

**2004
Water Use Efficiency
Grant Proposal**



San Diego State of the Urban Forest Report

to

**California Department of Water Resources
Office of Water Use Efficiency
1416 Ninth Street, Room 338
Sacramento, CA 95814
Attn: Debra Gonzalez**

by the

**City of San Diego
Water Department**



2004 Water Use Efficiency Proposal Solicitation Package

APPENDIX A: Project Information Form

Applying for:

Urban

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

(g) technical assistance

(h) other

3. Principal applicant (Organization or affiliation):

City Of San Diego

4. Project Title:

San Diego State of the Urban Forest Report

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

Name, title

Frank Belock, Jr.

Mailing address

Water Department Director

600 B Street, MS 913

Telephone

San Diego, CA 92101

Fax.

(619) 533-7555

E-mail

(619) 533-7589

fbelock@sandiego.gov

6. Contact person (if different):	Name, title.	Pamela Carreon, Senior Management Analyst
	Mailing address.	600 B Street, MS 913 San Diego, CA 92101
	Telephone	(619) 533-7517
	Fax.	(619) 533-7589
	E-mail	pcarreon@sandiego.gov

7. Grant funds requested (dollar amount): \$250,000
(from Table C-1, column VI)

8. Applicant funds pledged (dollar amount):
 0

9. Total project costs (dollar amount): \$250,000
(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 (%)
(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. (a) yes
(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.) (b) no

13. Is your project required by regulation, law or contract? (a) yes
 If no, your project is eligible. (b) no
 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.

14. Duration of project (month/year to month/year):	September 2005 to March 2007
15. State Assembly District where the project is to be conducted:	73,75,76,79
16. State Senate District where the project is to be conducted:	38,36
17. Congressional district(s) where the project is to be conducted:	50,53
18. County where the project is to be conducted:	San Diego
19. Location of project (longitude and latitude)	32/-117
20. How many service connections in your service area (urban)?	283,173
21. How many acre-feet of water per year does your agency serve?	236,268 AF

22. 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
 - (i) Investor-Owned Utility
 - (ii) Incorporated Mutual Water Co.
 - (iii) Specify _____

23. 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.

Signature

Name and title

Date

Statement of Work, Section 1: Relevance and Importance

Proposed Study - Relevance and Importance

With a current population of over 3 million, rapid growth in the San Diego area is accelerating water supply, storm water management, air pollution, and energy demand problems. These problems urgently need solutions. Urban forestry is integral to land use planning, managing storm water runoff, mitigating water shortages, conserving energy, improving air quality, enhancing public health programs, increasing land values and local tax bases, providing job training and employment opportunities, reducing costs of city services, and increasing public safety. Despite the relevance of urban forest ecosystems to the environmental and economic health of San Diego area communities, baseline information is lacking and required to adequately plan and manage these urban ecosystems.

Before regional plans can be developed to guide storm water management and the growth and governance of the region's urban forest, a State of the Urban Forest Report is needed. The goal of this 18-month study is to produce science-based information on the extent and value of the urban forest ecosystem for regional planning and advocacy. We anticipate that this baseline will facilitate tracking future canopy cover and impervious surface change, and serve as a baseline for developing comprehensive urban forestry, water conservation, and storm water management programs.

This project is designed to ensure that project goals and objectives produce meaningful results directly related to CALFED goals and objectives, as well as California Urban Water Conservation Council (CUWCC) Best Management Practices (BMPs). To date there has been no substantial study to ascertain water use efficiency associated with urban ecosystems. Insights garnered through this effort would be readily applicable to all jurisdictions throughout the state interested in exploring this water conservation strategy.

Explanation of the need for the project as related to critical local, regional, Bay-Delta, State or federal water issues.

