

Program Awaits Federal Funding Support

Launched in 2003, the **Farmington Groundwater Recharge & Seasonal Habitat Program** (Program) is a 10-year, \$33.5 million effort to begin restoration of the Eastern San Joaquin Groundwater Basin (Basin), a Central



California water resource in a state of critical overdraft and threatened by saline intrusion from under the Delta.

The Program is led by Stockton East Water District (SEWD), in partnership with other local water interests, and the Sacramento District of the U.S. Army Corps of Engineers. An award-winning effort, the Program works by partnering

with local water interests and landowners to implement conjunctive management strategies for the utilization of available water resources.

When surface water supplies are abundant, the Program's objective is to recharge the Basin through in-lieu irrigation and partnerships with growers who rotate direct recharge activities with other land-uses via short- and long-term agreements.

Since its inception, the Program has evaluated and/or tested more than a dozen candidate recharge sites within the service boundaries of SEWD, North San Joaquin Water Conservation District and Central San Joaquin Water Conservation District.

Direct recharge facilities developed through the Program, and its preceding studies, now contribute more than 11,000 acre-feet per year towards the Program's original recharge goal of 35,000 acre-feet annually.

To date, the Program has been maintained through approximately \$1.75 million in allocated Federal funds and more than \$10 million in local and State funds. A schedule of continued Federal funding through 2013 was submitted to Congress in February, 2007.

With additional Federal appropriations, Program partners plan to advance selected candidate sites to demonstration facilities; begin evaluation of additional candidate sites; and resume active recruitment and outreach of Program participants.

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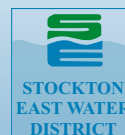
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US Army Corps of Engineers

Program Contacts:

Kevin Kauffman
SEWD General Manager
(209) 948-0333

Patrick Dwyer
USACE Program Manager
(916) 557-7802



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About the Farmington Program

Faced with limited surface water availability in Eastern San Joaquin County, growers, cities, rural neighborhoods and industries have relied heavily on mining water from underground aquifers. Groundwater use now exceeds nature's ability to self-replenish the aquifer by approximately 150,000 acre-feet per year. The cumulative effects:

- Groundwater is now up to 80 feet below mean sea level
- Intrusion of saline-tainted water from the west
- Municipal and rural wells have closed or failed

- Continually higher groundwater pumping costs
- Accumulated overdraft of more than two million acre-feet

To address this trend, Stockton East Water District (SEWD), with other local water interests, took a lead role in 1996 to work with the U.S. Army Corps of Engineers (Corps) to develop a conjunctive management strategy for Eastern San Joaquin County. The result is the Farmington Groundwater Recharge & Seasonal Habitat Program (Program).





The Program's goal is to provide average annual recharge of 35,000 acre-feet of water through spreading of water on agricultural fields and other recharge facilities, and increasing surface water deliveries in-lieu of groundwater pumping. Each tactic seeks to reduce overdraft and reduce the potential for further saline water intrusion.

For direct groundwater recharge activities, the Program seeks to enroll 25 to 30 parcels totaling up to 1,200 acres in short- and long-term agreements with landowners. Each would be compensated at

Eastern San Joaquin County and the Farmington Groundwater

Report / Action

Report Conclusion

Report / Action	Report Conclusion
Eastern San Joaquin County Groundwater Study 	1985 Concluded that the groundwater basin is overdrafted, saline water intrusion is a problem, and additional surface water supplies are needed
American River Water Resources Investigation 	1995 Considered extending the Folsom South Canal to deliver American River water in eastern San Joaquin County and reduce groundwater overdraft
Mokelumne Aquifer Recharge and Storage Project 	1996 Considered recharge and recovery of Mokelumne River water supplies to support Bay Area needs and reduce groundwater overdraft
Stockton Metropolitan Area, California Reconnaissance Report 	1997 Recommended study of Farmington Dam for conjunctive use purpose
Conjunctive Use Study 	1998 Concluded that groundwater recharge is the most cost-effective approach to reducing overdraft
Congressional Action 	2000 Congress authorized Program and Farmington Groundwater Recharge
Farmington Groundwater and Seasonal Habitat Study 	2001 Described Program components and general implementation approach

market rates for the use of their land.

