

2010 SACUBO BEST PRACTICES ENTRY:

**EVERY DROP COUNTS:
IMPLEMENTING EFFECTIVE AND SUSTAINABLE WATER
CONSERVATION MEASURES**

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Abstract

Sometimes you don't realize how much you need something until it's gone. In the summer and fall of 2007 (and continuing to this day), the University of Georgia (UGA) experienced a wake-up call when the local Athens area, like much of the state of Georgia, plunged into a drought of historic proportions. Dramatic conservation measures were put in place by the state and local governments, with the potential for even more drastic steps on the horizon if relief did not come through rain or a significant reduction in consumption.

Although the University's Physical Plant was already taking significant steps in these areas, UGA's Provost and Senior Vice President for Finance and Administration charged a task force to develop universal recommendations to address the critical water shortage. The task force's charge was three-pronged: 1) to develop practical recommendations for significantly reducing UGA's water consumption in the short term by as much as 25 percent without seriously affecting the University's mission; 2) to develop recommendations for sustained water conservation; and 3) to generate proposals for potentially increasing the University's water supply, both now and in the future. The time frame for its work was short: six weeks.

The success of the "Every Drop Counts" campaign is largely due to two factors: 1) the implementation of operational changes by the Physical Plant, including the installation of water-saving devices; and 2) the effectiveness of an awareness campaign to change the habits of faculty, staff and students. This combination yielded impressive benefits for the first 12 months: water savings of more than \$250,000 and a 28 percent reduction in consumption (18 percent more than the reductions mandated by the Governor). More impressive, however, is the momentum created by the campaign: campus water use has remained 21% below historical levels even after the drought emergency has passed. Much of the savings have resulted in the research arena, where faculty members have collaborated with the Physical Plant staff to identify and implement solutions to water-wasting practices. True to its mission as a land-grant and sea-grant institution, the University of Georgia continues to serve as a role model by not only reducing its own water consumption but also by demonstrating to the citizens of the state through teaching, research and service how water conservation can be improved statewide.

Introduction of the Organization

The University of Georgia (UGA), established in 1785 as the nation's first state-chartered university, is the flagship institution among the 35 colleges and universities in the University System of Georgia. With nearly 35,000 students, approximately 9,000 faculty and staff, and an annual budget of \$1.3 billion, UGA is the largest and most comprehensive educational institution in Georgia and a driving force in the state's economic growth.

The University of Georgia's academic reputation is on the rise, and admission is increasingly competitive. Approximately 18,000 applicants applied for the fall 2009 class of just over 4,700 freshmen. The University of Georgia is ranked 21st among the nation's top public universities by *U.S. News & World Report*, and the institution is consistently recognized as one of the best values in American higher education.

Nearly 1,600 employees serve in the University's Office of Finance and Administration, striving to provide the essential support required by the University of Georgia to achieve its ambitious academic, research and service mission. Seven divisions are housed under the auspices of Finance and Administration, managing the University's fiscal, human and physical resources. The Physical Plant (PPD) is one of those divisions, and this submission addresses a collaborative effort between the PPD and the UGA Water Resources Task Force, co-chaired by the Assistant Vice President for Finance and Administration, to identify and implement solutions to a drought crisis.

Statement/(Restatement) of the Problem/Initiative

The University of Georgia faced a significant challenge in fall 2007: how to maintain its core missions of teaching, research and service during an historic 100-year drought that was intensifying throughout much of the state. Water levels in many streams, lakes and reservoirs were at all-time lows, and both the state and local government had mandated restrictions on water use, with the possibility of further reductions on the immediate horizon. Various factors contributed to the situation, including a persistent lack of rain, rapid population growth in the region and widespread inattentiveness to the importance of conservation. In order to achieve significant reductions in water use, thoughtful changes had to be made in the University's operations, as well as in the personal habits of its faculty, staff and students.

