

PENNSSTATE



COLLEGE OF AGRICULTURAL SCIENCES • AGRICULTURAL RESEARCH AND COOPERATIVE EXTENSION



Water Conservation for Communities

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Introduction

Although water is essential for life, most people take it for granted. Water is generally viewed as an inexpensive and unlimited resource, and people are satisfied as long as a seemingly endless supply of good-quality water is available.

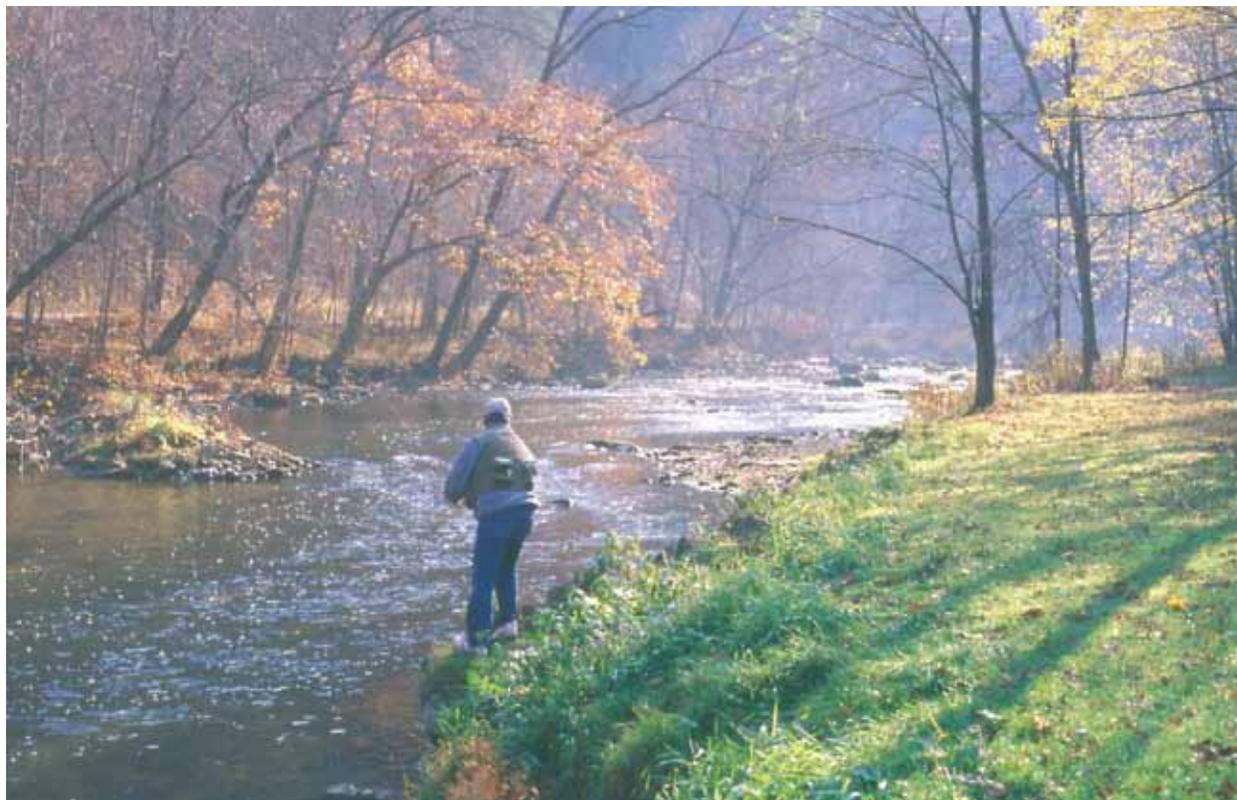
However, water supplies in this country are not limitless. In many areas future water availability is uncertain, and escalating water development costs have become a serious obstacle to expanding water supplies. Global climate change threatens to create even greater variability in water resources in some areas as seasonal or periodic droughts occur more frequently. Even in areas of relative water abundance, increasingly stringent requirements on wastewater discharges and growing infrastructure needs place a premium on reducing the amounts of water used and wastewater produced by homes and businesses.

