

Mojave Water Agency Water Supply Reliability and Groundwater Replenishment Program

CHAPTER 1: INTRODUCTION

1.1 Legal Basis for this Project EIR

In 1959, the Mojave Water Agency (MWA) was formed by an act of the California Legislature and activated by a vote of the residents in 1960 to manage declining groundwater levels in the Mojave Basin, Lucerne Valley, and El Mirage Basin. The Morongo Basin and Johnson Valley areas were annexed in 1965. MWA covers over 4,900 miles (Figure 1-1). Within the region served by MWA, 30 local water supply agencies and many individuals rely almost entirely on groundwater supply. Seven of these local agencies have developed Urban Water Management Plans. MWA does not supply water directly to local customers or regulate local-agencies' development of groundwater supply. Rather, MWA holds a State Water Project contract and utilizes a variety of facilities to import and distribute water to replenish groundwater basins and to meet the obligations of the Mojave Basin Area and Warren Valley judgments related to groundwater supply.

MWA's function is thus to utilize available supplies in a manner consistent with California Water Code Section 79562.5(b), which outlines four elements of integrated water management planning, specifically:

- Water supply,
- Groundwater management,
- Ecosystem restoration, and
- Water quality.

MWA operates under a Regional Water Management Plan, initially adopted in 1994 and revised in 2004, adopted by the Board of Directors of MWA on February 24, 2005 (2004 Regional Water Management Plan, see MWA 2004a) following adoption of a Final Program Environmental Impact Report (2004 PEIR; State Clearinghouse Number 2003101119) (see reference MWA 2004b). This Project EIR tiers off the 2004 PEIR.

MWA also operates under the Mojave Basin Area Judgment (Judgment), which sets limits (Free Production Allowances) on the amount of groundwater production that can occur in each subarea without incurring an obligation to purchase imported water. These limits are based on long-term (1931-1990) averages of water supply and the highest year of production between 1986 and 1990. The Judgment requires reductions in Free Production Allowances of 5% per year in each subarea until each subarea is in balance with the available water supply. Production in excess of the Free Production Allowance must be replaced with either (a) supplemental water from MWA or (b) use of unused Free Production Allowance from another party to the Judgment.

1.2 Purpose of the Project EIR

Within this context, MWA's role is to provide reliable supplemental water supplies to the Judgment to (a) replace supplies produced in excess of an agency's Free Production Allowance and/or (b) to replenish the region's overdrafted groundwater basins. The 2004 Regional Water Management Plan defines MWA's overall water management objectives for the period 2004-2020:

- A. Balance future water demands with available supplies recognizing the need to:
 - Stabilize the groundwater basin storage balance over long-term hydrologic cycles;
 - Protect and restore riparian habitat areas identified in Exhibit H of the Mojave Basin Area Judgment and California Department of Fish and Game (CDFG) management plan required by Exhibit H;
 - Limit the potential for well dewatering, land subsidence, and migration of poor quality water;
 - Maintain a sustainable water supply through extended drought periods; and
 - Select projects with the highest likelihood of being implemented.

- B. Maximize the overall beneficial use of water throughout MWA by:
 - Supplying water in quantity and quality suitable to the various beneficial uses;
 - Addressing issues throughout the MWA service area recognizing the interconnection and interaction between different areas;
 - Distributing benefits that can be provided by MWA in an equitable and fair manner;
 - Ensuring that costs incurred to meet beneficial uses provide the greatest potential return to beneficiaries of the project(s);
 - Avoiding redirected impacts; and
 - Identifying sustainable funding sources including consideration of affordability.

The region is divided into two major surface water drainage areas, the Mojave River Area and the Morongo Basin/Johnson Valley Area. These two hydrologically separate surface water basins overlie separate groundwater basins, which themselves are divided into distinct subareas and (as defined by the California Department of Water Resources) 22 specific groundwater basins. For purposes of management, MWA has identified six major management basins within its service area (Figure 1-2):

- Mojave River Basin
 - Alto Area
 - Oeste Area
 - Este Area
 - Centro Area
 - Baja Area
- Morongo Basin/Johnson Valley

To meet its obligations to parties to the Judgment and local agencies in these six areas, MWA operates by (a) making releases of supplemental supplies to the Mojave River mainstem for direct recharge to the river aquifer and/or (b) using a network of pipelines to deliver supplemental supplies to local groundwater replenishment facilities (recharge basins). At present, discharges to the Mojave River mainstem from Silverwood Reservoir are limited to periods when the endangered southwestern arroyo toad is not breeding or active in the channel.

