HOURGLASS

FOUNDATION

IS LANCASTER COUNTY RUNNING OUT OF WATER?

Lancaster County is known as the "Garden Spot of America." But, today our Garden Spot is in the midst of one of the worst droughts ever recorded.

Here are the facts:

- We've had too little rainfall to replenish groundwater
- Lakes, rivers and streams are at record low levels.
- Wells are going dry across the state
- Booming population growth and sprawling development have worsened natural conditions

This extreme water shortage has major implications for the economy, environment and quality of life for everyone who lives in the region. In February, Governor Mark Schweiker declared a "Drought Emergency" for Lancaster County and 23 other counties in Pennsylvania.

Lancaster County is rich in water resources

Lancaster County benefits from the fact that the Susquehanna and Conestoga rivers flow along and through its borders. In addition, the county also benefits from the presence of numerous lakes and streams. The county also receives water from what are called "watersheds" – massive land areas that drain water to a particular stream, river, or lake and carry it far downstream. The watersheds that carry water to Lancaster County extend as far as New York and New Jersey and include: Brandywine-Christina, Chester-Sassafras, Conestoga, Lower Delaware, Lower Susquehanna, Mullica-Toms, Sandy Hook-Staten Island and the Schuylkill.

Source: Map - Economic Development Company of Lancaster County. Watershed data – US Geological Survey

Despite these resources, Lancaster County is facing a water crisis.

Despite being surrounded by such rich water resources, water is becoming a scarce commodity in the towns, suburban developments and rural farmlands of Lancaster County. A dry fall in 2001 and mild winter produced too little rain and snow to replenish surface and groundwater to normal levels. At the same time, more and more residents and businesses have moved into the region, and are consuming water at a faster pace.

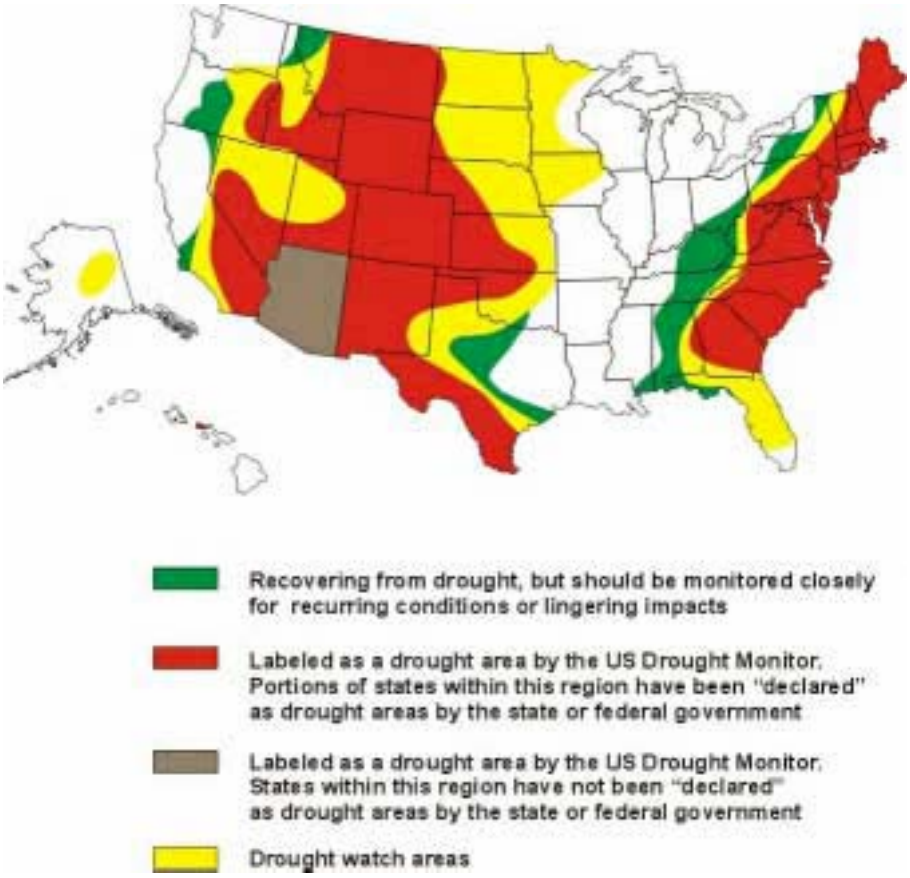
We are presently in the midst of a drought of historic proportions.

This drought is already having a significant impact on every aspect of our lives, impacting our home life, business, the environment, public safety, recreation.

While some aspects of this crisis are out of our control, there is also a great deal that we have done to make it worse. But, make no mistake about it, there is also a great deal that is within our power to lessen the affects of the drought. Unless all of us work together to conserve our precious water resources and engage in better planning for the future, we are putting at risk the very quality of life so many of us have come to enjoy.

Drought is a national problem

We are not facing this severe water shortage alone. Drought is becoming a national and global problem. Many nations are coping with drought emergencies that have resulted from cyclical natural cycles, poor logging and farming practices and booming development.



Drought Impacts in the US, Spring 2002

In the United States, many states along the East coast and mountain states are currently facing severe water shortages. Unlike other weather patterns, droughts usually start in the East and move West. Our current drought began in the east in 1999.

Source: www.droughtoutlook.com

What exactly is a drought?

Scientists typically define droughts in four different ways:

Meteorological:
Measures the extent to which precipitation is below normal. Due to climatic differences what is considered a drought in one location may not be a drought in another location.

Agricultural:
When the amount of moisture in the soil no longer meets the needs of a particular crop.

Hydrological:
When surface and subsurface water supplies are below normal.

Socioeconomic:

When physical water shortages begin to affect people.

Source: Photos and information, www.droughtoutlook.com

Drought: Mother Nature vs. Human Nature

While drought tends to occur in natural cycles that can last for a several years or more, many experts believe human activity is playing an increasing role in creating drought conditions.

Here are a few of the human related factors and theories that scientists believe are contributing to drought problems in many parts of the world:

Global warming. Emissions from cars, coal fired power plants, fertilizers in agriculture, refrigerants, chemicals released by production of natural gas all create and trap excess carbon dioxide, turning our atmosphere into a "greenhouse." This has made temperatures rise and caused more rapid evaporation of our earth's water assets.

Population growth. Booming population growth is putting greater pressure on existing water supplies. Farmland areas in Pennsylvania have seen explosive growth since the 1950s.

Sprawling development. In the past 30 years, suburban sprawl has meant more people, houses, malls, cars, lawns and asphalt. The process has fueled water consumption and created large expanses of "impervious" surfaces where rainwater cannot penetrate and return as groundwater.

