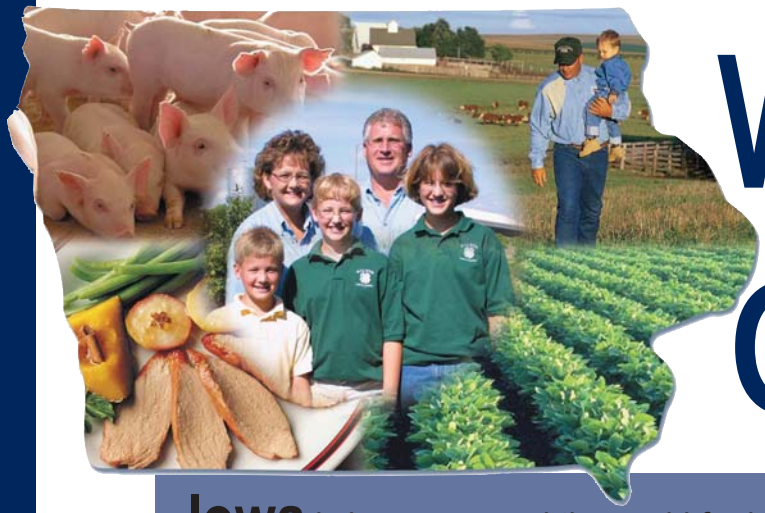
Agricultural Issues Where We Live



WATER QUALITY

Iowa is known around the world for being a food producing state. The abundance and diversity of plant and animal life throughout thousands of years is an essential element in maintaining Iowa's rich soil…some of the richest soil in the world. More than 90% of Iowa land is in agricultural production, a higher percentage than in any state in the United States. How we care for Iowa's natural resources such as soil and water, and all the plants, animals and people that share our space is important now and for the future.

Why is water quality important to you and especially to Iowa farmers?

Every person, animal and plant needs water. That's especially true for Iowa's farmers, who rely on water to raise their crops and livestock. Like you, they also need water for their normal family living. That makes water doubly important to farmers in Iowa.

If the household you live in is "average," your family uses about 500,000 gallons of water each year.[1] If you think that sounds like a lot, consider that you personally use about 150 gallons of water a day.[2] Every time you brush your teeth, take a shower or give your dog a bath, you're consuming water. Your body also uses water in just about everything it does, which means you need to drink the equivalent of six to eight glasses of water every day.

Iowa's farmers work hard to produce another essential element to nourish your body - food. Farmers depend on Iowa's rich soil, climate conditions, and that ever-important water, to grow grains, meat, milk, eggs, fruits and vegetables.

The United States has one of the safest water supplies in the world.[4] But all of us - including Iowa's farmers - want to make sure we maintain a safe, healthy water supply for our families, ourselves, and all the plants and animals that share water in our watersheds.

A farm pond helps filter soil nutrients, improving water quality downstream and provides recreation opportunities.

Sponsored by the Iowa Agriculture Awareness Coalition in partnership with:

Agribusiness Association of Iowa
www.agribiz.org
Iowa Agricultural Development Authority
www.iada.state.ia.us
Iowa Beef Industry Council
www.iabeef.org
Iowa Department of Agriculture and Land Stewardship
www.IDALS.org
Iowa Egg Council
www.iowaegg.org
Iowa Farm Bureau Federation
www.iowafarmbureau.com
Iowa Pork Producers Association
www.iowapork.org
Iowa Sheep Industry Association
www.sheepusa.org
Iowa Soybean Promotion Board
www.iasoybeans.com
Iowa Turkey Federation
www.eatturkey.com
ISU Agricultural Education & Studies Department
www.ag.iastate.edu/departments/aged/
Iowa State University Extension 4-H Food, Fiber, Environmental Science Program
www.extension.iastate.edu/GrowingintheGarden/
Midwest Dairy Association
www.midwestdairy.com
Silos & Smokestacks National Heritage Area
www.silosandsmokestacks.org
www.campsilos.org
Living History Farms
www.LivingHistoryFarms.org
Iowa Conservation Education Council
www.iaswcs.org
Iowa Department of Education / Iowa FFA Association
www.state.ia.us/educate/
www.ffaiafoundation.org/wwd/assoc.htm

Some photos provided by the USDA Photo Library, the NRCS Photo Library and the ARS Photo Library.
Design by Christa Hartsook

Iowa Agricultural Awareness Coalition

How do Iowa farmers help assure the quality of our water?

