On-Farm Irrigation System Evaluations
Provided by the Mobile Irrigation Laboratory of Kern County
Sponsored by the North West Kern Resource Conservation District

Introduction:

Farmers in the southern portion of the San Joaquin Valley irrigate their crops with four different sources of water. Those include the Friant-Kern Canal (Federal), California Aqueduct (State), Kern River (Local), and through the use of ground water.

The Mobile Irrigation Laboratory, sponsored by the North West Kern Resource Conservation District, formerly the Pond-Shafter-Wasco RCD, provides technical assistance to land owners to aid them in the efficient use of their irrigation water. This is done through on-farm irrigation system evaluations that provide observations and recommendations regarding system management and/or maintenance.

The Mobile Lab has been involved in numerous projects that have brought about a greater focus on water use efficiency, assisting growers in the optimized use of both systems and management. From drainage reduction to soil moisture monitoring, the emphasis has been on the conservation and efficient use of our irrigation water.

Assistance is also made available through organized irrigation workshops. These meetings are conducted with the help of the University of California Cooperative Extension, the Natural Resources Conservation Service, and the local RCD. Workshops have been conducted as far north as Madera at the request of the local irrigation district. These sessions provide a great opportunity to get current irrigation techniques and concepts out to farmers who might not otherwise have access to an on-farm evaluation.

Scope and Target Recipients:

This project would be to further the work of the Mobile Lab, providing assistance to agricultural landowners in the southern San Joaquin Valley, as well as extending it to interested parties in the north. The duration of the project would last for three years. This assistance would consist of on-farm irrigation system evaluations and would be available to farms of all sizes. Contact will be made with local water districts to determine those that would benefit from an on-farm analysis in areas outside of Kern County.

Many growers have access to private consultants that provide irrigation scheduling, but most of these consultants do not perform any type of system evaluation before scheduling the irrigations. The Mobile Lab provides much needed information about irrigation system performance that will enable the water user to be more proficient at scheduling their irrigations, even for those that do not utilize a consultant.

In farming, irrigation water management is a critical component of a successful operation, yet it tends to be neglected in many instances. There is much a farmer can do to better utilize the water that is available to him, from land leveling, to the installation of a tail water return system, to the proper maintenance of a micro irrigation system. These are areas where the Mobile Lab can help individual land owners to become better water managers.

The evaluation or assessment process involved in observing a working irrigation system includes monitoring various components of the system. Those components will vary depending on the system type, of which there are basically only two. Those include surface (or gravity flow), and pressurized systems.

1. Surface systems are made up primarily of two different types, including furrow and flood (Border Strip), which work on the same principle of advance and recession, taking into account flow rate and soil types.
2. Pressurized systems include the various types of sprinkler based systems (solid set, hand move, linear, undertree, micro, etc.), and are driven by pressure and flow rate. Observations in these systems are more extensive due to the nature of the system (ie.- a lot more hardware involved in the delivery of the water). There is even a break down between an impact type sprinkler system and a micro system, with even more to observe in the latter.

(In a pressurized system, the soil type is not a factor when determining the overall system uniformity (as opposed to the surface systems), because the soil type will not affect the ability of the system to deliver an even amount of water to the crop. However, it will impact the rate at which water can infiltrate down to the crop's root zone, along with its ability to hold water, which needs to be considered when scheduling an irrigation.)

Once an irrigation system evaluation is conducted and observations and recommend-dations are made, it would be beneficial to provide follow-up testing within a one to two year period to determine the level of improvement. This improvement would be evident by an increase in irrigation system uniformity and a potential reduction in overall water use. If the water user has more than one field with this same type of system, then the recommendations and results should be transferable to the other locations, thereby providing for an even greater water savings. This can be documented through a questionnaire to the water user regarding the impact to the irrigation system as a result of enhanced system performance.

Labor Costs:

Labor will be provided by the North West Kern RCD through the Mobile Irrigation Lab. The work will be headed up by the Mobile Lab Team Leader with the assistance of two irrigation technicians. The amount of travel will be based on the number of requests (unknown at this time) to do work outside of Kern County. Equipment purchased will be for a normal year's work load, which would be approximately 100 evaluations.

