

# SSWIFT Concept for Restoration of the Salton Sea



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## What is SSWIFT?

A new strategy to avoid a looming environmental disaster:

**SS** Salton Sea Authority Plan recognizes and works with

**W** limited Water

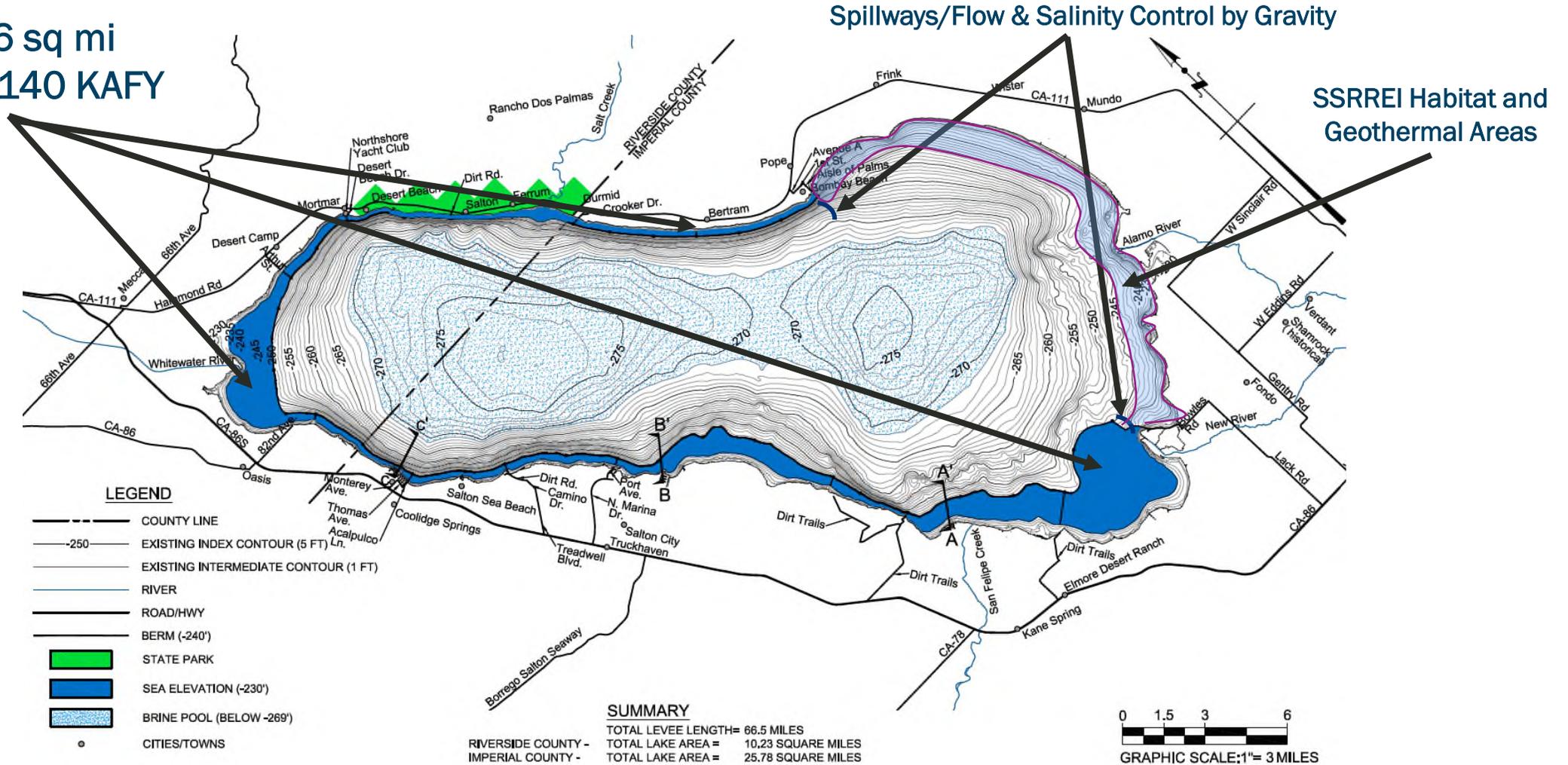
