

9. ONGOING - Evaporation Data

10. ONE-TIME - History of upland/watershed changes.

11. ONE-TIME/ONGOING – Groundwater Pumping and Subsidence Rates – USGS studies.

12. Wind Data – historical Data analysis; synthesis of data – summary data available.

13. ONGOING - Wave Date – effects on erosion; habitat evolution

14. ONE-TIME – Salt "crust" or gypsum precipitate – investigate along with bed sediment characteristics. Importance linked to elevation of ponds (low elevation will allow for sediment over crust. Is there an affect on sedimentation?

15. ONGOING - Sea Level Rise (historical data and analysis exercise – see AGU publication).

16. ONE-TIME – Accumulation of woody debris/trash, particularly on East Bay side.

17. ONGOING/ONE-TIME - Seasonal Pond Restoration Information: infiltration, shallow groundwater, soil characteristics (grain size), water source.

18. ONGOING - Boundary Conditions
    - Discharge/Flow Rates
    - Sediment Loads
    - Salinity, Sediment, Sediment flux (which bridge is ocean side of boundary?)
    - Geometry – bathymetries
    - Data for calibration/validation of models
    - Sloughs – suspended sediment, salinity, flux, velocity, etc.

Study of Empirical Examples, Historical Changes

19. ONGOING – Reference site work – compile existing and new information on nearby projects.

20. ONE-TIME - Geomorphic evolution of Bay: vegetation algorithms, sedimentation processes, hindcasting geomorphic changes to sloughs over last 10 years and determining accuracy of predictions; hindcasting shoreline evolution.

21. ONGOING – How have topography and bathymetry change. How have existing tidal systems changed over time; apply to project area.

22. Physical site changes over time/fish and wildlife use changes – pin down sedimentary parameters.

23. ONGOING - Interaction of fish and wildlife and morphology important – temporal, seasonal, climate. Distribution of fish and wildlife, and plants that would affect physical (spatial and temporal).

24. ONGOING - Go back to empirical examples in various stages of evolution and establishment. Sites we need to learn from/revisit. PWA's Tidal Wetlands Handbook (in progress), SFEI map of wetlands restoration projects. Give this equal weight to modeling. Look at slough scour, vegetation establishment. Sedimentation rates on fringe marshes – information to predict habitat evolution. Data from Eden Landing, initial stewardship monitoring. Look at other projects: NY Harbor, Everglades, PSE&G in New Jersey/Delaware

Existing Conditions

25. Characterize existing conditions – monitoring.

Infrastructure

26. ONGOING/ONE-TIME - Need to determine locations of freshwater inputs and amounts. Understanding of outfall from pollution control plants – salinity, water quality, temperature. Get historic data also.

27. ONE-TIME - Infrastructure list for project area. Storm Drains of cities and counties. SCVWD, Alameda. NASA/Moffett Field – evaporation ponds.

C. Water Quality/Contaminants Break-Out Session

1. Specific Decisions

Original Text

Specific Decision #15. Determine steps to be implemented to minimize mercury methylation and its effects on wildlife and humans. Identify the areas, if any, that require design adaptations due to elevated mercury levels.

Specific Decision #16. Determine how other contaminants and water quality issues will be addressed.

Specific Decision #15—no change
Specific Decision #16—change:
Determine how other contaminants (in water and sediment) will be addressed.
See notes in #3 Other Comments/Information below.

Revised Text

Specific Decision #17. Determine steps to be implemented to minimize mercury methylation and its effects on wildlife and humans. Identify the areas, if any, that require design adaptations due to elevated mercury levels.

Specific Decision #18. Determine how other contaminants (in water and sediment) will be addressed.

Specific Decision #19. Determine the effects of nutrients, nutrient loads, and nutrient cycling on the restoration effort (in both managed ponds and tidal areas), and define approaches to minimize risks of eutrophication.

Specific Decision #20. Determine the effects of salinity on other contaminants and water quality parameters, and how salinity ranges should be defined to optimize water quality in the project area.

