

SOLANO COUNTY WATER AGENCY



2005 Annual Report

Grant E-67020

Evapotranspiration Controller System Project



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I.) Project Description

The purpose of the evapotranspiration (ET) controller system project was to purchase, install, and monitor ET controller systems for large public landscapes. ET controller systems consist of solenoid valve controllers at each landscape site, which are linked to a central computer programmed with software to improve irrigation efficiency. A weather station is used to get daily evapotranspiration data which includes wind speed, relative humidity, and air temperature. The project was jointly funded between the State Water Quality Control Board, the Solano County Water Agency, and the four participating cities which include Benicia, Fairfield, Vacaville, and Vallejo. Table 1 lists the various parks and acreage of where the ET controllers systems were built.

The project goals are to reduce public water agency water use and to demonstrate the use of ET technology to both public and private sector landscapes.

City	Park Name	Acres
Benicia	Benicia Community Park	35
Fairfield	Laurel Creek	28
Vacaville	Arlington Park	15
Vacaville	Cannon Station	6
Vacaville	Hawkins Park	3
Vallejo	Bethel High School	15

Table 1 – List of the ET Controller Systems that were built.

II.) Project Cost

The project was completed in 2004 at a total cost of \$273,000. The project cost was composed of (i) the grant contribution of \$195,000 (ii) the local cost share of \$41,467 and (iii) in-kind installations and staff training by the local agencies estimated at \$36,833.

III.) Water Savings

The 2005 irrigation season was the first post-project season to monitor the new ET controllers. Each of the cities experienced a net decrease in water usage for 2005. Table 2 shows the average annual water usage before and after the ET controller project. Vallejo experienced the largest decrease in water usage at -43 % followed by Fairfield at -33 %, Benicia at -23 % and Vacaville at -14 %. The total water savings for 2005 is 87.20 ac-ft, which is enough water to supply 222 households a year. To calculate the amount of money saved for 2005 a usage cost of \$2.15 per 100 ft³ of raw water is assumed. The total amount saved is \$65,000 for all three cities. Table 3 shows the average annual cost of water before and after the ET Controllers were installed. For 2005, the City of Fairfield saved the most at \$21,595, while the Cities of Benicia, Vallejo and Vacaville saved between \$16,550 - \$13,036.

Annual Water Usage (x100 ft³)			
	Pre-project	Post-project	% Decrease
Benicia	42,584	32,932	-23%
Fairfield	30,040	19,995	-33%
Vacaville	42,021	35,958	-14%
Vallejo	28,513	16,290	-43%
Total	143,157	105,175	-27%
Net Savings =		87.20	ac-ft

Table 2 – Average annual water usage for the 4 project cities in Solano County.

Annual Cost of Water (in 2005 Dollars)			
	Pre-project	Post-project	Amt. Saved
Benicia	\$86,695	\$70,145	\$16,550
Fairfield	\$64,586	\$42,990	\$21,595
Vacaville	\$90,345	\$77,309	\$13,036
Vallejo	\$48,158	\$34,342	\$13,817
Total	\$289,783	\$224,785	\$64,998

Table 3 – Average annual cost of water before and after the ET Controllers were installed.

Besides annual comparisons, it is very helpful to know at what months the ET Controllers are most effective. For the Cities of Benicia, Fairfield, and Vallejo, monthly water usage data was provided so that pre-project months could be compared to post-project months (bimonthly data for Benicia). Figure 1 shows the average water usage for each month for (a) pre-project conditions and (b) post-project conditions for the City of Vallejo. According to Figure 1, the City of Vallejo saved water for every month but October with the ET Controllers. Additionally, the months of May – September show the largest water savings for Vallejo. For the City of Benicia, the months of June – July show the most substantial water savings. Figure 2 shows the average water usage for each month for pre and post-project conditions for the City of Benicia. Notice that the lines in Figure 2 appear to be more “stepped” than Vallejo. This is due to the fact that the data is bimonthly data which has been averaged for each month. For 2005 the City of Benicia saved water for every month except April and May. Figure 3 shows the water savings for the City of Fairfield, which saw substantial water savings in April – October, with the largest savings in June and July.

