




Mission Statement: To conserve, maintain, protect, and restore the soil, forest, water, and other natural resources of the United States and other lands; to promote means and opportunities for the education of the public with respect to such resources and their enjoyment and wholesome utilization.

<http://www.iwla.org/index.php>



Watershed Stewardship Action Kit

A Series of Fact Sheets Displayed in a Folder

by The Izaak Walton League of America

\$10.95 Folder

The kit is designed for volunteers, students, and landowners who want to make a difference in their communities. The kit covers watershed ecology, water quality problems, and actions individuals and groups can take to conserve watersheds. Educational fact sheets address stream and wetland ecology, water monitoring, and federal regulations. Action fact sheets teach the reader to organize watershed cleanups, reduce water usage at home, survey watersheds, and monitor water quality. Use this resource to start your own watershed stewardship projects or to teach others about the importance of water conservation. **To order visit the website below:**

<http://www.mwpubco.com/titles/iwlaactionkit.htm>

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Note: The entire contents of the action kit are not included.



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"WATER IS THE MOST CRITICAL RESOURCE ISSUE OF OUR LIFETIME AND OUR CHILDREN'S LIFETIME. THE HEALTH OF OUR WATERS IS THE PRINCIPAL MEASURE OF HOW WE LIVE ON THE LAND."

- Luna Leopold

WATERSHED STEWARDSHIP ACTION KIT

Understanding Your Watershed

The Vital Link Between Land Uses and Water Quality



WHAT IS A WATERSHED?

A watershed is the area of land and air that drains into a particular water body. A good way to understand watersheds is to think about what happens to one drop of rain when it lands on the ground. It could fall on a paved surface and run into a storm drain, through a pipe and into a stream. Or it could soak into the earth, become ground water, and slowly make its journey towards a wetland or river. A watershed can be large like the Mississippi River, which drains more than a million square miles of land from 33 states and two Canadian provinces, or as small as a few acres.

To locate your watershed, refer to the "Watershed Survey" factsheet in this publication.

HOW ARE LAND USES AND WATER QUALITY LINKED?

Any activity that occurs on the land can affect water quality because any pollutant on land or in the air can wash into waterways when it rains. Different land-uses have the potential to cause different types of water quality degradation. For example, rain that washes over your yard may pick up excess fertilizers and pesticides and carry them into your local water body. This may also happen on a farm. When rain washes over driveways, roofs, and streets, it can pick up oil, rubber and other residues. On hot days, these paved surfaces heat up rain runoff that can then enter a waterway and cause elevated water temperatures.

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Once you have determined whether or not your waterway is degraded, an inventory of land uses within the boundaries of your watershed will help you locate potential sources of degradation. Refer to the "Watershed Survey" factsheet in this publication for information about conducting a land-use inventory.

SOURCES OF POLLUTION: POINT AND NONPOINT

When asked to picture pollution entering rivers, most people think of discharge pipes from factories spewing foul-smelling chemicals into the water. Factory discharge pipes also are known as point sources of pollution because they come from a single source. Point sources of pollution threaten the health of rivers and are subject to federal regulations under the Clean Water Act. The National Pollution Discharge Elimination System (NPDES) requires factories and other point source dischargers to obtain permits and adhere to standards. Since its enactment, the Clean Water Act has been directly responsible for removing more than 1 billion pounds of toxic chemicals per year and more than 6 billion pounds of oxygen-depleting pollution from wastewater each year.

The major threat to today's water quality is pollution without an easily identifiable source, or nonpoint-source pollution. Nonpoint-source pollution accounts for more than half of all surface water pollution. We all contribute to nonpoint-source pollution. Using fertilizer and pesticides on our lawns, failing to clean up after our pets, and washing our cars are all activities that cause nonpoint-source pollution. Every time it rains or snows, natural and man-made pollutants on the land are washed into streams and wetlands with the storm water. These pollutants include pesticides, fertilizers, metals, manure, road salt and motor oil that originate from farms, lawns, paved surfaces, landfills and home septic systems. In addition, air pollutants contaminate rain water.