**IF** Incremental Funding

**T** limited Time

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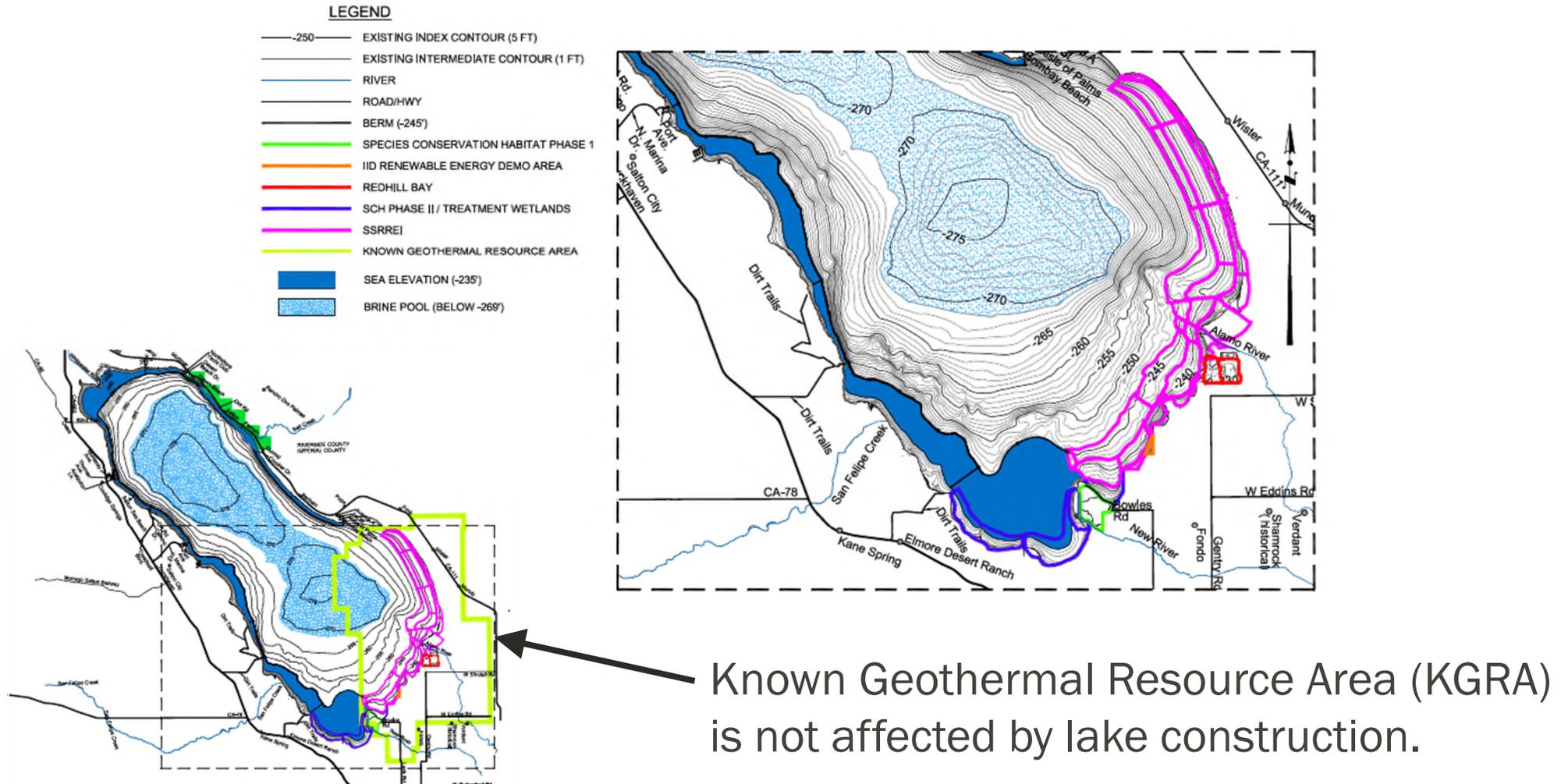
# SSWIFT Lake Concept: Water Surface at -235' NGVD (Levee at -245')

Lake area: 36 sq mi  
Inflow req'd: 140 KAFY



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# SSWIFT Lake with SSRREI & SCH