2. Data Gaps *(grouped into Tiers #1, 2, and 3 based upon votes)*

1. #1 - Physical distribution of Hg in ponds and adjacent marshes (special and temporal, and relative to pond history). [vote: 8 essential now/0 essential later]
    - *Pond history/mercury correlation could act as predictive tool*

2. #1 - Hg distribution in fish and wildlife. [9/0]

3. #1 - Effects of various physical and chemical factors, including salinity, on mercury cycling (especially sulfide production). [7/0]

4. #1 - Effect of restoration on mercury transport (export/sequestering as a result of landscape changes) [0/10]

5. #2 - Mercury cycling in existing South Bay Marshes [6/0]

6. #2 - Mercury cycling in "subhabitats" within marshes [6/1]
   - *Need to identify if these are methylation hot spots*

7. #2 (later) Preferred characteristics for imported sediment/cover sediment to foster vegetation growth (type of soil, nutrient and carbon content, etc.) [0/6]

8. #3 - Effects of nutrient load/cycling on wetlands vegetation communities [3/4]
   - *Small changes in nutrient availability could change the types of vegetation present (e.g., native vs. invasive Spartina) and the rate of vegetation development. Tidal salt marshes are typically nitrogen limited.*

9. #3 - Effect of nutrient load/cycling on phytoplankton/bacterial communities [3/4]

10. #3 - Possible data gap: distribution of contaminants in areas where scour (sp?) may occur (channels, sloughs, mudflats, etc.) [not voted]
    - *Will be determined after literature review of hot spots. Hot spots will be overlaid on preliminary restoration alternatives/concepts and modeling results to assess need for additional chemical/contaminant data.*

11. #3 - Possible data gap: contaminant cycling for other contaminants other than Hg. [not voted]
    - *Literature review needs to be conducted to assess potential concerns associated with other contaminants, including threshold concentrations, effects, and cycling processes.*

12. Reactivity of various sources of mercury (e.g., atmospheric deposition vs. various historical sources). [0/1]

13. Effects of turbidity on nutrient cycling/eutroplication [0/1]

3. Other Comments/Information

1. Any samples collected for mercury/methyl mercury analysis should be archived (frozen) so they could be analyzed for other constituents (Se, As, PCB's, DDT, etc.) later, if necessary.

2. Existing mercury data needs to be compiled and mapped before it can be determined whether additional data on the physical distribution of mercury is required.

3. A decision needs to be made about the relative importance of contaminant trapping/filtering/transformation as a project objective, relative to other project objectives.

4. Sulfide production in ponds can lead to odor problems and is a key factor in mercury cycling. A literature review on sulfide production should be conducted, and sulfide production in ponds should be investigated as part of physical/chemical effects on mercury cycling (data gap 6).

5. The required rate of water circulation to prevent eutroplication (sp?) needs to be determined. This should include a literature review and modeling/engineering analysis (to determine feasibility circulation rates). This information should be developed as part of the interim management monitoring/design effort because it is also required for that phase.

6. "Interim Management" may occur for decades in some ponds and should not be seen as a short-term activity.

7. Linkages to other issues/subject areas need to be clarified, and someone needs to verify that potential concerns/data gaps associated with these linkages are being addressed. Linkages include:
    a. Suspended sediment, movement of contaminated sediment and cycling of nutrients (physical process)
    b. Flood control/run off of contaminated sediment (physical process)
    c. Stormwater cleanup/contaminant load to project
    d. TMDLs/changes to contaminant load to Bay/project
    e. Guadalupe River TMDL/contaminant load to Alviso Slough
    f. Water residence times in newly opened tidal areas and managed ponds/effect on nutrient cycling and water quality
    g. Salinity required for habitat functions/effects on contaminant cycling. eutrophication (sp?) and vegetation

8. The mercury TMDL development should be tracked for its effects on the restoration planning.

9. Available data on mercury in wildlife should be mapped for the project area (include # of samples, etc.)

10. Mercury effects may be less based on total mercury in the system than mercury cycling rates (methylation/demethylation).

11. The main question is what drives mercury bio-availability in the South Bay?

12. How do we best monitor for mercury in wildlife (e.g. top or bottom of food chain, which species, etc.).

13. RWQCB is concerned that existing hyper-saline conditions may have sequestered mercury (and other metals/contaminants) that would be released as salinities are reduced.

14. When considering potential concerns with other contaminants in the South Bay, look at the 303 (d) list for the South Bay first (since these have already been determined to be of concern based on other agencies' findings).

15. Can soil amendments be added to sediment/restoration areas to enhance productivity?

16. Potential effects of nutrients should be examined for worst case situations (e.g., September), not "average" conditions.

17. Consider studying nutrient cycling in breathing marshes (for baseline data).

18. Consider monitoring phytoplankton, especially "nasty" species, relative to nutrient loads/cycling.

19. Can salinity in managed ponds be used as an indicator for other water quality parameters such as DO, BOD, etc. (i.e., is there sufficient correlation to flow rate and freshwater inputs)?

20. How much (if at all) does salinity protect against eutrophication, and what are the effective salinity ranges?