Another significant contributor to nonpoint-source pollution is soil erosion. Although erosion is a natural process, an unnatural acceleration of this process may be caused by construction sites, dirt roads, and

other land disturbances. In fact, according to the Environmental Protection Agency, eroded soil is the most widespread pollutant in rivers. Other possible sources of sediment pollution are cropland, surface mines, overgrazed pastures, landfills, logging operations and other activities that produce areas of bare soil. The texture of the soil and its potential for absorbing water, the steepness of the slope and the adequacy of protective ground cover are all factors that influence the extent of erosion.

Nonpoint-source pollution can degrade a stream quickly by introducing organic and inorganic pollutants that bury streambeds, decrease oxygen and negatively affect aquatic life. Nutrients, such as nitrogen and phosphorus, that enter streams through storm water runoff, cause excess algae growth in streams, lakes, wetlands and estuaries. When the algae dies, it decomposes, depleting dissolved oxygen required by fish and other aquatic organisms. Erosion of sediment into a stream can smother aquatic life and clog the gills of fish as well as diminish light that underwater plants need to grow. Bacteria washed into streams from septic tanks and animal waste runoff can make aquatic organisms and humans sick.

Nonpoint-source pollution problems are increased in urban and suburban areas because paved surfaces cause runoff to occur faster and in greater quantities. In a healthy and functioning watershed, pollutants are absorbed and filtered by soil and vegetation before they can reach waterways. Paved roads, parking lots and rooftops are called impervious because water is



unable to penetrate these surfaces to reach the soil beneath them. In many urban areas, storm water rushes over pavement, collecting nonpoint-source pollution. This water then flows into a storm drain and shoots through an outfall pipe directly into the stream. This high volume of storm water can erode streambanks, thus increasing the problem of sediment pollution downstream. New construction sites can also lead to sediment pollution if steps are not taken to prevent erosion of exposed soil. Impervious surfaces also cause thermal pollution because rainwater flows over hot pavement before entering the stream. As urban sprawl becomes the norm, nonpoint-source pollution becomes more and more difficult to address.



The Clean Water Act also regulates nonpoint-source pollution. For more information about the legislation and how you can participate in the regulatory process, refer to “Understanding and Using the Clean Water Act” in this publication. In addition, there are many actions you can take, both as an individual and as a part of your community, to prevent nonpoint-source pollution and to alleviate its effects on local waterways. There are choices we make every day that can affect the amount of nonpoint-source pollution entering our streams. This action kit can help you become a watershed steward by providing the tools to diagnose watershed problems and take action to improve the health of your watershed.

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AT SOME POINT, THE WILL TO CONSERVE OUR NATURAL RESOURCES HAS TO RISE UP FROM THE HEART AND SOUL OF THE PEOPLE – CITIZENS THEMSELVES TAKING CONSERVATION INTO THEIR OWN HANDS AND, ALONG WITH THE SUPPORT OF THEIR GOVERNMENT, MAKING IT HAPPEN.

– Mollie H. Beattie,
former Director,
U.S. Fish and
Wildlife Service

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WATERSHED STEWARDSHIP ACTION KIT

10 Steps to Cleaner Water



1. EDUCATE YOURSELF.

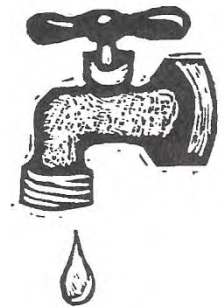
- Learn the characteristics of a healthy watershed and the functions and values of streams and wetlands.
- Learn how sediment, suspended solids, pH, nutrients, pesticides, metals, oil, and other potential pollutants harm local waterways.
- Gather information about how these pollutants may be affecting your watershed at your local library and on the Internet.
- Contact your state for copies of reports assessing the water quality of state rivers and wetlands. Your state may have a variety of pamphlets about river and wetland protection, habitat improvement, erosion control measures, volunteer organizing, and local environmental conservation laws.
- Check the Izaak Walton League's online resource list at www.iwla.org/sos/resources/.
- Research existing government and nonprofit programs and inform your local community and conservation groups about them.