Overall the Evapotranspiration Controller System Project shows some pretty remarkable savings both in water and in monetary value. Nevertheless, it is important to remember that water usage is also directly correlated to meteorological conditions. In 2005 precipitation continued well into June keeping the ground moist, and decreasing the need for irrigation. However, for the later part of 2005, a reverse trend occurred where the first substantial storm did not occur until December 16, which was later than normal. Therefore, the actual water savings seen in 2005 is related to (a) installation of the ET Controllers and (b) increased precipitation and changes in meteorological conditions for 2005. To get a better estimate of post-project conditions, water savings will need to be averaged over the next few years to factor out meteorological variations.

Water Savings with ET Controllers (City of Vallejo)

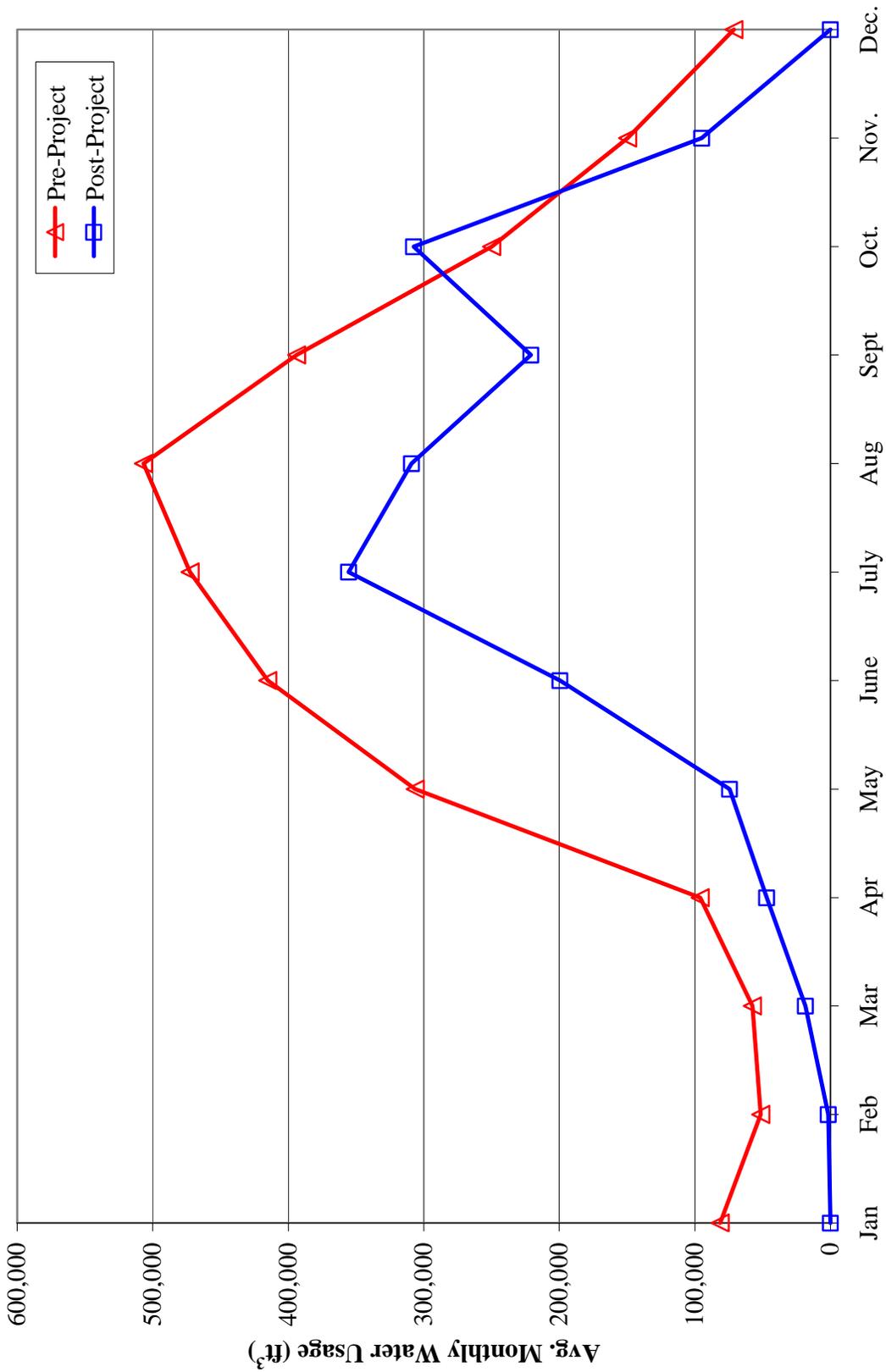


Figure 1 – Comparison of Water Usage for Pre and Post Project Conditions for the City of Vallejo.