There is widening recognition of the importance of community-level water conservation programs in reducing demand on the nation's water resources and

wastewater infrastructure. Proven strategies that can be used as part of a community water conservation program include the following:

- Public education programs
- Refit programs (installing water-saving devices in older buildings)
- Water-rate-structure revisions
- Distribution-system water loss reduction
- Water conservation regulations and ordinances

In this guide we discuss water conservation strategies, identify water conservation resources, and relate practical advice on beginning a conservation program based on research and experiences from across the country. The guide should be of interest and value to water utility personnel, planners, staff of environmental and community organizations, and individuals concerned with making our nation's water systems more efficient.



With increasing needs for water, comprehensive plans to conserve water are critical for preserving Pennsylvania's valuable surface and groundwater resources.

Why Conserve Water?

A mere one-half of one percent of all the water on earth is fresh water that is accessible to humans for water needs. Pennsylvania is fortunate to receive abundant precipitation, ranging from 32 to 48 inches per year. Roughly half of the state's residents rely on surface water supplied by the precipitation that flows to streams and into reservoirs. The remaining population relies on wells and springs that tap underground reservoirs of groundwater called "aquifers," also replenished by precipitation infiltrating deep into the ground.

Regardless of the source, the water available to humans is not only limited but in a continuous state of flux. In any given year, some areas may receive an overabundance of water, while others suffer from droughts. A growing and mobile human population also can stress traditionally adequate water supplies. Recent severe and recurring droughts in Pennsylvania resulted in increasing competition and disputes over water resources that ultimately led to the 2002 Water Resources Planning Act. The Act charged the Pennsylvania Department of Environmental Protection (DEP) to come up with a new State Water Plan to address current and future water use and demand.

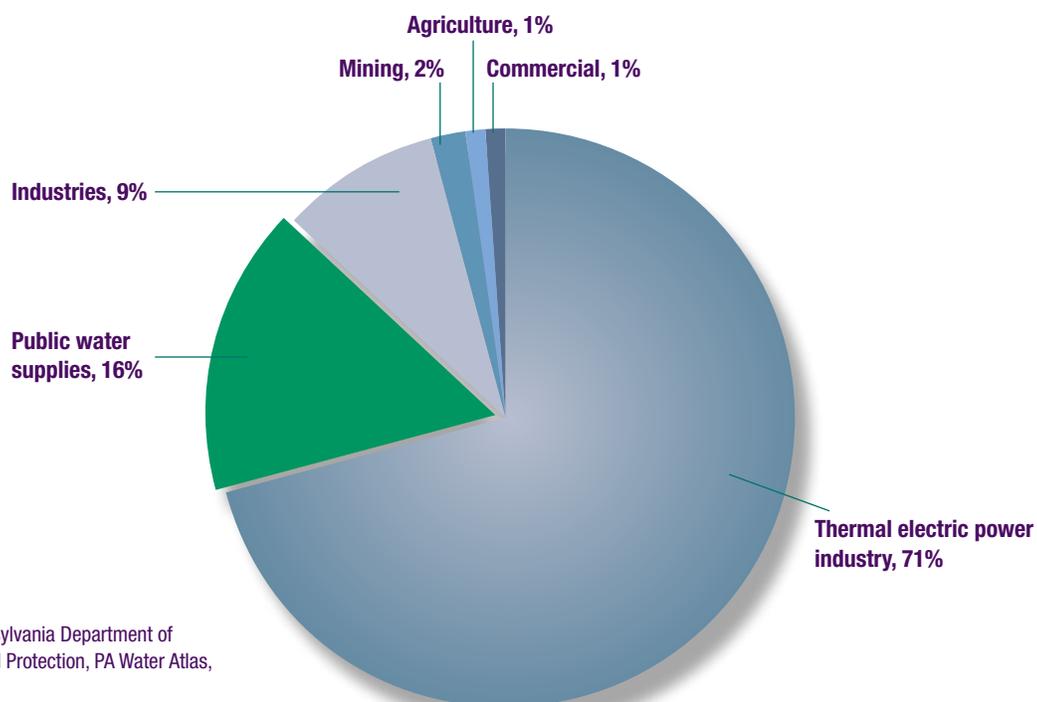
THE STATE WATER PLAN

Pennsylvanians withdraw about 9.7 billion gallons of water every day from a variety of surface- and ground-water sources. The various sectors using water in Pennsylvania are illustrated in the chart below.

Water-use patterns continuously evolve with population shifts, energy demands, farming practices, infrastructure management, consumer sophistication, national and international policies, and climate change. Each can influence how water resources are managed over the next several decades.

