

# RECLAMATION

*Managing Water in the West*

## **Plan of Study for the Southeast California Regional Basin Study**

**A Water Supply, Conveyance and Storage Assessment**



# Contents

|                                                     | Page     |
|-----------------------------------------------------|----------|
| <b>Introduction.....</b>                            | <b>1</b> |
| <b>Study Purpose &amp; Objectives .....</b>         | <b>2</b> |
| <b>Study Management .....</b>                       | <b>3</b> |
| <b>Study Schedule, Phases, &amp; Products .....</b> | <b>3</b> |
| <b>Schedule .....</b>                               | <b>3</b> |
| <b>Study Milestones .....</b>                       | <b>4</b> |
| <b>Tasks .....</b>                                  | <b>4</b> |
| <b>Budget .....</b>                                 | <b>6</b> |
| <b>Products .....</b>                               | <b>6</b> |
| <b>Appendix A – References .....</b>                | <b>1</b> |
| <b>Appendix B – Location Map .....</b>              | <b>1</b> |

# Introduction

The Bureau of Reclamation (Reclamation) completed a series of Inland Basins Project reports from 1965-1972. The reports inventoried the land and water resources in a region, development levels, and potential future water needs. In 1968, an interim report in this series was completed for the Borrego Valley area. Two report sections have strong implications for the southeast California region of today. The first section was the expected population, agricultural and industrial growth in the Borrego Valley, which would place more demand on the sole source of water supply – groundwater – resulting in overdraft. The second report section detailed three (3) potential sources of water and the possible conveyance routes to deliver the water to the Borrego area. These sources and routes included seawater desalination or import through the San Diego County Water Authority (SDCWA) system delivered via Pauma Valley and Lake Henshaw; brackish groundwater, import or treated agricultural return flows from Coachella Valley Water District (CVWD) delivered along the northwest side of the Salton Sea; and seawater/brackish groundwater desalination, treated agricultural return flows or import from Imperial Irrigation District (IID) delivered along southwest side of the Salton Sea.

Today, all three sectors – population, agriculture and industry – have expanded since the 1960's along with their water demands placing the Borrego Valley aquifer in an overdraft of 15,000 acre-feet per year (AFY). The USGS estimates that the upper aquifer may be depleted in as little as 50 years. Just as in Borrego, water supply demands have grown throughout the southeast California region. The San Diego, Riverside and Imperial county areas identified in 1968 as possible water supply sources for the Borrego Valley now face their own supply challenges. Reclamation proposes to work with a broad range of stakeholders including the Borrego Water District (BWD), IID, CVWD and SDCWA to update the 1968 reconnaissance report to an appraisal level evaluating a range of water supply, storage and conveyance alternatives including the 1968 sources that could be a regional benefit to all parties. The study area will be eastern Riverside County, and all of Imperial and San Diego counties.

Issues that will be addressed in the study include Borrego Valley aquifer overdraft and potential storage capabilities; IID's Colorado River entitlement over/under-runs and storage alternatives; CVWD's Colorado River entitlement over/under-runs and storage alternatives, and supply delivery alternatives to the Salton City area; treatment and storage alternatives of IID and CVWD agricultural return flows and perched groundwater; alternative delivery and storage options for SDCWA's Colorado River allotment; and maintaining a no adverse effect on the Salton Sea and/or associated archaeological-cultural resources and biological resources.

# Study Purpose & Objectives

Reclamation's Southern California Area Office (SCAO) in partnership with the Borrego Water District collaborated with three regional water districts – Imperial Irrigation District, Coachella Valley Water District, and San Diego County Water Authority – to develop a proposal that was submitted in June 2010 to Reclamation's Basins Study Program (Program). Additional stakeholders in this Region provided letters of support. In September 2010, the study was selected for partial funding to develop a plan of study. If that plan is approved by Reclamation then additional Federal funds will be available to match the District's cost share.

The primary goals of this study are to develop and analyze alternative solutions to improve southeast California's regional water supply utilization, storage and conveyance capabilities. This study will also coordinate with other regional planning efforts (e.g., California's Integrated Regional Water Management Planning efforts, and the Colorado River Basin Study), and other federal agencies (USGS) working on water related issues.

