IMPERIAL IRRIGATION DISTRICT

INTEGRATED WATER RESOURCES MANAGEMENT PLAN

Table of Contents for Vol. 1 and 2

IMPERIAL IRRIGATION DISTRICT
SEPTEMBER 2009

Table of Contents

1 Purpose and Need, Goals, and Objectives
- 1.1 Introduction
- 1.2 Conflicts
- 1.3 Purpose and Need for IID Plan and Proposed Imperial Region IWRMP
- 1.4 Goal
- 1.5 Objectives

2 Background and Plan Overview
- 2.1 IID Background and Authorities for Developing the IID Plan
- 2.2 Policy Baseline and Existing Conditions
- 2.3 Relation to Other IID Planning Efforts
- 2.4 The IID Water Supply Portfolio
- 2.5 Process and Planning Framework

3 Physical Setting, Regional Water-Related Components
- 3.1 Climate
- 3.2 Physical Components and Infrastructure
- 3.3 Geologic and Groundwater Setting
- 3.4 Other Geologic Resources
- 3.5 Land Use and Water
- 3.6 Flood Protection Measures

4 Proposed Regional Boundary
- 4.1 Basis for Imperial Region Boundary
- 4.2 Relationship and Coordination with other IRWMPs
- 4.3 Relation to other Plans in the Lower Colorado River Basin

5 Demand-Supply and Water Budget
- 5.1 Existing Water Supply and History
- 5.2 Current and Future Water Demands
- 5.3 Current Water Budget
- 5.4 Water Available for Development
- 5.5 Findings

6 Review of Water Management Strategies
- 6.1 Evaluation Method
- 6.2 Preliminary Findings and Screening Results
- 6.3 Strategies Carried Forward for Further Review
- 6.4 Strategies Recommended for Further Consideration as part of the Imperial Region IRWMP
- 6.5 Strategies Eliminated from Further Consideration or Integrated into Other Strategies

7 Demand Management Elements and Alternatives
- 7.1 Agricultural Water Use Efficiency and Conservation
- 7.2 Urban Water Use Efficiency/Conservation
- 7.3 Renewable Energy Production Water Conservation

8 Capital Facility Alternatives
8.1 Screening and Prioritization of Project Alternatives
8.2 Analysis of Priorities and Preferences
8.3 Additional Screening
8.4 Project Descriptions and Summary of Benefits and Risks
8.5 Recommendations and Conclusions

9 Program/Policy Elements Alternatives
9.1 Introduction
9.2 Background
9.3 IID's Role and Responsibility in Water and Land Use Decisions
9.4 Purveying Water to Cities or Other Retail Providers
9.5 Example Alternatives
9.6 Economics of Land Conversion
9.7 Policy Guidelines and Direction
9.8 Concepts Eliminated from Consideration
9.9 Key Concepts for Crafting Policy and Developing the Program
9.10 Findings and Conclusions
9.11 Recommendations

10 Funding Alternatives
10.1 IRWMPs

11 Developing the Imperial Region IRWMP
11.1 Decision Making Structure and Purpose
11.2 Financing the Imperial RWMG and Imperial IRWMP Activities
11.3 New Members
11.4 Working Relationships
11.5 Stakeholder and Public Involvement
11.6 Findings and Conclusions
11.7 Recommendations

12 Next Steps Implementation Plan
12.1 Project Results
12.2 Approach to Implementation
12.3 Imperial IRWMP

APPENDICES

Appendix A	Project Scoping Report Review and Evaluation of Water Management Strategies
Appendix B	Desalination/Groundwater Development Feasibility Study
Appendix C	Technical Memorandum 2.1 Document Existing Colorado River Water Supplies for the Imperial Irrigation District
Appendix D	Technical Memorandum 2.2 Historical and Forecasted Municipal, Commercial, and Industrial Water Demand
Appendix E	Tabulations of Water Budgets
Appendix F	Technical Memorandum IID Groundwater Banking Opportunities
Appendix G	Technical Memorandum: Summary and Analysis of Available Water Quality and Flow Data for Alamo and New Rivers and for Drains within the IID Project Area.
Appendix H	Water Treatment Process Cost Models
Appendix I	Regulatory and Permitting Requirements, Review of Potential Requirements and Complexity
Appendix J	Technical Memorandum Policy Briefing on Integrating Water Supply and Land Use Planning in IID IWRP
Appendix K	Project Evaluation and Ranking Criteria
Appendix L	Imperial Irrigation District Power Plant Water Use Evaluation, IEC
Appendix M-1	Technical Memorandum All American Canal/ East Highline Canal Groundwater Augmentation & Blending
Appendix M-2	Preliminary Evaluation of Substitution of Groundwater for Surface Water on Crop Water Needs
Appendix N	Capital Projects

