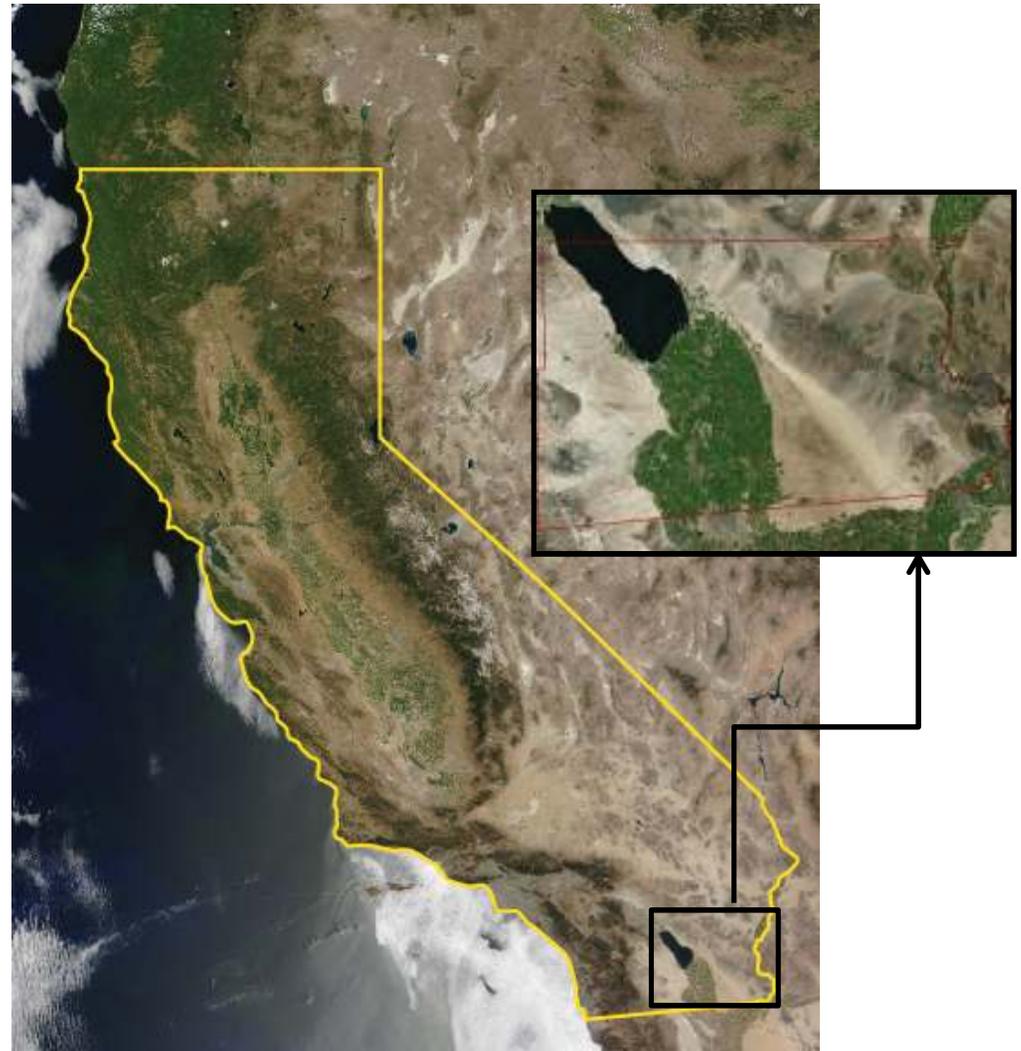
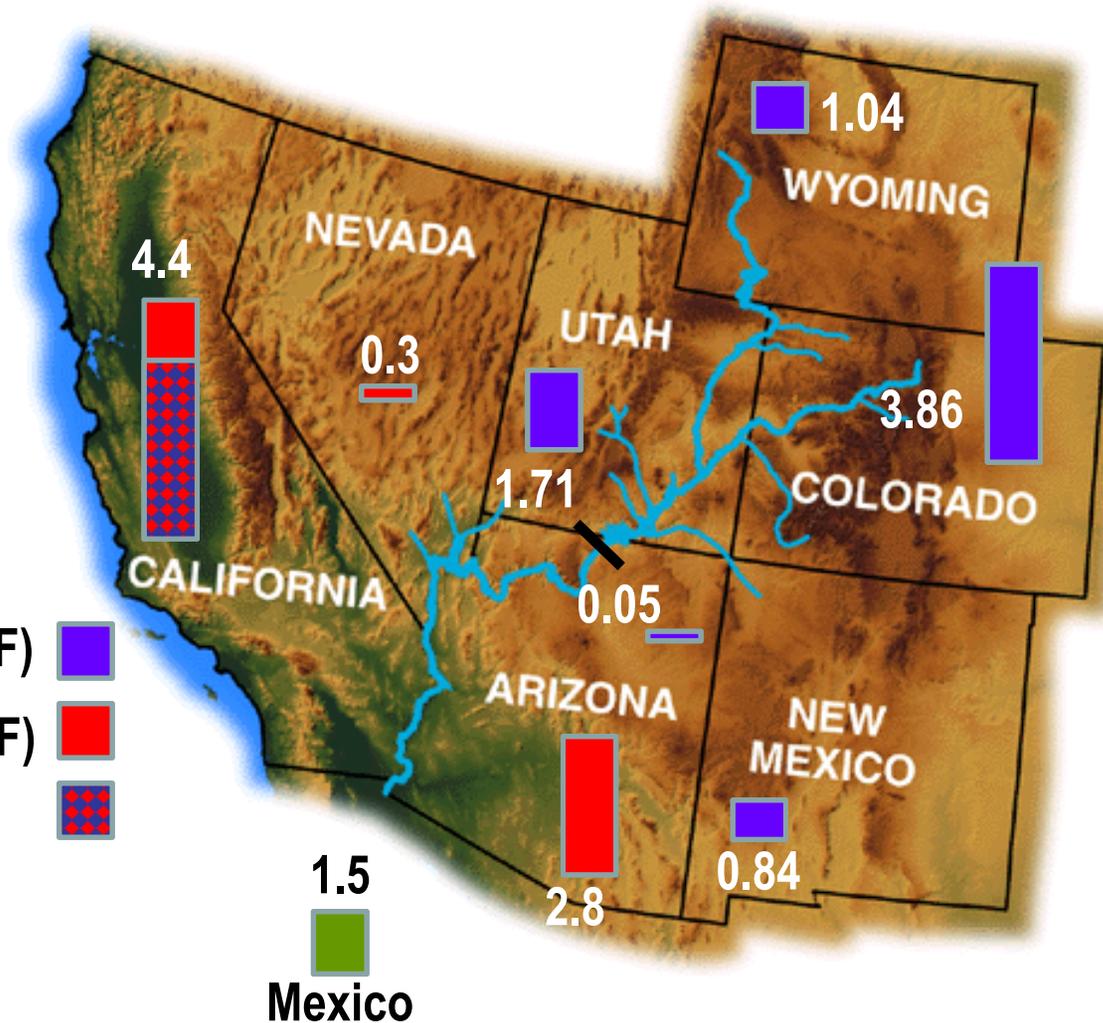


