South Bay Salt Pond Restoration Project

Initial Opportunities & Constraints Issues: Flood Management

May 25, 2004

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Project Context

- Goal and Objectives
- Existing Conditions (ongoing assessment)
- Opportunities and Constraints for flood issues (initial discussion)
- Restoration Alternatives:

Flood opps and constraints will be integrated with restoration alternatives

Types of Flooding

- Coastal flooding: high tides, waves, storm surge
- Fluvial flooding: large rainstorms
- Joint coastal/fluvial: winter rainstorms concurrent with high tides

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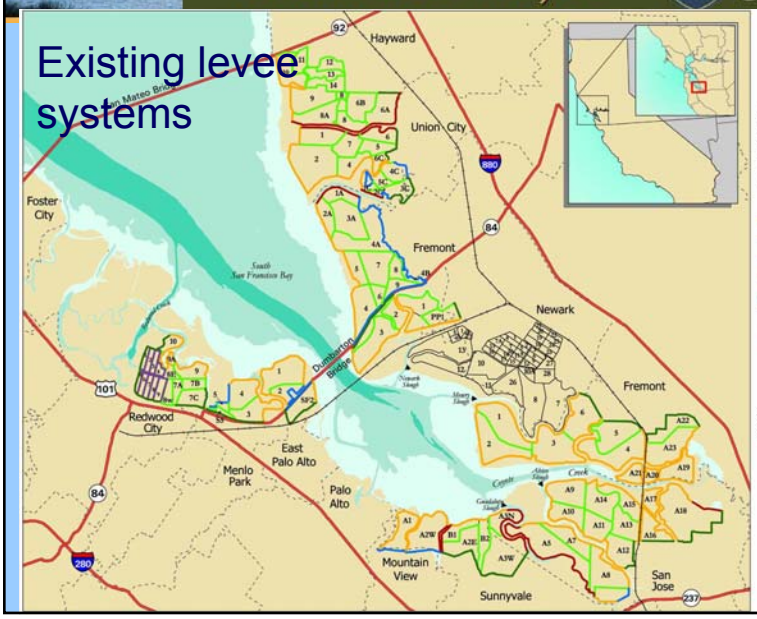
Existing levee systems



Map 11, Existing Levees and Berms in the South Bay Salt Ponds

This map shows the existing levees and berms that enclose the salt ponds. External levees are the primary means of flood protection today. Tidal restoration may require improving levees along the upland boundary that are identified here as "upland edge that depends on external salt pond berms for flood control."

Legend

- High Ground (no need for flood protection) (13 miles)
- External Salt Pond Flood Control Levee (80 miles)
- Internal Salt Pond Berm (offers no flood protection) (76 miles)
- Upland Edge that Depends on External Salt Pond Levees for Flood Control (21 miles)
- Publicly Maintained Flood Control Levee (17 miles)
- No Data for Levees/Berms (26 miles)
- City Boundaries
- Highways
- Railroad

Note:
Data are from Wildlands (1999) and have not been verified. No data are provided for a portion of Newark #2 plant as this area was excluded from the Wildlands analysis.

0 1,000 2,000 4,000 Meters
0 1 2 4 Miles

Data Sources: EcoAtlas, Cargill, USGS
Map Projection: CA Stateplane III, NAD83
Map Version 1.14 | Produced on: 04/24/01

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Existing levee systems: Outboard Levee erosion

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Existing levee systems: Outboard Levee with “stringer marsh”

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Existing levee systems: Inboard Levee erosion

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Flood Hazards: Severity and Mapping

- FEMA mapping of flood hazard zones: follows strict FEMA assessment criteria. Does not include facilities (levees) not designed to FEMA standards
- Actual flood hazards: results from the complex interaction of numerous levees, ponds in addition to engineered facilities.