Table 1- Projects Ranked by Cost

Name	Description	Capital Cost	O&M	Equivalent Annual Cost	Unit Cost ($/AF)	Yield (AF)
GW 18	Groundwater Blending- East Mesa Well Field Pumping to All-American Canal	$ 39,501,517	$ 198,000	$ 2,482,000	$ 99	25000
GW 19	Groundwater Blending- East Mesa Well Field Pumping to All-American Canal with Percolation Ponds	$ 48,605,551	$ 243,000	$ 3,054,000	$ 122	25000
WB 1	Coachella Valley Groundwater Storage Project	$ 92,200,000	$ 7,544,000	$ 5,736,746	$ 266	50000
DES 8	25 KAF East Brawley Desalination with Well Field and Groundwater Recharge	$ 100,991,177	$ 6,166,000	$ 12,006,000	$ 480	25000
AWC 1	Systems Conservation Projects (2)	$ 56,225,000	N/A	$ 4,068,000	$ 504	8000
DES 12	East Mesa 25 KAF Desalination with Well Field and Groundwater Recharge	$ 112,318,224	$ 6,336,000	$ 12,831,000	$ 513	25000
DES 4	50 KAF Keystone Desalination with IID Drainwater/Alamo River	$ 147,437,743	$ 15,323,901	$ 23,849,901	$ 477	50000
DES 14	South Salton Sea 50 KAF Desalination with Alamo River Water and Industrial Distribution	$ 158,619,378	$ 15,491,901	$ 24,664,901	$ 493	50000
DES 15	South Salton Sea 50 KAF Desalination with Alamo River Water and MCI Distribution	$ 182,975,327	$ 15,857,901	$ 26,438,901	$ 529	50000
DES 2	50 KAF Keystone Desalination with Well Field and Groundwater Recharge	$ 282,399,468	$ 13,158,000	$ 29,489,000	$ 590	50000
RW 5	Regional Plant Serving Tertiary Water to IID Canal	$ 20,818,710	$ 829,853	$ 2,033,801	$ 308	6600
RW 1	Disinfected Secondary Effluent from Existing Wastewater Treatment Plants Applied to Adjacent Agriculture	$ 18,779,688	$ 486,671	$ 1,572,702	$ 118	13300
RW 3	Upgrade Existing Plants to Tertiary and Deliver Effluent to IID Canal System	$ 90,531,216	$ 2,992,257	$ 7,498,347	$ 562	13300
RW 6	Regional Plant Serving Tertiary Water to Local Service Area and IID Canal	$ 102,374,854	$ 2,280,145	$ 8,200,493	$ 488	16800
DES 7	East Brawley 25 KAF Desalination with Well Field	$ 100,409,542	$ 6,157,000	$ 11,964,000	$ 479	25000
DES 11	East Mesa 25 KAF Desalination with Well Field	$ 111,746,590	$ 6,327,000	$ 12,789,000	$ 512	25000
DES 1	Keystone 50 KAF Desalination with Well Field	$ 281,817,834	$ 13,149,000	$ 29,447,000	$ 589	50000
DES 10	East Brawley 5 KAF Desalination with Well Field	$ 24,751,185	$ 1,525,000	$ 2,956,000	$ 591	5000
DES 6	Keystone 25 KAF Desalination with Well Field	$ 160,695,766	$ 7,061,000	$ 16,354,000	$ 654	25000
DES 17	Heber 5 KAF Desalination with Well Field	$ 95,899,356	$ 2,476,000	$ 3,303,000	$ 661	5000
DES 13	East Mesa 5 KAF Desalination with Well Field	$ 33,027,263	$ 1,648,000	$ 3,558,000	$ 712	5000
DES 16	South Salton Sea 5 KAF East Desalination with Well Field	$ 62,177,056	$ 1,971,000	$ 5,567,000	$ 1,113	5000
DES 3	Keystone Desalination 50 KAF with Well Field and Groundwater Recharge and MCI Distribution	$ 306,357,788	$ 13,518,000	$ 31,235,000	$ 625	50000
DES 9	East Brawley 25 kAF Desalination with Well Field, Groundwater Recharge and MCI Distribution	$ 162,175,609	$ 7,084,000	$ 16,463,000	$ 659	25000
RW 2	Upgrade Existing Plants to Tertiary and Deliver Effluent to a Local Market	$ 140,568,145	$ 2,597,145	$ 10,726,215	$ 919	11700
RW 4	Regional Plant Serving Tertiary Water Locally	$ 51,323,358	$ 1,438,723	$ 4,406,758	$ 938	4700
DES 5	Keystone 25 KAF Desalination with Well Field, Groundwater Recharge & Evaporation Ponds	$ 372,088,101	$ 10,232,000	$ 31,750,000	$ 1,270	25000
	Project alternatives were considered to have a lower priority - Unit cost > $600/AF , and were not ranked (NR) in the overall Alternatives Ranking Criteria Matrix					
	Project Alternatives were considered to have a lower priority due to no groundwater banking/storage elements and not enough annual yield production < 5,000 AF, and were not ranked (NR) in the overall Alternatives Ranking Criteria Matrix					
	Project Alternatives were considered to have a lower priority due dependance on outside agency parternability, and were not ranked (NR) in the overall Alternatives Ranking Criteria Matrix.					
(1)	Assumed 50 year lifespan, 5% interest. Other project used 30 yrs and 4%. Costs will be normalized in final report					
(2)	Systems Conservation includes 24 projects, costs from $398/AF to $1169/AF, averaging $504/AF					
(3)	Source water collected from Imperial and proposed Keystone Development					
(4)	Source water collected from Imperial, Brawley, El Centro, Colexic and proposed Keystone Development					