Water-Energy Grant Application
Cross Valley Canal Extension Lining - Pool No. 8

Appendix 3.4 - USBR Canal Lining Report

a/o 266-32

R-02-03

CANAL-LINING DEMONSTRATION PROJECT YEAR 10 FINAL REPORT

November 2002

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Reclamation

Pacific Northwest Region
Water Conservation Center

Technical Service Center
Civil Engineering Services
Materials Engineering Research Laboratory

EXECUTIVE SUMMARY

Reclamation has constructed 34 canal-lining test sections in 11 irrigation districts in four States to assess durability and effectiveness (seepage reduction) over severe rocky subgrades. The lining materials include combinations of geosynthetics, shotcrete, roller compacted concrete, grout mattresses, soil, elastomeric coatings, and sprayed-in-place foam. Twenty-eight test sections are located in central Oregon, three are in Montana, two are in Idaho, and one is in Oklahoma. Each test section typically covers 15,000 to 30,000 square feet. The test sections now range in age from 1 to 10 years. Preliminary benefit/cost (B/C) ratios have been calculated based on initial construction costs, maintenance costs, durability (service life), and effectiveness (determined by preconstruction and postconstruction ponding tests). The 34 test sections are divided into 4 generic categories as shown in the table below.

Table ES-1.—Test results for the 34 test sections

Type of Lining	Construction Cost ($/ft^2)	Durability (years)	Maintenance Cost ($/ft^2-yr)	Effectiveness at Seepage Reduction (percent)	B/C Ratio
Fluid-applied Membrane	$1.40 - $4.33	10 - 15 yrs	$0.010	90 %	0.2 - 1.5
Concrete alone	$1.92 - $2.33	40 - 60 yrs	$0.005	70 %	3.0 - 3.5
Exposed Geomembrane	$0.78 - $1.53	10 - 25 yrs	$0.010	90 %	1.9 - 3.2
Geomembrane with Concrete Cover	$2.43 - $2.54	40 - 60 yrs	$0.005	95 %	3.5 - 3.7

Each of the lining alternatives offers advantages and disadvantages. The geomembrane with concrete cover seems to offer the best long-term performance.

Fluid-applied membrane – Many of these test sections have failed and have been removed from the study. Most of the problems were related to poor quality control because of adverse weather common to field construction in late fall and early spring. These types of linings may have potential for special niche applications such as lining existing steel flumes or existing concrete channels.

Concrete – Excellent durability, but long-term effectiveness was only 70 percent because of random cracking. Irrigation districts are familiar with concrete, and they can easily perform required maintenance.

Exposed Geomembrane – The effectiveness is excellent (90 percent), but exposed geomembranes are susceptible to mechanical damage from animal traffic, construction equipment, and vandalism. Although exposed geomembranes have the lowest initial construction costs, they have a limited service life (typically 15 to 20 years). Also, exposed geomembranes are often poorly maintained because irrigation districts are unfamiliar with the geomembrane material, and sometimes need special equipment and training to perform even minor repairs.

Concrete with Geomembrane Underliner – The geomembrane underliner provides the water barrier, and the concrete cover protects the geomembrane from mechanical damage and weathering. System effectiveness is estimated at 95 percent. Districts can readily maintain the concrete cover, but they do not have to maintain the geomembrane underliner.

Effectiveness – Ponding tests showed a typical preconstruction seepage rate of about 1.0 foot per day. Postconstruction ponding tests showed effectiveness of 70 to 95 percent for the various lining alternatives.

Maintenance – Over the course of 10 years, maintenance costs have been relatively low for all the lining alternatives. Generally, exposed geomembranes require about twice the maintenance of concrete linings. For all lining alternatives, benefit/cost analysis shows that every $1 spent on maintenance returns $10 in conserved water by increasing effectiveness and design life. Therefore, more emphasis should be placed on maintenance, especially for exposed geomembrane linings.