The Salton Sea Challenge: Consequences of Agricultural-to- Urban Water Conservation Transfers

Tina Shields, PE
Water Manager
tlshields@iid.com



Colorado River Basin State Entitlements



Upper Basin (7.5 MAF) 
 Lower Basin (7.5 MAF) 
 IID (3.1 MAF) 



IID's Water Supply & Service Area

3,100,000 acre-feet annual Colorado River consumptive use entitlement

1,061,637 gross acres within boundaries

520,307 total acreage receiving water

471,273 total farmable acreage

449,336 total acreage in crop (includes multiple cropped area)

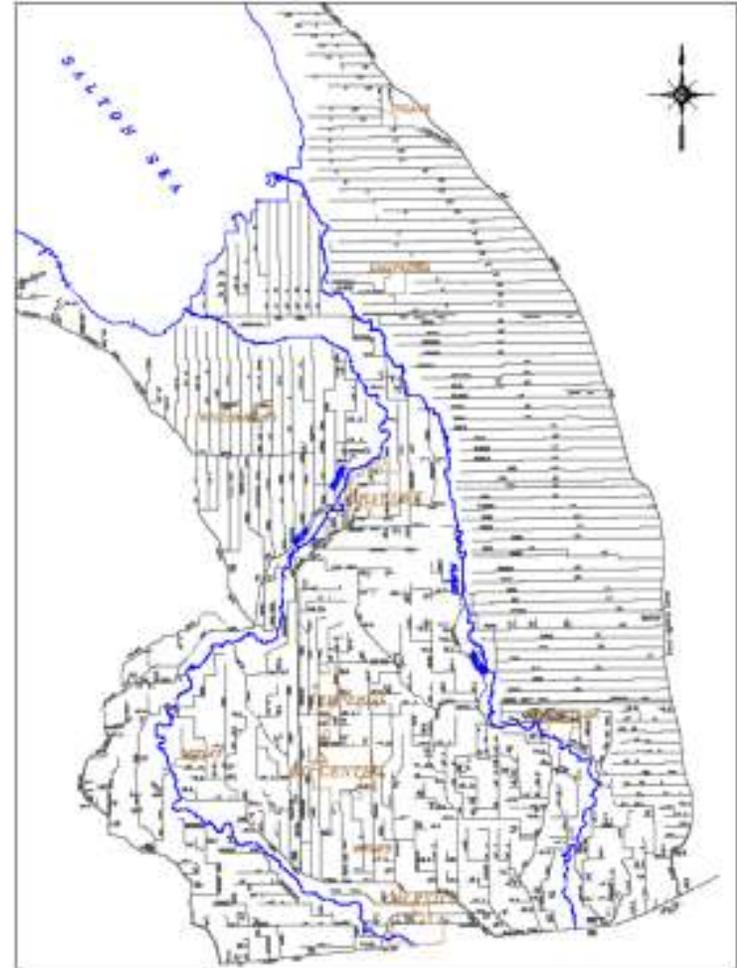


2016 data



Irrigation and Drainage System

- 148 miles of main canals
- 1,442 miles of laterals
- 1,457 miles of surface drains



Permanent Crops

- Permanent crops make up less than 5% of the total acreage.
- Feedlots, Sheep, Asparagus, Citrus, Aviary (Bees), Duck Ponds



Garden Crops

- Garden Crops account for nearly 26% of total acreage.
- Carrots, Lettuce, Melons, Cauliflower, Onions, Flowers



IID

A century of service.

www.iid.com

Field Crops

- Field Crops account for over 69% of total acreage.
- Alfalfa, Bermuda Grass, Sudan Grass, Wheat, Sugar Beets



2017 Top 14 Crops (Acres)



Alfalfa	148,397	33.0%
Bermuda Grass	52,050	11.6%
Sudan Grass	43,834	9.8%
Lettuce	32,069	5.9%
Sugar Beets	27,308	6.1%
Wheat	16,988	3.8%
Carrots	16,475	3.7%
Klein Grass	14,510	3.2%
Onions	13,194	2.9%
Broccoli	13,016	2.9%
Duck Ponds	9,546	2.1%
Spinach	8,775	2.0%
Sweet Corn	7,300	1.6%
Citrus	7,217	1.6%
Top 14 Crops Total Acres	409,866	91.2%
Total Acreage of Crops at IID	449,336	100.0%



The California Problem

(pre-Quantification Settlement Agreement)

- California's basic annual apportionment is 4.4 maf, but it had been using 5.2 maf.
- The excess water used by California was legally diverted by MWD from Arizona and Nevada's unused apportionments, but there were concerns about California's dependence on these unused flows and how it might affect other states' future growth.
- In 1996 Arizona created the Arizona Water Banking Authority to fully use its apportionment. In 2001 Nevada signed an intra-state water storage agreement with Arizona.