2. CHANGE YOUR BEHAVIOR.

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Find out how you can conserve water by making small changes in your everyday behavior. Here are some tips:

- Fix leaky faucets.
- Install low-volume toilets or reduce the volume of your existing toilets by placing water-filled plastic bottles in the tanks.
- Find and repair toilet leaks. To check for leaks, put food coloring in the tank. If colored water appears in the bowl after 30 minutes without flushing, there is a leak.
- Do not run water continuously while brushing teeth, shaving, or washing dishes.
- Only run dishwashers and clothes washers when there is a full load.
- Take shorter showers.
- Install a water-conserving showerhead.
- Consider not using garbage disposals because they consume large amounts of water and add organic materials to sewage treatment systems.
- Landscape your home with native trees, shrubs, and flowers that do not need to be watered or fertilized.



- If you need to water plants, use drip irrigation or soaker hoses. Capture rainwater from rooftops in rain barrels and use it to water plants.
- Ask your state cooperative extension office for help in testing your soil to make sure you use the right amount of fertilizer. Excess fertilizer washes into streams when it rains, which may cause algae growth and reduced levels of dissolved oxygen.
- Take used motor oil to a recycling center or a gas station that recycles it. Oil poured down drains goes into streams, and oil thrown away in the trash may leach from sanitary landfills to contaminate ground water.
- Do not pour household chemicals such as paint or cleaners down drains, storm drains, or on the ground. Better yet, select household cleaning products with low toxicity or pick a non-toxic alternative (see table).
- Participate in local programs for hazardous household waste disposal.
- Inspect septic systems annually and pump them out every three to five years.
- Clean up after pets and dispose of wastes in the trash or toilet.

3. BECOME A WATCHDOG FOR LOCAL WATER RESOURCES.

To be an effective watershed steward, you need to stay informed about the laws designed to protect our nation's water resources. Familiarize yourself with the Clean Water Act, which has provisions for citizen protection of rivers and wetlands, such as citizens' suits against polluting industries and citizen involvement in the permit review process. For more information on the Clean Water Act, see the fact sheet "Understanding and Using the Clean Water Act" in this kit. On a local level, you should also educate yourself about how particular industries might be affecting your watershed. All industries discharging wastewater into a waterway must have a National Pollution Discharge Elimination System (NPDES) permit, which regulates the type and amount of wastes allowed in industrial discharge. Contact your state's water-quality agency and get on its mailing list for permit review. Make comments on any permit applications that appear for your watershed, and encourage the use of alternative technologies that produce less pollution. Obtain copies of the permits already issued that affect your local stream. If you

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ALTERNATIVES TO HAZARDOUS HOUSEHOLD CHEMICALS

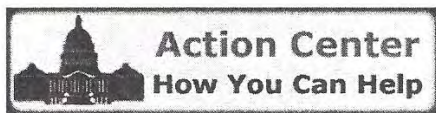
Household Chemical	Environmentally Friendly Alternative (s)
Ammonia-based cleaners	Vinegar, salt and water
Abrasive cleaners	•Lemon dipped in borax •Salt and baking soda
Furniture polish	Lemon juice and olive oil
Toilet cleaner	Baking soda
Oven cleaner	Liquid soap, borax, and warm water
Disinfectants	Water and borax
Drain cleaners	Boiling water, baking soda, and vinegar
Upholstery cleaners	Dry cornstarch
Mothballs	•Cedar chips •Lavender flowers
Plant insecticide	Soap and water
Silver polish	Soak in water, salt, baking soda, and a piece of aluminum
Window cleaner	White vinegar and water

detect a permit violation in the field through water quality monitoring, document the problem and report it to your state's water-quality agency. A failure to comply with permit requirements is a violation of the Clean Water Act and is subject to enforcement and fines.

Permits also are required to fill in or destroy wetlands. Citizens can provide comments about applications for permits to alter wetlands and can report violations of wetland law. Regulatory agencies are unable to discover and address every wetland violation that occurs. Citizen complaints often trigger enforcement actions. You can ensure that you are notified of permit applications in your area by contacting the Army Corps of Engineers office in your state.

