

South Fork Maquoketa River

Understanding and improving water quality



Winding for 17 miles through three counties, the South Fork Maquoketa River is part of northeast Iowa's natural beauty. It flows together with the Upper Maquoketa River to form another landmark, Backbone Lake. But erosion, nutrients and bacteria from the watershed are endangering water quality. What can be done to restore the South Fork to its former beauty?



Creating a watershed effort in the South Fork

Hundreds of years ago, the South Fork Maquoketa River meandered through northeast Iowa. A typical “prairie” river, with plenty of turns and bends, the South Fork also had nearby wetlands to

flooding. Fewer wetlands mean that more sediment and nutrients, like nitrogen and phosphorus, end up in the river.

A survey of watershed residents, conducted by the South Fork Watershed Project, found 75 percent of survey respondents felt water quality in the watershed was either poor or fair.

Survey respondents named sediment, manure and fertilizer as the major sources of contamination in the watershed.

The South Fork watershed stretches over Buchanan, Fayette and Delaware Counties, covering more than 36,000 acres, or 54 square miles, and includes the community of Lamont and a portion of Aurora.

The river itself begins in southern Fayette County and flows for 17 miles before joining with the Upper Maquoketa River to form the upper end of Backbone Lake in Delaware County.

About 88 percent, or 32,151

acres, of the watershed is used for agricultural purposes.

That includes 30,690 acres in corn/bean rotation, with only 427 of those acres contoured. There are more than 50 farms in the watershed with livestock.

A number of fish species call the river home, including northern brook lamprey, sunfish, chubs, shiners, suckers, darters minnows and the occasional trout.

To ensure the river continues to be a home for wildlife and a resource for surrounding communities, changes need to be made to improve water quality not only



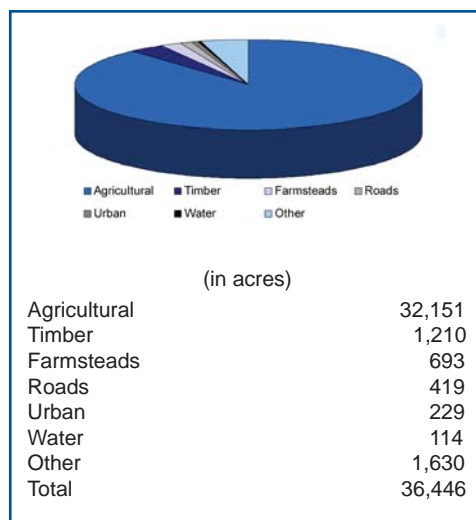
Picnic tables overlook the South Fork Maquoketa

help filter out sediment before it reached the river.

However, the river and the watershed have been changed over the years for agricultural purposes, with the river straightened and wetlands drained.

These changes have affected the way water moves through the watershed, and in turn, water quality.

With fewer turns and meanders to slow the river current, the area is more prone to erosion and



in the river, but in the streams and other water bodies in the watershed.

This can be done by implementing different farming practices and improving household wastewater treatment throughout the watershed, as well as educating watershed residents on how they can improve their water quality.

Critical areas

Critical areas are those that pose the greatest threat to water quality. In the South Fork Maquoketa watershed, they include:



- Areas that send the most soil to water bodies
- Sources of high fecal coliform bacteria, which indicate that disease-causing microorganisms may be present in the water
- Stream segments without filter strips
- Areas with livestock near streams
- Intensively cropped areas close to streams

What's a watershed?

A watershed is an area of land that drains water into the lowest point -- a body of water, such as a stream, lake or marsh.

Watersheds can be as small as a city block, draining into a creek, or very large.

The South Fork watershed covers 36,466 acres in Fayette, Buchanan and Delaware counties and is one of 25 sub-watersheds that make up the larger Maquoketa River watershed.

During a rainfall, water either travels over the surface or seeps into the ground.

Water traveling over the surface or through groundwater may pick up contaminants like sediment, chemicals and waste and deposit them in a body of water.



The South Fork watershed in relation to surrounding counties.

South Fork Water Quality Project sets goals

The South Fork Maquoketa Water Quality Project began in July 2004 with the goals of reducing sediment, bacteria and nutrients delivered to the river and Backbone Lake, as well as educating watershed residents.

The project is slated to take place over three years. Farming methods known as "best management practices" will be a large part of the plan to improve overall water quality in the watershed.

The South Fork project plans to reduce bacteria levels by installing animal waste systems and educating rural residents on proper treatment of household wastewater.

