

The Juniata and the Chesapeake Bay

The Chesapeake is a body of water, and like the human body, its health depends upon what you put into it. The Bay is fed by 10 major rivers and numerous smaller rivers and tributaries flowing out of Pennsylvania, Maryland, Delaware and Virginia. The Juniata River is one of those smaller rivers, important because its contents flow into the larger Susquehanna which provides half of the Bay's incoming fresh water. These tributaries pump in the nutrients and fresh water that, when mixed with the ocean's salt water, made the Chesapeake Bay the most productive estuary in the United States.

The Chesapeake, however, is not as healthy as it once was. The Bay has been diagnosed as suffering from the declining health of the rivers and streams which feed it. The Bay ecosystem depends upon a balanced supply of certain nutrients and fresh water; human activities in the watersheds feeding the Bay are disrupting that balance. This fact sheet describes the Juniata River, its contributions to the Bay, and some ways you can help keep the river clean and improve the outlook for the Bay.

THE JUNIATA, PAST AND PRESENT

The Juniata is a picturesque river, often cutting through high mountain ridges, revealing spectacular water gaps and baring the geological history of the Keystone State. The Juniata River drainage basin is a subbasin of the Susquehanna River watershed, and drains about 1/8th of it, or some 3,400 square miles in southcentral Pennsylvania. All or most of Blair, Huntingdon, Juniata and Mifflin counties, along with parts of Bedford, Centre, Dauphin, Fulton, Perry and Somerset counties are included in the Juniata's drainage basin. The Susquehanna River watershed encompasses nearly 27,000 square miles in Pennsylvania, New York and Maryland.

The Juniata River is approximately 100 miles long and is the second largest tributary to the Susquehanna River (the largest is the West Branch Susquehanna). The river was once paralleled by a canal system known as "the Great Canal," constructed as Pennsylvania's answer to New York's Erie Canal. The state sold the canal to the Pennsylvania Railroad which abandoned it as a transportation project after the damaging "Great Flood" of 1889.

One of the Juniata River's tributaries, Standing Stone Creek in northern Huntingdon county, got its name from association with an Indian tribe known as the Oneida. Tradition says the Oneida revered a 14-foot high and 6-inch square ceremonial stone decorated with engraved petroglyphs. Oneidn means "standing stone," and came into common local usage as a label for both the ceremonial stone and the tribe. Juniata is also reported to mean "standing stone."

The main stem of the Juniata River originates at the confluence of the Frankstown Branch Juniata and the Little Juniata near Petersburg in Huntingdon county. Major tributaries of the Juniata River include those on the map (center). The Juniata River enters the Susquehanna River at Duncannon in Perry county. Some of the Juniata's tributaries, such as Kishacoquillas Creek are significantly pollution-stressed and do contribute poor water quality to the system, but the main stem of the river is generally clear.

The relative shallowness and gentle course of most of this river along the base of steep, scenic slopes make it valuable for quiet recreational pursuits such as

canoeing and fishing.

Smallmouth bass and channel catfish are abundant in the river, and some mollusk species periodically occur. Some of the Juniata's tributaries are high quality, coldwater fisheries which support trout. Numerous game species of fish do well in the Juniata River, including the predatory muskellunge, an introduced sport fish. Muskellunge are prized as tough adversaries and can grow to more than 50 inches (over four feet) in length.

The Pennsylvania Fish Commission chose the stretch of the Juniata River near Thompsontown for its Van Dyke Research Station, the home base for Pennsylvania's Shad Restoration Project. American shad were historically numerous on this river and in the Susquehanna, and efforts are being made to restore this challenging game fish to these waters. Dams and other barriers block these (and other) migratory fish from completing their natural development cycles. Shad must be able to migrate as young fry down to the Chesapeake Bay and the ocean beyond, and return upstream as adults several years later to spawn. The Restoration Project is attempting to restore shad population levels, and to work with dam owners and the public to install fish lifts and ladders to help migratory species around the dams.

A variety of plants grow in and along the Juniata River, including water willow, lizard-tail and numerous species of pond weeds. One of the Juniata's gems is a Pennsylvania species of special concern, a plant classified as "threatened" in the state. The Jewelled-shooting-star, *Dodecatheon amethystinum*, grows on the moist, calcareous (limestone) cliffs along the Juniata formed by the river cutting down through the rock layers.

THE BASIN

Much of the Juniata River basin is mountainous, with ridges and valleys which are generally oriented from northeast to southwest. Weather-resistant sandstone generally forms the mountain ridges, whereas more erodable limestone and shale primarily underlie the valley regions.

Approximately 66% of the streamflow in the Juniata River is supplied by groundwater, either by flow from springs or by direct seepage to streambeds. The aquifers in the drainage basin are a thick sequence of folded sedimentary rock consisting chiefly of sandstone, siltstone, shale and limestone. As of 1990, total water use in the basin had increased by about 28 percent over 1970 rates; most of that increase has come from groundwater use, but has had little impact on groundwater availability. The Juniata River basin has had abundant water resources due to an average annual precipitation of 37 inches.