The current Pennsylvania State Water Plan replaces an outdated plan that was completed in 1983. The Water Resources Planning Act of 2002 established a statewide water resources committee and six regional committees to guide DEP in developing a new State Water Plan and updating it at five-year intervals. The updated plan seeks answers to the following questions: How much water do we have? How much water do we use? How much water do we need? Comprehensive water conservation programs for communities, industry, farmers, and households are an important component of the State Water Plan to ensure adequate water supplies for the foreseeable future.

Percentage of total water withdrawals for various water use sectors in Pennsylvania.



Source: Pennsylvania Department of Environmental Protection, PA Water Atlas, 2008.

ENERGY SAVINGS

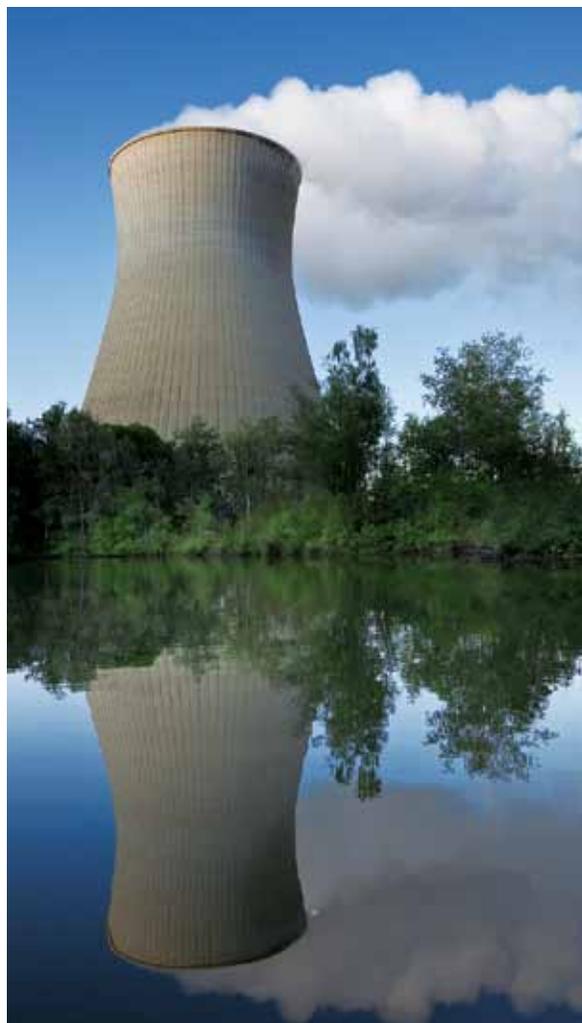
The fastest-growing cost in the nation's water budget is for the energy needed to pump water from one place to another. On an individual basis, an average homeowner pays more for energy to heat water than for all the water used in the home. Domestic water heating consumes three percent of the total national energy budget. Saving water saves energy, which, in turn, saves money on water and heating bills and reduces municipal energy costs.

Producing energy also requires significant amounts of water. The development of the natural gas industry in Pennsylvania, specifically the Marcellus shale, has many Pennsylvanians concerned about where the water will come from to harvest this gas resource. Other alternative and developing renewable energy sources also demand water usage during their production stages. It is clear that energy and water are closely associated, and conserving either resource can ultimately help conserve the other. For more information on the link between energy production and water resources, consult Sandia National Laboratories at www.sandia.gov/energy-water/.

REDUCED SEWAGE FLOW

Reducing per capita water use would concurrently reduce the amount of sewage generated and extend the "life" and capacity of many public sewage conveyance and treatment systems. This would lessen the need for construction of new sewage treatment plants or expansion of existing treatment facilities. Many communities have sewage facilities that are at or near their capacity. These overloaded sewage systems can result in bans on new sewer taps that can limit commercial and residential growth. A comprehensive approach to include replacing or updating faulty infrastructure, eliminating infiltration and inflow, as well as reducing water use could allow additional homes to be built in a given area without the need to add sewage conveyance or treatment plant capacities.

Homeowners with individual onsite septic systems would benefit from conserving water by reducing the hydraulic load or the amount of liquid waste entering their system. Overloaded systems are more likely to fail, posing problems for the homeowner and increasing the potential for polluting nearby groundwater or surface



Power plants represent the largest withdrawal of water in Pennsylvania.



Water conservation measures can reduce the need for expensive upgrades to water and wastewater infrastructure.