In October 2007, a 12-member advisory task force was charged with developing recommendations for the senior administration to consider in order to achieve more effective water conservation on campus. The charge to the task force was three-fold: (1) to develop practical recommendations to conserve significant amounts of water in the short term with the least possible impact on core missions; (2) to develop recommendations for sustained water conservation; and (3) to generate proposals for potentially increasing the University's water supply, both now and in the future. The need for relief was immediate, and the deadline for solutions was short: six weeks. The task force set to work without delay.

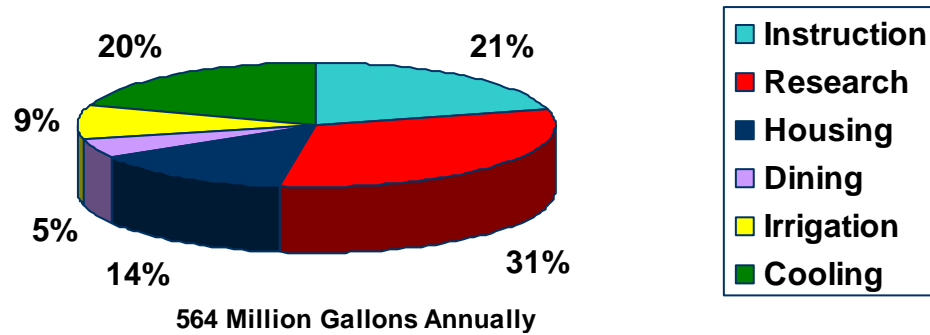
Rather than waiting until the report was finalized to initiate water-saving measures, the Physical Plant pushed forward with several ideas that previously had been "on the back burner" because the low cost of water in Athens-Clarke County had

produced less than desirable payback analyses. To create cohesiveness between the actions of the Physical Plant and the ongoing work of the task force, Physical Plant Division Associate Vice President Ralph Johnson played a pivotal role in the committee proceedings. The Physical Plant is the campus entity with the most knowledge of water-consuming systems and the organization which would ultimately manage any retrofitting projects. Other major water users on the task force included representatives from athletics, housing and the research faculty. In addition, a hydrologist and an extension professor served as members, as did representatives of the student body and staff.

Design

One of the first responsibilities of the water resources task force was to enlist the expertise of the Physical Plant in conducting an audit of water use on campus. As the largest user of water from the municipal water supply at 564 million gallons annually, the University possesses a considerable “hydrologic footprint.” For the most part, UGA water consumption is measured at the individual building level. This data has been compiled since 2000, and it provided the framework to assign water use to functional groups on campus. Water usage at UGA was broken down into the following categories: 31 percent was attributed to buildings with the primary function of research; 21 percent was consumed by instructional facilities; 20 percent was used for cooling; 14 percent was used for housing; 9 percent was utilized for irrigation; and 5 percent was dedicated to dining. These usage rates are depicted by the pie chart that follows.

Figure 1. FY 2007 Water Consumption by Category



Source: UGA Physical Plant

The next step for the task force was to identify the many conservation measures already underway at the University. While this may sound like a simple task, the actions were being undertaken in a host of different areas: classroom buildings, residence halls, conference center, research laboratories, grounds, athletics, etc. Gathering all the information was tedious, but it provided an impressive summary of the good efforts underway at the institution. For example:

- identification and repair of leaking water pipes and fixtures elevated to a top priority;
- replacement of the majority of shower heads and toilets in the residence halls with low-flow devices;
- installation of water-saving fixtures and devices in all resident instruction buildings underway (based on an audit to identify bathroom plumbing deficiencies on campus);
- no irrigation of the campus landscape, except for reduced watering of selected athletic fields from retention ponds;

- capture of rainwater and better mulching practices to preserve high-priority planted areas across campus; and
- suspension of pre-poured water placed at each table setting in the conference center.