Priorities for California's 4.4 MAF Apportionment with the QSA

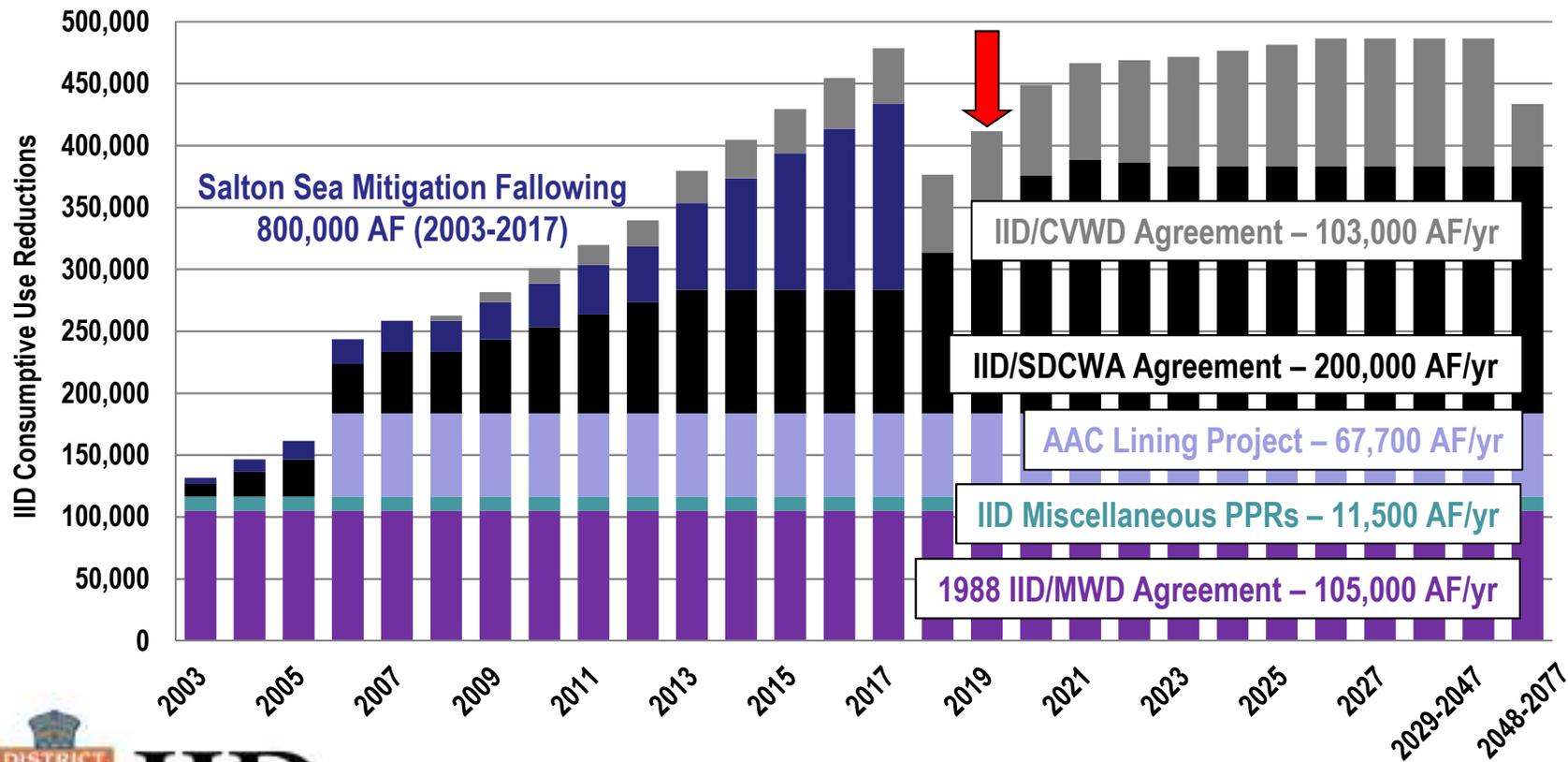
1. PVID	} (420,000 AF*)	} 3,850,000 AF
2. Yuma Project		
3. IID and CVWD) and CVWD (330,000 AF*)		
4. MWD.....	550,000 AF	
= 4.4 MAF (California's apportionment)		

5a. MWD.....	550,000 AF
5b. San Diego city, county (given to MWD).....	112,000 AF



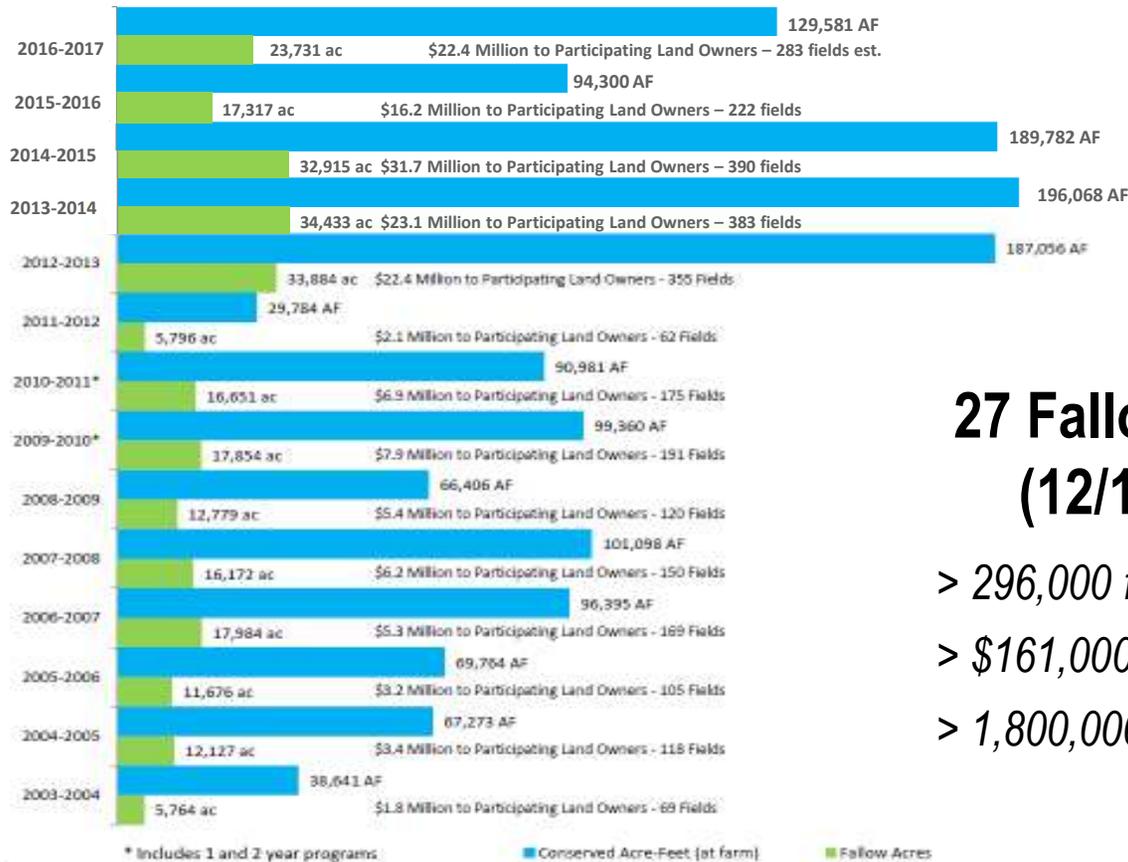
* Agricultural water agency entitlements under the QSA; MWD is responsible for the PVID/Yuma Project over/under as PVID/YPRD is not a party to the QSA.

