UC SAN DIEGO
DROUGHT ACTION PLAN

2014

Water at UC San Diego
Background Report and Action Strategy for Drought

The UC San Diego Campus

- The UC San Diego La Jolla campus (including Scripps Institution of Oceanography and the UC San Diego Medical Center – La Jolla) totals approximately **1,152 acres**.

- About **350 acres** of the campus is composed of canyons, natural slopes, groves and other areas that do not require irrigation.

- About 54 acres of the campus consists of **major turf areas and landscaped areas and athletic and recreation fields** (about 40% of these areas are already irrigated with reclaimed water).

- About 12,000 (40%) of UC San Diego's 29,000 undergraduate and graduate students live in **campus housing facilities**.

- On a normal day, the **campus population** of students, faculty, staff, and visitors approaches 55,000.

- UC San Diego's FY2013 campus **potable water consumption** was approximately 580 million gallons (2012 figures), of which 145 million gallons went to our Central Utility Plant cooling towers.

- Compared to an average of the three previous years (baseline), **campus potable water consumption decreased 4% in 2013**, despite a growth of 38K in new facility square footage.

Water Consumption Reduction Measures Already Taken or On-Going

- UC San Diego has developed a comprehensive Water Action Plan detailing how the campus will reduce campus-wide potable water use by 20% from the baseline by 2020. This multi-pronged plan targets a variety of conservation measures in the following areas:

    - New building construction
    - Existing building operation and maintenance
    - Irrigation and landscaping
    - Training and outreach
    - Behavioral modification

- UC San Diego has long been a leader in southern California in the use of **reclaimed water for landscaping irrigation**. Since 1998, the campus has used approximately 40 million gallons annually water from the North City Water Reclamation Facility – making UC San Diego one of the facility's largest customers.

- All new construction includes installation of **low flow water fixtures and native or drought tolerant vegetation.**

- **Retrofitting existing irrigation system with low flow devices.** Approximately 6,650 irrigation heads have been replaced. These changes have resulted in an annual savings of 7.2 million gallons annually in irrigation water used. In addition, a significant number of high water-use spray heads were removed and turf was replaced in Mesa Housing, saving about 900,000 gallons annually.

- Installation of a **computer controlled irrigation system** for 40% of our campus that uses weather data to adjust watering based on temperature and humidity. The system also detects abnormal water usage -- identifying possible water leaks. The 136 central irrigation controllers have the potential to save 100 million gallons annually.

- **Low flow sink, toilet and shower fixtures** have been installed in the majority of existing campus student residential facilities. Housing, Dining, and Hospitality (HDH) is looking into innovative solutions to safeguard retrofits from being tampered with. Sport Facilities completed a retrofit of its urinal flush valves in the Recreation, Intramural, Athletic Complex (RIMAC), and will continue this in the remaining Sports Facilities buildings.

- **Fire hydrant testing water** is used at the Central Utilities Plant as make-up water for the cooling towers. Water savings is equal to approximately 300,000 gallons annually.

- **Water conservation education and outreach** to students, staff, and faculty by HDH and by AQUAholics Anonymous, a campus water conservation group that conducts outreach during Earth Week each year.

- **Training landscaping staff** to identify signs of over watering and water leaks in irrigation systems. Once identified, UC San Diego deploys irrigation maintenance crews to change watering patterns or make repairs.

- HVAC **condensate water capture** for use in irrigation and buildings' non-potable water systems can save millions of gallons of water per year. Two new construction projects--Health Sciences Biomedical Research Facility 2 and Structural Materials Engineering Building--made this feature part of the design, saving approximately 1.5 million gallons per year. A study is being conducted to determine the viability of converting other existing systems to use condensate water in landscaping.

- **Laminar water flow devices** were installed in nearly 1000 faucets at the Hillcrest Medical Center. Water savings is approximately 2 million gallons annually. UCSD Medical Center plans to do the same project in the La Jolla Medical Center.

Additional Reduction Measures

The following projects could further reduce potable water consumption saving about 200 million gallons of potable (34% overall reduction) water from the amount that was used last year. In response to the drought, UC San Diego will be taking immediate action by completing several projects by summer 2014 which will have an impact on water consumption before the end of the peak season.