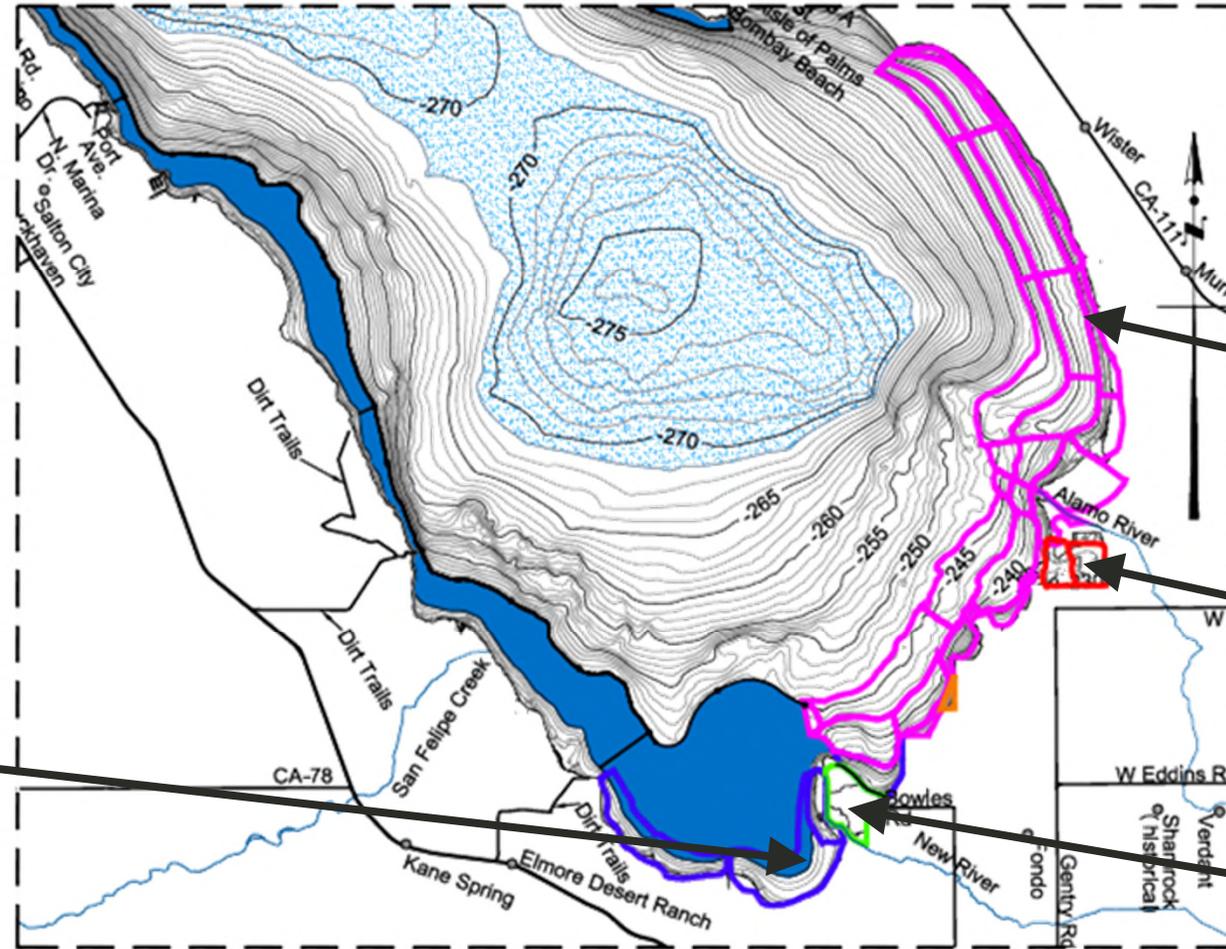


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# SSWIFT Lake with SSRREI & SCH

## LEGEND

- -250 — EXISTING INDEX CONTOUR (5 FT)
- — — EXISTING INTERMEDIATE CONTOUR (1 FT)
- RIVER
- ROAD/HWY
- BERM (-245')
- SPECIES CONSERVATION HABITAT PHASE 1
- IID RENEWABLE ENERGY DEMO AREA
- REDHILL BAY
- SCH PHASE II / TREATMENT WETLANDS
- SSRREI
- SEA ELEVATION (-235')
- BRINE POOL (BELOW -269')