There is no such thing as pure water. In nature, all water contains some impurities. As water flows in streams, sits in lakes and filters through layers of soil and rock in the ground, it dissolves or absorbs the things that it touches.[5]

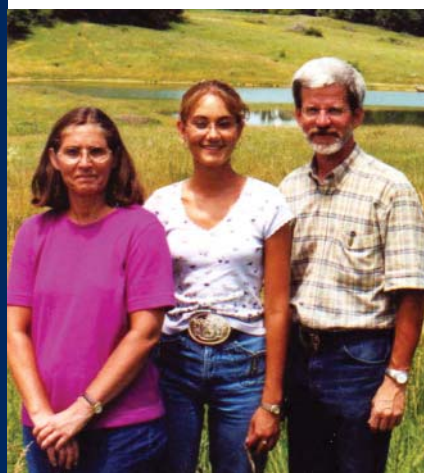
Every time we use water, we change it in some way. Sometimes we improve its quality, and sometimes we add pollutants that might have to be removed before it can be used again. According to the U.S. Environmental Projection Agency, there are six major types of water pollution:[6]

- Sediment
- Plant nutrients
- Biodegradable wastes
- Heat
- Chemicals
- Radioactive wastes

There is no single source for any of these types of pollution. In fact, in almost every category, there is the potential for pollution to come from a variety of sources - regular household use, factories, cities and towns, farming, etc.

Agriculture, or food production, has the potential to be one of many sources of water pollution in four of the six areas - biodegradable wastes, plant nutrients, sediments and chemicals -- if not properly handled.

Let's take a look at these areas and see what Iowa's farmers - and you - can do to protect our water.



Diane, Dresden and Dave Petty of Eldora have been honored as good environmental stewards. The Pettys raise cattle, hogs, corn, soybeans and hay.

Sediment

Sediment is soil that is washed or blown from land into lakes, rivers or streams. It is the single largest water pollution problem in Iowa. When water is polluted with sediment, it can clog the water systems of cities and towns. Sediment consists of Iowa's valuable soil and attached nutrients, which are used to grow crops. Excess nutrients washed into bodies of water can hurt plant and animal life.

Sediment can erode from land by being carried away during strong winds and heavy rainfall. Construction and mining also can cause sediment erosion. Soil can erode from river and stream banks and ditches, especially during times of flooding.

Buffer strips of grass create natural terraces on the contour of a farmed hill.

In the last 20 years, Iowa's farmers have cut the amount of soil erosion from farmland in half.[12] They have done this by:

● Changing the way they till the soil. Most farmers now wait until spring to till (prepare the soil for crops). More than 20 percent of Iowa's cropland is now farmed with "no-till" methods to reduce soil erosion.[13]

● Changing the way some land is farmed, by planting buffer strips of grass or trees along waterways; following the contours of steep or hilly fields instead of farming straight up and down hills; and installing terraces which make "stair steps" on steep fields. Plant roots hold the soil in place and act as a filter.

● Using land for grazing and forage production. Some land is too steep and hilly to grow row crops, like corn and soybeans, without causing serious soil erosion, so farmers use this land to graze cattle or sheep, or raise crops like hay, which holds the soil in place better than row crops.

● Planting field windbreaks. Flat, open ground can lose a lot of topsoil on windy days. By planting trees around their fields, farmers can help reduce wind erosion while providing a home for wildlife.

● Fencing stream or river banks so that animals will not trample the plants and the ground near them, which could otherwise cause the soil to erode into the water.

A windbreak along this Iowa farm reduces wind erosion from the surrounding field and provides a wildlife habitat.

Biodegradable Waste

Biodegradable wastes are things that will eventually break down and become part of the earth again. They include waste that comes from plants and animals. Biodegradable wastes can be helpful in growing crops and vegetation, and they put organic matter into the soil, which improves soil structure. However, too much biodegradable waste in one place can cause water pollution by providing food that helps harmful bacteria, protozoa and viruses grow. These organisms can make people sick, especially if they are very young, elderly, or have weakened immune systems.[7]

A grassy waterway allows water from a crop field to flow without carrying soil with it.