The recharge method of choice is field-flooding, a practice where a small perimeter levee is built around fallow farmland to allow winter flooding to a depth of up to 18 inches. In addition to groundwater recharge, this method often provides varying water depths that are ideal for a wide range of migratory waterfowl.

Lands can be cycled in and out of the Program with other traditional land uses, thereby making water a cash crop for enrolled landowners.

For in-lieu recharge, the Program seeks to expand surface water deliveries to the urban area, farms and other major groundwater users via existing and future transmission and distribution systems.

The Program is also investigating the feasibility of conducting direct groundwater recharge via flooding of vineyards when the plant is dormant. Early indications are that this type of field-flooding is an effective pest control for root-damaging nematodes, and has the potential of over 20,000 acre-feet per year of recharge in the region.

FOUR GROUNDWATER RECHARGE METHODS ARE FEATURED IN THE FARMINGTON GROUNDWATER RECHARGE PROGRAM:

Flooded Field

Often the lowest cost to design, engineer, and construct, a flooded field recharge involves pushing up two- to four-foot-tall berms and flooding to a depth of one to three feet. Such facilities can provide temporary habitat for migrating water fowl.

Spreading Basin

Longer lasting and developed to a higher level of design, engineering, and construction, the spreading basin method features a two- to six-foot-deep excavation to a field and berms up to 15 feet high. Water depths range from three to nine feet. To enhance percolation rates and minimize maintenance, SEWD is experimenting with a combination of ridges and furrows graded into the basin bottoms.

Pit Facility

This recharge methods features excavations with minimal to no side slope in the basin. This method is often employed in order to bypass a confining, hardpan or low-permeability soil layer.


In-Lieu

Rather than construct a recharge facility, in-lieu recharge features replacement of groundwater pumping with the delivery of surface water. Such practices reduce pumping stress on the basin and allow groundwater levels to rise through natural replenishment.

Recharge Program Milestones:

Program Cost Sharing	Recharge Facility Constructed	Candidate Sites Identified	Demonstration Testing	Peters Pipeline Completed	
  US Army Corps of Engineers					
2002	2003	2004	2005	2006	2007
Project Cooperation Agreement sets Federal cost shares at 75 percent. \$800,000 in Federal funding.	Farmington Groundwater Recharge Program initiated. 7,000 AF direct recharge facility built at SEWD. \$1 million in Federal funding.	12 candidate sites identified for evaluation, \$1 million in Federal funding.	Demonstration-level testing at six candidate sites. \$500,000 in Federal funding.	Peters Pipeline Project complete, 1,488 acres of farmland gain access to surface water (in-lieu recharge of approx. 4,000 AF).	Farmington Program's Federal actions on-hold pending further funding

Recharge Facilities

SITE	ACRES	POTENTIAL		STATUS
		Observations	Recharge Volume ¹ (acre-feet per year)	
1 Detention Basin No. 2 (Morada Lane)	15	Extensive hardpan and clay soils not suitable for groundwater recharge.	NA	Eliminated from consideration.
2 Pettit	20	Ideal for excavated pit recharge basin facility, with integrate wetlands and aquatic habitat.	4,800	Pending additional study for water supply and site studies.
3 Togninali		Low permeability of soils and remote location away from surface water source.	NA	Eliminated from consideration.
4 Filipelli	15	Limited size and existing land use limits groundwater recharge opportunities.	NA	Eliminated from consideration.
5 Hansen	50	Undulating topography and location well to the east of primary recharge target area.	NA	Eliminated from continued consideration due to site location.
6 Rajkavich		Low permeable soils suggest that groundwater recharge would not be favorable.		Eliminated from consideration.
7 BNSF	60	Deepening of three stormwater retention ponds could enhance recharge potential.	3,600	On-hold pending further dialog with BNSF officers.
8 Mariposa Lakes (Creek Partners LP)	Approx. 200	Soils data provided by candidate indicate some areas suitable for various recharge techniques.	12,000	On-hold pending site evaluation, water supply, and other studies.
9 Hammer	17	Medium to high capacity surface soils, with good percolation rates.	2,000	Site has been pursued by North San Joaquin Water Conservation District.
10 Kautz	25	Medium to high capacity surface soil encountered with good percolation rates.	2,100	Pending - Potential future in-lieu site.
11 Micke Grove Park/ Golf Course	160	In-lieu recharge via supplemental supplies of surface water for irrigation.	610	Pending approval for construction, planning and facility design.
12 Micke Grove Trust	200	Field flooding of vineyards during dormancy for groundwater recharge and pest control.	12,000	Pending further dialog with landowner.
13 SEWD Spreading Basin Facility	60	Three spreading basins filled with Calaveras and/or Stanislaus River water supplies.	7,000 ²	Completed in 2002.
14 SEWD Northwest	30	Soils suitable for flooded field and spreading basin techniques.	3,000 ²	Construction pending.
 Peters Pipeline	1,488	Surface water conveyance for agricultural and municipal use.	4,100 ³	Completed in 2006, with turnouts to 1,488 acres of farmland for in-lieu use.
Total Potential Recharge Volume (acre-feet per year)			52,210 ⁴	

