

PREVIOUS PAGE Recirculating water in backyard

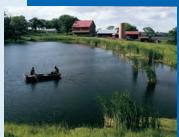
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(top) Landscaped backyard pond; (right) Fishing in farm pond; (left) Your "pond" may be as simple as a

On the farm

A properly located and maintained farm pond can help stop gully erosion and improve water quality. Ponds provide water for livestock, waterfowl, and fish; store water for emergencies; and add beauty to the landscape.

Wildlife use ponds for water and habitat. As one lowa farmer says about his pond, "I was always taught that one generation does for the next, and we thought leaving the land and water in better condition would be something good to leave to our children and grandchildren."



Also use **submerged pots** of water lilies, iris, spikerush, arrow-arum, duck potato, marsh marigold, and other native wetland plants. Natives are hardy and typically survive over winter in the backyard pond, unlike most non-native, tropical species.

Plants should cover 50 to 70 percent of the water surface. Set the plants 1 to 2 inches under water; the pots may need to be supported by submerged rocks or bricks. If you are using native plants, there is usually no need to fertilize them. For some exotic water lilies, limited fertilizing—once yearly—may be required. Check with your nursery on care of plants and how deep to place potted plants. Be aware that overfertilizing may cause unwanted algae blooms, which can rob the water of oxygen.

Add fish and scavengers

Consider stocking your backyard pond with fish. They are fun to watch, and help keep the pond free of unwanted insects. You'll also need scavengers, such as aquatic snails and tadpoles, to help control algae. In cold climates, a heater may be necessary for fish to survive the winter. Be aware that heaters can use large amounts of electricity.

For small visitors



Fill a small area with sand or gravel to create a shallow area where bees and butterflies can drink.

Safety

Locate the backyard pond where it is unlikely that unattended children or pets may be attracted to it. Check local safety ordinances to determine if a fence is required for the specific depth and size of your pond. Check local building ordinances for depth and safety restrictions and permits. Equip outdoor outlets with a ground-fault circuit interrupter.

More help

Your local nursery, landscaper, or other supplier can give you more information on the step-by-step process of building a backyard pond, selecting and establishing suitable plants in and around it, and landscaping.

Wetlands filter excess nutrients, chemicals, and sediment, and provide habitat for a host of interesting creatures.





In your backyard

any yards can support a backyard wetland that benefits you and your community. Letting runoff from your roof, parking area, and lot slowly filter through a mini-wetland helps prevent pollution of neighboring creeks and may help prevent flooding.

Where to put a wetland

Low areas that remain wet or damp much of the year are the easiest places to establish wetlands. Any **depression that collects rainwater** or runoff from downspouts, or serves as the path of drainwater leaving your yard, is an excellent spot to **plant wetland plants.** You'll create a backyard wetland area that will be very **low maintenance.** There will be no more "bogged down" lawn mowers because no mowing will be needed! The area will attract wildlife and filter the water draining off your property. If you do not have an appropriate natural site, you can create a wetland the same way you would a backyard pond. Do not put excess fertilizer or pesticides on your lawn or other areas feeding your wetland.

How to build a wetland

Partially blocking an existing drainage way or digging a shallow basin may be all you need to do if you have clay soil that naturally holds water. In better drained soil or where you want your wetland to stay wet most of the time, you can dig a shallow depression and bury a plastic liner as you would to create a backyard pond. How long the area stays flooded or wet during the growing season is key to the types of plants to use. If runoff will not naturally keep the area wet enough, you will need to have a supply of water available for occasional use.



Previous Page Wetland plants in low area between buildings.

THIS PAGE (top) Wet area below a spring grows wetland plants; (right) Common Yellowthroat, male; (bottom) Restored prairie pothole wetland.



Important! Because of the variety of potential conditions that you can create, and the potential side-effects of blocking drainage ways, you should always consult an expert before starting a wetland project.