SSRREI  
Habitat  
Areas

Redhill Bay

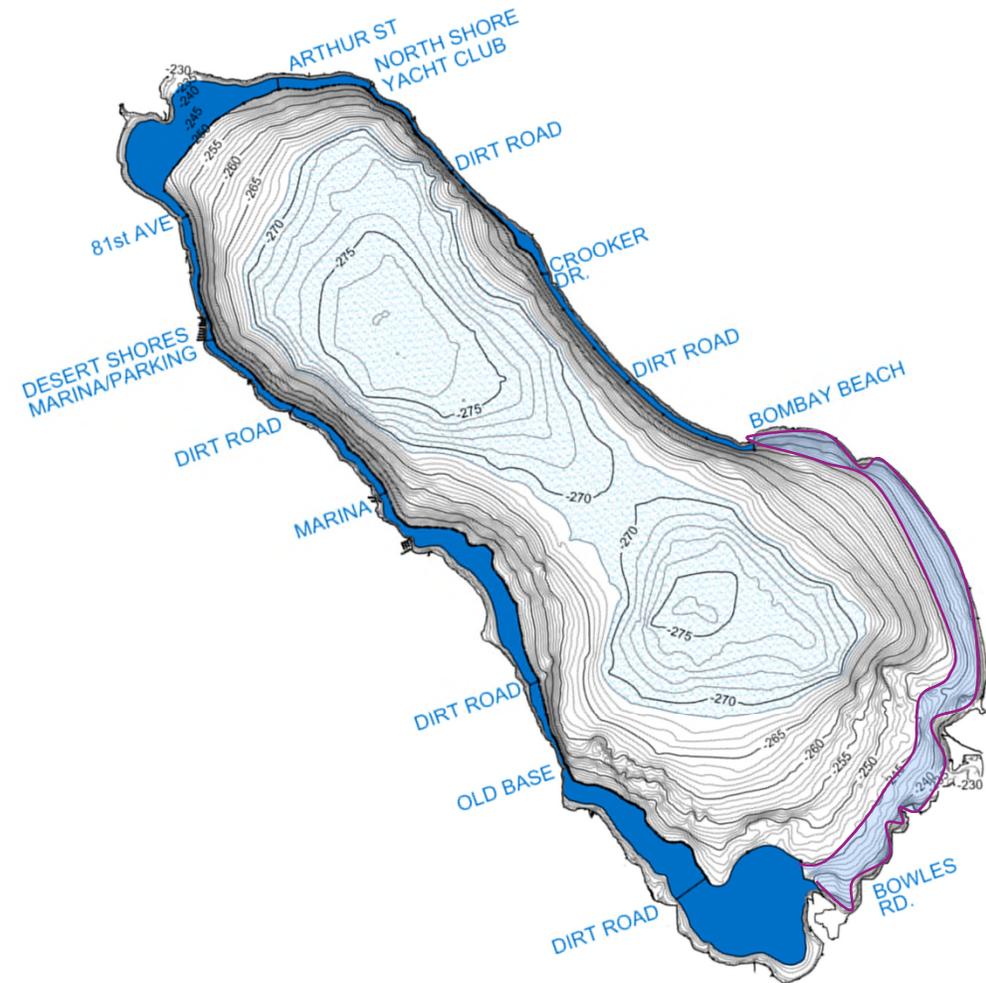
SCH

Possible location of  
treatment wetlands in  
SCH expansion area

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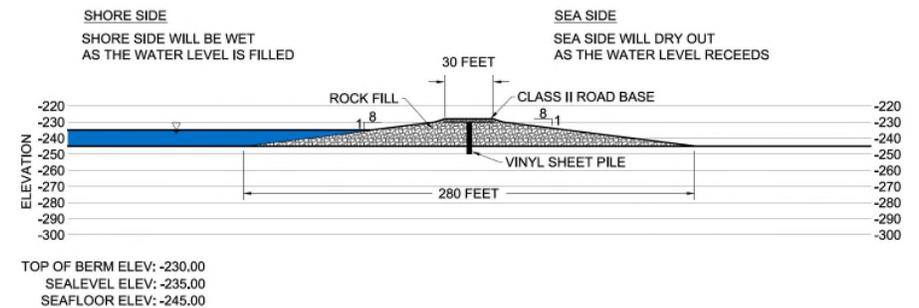
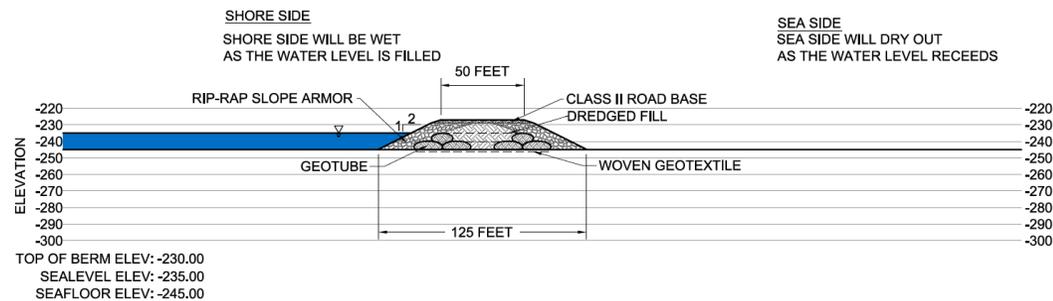
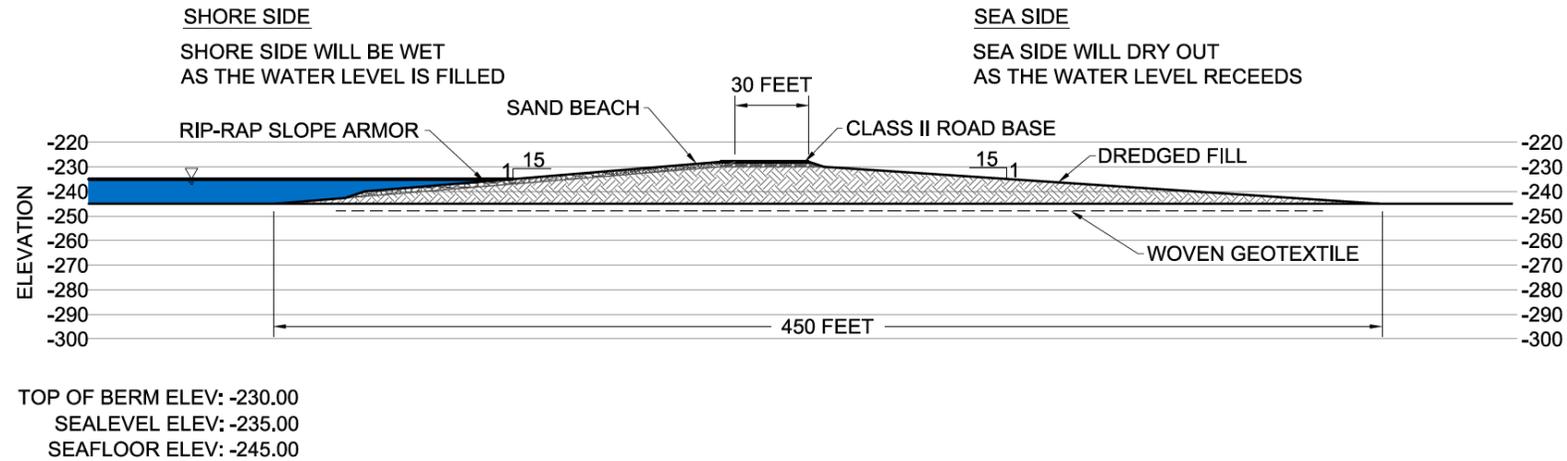
# Levee Plan with SSRREI