¹ Unless noted otherwise, potential recharge volumes based on test data or professional judgement.

² Figures represent recharge capacity based on water supplies available four of every seven years through Bellota and Peters Pipelines.

³ Assumes surface waters available five of every seven years.

⁴ Of this potential yearly recharge volume, approximately 11,000 acre-feet per year can be recharged via facilities at SEWD and agricultural lands supplied by Peters Pipeline.

1 Detention Basin No. 2 Site



Highway 99, east of Moshier Dr.
Morada, Calif.

Parcel size: 15 acres

Zone: Stockton East Water District

Water: Moshier Creek

Tests (results): Flooded Field (.07 to .1 feet/day)

Findings: Significant layer of hardpan and extensive clay layers contributed to poor infiltration for flooded fields.

Recommendation: Soils at site are not conducive for groundwater recharge.

Status: Eliminated from continued consideration.

2 Pettitt Site



East of South Kaiser Road and north of the South Fork of Littlejohns Creek, San Joaquin County, Calif.

Parcel size: 20 acres

Zone: Central San Joaquin Water Conservation District

Water: South Fork Littlejohns Creek

Tests (results): Flooded Field (.1 to .5 feet/day) and Excavated Pit (10 to 19.2 feet/day)

Findings: Significant layer of hardpan and clay contributed to poor infiltration for flooded fields; however, recharge rates exceeded 10 feet/day when this layer was excavated.

Recommendation: Full-scale, excavated recharge basin facility; opportunity to integrate wetlands and aquatic habitat.

Status: Pending additional study for water supply, site acquisition, and construction cost issues.

10 Kautz Site



Southeast Highway 99, east of Highway 99, south of Tree Rd. Lodi, Calif.