The amount of nutrients (such as nitrogen and phospho-

rus) sent to the river will be decreased by implementing nutrient and pest management plans, and by restoring wetlands.

Plans to reduce the amount of soil and sediment delivered to

Project Goals

- Reduce bacteria levels by 40 %
- Reduce sediment delivery by 30 %
- Reduce nutrient delivery by 30 %
- Provide residents with information and educational programs

the river include implementing management practices such as no-till, contouring, grassed waterways, filter strips, streambank stabilization, tree planting and timber

stand improvement.

The project also plans to provide watershed residents with information and educational programs on the importance of water quality, including demonstration sites and field days.

Details on how these best management practices work to improve water quality are found on pages 6 and 7 of this brochure.

More information on why sediment, nutrients, bacteria levels and outdated septic systems create water quality problems is found on pages 4 and 5.

Manure matchmakers help water quality

One group is making sure manure finds a good home in the South Fork watershed.

Rather than have excess manure be over-applied or otherwise end up in streams and the river, it can be given to those who are in need of manure for fertilizer or other uses.

The Iowa Pork Producers Association (IPPA) is donating \$5,000 to the South Fork Water-

shed project to collect water monitoring samples and to develop a watershed directory.

This is the first manure matching venture between the IPPA and a watershed project, although IPPA is interested in partnering with other watershed projects in Iowa.

The directory will list those in the South Fork and Upper Maquoketa watersheds with excess

agricultural manure and those who can put it to best use environmentally.

The directory will also feature other useful information on water quality, nutrient credits and local plot data.

After public meetings to discuss nutrient trading are held, the directory will be created and distributed to residents in the two watersheds.

Understanding problem

Bacteria



Swimming advisories can be posted due to high bacteria levels at state park beaches.

When rainfall washes sediment into streams, it also washes in bacteria attached to the sediment.

The bacteria can come from a number of sources, including animal wastes,

livestock, wildlife and septic systems in the watershed.

High levels of one type of bacteria, which includes *E. coli*, serve as an indicator that pathogens may be present in the water. Pathogens are microorganisms that can cause disease.

The DNR gathered data from six sampling sites in the South Fork watershed during 2003 and 2004, which showed an average bacteria

level between four and 27 times the state standard for *E. coli*.

One site in the South Fork watershed had an average of 20 times the state standard for *E. coli*.

About 30 watershed volunteers in the same DNR watershed study collected rainfall information, which showed the watershed is so large that rainfall in the upper watershed affects bacteria levels in the lower watershed.

Nutrients



High nutrient levels can cause algae blooms.

The most common nutrients in Iowa are nitrogen and phosphorus.

These two nutrients often come from sources such as manure and fer-

tilizer chemicals used for farms and urban lawns.

High levels of nutrients in any water body can lead to high levels of algae, which can cloud the water and lead to more serious problems like low oxygen levels, more rough fish like carp and a greater chance of toxic algae.

Phosphorus can attach to sediment and be carried through runoff into streams and the lake.

Nutrients can also arrive in water bodies attached to organic particles or in a dissolved state.

Flood problems affect water quality in river

Floods are nothing new in the South Fork watershed. A number of floods over the past few years led up to summer 2004, when at least five major flood events hit the watershed, washing loads of topsoil down the



river and causing large amounts of damage.

While severe rainstorms couldn't be stopped, some of the damage may have been lessened had the watershed been equipped to handle heavy rains.

"We cannot change the amount of rain we get or where it falls, but we can try to work with the rains instead of against them," said Tom Sperflage, South Fork watershed coordinator. "The amount of soil we have left is all we have."

The landscape has changed over time as natural structures that once helped to minimize flooding have been removed.

Wetlands and sloughs that would hold extra rainfall and filter out sediment have been drained

The scour channel to the left is likely an old river channel from hundreds of years ago, which would help reduce effects of flooding. The channel flows into the river, located behind the trees in the photo.

areas in the watershed

Sediment

Besides carrying bacteria and nutrients, sediment can fill in lakes and streams, reduce water depth and make water more vulnerable to problems caused by nutrients, like algae.

It can also damage the habitat of aquatic life, cause the loss of valuable topsoil and increase flooding events.

An estimated 12,131 tons of sediment are delivered every year

from fields in the South Fork watershed to the river and Backbone Lake. That works out to a third of a ton of soil from every acre in the watershed.

Every time it rains two inches (in a 24 hour period), about 8,300 tons of soil are washed off of fields in the watershed.

Fayette County spends approximately \$100,000 a year to clean sediment from road ditches,

like the one to the right.

