

Development of Alternatives



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Development of Alternatives

- ◆ **Review of Previous Efforts**
- ◆ **Issues Considered**
- ◆ **Proposed Approach**
- ◆ **Basic Assumptions**
- ◆ **Step-by-Step Process**
- ◆ **Examples of Alternative Layouts**

Review of Previous Efforts

- ◆ **Reviewed more than 250 alternatives and categorized into 27 groups of alternatives**
- ◆ **Basic criteria**
 - ☒ Maintained Salton Sea for agricultural discharge
 - ☒ Consistent with all legislation and regulation
 - ☒ Reliable technology
- ◆ **Consolidated further into sub-alternatives**
- ◆ **Need to develop consistent level of detail prior to further screening**
 - ☒ Water quality, habitat, and air quality
- ◆ **Therefore, developed a large range of sub-alternatives for the Feasibility Study**

Issues Considered for Development of Alternatives

- ◆ **Previous studies have focused on:**
 - ☒ Location and size of open-water Salton Sea
 - ☒ Salinity of Salton Sea
 - ☒ Habitat improvements
- ◆ **Recent regulatory and legislative actions have required the need to address other issues:**
 - ☒ Air quality management
 - ☒ Water quality - nutrients and selenium
 - ☒ In areas with "wetting-drying" cycles
 - ☒ In the deep water of the Salton Sea

Proposed Approach for Development of Alternatives

◆ Identification of overall water infrastructure facilities

- ☒ Location and size of Salton Sea open water

◆ Addition of other facilities

- ☒ Water treatment - nutrients and selenium
- ☒ Habitat - estuarine, open water, shoreline, fresh and saline marsh, upland
- ☒ Air quality management

◆ Considerations for economic development and recreation

Basic Assumptions for Development of Alternatives

◆ Water Infrastructure

- ☒ Maintain water elevation at -230 feet MSL
- ☒ Maintain salinity at 35,000 mg/L
 - ☒ Should we consider alternative with lower salinity?

◆ Water Treatment - Natural and Mechanical

- ☒ Reduce nutrients
 - ☒ Prevent fish and bird kills and reduce odors
 - ☒ Need to remove prior to selenium treatment
- ☒ Reduce selenium
- ☒ Initially treat all of inflows
 - ☒ Sub-alternatives without Water Treatment to accommodate potential upstream actions

Basic Assumptions - continued

◆ **Habitat**

- ☒ Provide for diversity and sustainability

◆ **Air Quality**

- ☒ Initial approach assumes emissions from all exposed areas (ie, not covered by other facilities, habitat, or water)
- ☒ Conservative assumption that all exposed area will be covered or managed

◆ **Assume all facilities placed in Salton Sea footprint to reduce air quality issues**

- ☒ Should we consider other locations?

Development of Alternatives using a Step-by-Step Process

◆ **Step 1 - Identify Larger Alternative Concepts**

- ☒ North Lake
- ☒ South Lake
- ☒ Concentric Circle/Circles
- ☒ Combine North Lake/Concentric Circle
- ☒ Evolving Sea
- ☒ Connection to Gulf of California
- ☒ No Action Alternative

Development of Alternatives - continued

◆ **Step 2 - Develop range of sub-alternatives**

- ☒ Determine basic surface area for Salton Sea and Brine Pond (ie, Evaporation Pond)
- ☒ Develop basic surface area for water treatment
 - ☒ Approximately 40,000 acres for natural treatment to remove nutrients and selenium (about 64 square miles)
 - ☒ Developing sizing for mechanical treatment
- ☒ Develop range of surface areas for habitats
- ☒ Identify remaining exposed surface area - and develop range of air quality management actions

Development of Alternatives - continued

◆ **Step 3 - Conduct Water Balance for Each Alternative by considering:**

- ☒ Evaporation from open water (including canals) or water on soils
- ☒ Evapo-transpiration of facilities
 - ☒ Natural treatment, habitat, and air quality management
- ☒ Water losses in mechanical treatment plants
 - ☒ Biosolids
 - ☒ Evaporation from process units

Development of Alternatives - continued

- ◆ **Step 4 - Develop specific design criteria and layouts for each facility**

Example of Design Layout for Air Quality Management

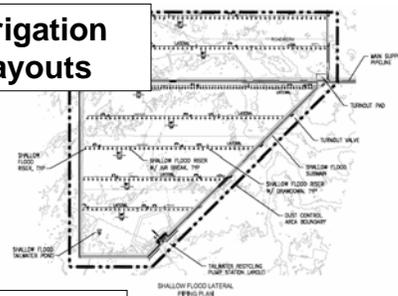
Saltgrass cover



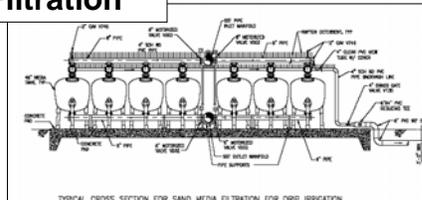
Salt-tolerant desert shrub cover



Irrigation Layouts



Filtration



Development of Alternatives - continued

◆ **Step 5 - Develop preliminary design layouts and cost estimates for all sub-alternatives**

- ☒ Facility locations and sizes
- ☒ Hydraulic grade lines
- ☒ Addition of pipelines, pumps, treatment, and other facilities
- ☒ Vegetation and aquatic plantings

◆ **Step 6 - Describe and compare the sub-alternatives in the Feasibility Study**

Example of Sub-Alternatives - Initial Layouts

- ◆ **No Action Alternative**
- ◆ **North Lake**
- ◆ **Concentric Circle**
- ◆ **Evolving Sea**