New Test Sections

The newest test sections have been in service for only 1 to 2 years. While some of these test sections look promising, more time is needed to evaluate them before estimating service lives and benefit-cost ratios. These test sections include:

Wet-applied polyurethane geocomposite
Exposed reinforced metallized polyethylene
Exposed bituminous geomembrane
Exposed white textured HDPE
Exposed EVA geocomposite

Coupon Testing

Six of the exposed geomembrane test sections were sampled for laboratory evaluation. Although many of the exposed geomembranes visually appear to be in excellent condition, the changes in physical properties suggest that many are beginning to degrade. Service life predictions are included in table ES-2.

Table ES-2—Coupon Testing of Exposed Geomembrane test sections

Test Section	Material	Age	Visual Assessment	Physical Property Testing	Service Life Prediction
A-3	80-mil Textured HDPE	10 years	Excellent	Elongation down 90% OIT down 30%	20-25 years
A-4	30-mil PVC with Bonded Geotextile	10 years	Very Good	Tensile up 30% Modulus up 140% Elongation down 70%	10-15 years
A-5	45-mil Hypalon	10 years	Fair to Poor	Tear strength down 60%	10-15 years
A-6	36-mil Hypalon	10 years	Fair	Tear strength down 60%	10-15 years
O-3	45-mil EPDM	2 years	Excellent	Elongation down 30% Tear strength down 50%	15-20 years
O-4	30-mil LLDPE	2 years	Excellent	Tensile down 10% Tear Strength down 10%	10-15 years

construction bids may be somewhat higher, depending on additional items such as mobilization, design costs, additional subgrade preparation, attachment to structures, contingencies, and unlisted items.

In addition to initial construction costs, the 34 test sections are evaluated for durability, maintenance requirements, and effectiveness at reducing seepage. These factors are combined to calculate life cycle costs.

Environmental Assessment of Canal Lining

Seepage from canals may contribute to groundwater and wetlands. The impact on groundwater and wetlands should be assessed prior to canal lining. This assessment may be mandated for projects using federal funding.

Sometimes canal seepage does not return to the river or increase local groundwater. In this case, the canal seepage is lost to beneficial use, and the canal-lining can proceed without further environmental assessment.

More often, canal seepage returns to the river or contributes to local groundwater. Other users may be using this water by diverting from the river or pumping from aquifers. These users may have a legal right to the water leaking from the canal.

Short sections of canal are often lined to mitigate problems associated with canal seepage. These problems often include stability of the canal bank, flooding of nearby houses and basements, and flooding of adjacent farmland removing it from production. In these cases, short sections (typically a few thousand linear feet) of canal are often lined without further environment assessment.

Restoration to Original Condition – Canals that were originally lined with concrete or compacted earth deteriorate over time and experience increased seepage rates. Concrete and compacted earth canal linings have a typical service life of about 50 years. Over time, the concrete cracks, subsides and heaves. Earth linings are gradually removed as the canal is cleaned out each year. A district that over-excavates their canal 1 inch each year, will completely remove a 3-ft compacted clay lining in only 36 years. The water lost to seepage belongs to the canal owner, and it is the owners right to re-line the canal to restore its original condition.

Value of Conserved Water

The B/C analysis uses $50 per acre-ft for the value of the conserved water. This value was selected as a reasonable price for water purchased on the open market. At the low end, farmers typically pay an assessment of $8 to $20 per acre-ft for the water delivered by their irrigation district. Additional water (when available) can usually be purchased for about twice this cost ($15 to $40 per acre-ft). These costs only reflect the costs for building and maintaining the infrastructure and for delivering the water. These costs do reflect the value of the water on the open market. When cities and developers need to purchase water on the open market, they typically pay $100 to $300 per acre-ft, with the higher prices paid in drought years and in areas where water is especially scarce. Based on this range of prices, a value of $50 per acre-ft seemed quite reasonable.