The California Solution: QSA/Water Conservation & Transfer Programs



IID Following Program Summary

(provisional data, subject to change and true-up)



27 Following Programs (12/1/03 – 6/30/17)

- > 296,000 fallowed acres
- > \$161,000,000 following payments
- > 1,800,000 acre-feet conserved water

* Includes 1 and 2 year programs
Traditional FP, does not include TLCPP

■ Conserved Acre-Feet (at farm) ■ Follow Acres



<http://www.iid.com/water/water-conservation/following>

www.iid.com

System Conservation Program

- The SCP is designed to improve IID's water management opportunities by adding to its operational flexibility toolbox utilizing:
 - Main canal seepage interception and recovery systems
 - Lateral interties
 - Main system and mid-lateral operational reservoirs
 - Groundwater recovery, storage and conjunctive use projects
- The SCP focuses on reducing operational discharge by integrating system improvements, technology, and real-time operational data and includes:
 - Automated lateral headings and operational discharge monitoring
 - Computers in zanjero vehicles with flow information and decision support features
 - SCADA upgrades



On-Farm Efficiency Conservation Program

- 2008 conservation yield = 581 AF
 - 2009 conservation yield = 236 AF
 - 2013 conservation yield = 17,276 AF
 - 2014 conservation yield = 44,371 AF
 - 2015 conservation yield = 87,721 AF
 - 2016 conservation yield = 138,585 AF
 - 2017 conservation yield = 151,750 AF
 - 2018 conservation yield = 180,000 AF*
- Total OFECP conservation > 620,000 AF

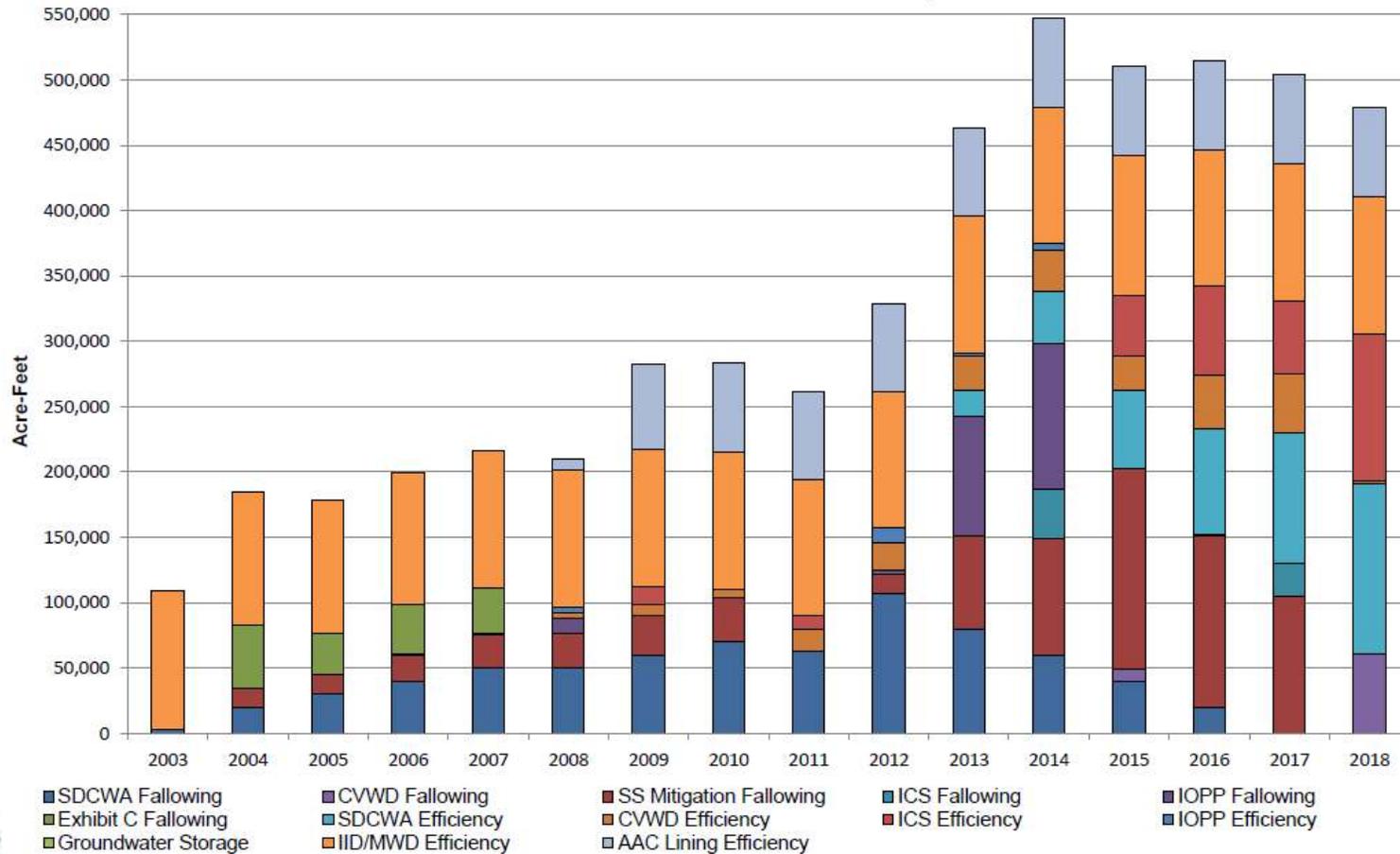
- Program is designed for maximum flexibility to allow for broad farmer participation and a wide variety of crops and growing seasons
- Incentivizes landowners and tenants to reduce water deliveries by improving on-farm water use efficiencies
- Conservation is measured relative to a ten-year historical baseline specific to each field and crop
- Payment rate = \$285/AF
- 4 AF/AC payment cap