The study will assess optimal water utilization, conveyance and storage alternatives that address southeastern California issues through:

- Characterize current regional water supply and demand, and conveyance and storage alternatives in southeastern California;
- Assess risk(s) to southeastern California water supplies through historical climate change variability, and future climate change and scenario modeling projections;
- Identify potential strategies and options to resolve southeastern California water supply and demand imbalances including:
  - Modifications to the operating guidelines or procedures of water supply systems;
  - Modifications to existing facilities and development of new facilities;
  - Modifications to existing water conservation and management programs and development of new programs;
  - Modifications to existing water supply enhancement programs and development of new programs; and
  - Other structural and non-structural solutions.
- Identification of potential legal and regulatory constraints and analysis of potential impacts to water users and southeastern California resources for the strategies and options considered; and
- Prioritization of identified strategies and options and the recommendation for potential future actions, including an engineering and economic feasibility study, Congressional authorization, environmental compliance activities, demonstration programs, and/or implementation as appropriate.

# Study Management

One Co-Study Manager will be designated from Reclamation and Borrego Water District. The Co-Study Managers will sit on and lead the Steering Team. The Steering Team will consist of technical representatives from Reclamation, BWD, CVWD, IID, and SDCWA. Other technical members may be appointed to the Steering Team if needed. Team members will collaborate and ensure all the Study tasks are completed in a cost-effective, timely manner, and are technically sound. Members of the Steering Team provide the expertise, experience, and knowledge that relate to the Study's scope and objectives.

# Study Schedule, Phases, & Products

The proposed Study will upgrade the 1968 reconnaissance investigation to an appraisal-level analysis. The Study will be broken out into five tasks with corresponding subtasks that address three major phases: Water Supply and Demand Assessment, Climate Change and Scenario Modeling Analysis, and Strategies, Options and Appraisal Level Analysis.

## Schedule

The Study will be conducted over a two year period beginning in January 2011.

| Phase                                                | 2011    |         |         |         | 2012    |         |         |         |
|------------------------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
|                                                      | Jan-Mar | Apr-Jun | Jul-Sep | Oct-Dec | Jan-Mar | Apr-Jun | Jul-Sep | Oct-Dec |
| Characterize water supply & demand <sup>1</sup>      | ■       | ■       |         |         |         |         |         |         |
| Climate change & scenario modeling <sup>2</sup>      |         |         | ■       | ■       | ■       |         |         |         |
| Options & appraisal level analysis                   |         | ■       | ■       | ■       | ■       | ■       |         |         |
| Identify strategies & Options <sup>3</sup>           |         |         |         | ■       | ■       | ■       | ■       |         |
| Identify legal & regulatory constraints <sup>4</sup> |         |         |         | ■       | ■       | ■       | ■       | ■       |
| Prioritize strategies & options <sup>5</sup>         |         |         |         |         |         | ■       | ■       | ■       |

See last footnote<sup>6</sup>

<sup>1</sup> These tasks were covered in the original June 2010 Basin Study proposal under Tasks 1 and 5

<sup>2</sup> This task was covered in the original proposal under Task 2

<sup>3</sup> This task was covered in the original proposal under Task 3 & 4

<sup>4</sup> This task was covered in the original proposal under Tasks 1, 3 and 7

<sup>5</sup> This task was covered in the original proposal under Tasks 6 and 7

<sup>6</sup> Task 8 in the original proposal is addressed throughout current Tasks 1-5

# Study Milestones

| <b>Milestone:</b> | <b>Deliverable Description:</b>                   |
|-------------------|---------------------------------------------------|
| Dec 10            | Update Plan of Study, Define Scope of Work        |
| Jun 11            | Water supply and demand assessment report         |
| Dec11             | Draft climate change and scenario modeling report |
| Mar 12            | Draft report on study strategies and options      |
| Jun 12            | Draft report on legal and regulatory constraints  |
| Sep 12            | Draft final report and appendices                 |
| Dec 12            | Final Study report and appendices                 |