4. ADVOCATE FOR BETTER WATERSHED CONSERVATION LAWS.

National and local regulation provide an excellent avenue for conserving the country's watersheds. For example, under the Clean Water Act, factories and other industries that discharge waste into waterways are required to apply for a permit and comply with certain standards or face steep fines or imprisonment. To keep current watershed conservation laws in place and to pass better laws, constituents need to tell their elected officials that clean water is an important issue. For more information on national watershed policy, advocacy tips, and action alerts on the most current conservation policy opportunities, please visit the League's Web page at www.iwla.org and click on "Take Action." This site also provides an easy way to send messages to members of Congress and to keep track of their votes on important conservation issues. In addition to advocating for better regulations on a national basis, you should get involved locally. Attend public hearings on watershed conservation issues. Present information about the importance of local water resources to planning commissions and local elected officials. For more information on getting started with local advocacy, contact the League.



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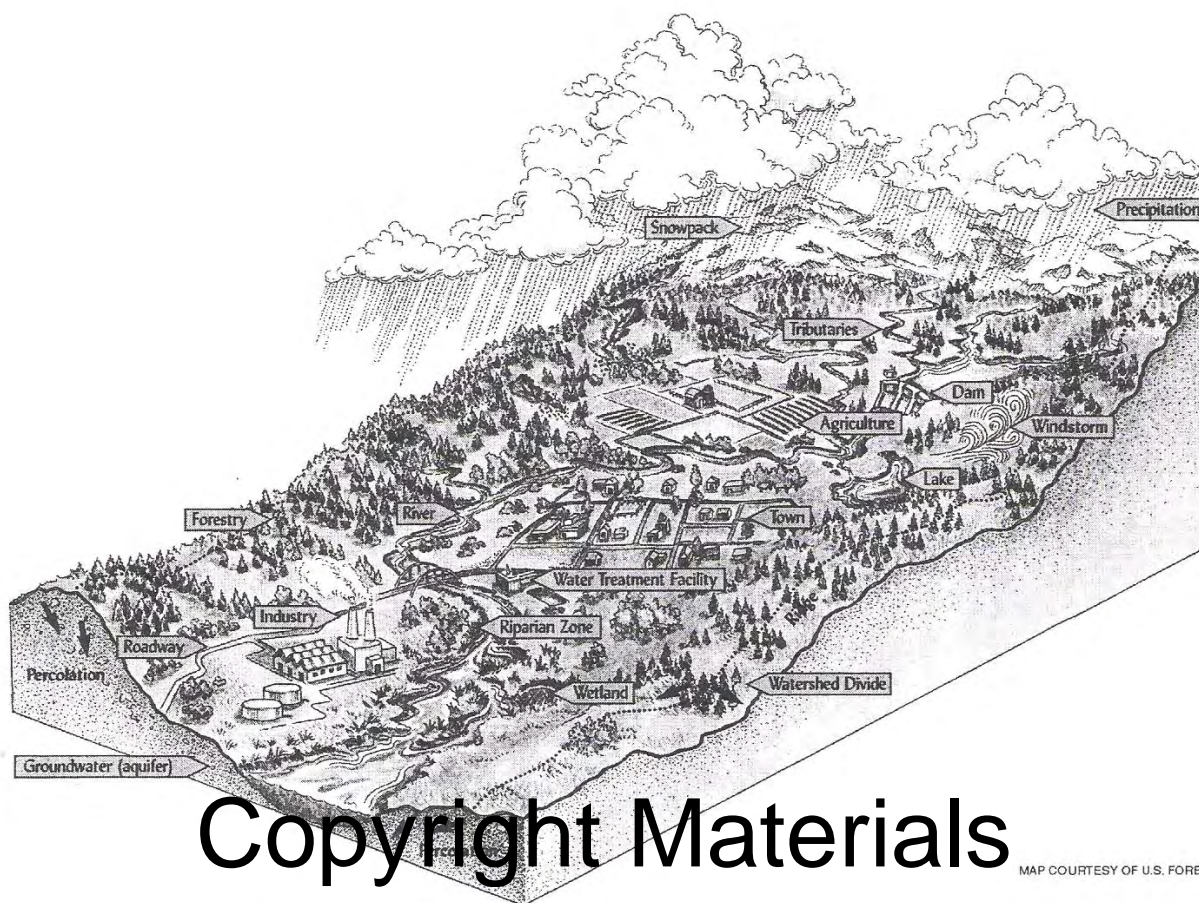
5. JOIN AN EXISTING WATER CONSERVATION GROUP OR FORM A NEW GROUP.