The 2004 Plan and 2004 PEIR note that one of the key problems to be addressed in order to meet these objectives is the substantial historic overdraft of groundwater basins within MWA's Service area. Groundwater overdraft in these six groundwater basins (Figure 1-2) and combined expected growth and associated increasing demand for water were projected to result in a groundwater recharge requirement of 59,100 acre-feet per year by 2020 (Table 1-1). The Mojave Floodplain Aquifer is the aquifer in the immediate vicinity of the Mojave River, and the Mojave Regional Aquifer is the aquifer underlying the (much larger) area outside of the direct influence of the Mojave River Floodplain.

Table 1-1. Summary of estimated MWA recharge requirements 2020), by aquifer (From 2004 PEIR, Section 2.8; See Figure 2 for location of Subareas).

PRINCIPAL AQUIFER	SUBAREA	PROBLEMS		ESTIMATED RECHARGE REQUIREMENT
		Overdraft	Growth	
Mojave Regional Aquifer	Alto	High	High	41,000
	Baja	High	Low	
	Centro	NA	NA	
	Este	Low-Moderate	Moderate	
	Oeste	Moderate	Moderate	
Mojave Floodplain Aquifer	Alto	High	High	23,000
	Baja	High	High	
	Centro	Low	Low	
Morongo Basin/Johnson Valley	Este/Lucerne	Low	Low	2,800
	Johnson Valley	Low	Low	
	Copper Mountain	Moderate	Moderate	
	Means/Ames	High	NA	
	Warren Valley	Low	Moderate	

Estimated recharge requirements shown on Table 1-1 are based on estimates of annual natural supply compared to current levels of consumptive use. Based on the 2004 PEIR, about 93% of the supply deficit occurs in the Alto and Baja subareas. These areas have the highest concentrations of development (Victorville/Hesperia and Barstow areas respectively). Areas with the highest historic overdraft and highest projected growth are shaded on Table 1-1, which shows that the most serious historic and potential problems are located in the Alto and Baja regions, where historic overdraft has been high. The 2004 Regional Water Management Plan identifies these regions as "High Priority" for action.

The significance of these problems is addressed in the 2004 Regional Water Management Plan and 2004 PEIR, which note, in summary, that:

- By 2020, projected demand exceeds supply by from 59,100 acre-feet per year to 81,500 acre-feet per year;
- Groundwater quality is affected by arsenic, nitrates, iron, manganese, chromium VI, total dissolved solids (TDS), total petroleum hydrocarbons (TPH), and volatile organic compounds (VOCs);
- Overdraft occurs in all areas, and this can cause wells to go dry, water quality to be degraded, land to subside, and riparian habitats to be affected;
- All but the Oeste and Morongo Basin/Johnson Valley subareas have riparian ecosystem maintenance problems;
- Wastewater discharges affect aquifer water quality;
- Activities in each subarea may be affected by activities in adjacent subareas;

The 2004 Plan notes that there are two fundamental actions that may be taken to address the problem of groundwater overdraft and future growth/water demand:

- Supply enhancement projects, either involving groundwater recharge or an increase in groundwater efficiency; and
- Management actions, involving conservation, storage agreements, and water transfers.

Between 2005 and 2020, MWA has a window of opportunity to address these problems, particularly to initiate banking and exchange programs. MWA has a State Water Project contract for a maximum 75,800 acre-feet of water per year, but from 1978 through 2001, average annual SWP deliveries were only 6,253 acre-feet, and no deliveries were made in 11 of the 24 years of record. This under-use of MWA's SWP contract supplies reflects local agency reliance on less-costly groundwater supplies. If MWA's full SWP Table A supply had been delivered over the same period of time, it would have been possible to substantially reduce (and in some instances fully offset) groundwater overdraft.