Failure to practice conservation. Until recently, citizens have behaved as if water was in limitless supply and failed to take simple steps to conserve water in their homes and at work.

Pennsylvania's recurring bout with drought

In 1999, a severe drought hit Pennsylvania. Wells and groundwater dropped to record low levels. Dry streams, wetlands and lakes caused immediate and long-term damage to fisheries and aquatic resources. Farmers suffered more than $1.3 billion in crop losses, and $1.5 billion in economic loss from decreased milk production.

But by fall of that year, Hurricanes Dennis and Floyd along with season heavy rains brought some relief to eastern and central Pennsylvania. Now, three years later, a drought has returned that is far worse than any in memory.

The Commonwealth uses five parameters to assess current drought conditions. These include:

- **Streamflows** (compared to the same time for the period of record)
- **Precipitation** (deviation from normal 30-year average precipitation)
- **Reservoir storage levels** in a variety of locations (especially three New York City reservoirs in the upper Delaware river basin)
- **Groundwater elevations** in a number of counties (comparing to past month, past year and historic record)
- **Palmer Drought Index**, a measure of soil moisture computed by the National Weather Service

Source: PA Department of Environmental Protection

Putting the brakes on drought in Pennsylvania

In February 2002, Governor Schweiker declared a "Drought Emergency" for 24 counties in Pennsylvania. In addition, 7 counties remain in a drought warning, and 31 counties are under a drought watch. The governor said. "If conditions do not improve, and we do not work together to conserve water, we could face the worst drought in our state's history by spring."

Pennsylvania has different warning levels to signify the severity of the drought conditions:

- **DROUGHT WATCH:** A period to alert government agencies, public water suppliers, water users and the public regarding the onset of conditions indicating the potential for future drought-related problems. Calls for voluntary water conservation to reduce water uses by 5% in the affected areas.

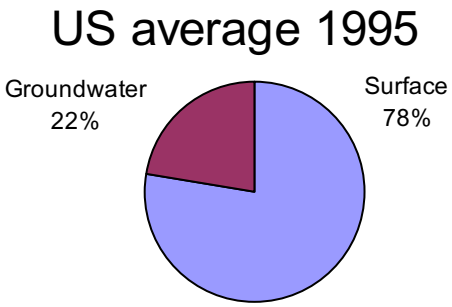
- **DROUGHT WARNING:** Initiates coordinated response using voluntary conservation measures to avoid or reduce shortages, relieve stressed sources, develop new sources, and if possible forestall the need to impose mandatory water use restrictions. The objective is to reduce overall water uses by 10-15% in the affected areas.

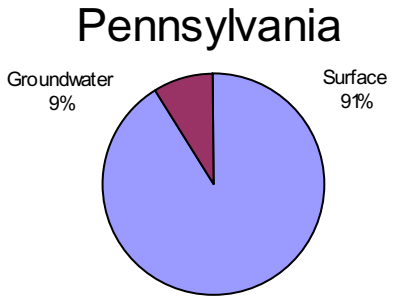
- **DROUGHT EMERGENCY**: A concentrated management phase to marshal all available resources to respond to actual emergency conditions, to avoid depletion of water sources, to assure at least minimum water supplies to protect public health and safety, to support essential and high priority water uses and to avoid unnecessary economic dislocations. It is possible during this phase to impose mandatory restrictions on nonessential water. During this phase is to reduce consumptive water use in the affected area by at least 15%, and to reduce total use to the extent necessary to preserve public water system supplies, to avoid or mitigate local or area shortages, and to assure equitable sharing of limited supplies.

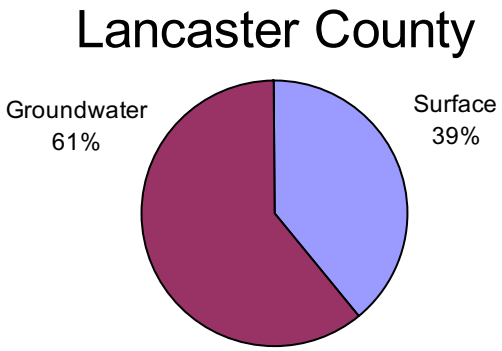
Source: Commonwealth of Pennsylvania

Where do we get our water?

In 1995, Pennsylvania got 91 percent of its fresh water from surface sources – lakes, rivers and streams, and only 9 percent from groundwater. The US average shows a higher dependence on groundwater, with much of it devoted to irrigation. Lancaster County is by far much greater dependant on groundwater for our source of water.







Source: US Geological Survey and Lancaster County Planning Commission Water Resources Plan

How do we use our water?

While the way we use water at home can have a major impact on our community's supply, it accounts for a fraction of all water use. In the United States, the majority of water use is devoted to generation of power and irrigating farmland.

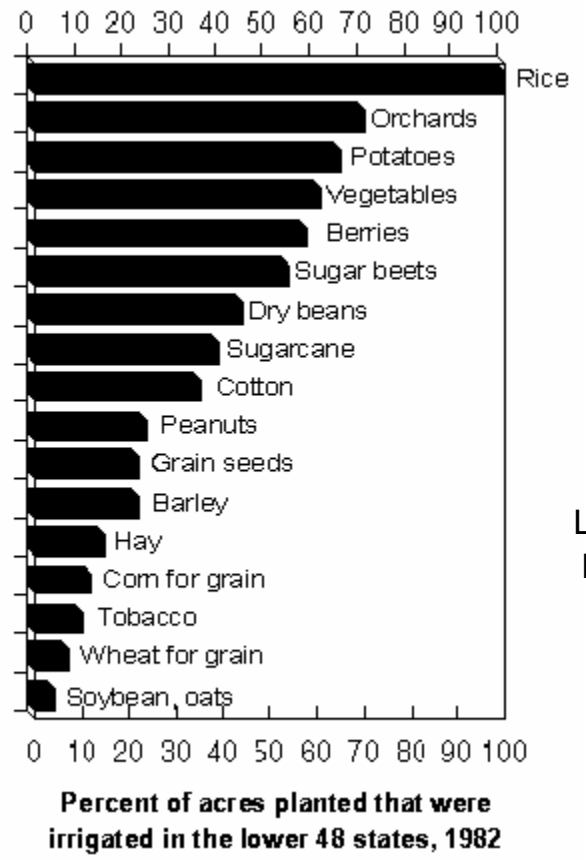
- Pennsylvania devotes a far greater portion of its water to producing electricity than most states, as well as a much higher portion for industry and mining.