Parcel size: 25 acres

Zone: North San Joaquin Water Conservation District

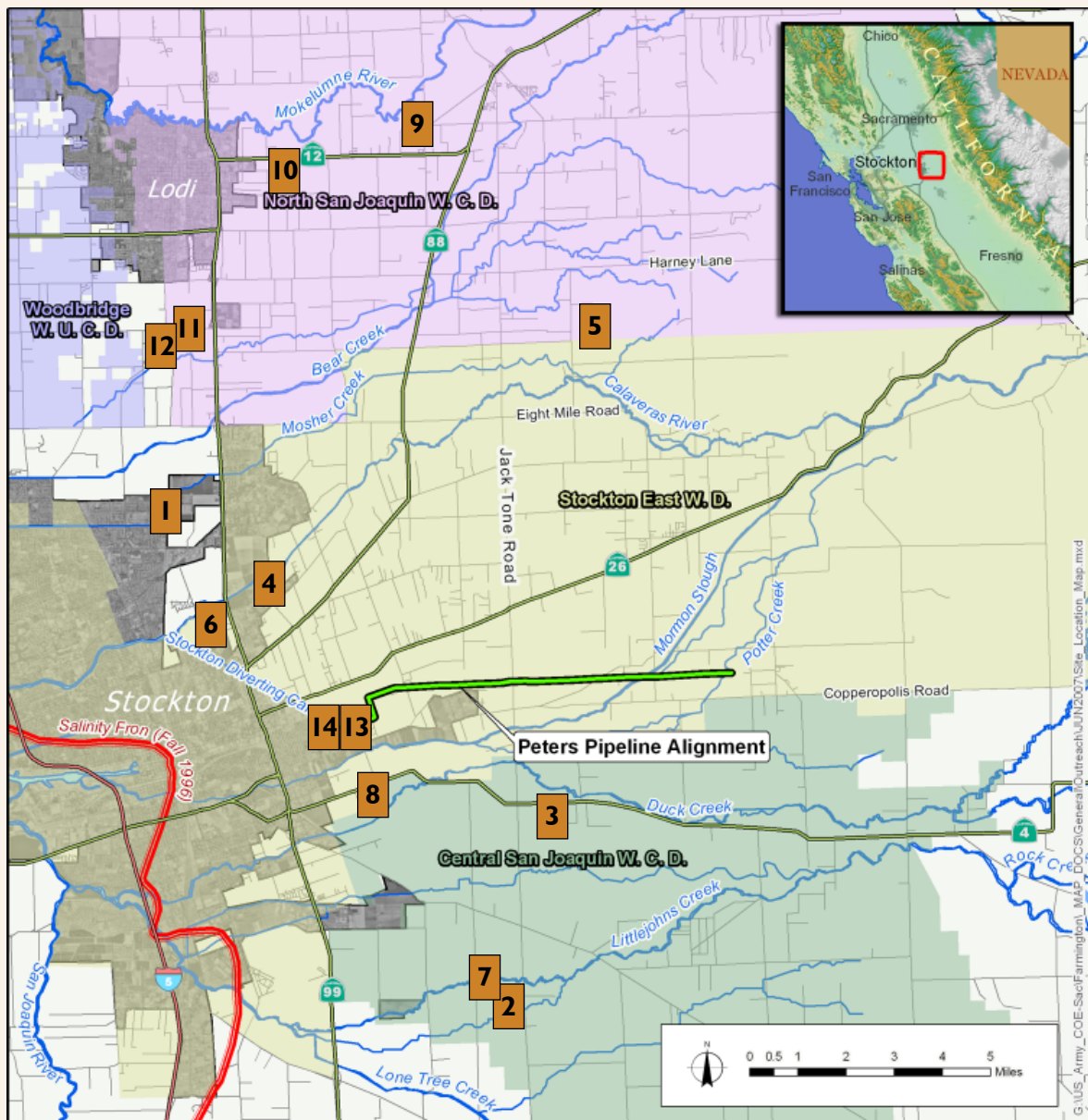
Water: Mokelumne River

Tests (results): Flooded Field (.2 to .5 feet/day) (average)

Findings: Medium quality to high performance site; comparable performance to other sites.

Recommendation: Advance to Demonstration Testing

Status: Pending - Potential future in-lieu site.



11 Mickey Grove Park and Golf Course



11793 N Micke Grove Rd.
Lodi, Calif.

Parcel size: 160 acres

Zone: North San Joaquin Water Conservation District

Water: Mokelumne River via Pixley Slough, with backup supply from Woodbridge Irrigation District and/or City of Lodi

Tests (results): In-lieu recharge through construction of a dual groundwater-surface-water system featuring a three-acre park pond.

Findings: Up to 610 acre-feet/year recharge and \$23,180/year in energy savings through avoidance of groundwater pumping.

Recommendation: Construct project, including planning, facility design and implementation.

Status: Pending approval

14 SEWD Northwest Site



East Main Street, two miles east of Hwy 99, Stockton, Calif.

Parcel size: 30 acres

Zone: Stockton East Water District

Water: Calaveras River or Stanislaus River

Tests (results): Flooded Field (.36 feet/day average); Spreading basin (.62 feet/day average)

Findings: Recharge rates for both methods are good. Flooded field the most feasible on a cost per unit basis.

Recommendation: Advance to Demonstration-Scale Recharge Testing for flooded field

Status: Construction pending. A component of an adjacent 60-acre facility named the Water/Environment Project of the Year, 2003, by the American Society of Civil Engineers, Sacramento Section.



Pipeline Expands Recharge Capabilities

Completed in 2006, the Peters Pipeline is a six-mile long, 60-inch diameter pipeline constructed as a direct and in-lieu recharge facility of the Farmington Groundwater Recharge Program.

