



# Hot Air from EEOP – A Newsletter

Environmental Education Outreach Program (EEOP)  
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<http://www.nau.edu/eeop/newsletter>

## The Newsletter

This newsletter is a service of the Institute for Tribal Environmental Professionals (ITEP) Environmental Education Outreach Program (EEOP). The EEOP staff created this newsletter for K-16 students, educators, and tribal professionals that are interested in learning more about environmental issues. This issue of the newsletter will focus on water education and water resources issues.

## Water and Energy - Drought and Climate Change

How are water, energy, drought, and climate change connected? Moving and treating water consumes energy, and producing energy nearly always consumes water: the two are tightly linked. The good news is that conservation of one, results in savings of the other as well. Drought is a period of unusually persistent dry weather that persists long enough to cause serious problems such as crop damage and/or water supply shortages. Continued warming of the earth's atmosphere will likely increase drought in many parts of the world. Some proposals for increasing water supply in drought stricken areas will require large amounts of energy to move water. The articles below will continue to expand on how water, energy, drought and climate change are connected.

## The Energy-Water Connection

The continued security and economic health of the United States depends on a sustainable supply of both energy and water. These two critical natural resources are closely linked - the production of energy requires large volumes of water, while the treatment and distribution of water is equally dependent upon readily available, low-cost energy. In 2000, irrigated agriculture and thermoelectric generation withdrawals of fresh water were approximately equal. In many regions of the country we indirectly use as much water turning on the lights and running electric appliances each day in their homes as we use directly in taking showers and watering lawns. Analyses of water use and availability indicate that to meet our future water and energy demands to support continued economic development will require improved utilization and management of both energy and water resources. According to the Sandia National Laboratories website, concerns about water and energy resources include:

- Projections that our growing population and economy will require an additional 393,000 MW of new generating capacity - about one thousand new 400 MW plants - by the year 2020.
- An increasing population, requiring both more food and energy, pushing the nation's two largest water users into competition for limited water resources.

- Potential environmental and ecological restrictions on the use of water for power generation - removal of hydroelectric dams, restrictions on cooling water withdrawals, and cooling water use - to protect aquatic species and habitat.

The nation's ability to meet the increasing demand for affordable water and energy will be seriously challenged by the emerging issues identified by the Sandia National Laboratories. In addition to these emerging issues, we also need to consider the impacts of droughts and climate change.

### What is a Drought?

A drought is defined as "a period of abnormally dry weather sufficiently prolonged for the lack of water to cause serious hydrologic imbalance in the affected area." -Glossary of Meteorology (1959). Lack of rainfall for an extended period of time can severely impact farmers and metropolitan areas. It does not take very long; in some locations of the country, a few rain-free weeks can spread panic and affect crops.

Here in the desert southwest, weeks without rain are not uncommon. However, when the weeks turn to months, serious problems can arise. Because of the fact that much of our drinking water comes from snowmelt, a dry winter can have serious implications in terms of how much water is available for the following summer season. Most locations have sufficient water reservoirs to make it through one dry winter. The real problem becomes back to back dry winter seasons; similar to what is occurring during the 1998-2000 period of time. With two significantly below-normal precipitation winter seasons, reservoirs are low and the fire danger rises as the forests dry out.

The Dust Bowl days of the 1930's affected 50,000,000 acres of land, rendering farmers helpless. In the 1950's, the Great Plains suffered a severe water shortage when several years went by with rainfall well below normal. Crop yields failed and the water supply fell. California suffered a severe drought around 1970. Rainfall was below normal for 1 1/2 years, and by the time September 1970 arrived, the fire potential was extremely high and dangerous. Temperatures rose to near the century mark and fires broke out. Losses were in the tens of millions of dollars.

Although we have frequently seen cycles of drought in the southwest; we don't know what the impact of climate change will be on these drought cycles. Perhaps what is now considered a drought will become normal in the future.

### What is the Impact of Climate Change on Water Resources?

Warming of the earth's atmosphere will continue to put mounting pressure on America's drinking water sources, leading to diminishing supplies in some regions and flooding in others, according to an analysis recently released by the Association of Metropolitan Water Agencies (AMWA), a nonprofit organization of the largest publicly owned drinking water systems in the United States. AMWA's report, "Implications of Climate Change for Urban Water Utilities", forecasts the likely impacts of climate change on water supplies in different regions of the U.S., such as an accelerated hydrologic cycle of evaporation and precipitation, water contamination, rising sea levels and pressure on terrestrial and aquatic ecosystems.