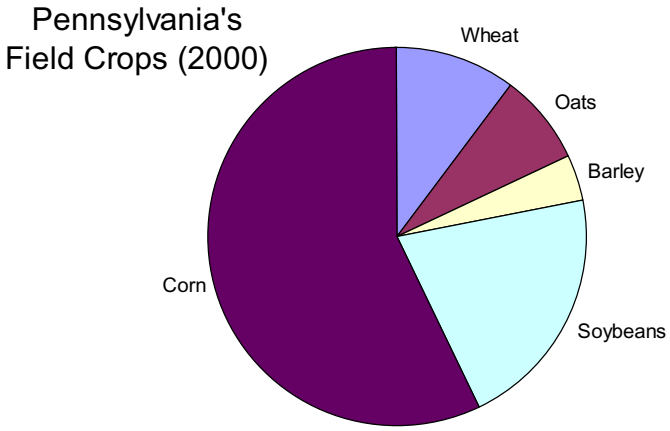
- Although Pennsylvania is one of the nation's principal farming states, our climate – until recently – has spared us the need to irrigate as much as other states. In the 1999 drought, however, this was not the case, and water shortages took a heavy toll on farmers.

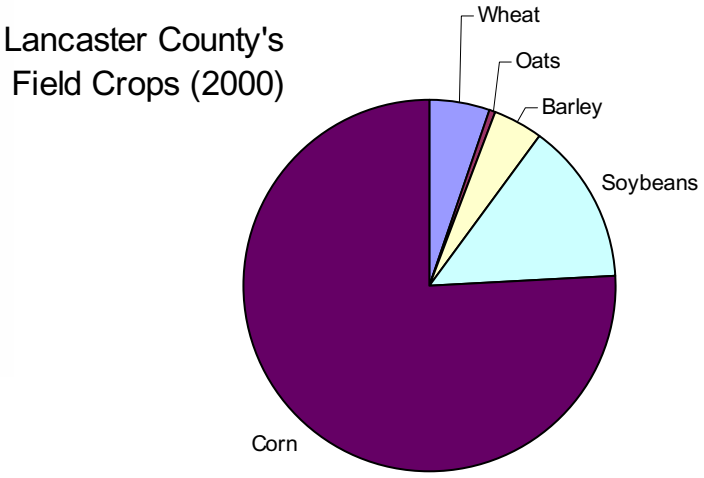
1995 Water Use Averages	**US**	**PA**	**Lancaster County**
Power Generation	47%	61%	33%
Public Supply	10%	16%	24%
Domestic	0.8%	2%	16%
Irrigation	33%	0.2%	1.1%
Livestock	1.4%	0.6%	7.5%
Industry/Mining	6.5%	20%	12%
Commercial	0.7%	0.3%	6.2%

Source: US Geological Survey

Which crops need more irrigation?







This bar chart gives you an idea of what kinds of crops need and receive irrigation in the United States. Almost 60 percent of all the world's fresh water withdrawals go towards irrigation uses. For example, 100-percent of the land used to grow rice is irrigated. Other crops, such as corn, don't rely on irrigation.

Lancaster County holds the distinction of being the most productive non-irrigated farming county in the United States. That means that in a normal year, the county receives ample rainfall during the growing season to produce a range of fruits and vegetables, and focuses on crops that require relatively little irrigation. However, experts say Pennsylvania crop farmers will face a double blow in 2002 -- declining crop prices and the drought.

Sources: Bar chart - US Geological Survey; Pie chart - National Agricultural Statistics Service

Drought and the farmer

A few key facts regarding agriculture and water usage in Lancaster County:

- **4,556 farms in Lancaster County generate $938 million annually.**
- In comparison, 1,505 farms in Chester County produce $310 million annually

These two counties share borders, together contributing to a major agricultural center in the state and the mid-Atlantic region. **Among all U.S. counties, Lancaster County produces more corn, poultry, barley, hay, hogs and beef cattle than any other county in Pennsylvania**.
According to the Pa. Department of Agriculture, there are about 38 livestock animals in Lancaster County for every person living here. In 2000 the Farm Animal Census:

Cattle & Calves 236,000
Chickens..... 12,938,300
Hogs & Pigs 325,000
Sheep.....4,500

In the U.S., Lancaster ranks:

- **1st - Total agricultural receipts (non-irrigated)**
- 1st - Total farms preserved
- 1st - Number of laying hens
- 2nd - Farms with sales greater than $100,000
- 3rd - direct marketing food
- 4th - Total number of farms 3rd
- 8th - Total number of dairy cows

Each year Lancaster farmers FEED:

- Eggs to 11.2 million people
- Milk to 10.8 million people
- Chicken to 4.3 million people
- Pork to 1.4 million people
- Beef to 454,000 people

With so much at stake, a severe drought will take an extraordinary toll on a major source of income for the county.

Source: Economic Development Company of Lancaster County and Pennsylvania Agricultural Statistics Service

Potential Threats to Our Water Supplies

Growth and Development Impacts

Population Growth - Projected population growth will increase water demand by an estimated 18.5 GPD by the year 2010. Population growth creates both the demand for water and, indirectly, most of the threats to future water supplies.

Impervious Cover - Accompanying population growth is development with its impervious cover. This creates higher rates of storm water runoff and, consequently, lower rates of groundwater recharge follow.

Filling of Wetlands - The filling of wetlands reduces ground and surface water recharge. Rural Development in Development in Low-Yield Water Areas - Rural development is usually dependent on on-lot wells to meet water needs. These are sometimes sited in areas with insufficient water yields to meet anticipated demands

Public Sewer in Low-Yield Water Areas - Public sewer lines into areas with low groundwater yields can further diminish limited groundwater supplies because public sewers do not replenish area groundwater as do on-lot sewage disposal systems.

Contamination of Water Supplies - The contamination of municipal surface or groundwater supplies has the potential to take one or more water sources out of production for the short-term to permanently. Such contamination can occur as a result of point or non-point pollution sources.

Water Supplier Practices

Lack of Contingency Planning - Local contingency planning for water emergencies assures that adequate alternate sources of water will be available.

Unknown or Inadequate Safe Yield or Allocation of Water - Future availability of water cannot be determined and system treatment and storage capacity cannot be maximized.

Over-pumping of Wells - Withdrawing groundwater faster than it can be recharged, occurs when established safe yields are regularly exceeded.

Inadequate Pumping or Treatment System Capacity – The system cannot deliver maximum possible water yields.

Inability to Meet Water Quality Requirements - New Federal and State water quality requirements may make it infeasible for some smaller suppliers without treatment systems to continue to supply water.

Inadequate Treated Storage Capacity - periodic localized water shortages or the over-pumping of wells to meet peak day needs and fire flow requirements.

