

SSALTS Project Tasks 1.2 - Initial Study Area List
(11"x17")

I#	Study Area Project/Program Candidate	Central Valley Basin Planning Area	Representative Sector/Area	Summary	Is the Study Area representative of 'typical' conditions?						Is sufficient information available to evaluate potential alternatives?					Are the alternatives scalable or can they be extrapolated?	Recommendation	CDM Smith Initial Recommendation for Use as a SSALTS study area?	
					Aerial extent	Sources of Salt	Salinity Reduction Method	In-Valley/ Out-of-Valley	Disposal Methods	Disposal Constraints	Surface Water or Groundwater (Disposal Endpoint)	Relevant Literature ^(H)	Performance Data	Cost Data	Potential Environmental Impacts				Longevity of Alternative
1	Red Rock Ranch Farm Drainage Management System	Tulare Lake Basin	Agriculture	Implementation of irrigation and drainage practices to reduce impacts of saline water on crops coupled with the need to be in compliance with zero-liquid discharge requirements.	Agricultural Farm (~7,000 acres)	Saline soil and drainage water; shallow groundwater	Reduction in irrigation water (~20%) using Integrated On-Farm Drainage Management System	In-Valley	Solar evaporator dried salts (stored, marketed, or disposed as waste)	Available land; zero-liquid discharge regulatory requirements	N/A	Y; AA	?	Yes	Potential impacts to wildlife from the Solar Evaporator	Long-Term	Yes	Good	Red Rock Ranch implements a unique alternative for salinity reduction in the San Joaquin Valley. Although a quick internet search did not find any performance data, several studies on the alternative were found as well as detailed cost data. Direct contact with Red Rock Ranch would be needed to gather information not readily available on the internet. This study provides an opportunity to evaluate the IFDM farming method.
2	Westside Drainage Plan: Grassland Bypass Project	San Joaquin River Basin	Agriculture	The Westside Drainage Plan is a combination of salt management strategies in use that include land retirement, groundwater management, source control and regional reuse. The Grasslands Bypass Project, a component of the Westside Drainage Plan, intercepts and re-routes the agricultural drainage water from the Grasslands Drainage Area and discharges the water downstream of the confluence of the Merced River with the San Joaquin River. The project has improved water quality in drainage channels. The current permit discharges to the SJ River will continue until 2019.	Grasslands Drainage Area (~97,000 gross acres of irrigated farmland)	Saline soil and drainage water; shallow groundwater	N/A	Out-of-Valley	San Joaquin River Discharge	Permits; assimilative capacity of San Joaquin River	Surface Water (San Joaquin River)	L; Q; P; Z	Yes (Annual Reports)	?	Potential impacts to wildlife,	Long-Term	Adaptable	Good	The Project has developed annual reports which provides performance data, however initial internet searches did not find any cost data. Direct contact with the program may be needed to obtain available information. This study area would provide an opportunity to evaluate the potential to re-route saline drainage water.
3	Westside Drainage Plan: Regional Reuse of Retired Land	San Joaquin River Basin	Agriculture	The Westside Drainage Plan is a combination of salt management strategies in use that include land retirement, groundwater management, source control and regional reuse. Regional reuse of retired land, a component of the Plan, looks at the implementation of land retirement and a regional drainage reuse program in the District. Land use would be delegated to maximize the drainage quantity reduction using salt tolerant crops. Lands that could be used for this project include retired lands and other areas that could easily be delivered drainage flows.	Water District	Agricultural drainage water	Land retirement and regional reuse of drainage water	In-Valley	Source Reduction	N/A	Surface water	F, R	Pilot Scale Info for Land Retirement	?	Wildlife impacts; groundwater impacts;	Long-Term	Yes	Good	The Westside Drainage Plan discusses the potential implementation of a Regional Reuse Program to reduce drainage quantity. In addition, The Land Retirement Demonstration Project was a 5 year study on the impacts of land retirement in the San Joaquin Valley. The report provides pilot scale performance data, however cost information was not included and could not initially be found. It is hoped that additional information could be obtained through direct contact. This study area provides the opportunity to evaluate the implementation of land retirement and regional reuse to reduce salinity discharges.