Effectiveness

Canal lining effectiveness is sometimes expressed as an absolute post-construction seepage rate (ft^3/ft^2-day). This study found that effectiveness is better expressed as a percent reduction in seepage, because the final seepage rate is a function of not only the lining material, but also the permeability of the native soils. For instance, let's look at a geomembrane lining with a small defect (hole). If the subgrade is moderately impermeable (fine-grained soils), then little water will seep through this defect. Conversely, if the subgrade is relatively permeable (sands and gravels), then a substantial amount of water will seep through this same defect. However, in both cases, the percent seepage reduction provided by canal lining (in this case, a geomembrane with a small defect) will be similar.

Using this approach, the various test sections have been divided into four broad categories. Linings within each of these categories use similar materials and have similar design lives, similar maintenance requirements, and similar effectiveness at reducing seepage. The effectiveness values were estimated from the ponding tests on the Arnold and North Unit Canals. Estimates of the durability and maintenance requirements were based on 10-year performance and our knowledge of the materials. Durability estimates have been modified slightly from the 7-year report, based on additional performance data. (See table 18.)

Table 18.—Test section results

Type of Lining	Number of Test Sections	Effectiveness (Seepage Reduction)	Durability	Maintenance ($/ft^2-yr)
Concrete	6	70 percent	40-60 years	$0.005
Exposed Geomembrane	14	90 percent	10-25 years	$0.010
Fluid-applied Geomembrane	8	90 percent	10-15 years	$0.010
Concrete with Geomembrane Underliner	3	95 percent	40-60 years	$0.005

Concrete—Concrete includes RCC, Shotcrete, and grout-filled mattresses. When new, concrete is initially quite watertight, although concrete does have a measurable permeability. However, within the first couple of years, concrete starts to develop cracks because of shrinkage during curing, and thermal movement (temperature differences between day and night and summer and winter). Furthermore, concrete often continues to crack over time because of subgrade movement. Also, Shotcrete thickness is difficult to control in the field, and holes routinely develop where original Shotcrete thickness was less than 1 inch. The grout-filled mattress has also cracked, especially in areas where it is less than 1 inch thick because of the rocky subgrade. Cracks tend to grow in length and numbers over the years, but so far, have not widened significantly. Also the concrete degrades because of freezing and thawing. All these degradation modes lead to a predicted service life of 40 to 60 years. Ponding tests show an effectiveness (seepage reduction) of 60 to 90 percent and an estimated long-term effectiveness of about 70 percent. Maintenance requirement s are relatively low for concrete, and irrigation district personnel are familiar with concrete and comfortable making the repairs.

CHAPTER 5
BENEFIT/COST ANALYSIS

All the canal-lining alternatives were compared using Benefit/Cost (B/C) analysis. Alternatives with a B/C ratio greater than 1 are economically viable, but alternatives with a B/C ratio less than 1 cannot be justified based on economics. Obviously, the higher the B/C ratio, the better the alternative economically. For instance:

B/C = 10 every dollar invested (cost) returns $10 in benefit
B/C = 1 every dollar invested (cost) returns $1 in benefit
B/C = 0.5 every dollar invested (cost) returns $0.50 in benefit

Benefit—The primary purpose of all the canal-lining alternatives is to conserve irrigation water. Therefore, the primary benefit is the value of the conserved water. For this study, the value of that water is estimated at $50 per acre-foot. District water assessments typically range from $10 to $25 per acre-foot, while water purchased on the open market costs as much as $300 per acre-foot. Secondary benefits are also achieved by canal lining. That is use of adjacent cropland normally flooded by leaking canals and remediation of damage to structures near canals (such as flooded basements) are examples of secondary benefits. However, the value of these secondary benefits is not included in this analysis.

