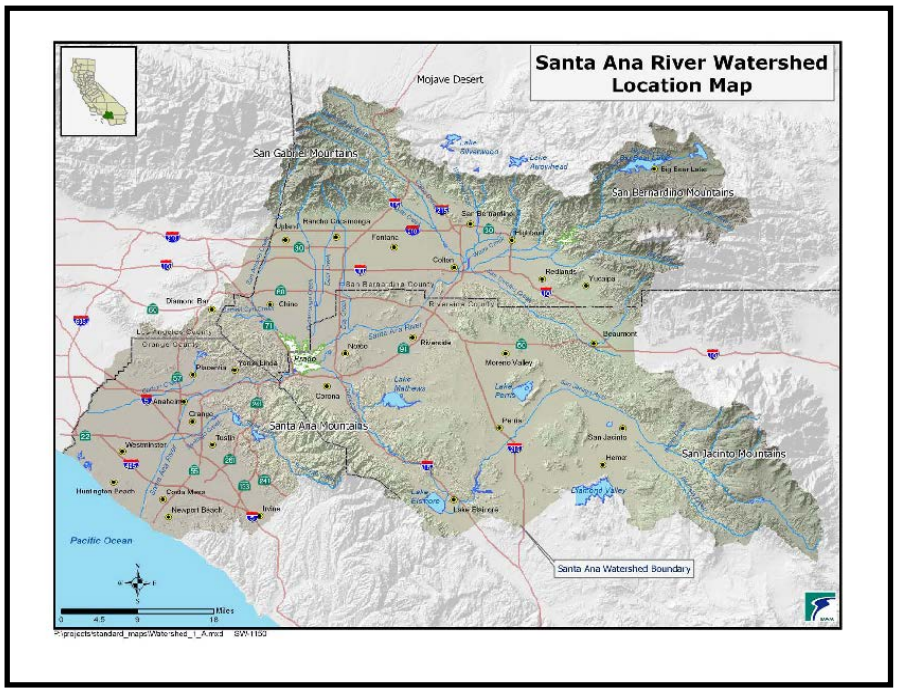
RECLAMATION

Managing Water in the West

SANTA ANA WATERSHED BASIN STUDY

INLAND EMPIRE INTERCEPTOR APPRAISAL ANALYSIS
TECHNICAL MEMORANDUM NO. 1
JANUARY 2012 (FINAL - MAY 2013)



U.S. Department of the Interior
Bureau of Reclamation

Santa Ana Watershed
Project Authority

PROJECT INFORMATION	
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PROJECT NAME:	Santa Ana Watershed Basin Study Inland Empire Interceptor Appraisal Analysis
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INTRODUCTION

Project Background

The One Water One Watershed (OWOW) Plan is the integrated water management plan for the Santa Ana Watershed. The OWOW Plan is administered by Santa Ana Watershed Project Authority (SAWPA). The purpose of One Water One Watershed 2.0 is to update the OWOW Plan. This OWOW 2.0 Plan Update will evaluate current water supply for the watershed and will address impacts and adaptation strategies to:

- Climate change,
- Increasing water demands,
- Water quality, and
- Future water supply needs.

The Bureau of Reclamation (Reclamation) Southern California Area Office (SCAO) and SAWPA submitted a proposal in June 2010 for funding of a Santa Ana Watershed Basin Study (Basin Study) in support of the OWOW Plan update, known as One Water One Watershed 2.0. In August 2010, this Basin Study was selected by Reclamation for funding.

This Inland Empire Interceptor Appraisal Analysis (Appraisal Analysis) is one component of the Basin Study.

Santa Ana Watershed Project Authority

SAWPA is a joint powers authority comprised of five member water districts that serve the vast majority of the Santa Ana Watershed. The area served by SAWPA is located within Orange, Riverside and San Bernardino Counties of California, bounded by the Pacific Ocean on the west, the San Bernardino Mountains to the north, and the San Jacinto Mountains to the east.

The five SAWPA Member Agencies are

- Eastern Municipal Water District (EMWD),
- Western Municipal Water District (WMWD),
- Inland Empire Utility Agency (IEUA),
- San Bernardino Valley Municipal Water District (SBVMWD), and
- Orange County Water District (OCWD).

These five agencies serve most of the Santa Ana Watershed. Population within the watershed has increased significantly; and this urban growth has put enormous pressure on the regional water supply, water quality and environmental/recreation resources.