The map at the bottom of the page shows the estimated amount of sediment sent to the South Fork Maquoketa River in one year.



Sediment fills a ditch along a county road.

Septic systems

County sanitarians estimate that 75 to 80 percent of household septic systems in the South Fork watershed are outdated or failing.

Without proper treatment, untreated sewage can enter streams, lakes and groundwater, polluting water with bacteria and nitrates.

These systems can pose a health threat to adults with weakened immune systems and to children who can come into direct contact with untreated sewage when playing in backyards, road ditches or creeks that have untreated sewage piped to them.



A failing septic system discharges sewage.

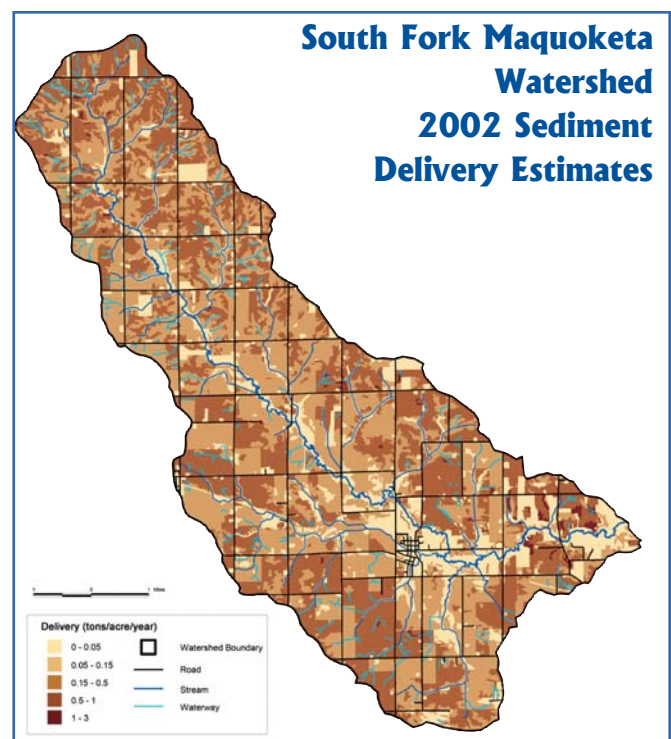
to make room for agriculture.

However, implementing watershed practices can help protect the area from future flooding. Practices would slow runoff leaving the fields, which would decrease flash flooding while helping save soil and filter runoff water before it enters the river.

“We cannot change the amount of rain we get or where it falls, but we can try to work with the rains instead of against them. The amount of soil we have left is all we have.”

Tom Sperfslage,
South Fork Watershed Coordinator

This map illustrates how much sediment is delivered to the South Fork Maquoketa River from locations in the



Best management practices



Nutrient and pest management

Nutrient management helps keep excess nutrients and chemicals out of surface water and groundwater. By monitoring soil and plant needs, farmers use only the necessary amount and types of fertilizer, and pesticides are used only when a pest problem is identified.

Because excess nutrients and chemicals are not wasted, nutrient and pest management also provides a financial benefit to farmers.

Nutrient and pest management can save money and protect surface and



Contouring

Contour farming, or planting rows around hills rather than up and down hills, reduces erosion from water runoff and conserves soil and water resources.

Farming straight up and down hills can greatly increase soil erosion, while contour farming helps reduce runoff by absorbing more water into the soil rather than allowing it to run off.

Contours create a pattern across a field in the South Fork watershed.



Nose pumps bring water from fenced-off streams to livestock.

Pasture management

Pasture management works to keep bacteria, excess sediment and nutrients out of streams while also helping prevent streambank erosion.

Installing fences to keep livestock out of streams prevents animals from tromping down streambanks, causing erosion and adding sediment to the stream.

Fencing in animals also helps reduce the amount of nutrients and bacteria from animal waste reaching the stream.

Livestock can still use the stream as a source of drinking water even if a fence separates them from the stream. Off-stream watering systems deliver water from the stream to the fenced-in area through pumps. Livestock operate the system by pushing their nose against the pump to deliver water.

Rotational grazing, or moving livestock from pasture to pasture on a preset schedule, reduces erosion and improves forage quality and quantity.

Financial incentives for conservation practices

Assistance with a number of cost-share, loan and other programs is available to landowners considering installing conservation practices and management techniques on their land.