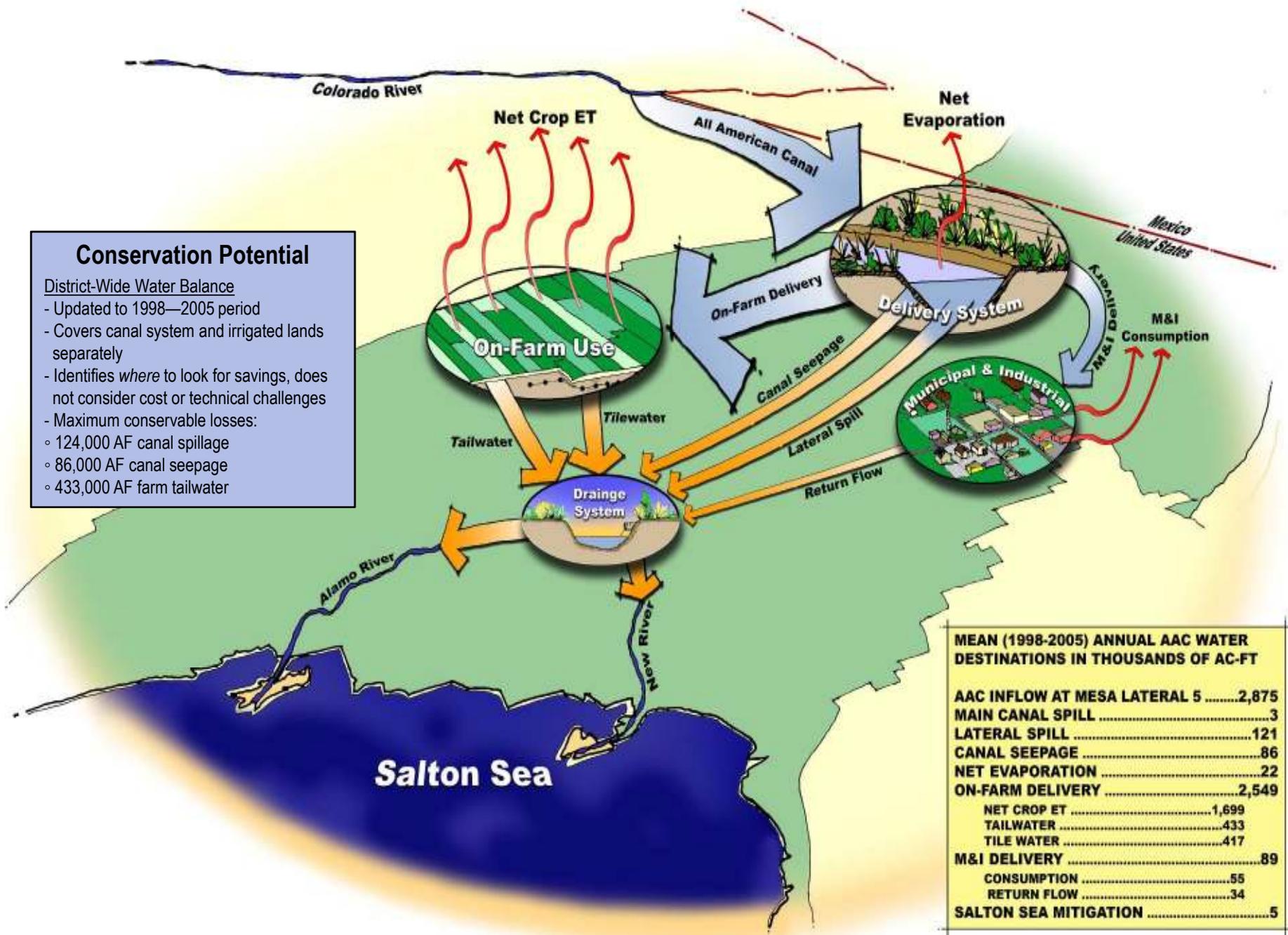
**estimated*



www.iid.com

IID Annual Conservation Summary





Conservation Potential
 District-Wide Water Balance
 - Updated to 1998—2005 period
 - Covers canal system and irrigated lands separately
 - Identifies *where* to look for savings, does not consider cost or technical challenges
 - Maximum conservable losses:
 • 124,000 AF canal spillage
 • 86,000 AF canal seepage
 • 433,000 AF farm tailwater

MEAN (1998-2005) ANNUAL AAC WATER DESTINATIONS IN THOUSANDS OF AC-FT

AAC INFLOW AT MESA LATERAL 5	2,875
MAIN CANAL SPILL	3
LATERAL SPILL	121
CANAL SEEPAGE	86
NET EVAPORATION	22
ON-FARM DELIVERY	2,549
NET CROP ET	1,699
TAILWATER	433
TILE WATER	417
M&I DELIVERY	89
CONSUMPTION	55
RETURN FLOW	34
SALTON SEA MITIGATION	5