MWA's ability to take delivery of its SWP Table A supply is affected by (a) lack of facilities to convey, recharge, and store this water and (b) funding limitations. The purpose of the Proposed Water Supply Reliability and Groundwater Replenishment Program is to address these two issues.

1.3 Mojave Water Agency 2004 Regional Water Management Plan PEIR

1.3.1 Scope

The 2004 Regional Water Management Plan and 2004 PEIR evaluated available water supplies and concluded, in summary, that:

- Most groundwater in the Mojave Basin is the result of infiltration of water from the Mojave River and/or local streams from the San Bernardino Mountains.
- Infiltration rates from the mountains to the Regional Aquifer are low, and groundwater in the Regional Aquifer may be the result of slow long-term recharge.
- Infiltration associated with precipitation in the Mojave Basin itself is minimal, due to the low annual precipitation and high rates of evapotranspiration.
- Groundwater extraction in excess of natural replenishment results in overdraft that is not rapidly replaced from natural resources.
- Groundwater levels in the regional aquifer were once higher than those in the Floodplain Aquifer, but overdraft has reversed this trend and the Mojave Floodplain Aquifer now recharges the Regional Aquifer.

Given these overall conclusions, the 2004 PEIR notes that correcting overdraft and managing water supplies in the future will require additional sources of supply and facilities to recharge this supply to the MWA groundwater basins. The 2004 PEIR identified 43 potential supply enhancement projects and management actions and evaluated (a) their priority for meeting defined regional needs and (b) their probable environmental effects at a programmatic level. These projects included a number of programs for water conservation:

- Non-native plant eradication (tamarisk),
- Agricultural water conservation programs, and
- Urban water conservation programs,

MWA determined that these conservation approaches were "high" priority and is in the process of implementing these programs as part of its overall approach to water management. The highest priority water supply enhancement projects are listed on Table 1-2.

Table 1-2. Summary of "high" priority water supply enhancement projects from the 2004 PEIR. Project numbers refer to Table 2-2, 2004 PEIR.

PROJECT #	PROJECT: LOCATION	AREA AFFECTED
4	RECHARGE: Oro Grande Wash	Mojave Regional Aquifer, Alto West
5	RECHARGE: Cedar Street Detention Basins	Mojave Regional Aquifer, Alto Mid 1
6	RECHARGE: Antelope Wash	Mojave Regional Aquifer, Alto Mid 1
11	RECHARGE: HDWD Recharge Basin 3, Warren Valley	Morongio Basin/Johnson Valley
13	RECHARGE: Newberry Springs	Mojave Floodplain Aquifer, Baja
18	RECHARGE: Rock Springs Release	Mojave Floodplain Aquifer, Alto
19	RECHARGE: Hesperia Lakes	Mojave Floodplain Aquifer, Alto
20	RECHARGE: South of Rock Springs	Mojave Floodplain Aquifer, Alto
21	RECHARGE: Release from Silverwood Lake to Mojave River	Mojave Floodplain Aquifer, Alto
42	SUPPLY: Pre-delivery of SWP Water	All areas
43	SUPPLY: Water entitlement exchanges	All areas

1.3.2 Program Level Analysis

The 2004 PEIR defined the existing condition, identified probable environmental effects, and addressed approaches to mitigation for the suite of 43 potential projects identified in the 2004 PEIR. The 2004 PEIR addressed the following categories of potential effect:

- Water Resources
- Biological Resources
- Land Use
- Public Services and Utilities
- Recreation
- Aesthetics
- Air Quality
- Cultural Resources
- Geology and Soils
- Hazards and Hazardous Materials
- Noise
- Traffic
- Growth
- Cumulative Impacts

For each of these categories, the 2004 PEIR identified the type of impacts, the general magnitude of these impacts, and a programmatic approach to avoidance, minimization, and mitigation for impacts. The approach to avoidance, minimization, and mitigation specified the type of environmental survey and analysis required, the type of mitigation if impacts were identified, and subsequent general monitoring protocols. The 2004 PEIR provides a systematic and integrated perspective on regional-level environmental conditions and impacts.