Water Savings with ET Controllers (City of Benicia)

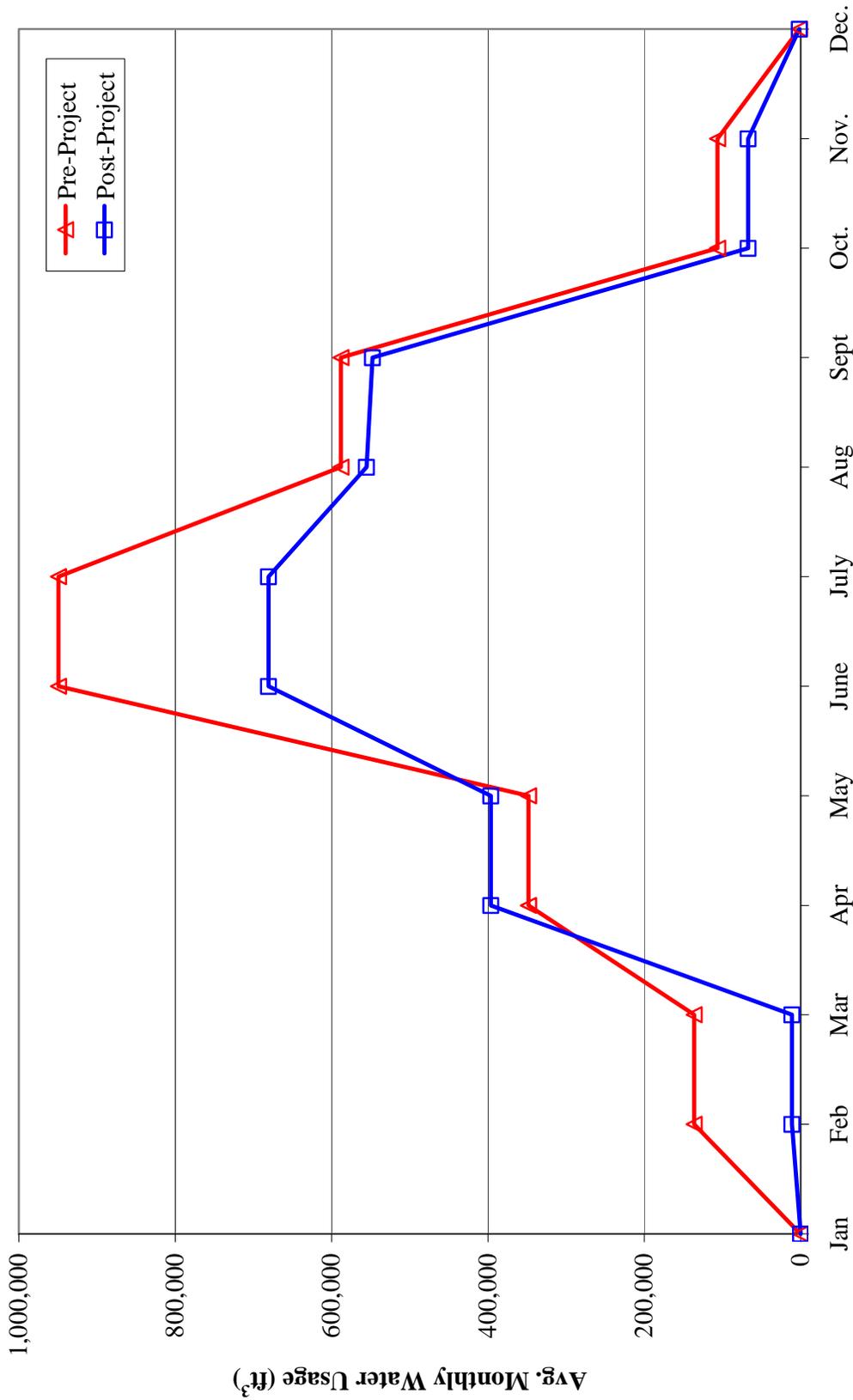


Figure 2 – Comparison of Water Usage for Pre and Post Project Conditions for the City of Benicia.