4	Westside Drainage Plan: Panoche Drainage District Reverse Osmosis Pilot Plant	San Joaquin River Basin	Agriculture	The Westside Drainage Plan is a combination of salt management strategies in use that include land retirement, groundwater management, source control and regional reuse. The Panoche Drainage District RO Plant, a component of the Westside Drainage Plan, reduces the use salinity in agricultural drainage water using reverse osmosis.	Drainage Impaired Lands in the San Joaquin Valley	Agricultural drainage water	Reverse Osmosis	In-Valley	Selenium Biotreatment & Evaporation Pond	Land, Cost	Surface water	F	? (Pilot Studies from Red Rock Ranch or Panoche Drainage District)	Yes (Planning Level Costs)	Wildlife	Long-Term	Yes	Good	Although performance data could not be found from this pilot plant, it is assumed that it exists and could be obtained through direct contact with the drainage district. The FEIS provided planning level costs for the RO plant. This study area provides the opportunity to evaluate the use of a reverse osmosis to remove salt drainage water.
5	Hilmar Cheese Waste Management Project	San Joaquin River Basin	Industrial	Study on the implementation of deep well injection to remove salt.	Industrial Site Boundaries	Processing wastewater	N/A	In-Valley	Deep well injection	Permits, Acreage, Cost	?	N	Modeling Info	Yes (Planning Level Costs)	Potential impacts to groundwater	Long-Term	Yes	Good	Hilmar Cheese Factory is one of the factories in the "industrial" sector that was looked at. This study area provides the opportunity to look at a deep well injection alternative.
6	Grassland Water District Real-Time Salinity Management Program	San Joaquin River Basin	Agriculture	Development of real-time management actions such as a web-based, publicly accessible flow and water quality monitoring network. Experimentation with drainage salt load scheduling to demonstrate improved capability to manage of salt load export to the San Joaquin River.	Water District	Agricultural drainage water	Wetland Management	Out-of-Valley	Water Flow Management	Permits (RWQCB)	Surface Water	L; Q	Pilot Scale	?	Wildlife impacts	Long-Term	Yes	Good	The Grasslands Real-Time Salinity Management was a project looked at by the District to manage the salinity discharge to the San Joaquin River. Pilot scale performance data is available, however we are still looking for cost information, and it is assumed it could be obtained through contact with the district. This study area provides the opportunity to evaluate real-time management programs to move salt out of the valley.
7	City of Dixon Salt and Sodium Reduction Program	Sacramento River Basin	Municipal	Implementation of a source control (mandated & voluntary) and education program to reduce the cost of treatment to remove salts	Municipal Boundaries	Water softeners, residential wastewater	Public Education; Incentive program to remove water softeners;	In-Valley	Source Reduction	N/A	Surface water	I; J; K	Yes (Source Control Effectiveness Report)	?	None	Long-Term	Yes	Good	The City of Dixon implements a public education program to reduce salinity source problems. They also implement a water softener incentive program to remove water softeners from residences. The City has a report on the effectiveness of these programs, however there is not cost information within the report. It is assumed that the City has this information, which could be obtained after contacting them. This study area provides the opportunity to evaluate the implementation of a public education program to reduce source salinity issues.