The City is located in a semi-arid coastal desert environment, receives 9 to 10 inches of rain annually, and imports 90% of its water from the State Water Project (SWP) and Colorado River. Approximately 32% of the City's imported water comes from the SWP. In fiscal year 2001-2002 the City used a total 219,170 acre feet of water. Of that 70,134 acre feet were imported from the SWP. Due to the City's heavy dependence on imported water, its supplies are only as reliable as those available to the wholesale agencies that serve the City, namely the San Diego County Water Authority and Metropolitan Water District of Southern California. These organizations continue to work on a number of key issues that would improve the long term reliability and cost of the City's imported water supplies. An important source of new water for the City is water saved through conservation (demand management) incentive programs. The City's conservation programs, all considered Best 5 Management Practices in California, directly resulted in over 13,000 acre feet of water saved in fiscal year 2004.

Indirect Bay-Delta system benefits can be obtained through the implementation of water conservation (demand management) projects demonstrating a potential for achieving California Bay-Delta Program goals. These goals include reducing water demand through “real water” conservation; improving water quality by altering volume, concentration, timing and location of return flows; improving ecosystem health by increasing in-stream flows where necessary to achieve targeted benefits. By reducing water waste, urban greenspace ecosystems decrease the amount of water demanded locally. Their widespread use can translate to a reduction in the amount of SWP water demanded by the City, leaving more water available to the Bay-Delta system at all times during the year.

Per the 2000 Record of Decision defining the Water Use Efficiency Program, water savings benefits derived from the use of urban greenspace ecosystems would:

1. Be “transferable to other parts of the State” if determined effective through the study proposed herein.
2. Likely result in actions taken by the City to increase the use of cost effective urban greenspace.
3. Increase the overall volume of available water in the Bay Delta System.

As such, the proposed study supports CALFED Water Use Efficiency Program goals and objectives.

Describe how this project would be consistent with local or regional water management plans or other integrated resource management plans.

The City has a structured and documented water conservation effort. In 1982, the City Council adopted and implemented a Water Conservation Plan and Work Program. The Work Program allocated the financial resources necessary to retrofit City buildings and facilities with water-conserving plumbing fixtures, update the existing City landscape and irrigation systems, initiate a public information program, propose a low-water use demonstration garden, and recommend developing an emergency plan for distributing water during a shortage. The City Council updated and incorporated the Water Conservation Plan and Work Program into Council Policy 400-11, entitled an “Action Plan for Implementation of Water Conservation Techniques”, adopted in 1987. The Action Plan requires the preparation of an annual report which reviews the water conservation activities undertaken by the City during the previous year.

All of the above mentioned conservation efforts and others have been, and continue to be carried out with success by the City. The proposed project aligns with the City’s current the Strategic Plan and Water Conservation Plan and Work Program, which call for increased conservation levels and continued exploration of new and innovative water saving technologies.

Document the implementation of water demand management activities that have been identified in urban or agricultural water management plans.

In compliance with State legislation, the City prepared its first Urban Water Management Plan and Conservation Program in 1985. The City's updated 2000 Urban Water Management Plan water conservation goal is to reduce the City's dependency upon imported water. In order to accomplish this goal, the City has worked to create a water conservation ethic, adopted policies and ordinances designed to promote City-wide water conservation practices, and implemented a comprehensive public information and education program. In addition, the City adopted the Strategic Plan for Water Supply, which outlines the preferred alternative to meet existing and ongoing demand for water from 1997 - 2015. Water conservation is integrated into this Plan for supplying water to meet forecast needs. The Plan calls for an increase in water conservation by 5%, or a doubling of water conservation over FY 1997 levels of 13,000 acre feet per year, by 2005. Specific new programs identified in the Plan include: turf management, targeting large landscaped commercial accounts, rain sensor rebates (irrigation incentives), H-axis clothes washer incentive program, facility repair and replacement, and enhanced public information program.

Describe how the project will further implement existing water management activities or initiate new ones.

The proposed feasibility study would define the net benefits and benefit-costs ratios for each type of urban greenspace ecosystem to assess the level of services provided and cost effectiveness. Results from this study would be directly relevant to local and regional water agencies exploring the viability of cost effective urban greenspace ecosystems for increased water conservation.

Statement of Work, Section 2: Technical/Scientific Merit, Feasibility

Project Plan, Methods, Procedures, Equipment, and Facilities.