The amount of water conserved by each canal-lining alternative depends on its effectiveness (percent seepage reduction) and the preconstruction seepage rate. For this study, we used a 180-day irrigation season, and a conservative preconstruction seepage rate of 1.0 foot/day (ft^3/ft^2/day). The effectiveness, durability, and maintenance requirements for four generic types of canal linings are listed in table 19.

Cost—The cost of each alternative is calculated as its life-cycle cost ($/ft2-yr). Life-cycle costs are calculated using initial costs, design life (durability), and maintenance costs. Initial costs were taken from tables 2, 3, and 4 in chapter 1 of this report. Durability and Maintenance costs were taken from table 19.

Table 19.—Effectiveness, durability, and maintenance requirements of generic types of canal linings

Type of Lining	Number of Test Sections	Effectiveness (Seepage Reduction)	Durability	Maintenance ($/ft 2-yr)
Concrete	6	70 percent	40-60 years	$0.005
Exposed Geomembrane	14	90 percent	10-25 years	$0.010
Fluid-applied Geomembrane	8	90 percent	10-15 years	$0.010
Concrete with Geomembrane Underliner	3	95 percent	40-60 years	$0.005

Benefit/Cost Ratios—B/C ratios were calculated for each test section and are tabulated in table 20. Sample calculation is shown in appendix E. Many test sections have favorable B/C ratios, and the lining alternatives with the highest B/C ratio include exposed geomembranes, geomembranes with concrete

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Appendix 3.5 – IRWM Group Meeting Minutes

Tulare Lake Basin Portion of Kern County
Integrated Regional Water Management Plan

January 23, 2012 1:00 pm – 3:30 pm
Kern County Water Agency
Stuart T. Pyle Water Resources Center
3200 Rio Mirada Drive, Bakersfield, CA 93308

Meeting Objectives:

- Plan Adoption Hearing
- Funding Review

AGENDA

1:00 **I. Welcome and Introductions**

A. Meeting purpose and agenda

B. Introduction of new participants

Lauren Bauer, KCWA

1:10 **II. Public Hearing**

A. Call to Order

Bill Taube, Co-Chair, called the hearing to order at 1:10 pm. It was verified that a notice of the public hearing was published in the Bakersfield Californian on January 15 and 22, 2012.

B. Public Comments

No public comments were received.

C. Vote

The RWMG members voted to approve and adopt the Kern IRWMP. None were in opposition. None abstained.

The hearing was closed at 1:15 pm.

Kern IRWMP Co-Chairs

1:55 **III. General Information Items**

A. ACWA Groundwater Surveys

ACWA has requested local water districts complete an online survey regarding groundwater. A link to survey is available on ACWA's website.

B. IRWMP GIS Forum

Lauren reported on the recent development of a Tulare Lake Basin GIS forum group. The group's intended purpose is to develop a regional GIS database and assist IRWMs that lack internal resources with development of maps, etc. necessary to complete their IRWMs.

C. Project Submission Deadline

The new project prioritization process has begun. All projects must be submitted by January 31, 2012. Existing projects are required to be resubmitted using the new form.

D. Planning Grants – 1 potential request

Lauren reported on a potential planning grant application for a feasibility study for DAC. The feasibility study would primarily be used to analyze community water

		systems and develop a leak detection program and system repair needs and priorities. *Lauren Bauer, KCWA*
2:15	**IV.**	**Review of Kern IRWMP Funding** A. Update on Status of Participation Agreement *The draft language is being reviewed by legal counsel from various Executive Committee members.* B. Consider Adopting Executive Committee Budget Determination Methodology The participants voted to approve the budget determination methodology developed by the Executive Committee. This methodolody will be used to develop the draft funding allocations. C. Review of Draft Funding Allocation The draft funding allocations will be emailed to everyone. *Lauren Bauer, KCWA*
3:00	**V.**	**Set Quaterly Meeting Schedule** *Quarterly meetings will be held the fourth Monday of the month from 1:00 pm to 3:30 pm. The meetings will continue to be held at the Kern County Water Agency.*
3:15	**VI.**	**Next Steps** A. Next Meeting *There is a need to meet more frequently than quarterly in order to complete the funding agreement and project prioritization process. Lauren will work with the participants to determine the next meeting date.* *Lauren Bauer, KCWA*
3:20	**VII.**	**Public Comment** *No public comments were received.*
3:30		***Close***

