Pollution Sources in the Lackawanna River Watershed

1 Combined Sewer Overflow (CSO)

There are over 150-combined sewer overflow points on the Lackawanna River between Forest City and Pittston. Combined sewer overflows or CSO's are features common to many urban sewer systems in the United States.

As cities developed sanitary sewers in the 19th century, pipes were laid under streets to convey sewage from homes and businesses to nearby waterways. Storm water from roofs and gutters enters catch basins along our streets and flows into the same pipe that carries the sewage. When sewer treatment plants were constructed in the mid 20th century, interceptor pipelines were built along our rivers and streams to carry the sewage to the plants for treatment. During rainstorms and snowmelts, storm water flows often exceed the capacity of the interceptor pipe. When this occurs the systems were designed with overflow chambers, which allow excess flow to be diverted into the river. This prevents backflow into streets and basements, rupture of the interceptor pipe or flooding of the sewer plant.

Several citizen lawsuits have forced the US EPA and PA DEP to begin to require local sewer authorities to develop alternatives to CSO's. Extensive engineering assessments are being developed to bring Lackawanna River sewer plants into compliance with the Clean Water Act.

2 Acid Mine Drainage (AMD) and Abandoned Mine Land (AML)

Acid mine drainage or AMD, refers to water which flows through coal mines and enters our waterways. The anthracite coal mines of the Lackawanna Valley became flooded after underground mining operations closed in 1960. In the flooded tunnels, groundwater mixes with surface water from tributary streams which loose their flow through infiltration into subsurface mine voids. As water flows through the old mine workings, it leaches sulfides and metals from the coal and rock formations. These minerals are carried in solution in the mine water. The mine water makes its way to the surface along the river where it discharges through old mine drainage pipes or tunnel openings

After 1960, when the last underground operations turned off their pumps, the amount of mine water exceeded the capacity of the remaining outlet pipes. This caused flooding in some low-lying locations. In order to stabilize the underground mine pool, a new and larger outlet was needed. Geologists and engineers working for the Commonwealth of Pennsylvania and the Federal Bureau of Mines determined that a location in the Connells Patch section of Old Forge would be appropriate to install a mine drainage borehole.

The Old Forge Borehole was sunk 400-feet into the Red Ash coal vein to drain the flooded mine voids between Old Forge, Scranton and Blakely in the summer of 1961. Every day since then, in excess of 100-million gallons per day of acidic mine water has flowed into the Lackawanna River. Over a ton and a half of iron oxide is dissolved in the daily flow. When this mine water enters the river, the iron oxide precipitates from the mine water and paints the river bottom a bright orange through Duryea and into the Susquehanna River. There are over a dozen smaller AMD sources in the mid and upper Lackawanna Valley, although none are as bad as the Old Forge Borehole.

AMD is also generated when rainwater and snowmelt flow through culm dumps and coal waste at abandoned mine land (AML) sites. This surface mine drainage causes erosion and sedimentation which carries solid particles as well as dissolved metals pollution into the Lackawanna River.

3 Storm water

Storm water runoff from impervious areas like roads, parking llots and roofs carries a rich soup of pollution into our streams and rivers. Heavy metals like iron, lead, aluminum; nutrients like nitrogen oxides, salts from winter de-icing and bacteria from pet waste are a few of the "choice" ingredients in storm water soup! Every road way and parking lot is a potential source of storm water soup. Newer designs for parking lots, roads and storm water management basins can help clean up storm water on its way to the River.

4 Erosion and Sedimentation (E&S)

Bare soil at construction sites and abandoned mine sites is subject to erosion from storms. Particles of soil and coal waste are carried by storm water flows as suspended sediments. As the storm flow looses its velocity and the flow level of our rivers and streams slows, these sediments drop out of the water column and accumulate on the bottom of the river or streambed. This, in effect, cements up the nooks between the river gravels and cobbles. This eliminates these spaces needed as habitat by aquatic insects, like the mayfly and caddisfly, which are the base of the aquatic food chain. Eroded sediments also act as vehicles to carry other pollutants such as heavy metals, nutrients and bacteria.

Good construction practices control erosion on site with silt fences, swales and sediment traps. Mine reclamation projects help to address revegetating and regrowing coal waste areas.

5 Agricultural Runoff

Agricultural runoff from farms can contain animal wastes, bacteria, fertilizer, pesticides and eroded soils. The Lackawanna County Conservation District works with our local farmers to help mange and prevent agricultural runoff pollution. Farmers who use agricultural Best Management Practices (BMP's) are often more effective and successful farmers than ones who don't.

6 Forestry Management

Forestry management has a major influence on the health of our watershed. While over 66% of our watershed is presently in forest cover, not all of our forests are healthy. Over harvesting and poor harvest practices can cause irreparable harm to our forests and the watershed resources like headwater streams and wetlands that are protected by extensive forest cover.

Conversion of forestland to residential and commercial development brings all of the urban storm water pollutants into our drinking water supply resource areas and fragments these forested watershed habitat areas into smaller patches. This results in a loss of ecological habitat for wild life, a loss of outdoor recreation resources, and lower water quality in streams that supply our water service reservoirs.

7 Litter and Junk

Litter, junk and illegal dumping contribute to the pollution of our watershed and a degradation of its ecological habitat in a variety of ways. Litter such as cigarette butts, fast food wrappers, and beer bottles can accumulate to clog storm drains, wash into our river and streams and add to the visible load of environmental pollutants. Yard waste, leaves and grass clippings degrade and add excess nutrients to our streams. Dumping of old appliances, televisions, shopping carts, and furniture along waterways adds metal and other debris to our environment. Illegal dumping of construction waste can add paint and chemical pollution. Dumping of tires, junk automobiles, and auto parts creates habitat for mosquitoes and generates pollution from metals and petroleum wastes.