Join a local Izaak Walton League chapter or a local watershed association. If there are no chapters or associations in your community, you may want to form a new League chapter or watershed group. There are many steps involved in getting started, but the first may be to find the right leader. The backbone of an organization is a strong leader, who should have enough time to devote to overseeing a project. This individual should be able to find the right people to fill various roles within the group and then be able to follow through in a supportive way to ensure that the work gets done. For more information on starting a group, refer to the factsheet "A Guide to Watershed Cleanups" in this kit.

Remember to work with other interested groups. All waterway conservation efforts can benefit from additional funds, volunteers, publicity, materials, technical knowledge, and other resources. Begin making a list of all the resources available to keep your project going. Survey your community for talent. Izaak Walton League chapters, other conservation organizations, civic associations, garden clubs, Boy and Girl Scout troops, government agencies, local corporations, universities, volunteer service corps, and many other groups can help. Many retired people have good backgrounds in natural sciences and can help with stream monitoring programs, water quality testing projects, fish and wildlife habitat areas, or legal and technical advice. Your city council, chamber of commerce, Conservation Corps, Junior League, or parks department might be able to donate equipment or funds. Approach local corporations and businesses for volunteers, project sites, funding, and in-kind donations. Many government agencies, private organizations, and foundations also fund local water conservation projects.

For more information on project planning and funding sources, contact the League's Watershed Assistance, Training, and Educational Resource (WATER) Center at (800) 284-4952 or sos@iwla.org. For information on League chapters near you or for information on forming a new chapter, visit the League's Web site at www.iwla.org.

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6. MAP YOUR WATERSHED.

Mapping your watershed can help you locate potential sources of pollution. Since water runs downhill, the lay of the land determines the size of your watershed. Try to determine the area of land sloping down to your stream. Contact the U.S. Geological Survey for topographic maps of your watershed. Your county environmental or planning office might also be able to produce a map of your watershed using Geographic Information System (GIS) software.

Knowing the boundary of your watershed is important because all land uses in the watershed affect the water quality. For example, if farming is a major activity in the area, your stream may suffer from an over-abundance of soil and nutrient pollution. If your stream is located in an urban environment with heavy development, it might suffer from excess sediment. By survey-

ing your stream and the surrounding area, you can determine the types of land uses in your watershed and indicate them on a map. This way, if you notice a change in water quality downstream, you can track possible sources upstream.

7. MONITOR STREAMS AND WETLANDS.

Use the League's biological stream-monitoring method to determine the water quality of a local stream. The League's method collects macroinvertebrate samples from monitoring stations every quarter of a mile along the stream. Monitoring data may be used to track changes in the water quality over time. Your state and local government agencies may accept your data to assess long-term water quality trends. For more information about the League's biological monitoring protocols, please review the factsheet "Stream Quality Survey Instructions" in this publication.

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Use data forms and instructions from the Izaak Walton League's *Handbook for Wetlands Conservation and Sustainability* to record the vegetation, soils, hydrology, and wildlife in local wetlands. Use this record to track changes in wetland characteristics over time that may alert you to problems or changes in land use. These records also may be used in public hearings to illustrate the functions and values of the wetland that will be lost if a permit to change a wetland is granted. Stream and wetland monitoring information may be used to make land-use management decisions and to prioritize areas for restoration. For information on other wetland monitoring methods, contact the Izaak Walton League.

8. ENHANCE STREAM CORRIDORS AND WETLANDS.

Stream and wetland cleanups are easy projects that can help enhance both the beauty and quality of a waterway. Cleanup campaigns have many benefits, one of which is attracting publicity to get community members interested in watershed conservation efforts. Always get permission from landowners along the waterway if you plan to enter private property. Invite landowners and other community members to participate. Adding an educational component to the cleanup can address the sources of pollution and engage the community in future pollution prevention. More information on organizing cleanups and keeping volunteers safe can be found in the factsheets "*A Planner's Guide to Watershed Cleanups*" and "*Safety and Fun in Your Watershed*" in this publication.

