Change Agent Group Goals-Water

Background Data

Sustainable Water Management requires a whole new way of looking at how we use our water resources and requires that we deal with water in a holistic fashion, taking into account the various sectors affecting water use, including political, economic, social, technological and environmental considerations. Central to this is the needs of *present* and *future* users. Water is a vital and renewable resource that has many functions for the environment and humans, including:[1]

1. Maintaining human health: clean water is essential for maintaining human health;
2. Maintaining environmental health: the health of aquatic ecosystems is essential for fish/seafood supply, is a major determinant of biodiversity, and provides for many other vital goods and services;
3. Supporting two production functions:
    a) Biomass production, necessary for the supply of food, fuel wood and timber; and
    b) Economic production, since industrial development has traditionally been "lubricated" by easy access to water;
4. Supporting two carrier functions:
    a) Water plays an active role in diluting and transpiration wastes; and
    b) In the natural erosion and land processes of the global water cycle;
5. Psychological function, which makes water bodies, water views, fountains and so on fundamental components of human preferences and desires. Water also plays a role in many religions and cultural activities.

List of Current Sustainable Practices:

Water

-Total fresh water consumption	**1995-1996**	**1996-1997**	**1997-1998**	**1998-1999**	**1999-2000**	**2000-2001**	**2001-2002**	**2002-2003**
Main Campus Water Use HCF/yr [8]	177,818.00	228,542.00	182,927.99	179,826.00	249,816.99	230,423.99	212,910.99	172,005.00
H&RS Apartments HCF/yr		87,120.00	76,665.60	78,843.60	85,677.60	74,487.60	100,623.60	96,267.60
Total Fresh Water Consumption		**315,662.00**	**259,593.59**	**258,669.60**	**335,494.59**	**304,911.59**	**313,534.59**	**268,272.60**
-Reclaimed Water Use	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
Main Campus Reclaimed Water Use HCF/yr [8]	60,445.00	70,516.00	53,877.00	68,738.00	62,700.00	52,428.00	69,186.00	65,523.00
Total Reclaimed water H&RS apartments HCF/yr [8]	61,419.60	66,211.20	47,175.48	66,080.52	66,036.96	53,622.36	61,550.28	59,938.56
Total Reclaimed Water Consumption	**121,864.60**	**136,727.20**	**101,052.48**	**134,818.52**	**128,736.96**	**106,050.36**	**130,736.28**	**125,461.56**

[8] Main campus includes all H&RS and other auxiliaries, but not apartments or FT. Data provided by Jim Dewey.

Jim will pass me the data (and reconfirm the reclaimed H_2O figures) to add the 2003-04 date and the 2004-05 data

1) The Built Environment -Campus has been practicing water conservation since the drought in the early 1980's. Since that time, water efficiency has been factored into project planning from the earliest stages; incorporating low-flow faucets, flush valves, and showerheads that reduce water usage. Beginning in 2001, the campus began installing waterless urinals and dual flush toilets.

With the Clean Energy and Green Building Policy in place, UCSB is also trying to achieve LEED Silver on all new construction, which has five possible points in the Water Efficiency category. In 2003, the Sustainability Working Team completed an assessment of LEED NC and recommended that all five points in the water category be achieved as a campus standard.

The LEED NC Water Efficiency points include:

Water Efficient Landscaping – reduce by 50%
Water Efficient Landscaping – No potable use or no irrigation
Innovative Wastewater Technologies
Water Use Reduction -20% Reduction
Water Use Reduction -30% Reduction
Water Use Reduction -30% Reduction

[1] (Falkenmark and Lundqvist, 1995)

Impacts of Cleaning Building Exteriors & Roofs- The cleaning process for the building exteriors requires testing for contaminants (i.e. lead paint). Catch basins are used to contain run-off during the process of spraying buildings to wash off particle matter,. If tests show the run-off contains lead, they do not water blast, but instead encapsulate the lead with primer prior to painting. Find out if we use phosphate cleaners – if so, what is the impact?? For roof cleaning, the only equipment used is brooms, rakes, and shovels. All work is done by manual labor. The cleaning process involves clearing all the drains and roof of debris and particle matter, and sweeping up dirt so it does not turn into mud during a rainstorm. Santa Barbara's weather is so mild that the campus does not have too many problems associated with clogged drains and dirty roofs.