Many small towns dot the basin, but only Altoona and Lewistown boast populations of greater than 10,000 people.

Steep slopes, railroad tracks and roads paralleling most of the length of the main river continue to discourage immediate riverside development. Summer homes do occur along the main stem, but improved sewage treatment helps protect water quality in modern times. No major industries directly flank the river's main stem.

THE CURRENT STATUS OF THE RIVER SYSTEM

Road improvements in the Juniata River drainage basin are allowing people to travel further to their places of work--Harrisburg is no longer an unreasonable commute. Consequently, population levels are gradually increasing. Changes in agricultural practices statewide are resulting in more intensive activities on smaller parcels of land. These changes have significant potential to impact both the quantity and quality of surface groundwater.

Significantly pollution-stressed tributaries include the lower reaches of the Kishacoquillas Creek north of Lewistown and the upper reaches of the Little Juniata River in the Altoona-Tyrone area. The tributaries carry heavy silt loads and/or excess nutrients from agricultural runoff and streambank erosion into the main river channel, as well as oil, heavy metals and chemical contaminants from industrial discharges (from paper and steel mills, for example), leaking petroleum products from underground storage tanks, and raw sewage from domestic or municipal sources. However, groundwater quality is still considered generally adequate for most uses.

Periodic heavy rainfall in the basin followed by high, swift currents in the river often help dilute and flush the river, enabling it to cleanse itself with reasonable success. The Chesapeake Bay, however, ultimately receives the pollution scoured out of feeder streams and rivers such as the Juniata. Bay protection begins "at home," and home is anywhere there is a waterway that eventually connects to the Bay.

Silt and other pollutants are problematic in waterways. They coat stream bottoms and fill spaces between riverbed materials. This suffocates riverbed plants and animals, covers up their potential living spaces and blocks out essential sunlight. Industrial, agricultural and urban suburban pollutants such as excess nutrients (from sewage effluent and fertilizer, including animal manure) cause algae populations to flourish in waterways. The decay of algae depletes water oxygen levels and stresses other aquatic organisms in waterways, from small tributaries to large estuaries like the Chesapeake Bay.

The Broad Top coal field in Bedford, Fulton and Huntingdon counties contains the only significant section of coal-bearing rocks in the Juniata River basin. Commercial development of coal there ran from the mid-1800's to about 1918. Much of the land in this area has been disturbed and local groundwater in some places has been seriously degraded by acid mine drainage. The Juniata's mainstem appears unaffected by acid mine drainage.

ASSESSING THE FUTURE

The types of pollution which affect the Juniata River, fortunately, tend to be local in nature and have not yet overcome the ability of the system to handle them. River pollution is a reflection of the ways in which the surrounding land is used. Industrial and municipal waste disposal, and farming and yard care practices along Juniata tributaries will shape the Juniata's future.

Since the late 1980's, many counties in the Juniata basin have become participants in the Pennsylvania Chesapeake Bay Program, which enables farmers to receive financial help to implement water quality protection measures through their local conservation districts. Farmers in selected watersheds of the Juniata basin are currently eligible.

The Juniata River may face impacts from beyond its basin, as well. A plan under

review would release water from the Raystown Dam flood-control impoundment on the Raystown Branch Juniata to help maintain fresh water flowing into the Chesapeake Bay. The Bay ecosystem requires a certain critical mix of fresh and salt water, especially in its upper reaches. Increased water withdrawals for human activities (industrial and municipal) from rivers in the Bay watershed, coupled with extended periods of drought have decreased the fresh water flowing into the Bay. Potential environmental concerns about the proposed water releases from Raystown center around the inconsistently fluctuating water depth and flow which would result, and potential negative effects on aquatic organisms.

WHAT YOU CAN DO

As a homeowner you can:

- Practice proper disposal of household hazardous wastes.
- Refrain from dumping household toxins, paints and cleaners down your drains, and choose nontoxic alternatives. Recycle vehicle oil instead of pouring it onto the ground. Plant groundcover, shrubs and trees in your yard to minimize the extent of paved surface on your property and minimize runoff into nearby storm drains or streams.

As a farmer you can:

- Work with your conservation district to setup best management practices for water pollution prevention in your activities.

As a municipal official you can:

- Ensure that your ordinances give you the tools you need to guide growth in your area. Consider the sewage effluent and water withdrawal capacities of local waterways in your planning.

As an industrial company representative you can:

- Help explore and implement best management and disposal practices for your industrial wastes.

As a citizen you can:

- Join others conducting citizen monitoring for local waterways.
- Work with your municipal zoning boards to plan and guide development, reducing stress on local waterways.
- Keep an eye out for actual or potential nutrient and sediment pollution problems and report them to the appropriate authorities.
- Adopt a stream under the Fish Commission's "Adopt-A-Stream" program and help protect a waterway of special concern to you.
- Become informed about environmental legislation which enhances or protects water quality, and join with others working for its passage.