Expand on cleanup efforts with other types of enhancement projects. Removing exotic invasive plant species can provide room for native plants to grow. Native plants are important because they provide food and habitat for wildlife. Planting buffers of vegetation around streams

and wetlands improves wildlife habitat and water quality by filtering rain runoff. Buffers also prevent erosion because root systems stabilize streambanks, and they shade the water, lowering the temperature and allowing additional dissolved oxygen for fish, aquatic insects, and crustaceans. For more information on enhancement, please refer to the League's publication, *A Handbook for Stream Enhancement and Stewardship*.

9. PROMOTE STORMWATER SOLUTIONS AT HOME AND IN THE COMMUNITY

Incorporate water-saving and water-cleansing techniques at home such as rain barrels, rain gardens, and backyard wetlands. Invite neighbors to tour your yard, and let them know how they can become part of the solution to nonpoint source pollution in the community.

Rain barrels are large containers that collect and store rain from downspouts. The water can later be used for lawns and gardens. Rain gardens temporarily store rainwater from paved surfaces and downspouts in a low-lying garden area, which holds water for several hours until it is absorbed by the plants and soil. Fertilizers, pesticides, grease, and other pollutants are trapped by the soil and plant roots while the clean water trickles down into the groundwater. Homeowners benefit from rain gardens because they provide a colorful, low-maintenance backyard habitat. In addition to creating rain gardens, you can use native vegetation to transform soggy backyards into wetlands that further improve water quality and wildlife habitat.

Encourage your community to reduce nonpoint source pollution through conservation development. Conservation development relies on careful stewardship of the land and water to build livable communities. Often, conservation development involves grouping buildings close together in the least environmentally sensitive part of the site, while conserving the rest of the area as shared open space. Find out if the local regulations and ordinances support conservation development. If not, educate municipal officials and the community about how conservation development can improve water quality. Work with elected officials to pass zoning ordi-



nances that provide incentives to developers who design projects with conservation in mind.

Contact the Izaak Walton League for more information about rain barrels, rain gardens, backyard wetlands, and conservation development practices.

10. EDUCATE OTHERS.

One of the best ways to get others involved in watershed stewardship is to teach a friend, neighbor, or school group about watershed conservation. Talk to local civic groups and explain the need for their involvement. You can also target a specific audience for your message. For example, work with local landowners to develop land-use strategies for water quality, such as planting buffer strips of vegetation along streambanks. Or, host a watershed festival to raise public awareness. To reach a broad audience, keep the media updated about your project. Suggest a story about your stream or wetland project, and ask the media to cover local events. Explain that the project benefits the local community since clean water means a safer, healthier, and more aesthetically pleasing environment for everyone. You can also write letters and op-eds to local newspapers. Keep copies of any media coverage for future use.



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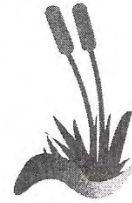
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**AN UNDIS-
TURBED RIVER
IS AS PERFECT
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EVERY REFRA-
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GLIMPSE OF
ETERNITY.**

— Thomas
McGuane,
"Midstream," *An
Outside Chance*

WATERSHED STEWARDSHIP ACTION KIT

Understanding and Using the Clean Water Act



The survival of every person, plant, and animal depends on clean water. Unfortunately, many of our daily activities can degrade water quality. The Clean Water Act was established to strike a balance between our daily activities and the purity of our water resources.

Passed in 1970 with additional amendments in 1972, the Clean Water Act (CWA) is the primary piece of national legislation that protects water quality in the United States. It gives the U.S. Environmental Protection Agency (EPA) the authority to set and enforce water quality standards and regulate pollutants that are discharged into waterways. Although states and local governments have the authority to develop more stringent water quality regulations than those outlined by the federal government, in many cases the CWA may be the only legislation that a community or a state has to improve or protect their water quality.