Cost Share:

The local cost share will be provided by water districts that have committed to the program, providing approximately 48% of the project costs. The remainder of the local cost share will be provided through a grant from the Bureau of Reclamation, providing 16% of the project costs.

Potential Benefits:

As water users are educated in the proper management and maintenance of their irrigation systems, they will be able to more accurately address the water needs of their crops. As recommendations for irrigation system improvements are implemented, with the improvements documented, a potential water savings may occur. Depending on the system and the crop and the level of improved uniformity, the water savings could range from 5 to 25%.

2004 Water Use Efficiency Proposal Solicitation Package

APPENDIX A: Project Information Form

Applying for: ❑ Urban xx Agricultural

1. (Section A) **Urban or Agricultural Water Use Efficiency Implementation Project**
   - ❑ (a) implementation of Urban Best Management Practice, #_____
   - ❑ (b) implementation of Agricultural Efficient Water Management Practice, #_____
   - ❑ (c) implementation of other projects to meet California Bay-Delta Program objectives, Targeted Benefit # or Quantifiable Objective #, if applicable _____
   - ❑ (d) Specify other: _____

2. (Section B) **Urban or Agricultural Research and Development; Feasibility Studies, Pilot, or Demonstration Projects; Training, Education or Public Information; Technical Assistance**
   - ❑ (e) research and development, feasibility studies, pilot, or demonstration projects
   - ❑ (f) training, education or public information programs with statewide application
   - xx (g) technical assistance
   - ❑ (h) other

3. Principal applicant (Organization or affiliation): North West Kern Resource Conservation District

4. Project Title: I On-Farm Irrigation System Evaluations

5. Person authorized to sign and submit proposal and contract:

Name, title	Brian W. Hockett, Dist. Mngr
Mailing address	5000 California Ave., #100
	Bakersfield, CA 93309
Telephone	(661) 336-0967, ext. 5
Fax.	(661) 336-0857
E-mail	brian.hockett@ca.usda.gov

6. Contact person (if different): Name, title.

Mailing address.

Telephone

Fax.

E-mail

7. Grant funds requested (dollar amount): **$50,000.00**

(from Table C-1, column VI)

8. Applicant funds pledged (dollar amount): $87,500.00

9. Total project costs (dollar amount): $137,500.00

(from Table C-1, column IV, row n)

10. Percent of State share requested (%) 100%

(from Table C-1)

11. Percent of local share as match (%) 100%

(from Table C-1)

12. Is your project locally cost effective?

Locally cost effective means that the benefits to an entity (in dollar terms) of implementing a program exceed the costs of that program within the boundaries of that entity.

(If yes, provide information that the project in addition to Bay-Delta benefit meets one of the following conditions: broad transferable benefits, overcome implementation barriers, or accelerate implementation.)

☒ (a) yes

☐ (b) no

11. Is your project required by regulation, law or contract? If no, your project is eligible.

If yes, your project may be eligible only if there will be accelerated implementation to fulfill a future requirement and is not currently required.

Provide a description of the regulation, law or contract and an explanation of why the project is not currently required.

☐ (a) yes

☒ (b) no

12. The benefits of the program are transferable from one area to another, providing for water to many areas.

12. Duration of project (month/year to month/year): **3 years upon execution of contract**

13. State Assembly District where the project is to be conducted: **30th & 32nd**

14. State Senate District where the project is to be conducted: **18th & 16th**

15. Congressional district(s) where the project is to be conducted: 20th & 22nd

16. County where the project is to be conducted: Kern – Madera

17. Location of project (longitude and latitude)

18. How many service connections in your service area (urban)? NA

19. How many acre-feet of water per year does your agency serve? NA

20. Type of applicant (select one):

- ❑ (a) City
- ❑ (b) County
- ❑ (c) City and County
- ❑ (d) Joint Powers Authority
- ❑ (e) Public Water District
- ❑ (f) Tribe
- ❑ (g) Non Profit Organization
- ❑ (h) University, College
- ❑ (i) State Agency
- ❑ (j) Federal Agency
- ☒ (k) Other - Resource Conservation District
  - ❑ (i) Investor-Owned Utility
  - ❑ (ii) Incorporated Mutual Water Co.
  - ❑ (iii) Specify _____

21. Is applicant a disadvantaged community? If 'yes' include annual median household income.

(Provide supporting documentation.)