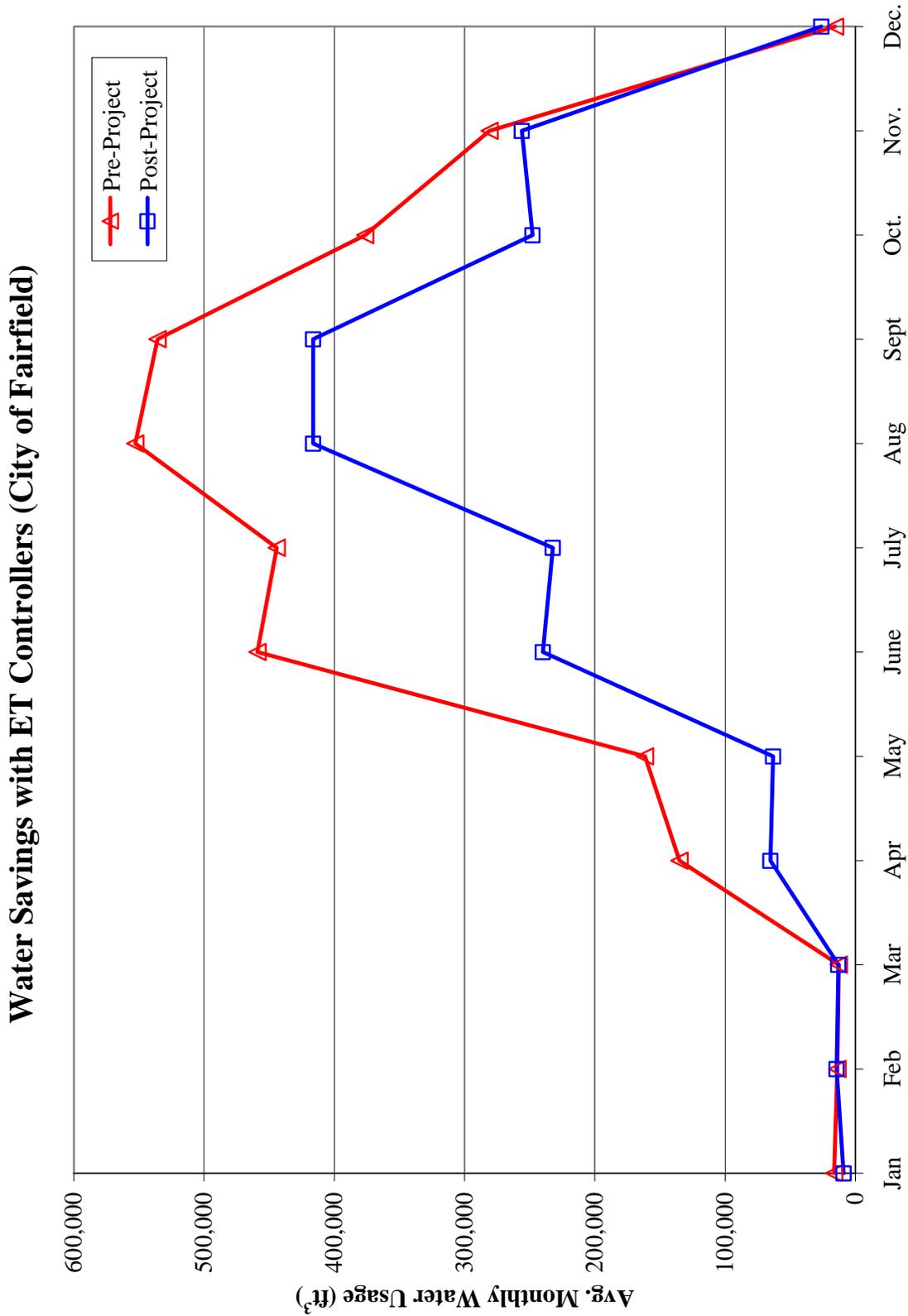


Figure 3 – Comparison of Water Usage for Pre and Post Project Conditions for the City of Fairfield.