Based on proposed avoidance, minimization, and mitigation measures proposed, the 2004 PEIR concluded:

"Numerous impacts are identified as less-than-significant with no mitigation required. Impacts to air quality associated with construction and secondary effects of growth supported by the Plan were found to be significant and unavoidable. All other impacts were either less than significant or reduced to less than significant levels through implementation of mitigation measures."

1.3.3 Relationship of 2004 PEIR to Water Supply Reliability and Groundwater Replenishment Program

The potential elements of the Water Supply Reliability and Groundwater Replenishment Program were identified and evaluated at a programmatic level in the 2004 PEIR, including both facilities and their operations. The purpose of this Project EIR is to (a) more precisely define the scope and operation of various alternatives, including additional features that may be required for banking, exchange, and long-term MWA use and (b) more precisely identify and quantify the potential impacts of specific alternatives involving various combinations of the 43 potential projects identified in the 2004 PEIR and to propose specific mitigation to reduce these impacts to a level of less than significant, to the extent feasible, in accordance with the 2004 PEIR.

1.4 Scope of Analysis

1.4.1 General

To accomplish its objectives and meet regional needs, MWA would (a) use existing facilities, enhance existing facilities and/or construct new facilities to increase capacity for groundwater recharge and extraction; and (b) modify its current operations to include water banking programs and water exchange programs to enhance operational flexibility and water supply reliability. Although new facilities and operational flexibility may result in water banking and exchange opportunities among various agencies, MWA is specifically evaluating a potential water banking and exchange program with Metropolitan Water District of Southern California (Metropolitan) as part of the Proposed Project. MWA will also evaluate the potential for using the proposed facilities to conduct water banking programs with other entities.

In this Project EIR, MWA has not selected a Proposed Project. Rather, MWA has conducted a detailed engineering feasibility analysis to identify a suite of potentially feasible facilities and operational scenarios for detailed consideration. These facilities and operations have been combined to form seven potential alternatives with four varying levels of facilities combined with three operations scenarios. The EIR will (a) describe the feasibility analysis and (b) address this range of potentially feasible alternatives.

Facilities which are included in the various alternatives include:

- The existing Mojave River Pipeline and Morongo Basin Pipeline (and modifications to these facilities);
- Existing recharge basins at Hodge, Lenwood, Daggett, and Newberry Springs (Mojave River Pipeline) and the Warren Basin (Morongo Basin Pipeline);
- Additional groundwater recharge basins in the vicinity of the California Aqueduct, along the Morongo Basin Pipeline, in Oro Grande Wash, and in Antelope Wash;
- Additional wells in the vicinity of the Mojave River upstream of the Narrows, along the California Aqueduct, East Branch; along the Mojave River Pipeline, and at various locations in the vicinity of Hesperia and Victorville;
- Additional pipelines to convey water to and from recharge basins and wells;
- Temporary sand dikes in the mainstem Mojave River to enhance recharge in the reach between Mojave Forks Dam and the Narrows;
- Facilities and/or rights of way to provide for delivery of supplies from the State Water Project via the West Fork of the Mojave River and/or existing drainage washes leading from the California Aqueduct to the mainstem Mojave River; and
- Ancillary facilities associated with these potential project elements such as monitoring wells, power lines, and pumps and pump housings.

Changes to MWA operations include (a) implementation of a traditional water banking program and (b) implementation of a combined water banking and on-going water exchange program.

1.4.2 Public Scoping Comments and Known Areas of Controversy

The 2004 PEIR documents public comments and concerns about the overall 2004 Plan. In addition, at a Scoping Meeting of the MWA Technical Advisory Committee (TAC), six members of the TAC provided input to the scope of the Project EIR. Public comments were also received at a public meeting of the TAC, at a Scoping Meeting in the City of Barstow, at a Scoping Meeting in the Yucca Valley, and following publication of the Draft 2004 PEIR. Review of these comments shows areas of public concern were:

- Assurance that mitigation would be implemented;
- Growth;
- Enforcement of the standards in the 2004 Plan;
- Consistency with the Mojave Basin Area Judgment;
- The need for a cost-benefit analysis;
- Whether Old Woman Springs Ranch would be part of the 2004 PEIR analysis;
- Water Quality problems in a variety of subareas;
- Potential for use of above ground storage;
- Coordination with local agencies to avoid duplication of effort;
- Consistency with CDFG agreements with Victor Valley Wastewater Authority