What to plant

A wide variety of attractive plants can grow in wet areas. Cattails and many varieties of reeds thrive in the open sun and are easy to care for. Many species are not harmed by long dry periods during the summer. Cardinal flowers, sweet flag, and pickerel weed thrive in wet areas. Trees and shrubs like black gum, water oak, red-osier dogwood, button bush, and sweet pepper bush add texture, color, and beauty to any landscape, and are adapted to poorly drained soil. A variety of attractive ferns, skunk cabbage, and Jack-in-the-pulpit grow well in wooded wetlands that

are damp and shaded. If you create bog conditions of permanently damp organic soil, you can grow native orchids, Venus flytrap, and sundew.

Wildlife in your wetland

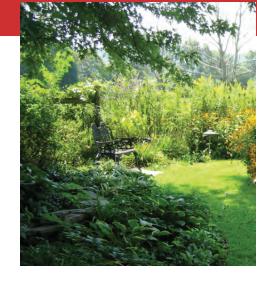
Many birds and small animals will quickly start using your wetland. Usually frogs, toads, salamanders, and aquatic insects will find your wetland during the first spring. A deep, permanent pool in the wetland can support native frogs, toads, and possibly fish that will eat mosquito larva and other insects. Most frogs and toads need spring pools in which to breed; their tadpoles need shallow water for several weeks while they mature. Wetlands that dry out in the summer can support a variety of plants and wildlife and will not produce mosquitoes.

On the farm

Wetlands filter excess nutrients, chemicals, and sediment from runoff, keep ground water pure, hold back flood waters, provide habitat for migratory birds and local wildlife, and add beauty to the landscape. Across the country, many farmers are restoring wet areas in cropland and pasture to fully functioning wetlands that benefit their land and the environment.



Composting turns household wastes into valuable fertilizer.





In your backyard

ll organic matter eventually decomposes. Composting speeds the process by providing an ideal environment for bacteria and other decomposing micro-organisms. The final product, humus or compost, looks and feels like fertile garden soil. This dark, crumbly, earthy-smelling stuff works wonders on all kinds of soil and provides vital nutrients to help plants grow and look better.

Decomposing micro-organisms need four key elements to thrive: nitrogen, carbon, moisture, and oxygen. For best results, mix materials high in nitrogen (such as clover and fresh grass clippings) and those high in carbon (such as dried leaves and twigs). If there is not a good supply of nitrogen-rich material, a handful of general lawn fertilizer will help the nitrogen-carbon ratio. Moisture is provided by rain, but you may need to water or cover the pile to keep it damp. Be careful not to saturate the pile. Oxygen is supplied by **turning or mixing** the pile. More turning yields faster decomposition.

Getting started

Many materials can be added to a compost pile, including leaves, grass clippings, straw, woody brush, vegetable and fruit scraps, coffee grounds, livestock manure, sawdust, and shredded paper. Avoid using diseased plants, meat scraps that may attract animals, and dog or cat manure, which can carry disease.

Composting can be as simple or as involved as you would like, and depends on how much yard waste you have, how fast you want results, and the effort you're willing to invest.

Cold composting



With cold composting, you can just pile grass clippings and dry leaves on the ground or in a bin. This method requires no maintenance, but you'll have to wait several months to a year for the pile to decompose. Cold composting works well if you're short on time or have little yard waste. Keep weeds and diseased plants out of

the mix. Add yard waste as it accumulates.



Previous Page
Nutrient-rich compost

THIS PAGE (top) A healthy backyard; (top right) Finished compost; (bottom right) Finished compost showing crumbly structure; (bottom) Manure storage tank.

Hot composting

Hot composting requires more work, but with a few minutes a day and the right ingredients you can have finished compost in a few weeks. Hot piles must be built all at once in a 4- to 5-foot cube and turned regularly. As decomposition occurs, the pile will shrink. A 3-foot cube is needed to maintain necessary heat. Hot piles can reach 110 to 160 degrees Fahrenheit, killing most weed seeds and plant diseases.

- On a level site, lay down bricks or prunings to promote air circulation.
- Spread several inches of the high-carbon material, then mix high-carbon and high-nitrogen material together. Water periodically.
- Punch holes in the sides of the pile for aeration.
- The pile will heat up and then begin to cool. Start turning when the pile's temperature begins to drop.