- ❑ (a) yes, _____ median household income
- ☒ (b) no

2004 Water Use Efficiency Proposal Solicitation Package
APPENDIX B: Signature Page

By signing below, the official declares the following:

The truthfulness of all representations in the proposal;

The individual signing the form has the legal authority to submit the proposal on behalf of the applicant;

There is no pending litigation that may impact the financial condition of the applicant or its ability to complete the proposed project;

The individual signing the form read and understood the conflict of interest and confidentiality section and waives any and all rights to privacy and confidentiality of the proposal on behalf of the applicant;

The applicant will comply with all terms and conditions identified in this PSP if selected for funding; and

The applicant has legal authority to enter into a contract with the State.

	Brian W. Hockett, District Manager	Jan. 06, 05
_____	_____	_____
Signature	Name and title	Date

Applicant: North West Kern Resource Conservation District

Year 1

THE TABLES ARE FORMATTED WITH FORMULAS: FILL IN THE SHADED AREAS ONLY

Section A projects must complete Life of investment, column VII and Capital Recovery Factor Column VIII. Do not use 0.

Table C-1: Project Costs for year 1 (Budget in Dollars)

	Category (I)	Project Costs $ (II)	Contingency % (ex. 5 or 10) (III)	Project Cost + Contingency $ (IV)	Applicant Share $ (V)	State Share Grant $ (VI)	Life of investment (years) (VII)	Capital Recovery Factor (VIII)	Annualized Costs $ (IX)
	Administration[1]								
	Salaries, wages	$108,000	0	$108,000	$67,000	$41,000	0	0.0000	$0
	Fringe benefits	$15,000	0	$15,000	$10,000	$5,000	0	0.0000	$0
	Supplies	$1,000	0	$1,000	$500	$500	0	0.0000	$0
	Equipment	$500	0	$500	$500	$0	0	0.0000	$0
	Consulting services	$0	0	$0	$0	$0	0	0.0000	$0
	Travel	$2,500	0	$2,500	$1,000	$1,500	0	0.0000	$0
	Other	$10,500	0	$10,500	$8,500	$2,000	0	0.0000	$0
(a)	Total Administration Costs	$137,500		$137,500	$87,500	$50,000			$0
(b)	Planning/Design/Engineering	$0	0	$0	$0	$0	0	0.0000	$0
(c)	Equipment Purchases/Rentals/Rebates/Vouchers	$0	0	$0	$0	$0	10	0.0000	$0
(d)	Materials/Installation/Implementation	$0	0	$0	$0	$0	0	0.0000	$0
(e)	Implementation Verification	$0	0	$0	$0	$0	0	0.0000	$0
(f)	Project Legal/License Fees	$0	0	$0	$0	$0	0	0.0000	$0
(g)	Structures	$0	0	$0	$0	$0	0	0.0000	$0
(h)	Land Purchase/Easement	$0	0	$0	$0	$0	0	0.0000	$0
(i)	Environmental Compliance/Mitigation/Enhancement	$0	0	$0	$0	$0	0	0.0000	$0
(j)	Construction	$0	0	$0	$0	$0	0	0.0000	$0
(k)	Other (Specify)	$0	0	$0	$0	$0	0	0.0000	$0
(l)	Monitoring and Assessment	$0	0	$0	$0	$0	0	0.0000	$0
(m)	Report Preparation	$0	5	$0	$0	$0	0	0.0000	$0
(n)	**TOTAL**	$137,500		$137,500	$87,500	$50,000			$0
(o)	Cost Share -Percentage				64	36			

1- excludes administration O&M.