- Water quality issues associated with recharge: washdown, upwelling, silt, TDS, and dissolved VOCs to be addressed at a site level;
- Positive impacts of recharge are balanced against negative impacts;
- The need to remediate historic overdraft;
- Identification of current uses that are not beneficial;
- Water reclamation outside of the Alto Basin should be considered;
- Need to consult with CDFG on issues of land, mitigation measures, listed species impacts, and direct, indirect, and cumulative impacts;
- Structures should not alter drainage or affect downstream properties;
- Enforcement of FEMA floodplain regulations;
- Need for permit before work in the floodplain is initiated;
- Need to cite Southern California Association of Governments policies and address them;
- Need to address water quality issues, including: salinity, contamination of soils, nutrients from recycled water, waste brine from treatment plants, herbicides, disinfection byproducts, and emergent chemicals in wastewater;
- Risk associated with filtrate pollution;
- Concern about alternative formulation in the Joshua Tree area;
- MWA's technical, legal, and physical ability to do the 2004 Plan;
- Cost of SWP water and profit to MWA;
- Whether supply and growth projections are accurate given climate change;
- Loss of Pacific Flyway habitat at Hinkley;
- Objective: to meet demand or recover groundwater;
- Ability of MWA to meet needs with projected growth (Hinkley);
- Use of natural recharge basins in Lucerne Valley to obtain multiple benefits;
- Need for water quality treatment in Lucerne Valley; and
- Consistency with the County General Planning effort.

Comments at the April 27, 2005 TAC Meeting on the Project EIR (Chapter 9) indicated concern about the following issues:

- Connection of proposed facilities to the City of Adelanto;
- Need to ensure and adequately document that there is no net loss of water associated with water banking;
- Need to discuss how the Proposed Project is consistent with the Mojave Basin Area Judgment;
- Need for sensitivity analyses to deal with the potential range of effects;
- Is the project basin-wide;
- Need to consider making return deliveries from water banking via a pipeline/canal from Lucerne Valley to the Colorado Aqueduct; and
- How the project would affect the Transition Zone at the Narrows, which is an issue for CDFG.

The FEIR also responds to comment received from the public and from agencies during the draft EIR review period from October 28, 2005 through December 13, 2005 (Appendix A):

INDIVIDUALS

- Mr. Chuck Bell, written comments received during the 47-day comment period;
- Mr. Jeff Bentow, Yermo Water Company, oral comments at the November 8, 2005 public meeting and the November 9, 2005 MWA Technical Advisory Committee;
- Mr. Lou Kershberg, oral comments at the November 8, 2005 public meeting;
- Mr. Guy Patterson, oral and written comments at the November 9, 2005 MWA Technical Advisory Committee
- Mr. and Mrs. Gary E. Thrasher, written comments received during the 47-day comment period;
- Mr. Mathew Woods, oral comments at the November 8, 2005 public meeting and written comments at the November 9, 2005 MWA Technical Advisory Committee
- Mr. Joseph Monroe, written comment received November 17, 2005.

AGENCIES

- California Department of Fish and Game, Habitat Conservation Program, Region 6, Ms. Denyse Racine, Supervisor;
- California Regional Water Quality Control Board, Lahontan Region, South Basin Regulatory Unit, Mr. Greg Cash, Engineering Geologist
- California Department of Water Resources, State Water Project Analysis Office, Ms. Elizabeth Patterson, by email 24 October 2005.
- County of San Bernardino, Department of Public Works, Environmental Management Division, Mr. Naresh P. Varma, Chief

In addition, MWA discussed the proposed project with staff of its potential water banking partner (Metropolitan Water District of Southern California) who unofficially suggested some minor editorial changes to the document. Finally, MWA received correspondence from the Southern California Association of Governments declining to comment on the draft EIR and from the State Clearinghouse indicating that it had not independently received comments from state agencies. MWA's responses to these comments involved (a) clarifications of data provided in the draft EIR and (b) acceptance of additional mitigation recommendations, as documented in Appendix A.