Water Leakage - A number of the County's large community water systems exhibit high water leakage rates caused by older water distribution lines in need of repair or replacement.

Water Wastage - When more water is used for any purpose than is strictly needed.

Water Pricing - Water pricing can affect water consumption and conservation practices. The great majority of fee schedules in the County utilize graduated pricing, meaning lower per unit costs with increasing water consumption discouraging water conservation.

Conflicts between Water Service Areas and Planned Growth Areas - Indicated by a lack of coordination in planning between the water providers and municipalities.

Changing Water Use

Self-supplied Industrial Uses - Self supplied industries, particularly food processing plants, withdraw more groundwater than do some of the County's smaller public water systems. The County's strong agricultural economy could well spur the expansion of some of these plants or the establishment of new ones. The demand for water by the food-processing sector is therefore likely to continue to grow. These plants may be near urbanized areas and utilize public sewer, diminishing groundwater recharge, possibly affecting the water yields of nearby wells. New industries requesting public water might tax limited water availability.

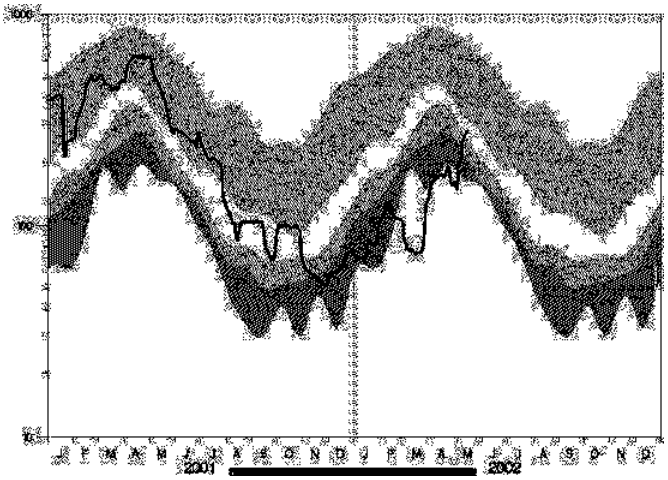
Intensive Animal Operations - Over the last few decades, water use for livestock in these types of operations has doubled. While most such operations do not utilize public water, some do, and others located within existing or potential public water recharge areas could affect future public water availability.

Private Water Bottlers - These companies are required to have permits to withdraw more than 100,000 GPD are not otherwise limited in the amount of water they are legally permitted to take. The potential increased withdrawal of water by existing companies or the location of new water bottlers or other large water users, such as beverage bottlers or breweries in the County, could pose a threat to future water availability.

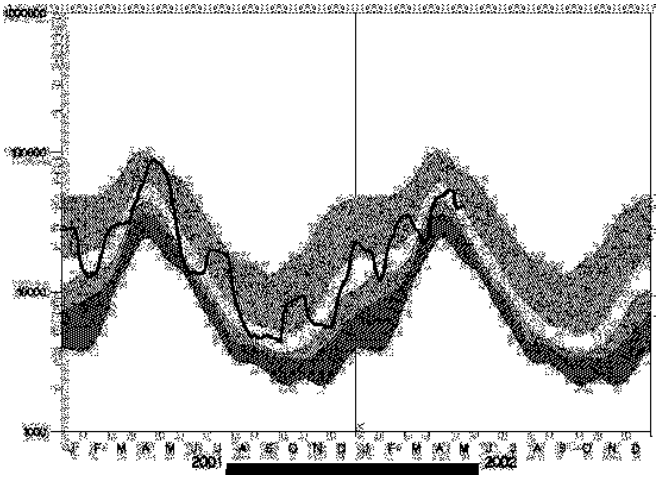
Out-of-County River Allocations - A number of competing users of water from the Susquehanna River exist in both Pennsylvania and Maryland. The Chester Water Authority is authorized to withdraw 24 MGD in additional water over its current withdrawal of 6 MGD, and the City of Baltimore is authorized to withdraw 250 MGD, virtually none of which is currently used. While the Lancaster and Columbia systems are authorized to withdraw approximately 18 MGD in additional water from the Susquehanna over current use levels, it is unclear whether sufficient water exists to satisfy all allocations and still maintain required minimum streamflow standards

Source– Lancaster County Planning Commission—Water Resources Plan

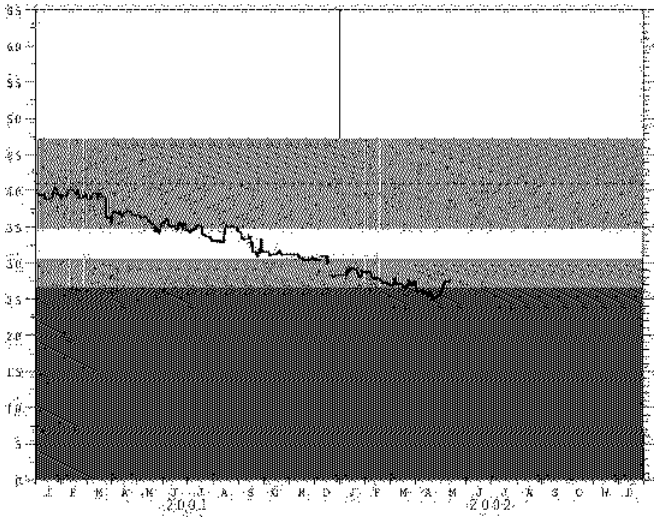
Water in Lancaster County has dwindled at an alarming pace



The water flow on the Conestoga River at Lancaster graphed from January 2001 through May 2002. The lowest band indicates severe drought. During March 2002, the level fell significantly below the lowest recorded drought readings. Recent rains have restored levels to almost normal readings indicated by the top band.



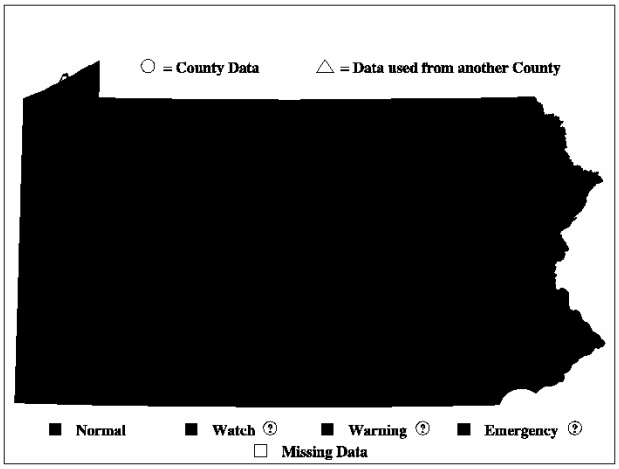
The water flow on the Susquehanna River at Harrisburg also for the period January 2001 through May 2002. Significant rainfall in the upper watershed has maintained flows in and out of normalcy. March 2002 also recorded flows of extreme drought conditions indicated by the drop into the lower band.