SAWPA first formed as a planning agency in 1967, and was reformed in 1972 with the mission to plan and build facilities to protect water quality and enhance the water supply within the Santa Ana River Watershed. SAWPA's mission is to protect water quality and enhance the water supply within the Santa Ana River Watershed. This mission includes the goal of achieving a salt balance in the upper Santa Ana Watershed. For these purposes, SAWPA developed the Inland Empire Brine Line (Brine Line), which was formerly known as the Santa Ana Regional Interceptor (SARI), for the purpose of exporting salt from the Santa Ana Watershed. Exportation of salt prevents its accumulation in the Watershed and protects the quality of the potable water supply. The future of the potable water supply will continue to rely upon an economical means of collection, treatment and disposal of brine. The Brine Line collects and disposes of brine flow from the Santa Ana Watershed and is critical to SAWPA's mission success. Multiple branches of the existing Brine Line system converge in the vicinity of Prado Dam.

Inland Empire Interceptor

The report entitled ***Santa Ana Watershed Salinity Management Program, Phase 2 SARI Planning Technical Memorandum***, prepared by CDM, et al, in May 2010 identified and investigated several alternatives for disposal of Brine Line flows. That study included a cursory review of a proposed new Brine Line outfall to the Salton Sea to replace the existing Pacific Ocean outfall, referred to in this Appraisal Analysis as the Inland Empire Interceptor, or IEI.

Appraisal Analysis Objectives

The purpose of this Inland Empire Interceptor Appraisal Analysis (Appraisal Analysis) is to help determine whether more detailed investigations of the proposed Inland Empire Interceptor (IEI) are justified. Under Reclamation criteria (***Reclamation Manual FAC 09-01***), appraisal analyses "are intended to be used as an aid in selecting the most economical plan by comparing alternative features" and are to be prepared "using the available site-specific data." Several alternative conceptual designs for the proposed IEI will be developed and evaluated for this Appraisal Analysis for the purpose of comparison.

In consideration of these objectives, the Appraisal Analysis will address the following:

- Water quality and environmental considerations,
- Brine pre-treatment requirements,
- Environmental permitting requirements,
- Institutional constraints,
- Preliminary pipeline alignments,
- Pumping requirements, and
- Capital and Operation, Maintenance and Replacement (OM&R) costs.

Technical Memorandum No. 1

The purpose of this Technical Memorandum No. 1 is to identify the information that has been gathered for use in performing this Inland Empire Interceptor Appraisal Analysis. This information gathering includes collection of data from SAWPA and other agencies. Information gathering also includes obtaining and reviewing previous study reports and other available documents that may be useful in performing the Study.

DATA COLLECTION

Historic and Future Brine Flow

This Appraisal Analysis will present historic brine concentration and flow data for the Santa Ana Watershed. This historic data will be used in development of future brine concentration and flow projections. Current and projected flow data obtained from SAWPA member agencies (EMWD, IEUA, OCWD, SBVMWD and WMWD) may also be used to perform this analysis.

Inland Empire Brine Line

The Brine Line includes approximately 72 miles of pipeline in multiple branches which converge in the vicinity of Prado Dam near the City of Corona. It has a planned capacity of approximately 32.5 MGD and was planned for collection and exportation of approximately 271,000 tons of salt per year from the upper Santa Ana Watershed, east of the Santa Ana Mountains. Currently (2010 & 2011); and the current average system flows are approximately 11.7 MGD and over 75,000 tons of salt are exported per year.

Another 21 miles of pipeline convey the combined flows to Orange County Sanitation District (OCSD) facilities for treatment and disposal by discharge to the Pacific Ocean. This pipeline has a nominal capacity of 30 MGD. The planned capacity of the Brine Line system (32.5 MGD) exceeds the hydraulic capacity of the pipeline from the Brine Line convergence near Prado Dam to the OCSD facilities. Furthermore, the agreement between SAWPA and OCSD allows Brine Line flows to the OCSD system up to only 17.0 MGD, with a contractual right to purchase up to 30.0 MGD capacity.

As discussed above, the report entitled ***Santa Ana Watershed Salinity Management Program, Phase 2 SARI Planning Technical Memorandum***, prepared by CDM, et al, in May 2010 identified and investigated several alternatives for disposal of Brine Line flows. That study included a cursory review of a proposed new Brine Line outfall to the Salton Sea to replace the existing Pacific Ocean outfall.