On the basis of this information and from learning of the experiences of peer and aspirational institutions, the task force was able to develop its recommendations for short-term and long-term water savings and resource enhancement.

Based on the above distribution of campus water use, the Physical Plant put into action the following projects targeted at the areas of research, instruction and cooling, which represent 72 percent of campus water use:

- a comprehensive plan to retrofit the campus instructional spaces to low-flow restroom fixtures (toilets, urinals and sink aerators);
- connection of 28 “once-through” cooling units to recirculated water systems; and
- installation of 63 meters for cooling tower supply water.

The Physical Plant redirected budgeted funds from other utility and building maintenance projects to meet these immediate needs. The existing plumbing staff was supplemented with local contractors to deliver the projects in the shortest time period possible. By the time the final report from the task force was issued, all of these projects were well underway.

The task force co-chairs also immediately enlisted the aid of the UGA Public Affairs Office in developing a logo and various treatments for the campaign slogan the group had adopted: “Every Drop Counts.” Recognizing that the University campus

includes many diverse constituents—faculty, staff, students (not all of whom were experiencing droughts in their hometowns), alumni, visitors, sports fans, the local community, the state as a whole (through UGA’s public service and outreach mission), lawmakers and even environmental watchdog groups, in this case—numerous techniques would need to be employed to deliver an effective message of conservation.

Implementation

Saturation of the message was essential in order to achieve the mandated water reductions imposed by the state and local governments. Designers in the Public Affairs Office quickly developed a logo for the campaign, which UGA’s Athletic Association further honed by incorporating the athletic icon for its own use. Posters were developed to encourage campus users to take common-sense actions such as turning off the water when they washed their hands. A hotline was established to report water leaks across campus; vinyl-cling stickers bearing the hotline were produced to place on mirrors and bathroom doors across campus. The Residence Hall Association incorporated the logo into its own specialized messages encouraging students to shorten their time in the shower, turn off the faucet while brushing their teeth and to wash only full loads of laundry. The University’s conference center informed guests that it would not be washing hotel linens daily, unless requested; and the University’s fitness center placed posters encouraging shorter showers and the use of hand sanitizer as an alternative to hand washing. The Athletic Association developed public service announcements (PSAs), featuring its head coaches, for all sports venues. In addition, UGA’s county extension officers incorporated “Every Drop Counts” into a campaign to reach homeowners and

young students across the state (recognizing that children often lead their parents to change). One of the campaign items included a refrigerator magnet.

A Web page was set up in the early days of the campaign to provide the campus community with tips on water conservation and to solicit input and ideas from faculty, staff and students. Feedback from the campus community, which was monitored by the task force co-chairs, was active, with more than 115 suggestions and/or comments submitted by year-end. This reporting mechanism led to a direct change in the University's practice in midstream: when numerous complaints regarding overly-sensitive automatic flushing mechanisms were received, the Physical Plant deactivated them on more than 150 toilets across campus. In doing so, the campus community realized that its input really did make a difference.

As previously stated, the Physical Plant reprioritized its plumbing work to address the retrofit of instructional space restroom fixtures. Despite the survey of campus water use completed in 2004, only 20 percent of the retrofits had been accomplished, due to other demands on plumbing staff and the fact that fixture retrofits have multi-year paybacks. However, in the face of a crisis, \$425,000 was earmarked to finish the work: changeouts of more than 1,500 toilets, 500 urinals and 2,000 faucet aerators. Completing this project is believed to have saved 30 million gallons of water annually, a huge contributor to the overall campus reduction.

Another immediate project involved the connection of 28 "once-through" cooling units to building chilled water loops in two science buildings: Biological Sciences and Miller Plant Sciences. "Once-through cooling" is an inefficient practice of using municipal tap water to cool refrigeration compressors and other lab equipment. The tap

water is run through the machine to lower its temperature and then dumped into the sewer system. Although this practice provides a very inexpensive method of cooling, the water use can be excessive. Also, watching large volumes of water run down floor drains is not an image you want in a drought. Again, this project finished an initiative begun previously but not completed due to more pressing priorities in facilities management.