Lancaster County Precipitation recorded on a 365 day running average from January 2001 through May of 2002 shows the steady fall from a 40” yearly normal into a 25” extreme drought condition recorded in March indicated by the lowest band.

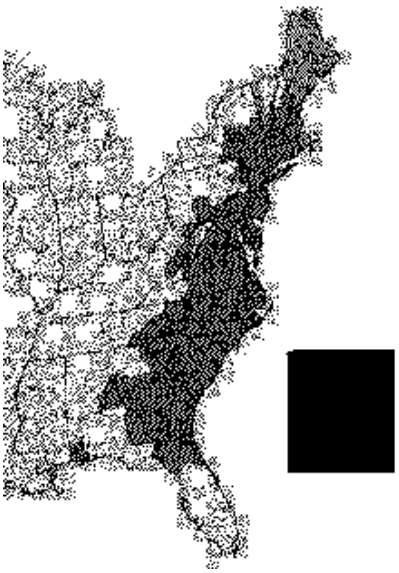
Lancaster County in the danger zone

Lancaster County now falls within a band of counties in Eastern Pennsylvania that meet the definition of a drought emergency. Both **surface wate**r (lakes, rivers, streams, dams, wetlands) and **groundwater** (the water that seeps underground into porous layers of rock and soil) have dropped to critically low levels.



PA Ground Water Indicator Map - April 2002
The darkest indicated counties in the southeast corner of Pennsylvania are in the Emergency condition.

Source: 2002 National Drought Mitigation



This chart from NOAA's National Climatic Data center indicates that the areas with the darkest shading will require from 18 to 32 inches of rain to end drought conditions within FOUR months or by the end of the summer.

How did we get Here?

Clearly, many of the causes of drought are beyond our control. But the combined actions of residents, businesses and government planners have begun to deplete water at a far faster pace than ever in history, making it difficult to recover from a cycle of too little rainfall.

Why is this happening? Life in Lancaster County has changed dramatically in the past few decades. For one thing, there are now nearly a half a million people who call Lancaster County home. By the year 2020, the Lancaster Planning Commission projects the population will climb to almost 600,000, placing even more stress on the county's water supply.

According to the 2000 US Census,
the population of Lancaster County grew by

84.8%

in the years from 1950 to 2000.

By comparison, Pennsylvania grew by only

8.5%

Water and the Law

When Pennsylvania was founded in 1682 its natural resources were boundless. There was no need to be concerned about the endless forests, the rivers, minerals and species of wildlife. Everything was on a scale never imagined by our forefathers. Three hundred years later Pennsylvania finally realized that our resources were not boundless and, in many cases, had become endangered. Finally in 1971 the Constitution of Pennsylvania included a historic amendment, Article 1, Section 27:

"*Pennsylvania's public natural resources are the common property of all people, including generations to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people."*

Water is recognized as a vital resource for the life and health of every Pennsylvanian and yet it is governed, or not governed, by doctrines and practices that stretch back in time and are no longer adequate to ensure the well being of all citizens. There are three basic rules of thumb governing current water use:

I. Riparian Rights (from Latin word for stream bank) - These allow a landowner to withdraw stream water for domestic use and reasonable use on his/her property. Transfer of water off the property was considered unreasonable.

II. American Rule - A landowner can withdraw groundwater (underground water) for any use on his/her land. If a neighboring land owner can dig a deeper hole and install a stronger pump, there is no recourse.

III. Municipal Water Suppliers - Court decisions have allowed municipalities to extract water from outside their boundaries.

This is a very brief overview and these are some of the conclusions on our present access and use of water:

- There is no guarantee of an individuals water rights.
- There is no established provision for the settling of competing use, especially in droughts.
- There is no provision for the conservation of water neither in normal times nor in periods of drought.
- There is no provision for increasing demand as development and population grows.
- Local authorities are not required to consider water resources in making land use decisions.

These conditions do not measure up to the State Constitution, Article I, Section 27. It's time that water was recognized as a vital resource for the life and health of every Pennsylvanian.

Source: League of Women Voters in Pennsylvania and its publication "Water Use & Water Rights in Pennsylvania", 1998

Drought and Sprawl

Along with this population boom in Lancaster County has come sprawling development. Apart from natural cycles, sprawling development has been the single most important contributor to drought. More people lead to a greater demand on the existing water resources and a seemingly ever expanding grid of impervious surfaces.

More development means:

- **More consumption:** more subdivisions, malls, big box retailers and mega-schools – all consuming water.
- **Less absorption:** more parking lots and highways that create an impervious surface - a barrier to rainwater that prevents it from replenishing the groundwater.

In the process of creating housing for 60,000 residents, Lancaster County has lost about 4,800 acres to development each year since 1980 – the equivalent of 68 square miles, according to the National Trust for Historic Preservation (NTHP).

Source: Lancaster Farmland Trust

When to call it "sprawl"

Sprawl is a complex issue. Typically, sprawl never looks like sprawl when it starts. Thousands of decisions made every day by individuals, business people, and public officials contribute to the growth trends that become sprawl.

Many of us can recognize the affects of sprawl on our region without resorting to a dictionary. But the impact goes far beyond the things we can readily observe. You know you're looking at sprawl when you see:

- **Fewer people living on more land**
- **Development expanding outward in poorly planned, unconnected way**
- **Housing, schools, retail shopping, civic institutions, each forming an island of its own, rigidly segregated from each other**
- **Bulldozing of farmlands and environmentally sensitive areas**
- **Absence of sidewalks and dependence on cars for every activity outside the home**
- **Small developers operating independently of each other**
- **No apparent coordination of planning between one municipality and the next.**

The impact of drought is everywhere in Lancaster County

According to recent news reports, no part of Lancaster County has remained untouched by the impacts of drought. Here's just a sampling of what county residents are facing:

- **West Cocalico Township**: Water level is 30 feet below normal. Supervisors have banned all non-essential water uses.
- **East Cocalico Township**: 12 operating wells are 10 to 15 percent below their worst levels of 1999. Water rationing may be necessary in the future, with costs rising sharply beyond 40 gal./person limits.
- **Penn Township:** Well levels dipped dangerously low in 1999 and customer usage has increased by 25-30% since then. A plan to provide water to the Pleasantville Nursing Home would increase the township's water usage by another 30 percent.
- **Lititz Borough and Warwick Township**: Well levels dropping about six inches a month now. Officials are testing two new wells and hope to bring them on line by next year.
- **East Petersburg Borough**: The borough taps 150,000 gallons of water daily from its spring, 70,000 gallons of water from its well and between 70,000 and 100,000 gallons from Lancaster City. The spring and wells all show declining levels.
- **Mount Joy Borough**: The borough's two wells are taking longer to recover after water is drawn from them. Many private wells in the area have already failed. If the drought continues, mandatory rationing could occur.
- **Strasburg Borough** gets its water from wells and springs it owns in neighboring municipalities. The borough fared well in 1999, but well levels are creeping ever closer to action plan trigger points.
- **Denver Borough:** Brought a water filter plant online in early February. That has allowed well levels to return to a normal level, after having dipped to their lowest levels ever.
- **New Holland Borough** reports water levels in the borough's wells are down slightly and are dropping. They are also taking longer to recharge.
- Public water supplies in **Manheim, Elizabethtown and Quarryville boroughs** and **Conoy, East Earl and West Earl townships** have not been significantly impacted either in 1999 or this year. But some spokesmen predict trouble if drought persists.
- **Conestoga Township:** Residents have their own private wells and there are worries about their longevity. Some wells have already gone dry.
- **Christiana Borough:** Taps two wells and 10 springs to supply water to its residents. Springs are currently supplying 55-60% of daily usage vs. 90% when there is no drought.
- **Elizabeth Township**: Residents have drilled new wells to replace dry ones, but new wells aren't yielding much water. The township is served entirely by private wells.
- Other townships where residents mostly tap private wells include **Bart, Brecknock, Caernarvon, Colerain, Drumore, East Drumore, Eden, Fulton, Leacock, Little Britain, Martic, Paradise, Pequea, Providence, Sadsbury, Salisbury and Strasburg Township.**
- **Lancaster City:** The water system taps the Susquehanna and Conestoga rivers to supply its own water and that of **East and West Hempfield, East and West Lampeter, Lancaster, Manheim, Manor, Upper Leacock and West Earl townships and East Petersburg and Millersville boroughs.** The Susquehanna also supplies **Columbia and Mountville boroughs,** as well as sections of **West Hempfield and Manor townships**.

Source*:* Ryan Robinson, *Lancaster New Era*, February 25, 2002

What are we going to do when the well runs dry?

While many people in Lancaster County rely on municipal water systems that are fed by rivers, thousands more depend on municipal wells or their own private wells for all of their water needs. In 1990, more than 2.7 million Pennsylvanians depended on their own well water to supply their domestic needs. In fact, Pennsylvania ranks second only to California in the number of residents who supply their own water.

A drinking water well uses groundwater as its source of water. Groundwater exists in the spaces, cracks and fractures in the underground soil and rock formations known as an "aquifer."

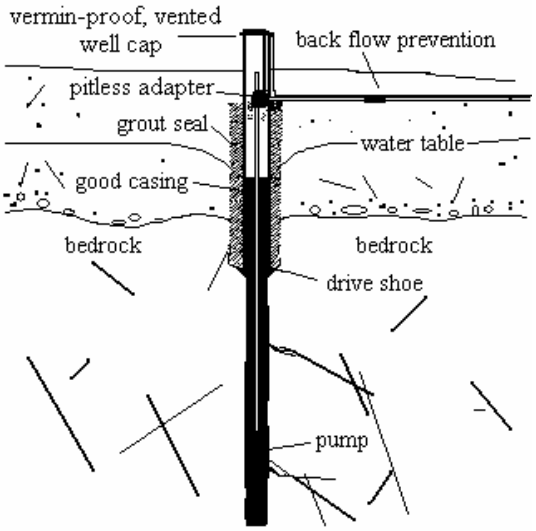
- **Well water or "self-supplied" water is extraordinarily important to Pennsylvanians**, and to Lancaster County in particular, with its large rural population and Amish communities.

- In February 2002, the *Lancaster New Era* reported that at least 20 private wells in West Donegal Township had gone dry and the water level in the local water authority's two wells had dropped considerably. The township was having to truck in water from Elizabethtown Borough. Strict water rationing has not been ruled out if conditions worsen.

Source: Data from the US Geological Survey

Can a new well drilled in my neighborhood cause my well to go dry?

A well works by inserting a pump inside a drilled hole to bring water up and into a house through a pipe. If there is no groundwater, when the tap is turned on, nothing comes out.



As neighborhoods and communities expand, private water wells sometimes compete for the groundwater. If a neighbor's private well is affecting yours, the PA Dept. of Environmental Protection can provide little help, because water wells are essentially unregulated in Pennsylvania.

Private water well conflicts highlight the need for good water planning when land developments are designed. On a larger scale, if you suspect that your water well is being impacted by a large groundwater withdrawal and you live in central or eastern Pennsylvania, your river basin commission may be able to assist you. Both the Susquehanna and Delaware River Basin Commissions regulate large withdrawals* of groundwater in wells used for agricultural, municipal, industrial and other purposes. In order to withdraw large amounts of groundwater, entities must demonstrate that there is no significant impact on other water resources such as private wells.

* in excess of 100,000 gallons per day

Source: PA Department of Environmental Protection

Fighting Fire With What?

Drought & Public Safety

Fire department officials in larger towns in Lancaster County expect to have adequate water to fight fires this summer from hydrants and other water sources. But fire fighters serving more rural, outlying areas fear the current drought could put people and property at greater risk.

- Rural fire fighters in outlying areas depend upon local ponds and streams to refill their fire trucks. Larger rigs can hold as much as 2000 gallons of water. According to Chief James Roop, of the New Danville Fire Company, **a barn fire can require as much as 150,000 to 250,000 gallons of water to put out.**

- Fire chiefs say that water levels in many small ponds and streams have dropped 50% to 75% below normal. In addition, heavy mud and algae have already made some ponds unusable.

- Fire companies have started their own conservation measures**,** including washing their rigs and equipment less often. Many continue to refill residential cisterns, but have stopped using their own reserves to top off residential swimming pools.

Source: *Lancaster New Era,* April 3, 2002

We are not as rural as some might think

Many people picture Lancaster County as a historically rural community. The fact is, though, that the county has always used its water to drive business. In the 1800s in Lancaster County had over 300 grist mills operated on county streams, along with numerous textile mills and other factories that harnessed water power. Today, 95 percent of all employees in Lancaster County work in non-farm jobs.