The Salton Sea



- 360 square miles, up to 52' deep
- Congressionally designated agricultural sump for IID/CVWD
- Volume of 7.5 MAF with annual inflow of up to 1.3 MAF, no outflow
- Nearly 50% saltier than the ocean
- Repository for agricultural drainage
- Heavily used by migratory waterfowl including endangered species
- > 7' elevation decline since 2003; despite the replacement of conserved water reductions through the delivery of mitigation water
- Without transfers, Sea was estimated to turn hypersaline between 2010 and 2025
- With transfers, Sea is estimated to turn hypersaline 1-9 years earlier

www.iid.com



Salton Sea Mitigation Water Requirements (2003-2017)

- The SWRCB imposed a 15-year mitigation delivery requirement that was intended to maintain salinity levels for a long enough period of time to study feasibility, determine a restoration alternative, and then begin implementation. Mitigation deliveries total 800,000 AF over the 15-year mitigation period; 280,000 AF are scheduled for 2016-2017.
- Mitigation volumes are proportional to the reduced Salton Sea inflows resulting from the conserved water transferred to SDCWA. Mitigation volumes increase as the conversion from fallowing to efficiency-based conservation measures ramps up (every 1 AF of efficiency-based conservation is 1 AF of reduced Salton Sea inflow).

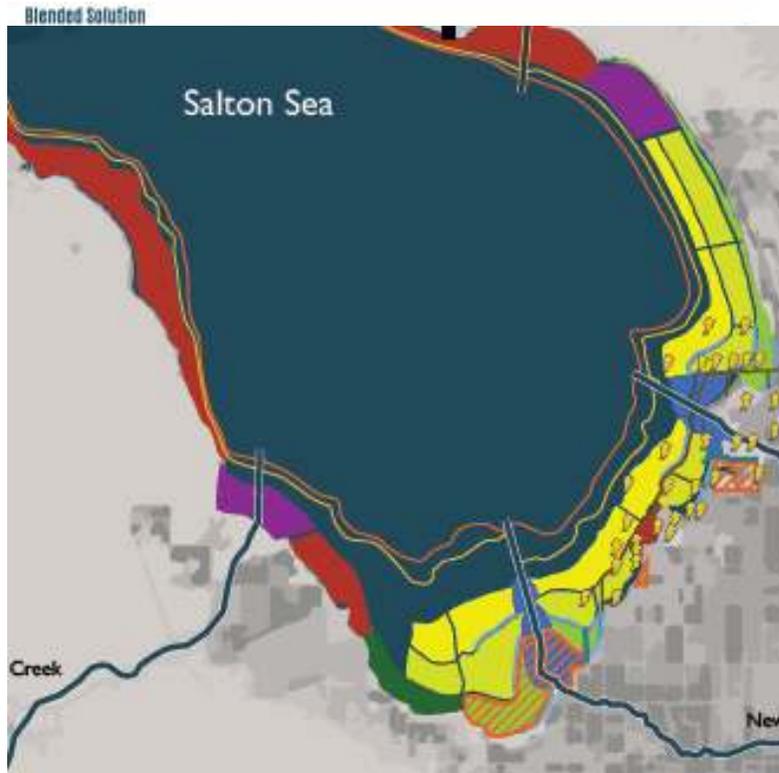


California Salton Sea Commitments

- SB 277 (Ducheny 2003), part of legislation authorized to facilitate approval of the QSA, established California's intent to restore the Salton Sea and initiated a process to develop a Salton Sea restoration and financing plan.
- A 2007 study identified a \$8.9 billion preferred restoration alternative (compared with an estimated an \$800 million 'no action' alternative).
- California was also a signatory to the QSA JPA, the entity created to fund mitigation measures, and committed contractually to fund mitigation expenses after the \$133 million (2003 nominal dollars) of water agency contributions are exhausted.



Salton Sea Restoration & Renewable Energy Initiative



In 2014, IID and Imperial County developed the SSRREI concept, releasing a framework in 2015. The Initiative proposes to use habitat and renewable energy projects to reduce playa exposure and prevent air quality problems as the shoreline recedes due to the implementation of QSA water conservation measures and includes:

- *Phased mitigation and restoration activities to help ensure the long-term viability of the QSA water transfers and provide regional water supply reliability.*
- *Development of up to 1,700 megawatts of new geothermal baseload energy and other emerging resources (solar, wind, algae, etc.) to assist California utilities in meeting their green energy requirements.*



www.iid.com

A Call to Action: IID's SWRCB Petition

- On November 18, 2014 IID submitted a petition to the California State Water Resources Control Board to exercise its continuing authority over the nation's largest agricultural-to-urban water transfer.
 - *The 15-year mitigation flow requirement, intended to serve as a bridge to a state restoration obligation legislated in 2002 to facilitate approval of the QSA, concludes in 2017 and no habitat projects have been built nor has the state clearly defined its restoration plans.*
 - *The petition called on the SWRCB to commence a facilitated dialog to identify the most realistic, smaller but sustainable, Salton Sea restoration alternative and a durable funding mechanism, and then condition the water transfers on the state satisfying its unmet restoration obligation.*
- On March 4, 2017, more than two years later and with less than ten months of mitigation flows remaining, IID filed a request for a SWRCB evidentiary hearing to ensure the long-term viability of the QSA water transfers and provide for the implementation of a smaller but sustainable restoration plan that includes:
 - *Annual acreage milestones and performance standards, an adaptive management implementation plan, funding alternatives, permit streamlining options, a five-year reconsultation process to initiate Phase II planning efforts, and an affirmative state restoration commitment with SWRCB oversight.*