Livestock production creates biodegradable waste in the form of manure from animals like cattle, pigs, sheep, chickens and turkeys. There also are many other sources of biodegradable waste, including human waste (sewage), food scraps, lawn clippings, pet waste and wildlife waste.

Some of the practices that farmers use to limit the amount of biodegradable waste in an effort to prevent contaminates from entering our water are:

- Storing manure in concrete pits or tanks that keep it out of streams and rivers and hold the manure until it can be used as a nutrient for the soil to grow healthy crops.

- Creating nutrient use plans, which help farmers decide when and where to apply nutrients to the soil. The plans also help farmers balance the amount of manure they apply to the amount the earth can absorb. Farmers recycle manure by using it as crop fertilizer. Manure contains important nutrients for the soil and can be used to replace commercial fertilizer.

- Fencing streams or rivers to prevent animals from depositing waste directly into the water. Many farmers also place food and water sources for their animals away from creeks and streams so the animals don't gather near the water.

This wetland is located near a cattle feedlot. The nutrient plan for the waste collected in the feedlot was to use a large soil filtration field and a lagoon prior to any water reaching the wetland. Water tests done in the wetland showed that this was a good plan because there were few nitrates found in the wetland.

Plant Nutrients

Animal manure, human sewage, and commercial (manmade) fertilizers are considered nutrients because they can promote the growth of plants. Detergents and industrial wastes also contain substances that may help plants grow (nitrogen and phosphorus). Some nutrients found in the soil occur naturally such as the natural breakdown of soil, decaying leaves, and other naturally occurring actions.

Many of the nutrients used to bring the soil to life so it can grow healthier plants can overfeed a waterway to death. Overfeeding waterways with too many nutrients, especially nitrogen and phosphorus, can upset the balance of plants and other life growing in the water. When plants like algae grow too fast, they can use most of the oxygen in a stream reducing the oxygen level for other life forms including fish.

For farmers, nutrient management is a matter of economics and health. Purchasing fertilizer or preparing soil nutrients, such as manure, and applying them costs farmers a lot of money, which makes over-application financially wasteful. Excess nitrogen or "nitrates" in drinking water can be harmful to people, including their own families, which makes over-application a health risk. Here are some ways Iowa's farmers are controlling the amount of plant nutrients or fertilizer applied to their crops.

● Testing the soil and fertilizer to decide the amount of soil nutrients needed for healthy plants to grow. Farmers test organic fertilizer (manure) and do an analysis of existing nutrients available. They make science-based recommendations on man-made fertilizers before applying them to their fields.

● Using organic fertilizers (manure) when possible, because they release nitrogen more slowly than man-made fertilizers. Manure from most livestock farms must be applied to the soil by a farmer or hired professional who has taken a test and become certified in manure application management. When manure is used to help grow crops, it improves the soil structure, reducing the ability of soil to erode.

● Using commercial fertilizers (man-made) when needed.

Using a small sprayer, a farmer applies fertilizer to his field. Controlled amounts of the fertilizer are released directly where it is needed.

A manure spreader places organic materials back into the soil, improving soil structure, while providing important nutrients for plant growth.

● Storing manure. When manure is stored in holding tanks or pits, it can be managed instead of potentially washing into waterways. Farmers can use modern liquid manure applicators to inject a calculated amount of manure into a field as fertilizer. For more information about manure storage, refer to "Manure/Animal Nutrients Storage" on page 8.

● Using computer technology such as global positioning systems (GPS) to deliver nutrients more precisely to the soil, applying more fertilizer where it

is needed and less where it isn't.[9]

● Planting filter strips or buffer strips of grass, shrubs and trees along waterways so that water is filtered as it runs off fields.

● Rotating crops raised on land, so that more of the soil's natural nutrients are utilized, and fewer fertilizers have to be added.

● Planning the timing of nitrogen fertilizer application. While nitrogen is extremely important to farmers for growing crops, under certain conditions nitrogen can move easily out of the soil and into water. To keep nitrogen in the soil, many farmers wait to apply nitrogen fertilizer in the early spring while the soil is still cold (below 50 degrees F), but not frozen. This prevents direct run-off problems because the nutrients stay where they are applied on the soil. If nitrogen is applied in the fall, stabilizer additives can be added to keep the nitrogen from moving through the soil.