- Total levee length: ~65 mi
- Total lake area: 36 sq mi
  - Riverside County: 10 sq mi
  - Imperial County: 26 sq mi
- Total of 12 spur levees that connect to existing roads
- Annual evaporation (Inflow requirement): 140,000 AFY



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# Three Conceptual Levee Configurations



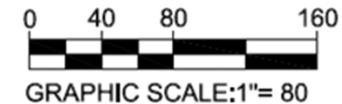
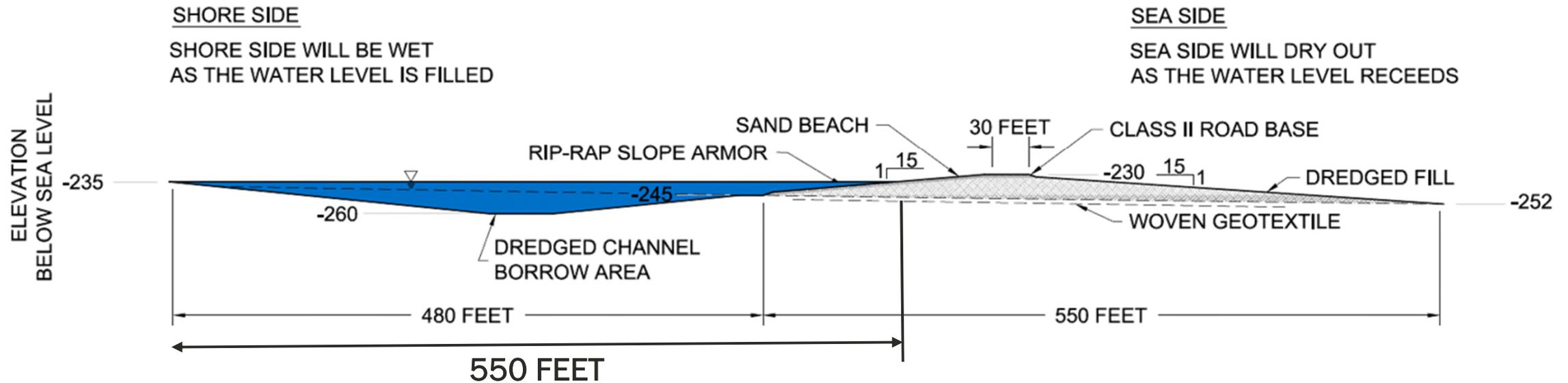
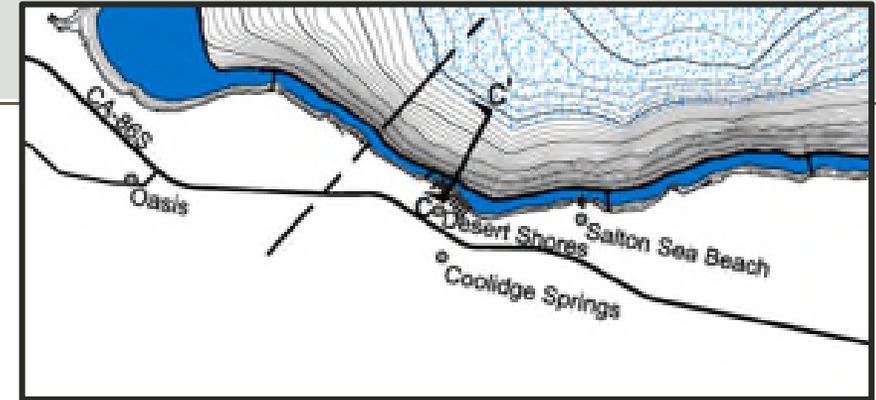
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# Cost and Feasibility Comparison

