



On-Site Investigation of Source Water Area



Ground breaks for the Elliott wetland restoration project Oct. 11, 2012.

Elliott's drinking water wells contained nitrate levels of concern. During the DNR's Source Water Protection (SWP) program investigation, soil contamination from a business was discovered. Although that was soon remedied, well tests continued to show nitrate levels of concern from general soil conditions.

A denitrification facility was out of the question for the city of 350 people, so the city hoped for a natural way to denitrify the water.

Dan Cook, one of DNR's SWP groundwater site investigators, learned the land just east of Elliott's well had been a wetland prior to being drained many years ago and farmed. East of that area the wetland remained intact.

"Groundwater samples taken from the west side of the nearby wetland showed little to no nitrate, even though the general soil conditions on its east side were similar to those at the Elliott well," said Cook.

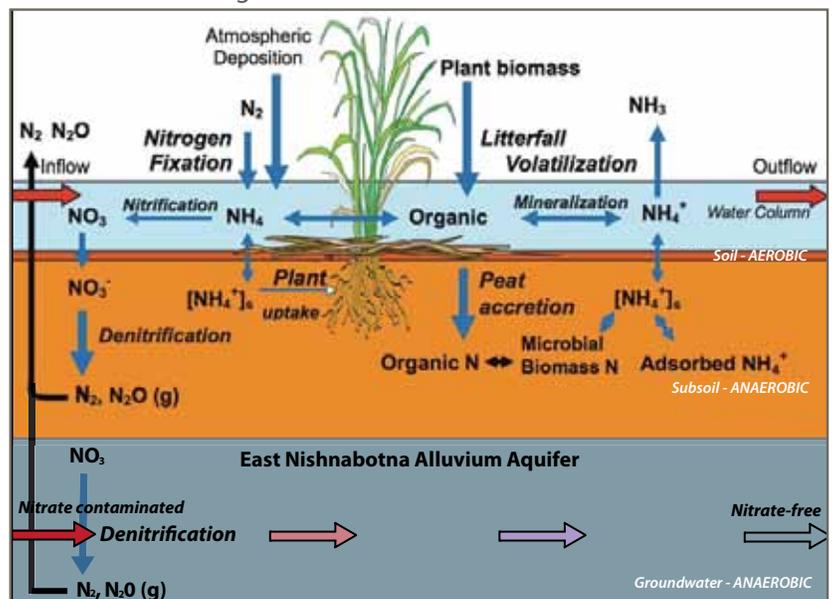
This information proved to be the clincher as to how to naturally and economically remove nitrate from the Elliott groundwater: return the L-shaped 22-acre site east of the well back into a wetland and add a native grass buffer.

The school district agreed to donate 4.7 acres it owned just north of the elementary school to the project. The farmer who owned the remaining 18 acres agreed to sell it to the city of Elliott

if, several of Elliott residents agreed to sell portions of their property in order to square up the property line. This was truly a community effort.

Microbes in wetland soils reduce nitrate

A wetland reduces nitrate in the groundwater through a natural process. The decomposition of plant debris in a wetland is carried out by microscopic organisms called microbes in the top three inches of soil. They need oxygen to feed on carbon in plant material. Microbes take oxygen from the wetland water in the soil. Peat is the result of feeding on carbon.



Solutions Target Contaminants, Not Water Treatment



SWP LOCAL PLANNING TEAM AND CONTRIBUTORS

City of Elliott
Griswold Schools
Local landowners
U.S. Corps of Engineers
Montgomery County Conservation
Montgomery and East Pottawattamie districts of Soil and Water Conservation
Iowa Department of Natural Resources
Resource Enhancement and Protection grant (REAP)
IDALS — Division of Soil Conservation
Watershed Improvement Review Board
U.S. Fish and Wildlife Foundation 5 Star Grant
Montgomery and Pottawattamie Pheasants Forever
Montgomery County Board of Supervisors
USDA-Natural Resources Conservation Service
Golden Hills RC&D
State Revolving Fund
City of Stanton
U.S. National Park Service

When the oxygen in the soil's water is used up, microbes take oxygen from nitrate in the subsoil. The nitrate, losing its oxygen, turns into nitrogen and nitrous oxide gases, both of which escape into the air. This process is called denitrification.

When oxygen from the subsoil is exhausted, the microbes move into groundwater to break up nitrate and use oxygen. Water drawn from the aquifer after it passes through the wetland has little to no nitrate left.

Even though the area east of the well was drained, the subsoil created by several thousand years of wetland remains. When the wetland is reestablished, the belief is the microbes will reach critical activity much sooner than starting from scratch.

Collaboration and connections

Through a 28E agreement from the SWP Program for Priority Community Water Supplies, the Golden Hills RC&D staff assisted the SWP Team in coordinating and locating resources to complete the SWP team-developed plan.

NRCS and Division of Soil Conservation staff developed the technical wetland plans and obtained necessary permits and program funds for completion of the plan.

Funding to purchase the farmland was secured from a grant from the Watershed Improvement Review Board.

Bridge materials, left over from a project done by the city of Stanton,

have been offered to Elliott's wetland project, including help from city of Stanton employees to install the bridge.

Soil removed from the site will be used to build up the path through the wetland to facilitate the outdoor classroom and paths. Additionally, the county will use the extra soil for raising a nearby road that historically floods during wet periods. Remaining soil may be offered to the Elliott community and others nearby.

Excavation

The soybean field on the school-donated acres was harvested right after the project ground-breaking ceremony Oct. 11, 2012. Ground work will be completed in April 2013.

Community benefits

When completed, the Elliott and surrounding communities will have a short and long walking trail with a bridge over the wetland, interpretive panels, and a shelter house for enjoying wetland wildlife viewing.

Educational opportunities for elementary school children will include movement of the sun through the installation of a human sundial, wildlife viewing with a bird feeding station and telescope, and hands-on learning of the environmental sciences, such as: water testing.

"Our students are so lucky to have this experience of learning how to protect and appreciate their natural resources to ensure quality drinking water," says Deb Karwal, naturalist for Montgomery County Conservation. "A short walk will take them back into Iowa's history, and they can observe native creatures. These kids will grow up to love their environment."

For more information email SWP Coordinator Becky Ohrtman at Rebecca.Ohrtman@dnr.iowa.gov or call her at 515-725-8332.

The local FFA and the city partnered to plant and harvest the four acres of soybeans prior to wetland construction. Proceeds from the soybean crop will pay for a portion of the outdoor classroom.