Move materials from the center to the outside and vice versa. Turn every day or two and you should get compost in less than 4 weeks. Turning every other week will give compost in 1 to 3 months. Finished compost will smell sweet and be cool and crumbly to the touch.



Steven J. Saffier



Steven J. Same

On the farm



Like composting, waste management on the farm turns a potential waste into a resource that saves money and helps the environment.

Producers use livestock manure to fertilize crops. When manure is properly handled, it can be safely applied to the land without the risk of polluting water.

Composting is also practiced in some poultry operations. The compost is used as fertilizer on the farms and for lawns and gardens.

Mulching cools, protects, and enriches the soil.

In your backyard

ulching involves placing a layer of organic material around plants. As mulch decomposes, it adds organic matter to the soil. This provides important nutrients for plants and an ideal environment for earthworms and other organisms that help **enrich the soil.**

Mulching can recycle yard wastes and improve your soil. Mulch **protects soil from erosion**, prevents weed growth, conserves soil moisture, stabilizes soil temperature, reduces compaction, and keeps clean and dry any fruit or vegetable that touches the ground.

Mulch materials

The best place to look for mulch materials is in your own yard. **Grass clippings and leaves** work well for mulching if they are dry and weed free. Avoid adding clippings to your vegetable garden from lawns that have been treated with weed killer within the last two mowings. If you live near farming areas, you may be able to get old hay from a farmer or feed store.

Compost makes an excellent organic mulch material. It adds nutrients to the soil and has a natural appearance. Wood chips and bark work well around trees and shrubs and make attractive walkways through gardens.

Applying mulch

Apply mulch when plants are established and soil is warm. First, water your garden well. Then place a layer of mulch around the plants. Thickness of the mulch layer varies for each material:

Dry grass clippings 2 inches
Shredded hardwood mulch,
straw, or wood chips 2 to 4 inches
Compost 3 to 4 inches
Dry leaves 6 inches



June Davidek, USDA

You will help insulate the root zone and lower evaporation rates if you liberally apply mulch. Be careful not to smother the plants. As the mulch breaks down, add more material to the top throughout the growing season. After harvest, **work the mulch into the soil** to integrate the organic matter, or leave it on the surface to **decay naturally** and be carried into the soil by earthworms.

On the farm

Leaving the previous year's crop stubble on the soil surface is called conservation tillage.



This practice helps keep wind from blowing soil particles and helps stop rain from washing soil away. Also, research is showing that leaving crop residues helps hold carbon in the soil and aids in reducing greenhouse gases. This practice is often used in combination with other conservation measures such as wind strips or contour farming.

Apply only those nutrients the plants can use.

In your backyard

utrients are essential for good plant growth, but overapplying nutrients is not good for plants or for the environment. Excess nutrients leach through the soil and end up in ground water, or run off into storm sewers and end up

choking a lake or stream.



The three primary plant nutrients are nitrogen, phosphorus, and potassium. Generally, nitrogen promotes top growth, phosphorus helps develop stronger roots and more flower and fruit production, and potassium builds durability and disease resistance.

Remember to **consider native plants** or others with low fertilizer needs.

Soil test is key

The key to good nutrient management on the farm and in your backyard is a reliable soil test. Without a soil test, you could be applying too much, too little, or the wrong nutrients. You'll want a separate soil test for your lawn and for your garden.

Commercial soil test kits are available at nurseries and lawn and garden suppliers. Ask for information on how to take your soil samples. Apply **only the nutrients needed** according to the soil test, and at the right time. Never exceed the recommended rate.

Fertilizing lawns

- Use slow-release nitrogen fertilizers.
- Mow often, and leave grass clippings on the lawn for fertilizer.
- Be careful not to spread fertilizer on sidewalks and driveways.
- Be sure to calibrate your spreader correctly.

Fertilizing gardens

- Use compost to enhance or replace fertilizers.
- Choose a level site, or terrace the garden, to avoid runoff and erosion.
- Place fertilizer near plants rather than broadcast it over the entire garden.
- Add organic matter to the soil by using manures and organic fertilizers at a conservative rate.