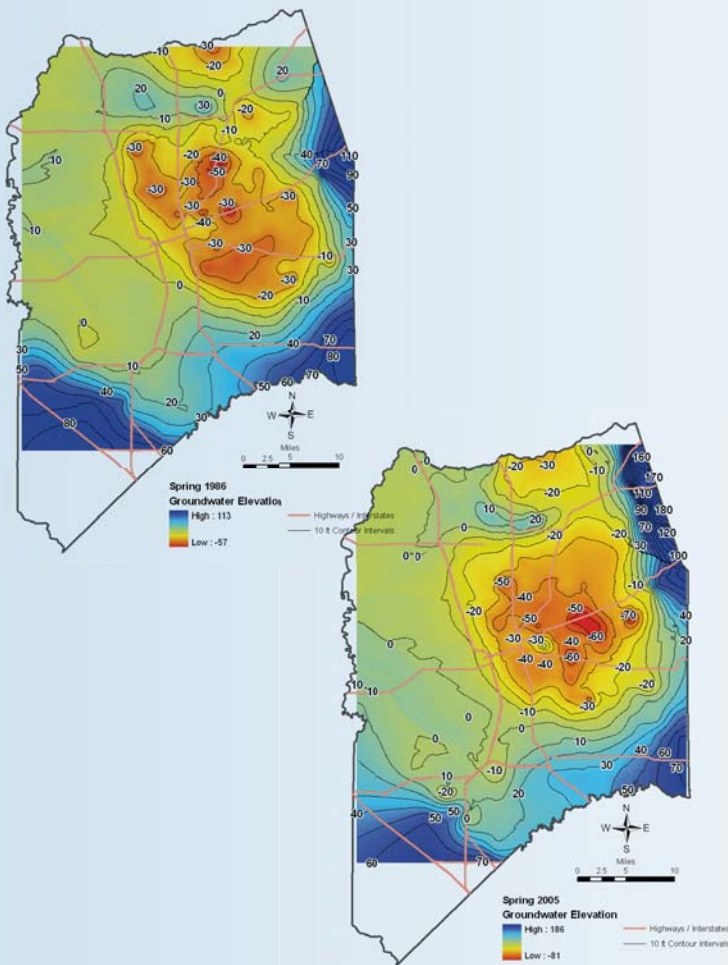
The \$7.5 million pipeline was funded through a \$3.7 million award from the Proposition 13 Groundwater Recharge Storage Construction Grant and bond funds shared by the City of Stockton, California Water Service Company, San Joaquin County and Stockton East Water District.

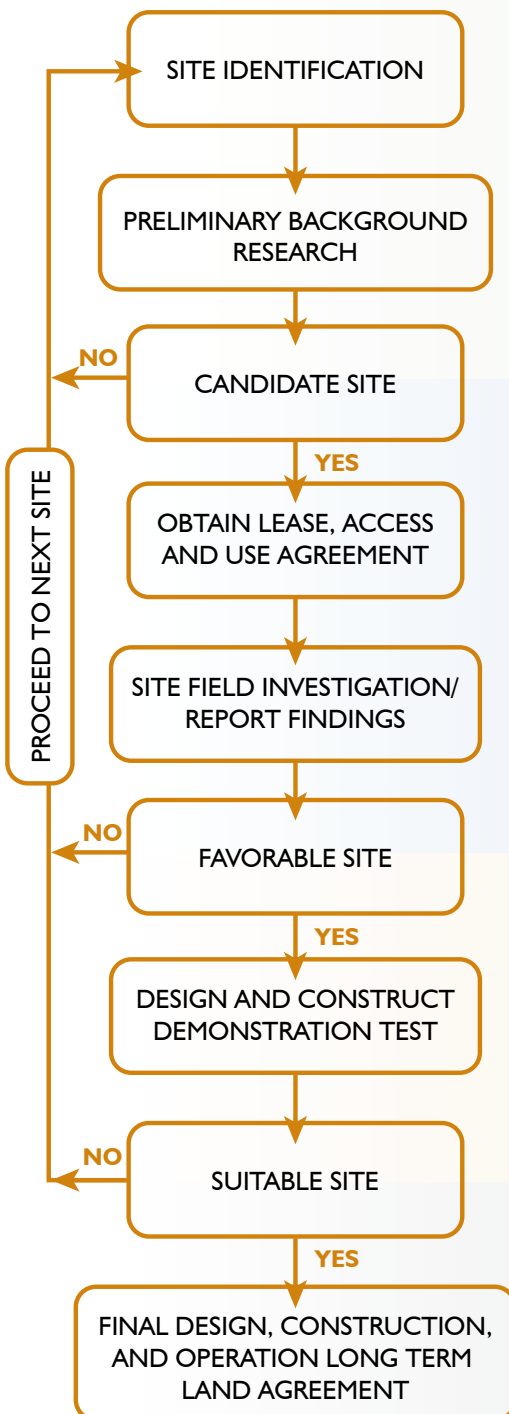
The pipeline carries water from the Stanislaus River and Calaveras River to the District's Dr. Joe Waidhofer drinking water treatment plant.