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Appendix 3.6 – IRWMP Adoption Resolution

BEFORE THE BOARD OF DIRECTORS

OF THE

KERN COUNTY WATER AGENCY

In the Matter of:

AUTHORIZATION TO ADOPT	*
THE KERN INTEGRATED REGIONAL	*
WATER MANAGEMENT PLAN	*

I, Lucinda J. Infante, Secretary of the Board of Directors of the Kern County Water Agency, of the County of Kern, State of California, do hereby certify that the following resolution proposed by Director Page and seconded by Director Mathews, was duly passed and adopted by said Board of Directors at an official meeting hereof this 14th day of December, 2011, by the following vote, to wit:

Ayes: Lundquist, Mathews, Rogers, Page, Parker and Radon

Noes: None

Absent: Van Skike

Lucinda J. Infante
Secretary of the Board of Directors
of the Kern County Water Agency

Resolution No. 61-11

WHEREAS, California voters passed Proposition 50, the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002, and Proposition 84, the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act, in 2006, which provided funds for the development and implementation of integrated regional water management plans (IRWMP); and

WHEREAS, on January 29, 2009, the Kern County Water Agency (Agency) entered into a "Participation Agreement for Development of an Integrated Regional Water Management Plan for the Tulare Lake Basin Portion of Kern County" (Kern IRWMP); and

WHEREAS, the participants of the Kern IRWMP, including the Agency, have worked collaboratively to develop a final plan that includes, among other elements, regional water management goals and objectives; and

WHEREAS, a draft of the Kern IRWMP, dated October 2011, was circulated for a 30-day public review period; and

WHEREAS, the Kern IRWMP participants voted to approve the final Kern IRWMP on November 23, 2011; and

WHEREAS, section 10543 of the California Water Code requires an IRWMP to be adopted upon completion; and

NOW, THEREFORE, BE IT RESOLVED, by the Board of Directors of the Kern County Water Agency that:

1. The foregoing recitals are true and correct.

2. The Board of Directors of the Agency adopts the "Kern Integrated Regional Water Management Plan."

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Appendix 3.7 – IRWMP Project Prioritization List