The third project initiated by the Physical Plant was to install water meters to measure water use by cooling towers. While this did not produce an immediate water savings, the meters will allow the Physical Plant Division to monitor for potential control malfunctions, which can cause hundreds of gallons of water per hour to be wasted. Through metering, anomalies can be quickly discovered and rectified in the future.

The task force was proactive in communicating to the campus and local community the conservation measures that were underway and those that were being considered. Periodic informational emails from the senior administration were distributed to faculty, staff and students. An open forum was offered on October 23, 2007. Members of the task force and guests presented an overview of the severity of the drought, conservation measures the University was taking and the work of the task force. This forum was broadcast live on UGA's campus cable station and was later rebroadcast on many occasions. In addition, the task force co-chairs coauthored an op-ed on UGA's efforts which ran in the local newspaper. Regular articles were featured in *Columns*, the University's weekly newsletter distributed to all faculty, staff and alumni leadership. The task force co-chairs and several committee members also made themselves available for numerous interviews, whether they were with student print/broadcast outlets, Atlanta media, NPR or other out-of-state outlets. The co-chairs briefed the local press on

developments following every meeting. Task force members participated in a live broadcast by student reporters with the Grady College of Journalism and Mass Communication, as well as in several forums with community leaders.

The Report of the Ad-Hoc Task Force on Water Resources was released on November 15, 2007, and it recommended actions in the following areas: short-term water conservation, sustained water conservation (educational, research/laboratory, construction and equipment, landscaping and irrigation) and water supply. At this point, implementation of the plan was passed to the Physical Plant. Each suggestion was prioritized and resources and material costs estimated. For FY 2008, the following funds were earmarked to accomplish these specific actions:

- Retrofit all campus facilities with low-flow toilets, low-flow flush valves for existing urinals and ultra low-flow faucet aerators - \$425,000
- Audit water-using research equipment - \$50,000
- Complete the conversion of 28 once-through water-sourced cooling units in Biological Sciences and Miller Plant Sciences - \$38,000
- Install a chilled water connection to existing growth chambers in the Life Sciences building - \$37,000
- Install water sub-metering to better capture individual building water use - \$20,000
- Install supply water metering on campus cooling towers - \$46,000

Continuing in FY 2009, the following measures were taken:

- Installed a lab vacuum system in the Chemistry building to curtail the use of water aspirators used to create a vacuums in undergraduate chemistry labs - \$95,000
- Retrofitted all campus sterilizers with water-saving controls - \$81,200
- Collected air conditioning condensation from five locations on campus to augment cisterns and, in one case, to provide all the necessary supply for a high-profile water fountain - \$37,000

Benefits

The result of UGA’s comprehensive public awareness effort was buy-in from the campus community and widespread participation in a unified effort to reduce consumption. Without the “Every Drop Counts” campaign, some measures might have been viewed as draconian and met with resistance. For example, male football fans at home games were asked not to flush the urinals in the stadium after each use but rather to allow restroom attendants to flush them occasionally. Instead of an uproar from angry fans, television coverage of a game actually zeroed in on a conservation message from the student section —“CONSERVE WATER”—spelled out in school colors across the backs of male fans. Faculty researchers contacted the task force to inform the members of methods they had implemented to control the use of water in their laboratories so that these ideas could be shared with colleagues. Students in residence halls planned “water wars” to increase awareness and reduce consumption.

As is apparent, the “Every Drop Counts” campaign was undertaken quickly and effectively on a grassroots level. Very little additional budget or staff time was required.

Approximately \$10,000 was spent on 2,400 posters, 200 stickers, 600 buttons, 20,000 magnets (for Cooperative Extension across the state) and miscellaneous costs associated with the public forum. The PSAs were produced in-house (and at no charge) by the Public Affairs broadcast/video unit.