- Preliminary cost comparison
  - Earthen Levee Embankment – \$10 million/mile
  - Geotubes® – \$12 million/mile
  - Vinyl Sheet Piles – \$11 million/mile
- Earth Embankment appears to be best in terms cost, constructability and maintenance consideration
  - Also provides deepest lake because it relies on extensive dredging
- Others continue as options until more detailed design can be completed

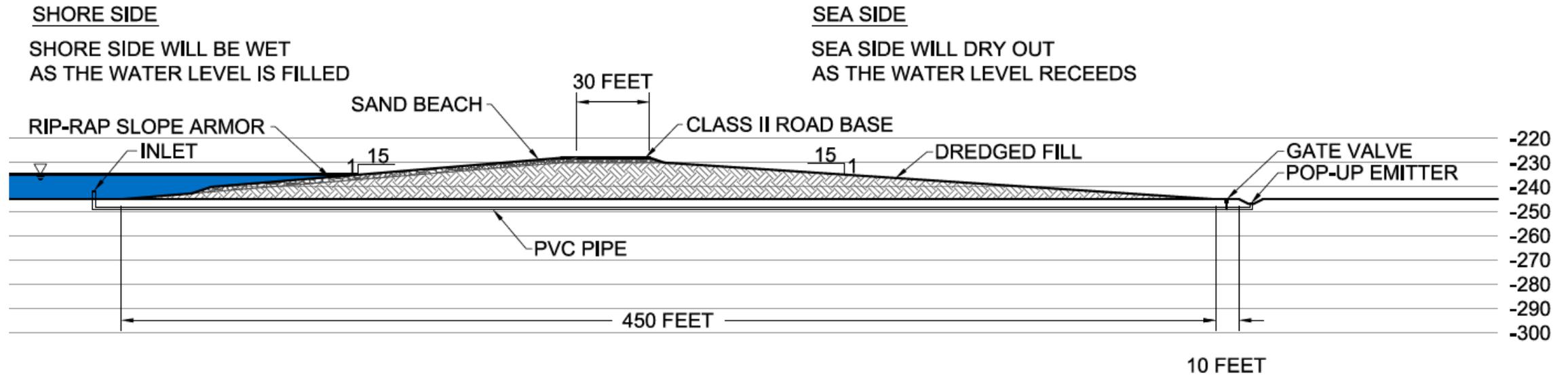
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# Narrowest Area (Section C-C')

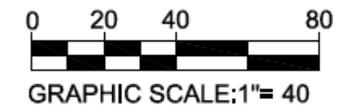


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# Emergency Irrigation System for Emissive Areas