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8	San Luis Drainage Feature Re-Evaluation - Brine Line	San Joaquin River Basin	Agriculture	Project which evaluated the use of a brine line to dispose of saline agricultural drainage water outside the valley to either the ocean (near Monterey) or within the Delta.	Drainage Impaired Lands in the San Joaquin Valley	Agricultural drainage water	N/A	Out-of-Valley	Brine Pipeline	Cost	Surface water	F; N	?	Yes (Planning Level)	Wildlife; air quality.	Long-Term	Yes	Good	The San Luis Drainage Re-Evaluation FEIS looked at a potential brine line with an outfall at several locations (Monterey Bay or the Delta). The cost of such a project was included in the appendices of the EIS. This study area provides the opportunity to evaluate the use of a brine line to move salt out of the valley.
9	Tulare Lake Bed	Tulare Lake Basin	Agriculture	A study to evaluate appropriateness of a de-designation of MUN from a portion of the Tulare Lake Bed. This project would serve as an archetype or template for future studies in which the purpose is to evaluate the appropriateness of the MUN beneficial use on a designated groundwater body.	Tulare Lake Bed	Agricultural drainage water	N/A	In-Valley	Designated Salt Disposal Area	Land, Cost	Ground-water	Future Tulare Lake Bed Project Area Characterization	Future Tulare Lake Bed Project Area Characterization	?	Wildlife	Long-Term	Yes	Good	Ongoing studies for the Tulare Lake Bed MUN de-designation project. Although no information from the project is publicly available, it can be obtained. This project would provide the opportunity to evaluate the potential of a regional designated salt disposal sink.
10	Tomato Processing Plant	San Joaquin River Basin	Industrial	Tomato and fruit processing plant generating saline wastewater.	Industrial Land	Softener regeneration, boiler blowdown, cleaning & process chemicals	?	?	?	?	?	N	?	Yes (Planning Level)	?	?	?	Good	Although specific salinity reduction information could not be found for a tomato processing factory (using internet searches), it is assumed that salinity reduction measures are implemented at factories and both performance and cost information is available. This study area provides the opportunity to evaluate how industrial users mitigate salinity in their discharges.
11	City of Fresno Outreach Program	Tulare Lake Basin	Municipal	Implementation of a source control education program to reduce the cost of treatment to remove salts.	Municipal Boundaries	Water softeners, cleaning chemicals, fertilizer	Public Education Program	In-Valley	Source Reduction	N/A	Surface water	?	?	?	None	Indefinite	Yes	Fair	This public education program has minimal information on the internet. We could not find any performance data or cost information for the
12	Stevinson Water District Wetland Project	San Joaquin River Basin	Agriculture	Development of artificial wetlands and ancillary facilities to manage and reduce salt loading in the San Joaquin River.	Water District	Agricultural drainage water	N/A	Out-of-Valley	Artificial Wetland	Permits, Acreage	Surface Water	O	?	?		Long-Term	Yes	Fair	Stevinson Water District developed artificial wetlands to reduce their salinity discharge into the San Joaquin River. Although performance and cost data could not be found via internet search, it is assumed they are available through direct contact with the water district. The study provides the opportunity to evaluate salinity reduction through the development of wetlands.
13	City of Woodland Salt Minimization Project	Sacramento River Basin	Municipal	Implementation of a source control education program to reduce salts in the water.	Municipal Boundaries	Water softeners	Public Education Program	In-Valley	Source Reduction	N/A	Surface water	?	?	?	None	Long-Term	Yes	Poor	This public education program has minimal information on the internet. We could not find any performance data or cost information for the program.
14	Almond Board's Outreach for Orchard Management	Central Valley	Agriculture	Implementation of education of and outreach salt management strategy.	Central Valley/ Almond Orchard	Saline soil and drainage water; shallow groundwater	?	?	Source Reduction	?	?	?	?	?	?	?	?	Poor	The measures that the Almond Board recommends could not be found.
15	Wine Industry Recommended Practices	Central Valley	Agricultural/ Industrial	Development and implementation of management practices for managing salt in discharges.	Central Valley/ Wine Making Facilities	Saline soil and drainage water; shallow groundwater	?	?	?	?	?	?	?	?	?	?	?	Poor	The measures that the Wine Industry recommends could not be found.

Notes

⁽¹⁾ Letters refer to the "List of Relevant Literature Found" Document

"?" Indicates that the information was not initially found through an internet search, but CDM Smith is waiting for a finalized list of studies to be approved prior to directly contacting programs for any available information. If CV-SALTS participants are aware or have information on the project, please send it to Tom Quasebarth at CDMSmith (quasebarthT@cdmsmith.com)