Applicant: North West Kern Resource Conservation District

Year 2

THE TABLES ARE FORMATTED WITH FORMULAS: FILL IN THE SHADED AREAS ONLY

Section A projects must complete Life of investment, column VII and Capital Recovery Factor Column VIII. Do not use 0.

Table C-1: Project Costs for year 2 (Budget in Dollars)

	Category (I)	Project Costs $ (II)	Contingency % (ex. 5 or 10) (III)	Project Cost + Contingency $ (IV)	Applicant Share $ (V)	State Share Grant $ (VI)	Life of investment (years) (VII	Capital Recovery Factor (VIII)	Annualized Costs $ (IX)
	Administration[1]								
	Salaries, wages	$108,000	0	$108,000	$67,000	$41,000	0	0.0000	$0
	Fringe benefits	$15,000	0	$15,000	$10,000	$5,000	0	0.0000	$0
	Supplies	$1,000	0	$1,000	$500	$500	0	0.0000	$0
	Equipment	$500	0	$500	$500	$0	0	0.0000	$0
	Consulting services	$0	0	$0	$0	$0	0	0.0000	$0
	Travel	$2,500	0	$2,500	$1,000	$1,500	0	0.0000	$0
	Other	$10,500	0	$10,500	$8,500	$2,000	0	0.0000	$0
(a)	Total Administration Costs	$137,500		$137,500	$87,500	$50,000			$0
(b)	Planning/Design/Engineering	$0	0	$0	$0	$0	0	0.0000	$0
(c)	Equipment Purchases/Rentals/Rebates/Vouchers	$0	0	$0	$0	$0	10	0.0000	$0
(d)	Materials/Installation/Implementation	$0	0	$0	$0	$0	0	0.0000	$0
(e)	Implementation Verification	$0	0	$0	$0	$0	0	0.0000	$0
(f)	Project Legal/License Fees	$0	0	$0	$0	$0	0	0.0000	$0
(g)	Structures	$0	0	$0	$0	$0	0	0.0000	$0
(h)	Land Purchase/Easement	$0	0	$0	$0	$0	0	0.0000	$0
(i)	Environmental Compliance/Mitigation/Enhancement	$0	0	$0	$0	$0	0	0.0000	$0
(j)	Construction	$0	0	$0	$0	$0	0	0.0000	$0
(k)	Other (Specify)	$0	0	$0	$0	$0	0	0.0000	$0
(l)	Monitoring and Assessment	$0	0	$0	$0	$0	0	0.0000	$0
(m)	Report Preparation	$0	5	$0	$0	$0	0	0.0000	$0
(n)	**TOTAL**	$137,500		$137,500	$87,500	$50,000			$0
(o)	Cost Share -Percentage				64	36			

1- excludes administration O&M.

Applicant: North West Kern Resource Conservation District

Year 3

THE TABLES ARE FORMATTED WITH FORMULAS: FILL IN THE SHADED AREAS ONLY

Section A projects must complete Life of investment, column VII and Capital Recovery Factor Column VIII. Do not use 0.

Table C-1: Project Costs for year 3 (Budget in Dollars)