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On the farm

Previous Page (top) Applying shredded mulch; (bottom) Soybeans growing through corn residue.

THIS PAGE
(top right) Using soil test
kit in yard; (bottom)
Testing soil on the farm;
(top left) Curbside runoff
drains to lake.

Agricultural producers sample soils for nutrient needs. As technology becomes available and affordable, more producers are varying fertilizer rates within each field, depending on soil test results. This precision farming method places the correct amount of fertilizer where it is needed. Applying only those nutrients plants can use improves the farm economically and environmentally.



Terracing makes flower and vegetable gardening possible on steep slopes.

In your backyard

erraces can break your backyard into several minigardens. On steep slopes, terracing can make planting a garden feasible. Terraces prevent erosion by shortening the long slope into a series of shorter, more level steps. This allows heavy rains to **soak in rather than run off** and cause soil erosion.

Materials for terraces

Building terraces is like building a staircase. The material you use to make the face of the stair may be treated lumber—such as railroad ties, poles, or posts—or bricks, rocks, concrete blocks, or similar materials.

Height of walls

The steepness of the slope often dictates wall height. Make the terraces in your yard high enough so the land area between them is **fairly level**. Be sure the terrace material is **strong** enough and **anchored well** enough to stay in place through freezing and thawing, rainstorms, and so forth. Large projects, such as retaining walls, may require a professional design and specialized assistance and equipment. Be sure to **check local building codes** regarding the installation of high walls, and **work safely**.

Erosion control is a consideration

Heavy rains can cause erosion between terraces, and create small gullies if water concentrates as it goes over a terrace. To help prevent erosion, **add mulch or other good ground cover** on land between terraces.



Ron Nichols, USD

On the farm

Terraces catch runoff water, let the water soak into the ground, and deliver the excess safely to the bottom of a hillside —much like eavespouts on a house. The earthen ridges built around a hillside on the contour cut a long slope into shorter slopes, preventing water from building to a highly erosive force.



Gene Alexander, USE

Some terraces are seeded to grass, which provides erosion control and a nesting area for birds. Terraces are often used in combination with other conservation practices to provide more complete soil protection.

Drip irrigation and other water conservation practices can save water and money.

In your backyard

f you rely on watering to make your lawn grow and your garden productive, consider a more efficient system. There are several ways to improve the use of water.

Use water again

When it rains, if no water recycling system has been planned, the water that runs off your house keeps on going to the storm sewer. By saving that water, and reusing it on your garden or lawn later, you save energy and water.

A simple recycling system directs water from eavespouts to a storage barrel. You fill a bucket with water from the storage barrel and carry the water to your garden. This is a simple and effective system. However, you may want a more elaborate method of capturing and distributing rain water.

Watering to save energy



Whenever practical, water in the early morning. In arid climates, it's okay to water in the evenings and at night. You'll lose less water to evaporation than if you watered in the middle of the day, and the plants are less stressed and can take up the water more efficiently.

Mulch or fiber cloth preserves soil moisture. You can find supplies and information at a nursery or hardware store.

Consider planting native species. They usually use little or no water beyond normal rainfall.

Drip irrigation benefits

A drip irrigation system will provide water directly to the plant. You can control the flow to each plant.



(top) Terraced flowerbeds; (bottom) Farming grassed terraces on the contour.

THIS PAGE

(top) Drip irrigation in vegetable garden; (bottom) Efficient drip irrigation on the farm.

Drip irrigation ranges from inexpensive soaker hoses to elaborate computerized systems. There may be an up-front investment, but you'll use less water and have better water distribution.

Garden or hardware stores will have the supplies you need. You may even want to engineer your own system from a garden hose. Be sure not to overapply fertilizer when using a drip sys-

On the farm

Drip irrigation, commonly used on fruits and vegetables, minimizes the amount of water that evaporates, and it maximizes the amount that is used by plants. By placing the water directly on the plant, or next to it, less water evaporates and less is wasted on bare soil.

High-efficiency irrigation systems for row crops



use less energy to pump water and, since they spray water downward, less water evaporates before it reaches the crop. Farmers implement other water management practices to reduce the amount of water used to produce a crop.