The City would like to conduct a study and develop a State of the Urban Forest Report to assess the current state of the urban forest and develop a shared vision for its future. The report will combine field surveys and existing remotely sensed imagery to quantify the benefits of San Diego's existing urban greenspace ecosystems. We will quantify the current urban forest's role in improving air quality, reducing energy costs, intercepting rainfall and reducing runoff, increasing property values and providing other important social and economic benefits. Also, we will stratify irrigated greenspace by type (i.e. tree/impervious, tree/turf, turf, groundcover/shrubs) and estimate annual landscape water consumption and other maintenance costs (ie. mowing, pruning, tree removal, etc.). Net benefits and benefit-costs ratios will be developed for each type of greenspace to assess the level of services provided and cost effectiveness.

Recommendations will address questions such as:

- What is the optimal amount of water for the existing greenspace system?
- How can this system be configured to produce greater benefits at less cost?
- What techniques are available to track change in greenspace structure, function, and value?

Proposed Task list, Work Plan, Schedule, Start/End Dates, Projected Costs.

The following is the task list, work plan, schedule, start/end dates and projected costs suggested for the proposed study :

Task I: An UFORE Urban Ecosystem Analysis will be prepared. This is a two-tiered analysis that links GIS-based analysis of land use/land cover with field surveys of 200-300 randomly located 1/10 ac plots. Because the plots cover all land uses, results depict conditions and values for the entire urban forest. Homeowner surveys will collect data on residential irrigation and landscape maintenance practices. Projects will include information on tree/shrub species composition and health, canopy cover, management needs, and annual benefits produced.

September 2005 to June 2006 \$125,000

Task II: The value of annual benefits produced by the current greenspace will be mapped and listed for each neighborhood within the city. New methods will be required to derive estimates of benefits from turf, shrubs, and groundcovers. Benefits will be monetized using local prices.

June 2006 to December 2006 \$ 75,000

Task III: The potential value of future greenspace will be determined assuming agreed upon configuration of different greenspace types, and practical tree planting and conservation levels.

January 2007 to March 2007 \$ 50,000

Deliverables: The final product of this study will be a State of the Urban Forest Report that contains the following:

1. A review of the structure, functions, benefits, and costs associated with San Diego's greenspace system.

2. Maps showing the greenspace system, planting opportunities, and the value of benefits provided by current and future greenspace configurations.
3. Recommendations concerning optimal greenspace structures, associated water demands and functional benefits.
4. Suggestions for monitoring greenspace change in the future, including use of remote sensing and permanent plots.

Environmental Documentation:

Not applicable. This is not a “project” as defined by CEQA.

Statement of Work, Section 3: Monitoring and Assessment

Monitoring Plan:

The State of the Urban Forest report will quantify the benefits of San Diego’s existing urban greenspace ecosystems and estimate the annual landscape water consumption and other maintenance costs of greenspace by type. Net benefits and benefit-costs relation will be developed for each type of greenspace to assess the level of services provided and cost effectiveness. This information will be used by the City in evaluating existing and future urban greenspace ecosystems.

Statement of Work - Section B Additional Information:

A growing body of research, in the field of environmental sciences, supports the idea that vegetative land cover in urbanized areas provides significant economic benefits. Studies conducted at the University of California Davis, Center for Urban Forest Research, for example, demonstrate the value of tree-covered areas versus those covered with impervious surfaces. These studies have measured the ability of pervious landscape areas to increase on-site water retention, thereby reducing the demand for supplemental irrigation of landscape plants.

Additional research conducted by the non-profit group Tree People, in Los Angeles, American Forests, in Washington D.C, and the National Parks Board of Singapore, are leading to a more precise understanding of the interrelated values of landscape plants in highly urbanized environments. This research demonstrates the links between abundant, vegetative land cover and effective water management. Reduced water pollution from runoff, reduced energy consumption from water waste and the heat island effect, and

improved air quality due to carbon sequestration and photosynthesis, all result from well managed, properly irrigated urban landscapes.

Given the documented benefits of effective landscape water conservation, several questions remain unanswered: (1) what is the total amount of water savings that can be achieved by implementing on-site water retention design methodologies in San Diego?; (2) do certain locations require unique designs approaches?; (3) which plant species are preferred, and in what combinations and densities?