Potable Water Saving Project List							
Area	**Project Description**	**Est Savings Per Year (Gal)**	**Est Project Cost**	**Projected Complete**	**$/G Saved**	**%from FY13**	**% from baseline years (FY10-FY12)**
Facilities Management(FM)	Retrofit water fixtures in 25 buildings with low flow devices	10M	$800K	Summer 2014	0.05	2.59	2.50
FM	Connection of reclaimed water to East Campus Utilities Plant	10M	$100K	Summer 2014	0.01	1.72	1.67
HDH	Install flow control valve in Eleanor Roosevelt College residential bathrooms	2M	$3K	Summer 2014	0.0015	0.34	0.33
HDH	Retrofit dish room, with low-flow pre rinse spray valve and educate staff	1M	$2K	Summer 2014	0.002	0.0003	0.0003
Sports Facilities(SF)	Retrofit urinal flush valves in remainder SF buildings.	200K	$4K	Summer 2014	0.02	0.03	0.03
SF	As needed, replace/rebuild shower valves; install low-flow shower heads.	1.0 gpm	$15K	Summer 2014	Dependent on number replaced		
SF/EHS	As needed, install low flow laboratory and lavatory aerators.	1.7 gpm	$10K	Summer 2014	Dependent on number replaced		
Facilities Design & Construction (FDC)	New construction of Central Research Support Facility-consolidation of existing animal cage wash services	18.5M	$27M	Fall 2014	1.46	3.19	0.03
SF	Install artificial turf in Muir Field	2M	$1.5M	Fall 2014	0.75	0.34	0.33
FM	As needed, install tempering devices in autoclaves to reduce the use of water to cool discharge water	75%-90% of water flow	$2K/autoclave	Fall 2014	Dependent on number replaced		
FM	Replace out dated controllers at Scripps Institution of Oceanography with weather based central controls, spray heads with low water use heads.	7M	$80K	Winter 2014	0.01	1.21	1.17
FDC	Expansion of reclaimed water to Central Utility Plant and irrigation areas not currently covered. Sub metering and automatic readings will be included.	120-140M	$6M	Fall 2015	0.04	22.41	20.00
Approximate Total		**180M**	**$40M**		**0.2**	**31%**	**30%**

Additional Water Reduction Strategies that Require Funding and/or Resources	
FM/FDC/HDH	Benchmark buildings, conduct audits, and identify leaks or operation issues. Design guidelines can also be written and operations can be tracked after new construction or major renovation
FM	Conduct professional irrigation and landscape audit to identify water saving opportunities, create plan
FM	Replace turf areas with xeriscape. Project is estimated to cost $1M with a savings estimated at 8M gallons per year.
HDH	Replace shower heads to restrict time or hot water
Planning	Conduct advanced planning for update to Long Range Development Plan, specifically addressing landscape design for colleges and overall campus.

Challenges Facing the Campus and Potential Next Steps

- The primary challenge for substantial additional reduction efforts is **growth associated with facility expansion and new construction**. Over the last five years, we have increased square footage and added additional beds for undergraduate and graduate housing. Our aim is to meet UCOP Sustainability goals for 20% per capita reduction by 2020. After which, we may strive to achieve no net gain in overall water use. UCOP Policy or campus policy to support this, or any additional goals, would be an effective tool in its implementation.

- Although substantial reductions in potable water consumption may be realized with the use of reclaimed water on large turf areas, **additional reductions** related to ornamental landscaping and smaller turf areas may be more difficult given the associated costs involved.

- **Special circumstances** such as the need for infection control, high-level sanitary conditions, or the use of water in research processes may lead to a limited ability to substantially reduce consumption.

- As a research institution we have the talent and resources to **research and develop** cutting edge technology for implementation on our campus. UC San Diego is investigating seawater cooling for our buildings in Scripps Institution of Oceanography, and possible use in other parts of our campus. Other technologies to consider include biological wastewater treatment and desalination package units.

- UC San Diego is committed to continually finding ways to reduce potable water use and improve water efficiency through new technology, behavior changes, implementing water efficient building and landscaping standards. UC San Diego will lead by example and will continue to work closely with the City of San Diego and Metropolitan Water Authority to meet the water supply challenges that California faces