Custodial Services-In 2005/06 custodial services implemented a change in cleaning chemicals used on campus. They now use "Green Seal Certified" products for most of their normal cleaning. These products are environmentally friendly and assist in improving the quality of wastewater exiting the campus. There are still a number of non-environmentally friendly products in use and the custodial team is researching products for possible replacement over the next two to three fiscal years. (H&RS-can you give us your input on this paragraph? Also, UCen – what are your practices?)

Campus Infrastructure-In 2002, the campus created "The virtual chilled water loop" on the North-East side of campus. The campus chilled water loop allows us to use the most efficient combination of chillers to meet demands, providing substantial saving in chilled water production and pumping power. This loop currently connects fourteen buildings (mainly laboratory buildings) saving not only the energy in running individual chillers, but the associated water as it is a closed-loop system. The buildings included in the North-East loop are the Library, Bren Hall, MSRB, Life Science, Bio II, Engineering I, Engineering II, Engineering Science, CNSI, Broida, PSB South, PSB North, Chemistry, and Music. A second loop has been added on the West side of campus that currently services HSSB and Snidicor. Plans are in place to connect this loop to SRB, the Events Center. The East and West loops will be connected within the next two years in coordination with the ESSB project.

Permeability-With the Bren Hall project, the first successful permeable fire road (turf block with a grass overlay) was integrated on the campus. This allowed the site around Bren to increase permeability (recharging the water table). The campus is currently exploring various methods of integrating a higher percentage of permable surfaces that would greatly impact groundwater management.

Current successful practices in this area include:

1. Metering and on-going measurement and verification of water use
2. ADD TEXT HERE
3.

2) Grounds & Landscape Irrigation- UCSB's Grounds department is responsible for 800 acres of landscape, hardscape, irrigation, erosion control, and integrated pest management. The 800 acres is divided into four zones. All Grounds staff maintains their allocation of space in the same fashion, but each team is zone specific. Maintenance of the other 2,000 acres of campus is split between Housing & Residential Services (H&RS) and Cheadle Center for Biodiversity and Ecological Restoration (CCBER).

UCSB has been using reclaimed water for its irrigation since 1994. Currently, reclaimed water for irrigation reaches approximately 90% of campus. The current reclaimed water contract requires that we use a minimum of 140 acre-feet per year. The campus has also invested in an automated irrigation system that is controlled by a weather station located on campus. The controls automatically notify the weather station on the evapotranspiration levels. The landscaping is only irrigated when these levels are low. Plans include capturing the balance of the campus irrigation system with reclaimed water within the next 2 fiscal years.
Current successful practices in this area include:

1) Housing & Residential Services (H&RS):
   A. Several turf areas have been replaced with plants that require less irrigation
   B. Astroturf and porous hardscape *(e.g., decomposed granite) has been installed in limited areas, with possible future sites still being explored
   C. High water use plants have been replaced in several areas with plants requiring less water
   D. Demonstration gardens highlight new plants and plant groupings that show possible ways of incorporating water conserving plants while still providing color and style in gardens

E. Reduction/elimination in non-environmentally friendly products for landscape maintenance
F. Present excess water is drained to water retention ponds and holding areas
G. H&RS has an existing water conservation plan (INSERT THEIR PLAN HERE) which outlines several ways that they are focusing on saving water, including reduction in turf, incorporation of recycled water, and advanced central irrigation programs