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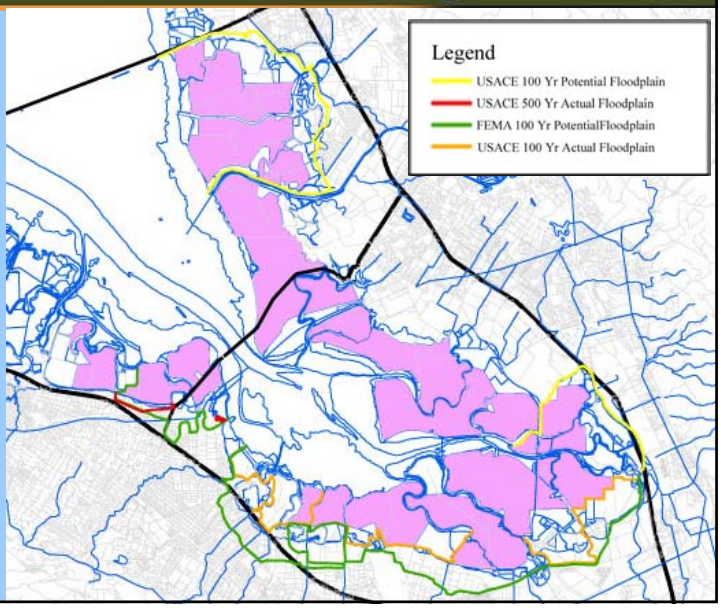
Areas of mapped coastal flooding



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Fluvial Flooding

- Open channels (Alameda Creek, Guadalupe River etc.)
- Storm drain outfalls (pump station outfalls and gravity systems

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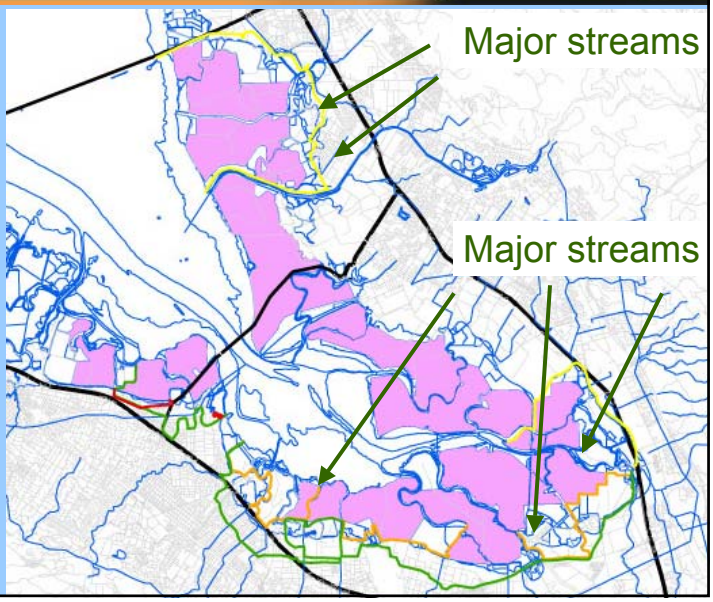
Sources of fluvial flooding: streams



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Existing flood control channels:
-levees
-sedimentation

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Pump Station and storm drain outfalls

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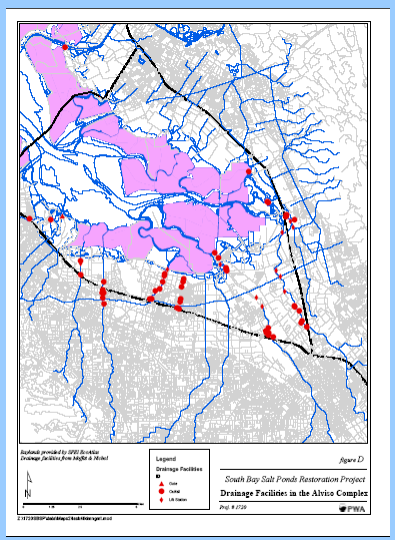
Drainage Facilities



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Key Opportunities: overview

- Maintain or improve existing levels of flood protection
- Build on the existing system of flood defense
- Improve coordination of flood management activities (all land will be in public ownership)
- Provide a more consistent level of engineered flood protection

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Key Opportunities: Fluvial

- Increase channel flow capacity through the SBSP: setback or remove levees
- Increase channel cross-section: If we increase channel flow from the restored wetlands, the additional flow will increase channel size by scouring.
- These will reduce the need for ongoing dredging.
- Opportunity to add additional channel connections to the bay if necessary.

