# Improving the Raccoon River

Pollutants: Nitrate and bacteria Pollution Sources: Rowcrop agriculture, livestock production, wastewater treatment plants

The Raccoon River needs your help. As you'll read below, the DNR has written plans to identify the river's problems and possible solutions.

The DNR needs your help now in putting the plans into effect. A healthier Raccoon River depends on you.

# What's wrong with the river?

Bacteria

Pollution from human and animal waste, also known as fecal matter, keeps the river from meeting water quality standards for recreation, like swimming and canoeing.

Untreated waste from these sources can carry disease-causing microorganisms, called pathogens, into the water. These pathogens can make people sick when they come in contact with the water. Testing for E. coli bacteria levels can indicate if there may be fecal matter and diseasecausing pathogens present in the water.

### Nitrates

High nitrate levels at certain times of the year also keep the river from meeting water quality standards as a public drinking water supply in Panora and for about 300,000 people in Des Moines and surrounding areas.

The water quality limit for nitrate is designed to protect human health, particularly for infants under six months old and pregnant women.

Currently, Des Moines drinking water is safe, as it is treated by a nitrate



The Raccoon River at the Two Rivers Area near Van Meter.

Photo by: Clay Smith, DNR



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removal facility, the largest of its kind in the world. The Des Moines Water Works constructed the facility in 1991. It runs an average of 45 days per year, costing \$3,000 to run *per day.* 

While only certain segments of the river are on the impaired waters list (see map on next page), it's necessary to improve water quality in the entire watershed to maintain clean water in the river along the impaired segments.





# What is causing the problem?

Bacteria and nitrate in the river come from both point and nonpoint sources. Pollution from point sources, like a wastewater treatment or industrial plant, are regulated and easily traced back to a specific "point." Pollution from nonpoint sources, such as runoff from farm fields or the natural landscape, is not as easily traced back to a specific point. While there are point sources in the watershed, the water quality improvement plan has identified that most pollution comes from nonpoint sources.

In the Raccoon watershed, nonpoint sources of bacteria include areas used to land-apply manure, feedlots and pastures, and improperly connected or failing septic systems. Rainwater and snowmelt can wash waste from livestock (confined and pastured), pets and wildlife into the river.

Runoff and tile drainage from farm fields are the major contributors of nitrate to streams and the river in the watershed. Other contributors include municipal and industrial wastewater discharges and natural sources.

To reduce the amount of bacteria and nitrates reaching the river, changes in land management will be needed. It will take time to make these changes and to see the effects.

### What can be done to improve the river?

The Iowa DNR has created a water quality improvement plan (also known as a TMDL, or total maximum daily load) for the Raccoon River.

The ultimate goal is to improve water quality and remove the river from the state's impaired waters list. To do that, levels of bacteria, from human and animal waste, and nitrates need to be significantly reduced in the watershed.

The DNR partnered with the U.S. Geological Survey to use modeling methods to show where

The maps at left show where nitrate (top) and bacteria (bottom) come from in the Raccoon River watershed. Darker shaded areas send more nitrate and bacteria to the river than lighter shaded areas. pollution is coming from in the watershed and where those pollutants could be reduced the most.

For water quality improvements to happen, local community members and landowners, in cooperation with city, county and state governments, need to get involved. Participation by developers, local businesses and cities will also be extremely important in putting improvement plans in place.

However, everyone's input and comments are important as we collectively work toward improving the situation in the river for future generations.

### What's next?

Now that the DNR has written a water quality improvement plan for the Raccoon River, Iowans can work with the DNR and other agencies to put that plan into action.

The improvement plan suggests approaches

to improving water quality in the Raccoon watershed. First, the plan advises that rather than approach the large Raccoon watershed as a whole, improvement efforts should focus on smaller sub-watersheds. With this approach, it's easier to pinpoint problems with in-depth research and to propose solutions. Improvements in these smaller areas will affect the overall health of the river.

Within these sub-watersheds, individual landowners can make a difference by using conservation farming practices on their land. These practices can help reduce the amount of nitrate and bacteria reaching streams and the river.

Some practices will focus more on nitrate, others on bacteria, and some will help reduce both. There are more documented ways to reduce nitrogen reaching streams than bacteria. However, because nitrogen comes from many sources in the environment, a single landowner may be able to make a greater reduction in bacteria.



Left: The Raccoon River watershed, shaded in gray, drains 2.3 million acres of land in western and central lowa. A watershed is the area of land that drains to a stream or lake.

Impaired segments of the Raccoon River (shown in yellow, green and red on the map):

- Mouth of the Raccoon River to the confluence of the north and south Raccoon (nitrate and bacteria)
- From Indian Creek to Cedar Creek in Sac County (bacteria)
- From Buttrick Creek to Short Creek in Greene County (bacteria)
- Below the Lake Panorama Dam at the Panora drinking water intake (nitrate)

Some of the best conservation practices a landowner could adopt for reducing nitrogen reaching streams include changing the timing and rate of nitrogen applications to farm fields. Nitrogen fertilizer should be applied in spring or in fall only after the soil temperature is below 50 degrees (F).

By injecting nitrogen fertilizer into the ground, a landowner reduces the risk of nitrogen washing off into streams. To reduce bacteria reaching streams, landowners can use improved manure management practices. Landowners can take appropriate nutrient credit for manure applications and reduce manure application to fields during periods where runoff is likely, such as a rainy week or on saturated or frozen ground.

In the field, landowners can reduce losses of nitrate (both on the surface and in the ground) by using perennial vegetation or cover crops, like hay, on farmland.

Diversifying cropping systems, retiring lands to the Conservation Reserve Program, or using cover crops during non-crop periods can reduce the amount of runoff and tile drainage as well as nitrate levels during vulnerable spring and fall periods.

Using alternative tile drainage designs can reduce the amount of nitrate lost below the surface in heavily drained areas. To prevent bacteria in fields from reaching streams, landowners can better manage pastured areas. Fencing livestock away from streams, using rotational grazing systems and improving how manure is handled can reduce the amount of bacteria running off from fields, feedlots and manure storage structures.

Outside the field, there are a number of other practices that can reduce the amount of nitrate reaching streams.

Planting trees and other deep-rooted plants, like warm season grasses, in riparian buffers along streams can filter out nitrogen before it reaches the water.

For larger areas, creating wetlands to filter tile line drainage can reduce nitrate. Studies by Iowa State University have found that relatively small areas of wetlands can remove up to 70 percent of nitrate from incoming drainage.

There can be help for landowners looking to use new conservation practices, and for residents in the Raccoon River watershed who want to improve their river.

By working with the DNR or your local soil and water conservation district, you can organize a watershed project. By coming together, we can accomplish more.

## About water quality improvement plans

The DNR tests waters throughout lowa to make sure they are meeting state water quality standards. Those standards are in place to protect drinking water, aquatic life and recreational uses, like swimming. When a river, stream or lake doesn't meet those standards, the river, stream or lake is placed on the state's impaired waters list. The DNR then creates a plan which outlines ways lowans can help improve the water quality in their community's lakes and streams.



DNR needs your input

Every lowan needs the help of their fellow citizens and watershed groups to improve water quality in their community.

If you or your group would like to meet with a DNR staff member to discuss water quality, please contact:

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For more information on water quality improvement plans, please visit:

http://watershed.iowadnr.gov