Qualifications of the Applicants and Cooperators

1. Resumes of the project managers

The resume of Dan Carney, City of San Diego Landscape Architect, is attached. Mr. Carney will administer the contract, oversee the work and maintain all required DWR documentation.

2. Identify and describe the role of any external cooperators that will be used for this project.

The consultant for this project will be the Center For Urban Forest Research. For information on this group please visit their website at cufr@ucdavis.edu.

3. Briefly describe any previous water use efficiency grant projects in which the applicant has participated.

The City of San Diego Water Resource Management Program in the past 14 years, has received local, state and national awards for conservation program design, development and implementation. This includes public education and outreach to promote water conservation technologies. Some of these programs intended to reduce water consumption include:

Commercial Landscape Survey Program

Through this program water customers with irrigated landscape areas one-acre or larger receive on-site technical assistance to improve water management practices. Working directly with both the landscape maintenance staff and the property manager, City staff provides detailed recommendations including customized water budgets, irrigation schedules, and suggested hardware improvements to boost water use efficiency. This program receives co-funding from the San Diego County Water Authority and the Metropolitan Water District of Southern California. In it's third year of operation, the program has resulted in measured water savings averaging one acre-foot per acre of irrigated landscape, a 25% reduction for most customers.

Residential Survey Program

This program offers residential customers an interior and exterior water use survey of their home. The service consists of analyzing water usage and flow rates of fixtures, checking for leaks, installing water-saving devices, and recommending efficiency improvements to landscaping and irrigation. A typical household participating in the program can reduce daily water consumption by 13%. This program is extremely popular, because surveyors can often identify hard-to-find water leaks that contribute to higher water and sewer bills. The Residential Survey Program accounts for water saving of 40 gpd for each survey.

4. If applicant is a disadvantaged community, provide geographic scope and the source of information documenting annual median household income.

Not applicable.

Outreach, Community Involvement and Acceptance

The City has a website and a Public Information Office to interface with the public and community groups.

Please see Attachment B for support letter from San Diego County Water Authority.

Innovation

Long-term management, reducing costs and increasing benefits of urban ecosystems requires a thorough analysis and understanding of these systems. Through analysis we will better able to maximize their benefits, demonstrate whether their costs outweigh their benefits and have a vision for the future. Information obtained through this study could be used statewide in other cities as part of their water conservation efforts.

Benefits and Costs

Please see Attachment C-1.

Project Cost

The consultant will be the Center For Urban Forest Research. For more information on this group please visit their website at cufr.ucdavis.edu.

Potential Benefits and Information to be Gained

The City believes that completion of this study will assess the current state of the urban forest and assist in developing regional plans to guide storm water management and the growth of the region's urban forest. Optimal existing and future greenspace structures will be garnered through this study as well as future monitoring methods. Net benefits and benefit-cost ratios for each type of urban greenspace will be determined to assess the level of services provided and cost effectiveness. Results from this study would be directly relevant to local and regional water agencies exploring the viability of cost effective urban greenspace ecosystems for increased water conservation.

Benefits Realized and Information Gained Versus Costs

The study will determine the benefits and costs.

ATTACHMENT A

Curriculum Vitae

Daniel R. Carney

Landscape Architect

Summary:

- 11 years professional practice in Landscape Architecture, specializing in, water resource conservation, site design and construction management.
- 19 years landscape management and contracting experience.

Education:

- Bachelor of Science Landscape Architecture
California Polytechnic University Pomona, 1994, Honors

Professional Qualifications:

- Landscape Architect - California Architects Board, 1996
- Landscape Contractor - California State License Board, 1991
- Instructor - Cuyamaca Community College, Horticulture Department
- Certified Irrigation Auditor - The Irrigation Association

Publications

- Constructed Wetlands in the Rose Creek Watershed
City of San Diego, 2000
- Commercial Landscape Surveys – A New Standard of Excellence
American Waterworks Association, 2002
- Numerous articles on landscape design, water conservation and the natural environment.