● Feeding phytase in pork, egg and turkey production. Phytase is a naturally produced enzyme added to pig, chicken and turkey feed which reduces the amount of phosphorus in the manure. When pigs and chickens eat this substance in their feed, the manure they produce contains about one-third less phosphorus.[10] As a result, the nutrient content of manure better matches the nutrients needed to grow corn and soybeans.

● Restoring wetlands, which are areas of land that are covered with water for at least part of the year and are not farmed. Wetlands provide habitat for wildlife and also filter 40 to 90 percent of nitrogen out of water.[11]

Chemicals

We use many chemicals in our everyday lives, to make our drinking water safe, to keep our food safe, as medicines and in our makeup. Unfortunately, if chemicals are misused, or improperly disposed of, they can cause water pollution.

Like gardeners, lawn maintenance companies, and homeowners, many farmers use chemicals called herbicides to kill weeds in their crops, and insecticides to kill insects that can damage crops. If these chemicals are not used properly, or measures aren't taken to prevent them from washing into waterways or leaching (leaking) into groundwater, they can pollute rivers, streams and groundwater.

Producers test the soil for chemical residues near an on-farm stream. Regular sampling prevents overuse of chemicals on fields or leaching of chemicals from the manufacturing, municipality or agricultural industries.

There are many other ways that chemicals can get into water, including waste from factories; air pollution (which can cause rainwater to become polluted); oil and gasoline spills; and leaching into groundwater from landfills. Household cleaners,

dyes, paints, and solvents also are problems. So are dry-cleaning solvents and medicines.

As more and more of our land becomes paved for highways and parking lots, chemical pollution of water becomes more of a problem. Water runs right off of these hard surfaces rather than being filtered through soil and plant roots, and into storm sewers, streams and rivers. The water washes all of the chemicals on the concrete - from things like oil, gasoline, antifreeze and brake fluid - directly into the water system.

Crop chemicals are not limited to use in farming. They are applied to golf courses, parks and road ditches. People also use them on their own lawns and gardens. In fact, homeowners who do not use professional licensed turf applicators can over apply pesticides if they are not careful. Farmers and professional agricultural and turf applicators have to take classes and be certified to use restricted use chemicals. Homeowners have no requirements to apply over-the-counter products. Farmers are working to reduce chemical use and pollution by:

● Using a practice called "integrated pest management," which relies less on chemicals and more on "good" insects and plants to control insect damage to crops.

● Using GPS to apply chemicals. Just like fertilizers, chemicals can be applied with the help of global satellites, so no extra fertilizers or products are applied where they aren't needed.

● Banding instead of broadcast spraying chemicals. When farmers "band" their crops, they apply chemicals only in a narrow band over the crop row instead of spraying them over all the field, so they use a lot less chemical.[15]

● Planting biotechnology crops. Some plants, such as special varieties of soybeans and corn, are bred to have natural resistance to certain plant diseases and insects, so they do not need to be treated with as many chemicals.[16]

● Using mechanical weed control. Some farmers use tools like a rotary hoe or cultivator to till between the rows of plants and remove the weeds, instead of spraying chemicals. This practice also can save farmers money.

● Recycling chemical containers. Instead of throwing away dirty chemical containers that end up in landfills, many farmers return their washed containers to the place they bought them, so they can be used again.

Kristy York, NRCS Soil Conservationist in Audubon County, Iowa, uses a Global Positioning System (GPS) and a personal digital assistant (PDA) to record natural resource data in the field for the National Resources Inventory.

Cultivating weeds mechanically is often used in place of spraying chemicals, saving farmers money and applying fewer chemicals on a field.

Manure/Animal Nutrient Storage

Liquid manure from deep pits made of concrete beneath the hog building is applied to fields to nourish the soil and fertilize the crops.

A producer inspecting two lagoons. The liquid manure in lagoons is treated.

Stockpiled poultry manure ready to be spread on a field as fertilizer.

Livestock producers must store manure -- referred to as animal nutrients because of the resources for plant growth contained within -- to get the best fertilizer value and to assure that the nutrients do not inadvertently find ways to environmentally sensitive areas. The design and construction of manure storage facilities depends on the source of manure, solid versus liquid, the intended use of the nutrients, and location of the operation.