Industry	**Number of Employees**
Manufacturing	56,803
Retail trade	37,482
Construction	16,855
Health services	15,804
Educational services	14,791
Other professional and related services	11,765
Finance, insurance, and real estate	10,008
Wholesale trade	9,901
Agriculture, forestry, and fisheries	*9,770*
Transportation	8,430
Business and repair services	8,016
Personal services	5,700
Communications and other public utilities	3,966
Public administration	3,735
Entertainment and recreation services	1,715
Mining	551
Total	**215,292**

Source: US Census Bureau

Power, Light and Water

Much of the nation's water supply – about 39 percent -- gets used to generate electricity. Pennsylvania devotes an even higher proportion - 53 percent of its total water resources - to generate power.

Water gets used in power generation in one of three ways:

- **Hydroelectric power** (water-driven power generators inside dams)
- **Thermoelectric power** (generators powered by coal, natural gas, oil)
- **Thermonuclear power** (nuclear-powered generators)

Hydroelectricity accounts for less than 10% of energy produced nationwide. One of the main uses of water in the power industry is used to generate steam to drive turbine generators. It is also used to cool the power-producing equipment. In the process, of course, the equipment also heats up the cooling water. Water that becomes too hot cannot be released back into the environment. In nuclear plants, hot water is cooled by evaporation as it is sprayed into the air inside the cooling towers.

Source: US Geological Survey

Power plants gulp millions of gallons of river water

In 1990, Pennsylvania's devoted almost 6 billion gallons of water a day to generating power. According to the US Geological Survey, the water was used as follows:

69% Fossil-Fueled Power Plants (Coal, oil, natural gas)

30% Nuclear Power Plants

Hydroelectric Power accounts for only 1% of the electricity generated in Pennsylvania.

Many of the state's major power plants are located in South Central Pennsylvania. While Lancaster County devoted only 3% of its water in 1995 to power plants, energy companies have proposed building three new plants, fueled by natural gas that would take "immense gulps" from the lower Susquehanna River, a major supplier of water to Lancaster County.

The three proposed plants include:

- **Just south of York Haven, York County**, NRG Energy, a Minneapolis-based power company, wants to build a 900-megawatt, $500 million plant, consuming up to 9.2 million gallons daily.
- **Outside Marietta in East Donegal Township, Lancaster County**, Conectiv wants to build a 1,100-megawatt plant costing $600 million, consuming up to 8.46 million gallons daily.
- **Outside Delta in Peach Bottom Township, York County**, Conectiv wants to build a 1,100-megawatt plant costing $600 million, consuming up to 6.61 million gallons per day.

Each plant would consume more water than any existing single user in Lancaster County. Together, the three could consume 34 percent more water than all existing users, combined, consume now. As the drought worsens, consumers must ask: Will there be enough water to go around

Source: Tim Mekeel, *Lancaster New Era*, April 2, 2002

Drought and Recreation

Lancaster County has 12 public and 4 private golf courses, which together consume large quantities of water. During the current drought emergency, Pennsylvania has ordered golf courses to reduce water use by 30%. Golf courses must now submit a plan for their water use, subject to state approval, based metered use in the past five years, or a "basis quantity of 41,000 gallons per week per acre of greens, tees and fairways." What this means is that a private golf course in the county that measures 125 acres could have potential water needs of more than 5 million gallons a week.

While some of the water used to irrigate golf courses goes back into groundwater systems, golf courses, like farms, depend heavily on fertilizers and pesticides that can run off or are absorbed into groundwater supplies.

Water also represents a vital asset to Lancaster's tourism industry as a whole, including its 94+ parks, 11 swimming pools, numerous recreational facilities, campgrounds, riding stables, boating clubs/marinas, as well as game and fishing habitats. The Conestoga River once had numerous dams which have fallen into disrepair, or were abandoned. These dams, used to power mills, feed canals, and generate electricity led to the elimination of the once plentiful shad and left a legacy of environmental degradation and conditions that are hazardous to public safety. Since 1996, the PA Fish and Boat Commission have removed seven dams from the southern Conestoga and its tributaries, permitting the shad to return.

Sources: PA; American Rivers

Searching for remedies

Water problems don't stop and start at county and state lines, and neither will solutions.

For example, the Delaware River provides about half of New York City's water and also serves 12 million people downstream, some as far as Philadelphia and parts of the state of Delaware. Under an existing sharing scheme among New York, New Jersey, Pennsylvania and Delaware, New York City is obliged to dump water from its reservoirs to sustain an acceptable flow in the Delaware.

The Pennsylvania Legislature is also considering a bill that would create the first statewide system for conserving water and tracking all water use. The bill cites projections that parts of the state will run out of water in a few decades.

The Lancaster County Planning Commission has developed **a Water Resources Plan**. To learn more about it, visit the LCPC web site at www.co.lancaster.pa.us/planning.htm.

In February 2002, the Commission also appointed a **Lancaster County Drought Task Force**. Members include:

Charlotte Katzenmoyer
Director or Public Works
City of Lancaster

Robert Marion
GCI Environmental Services

Richard Shoup
Dept. of Environmental Protection

Robert Rissler
Upper Leacock Twp. Water Dept.

Randall Gockley,
Emergency Mgmt. Agency

Dan Guers
Mgr. Akron Borough

Ellen Weekes
Office of Aging

Leon Ressler
Penn State Coop. Extension

Brent Landis
Chamber of Commerce and Industry

Lester Houck
Salisbury Township

Brenda Pitman
Emergency Management
Health Services

Eric Bachman
Emergency Management
Fire Services

Brian Brandt,
Police Chief
West Earl Township

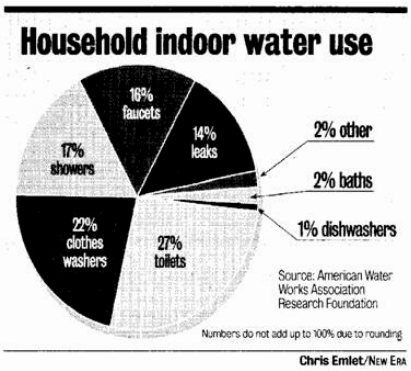
Lisa Boyd
Manager
Strasburg Borough

Jean Juengling
GIS Department

Paul Thibault
County Commissioner

Michael Ranck
Hourglass Foundation

Water Conservation Tips for Everyone



The average person uses about 62 gallons of water every day with the majority of water used for clothes washing, toilet flushing and showering, followed by faucet use and leaky fixtures. Leaks account for 14 percent of all residential indoor water use, according to one national study. So it's not just a drop in the bucket.