Kern IRWM Group
Project Prioritization List

4/10/2014

Form #	Subregion	Project Applicant	Title	Tier 1 Score (1)	Subregion Top 5	Priority	Supplemental Drought Form Submitted
CK-1	County of Kern	County of Kern	South Shafter Sewer	31	Y	High	
CK-2	County of Kern	County of Kern	Caliente Creek Habitat Restoration	44	Y	High	
CK-3	County of Kern	County of Kern	Lakeshore Pines Leachfield Restoration	29	Y	High	
CK-4	County of Kern	County of Kern	Lake Isabella Detailed Sewer Study	33	Y	High	
CK-5	County of Kern	County of Kern	Krista Mutual Water Company Water Project	30	Y	High	
CK-6	County of Kern	County of Kern	Reeder Tract WWT Facility	22		Low	
CK-7	County of Kern	County of Kern	Sandy Creek Bank and Erosion Protection	24		Low	
CK-8	County of Kern	County of Kern	South Taft Sewer Improvements	26		Low	
CK-9	County of Kern	County of Kern	Cuddy Creek Restoration Project	28		Low	
CK-10	County of Kern	County of Kern	Reconstruction of Adams/Jefferson St - Ford City	13		Low	
CK-11	County of Kern	County of Kern	Disadvantaged Community Leak Detection Program	27		Low	
CK-12	~~County of Kern~~	~~County of Kern~~	~~Athal Water Project~~			A	
GB-1	Greater Bakersfield	Improvement District No. 4	Recharge Improvement Project	19	Y	High	
GB-2	Greater Bakersfield	Improvement District No. 4	Beardsley Pipeline	22	Y	High	Y
GB-3	Greater Bakersfield	Improvement District No. 4	CVC Extension Lining	17	Y	High	Y
GB-4	Greater Bakersfield	Improvement District No. 4	Groundwater Monitoring Wells	16	Y	High	
GB-6	Greater Bakersfield	Improvement District No. 4	Surface Water Quality Monitoring Stations	10	Y	High	
GB-5	Greater Bakersfield	City of Bakersfield	Water Conservation Project for Metropolitan Bakersfield	20		Rd2 Imp. Grant	
WA-1	KCWA	Kern County Water Agency	Biodenitrification of Groundwater Pilot Program	24	Y	High	
WA-2	KCWA	Kern County Water Agency	Photovoltaic Arrays	21	Y	High	
WA-3	KCWA	Kern County Water Agency	Well-head Arsenic Treatment	23	Y	High	
KF-2	Kern Fan	Kern Water Bank Authority	Kern Water Bank Short-Term Storage Program	21	Y	High	Y
KF-3	Kern Fan	Buena Vista Water Storage District	Brackish Groundwater Remediation Project	27	Y	High	Y
KF-4	Kern Fan	Buena Vista Water Storage District	Conservation Easement Water Acquisition and Management Project	20	Y	High	Y
KF-5	Kern Fan	Buena Vista Water Storage District	Groundwater Recharge and Recovery Project	36	Y	High	Y
KF-1	Kern Fan	Kern Water Bank Authority	Kern Water Bank Recharge and Recovery Enhancement Project	36		Rd2 Imp. Grant	
KF-6	Kern Fan	Tulare Basin Wildlife Partners	Goose Lake Wetlands Reserve Program Residual Value Purchase			Low	
KF-7	Kern Fan	Tulare Basin Wildlife Partners	Goose Lake Conservation Plan and DFG CAPP			Low	
KF-8	Kern Fan	Tulare Basin Wildlife Partners	Riparian and Wildlife Corridor Planning Area - Kern River			Low	
KF-9	Kern Fan	Buena Vista Water Storage District	Water Exchange Project			Low	
KF-10	Kern Fan	Buena Vista Water Storage District	On-Farm Water Use Efficiency	18		Low	
KF-11	Kern Fan	Buena Vista Water Storage District	Northern Improvement Project	19		Low	
KF-12	Kern Fan	Buena Vista Water Storage District	Kern Fan Direct Recharge and Recovery Project			Low	
KF-13	Kern Fan	Buttonwillow County Water District	Waterline Replacement Project	18		Low	