Among the actions that the report suggests are that water systems prepare for the impacts of climate change by conducting vulnerability assessments to identify short-term adaptation needs; cooperative planning and modeling efforts among utilities to devise strategies addressing likely

regional water resource issues; and efforts by utilities to reduce their own greenhouse gas emissions.

"The ramifications identified in the report point to at least two key needs," said VanDe Hei. "Scientific research is needed to better understand the impacts of climate change on existing fresh water resources and to help develop and assess the affordability of alternative water sources -- such as reuse, recycling, conservation and desalination."

### Taking Action.

It may seem like there is not much that one individual can do to address all these issues. However, like many environmental problems, water resource issues are caused by the cumulative actions of millions of individual people. Therefore, each individual can also reduce their contribution to the problem and become part of the solution. Individuals can contribute directly by conserving both energy and water. For example, you can:

- Turn off lights, computers, and other appliances when you're not using them.
- Use energy-efficient appliances: lighting, air conditioners, heaters, refrigerators, washing machines, etc.
- Only use electric appliances when you need them.
- Keep your thermostat at 68°F in the winter and 72°F in the summer. You can turn it even lower in the winter and higher in the summer when you are away from home.
- Use Compact Fluorescent Light-bulbs (CFL) in your home and office.
- Change to landscaping that requires less water.
- Fix leaky faucets and plumbing joints.
- Don't run the hose while washing your car. Use a bucket of water and a quick hose rinse at the end.
- Install water-saving shower heads or flow restrictors.
- Run only full loads in the washing machine and dishwasher.

### Internships – Water Resources

The EEOP staff is pleased to announce a new Short Internship Program (SIP) opportunity. The EEOP internship program has been expanded to include a water resources internship. This internship program is available to tribal organizations in the southwest – California, Arizona, and New Mexico. A tribal organization interested in hosting a water resources internship can complete an online application available on the EEOP website. A student interested in completing a water resources internship is invited to complete an online application via the EEOP website.

The internship should engage either college students or mature high school students in issues related to tribal water resources. For example, the intern could do a water quality study of a nearby lake or stream. The majority of the internships will be 40 hours. There are no travel or housing allowances for this program.

The EEOP staff may be able to help with water quality work by providing instruments. The EEOP staff also has references and other materials that an intern might find helpful.

This new internship program is made possible by the University of Arizona (UofA) Sustainability of semi-Arid Hydrology and Riparian Areas (SAHRA), which is funded by the National Science Foundation (NSF).

## Curriculum for Water Education

There are a wide range of curriculum resources available to educators interested in doing water education. The EPA provides a wide range of sources via its website. A national water education program is the Project WET (Water Education for Teachers) program. The Project WET program has developed a wide range of curricular materials.

**Project WET Curriculum and Activity Guide.** The centerpiece of the Project WET program is the Project WET Curriculum and Activity Guide. The 561-page guide is a collection of multidisciplinary water-related activities for ages 5 through 18 that are hands-on, easy to use, and fun. The lessons incorporate a variety of formats, such as large and small group learning, whole-body activities, laboratory investigations, discussion of local and global topics, and community service projects.

**Healthy Water, Healthy People (HWHP) Program.** The HWHP program consists of an activity guide and a technical reference manual for anyone interested in learning and teaching about contemporary water quality education topics. The activity guide is for educators of students in grades 6 through university level. The purpose of the guide is to raise the awareness and understanding of water quality topics and issues and their relationship to personal, public, and environmental health. The technical reference manual is an excellent companion text that supports all of the Healthy Water, Healthy People publications and materials.

**Arizona Conserve Water Educators' Guide.** The guide provides an overview of Arizona's water resources, lessons on the interconnection of all water supplies and water users, and a spotlight on conservation inside and outside the home, including water reuse, water audits and new technologies. Ten true Arizona water conservation stories provide evidence that conservation is important, achievable and smart business.

The EEOP staff is available to conduct water education workshops for educators throughout the southwest.

## Future Issues

The EEOP staff is interested in articles sharing stories from students, teachers, or tribal professionals influenced by ITEP or EEOP activities. The next issue will highlight the Student Summer Internship (SSI) program and the Summer Scholars program.

## Credits and Contacts

The US Environmental Protection Agency (USEPA) Office of Air and Radiation provides part of the funding to make this newsletter possible. The newsletter is disseminated on various list serves, however, if you would like to join the newsletter list serve, contact Mansel.

Our staff looks forward to providing new services and developing new programs, as well as continuing existing programs. We especially look forward to hearing from you. So please visit our website at <http://www.nau.edu/eeop> or contact us via telephone or email.

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