Appraisal estimates will be developed for the costs of the proposed IEI. This Appraisal Analysis will address:

- Water quality and ecological effects of discharging brine flow to the Sea,
- Brine pre-treatment requirements,
- Environmental permitting requirements,

- Institutional considerations (e.g. interactions with the Salton Sea Advisory Committee and Indian Tribes),
- Preliminary pipeline alignments,
- Pumping requirements and energy demands, and
- Appraisal estimates of the capital and operational, maintenance and replacement (OM&R) costs.

INFORMATION GATHERING

Previous Studies

[1] ***One Water One Watershed, 2010 Integrated Regional Water Management Plan***, Santa Ana Watershed Project Authority, 2010.
http://www.sawpa.org/owow-generalinfo.html

[2] ***Inland Empire Brine Line Disposal Option Concept Investigation (Draft)***, Santa Ana Watershed Project Authority, October 2011.

[3] ***Santa Ana Watershed Salinity Management Program, Summary Report***, Camp, Dresser & McKee (CDM), et al for Santa Ana Watershed Project Authority, July 2010.
http://www.sawpa.org/documents/SAWPASummaryReportJuly2010.pdf

[4] ***Santa Ana Watershed Salinity Management Program, Phase 2 SARI Planning Technical Memorandum***, Camp, Dresser & McKee (CDM), et al for Santa Ana Watershed Project Authority, May 2010.
http://www.sawpa.org/documents/SAWPATM2_Final.pdf

[5] ***Southern California Regional Brine-Concentrate Management Study – Phase I, Executive Summary***, Bureau of Reclamation, October 2009.
http://usbr.gov/lc/socal/reports/brineconcentrate/1ExecSumm.pdf

[6] ***Final Environmental Assessment SARI Repairs Upstream of Prado Dam***, Santa Ana Watershed Project Authority, April 2011.
http://www.sawpa.org/documents/sari/Prado%20SARI%20Line%20fdEA%20REPAIRS.pdf

[7] ***Restoration of the Salton Sea, Summary Report***, Bureau of Reclamation, September 2007.
http://www.usbr.gov/lc/region/saltnsea/FinalSummaryRpt.pdf

[8] ***Salton Sea Species Conservation Habitat Project Draft Environmental Impact Report***, for U.S. Army Corps of Engineers and California Natural Resources Agency by CDWR & CDFG, with assistance from Cardno ENTRIX, August 2011. http://www.water.ca.gov/saltonsea/habitat/eir2011.cfm

[9] ***Salton Sea Ecosystem Restoration Program Draft Programmatic Environmental Impact Report***, for California Natural Resources Agency by CDWR & CDFG, with assistance from CDM, October 2006 and ***Salton Sea Ecosystem Restoration Program Draft Programmatic Environmental Impact Report***, for California Natural Resources Agency by CDWR & CDFG, with assistance from CDM, June 2007. http://www.water.ca.gov/saltonsea/peir/

[10] ***Hazard, The Future of the Salton Sea with No Restoration Project***, Pacific Institute, May 2006. http://www.pacinst.org/reports/saltonsea/report_lowres.pdf

Background Information

[11] ***Brine Line to the Salton Sea*** (PowerPoint Slides), Celeste Cantu' Santa Ana Watershed Project Authority.

[12] ***Inland Empire Brine Line (Santa Ana Regional Interceptor, SARI)*** (PowerPoint Slides), Rich Haller, Santa Ana Watershed Project Authority, March 2010. http://www.sawpa.org/documents/sari/BrineLine3-23-10.pdf

Other Resources

[13] California Environmental Quality Act, Public Resources Code Section 21000. http://www.leginfo.ca.gov/calaw.html

[14] The California Coordinate System, Caltrans Surveys Manual, Survey Datums, June 2001. http://www.dot.ca.gov/hq/row/landsurveys/SurveysManual/04_Surveys.pdf

[15] ***Reclamation Manual, Directives and Standards, FAC 09-01, Cost Estimating & 09-0,2 Construction Cost Estimates and Project Cost Estimates***, Bureau of Reclamation, October 2007.

[16] ESO Manual, latest edition, 2011.