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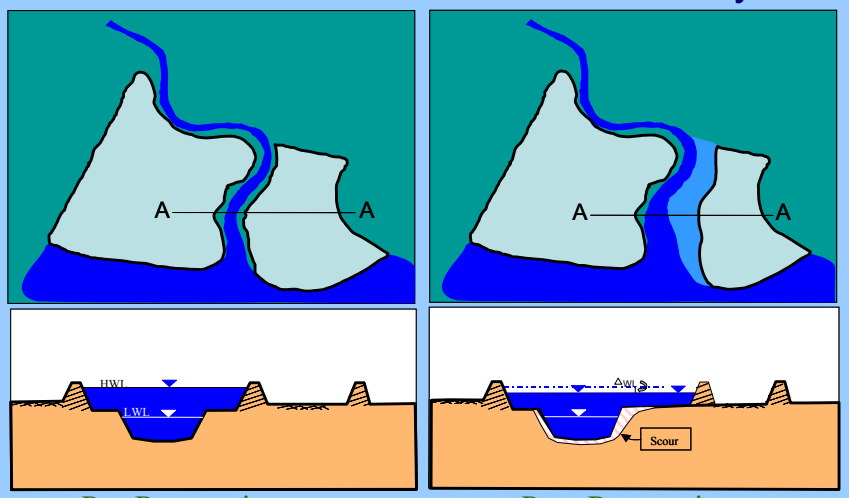
Use tidal scour to increase flood conveyance



Pre-Restoration Post-Restoration

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Key Opportunities: Coastal Flooding

- Identify and plan a consistent, linked and coordinated coastal flood management system
- Design this to the specific local hazards in the South Bay
- Provide a program of levee monitoring and maintenance
- Maintain or reduce the inland areas subject to flood hazards.
- Use the restored wetlands to act as wave buffers to reduce the threat/maintenance of the flood levees.

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Key Constraints

- Existing flood hazards must not be increased, both for actual flood hazards, and FEMA mapped flood zones.
- The function of infrastructure (PG&E facilities, storm drain, pump station and sewage treatment outfalls, pipelines etc) within and adjacent to the project site must be maintained.
- Restoration of ponds to tidal marsh brings the Bay closer to the land edge. The flood management system must provide adequate protection for this.
- The flood management plan must address existing flood hazards, but also look to the future (be flexible/adaptable to changing sea level, sediment supply, etc.)

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Key Constraints

- The existing flood management programs were developed based on many years of experience. In a complex system, it is important to implement changes carefully, with input from local experts.
- The plan must recognize significant local and regional differences in flood hazards and existing pond conditions (for example: extreme subsidence in the Alviso area; more severe wave climate in the Baumberg area, proximity of major roadways in West Bay ponds, etc)

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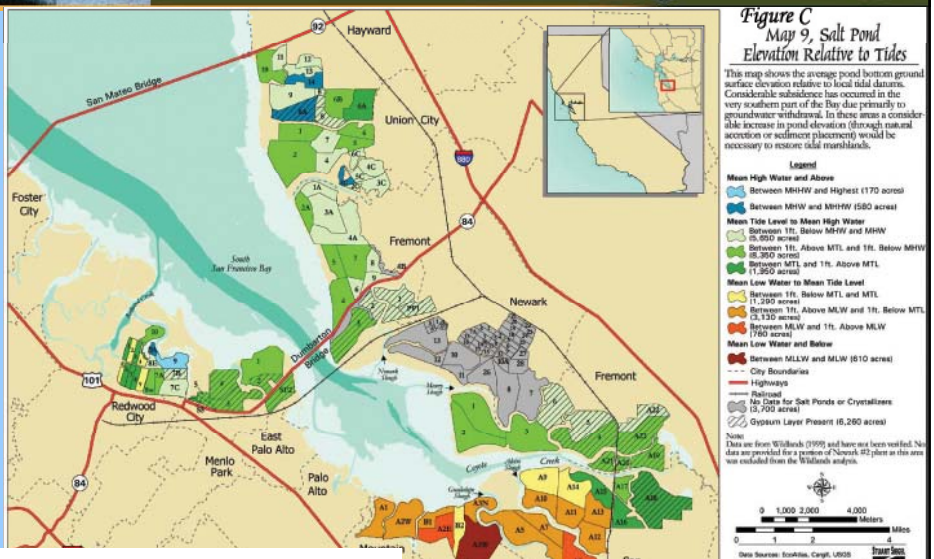

Existing Pond Elevations

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Key Constraints (con't)

- The flood construction and management system must be cost effective to build and maintain.
- There must be clarity regarding responsibility for construction, monitoring and maintenance of all flood facilities.
- The flood plan must be integrated with other SBSP objectives (habitat), recreation, access, adjacent land use planning, and applicable regulations