Examples of manure storage facilities include:

- Deep pits --- Deep pits designed to store manure slurry located either under a confinement barn or located outside of the barn; primarily constructed of concrete.

- Slurry store --- Above ground, outside structures utilized to store liquid manure.

- Lagoon --- Earthen structure, often lined with clay or other products to prevent seepage. Typically, a lagoon is utilized as a liquid manure treatment facility.

- Earthen storage --- Earthen structure utilized only to store liquid manure outside. Unlike a lagoon, a majority of the nutrients in an earthen storage facility are typically used as a crop fertilizer.

- Stockpile --- Sometimes solid manure can be stockpiled for a time until it can be used as a crop fertilizer. This is not a common practice today.

- Compost pile --- Sometimes solid manure is composted in a compost bin or windrow. Composting is a treatment method which creates a crop fertilizer.

Your Role in Protecting Iowa's Water Quality

Your family can prevent water pollution, too. Did you know that a single quart of used motor oil disposed of improperly in your home could pollute up to 250,000 gallons of water?[17] Even little things - both good and bad - can make a difference if enough people do them.

Here are some positive things you and your family can do to help protect our water supply:

- Plant grass, trees and shrubs to reduce soil erosion and filter water.

- Compost food scraps and lawn clippings, and use them for mulch and fertilizer for your lawn and garden.

- Collect and properly dispose of pet waste before it washes away.

- Use household detergents that are lower in phosphates.

- Substitute baking soda, soap, vinegar and borax for harsh detergents.

- Keep litter and debris off your lawn to prevent it from being washed into storm sewers and subsequently rivers and streams.

- Burn ethanol in family vehicles to reduce chemical air emissions.

- Recycle and use products with less packaging that is discarded and sent to landfills.

- Don't dispose of hazardous materials such as batteries, nail polish, paints, etc. down the drain or toilet. Instead, utilize hazardous waste disposal programs offered by many communities.

- Use recycling centers to also dispose of used motor oil and tires.

- Homeowners should carefully apply lawn products such as fertilizers and pesticides according to package directions. Don't fertilize your lawn in the hot summer when the lawn is dry and brown. Keep lawn fertilizer on the grass; don't overapply so it lands on your driveway, sidewalk or streets. Have your lawn's soil tested for the nutrients it needs. Apply only as much fertilizer as it needs.

A farm family plants a new seedling near a refurbished streambank. The tree will help to anchor the soil and prevent erosion into the stream.

No one "owns" our water. We all need it. We all use it. And we all share the responsibility to protect it.

Composted material such as food scraps and lawn clippings is a nutrient-dense addition to the soil around trees, flowers and gardens for homeowners. You can start a compost bin in your backyard.

Glossary of Terms

The following terms are Iowa agricultural practices and concepts that relate to protecting water quality. Iowa grain and livestock producers work with scientists, engineers, and the Iowa Department of Natural Resources to incorporate these practices on their farms. Next time you drive in the Iowa countryside, see how many of these water quality (and soil conservation) practices you can identify.

buffer or filter strip: a strip of grass, trees, and shrubs planted near a field, often separating a field from a stream; the plants protect water quality by collecting and using (filtering) nutrients and chemicals before they enter the water supply

contour farming: a method of planting rows of crops following the line of a slope rather than up and down or straight across a hillside, plants are planted on ridges which slow the water flow down the hill; protects water quality by reducing soil erosion and improving water infiltration

cover crop: a crop of grass, clover, etc. grown to protect the soil from erosion by slowing wind and water right before it reaches the soil; the plants also absorb nutrients and chemicals from the water before they enter the water supply; used in several water quality practices such as waterways and filter strips

crop residue management (no-till, mulch till, ridge till): a practice of leaving last year's crop residue (remaining portions of the plants after harvest) on the surface of the ground, (tillage is when the soil and plant residue is turned so that the plants end up under a layer of soil); when plant residue becomes a ground cover such as in no-till, mulch till, and ridge till farming methods, the plants prevent soil erosion and protect water quality

crop rotation: rotating crops grown in a field from year to year; for example corn one year and soybeans the next year; legumes such as soybeans replace nitrogen in the soil that the corn has used; protects water quality by reducing the need to apply soil nutrients and chemicals