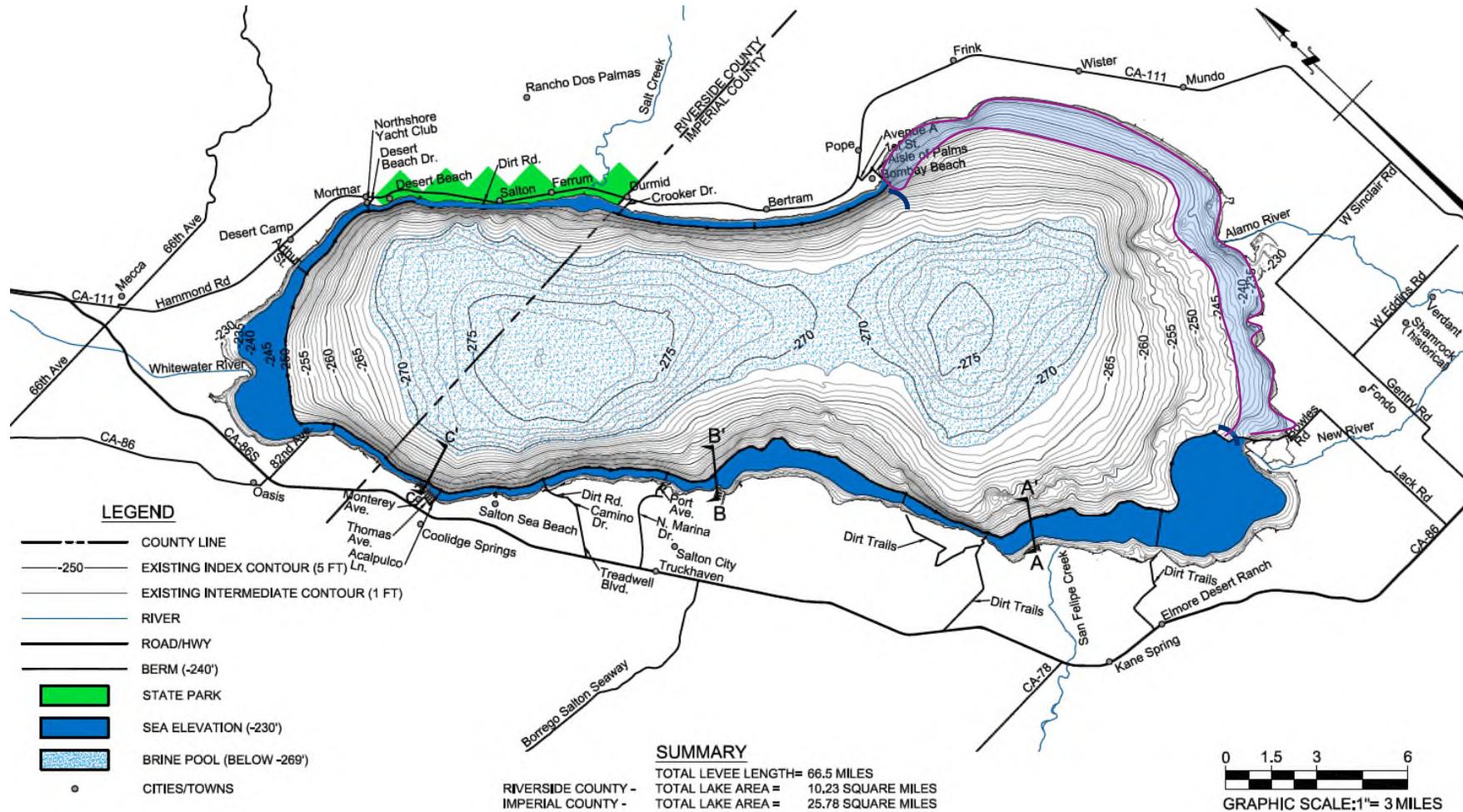


TOP OF BERM ELEV: -230.00  
 SEALEVEL ELEV: -235.00  
 SEAFLOOR ELEV: -245.00



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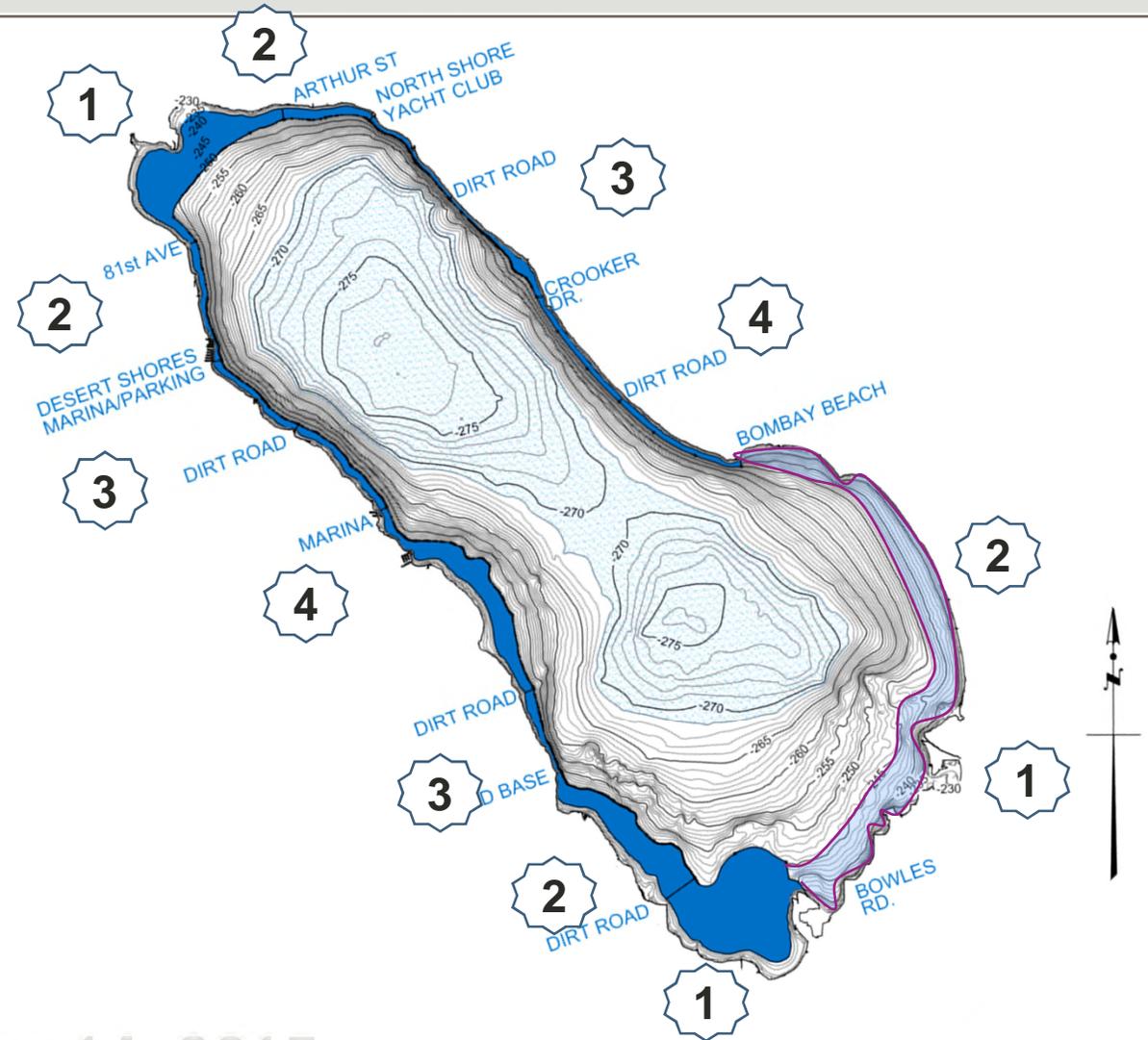
# Emergency Irrigation System for Emissive Areas