CA Salton Sea Task Force Agency Actions & Federal Memorandum of Understanding



- Released October 17, 2015, and called for the immediate development and implementation of a Salton Sea management plan
- Habitat creation goals of 9,000 – 12,000 acres (short-term) and 18,000 – 25,000 acres (mid-term)
- Accelerated project implementation and increased public outreach
- Evaluation of renewables and transmission at Salton Sea
- On August 31, 2016 the US Department of Interior and California Natural Resources Agency sign MOU to coordinate Salton Sea management activities in support of water supply reliability.
- On January 18, 2017 DOI and CNRA sign MOU Addendum that includes the coordination of renewable energy and economic development opportunities at the Sea and other measures.
- On March 16, 2017 CNRA released a draft 10-Year Phase I Salton Sea Management Plan



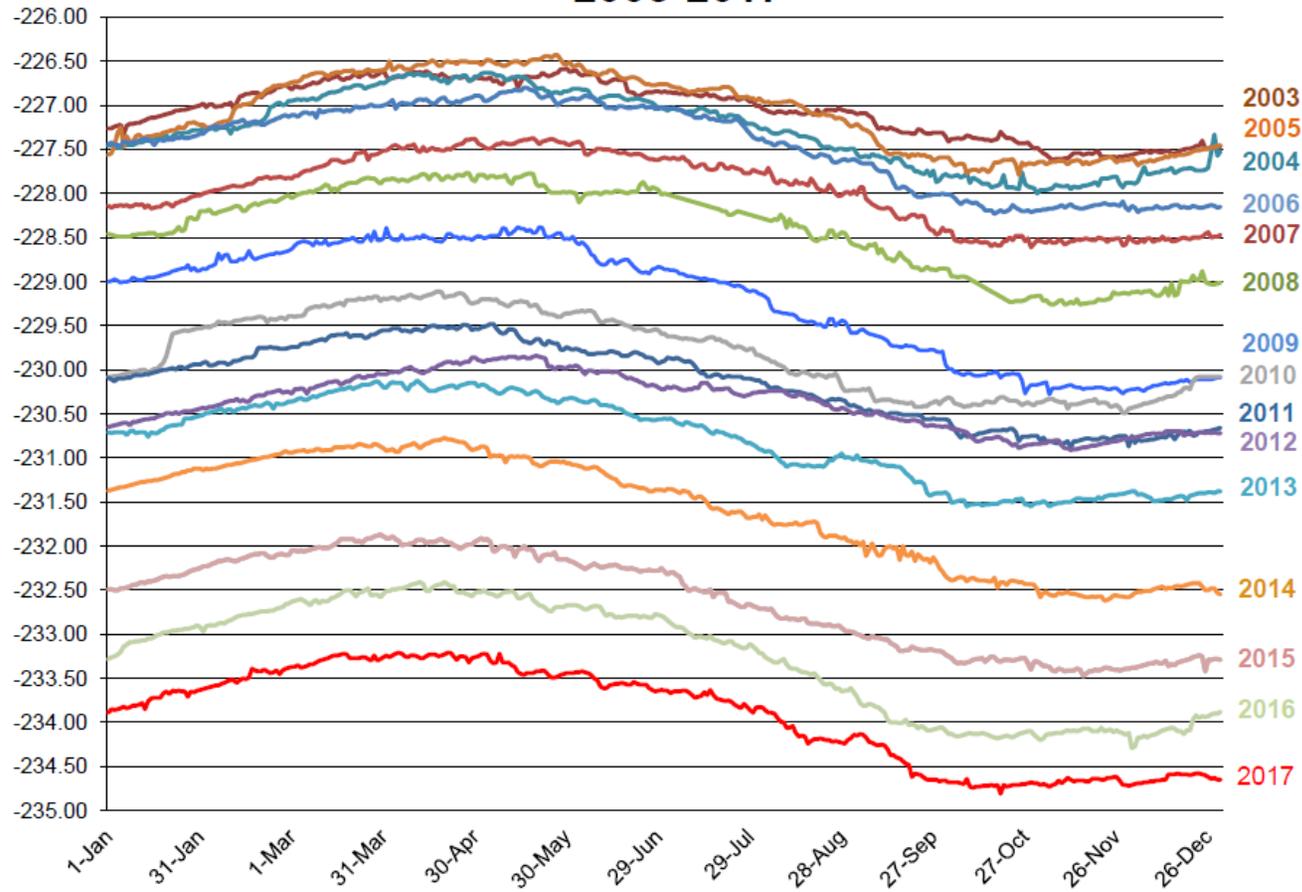
SWRCB Stipulated Order

On September 7, 2017, the SWRCB held a public workshop regarding the Salton Sea Management Plan and a draft stipulated order developed by the state, IID, Imperial County and the San Diego County Water Authority, in consultation with the NGOs. This stipulated order was adopted on November 7, 2017 with minor modifications to improve public outreach and local coordination.



Salton Sea Elevation @ Fig Tree John

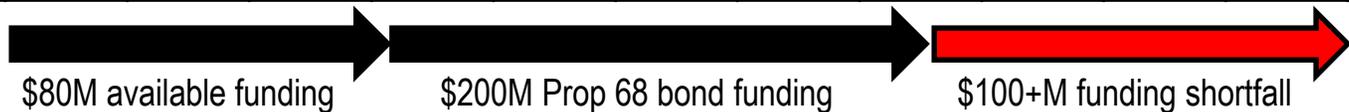
2003-2017





California's Phase I Salton Sea Management Plan

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Total Projected Salton Sea Exposed Playa Acreage	18,625	22,172	26,381	31,427	37,011	42,540	47,863	52,752	57,067	60,905	64,200	66,948
Annual Projected Increase in Exposed Playa Acreage		3,547	4,209	5,046	5,584	5,529	5,323	4,889	4,315	3,838	3,295	2,748
Cumulative Projected Increase in Exposed Playa Acreage		3,547	7,756	12,802	18,386	23,915	29,238	34,127	38,442	42,280	45,575	48,323
Annual Playa Acreage Coverage Milestones		500	1,300	1,700	3,500	1,750	2,750	2,700	3,400	4,000	4,000	4,200
Cumulative Playa Acreage Coverage Milestones		500	1,800	3,500	7,000	8,750	11,500	14,200	17,600	21,600	25,600	29,800
Projected SSMP Cost		\$10M	\$27M	\$35.5M	\$43.5M	\$33.5M	\$35.5M	\$34M	\$42.5M	\$47.5M	\$37.5M	\$36.5M