farm pond: a pool of water formed by building a dam or pit where water is collected in low-lying areas; protects water quality by collecting and storing runoff water

fencing: fences are constructed to keep animals away from waterways, streams, rivers and other water sources; protects water quality by preventing livestock from trampling plants and eroding the soil, and from depositing waste near water sources

filter: to remove solid particles (such as soil), impurities, etc. from a fluid (runoff water) passing through a porous substance or filtration device (plants); plants protect water quality because they filter or stop soil found in runoff water from entering water sources

hydrologic cycle: a continuous process involving the circulation of water from oceans into the atmosphere (evaporation into vapor), to the land (condensation into precipitation), and back to the oceans (water flow); the understanding of this process is important to the design of water quality protection practices or methods

manure storage: a structure built to safely contain manure until it has the best characteristics to spread on fields; protects water quality by preventing run-off from feedlots and allows time for the manure to contain the right characteristics for soil and plant absorption

nutrient management: a method of considering soil tests, last year's crop residue, and setting goals to determine how much and when nutrients such as animal manure, sludge, and chemical fertilizers are needed for the next crop; protects water quality by reducing the amount of excess nutrients that could flow into the water supply

pasture planting: a low producing pasture or field is planted with grass or legumes; a good crop of plants in a pasture protects water quality by slowing and filtering water and preventing soil erosion

pest management: scouting crops to determine type, stage of development, and damage from insects, weeds, and disease and then evaluating findings to develop a good plan to manage the pests; protects water quality by reducing runoff from the amount of chemicals applied to control the pests, integrated pest management uses insects and plants to control other damaging insects and plants also reducing the need for chemicals

planned grazing system: pastures are divided into smaller, fenced pastures or paddocks where livestock is moved between the paddocks on a schedule to allow plants to regrow and continue to provide nutritious livestock feed; protects water quality by providing a good cover crop and reducing trampling of plants and soil to stop erosion, distributes animal manure more evenly which provides nutrients for plant growth and prevents excess runoff

pollute: to make unclean, impure, or contaminated; pollutants affecting water quality include sediment, biodegradable wastes, plant nutrients, heat, chemical, and radioactive wastes; potential pollutants and pollution sources need to be identified in order to protect water quality in a watershed

precipitation: a deposit of rain, snow, sleet, hail, mist on the ground, also described by the amount of the deposit; the initial source of our water supply

runoff: the water, sediment, soil nutrients, chemicals, etc. that are not absorbed by the soil or plants so it runs off the ground where it fell or was applied; many of the practices described in this list protect water quality by capturing the runoff before it enters the water supply

sediment erosion: any matter, including soil, that is washed or blown from the ground into lakes, rivers or streams; it occurs naturally along river and stream banks or from ditches, especially in flooding, or people and equipment can cause sediment erosion from field work, construction, and mining; many of the practices or methods described here reduce sediment or soil erosion which is the largest water pollution problem in Iowa

soil or plant nutrient: a food resource that promotes growth of plants, agricultural examples include decayed plants breaking down in the soil, animal manure, human sewage, and commercial (manmade) fertilizers; farmers use management techniques to determine the appropriate amount and time to apply soil nutrients to protect water quality by reducing excess runoff

terrace: a raised, flat mound of earth with sloping sides constructed on a hillside, acts like a dam to stop or slow and guide the flow of water down the hill; protects water quality by slowing runoff and infiltration of water into the soil and plants

testing (soil testing and manure testing - separate tests): a representative sampling of soil or stored animal manure is collected and sent to a lab to determine the nutrient content; protects water quality by preventing over-application of nutrients on a field which could cause the excess to runoff into the water supply

watershed: an area including farms, cities, industry, and public land use that sheds or causes water to flow into streams, rivers, lakes, or wetlands; it is important to identify the water flow and land use in a watershed in order to design and incorporate a plan to protect water quality from all potential pollutants in the watershed

waterway: a natural drainage way where water runs off the land and flows to other water sources; it can be planted in sod; grassed waterways protect water quality by preventing soil erosion; and filtering and absorbing nutrients and chemicals before they reach the water supply

wetland: natural wetlands in Iowa include sloughs, potholes, and marshes found in lowlands that contain saturated soils and water-loving plants and may have standing water all or part of the year; they protect water quality in a variety of ways including filtration of runoff and surface waters, they can be used in sewage and animal waste treatment, and they reduce soil erosion and flooding

windbreak: rows of trees and shrubs planted to protect areas from wind; protects water quality by reducing sediment erosion caused by wind, especially along a farm field

woodland management: pruning and harvesting existing trees, planting new trees, removing debris to maintain ground cover and good root systems; improves water quality by reducing run-off and soil erosion and filters water, many Iowa farmers also manage woodlands