Approximately 1,500 acres of farmland receive wet year surface water supplies from the pipeline, an in-lieu recharge benefit of 4,000 acre-feet. Another 8,500 acres of farmland are eligible for this surface water supply.

The pipeline further enables a 60-acre complex of recharge ponds and fields adjacent to the District's Dr. Joe Waidhofer drinking water treatment plant to operate un-interrupted. Built via the Farmington Program, but funded with State and local money, the recharge facility returns up to 10,000 acre-feet of water annually to the groundwater tables. This stored water can be drawn and delivered to municipal and industrial customers during dry years.

The spreading basins component was awarded the American Society of Civil Engineers Water/Environmental Project of the Year in 2003, Sacramento Chapter, and the San Joaquin Council of Government Regional Excellence award in 2004.





STAGE 1: SITE SCREENING

- Is location appropriate for program objectives?
- Are soils appropriate for recharge?
- Are land uses compatible?
- Are water supplies available?
- Is property available?
- Are environmental impact mitigable?

STAGE 2: FIELD INVESTIGATION

- Geology and soils data collection
- Land use/water conveyance - field confirmation
- Habitat issues - field inspection
- Aerial photo interpretation
- Groundwater conditions
- Confirm site history
- Confirm site suitability for recharge

STAGE 3: SITE TESTING

- Monitoring well drilling and construction
- Baseline soil and water quality testing
- Site preparation
- Groundwater level monitoring
- Groundwater quality monitoring
- Conveyance water quality monitoring

STAGE 4: LONG-TERM OPERATION & MAINTENANCE

- Continued management of recharge basins to maximize percolation

Stakeholder Outreach: Tapping Into Established Awareness

For many rural and family farmers in Eastern San Joaquin County, a reminder that groundwater levels continue to inch lower and lower arrives from PG&E.

Contained within the monthly electric bill, customers can track a well's energy consumption. If groundwater pumping hasn't changed, but the bill went up, then the water level must have dropped.

Tapping into this pocket-book reality has been a component of a proactive stakeholder outreach and involvement program conducted by the Program partners.

The main focus of outreach is to support communication among landowners to the issue of overdraft and rising pumping costs, and offer the Program as a viable solution. A particular focus has been to involve respected landowners in

outreach activities.

Elements supporting this grassroots-oriented effort include:

- A comprehensive Program website (www.farmingtonprogram.org), including current and historical information, testimonials, and news articles.
- Informational materials distributed by mail, on-line and public counters.
- Program information kit tailored to participants, legislators, media and other interested parties.
- Comprehensive database of lands 20 acres and larger.
- An information booth at the Stockton Ag Expo, public meetings, and an active speakers bureau.
- Outreach to consumer and trade media outlets, including editorial board briefings.
- A water cost calculator for landowners (www.sewd.net) to determine the cost savings



November 2003 ribbon cutting ceremony for SEWD Recharge Basins



Farmington
Groundwater Recharge Program

A Program of

Program Supporters

**United States Army
Core of Engineers**

**California Water Service Company
Central and South Delta Water Agencies
Central San Joaquin Water Conservation District
City of Lodi
City of Stockton
Ducks Unlimited**

**Stockton East Water
District**

**Natural Heritage Institute
North San Joaquin Water Conservation District
San Joaquin County
San Joaquin County Flood Control and Water Conservation District
San Joaquin Farm Bureau Federation
Woodbridge Irrigation District**