2) Cheadle Center for Biodiversity and Ecological Restoration (CCBER).
   A. CCBER chooses xerophytic plants that are adapted to living in a dry arid habitat - all plant material is derived from locally native seeds and is propagated and installed in sites with the appropriate environmental conditions to support the plants while also maintaining aesthetic considerations, views, etc.
   B. Plants are grown in an organically based nursery with no inorganic fertilizers or pesticides. Materials are recycled, (e.g. pots and soil).
   C. The majority of work is done by hand – weeding, watering, planting – without the use of mechanized equipment. Fossil Free Landscape approach
   D. Minimal water is used during the first year as native plants are utilized. This allows the appropriate water regime/utilization for the site
   E. Storm water is handled such that it provides multiple benefits – e.g. removed from site, filtered into soil, supporting biodiversity, aesthetics.
3) Grounds
   A. Hedges that require no additional water than what is provided naturally in our climate. These include raphiolepis and westringia salvia, which thrives in the minimal amount of rainfall Santa Barbara receives
   B. Drought tolerant native/adaptive plants, such as ceanothis and lantana. These plants use little water and require minimal maintenance
   C. Trees that require little water once stabilized are chosen. Examples of these trees are: Tipuana, Coast Live Oak, and Tristania conferta
   D. Grounds is installing more artificial turf for playing fields to address student requests that we provide recreation areas 24/7. Playing fields with sod require more maintenance, fertilizer, and water. With artificial turf neither water nor fertilizer is applied, and the field can be played on year-round because the artificial turf does not wear as quickly as regular turf. IF PERMEABLE – STATE HERE e.g. permeable artificial turf
   E. Both Grounds and H&RS have a schedule for mowing and thatching grass. Leaving grass clippings on the lawn aids in returning nutrients to the soil (especially nitrogen as grass clippings are nitrogen rich). This results in a reduced use of fertilizers.
   F. Reduction/elimination in non-environmentally friendly products in landscape maintenance (ADD TEXT HERE THIS NEEDS MORE INFORMATION – TOO VAGUE).

3) Preservation of Wetlands/Open space

Insert info of preservation of water table via these processes

4) **Storm water/Waste Water** –The campus has a general storm water control plan. For the past seven years, the campus has maintained fossil filters in most construction projects. With the practice of achieving LEED Silver on all new construction projects, there is a requirement for site protection that requires all projects to use filters, hay bails, and tarp materials to keep particulates from exiting the site. There are approximately 50 or 60 fossil filters currently in place. In addition, lot 30 has separators (tanks with baffles) to collect run-off. Storm water planning is approached in two ways. On a small scale, each construction project is required to plan and implement a storm water system that feeds into the larger campus system. The second level is planned on a campus-wide scale. The campus has been divided into four zones to address end of source treatment. The areas identified for this process are the slough on the north side, the lagoon on the south side, wetland and bioswale on the west side, and the ocean on the east side. The end of source treatment will take out solids and debris. Physical Facilities also cleans all road and parking lot surfaces on a weekly basis to improve the water quality exiting the campus.

Since 2002, UCSB began integrating waterless urinals on all new projects and retrofitting them in a number of locations throughout the campus. This has resulted in a reduction of the quantity of wastewater produced. As a side note, Goleta Water is currently in the process of converting their system to full secondary treatment, improving the quality of reclaimed water.

Long Term Vision:
All potable water will be garnered from within the campus footprint for first use, re-processing, and re-use. All storm water that exits our site will be in an unpolluted state. All seawater used on campus will re-enter the marine environment in a non-invasive state (unpolluted/unheated condition so there is no impact on the marine life).

