



Water Monitoring

The mission of ACWA is to identify and advance solutions that reduce nutrient loss, build healthier soils, and improve Iowa's waters. Their commitment to stream monitoring in the Raccoon, Des Moines and Boone rivers and their tributaries is their hallmark. The nitrate-N database that ACWA began in 2000 continues today, amassing more than 20 years of data. It is one of the most extensive in the state, and possibly the Midwest, that tracks export levels of nitrogen from these rivers and streams.

In 2008, ACWA added the oversight of edge-of-field water monitoring on private farms in the Raccoon and Des Moines River watersheds. Tile-drained water sampling provides information to specific fields, which relates to the farmer's management of that field including crop grown, fertilizer applications and conservation practices such as cover crops. In 2020, ACWA sponsored analysis of 590 water samples from 150 tile outlets and 9 sites with bioreactors or saturated buffers. The sample numbers are fewer than the previous year due to drought conditions most of the area.

The aggregated data has helped ACWA target areas for watershed improvement implementation, such as the Elk Run and Farm to River Partnership Water Quality Initiatives. This data also brings to light long-term trends and provides farmers with feedback on their individual operations.

Nitrogen loss from a watershed is the product of river flow and the nitrogen concentration in that water. During high flow, concentrations are diluted but the sheer volume of water moving through the system tends to lead to high losses. High nitrate concentrations pose a risk for drinking water but are not necessarily correlated with a large amount of total loss if the flow is consistently low. Figure 1 shows the export of nitrogen for the major rivers that ACWA monitors between April and July.

In 2020, the Raccoon River and Boone River each had a combination of lower-than-average concentrations and river flows resulting in low overall losses

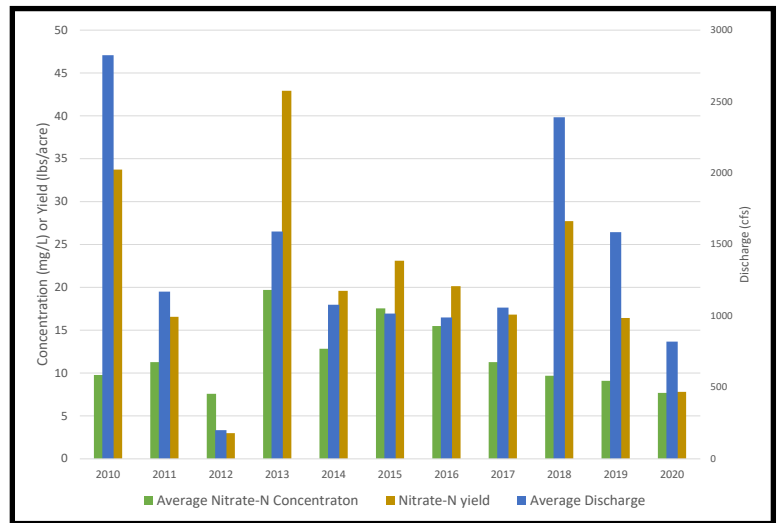


Figure 2. Boone River Nitrogen Loss and River Flow from 2010 through 2020.

	Beaver Creek	Des Moines River	Upper Boone River	Boone River	Upper North Raccoon River	North Raccoon River	Middle Raccoon River	South Raccoon River
Acres	236,475	3,739,942	266,985	541,309	1,030,905	1,462,636	384,544	240,291
2020	5.6	6.8	8.7	7.8	7.6	7.5	1.6	3.1
2007-2019 Average	17.8	12.9	23.9	22.0	17.4	18.0	10.6	14.8

Figure 1. Average export of nitrogen in pounds per acre in 2020; estimated load divided by total acres.

of about eight pounds of nitrogen per acre from April through July. Figure 2 illustrates this for the Boone River for the decade. Note that 2012 was a drought year.

Further focusing on the Elk Run watershed, which is within the Raccoon River watershed, provides an

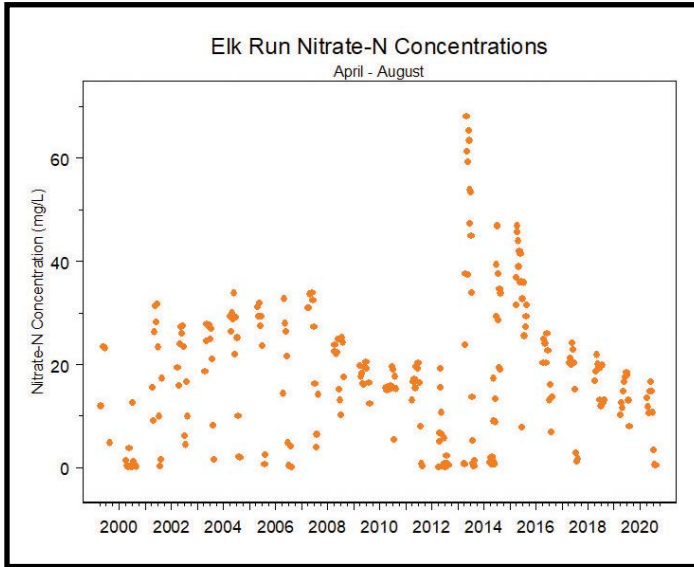


Figure 3. Elk Run watershed Nitrate-N concentrations between 2000-2020.

example of what has been happening with nitrate concentrations on a smaller scale. Figure 3 looks at the watershed over 20 years, from 2000 through 2020. It shows considerably high nitrate-N concentrations between 2000-2008, and a slight decline during the very wet years of 2008-2010. Nitrate-N was very low during the drought years of 2011-2012. There was a large increase in 2013, not unlike what was happening over the entire Raccoon River watershed, but 50-60 mg/L is a high concentration even for tile lines.

In 2018, the Farm to River Partnership Water Quality Initiative began, which included the Elk Run watershed in the project area. Farmers began to use cover crops and change their nutrient management strategies, which one could hope, is reflected in the graph.

ACWA members care about the waters that flow across the land they serve. They care about those living downstream who rely on the Raccoon, Boone, and Des Moines rivers for drinking water. They are concerned about the water quality for those who use the rivers for recreation. ACWA is working with numerous partners — urban and rural — with the common goal of reducing nutrients in these waterbodies in the near future and for years to come.