1. **Replace an old toilet with a new 1.6 gallon-per-flush model.** This measure can save a typical household from 7,900 to 21,700 gallons of water per year;

2. **Save over 1,000 gallons per year by placing a plastic jug of water or commercial "dam" in older toilet tanks** to cut down on the amount of water needed for each flush.

3. **Repair dripping faucets and leaking toile**ts (flapper valves are usually the cause). Repairs can save more than 10 gallons of water per person per day. A faucet dripping at one drop per second wastes 2,700 gallons per year.

4. **Wash clothes and dishes only when you have a full load.** When replacing an older machine, consider high efficiency models, which use an average of 30 percent less water and 40-50 percent less energy, saving about 9 gallons per washing machine cycle and 7.5 gallons per dishwasher cycle.

5. **Install low-flow, water-efficient showerheads and faucets** and save 1-to-7.5 gallons per minute. Taking a quick shower can save an average of 20 gallons of water.

6. **Turn off the water when brushing teeth or shaving** to save more than 5 gallons per day.

Source: PA. Dept. of Environmental Protection

Legislative Initiatives

Currently 38 of Pennsylvania's 67 counties are under a drought declaration. Last December, David Hess, Secretary of the PA Department of Environmental Protection, outlined the Administration's new Water Resources Initiative designed to inventory and protects Pennsylvanian's water resources from overuse.

"The time to act on this issue is long overdue, " Hess said. "In four out of the last six years, drought conditions have reached emergency levels. Like a good financial planner, Pennsylvania needs to take stock of its water resources, develop a water budget and plan for the future."

The initiatives included in the proposed legislation—Senate Bill 1230, sponsored by Sen. James Gerlach (R-Chester) and House Bill 2230, sponsored by Rep. Art Hershey (R-Chester) - will accomplish four of the Schweiker Administration's water resources objectives that were recommended at the Statewide 2001 Water Forums.

Update the State Water Plan: An update of the State Water Plan in three years and have updates every five years thereafter. A new Statewide Water Resources Advisory Committee would be formed to help guide the planning process and assure broad public participation, including a formal review of the updated State Water Plan;

Identify Critical Water Planning Areas: It is expected that during the updating of the State Water Plan, areas will be identified where the demand for water exceeds, or is projected to exceed, available supplies. These areas would be designated as Critical Water Planning Areas and identified on a multi-municipal watershed basis, possibly covering a dozen or more local governments. Identifying Critical Water Planning Areas allows time and attention to be focused on those areas of Pennsylvania that have water problems without putting in place a large, complicated bureaucracy;

Create a Water Conservation Program: The act would establish a formal program to promote water conservation and water use efficiency practices for all water users. A Water Resources Technical Assistance Center also would be created to promote the use and development of water conservation and water-use efficiency education and technical assistance programs. Grants also would be provided for water-resources education and technical assistance; and

Set Water Well Construction Standards: The act would modernize the Water Well Drillers License Act of 1956, transfer responsibilities from the Dept. of Conservation and Natural Resources (DCNR) to DEP and require DEP to develop water-well standards. DEP through the Environmental Quality Board, would establish minimum standard for siting, construction, alteration and abandonment of water wells with the help of a special Water Well Advisory Committee.

"Protecting our water resources is an idea that is tied closely to our improved land-use planning laws," Sen. Gerlach said. "The legislation is intended to help communities work together on watershed planning issues—to protect our natural resources and guard against water shortages and water degradation. It recognizes that water, like land, is a finite and precious resource that must be managed to the best benefit of our people and our environment."

Rep. Hershey said, "The need for this legislation is abundantly clear. Drought conditions have existed over the last several years, and we are only going to increase our water uses in the future. We need to develop an up-to-date inventory of our water supply and uses. The legislation is vital toward that end."

The legislation also would support other recommendations made in 1998 by the Governor's 21st Century Environment Commission, including:

Collection of data: Users of 10,000 gallons a day or more would register and report their water use to DEP annually (there is no fee for registration). DEP would work with the existing river

basin commissions to share information and avoid duplicate reporting;

Integrated Water Resources Plans: Once established, a Critical Water Planning Area would serve as the planning boundary for the creation of a more detailed "water budget" for the area.

Through an open, public process, DEP would ask the people of that area to designate an organization to create an Integrated Water Resources Plan. The organization must be representative of the area and include local stakeholders in a local Watershed Planning Advisory Committee and be capable of developing a plan. DEP would provide technical support and would administer grants to reimburse up to 75 percent of the cost of developing a plan;

PENNVEST Funding: To specifically address the issue of water losses in public water supply systems, PENNVEST would be directed to give priority to funding projects that address unaccounted-for water losses or that implement water conservation measures when water-loss rates exceed 20 percent.

Disputes Among Water Users: DEP would established a voluntary mediation program to facilitate the settlement of conflicts between water users, providing an alternative to litigation. This legislation does not alter the common law rules that apply to water withdrawals.

Become water savvy

How can I learn more about groundwater and water resources?

See the DEP website on private wells at www.dep.state.pa.us (direct LINK "private wells" and "water resources").

Checkout the study and research done by the Lancaster County Planning Commission at their web site at http://www.co.lancaster.pa.us/planning/site/default.asp

The Lancaster County Water Resources plan is located at: http://www.co.lancaster.pa.us/planning/cwp/view.asp?a=476&Q=387229&planningNav=|5851|5852|

See the Pennsylvania Geologic Survey's "The Geology of Pennsylvania's Groundwater" at http://www.dcnr.state.pa.us/topogeo/groundwater/groundwater.htm

Check out EPA's publication EPA The Water Sourcebooks at http://www.epa.gov/safewater/kids/wsb/index.html

Download the Water Resources Education Network publication Groundwater - A Primer for Pennsylvanians at http://pa.lwv.org/wren/pubs/primer.html

Visit the Department of Conservation and Natural Resources' website at www.dcnr.state.pa.us/topogeo/

Visit the Susquehanna River Basin Commission's website at www.srbc.net or call 717-238-0423

Visit the Delaware River Basin Commission's website at www.drbc.net or call 609-883-9500

Visit the Pennsylvania Groundwater Association website at www.pgwa.org.

Learn about dam removals on the Conestoga River at American Rivers at http://www.amrivers.org/tableofcontents/ssconestoga.htm

Visit the Chesapeake Bay Foundation website at www.cbf.org.

Visit the United States Government website on water at http://water.usgs.gov/

Visit the Association of Metropolitan Sewerage Agency to view their clean water initiative at www.amsa-cleanwater.org

Visit POWR – Pennsylvania Organization for Watersheds & Rivers at www.pawatersheds.org

Suggested Reading

Susquehanna, River of Dreams by Susan Q. Stranahan

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