## Tasks

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Task 1 Water Supply Assessment:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1.1 Review & Select Methods to Estimate Current Supply: <ul style="list-style-type: none"> <li>1.1.1 Historic Observed Record</li> <li>1.1.2 Paleo Record</li> </ul> 1.2 Review & Select Methods to Project Future Supply 1.3 Conduct Assessment of Current Supply 1.4 Conduct Assessment of Future Supply                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Task 2 Water Demand Assessment:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2.1 Review & Select Methods to Estimate Current Demands 2.2 Review & Select Methods to Project Future Demands 2.3 Conduct Assessment of Current Demands 2.4 Conduct Assessment of Future Demands                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Task 3 Water Supply and Demand Assessment Report:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 3.1 Prepare Draft Interim Report 3.2 Peer Review Report 3.3 Prepare & Publish Interim Report                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Task 4 Climate Change and Scenario Modeling:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 4.1 Coordinate BCM-climate change modeling efforts with local and regional stakeholders <ul style="list-style-type: none"> <li>4.1.1 Enhance, modeling capability as needed to incorporate methods to project future supply</li> <li>4.1.2 Conduct sensitivity analysis of selected methods to project future supply</li> </ul> 4.2 Develop range of 3-5 future demand scenarios for residential, agricultural and industrial demands <ul style="list-style-type: none"> <li>4.2.1 Develop model parameters to incorporate methods to project future demands</li> </ul> 4.3 Determine Baseline System Reliability <ul style="list-style-type: none"> <li>4.3.1 Determine Baseline Scenario Modeling Assumptions</li> <li>4.3.2 Prepare Model to Simulate Baseline Scenario</li> <li>4.3.3 Perform Model Simulations</li> <li>4.3.4 Synthesize &amp; Analyze Model Results</li> </ul> |

- 4.3.5 Summarize Model Results
- 4.4 Project Future System Reliability
  - 4.4.1 Determine Future Scenario Modeling Assumptions
  - 4.4.2 Prepare Model to Simulate Future Scenarios
  - 4.4.3 Perform Model Simulations
  - 4.4.4 Synthesize & Analyze Model Results
  - 4.4.5 Determine Modeling Assumptions for Supply/Demand Opportunities
  - 4.4.6 Prepare Model to Simulate Future Conditions Under Supply/Demand Opportunities
  - 4.4.7 Perform Model Simulations with Supply/Demand Opportunities
  - 4.4.8 Synthesize & Analyze Model Results
- 4.5 Prepare Draft Interim Report
- 4.6 Peer Review Report
- 4.7 Prepare & Publish Interim Report

#### **Task 5 Strategies, Options and Appraisal Level Analysis:**

- 5.1 Develop Opportunities:
  - 5.1.1 Identify Opportunities
  - 5.1.2 Determine Preliminary Opportunities for Evaluation
  - 5.1.3 Analyze Opportunities (Preliminary)
- 5.2 Evaluate & Refine Opportunities:
  - 5.2.1 Technical & Economic Feasibility
  - 5.2.2 Uniform Cost Comparison
  - 5.2.3 Environmental Impacts/Permitting Requirements (e.g., Salton Sea, Environmental Justice, ESA)
  - 5.2.4 Economic and Socioeconomic Impacts
  - 5.2.5 Legal and Public Policy Considerations (e.g., Law of the River, QSA)
  - 5.2.6 Risk and Uncertainty
  - 5.2.7 Others
  - 5.2.8 Assessment of Effectiveness
  - 5.2.9 Potential Yield
  - 5.2.10 Timeframe for Implementation
  - 5.2.11 Agreements or Partnerships Needed
  - 5.2.12 Cost Allocation
  - 5.2.13 Sitting
- 5.3 Finalize Opportunities:
  - 5.3.1 Determine Ability of Opportunities to Resolve Imbalances
- 5.4 Prepare Draft Interim Report
- 5.5 Peer Review Report
- 5.6 Prepare & Publish Interim Report

# Budget

| Task   | Role / Responsibility                                                             | Estimated Cost      |
|--------|-----------------------------------------------------------------------------------|---------------------|
| Task 1 | Study Team                                                                        | \$57,270.00         |
| Task 2 | Study Team                                                                        | \$40,050.00         |
| Task 3 | Study Team                                                                        | \$10,500.00         |
| Task 4 | Reclamation                                                                       | \$254,000.00        |
| Task 5 | Study Team                                                                        | \$395,391.00        |
|        | Subtotal                                                                          | \$757,211.00        |
|        | Study Management (10%)                                                            | \$832,932.10        |
|        | <b>Total</b>                                                                      | <b>\$832,932.10</b> |
|        | Note: In Task 4 & 5 additional funding may be requested to complete these actions |                     |

# Products

The primary products produced in this Study will be interim written reports to be integrated into a final report that will include the following elements:

- Characterization of current and projected water supply and demand;
- Characterization of climate change impacts on supply and demand;
- Assessment of future residential, agricultural and industrial demand scenarios;
- Development and evaluation of options for balancing supply and demand;
- Description of methods and research processes, including assumptions, models and data used in the Study; and
- Description of stakeholder involvement.

# Appendix A – References

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## Appendix B – Location Map