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# Sequencing

- Maintenance roads to levees create cells
  - Same as levee design
- Cells connected by culverts
  - Closed until next cell constructed
  - Eventually replaced by bridges
    - Or floating bridge
- 3 cells per phase for 4 phases
  - Start at New Rivers
  - 200M - \$250M /phase



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## Preliminary Cost Estimate

Program Component	Est. Cost (\$M)
Levees	\$690
Spillways and Culverts	50
Treatment Wetlands	25
SSRREI 2018 Blended Habitat	150
Ecotourism Features	20
<b>Total</b>	<b>\$960</b>

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# Alternative Evaluation

Alternative Evaluation Criteria	SSWIFT	State 2006	SSA 2006	Pump In/ Pump Out
Preserve the Sea as a Repository for Agricultural Runoff	Yes	Yes	Yes	Yes
Provide Large Lake with Stable Elevation	Yes / Smallest	Larger than SSWIFT	Larger than State	Full Sea
Improve Water Quality: Salinity	5 – 35 PPT	35 PPT	35 PPT	45 - 50 PPT
Improve Water Quality: Nutrients/Other Constituents	Yes	Yes	Yes	Yes
Maintain and Improve Habitat	Yes	Yes	Yes	Yes
Timeframe to Achieve Water Quality & Habitat Objectives	Short	Medium	Medium	Long
Respond to Inflow Changes (Required Water Inflow)	140 - 200 KAFY	700 AFY	700 AFY	700 AFY
Increase Recreational and Economic Potential	Yes	Yes	Yes	Yes
Air Quality Mitigation	Good	Good	Good	Very Good
Provide High Safety Rating/Low Risk of Failure	Low	Moderate	Moderate	Moderate
Permitting	Average	Average	Difficult	Very Difficult
Reasonable Cost/ High Probability of Financing	Yes	No	No	No
Capital Cost (\$2015) <sup>1</sup>	\$1 Billion	\$12 Billion	\$4-5 Billion	\$20+ Billion
O&M Cost	Low	High	High	Very High
Constructability	Reasonable	Difficult	Difficult	Very Difficult

<sup>1</sup> Costs adjusted to \$2015 by ENR CCI – Add 35%

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## Advantages of SSWIFT Lake

- Elevation slightly below historic shorelines from 1960-2010 period; however:
  - Allows for perimeter habitat & energy projects (e.g. IID SSRREI projects)
  - Allows for gravity flow system with some elevation variation from north to south
  - Larger lake & slightly lower cost
- Water requirement for lake: 140-200 KAFY
  - Remaining inflow used for SCH, SSRREI, dust control, other habitat projects
- Treatment wetlands & flushing will provide improved water quality
- Spillways in north & south allow wide range of salinity control
  - Salinity can be controlled in the range from fresh to marine
- Deep lake areas for fish: up to 25 ft deep
  - Maintains food source for fish eating birds

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## Advantages In Imperial County

- 26 square mile lake with areas up to 25 feet deep
  - Provides lake with cleaner, lower salinity water
  - Stable shoreline for Imperial County communities such Bombay Beach, Desert Shores, Salton City & Salton Sea Beach
  - Dredging will allow access to existing marinas
  - Preserves deep reservoir in south for micro-climate for agriculture
  - Preserves shallow habitat zone along nearly 30 miles near existing shoreline
- Habitat development in SSRREI area allows full access to KGRA
- Works well with existing IID Area Quality Control Plan
  - Provides irrigation source for emissive playa

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## Advantages In Riverside County

- 10 square mile lake with areas up to 25 feet deep
  - Preserves shallow habitat zone along about 12 miles near existing shoreline
- Provides lake with cleaner, lower salinity water
  - Stable shoreline for Riverside County areas including the State Recreation Area
  - Dredging will allow access to existing marinas such as North Shore Yacht Club
- Provides irrigation source for emissive playa

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