

Water Pollution: Getting Better?



Picture by Hopkins North Junior High 9th Grade Commercial Art Class.

Success Story: Minneapolis

In the 1920s and 1930s, Minneapolis dredged a wetland to form Lake Calhoun. In the 1990s, concerned about algae blooms caused by excess phosphorus, Minneapolis and the Minnehaha Creek Watershed District diverted storm drains into a restored pond where sediments in runoff settle out. Cat tails and other plants also filter out pollutants. Area students helped plant native plants. Students also painted storm drain signs and leafleted to alert property owners about water quality issues.

What Is the Problem?

Land Use Impact on Water Quality

(See Figure 1.)

- *Prairie, Wetland, & Forest:* Filter, slow runoff.
- *Residential:* Increases runoff; “nonpoint” pollutants may include: grass clippings, leaves, pet waste, fertilizer, road salt, trash, car oil and exhaust.
- *Industrial:* Increases runoff; “point source” pollutants may include chemicals and heavy metals.
- *Agricultural:* Increases runoff; “nonpoint” pollutants may include: fertilizers, pesticides, animal waste, and eroded soils.
- *Wastewater Treatment:* removes most pollution from home and industry sewage.

Natural Systems

When Europeans first came to Minnesota, they travelled by canoe across a vast land filled with water. 18.6 million of Minnesota’s 53.6

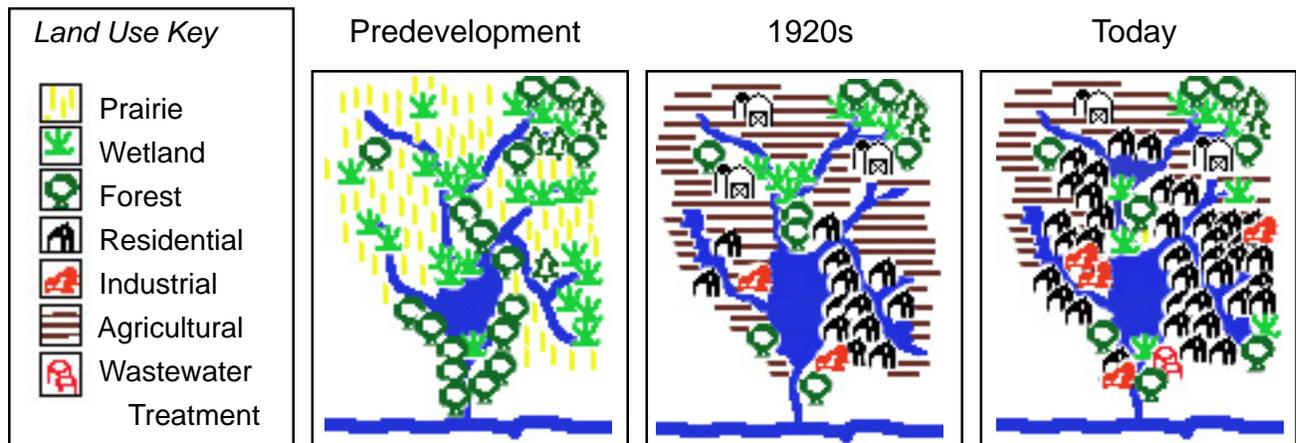
million acres were wetlands. There are 93,000 miles of streams and rivers and more than 11,500 lakes. The Dakota called it “Minnesota,” “land of sky-colored waters.”

Rain and snow melt flowed slowly over the land, absorbed by forest and prairie soils, and captured by wetlands and lakes. These captive waters seeped into the ground, recharging underground aquifers, filtering through rocks and soils, and feeding lakes and rivers. Wetland plants filtered surface waters. Plants and animals adapted to the seasonal rise and fall of water levels. Large floods were rare. Most surface water was clean enough to drink.

Development

By the 1800s, all that began to change. Settlers cleared the forests, plowed the prairies, drained or filled wetlands, built navigation locks and channels on rivers, and pushed the water off the land with roofing, roads, ditches, and storm sewers which dump untreated water into rivers. Today much of the forest cover, half the wetlands, and almost all of the native prairie are gone.

Fig. 1: Changes in a Typical Metropolitan Minnesota Watershed



Development Continued.