8 Point Source Pollution

All of the sources of pollution listed above are considered "Non-point sources," because they occur over a large area of a watershed. A "Point source" of pollution is considered a single location, usually an industrial site or public sewage treatment plant. Point sources are heavily regulated under the Clean Water Act. The owners of the point source, be they a private industry, a municipal authority, a utility or even a federal agency, must obtain a National Pollutant Elimination Discharge System (NPDES) permit from their state's environmental agency and the U.S. EPA. These permits regulate the treatment and discharge of treated wastewater into our nations waterways. Industrial and municipal wastewater treatment processes are intended to reduce or eliminate many, but not all, pollutants. Trace amounts of some pollutants are permitted to be discharged, based on the assumption that the larger volumes of water in our rivers, streams and lakes will dilute the pollution.

One way of determining if this system is working is to establish the Total Maximum Daily Load (TMDL) of each type of pollutant that a waterway can absorb before the water quality or total environmental quality of a particular body of water is degraded to a pre determined degree. Although TMDL's were required to be established since the 1972 Clean Water Act became law, the EPA and the states are just beginning to complete these measurements and establish TMDL's as permitting requirements.

Susquehanna County

Wayne County

Luzerne County

Lackawanna County

Dunn's Pond

Uniondale

Stillwater Dam

Forest City

Vandling

Fell Township

Carbondale

Carbondale Township

Mayfield

Jermyn

Archbald

Scott Township

South Abington

Blakely

Dickson City

Olyphant

Jessup

Throop

Dunmore

Scranton

Taylor

Old Forge

Moosic

Roaring Brook

Elmhurst

Jefferson Township

Madison

Moscow

Spring Brook

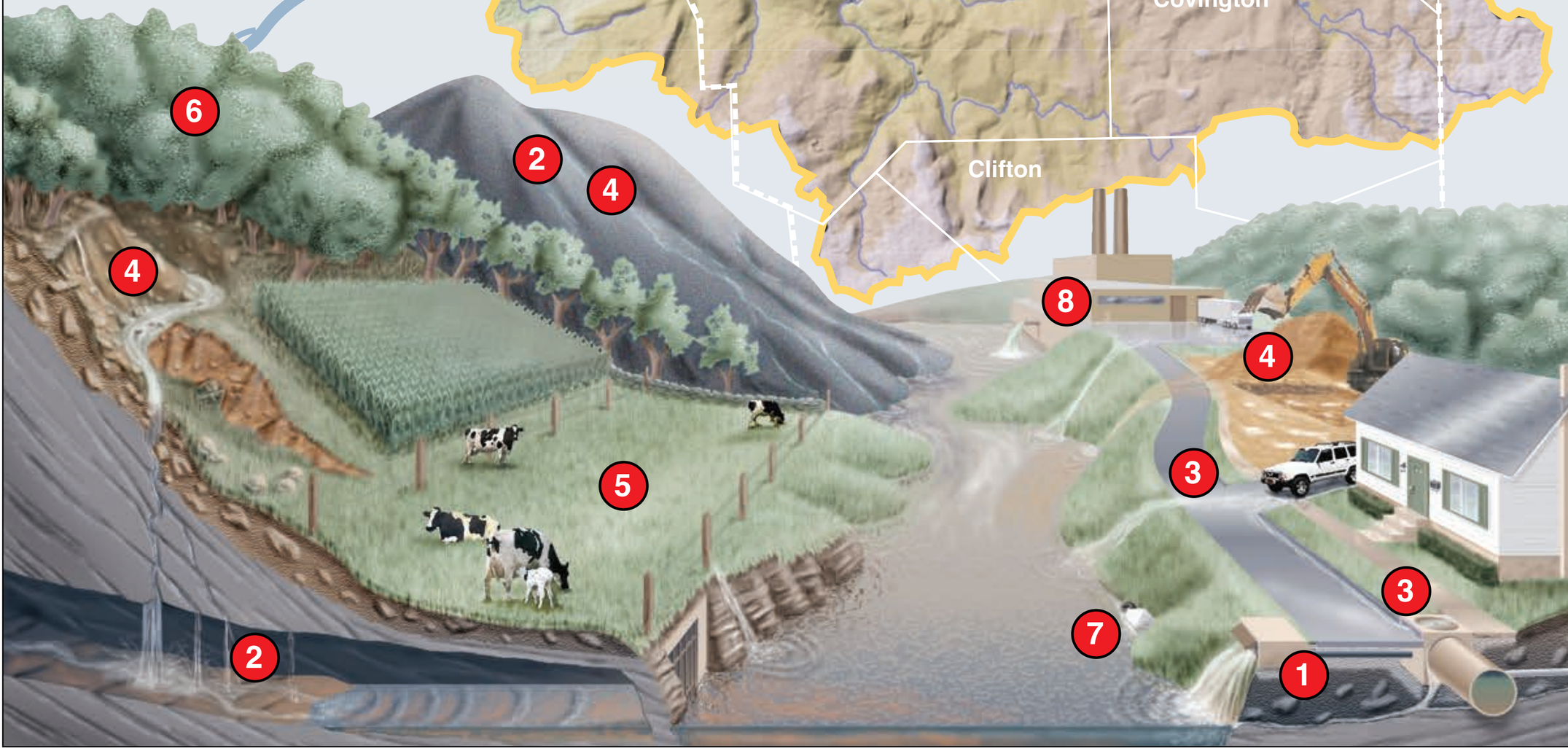
Covington

Clifton

Pittston

WEST MOUNTAINS

MOOSIC MOUNTAINS



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