Kern IRWM Group
Project Prioritization List

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Form #	Subregion	Project Applicant	Title	Tier 1 Score (1)	Subregion Top 5	Priority	Supplemental Drought Form Submitted
KR-1	Kern River Valley	County of Kern	Weldon Regional Water Project	39	Y	High	
KR-2	Kern River Valley	Tubatulabal Tribal Water Board	Phase II Safe Drinking Water and Tribal Allotments Community Water System	48	Y	High	Y
KR-3	Kern River Valley	Tubatulabal Tribal Water Board	Phase II Safe Drinking Water and Community Use Area - White Blanket Allotment	38	Y	High	
KR-4	Kern River Valley	Desert Mountain Resources Conservation and Development Council	Eradication of Invasive Weeds in the Kern River Valley and Walker Basin	47	Y	High	Y
KR-5	Kern River Valley	County of Kern	Tradewinds Auxiliary Well or Uranium Treatment	30	Y	High	Y
MF-1	Mountains/Foothills	County of Kern	GHSC Force Main Project	27	Y	High	
MF-4	Mountains/Foothills	Bear Valley Community Services District	Radio Nuclides Treatment Project	23	Y	High	Y
MF-2	Mountains/Foothills	Tehachapi-Cummings County Water District	Tehachapi Regional Water Conservation Program	36		Rd2 Imp. Grant	
MF-3	Mountains/Foothills	Tehachapi-Cummings County Water District	Public Facility Distribution Line and Nitrate Removal Program	41		Rd2 Imp. Grant	
	~~Mountains/Foothills~~	~~Frazier Park Public Utility District~~	~~Well Replacement~~		~~Y~~	Removed	
NC-1	North County	City of Shafter	Well No. 15	27	Y	High	
NC-2	North County	City of McFarland	Browning Road Storage Tank and Booster Facility	37	Y	High	Y
SC-8	South County	Arvin-Edison Water Storage District	In-Lieu Banking Program	78	Y	High	Y
SC-11	South County	Arvin-Edison Water Storage District	Improved Stormwater Management and Flood Control	75	Y	High	
SC-10	South County	Arvin-Edison Water Storage District	South Canal Balancing Reservoir	67	Y	High	
SC-7	South County	Arvin-Edison Water Storage District	Forrest Frick Rehabilitation Project	56	Y	High	Y
SC-1	South County	Arvin-Edison Water Storage District/Kern Delta Water District	AEWSD Intake Canal and Kern Delta Buena Vista River Canal Intertie Project	54	Y	High	
SC-2	South County	City of Arvin	Sycamore Drainage Facilities	32		Rd2 Imp. Grant	
SC-3	South County	Wheeler Ridge-Maricopa Water Storage District	Groundwater Storage and Recover in White Wolf Basin	43		Low	
SC-9	South County	Arvin-Edison Water Storage District	Lateral Capacity Improvement Project	43		Low	
SC-5	South County	Mettler County Water District	Mettler Groundwater Protection Project	38		Low	
SC-4	South County	Arvin-Edison Water Storage District	Wasteway Basin Improvement Project	32		Low	
SC-14	South County	Lamont Public Utilities District	Renovation of Belowground Storage Reservoir	20		Low	
SC-15	South County	Arvin Community Services District	Arsenic Mitigation Project	16		Low	
SC-13	South County	Lamont Public Utilities District	Water Quality Improvement Project for Well No. 16	14		Low	
SC-12	South County	Lamont Public Utilities District	Well No. 19 Arsenic Reduction Blending Project	12		Low	
SC-6	South County	Wheeler Ridge-Maricopa Water Storage District	Solar Power Generation	3		Low	
SC-16	South County	Mettler County Water District	Mettler Well No. 4 Project			Low	

Kern IRWM Group
Project Prioritization List

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Form #	Subregion	Project Applicant	Title	Tier 1 Score (1)	Subregion Top 5	Priority	Supplemental Drought Form Submitted
WS-1	Westside	Lost Hills Water District	Regional Brackish Water Treatment Project	13	Y	High	Y
WS-2	Westside	Berrenda Mesa Water District	Westside Districts' Groundwater Banking Project	25	Y	High	
WS-3	Westside	Berrenda Mesa Water District	Lost Hills Surface Water Treatment Plant	19	Y	High	
WS-4	Westside	Lost Hills Utility District	Construction of a New Well to Provide a Firm Water Supply to the LHUD Users	17	Y	High	Y
WS-5	Westside	Lost Hills Utility District	Storage Tank Rehabilitation to the LHUD 2.0 MG Storage Tank	11	Y	High	Y
WS-6	Westside	City of Taft	Storm Drain and Floodplain Basin Project	8		Low	
WS-7	Westside	City of Maricopa	Maricopa Wastewater Project	6		Low	
WS-8	Westside	Tulare Basin Wildlife Partners	Buena Vista Lake-Kern Lake Conservation Plan and DFG CAPP	8		Low	

Notes:

(1) Highlight indicates project re-submitted & rescored