Early detection and treatment of pests means a healthier growing environment.





In your backyard

ood planning can put you a step ahead of unwanted insects, weeds, and diseases. Healthy, vigorous plants minimize pest damage.

Regular monitoring of your lawn or garden is the best way

to stay on top of potential plant health and pest problems. If you see minimal damage, it is often easiest to just tolerate it and continue monitoring. If pests begin to cause serious damage, there are a number of treatment methods.



Preventing pests

- Plant disease- and pest-resistant species.
- Select a variety of hardy plant species and space them properly.
- Select plants that bloom and bear fruit at different times of the year.
- Plant flowers, herbs, and vegetables together and change the location of annuals every year to prevent buildup of certain pests.
- Clean up plant litter and remove weeds before they go to seed.
- Add bird and bat houses to the garden.
- Provide habitat for beneficial insects that prey on pests.
- Water and add nutrients properly to increase plant vigor.

Physical pest control



- Remove insects by hand.
- Wash pests away using a spray nozzle.
- Set traps.
- Make physical barriers around plants, such as a wire mesh fence partially sunk into the ground for rabbits, aluminum foil wrapped around vegetable plants for cutworms, and solid barriers to prevent weeds from invading flower beds or vegetable gardens.

Beneficial insects

Having the right insects in your garden or backyard can keep pests and weeds in check. Beneficial insects, such as ladybugs, assassin bugs, and praying mantises, prey on insects that can harm your plants. The following insects can help control pests in your backyard.



Previous Page (top left) Aphids; (bottom left) Spot spraying dandelion.

THIS PAGE (top)
Ruby-crowned
Kinglet;
(bottom)
Scouting a
farm field.

- Ladybugs and lacewing larvae for controlling aphids and a wide variety of other insects.
- Praying mantises for controlling many insects.
- Seedhead weevils and other beetles for controlling weeds.
- Predatory mites for controlling pest mites, thrips, and many others.
- Ground beetles for controlling caterpillars that attack trees and shrubs.

Chemical controls

If the methods listed above fail to solve your pest problem, use chemicals of **low toxicity** and **rapid decomposition**. Always read the label, **follow directions**, wear protective clothing, and spot-spray. Some of these chemicals are:

- Pesticidal soaps for aphids, scale crawlers, whiteflies, and thrips.
- Insecticidal dusts for aphids, beetles, fleas, ticks, ants, and crickets.
- Horticultural oils for aphids, mites, leafhoppers, mealybugs, scales, plant lice, and mosquito larvae.
- Botanicals for leafminers, fleas, and ticks.

Before you apply pesticides, make sure that they will not harm beneficial insects or be hazardous to humans, pets, or wildlife.

Living in harmony with wildlife

In some instances, practices described in this book could attract unwanted wildlife, or more of a species than is desirable. If you have problems with any wildlife species, most nurseries or garden stores and the organizations listed in the "Where To Get Additional Assistance" section at the back of this book can provide information on preventing or controlling them. The government agencies listed can provide information on Federal and State regulations regarding protection of wildlife species. Equipped with the right information and tools, most people are able to solve their own problems and live in harmony with wildlife.

On the farm

Proper pest management on the farm involves a variety of practices, like rotating crops to reduce disease and insect problems, and establishing tall grass hedges to provide habitat for beneficial insects. Most farmers now monitor their fields regularly, a practice called "scouting," to keep track of insect and weed populations. Only when populations reach a level where an unacceptable amount of damage is likely are direct control measures initiated.

When pesticides are necessary, farmers fill and clean tanks away from water sources, mix



only necessary amounts, and apply only to land where problems exist.

Backyard practices can be used in shared spaces and public places, too.

In your school or community

ven if you don't have a backyard of your own, there are many opportunities to use the practices in this book to contribute to a healthy environment. Backyard ponds, wetlands, native grass plantings, and plants that attract wildlife can improve school grounds, areas around apartments and businesses, community gardens, parks, and other community areas.

Consider starting a backyard conservation project in your community. Any vacant lot or unused space is a candidate for improvement with natural plantings. A community garden can be a source of pride as well as a source of food. A garden also can be a hands-on teaching center for natural resource conservation concepts.