These definitions were adapted from *Conservation Choices*, Natural Resources Conservation Service, United States Department of Agriculture; *Where We Live*, Iowa State University Extension 4-H Food, Fiber, Environmental Science Program; and *Webster's New World Dictionary of the American Language.*

References:

Buffer strips and a windbreak reduce soil erosion from the crop field.

1 United States Environmental Protection Agency, "Protecting America's Public Health," Drinking Water Fact Sheet, EPA 816-H-02-001, January 2002

2 United States Environmental Protection Agency, Water Quality Fact Sheet, 2002

3 "Iowa Watershed Task Force Report," Iowa Department of Agriculture and Land Stewardship, Division of Soil Conservation, 2001

4, 6 United States Environmental Protection Agency, "Drinking Water and Health: What You Need to Know," Ground Water and Drinking Water Fact Sheet, EPA 816-K-99-001, October 1999

5 United States Environmental Protection Agency, "What Contaminants are Found in Drinking Water?," Ground Water and Drinking Water Fact Sheet, EPA 816-K-99-001, October 1999

7 United States Geological Survey, "A Primer on Water Quality," FS-027-01, 2001

8 "Wetlands Planned to Remove Nitrates from Water," Iowa Farmers: Stewards of the Land, Iowa Farm Bureau Federation, February 2002

9 "GPS Helps Put Manure Where it Counts," Agricultural Research, June 1998

10 "Iowa Pork Production Today - Industry Facts and Informational Points," Iowa Pork Producers Association, 2002

11 "Iowa a National Leader in Restoring Wetlands," Iowa Farmers: Stewards of the Land, Iowa Farm Bureau Federation, February 2002

12 "Iowa Farmers Leading Environmental Protection," Iowa Farmers: Stewards of the Land, Iowa Farm Bureau Federation, February 2002

13 "Farmer Efforts Cut Soil Erosion in Half," Iowa Farmers: Stewards of the Land, Iowa Farm Bureau Federation, February 2002

14 , 17 United States Environmental Protection Agency, Water Pollution Fact Sheet, 2002

15 "Iowa Agricultural Practices and the Environment," Iowa Association of Naturalists, September 1998

16 Federation of Animal Science Societies, "Facts on Biotech Crops - Impact on Meat, Milk and Eggs," Ref. 5798, September 2001

Web Sites:

Agricultural Research Service, **http://www.ars.usda.gov/**
Clean Water Through Conservation, EPA, **http://www.epa.gov/watrhome/you/intro.html**
Core4 Conservation for Agriculture's Future, Purdue University, **http://www.core4.org**
Earth 911, **http://www.earth911.org**
Faces of Agriculture, **http://www.facesofag.com/**
Iowa Department of Agiculture, **http://www.agriculture.state.ia.us/waterresource.htm**
Iowa Farm*A*Syst, **http://www.ifbf.org/farmasyst/**
Iowa Farm Bureau Federation, **http://www.agandenvironment.com**
Iowa Manure Management Action Group, **http://extension.agron.iastate.edu/immag/**
Iowa State Water Resources Research Institute, **http://www.water.iastate.edu/**
Iowa State University Extension, **http://extension.agron.iastate.edu/Waterquality/**
National Soil Tilth Laboratory, **http://www.nstl.gov/index.html**
Natural Resources Conservation Service (NRCS), **http://www.nrcs.usda.gov**
NRCS Buffer Strips Information, **http://www.nrcs.usda.gov/feature/buffers/**
Poultry Water Qualtiy Consortium, **http://www.poultryegg.org/PWQC/index.html**
Soil and Water Conservation Society, **http://www.swcs.org/**

Where We Live

Partially funded by the Iowa Department of Natural Resources (DNR) Resource Enhancement and Protection Fund.