Mission Statement:
In order to realize our vision, the Sustainable Water Team will provide leadership for campus by:

1. Working closely with PF/CCBER/H&RS on planning and implementing water conservation measures and a water management plan
2. Reviewing plans for new buildings and renovations to assure water efficiency measures have been properly integrated
3. Research and employ new water efficient technologies
4. Providing information about water use and its global environmental impact to campus constituents
5. Revisiting our water contracts to see where we can make improvements in the short-term
6. Assisting with water related policy creation and implementation
7. Coordination with the Grounds Team to ensure plants used on campus have minimal water needs/impact
8. Assisting with the creation of the Office of Sustainability (OS) to be sure water issues are implemented into their oversight/measurement & verification/annual reporting
9. Working with OS on education and outreach efforts to ensure the campus constituency is well educated on water issues
10. Working with the Academics and Research Team to see where we can imbed water related issues can be integrated into the curriculum "plant as learning lab"
11. Working with the Procurement Team to see where we can improve purchasing practices (water efficient supplies and equipment)
12. Working with the Waste Team with the "best lab practices/microchemistry" to reduce water use

Goals (measurable or numerical data)

Short term (0-1 years)

1. Gather and assess missing data for water (potable, reclaimed, storm)
2. Make recommendations to information tracking systems (assess additional metering needs for water use – all types)
3. Set reduction targets for potable water use and budget for achieving these goals
4. Hire a consultant to perform a hydrologic feasibility study of the campus (keeping to Gleick's findings in 1996, "the use of water that supports the ability of human society to endure and flourish into the indefinite future without undermining the integrity of the hydrological cycle or the ecological systems that depend on it")
5. Explore partnerships with Goleta Water/Sanitary
6. Conduct feasibility study of collecting ground water from Bren Burrito and Psychology Addition.
7. Implement annual water audits for the campus
8. Research and test water efficient toilets
9. Write specification for the campus for preferred toilets
10. Work with UCen Dining Services and H&RS to insure the most effective equipment is utilized in addressing food needs. (Do we wash dishes effectively here? What')

Intermediate (1-5 years)

1. Reassess goals based on findings of studies completed in year 1
2. Work with PF/UCen/H&RS/CCBER on crafting a water efficiency strategy for the campus
3. Reduce potable water use from off campus by 15% (1-3 yrs) and 25% (3-5 yrs)
4. Increase reclaimed water use by 15% (1-3 yrs) and 25% (3-5 yrs)
5. Complete annual water audit and reporting (measurement & verification) and look for ways to annually reduce our water use from off-site
6. Modify and improve water contracts as needed
7. Assist with macro level implementation of OS and water outreach efforts
8. Work with Waste Team on improving lab/microchemistry practices to reduce water use
9. Work with the Procurement team to implement a water efficient purchasing policy and procedure
10. Work with the Academics & Research team on education – Plant as learning lab
11. Complete feasibility study for improving the campus' permeable surfaces

12. Implement findings from permeability study – write spec's etc.
13. Implement projects from feasibility study on ground water catchment systems (provide 25% of our potable water from on-site generation)
14. Implement projects from hydrologic feasibility study
15. Complete re-claimed water irrigation connections for the campus - no potable water to be used on the grounds by 5 year mark
16. Continue work with Grounds Team on water efficient plant choice

Long Term (5-10 and 10-20+)

1. Reduce potable water from off campus use by 50% (10-15 yrs) – provide 50% of our potable water from on-site generation (10-15 yrs)
2. Reduce potable water from off campus use by 75% (15-20 yrs) – provide 75% of our potable water from on-site generation (15-20 yrs)
3. Reduce potable water from off campus use by 90% (20-25 yrs) – provide 90% of our potable water from on-site generation (20-25 yrs)
4. Reduce potable water from off campus use by 100% (25-30 yrs) – provide 100% of our potable water from on-site generation (25-30 yrs)

Barriers:

1. Funding for implementation of projects (metering, extension of loop, extension of reclaimed water for irrigation, etc).
2. Data/information tracking systems need to be strengthened
3. Dealing with unknown conditions:
    a. Assess if there are tanks in ground that need to be dealt with
    b. Does the campus have other existing conditions that would make it hard for us to attain our long-term goal?
4. Education and outreach efforts are currently not in place
5. Need to gather additional information to see if there are there any legal restraints we need to follow/address

Action Items:

Our team still needs to complete this section an insert them into the goal area