	Category (I)	Project Costs $ (II)	Contingency % (ex. 5 or 10) (III)	Project Cost + Contingency $ (IV)	Applicant Share $ (V)	State Share Grant $ (VI)	Life of investment (years) (VII	Capital Recovery Factor (VIII)	Annualized Costs $ (IX)
	Administration[1]								
	Salaries, wages	$108,000	0	$108,000	$67,000	$41,000	0	0.0000	$0
	Fringe benefits	$15,000	0	$15,000	$10,000	$5,000	0	0.0000	$0
	Supplies	$1,000	0	$1,000	$500	$500	0	0.0000	$0
	Equipment	$500	0	$500	$500	$0	0	0.0000	$0
	Consulting services	$0	0	$0	$0	$0	0	0.0000	$0
	Travel	$2,500	0	$2,500	$1,000	$1,500	0	0.0000	$0
	Other	$10,500	0	$10,500	$8,500	$2,000	0	0.0000	$0
(a)	Total Administration Costs	$137,500		$137,500	$87,500	$50,000			$0
(b)	Planning/Design/Engineering	$0	0	$0	$0	$0	0	0.0000	$0
(c)	Equipment Purchases/Rentals/Rebates/Vouchers	$0	0	$0	$0	$0	10	0.0000	$0
(d)	Materials/Installation/Implementation	$0	0	$0	$0	$0	0	0.0000	$0
(e)	Implementation Verification	$0	0	$0	$0	$0	0	0.0000	$0
(f)	Project Legal/License Fees	$0	0	$0	$0	$0	0	0.0000	$0
(g)	Structures	$0	0	$0	$0	$0	0	0.0000	$0
(h)	Land Purchase/Easement	$0	0	$0	$0	$0	0	0.0000	$0
(i)	Environmental Compliance/Mitigation/Enhancement	$0	0	$0	$0	$0	0	0.0000	$0
(j)	Construction	$0	0	$0	$0	$0	0	0.0000	$0
(k)	Other (Specify)	$0	0	$0	$0	$0	0	0.0000	$0
(l)	Monitoring and Assessment	$0	0	$0	$0	$0	0	0.0000	$0
(m)	Report Preparation	$0	5	$0	$0	$0	0	0.0000	$0
(n)	**TOTAL**	$137,500		$137,500	$87,500	$50,000			$0
(o)	Cost Share -Percentage				64	36			

1- excludes administration O&M.

Applicant: North West Kern RCD

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Table C-2: Annual Operations and Maintenance Costs

Operations (1) (I)	Maintenance (II)	Other (III)	Total (IV) (I + II + II)
$137,500	$0	$0	$137,500

(1) Include annual O & M administration costs here.

Table C-3: Total Annual Project Costs

Annual Project Costs (1) (I)	Annual O&M Costs (2) (II)	Total Annual Project Costs (III) (I + II)
$0	$137,500	$137,500

(1) From Table C-1, row (n) column (IX)
(2) From Table C-2, column (IV)

Table C- 4: Capital Recovery Table (1)

Life of Project (in years)	Capital Recovery Factor
1	1.0600
2	0.5454
3	0.3741
4	0.2886
5	0.2374
6	0.2034
7	0.1791
8	0.1610
9	0.1470
10	0.1359
11	0.1268
12	0.1193
13	0.1130
14	0.1076
15	0.1030
16	0.0990
17	0.0954
18	0.0924
19	0.0896
20	0.0872
21	0.0850
22	0.0830
23	0.0813
24	0.0797
25	0.0782
26	0.0769
27	0.0757
28	0.0746
29	0.0736
30	0.0726
31	0.0718
32	0.0710
33	0.0703
34	0.0696
35	0.0690
36	0.0684
37	0.0679
38	0.0674
39	0.0669
40	0.0665
41	0.0661
42	0.0657
43	0.0653
44	0.0650
45	0.0647
46	0.0644
47	0.0641
48	0.0639
49	0.0637
50	0.0634

(1) Based on 6% discount rate.

Applicant: **North West Kern Resource Conservation District**

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Table C-5 Project Annual Physical Benefits (Quantitative and Qualitative Description of Benefits)

	Qualitative Description - Required of all applicants[1]				**Quantitative Benefits - where data are available [2]**
	Description of physical benefits (in-stream flow and timing, water quantity and water quality) for:	Time pattern and Location of Benefit	Project Life: Duration of Benefits	State Why Project Bay Delta benefit is Direct[3] Indirect [4] or Both	Quantified Benefits (in-stream flow and timing, water quantity and water quality)
Bay Delta					0
Local				**Not applicable.**	

[1] The qualitative benefits should be provided in a narrative description. Use additional sheet.

[2] Direct benefits are project outcomes that contribute to a CALFED objective within the Bay-Delta system during the life of the project.

[3] Indirect benefits are project outcomes that help to reduce dependency on the Bay-Delta system. Indirect benefits may be realized over time.

[4] The project benefits that can be quantified (i.e. volume of water saved or mass of constituents reduced) should be provided.