Businesses often sponsor community improvement projects in cooperation with schools and civic organizations, which contribute labor.















Ways to promote backyard conservation in your neighborhood

- Encourage public officials to practice backyard conservation on parks and other public property.
- Plan projects in cooperation with neighboring property owners.
- Encourage community involvement.
- Encourage your building owner to use backyard conservation practices on the grounds around the building.
- Encourage school classes and other organizations to become involved in planning and caring for the areas.



Jim Archambeaul



Previous Page (top) Restored community wetland; (center) Rufous Hummingbird, male; (bottom) Urban community garden.

This Page

(top left) Planting to enhance community areas; (top center) Eastern Bluebird, female, feeding young; (top right) Mulch of grass clippings on vegetable garden; (bottom right) Arboretums and parks foster interest in gardening, horticulture, and environmental issues; (bottom left) Fun and learning in a school garden.



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Additional information on backyard conservation is available on the Web at http://www.nrcs.usda.gov/backyard. For more information on the following topics, please contact the organizations listed below:

WHERE TO GET ADDITIONAL ASSISTANCE

Audubon At Home

For information on creating healthy habitats in your backyard and beyond, visit http://www.audubon.org and click on Audubon At Home. To find your nearest Audubon chapter or center, click on States, Centers & Chapters. For more information, write to audubonathome@audubon.org

Backyard conservation practices

- Bat Conservation International 512-327-9721 http://www.batcon.org
- Wildlife Habitat Council 301-588-8994 E-mail: whc@wildlifehc.org http://www.wildlifehc.org
- Your local USDA Service Center (listed in your phone book under U.S. government, Department of Agriculture)
- USDA Natural Resources Conservation Service 202-720-3210 http://www.nrcs.usda.gov
- USDA Farm Service Agency 202-720-9563 http://www.fsa.usda.gov

Backyard Wildlife Habitat

National Wildlife Federation Backyard Wildlife Habitat Program 703-438-6000 http://www.nwf.org/ backyardwildlifehabitat/

Developing and managing wildlife habitats and controlling unwanted wildlife

■ Your State fish and wildlife agency (listed in your phone book under State government)

- International Association of Fish and Wildlife Agencies 202-624-7890 www.iafwa.org
- The Wildlife Services office nearest you (listed in your phone book under U. S. government)
- USDA Animal and Plant Health Inspection Service 301-734-7921 http://www.aphis.usda.gov

Horticulture, wildlife, urban forestry

- Your local extension office (listed in your phone book under local government)
- A land-grant university
- Cooperative State Research, Education and Extension Service, USDA http://www.csrees.usda.gov
- National Arbor Day Foundation 888-448-7337 http://www.arborday.org
- USDA Forest Service http://www.fs.fed.us 202-205-8333
- Your State forester (listed in your phone book under State government)

Locally-led conservation initiatives

- Your local conservation district (listed in your phone book under county government)
- National Association of Conservation Districts 202-547-6223 http://www.nacdnet.org

Pollinators, bee gardens

- North American Pollinator Protection Campaign 415-362-1137 http://www.pollinator.org http://www.nappc.org
- International Sonoran Desert Alliance http://www.isdanet.org
- University of California, Berkeley http://nature.berkeley.edu/urbanbeegardens
- USDA-ARS Carl Hayden Bee Research Center http://gears.tucson.ars.ag.gov

Restoring and protecting wildlife habitat

- Your local U.S. Fish and Wildlife Service office (listed in your phone book under U.S. government, Department of the Interior)
- U.S. Fish and Wildlife Service http://www.fws.gov

Watersheds, oceans, and wetlands protection

■ U.S. Environmental Protection Agency http://www.epa.gov/owow/ Wetlands Helpline: 1-800-832-7828 Safe Drinking Water information: http://www.epa.gov/safewater

Other sources of information

- Local garden centers
- Landscapers
- Garden clubs
- Native plant societies











FRONT COVER (top) Contour stripcropping, Tim McCabe, USDA; (center) Cedar Waxwing, © Tom Munson

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