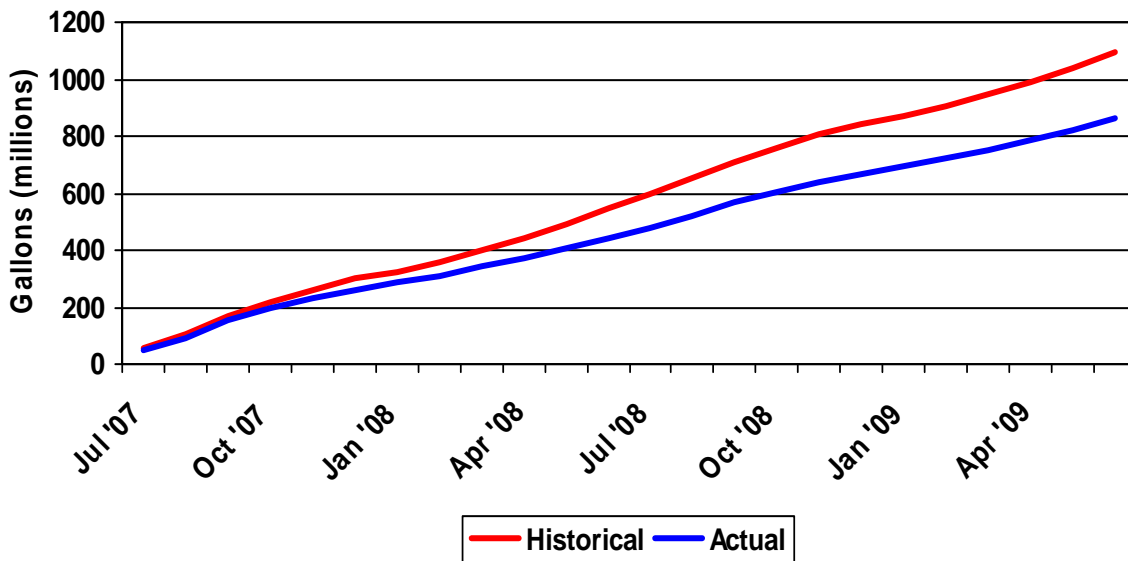
University of Georgia President Michael F. Adams, when questioned by the media about UGA's efforts, routinely stated that he was surprised to find that the research area was the largest water consumer on campus at 31 percent. That stigma has driven that community to work aggressively toward conservation, both with renewed awareness of lab practices and through investment in water-saving equipment. A directive from the Provost was circulated to the researchers working in greenhouses to cease using automated watering systems, to water only by hand and to make special efforts to reduce water use. As a result, greenhouse water use was reduced by 36 percent or 6,711,000 gallons. After the drought ended, traditional watering practices resumed, but continued awareness of greenhouse water use and the installation of new equipment to recycle cooling water in these labs have sustained savings at 5 million gallons per year.

When an inquiry was sent by the Physical Plant to researchers asking for help in identifying water-wasting equipment, more than 100 responses were received. Research water use has declined by one-third, an astounding 52 million gallons since the onset of the "Every Drop Counts" campaign, due almost exclusively to behavioral changes.

Like the successes in the research areas, the overall result of the conservation effort has been a huge amount of bang for little buck. Over the 12-month period from November 1, 2007 to October 31, 2008, when the Governor issued an executive order for all state agencies to reduce water use by 10 percent, UGA's water use was down 28

percent, representing a total savings of over 90 million gallons. Through the remainder of FY 09, water use has remained over 20% below the FY2007 historical consumption. Figure 2 illustrates these overall savings to date since the launch of the “Every Drop Counts” campaign.