All these changes boosted an economy that supports four million Minnesotans today. Yet surface waters became polluted by factory outflow, agricultural runoff, and human and animal waste. (The average household annually generates 80,000 gallons of wastewater.) Soils exposed by farming, mining, forestry, and construction eroded into waterways. Disastrous flooding became a regular event.

What Is Being Done?

As population and industry grew, so did concern for water quality. By the 1950s, powerful laws began to pass, especially the 1972 U.S. Clean Water Act. Today, most "point" sources are closely regulated. So concern turns to "nonpoint" pollution. Now everyone must take action.

Cleaning Up

- 1880s: Twin Cities built sewer systems. These emptied directly into the Mississippi.
- 1926: Minnesota Board of Health declared Mississippi River a public health nuisance.
- 1938: Pig's Eye wastewater treatment plant opened in St. Paul. In months, mats of sludge and scum disappeared from river.
- 1940s: Fish began to return to the Mississippi.
- 1950s-60s: Metro population outgrew water treatment plants, water quality declined again.
- 1955: Minnesota Legislature passed Watershed Act, allowing local governments to form watershed districts to regulate and manage water quality.
- 1966: Wastewater treatment adds biological agents.
- 1972: Congress passed Clean Water Act, setting national goal of "fishable, swimmable" rivers. Factory outflows and other "point" sources of pollution began to be closely regulated.
- 1973: Minnesota's Citizen Lake Monitoring began.
- 1980s: Industries reduced discharge of heavy metals and other pollutants. Wastewater treatment plants reduced releases of phosphorus.
- 1985-1995: Twin Cities separated pipes that had carried both rain water and raw sewage.
- 1986: Wastewater treatment plants began to neutralize chlorine in treated water.
- 1987: Mayflies returned to Mississippi in St. Paul.
- 1989: Minnesota Department of Natural Resources created Adopt-a-River Program.
- 1990s: Citizen monitoring and service grew.

Sources includes "100 Years of Water Quality Improvements in the Twin Cities." Metropolitan Council Environmental Services. (1999)

What Can We Do About It?

In order to protect lakes, streams, and rivers, we must prevent pollution throughout a watershed. Students across Minnesota have become active protecting water quality. Popular projects include:

- Organize trash cleanups.
- Paint signs next to storm drains and pass out leaflets to property owners.
- Test soil and report results to homeowners.
- Monitor water quality; report results.
- Plant prairie grasses and flowers, trees shrubs to reduce erosion.
- Educate fellow students and the public.

Vocabulary

- Algae blooms: phosphorus from fertilizers, leaves, grass clippings, and erosion feeds explosive growth of green slime in water.
- Aquifers: water in cracks and spaces underground.
- Runoff: rain or snow melt flowing over the ground. Runoff washes pollutants into waterways. Too much runoff causes flooding.
- Sediments: dirt and other small particles in water block light and bury plants and animals.

Mo' Info.

Step-by-step instructions on how to organize stenciling and other service projects: *Pollution Prevention Project Guide*; Call Minnesota Office of Environmental Assistance for a copy (651) 215-0232.

Other Resources:

- Curriculum: "Environmental Resource Guide: Nonpoint Source Pollution Prevention," Air & Waste Management Association, (412) 232-3444.
- Video: "Minnehaha Creek: Stewardship of an Urban Watershed," (952) 471-0590.
- 3-D Interactive Displays:
- "Enviroscape" Runoff Model: Met Council Environmental Services, (651) 602-1805
 - "WaterShed" Exhibit: Watershed Partners, (651) 523-2480.
- Picture-Maps: 35 x 22-inch, comparing undeveloped and planned vs. unplanned watersheds. Free. Call (800) 435-7627.
- Local Partners: www.bwsr.state.mn.us - Hit button for "Local Gov'ts," then find your county and/or watershed. Also call your city.

Watershed Resources Youth Stewardship Project

Susan or Rich Cairn, 3715 45th Ave. S., Minneapolis, MN 55406 (612) 722-5806 voice 722-6062 fax cairn@tc.umn.edu
Supported by: Environment and Natural Resources Trust Fund, Legislative Commission on Minnesota Resources