Additional Resources Cited in Technical Memorandum No. 2

The following Additional Resources are referenced in Technical Memorandum No. 2 by the numbers listed below, which are not cited in previous Technical Memoranda. Reference numbers are reused and duplicate numbers used in previous Technical Memoranda. Various Urban Water Management Plans (not listed) are also referenced in Technical Memorandum No. 2.

[6] ***Coachella Valley Final Water Management Plan***, Coachella Valley Water District in association with MWH Americas, Inc. and Water Consult, Inc., et al, September 2002.

[7] ***Coachella Valley Water Management Plan Update (Draft Report)***, MWH Americas, Inc. and Water Consult, Inc., et al for Coachella Valley Water District, December 2010.

[8] ***2010 Urban Water Management Plan (Final Report)***, Coachella Valley Water District in association with MWH Americas, Inc., July 2011.

[9] ***Draft Subsequent Program Environmental Impact Report (Administrative Draft)***, Coachella Valley Water District, July 2011.

[10] ***Final Subsequent Program Environmental Impact Report***, Coachella Valley Water District with assistance from MWH Americas, Inc. and Water Consult, Inc., January 2012.

Additional Resources Cited in Technical Memorandum No. 3

The following Additional Resources are referenced in Technical Memorandum No. 3 by the numbers listed below, which are not cited in previous Technical Memoranda. Reference numbers are reused and duplicate numbers used in previous Technical Memoranda.

[4] ***DRAFT Memorandum, Subject: Santa Ana Regional Interceptor (SARI) Solids Control Alternatives Conceptual Costs***, CDM for Santa Ana Watershed Project Authority, April 1 2011.

[5] ***Central Arizona Salinity Study, Strategic Alternatives for Brine Management in the Valley of the Sun***, U.S. Department of Interior Bureau of Reclamation, January 2010.

[6] ***Restoration of the Salton Sea, Summary Report***, U.S. Department of Interior Bureau of Reclamation, September 2007.

[7] ***Salton Sea Species Conservation Habitat Project Draft Environmental Impact Report***, for U.S. Army Corps of Engineers and California Natural Resources Agency, by California Department of Fish and Game and California Department of Water Resources with assistance from Cardno ENTRIX, August 2011.

[8] ***Salton Sea Ecosystem Restoration Program Draft Programmatic Environmental Impact Report***, for California Natural Resources Agency, by California Department of Fish and Game and California Department of Water Resources with assistance from CDM, June 2007.

[9] ***Salton Sea Revitalization & Restoration, Salton Sea Authority Plan for Multi-Purpose Project, Executive Summary***, Salton Sea Authority, June 2006.

[10] ***Manual: Constructed Wetlands Treatment of Municipal Wastewaters***, U.S. Environmental Protection Agency, 1999.

[11] ***Water Quality Control Plan: Colorado River Basin - Region 7***, Colorado River Basin Regional Water Quality Control Board, 2006.

[12] ***Evaporation Pond Sizing with Water Balance and Make-up Water Calculations***, Idaho National Engineering and Environmental Laboratory, Engineering Design File, 2001.

[13] ***Hydrologic Regimen of Salton Sea, California***, U.S. Department of Interior Geological Survey, Professional Paper 486-C, 1966.

[14] ***Membrane Concentrate Disposal: Practices and Regulation***, U.S. Department of Interior Bureau of Reclamation, Desalination and Water Purification Research and Development Program Report No. 69, September 2001.

[15] ***Principles of Design and Operations of Wastewater Treatment Pond Systems for Plant Operators, Engineers and Managers***, U.S. Environmental Protection Agency, 2001.

[16] ***Recommended Standards for Wastewater Facilities,*** ("Ten States Standards") Great Lakes Upper Mississippi River Board of State Public Health and Environmental Managers ("GLUMRB"), 1990.

Additional Resources Cited in Technical Memorandum No. 4

The following Additional Resources are referenced in Technical Memorandum No. 4 by the numbers listed below, which are not cited in previous Technical Memoranda. Reference numbers are reused and duplicate numbers used in previous Technical Memoranda.

[7] ***Desert Aqueduct Project Development Plan Phase 1 Report (Draft)***, GEI/Bookman-Edmonston, et al for Coachella Valley Water District, et al, August 2007.

[8] ***RSMeans Facilities Construction Cost Data, 2011, 26th Annual Edition***, RSMeans, a division of Reed Construction Data, 2010.