Figure 2: UGA Actual Water Use Since July 2007



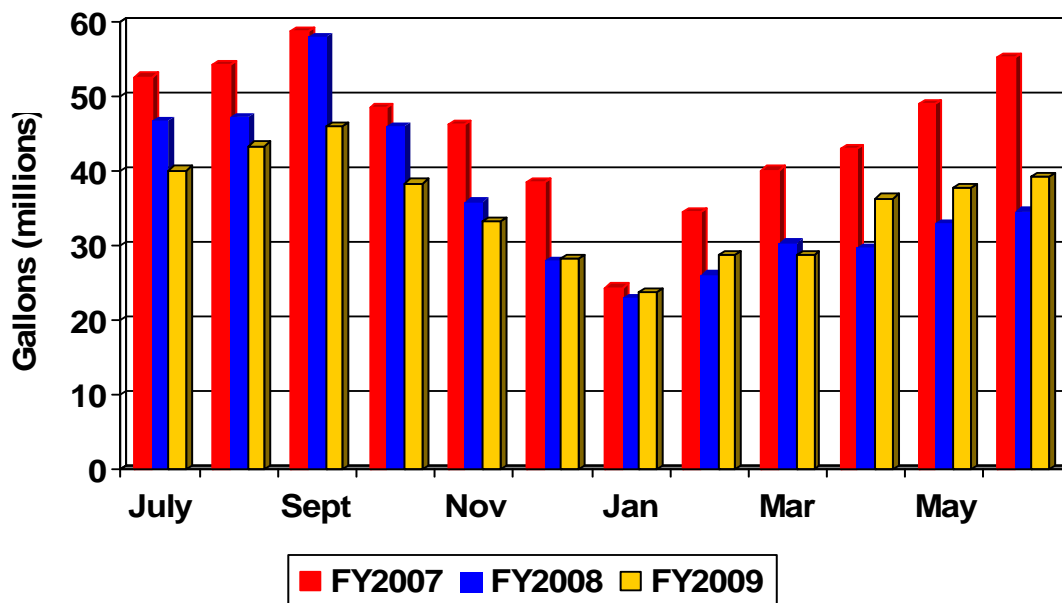
Thankfully, conservation across the Athens community and some relief from winter rains and summer thunderstorms have staved off the need for more dramatic water reduction mandates; but, should they be required again, the University of Georgia will be better prepared, thanks to the effectiveness of the “Every Drop Counts” campaign.

Retrospect

The rains returned in the winter and spring of 2009, and the reservoirs filled again. The state Environmental Protection Division and the Governor proudly proclaimed, “The drought is over!”, but forward-thinking planners at the University of

Georgia have learned a valuable lesson. Rather than revert to old water-wasting habits, water conservation remains at the forefront. Water system improvements are now firmly entrenched as a standard line item for funding in the annual budget for major repairs and renovation (MRR), and UGA is now incorporating water-saving measures into new buildings and renovations. UGA’s campus fountains, shut down in the drought, are now running again, but they are being supplied with roof run-off and condensate captured from neighboring buildings. Signs explain the use of this recycled water to passers-by in order to further the University’s educational efforts in water conservation. Figure 3

Figure 3: UGA Actual Water FY 2007, 2008, 2009



demonstrates how UGA’s water savings are continuing, even with the most severe drought restrictions now lifted.

The work of the Ad-Hoc Task Force for Water Conservation created tremendous public awareness of the critical drought situation and served as an impetus for personal water conservation activities on the campus. The savings were achieved through the

collective efforts of faculty, staff and students taking personal accountability for campus water use as well as by equipment upgrades and retrofits accomplished by the Physical Plant. To maintain the drive for conservation within the faculty, staff and students, however, there had to be tangible water savings on the campus and these savings needed to be communicated to those constituents. To communicate the success, both internal and external print media were notified and monthly update reports were sent to UGA senior administrators and the University System of Georgia Board of Regents. Going forward, UGA has continued making water efficiency improvements even during times of abundant water supply. By continuing this process, the University of Georgia will be much better when, not if, the next drought occurs.