For more information on these programs, contact your local NRCS/FSA office, or Tom Sperfslage, watershed coordinator:

- Buchanan County:
(319) 334-2543
- Delaware County:
(563) 927-4250

Tree plantings and timber stand improvement

Tree plantings can take a number of shapes and provide multiple benefits. Plantings can provide ground cover for highly eroding slopes and create windbreaks, helping reduce erosion from wind.

Trees can also protect young plants, livestock and farm buildings from winds and provide a habitat for wildlife.

help improve water quality

Wetland restoration

Many of the wetlands in the South Fork watershed and across Iowa were degraded or drained in the past to make room for farm fields. Today, many wetlands are being restored for their ability to filter out nutrients, chemicals and sediment before they reach a stream or lake.

Wetlands also provide animal and plant habitat, water purification, and shoreline and flood protection.

Wetlands help improve water quality and provide a habitat for wildlife.



Photo by USDA NRCS

Septic system upgrades

Proper treatment of household wastewater helps keep bacteria and nitrates from polluting streams, lakes and groundwater.

Financial assistance may be available for creditworthy homeowners who need to replace their inadequate or failing onsite septic system through the DNR's Onsite Wastewater Systems Assistance Program (OSWAP), which offers low-interest loans through participating local lenders. For more information, visit www.iowadnr.com/water/septic/

Workers install a new septic system for a homeowner.



Grassed waterways and filter strips

Grassed waterways are shaped and placed in areas with concentrated water flow to slow water, guide it off the field and reduce gully erosion. Grassed waterways help disperse water, preventing small streams from forming.

The practice can also help prevent ephemeral gullying, which is a type of erosion created by concentrated water and found in low areas between hills.

Filter strips work to slow water running off of farm fields. The strips also filter out sediment, fertilizers and herbicides from the water before it reaches a lake or stream.

A filter strip usually includes a strip of grass, trees, shrubs or a combination of the three. Located along a stream, the strip also helps reduce streambank erosion and provides habitat for wildlife.

Used together, grassed waterways and filter strips can trap nutrients and sediment.



A grassed waterway in the South Fork watershed helps reduce

No-till

By using crop residue to protect against soil erosion from wind and water, no-till farming helps conserve water and soil resources.

With no-till, farmers plant directly into last year's crop stalks and stems. The soil is left undisturbed after the harvest and throughout the season, except for when the seed is planted. To plant, farmers use no-till planters and drills that are able to penetrate undisturbed soil.

Animal waste storage facilities

Animal waste storage facilities work to keep manure contained until it can be used for proper land application. Without proper containment, manure can pollute groundwater, lakes and streams, sometimes causing fish kills. Using biofilters and covered lagoons can also help to reduce odor and other emissions.

One landowner's homegrown conservation

Conservation practices are helping protect Albert Roepke's farm, land that has been in his wife's family for almost 150 years.



Filter strips on Albert Roepke's farm slow runoff and provide wildlife habitat.

Roepke and his wife have spent 44 years on the farm, located in the western part of the South Fork watershed, just north of Aurora.

For 70 years, Roepke has worked on a farm and is well aware of problems in the watershed.

"I've seen more erosion in the last 20 years than in my lifetime," said the 80-year-old Roepke. "The land is all worked now."

Flooding has always been a problem in the watershed, he said. He's seen water in his fields that stretched over a half mile, taking valuable topsoil with it.

To help save the soil, Roepke has been doing minimum tillage and no-till for years. He's installed filter strips and is installing a wetland in the spring. The 100-foot wide strips have helped slow runoff from the fields, and the wetland should add flood protection.

While he noted floods this past spring hurt the pheasant population in his fields, Roepke said the filter strips also work to attract wildlife.

"I like to see pheasants in the morning," he said. "And it's always nice to hear quail."

Water quality is a grassroots effort

Improving water quality in the South Fork watershed starts with the watershed residents. There are a number of ways to get involved with efforts to improve the watershed. The following are just a few:

- Contact Roger Erickson with the South Fork Watershed Project at (319) 334-4105 for ideas on how to become involved
- Talk to your neighbors and friends about water quality and land management concerns
- Volunteer as an IOWATER water monitor. Learn more at www.iowater.net
- Landowners can learn about what conservation practices may be right for their land by contacting a local NRCS office, DSC or Soil and Water Conservation

District staff member, or local DNR private lands biologists and forestry staff

- Join a friends group, like Friends of Backbone Lake, a group of local citizens working to improve water quality in the watershed
- Avoid over-applying lawn and crop fertilizers, since excess fertilizer, loaded with chemicals, can run off with rainfall into bodies of water in the watershed
- Perform regular maintenance on septic systems
- Recycle and dispose of all trash properly

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