Public Speaking / Media:

- Television and Radio
- Professional Organizations
- Community Advisory Boards and Associations
- Non-governmental Organizations
- Government Agencies, Committees, and Conservation Task Forces

ATTACHMENT B



San Diego County Water Authority

4677 Overland Avenue • San Diego, California 92123-1233
(858) 522-6600 FAX (858) 522-6568 www.sdcwa.org

January 5, 2005

Debra Gonzalez
Office of Water Use Efficiency
California Department of Water Resources
1416 Ninth Street, Room 338
Sacramento, CA 95814

MEMBER AGENCIES

- Coronado
Municipal Water District
- City of Del Mar
- City of Escondido
- City of National City
- City of Oceanside
- City of Poway
- City of San Diego
- Fallbrook
Public Utility District
- Hills Water District
- Olivenhain
Municipal Water District
- Otay Water District
- Pedro Dam
Municipal Water District
- Camp Pendleton
Marine Corps Base
- Rainbow
Municipal Water District
- Ranoma
Municipal Water District
- Municipal Water District
- San Diego Water District
- Santa Fe Irrigation District
- South Bay Irrigation District
- Vulcanas Water District
- Valley Center
Municipal Water District
- Vista Irrigation District
- Yuima
Municipal Water District
- OTHER REPRESENTATIVE**
- County of San Diego

**RE: City of San Diego Water Department Water Use Efficiency Grant Proposals
Letter of Support**

Dear Ms. Gonzalez

The San Diego County Water Authority encourages and supports the following three (3) grant proposals for the City of San Diego Water Department:

- **San Diego State of the Urban Forest Report**

The goal of this study is to produce science-based information on the extent and value of the urban forest ecosystem. This will facilitate tracking future canopy cover and impervious surface change, serve as a baseline for developing comprehensive urban forestry, conservation, and storm water management programs applicable to all jurisdictions throughout the state. The project is also directly related to CALFED goals and objectives as well as the California Urban Water Conservation Council's (CUWCC's) Best Management Practices.

- **Pressure Regulator Incentive Pilot Program**

This project would begin promoting and assisting customers to install pressure regulators that have been identified as having high or low water pressure via audits through the City's Water Conservation Program. Benefits include more efficient irrigation distribution, lower water usage and less site runoff. The proposed project supports CALFED Water Use Efficiency program goals and objectives. Regionally, and statewide, the data obtained through this pilot program could be used to create a data conservation model for similar programs throughout California.

- **Recirculating Hot Water Systems Residential Survey and Feasibility Study**

This project is to conduct a survey, cost benefit analysis, and feasibility study on CUWCC's Potential Best Management Practice # 10. Results from this study would be relevant to regional and statewide water agencies exploring the viability of recirculating hot water systems as an indoor water saving conservation strategy. The study supports

A public agency providing a safe and reliable water supply to the San Diego region

CALFED Water Use Efficiency Program goals and would increase the volume of available water in the Bay Delta System.

The Water Authority views these submissions under Proposition 50 Chapter 7, Water Use Efficiency as having beneficial results locally and statewide. Examining additional water supply sources is an ongoing practice in our region and the information we obtain from these studies will be useful. The state also will benefit as it compiles data from various sources. If these studies ultimately result in the development of these water use efficiency projects, there will be a reduction in the demands on the state's imported water system.

These are prudent measures with potentially significant waters supply benefits to California. Again, the San Diego County Water Authority supports and respectfully requests your endorsement of these Water Use Efficiency Grant Proposals.

Sincerely,

A handwritten signature in black ink, appearing to read 'Maureen A. Stapleton', with a stylized flourish at the end.

Maureen A. Stapleton
General Manager

cc: Frank Belock, Jr., City of San Diego Water Department Director

I:/vvd/letterofsupport.doc

Applicant: City of San Diego - State of the Urban Forest Report

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 (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	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Fringe benefits	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Supplies	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Equipment	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Consulting services	\$250,000	0	\$250,000	\$0	\$250,000	0	0.0000	\$0
	Travel	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Other	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(a)	Total Administration Costs	\$250,000		\$250,000	\$0	\$250,000			\$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	\$250,000		\$250,000	\$0	\$250,000			\$0
(o)	Cost Share -Percentage				0	100			

1- excludes administration O&M.