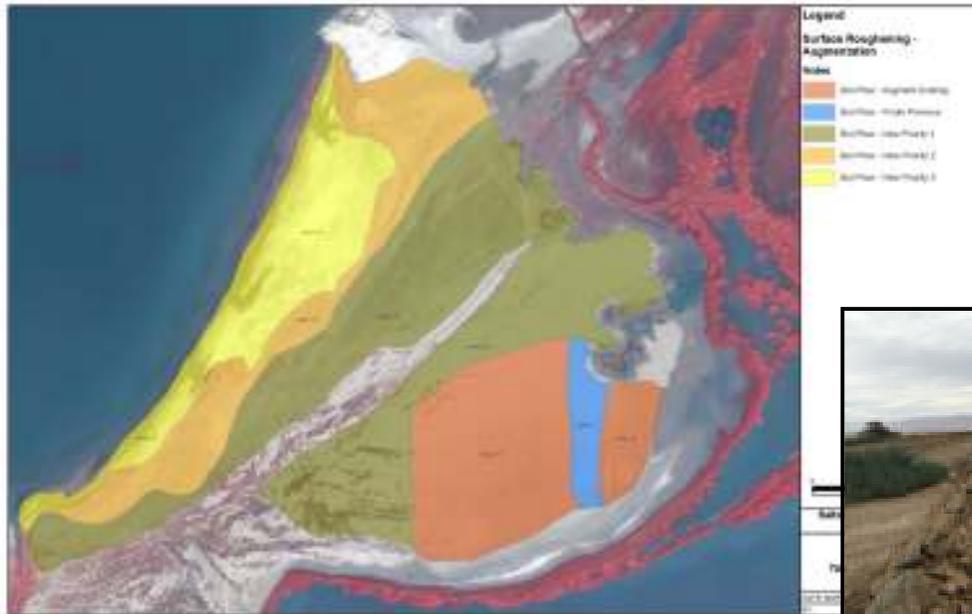


IID's Salton Sea Air Quality Mitigation Program



- Developed in coordination with Imperial County; a comprehensive, science-based adaptive approach to characterize emissions potential of exposed playa as the Sea recedes and proactively implement projects to prevent significant dust emissions
- Pilot testing a range of dust control measures tailored to climate and soil conditions around the Salton Sea
- Identifying measures that can be quickly implemented and scaled to create a stable surface and/or prevent the spread of dust emissions on exposed playa

Air Quality Mitigation – Surface Roughening



- Modifies airflow and decreases wind velocity at the surface
- Physically traps soil particles that enter the area from upwind sources

Air Quality Mitigation – Vegetation Enhancement

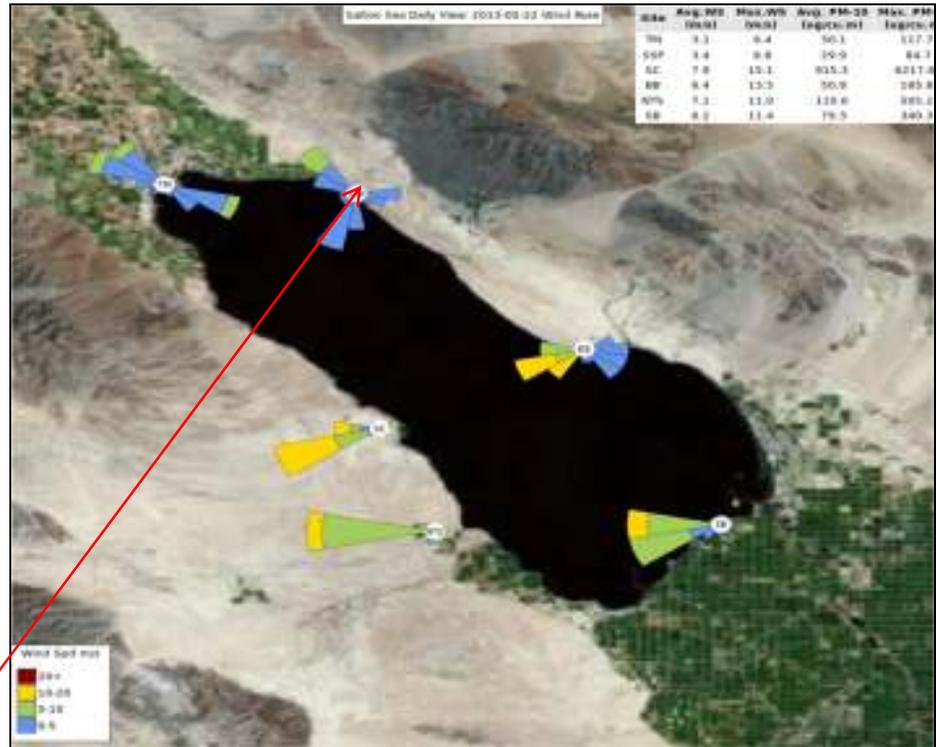


Salton Sea Air Quality Monitoring



Portable In Situ Wind Erosion Lab

Salton Sea State Recreation Area Air Monitoring Station



Weather patterns May 2013 (Photo Credit: Air Sciences)

- 6 air stations around the Salton Sea
- Mobile MET stations at pilot project sites and Ocotillo Wells & Anza Borrego state parks
- Mobile cameras at air stations, pilot projects and state parks
- 360 degree camera on top of Red Hill



Air Quality Pilot Projects

- Over 1,000 acres of pilot projects on the ground with 1,000 acres more to be constructed by mid-2019
- Project locations include north and south sides of the Alamo River, Poe Road, Bombay Beach and Coachella Valley
- Planned projects for the next 18 months: New River west, Coachella Valley (Whitewater), Vail Cutoff Drain, Salton City Wash and a surfactant project



www.iid.com





Why restoration?



IID

A century of service.

www.iid.com

IID's QSA Water Conservation & Transfer Summary (2003-2018* Total > 5,270,000 AF)