1.4.3 Scope of Project EIR

This Project EIR describes the full scope of alternative formulation and evaluation, beginning with initial feasibility analyses and ending with formulation and evaluation of Proposed Project alternatives. First, it describes the initial effort to screen alternatives based on technical feasibility, cost, and environmental effects. Second, it describes the results of screening and the elimination of some alternatives. Third, it discusses the rationale for formulation of Proposed Project alternatives combining various facilities, and evaluates the potential impacts of these alternatives. The Project EIR addresses both construction and long-term operation and maintenance of the various alternatives.

Each Proposed Project alternative may involve traditional water banking and a modified banking program that includes on-going water exchanges between Metropolitan and MWA:

- Traditional water banking involves construction of facilities to receive water supplies (deposits) from various sources and to store them in a groundwater "bank." These supplies are then returned to the original "depositor" at a later date, minus a percentage to account for loss during recharge and storage. The costs of facilities needed to accomplish the banking program are shared by the partners in the program. As a result, MWA would be able to accelerate development of some facilities needed for accomplishment of its objectives. Traditional water banking generally involves deposits in wet years and returns during dry years. Under a traditional water banking operation with Metropolitan, MWA would be able to make returns by (a) delivering a portion of its SWP supply to Metropolitan and/or (b) pumping stored groundwater into the California Aqueduct.
- Water banking combined with an on-going exchange program involves traditional water banking, combined with on-going water exchanges such as the exchange program MWA currently operates with Solano County Water Agency. The exchange component of such a program involves each partner's exchange of available SWP supplies when the other partner may need them or have capacity to store them; no direct return of stored groundwater is involved in this element of the program. Combining such programs allows for management of supplies on a flexible basis, including short-term banking and exchange of supplies among multiple agencies, depending on water availability and availability of storage within each agency's service area.

The development of new facilities, the modification of existing facilities, changes in operations of facilities, and changes in the timing and amount of water delivered to and returned from MWA as a result of banking and exchange may have positive and/or negative effects on the following environmental resources:

- Aesthetics, including effects related to facilities constructed in the viewshed of residential development;
- Air quality, including dust and emissions from construction equipment and from equipment used during operation of facilities;
- Biological resources, including temporary and permanent loss of habitat, potential take of threatened and endangered species, and potential enhancement of habitat associated with higher groundwater levels;
- Cultural resources, including potential construction effects on buried historic and pre-historic resources;
- Geology and soils, including potential for erosion in areas of recharge, compaction of soils, and effects associated with sediment build up in recharge areas;
- Hazards and hazardous materials, including potential for fuel and lubricant spills during construction and operation of facilities;

- Land use, including use of over 500 acres of land for recharge basins and/or wells;
- Noise, including construction noise and noise from operation of new and existing facilities;
- Public services and utilities, including temporary interruptions in utility service during construction;
- Recreation, including reduced access to the mainstem Mojave River and/or local washes proposed for use as recharge facilities and or conveyance for flows to the mainstem Mojave River and including potential for incidental use of some facilities for low-impact recreational purposes such as jogging, hiking, and biking;
- Traffic, including temporary traffic delays during construction; and
- Water resources, including potential changes in groundwater levels and groundwater quality when compared to the baseline condition and/or the without-project condition.

As noted above, the Project EIR does not identify a preferred alternative, but rather carries a number of potential alternatives forward for consideration by MWA's Board and discusses the key environmental factors to be weighed in an MWA Board decision making process. Each of these alternatives is described as a Potential Proposed Project, and is fully evaluated.

1.4.4 Report Organization

The Final Project EIR is organized into the following Sections:

Executive Summary

Chapter 1: Introduction

Chapter 2: Project Purpose and Need

Chapter 3: Initial Screening of Alternatives and Formulation of Alternatives for detailed Evaluation

Chapter 4: Description of Project Alternatives

Chapter 5: Environmental Setting, Impacts, and Mitigation Measures

Chapter 6: Cumulative Impacts

Chapter 7: Comparison of Alternatives

Chapter 8: References

Chapter 9: Record of Public Involvement

Chapter 10: List of Acronyms and Special Terms

Chapter 11: List of Preparers

Appendix A: Comments and Responses to Comments