The purpose of the Clean Water Act is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." Goals set forth in the CWA include eliminating discharge of pollutants and navigable waters by 1985 and achieving water quality that protects fish and wildlife and allows recreation in and on the water by 1983. The CWA strives to achieve these goals by prohibiting the discharge of toxic pollutants in toxic amounts and by developing and implementing programs for the control of nonpoint sources of pollution.

Since its enactment, the CWA has been directly responsible for removing more than 1 billion pounds of toxic chemicals from waterways and more than 6 billion pounds of oxygen-depleting pollution from wastewater each year. These improvements result in cleaner, safer water for public consumption and recreation, and improved aquatic habitat for fish and wildlife. However, much more needs to be done. In fact, approximately 40 percent of the waterways that have been assessed still are not safe for swimming and fishing. Fortunately, each of us can become involved in strengthening the Clean Water Act and using it to protect and improve the streams and wetlands in our neighborhoods.

WATER QUALITY STANDARDS

The CWA directs states and tribes to establish water quality standards for each waterway. These standards include designated uses, water quality criteria, and antidegradation requirements. The designated uses include current uses of the water body and future desired uses that require good water quality. Designated uses may include activities such as fishing, swimming, or boating. The water quality criteria are developed to describe the chemical, physical, and biological conditions needed to support each of the designated uses. The antidegradation policy prohibits activities that would pollute

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POINT SOURCE DISCHARGE PERMITS

Under the Clean Water Act, it is illegal to discharge any pollution into a water body without a permit. All point-source pollution discharges require a National Pollutant Discharge Elimination System (NPDES) permit. Point sources of pollution include any pollution discharged through a pipe, ditch, conduit, or other discrete conveyance. Examples of point sources include municipal and industrial wastewater plants, stormwater and mining runoff, concentrated animal feeding operations (such as those located on factory farms), and sewer overflows. NPDES permits set requirements for the maximum amount of pollution allowed from each point source. The CWA also encourages the use of the best available technology for pollution control. The limits on pollution required in the permits are based either on the best available technology for reducing pollution or on the quality of the receiving water, whichever type is more stringent.

water to the extent that a current use is no longer supported. If a water body has exceptional ecological or recreational significance, this policy protects that water body from any activity that would detract it

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The water quality standards established by the states are very important because all water quality protections for specific waterways are based on these standards. Each of us has an opportunity and a responsibility to make sure that the standards provide adequate protection for each watershed. Another way to become involved with water quality issues is to work on your state's triennial review of water quality standards by participating in public hearings and submitting written comments.

Also, under Section 305(b) of the CWA, the U.S. Environmental Protection Agency is required to report to Congress every two years on the status of surface water quality. Each state in turn reports to EPA on its water quality. The reports help determine priorities at the state and federal levels for pollution control and management. The reports are available to the public and provide current information on water quality.

For more information on permits in your watershed, contact your state's water quality agency and place your name on its mailing list for permit review. With this knowledge, you'll be able to make comments on any permit applications that are submitted for your watershed. You might also want to obtain copies of the permits already issued that affect your local water bodies. If you notice a permit violation or an illegal discharge without a permit, document the problem and report it to your state's water quality agency. A failure to comply with permit requirements is a violation of the Clean Water Act and is subject to enforcement and fines. If the state agency or the EPA does not enforce permits when they are violated, individuals or groups may sue the polluters directly. For information on what to look for when reviewing NPDES permits and how to make effective comments, visit www.cleanwateract.org.

IMPAIRED WATERS AND TMDLS

The Clean Water Act requires states to identify impaired waters, which are waters that do not currently meet water quality standards, and threatened waters, which are not expected to meet those standards even after full implementation of existing per-

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mits. Every two years, states review water quality data and update their lists of impaired and threatened waters, called the 303(d) list. States are then required to develop a Total Maximum Daily Load (TMDL) for every water body on the list. A TMDL is a pollution cap for the water body and includes a plan to make sure pollution levels do not exceed that cap. If the state does not develop an adequate TMDL for a water body, EPA is required to develop and implement one.

You may submit data to the state for consideration when listing impaired waters. Also, you may comment on the draft list that is circulated for public review before the list is submitted to EPA. In many states, the TMDL process has been jump-started by citizen action.

As of this update, EPA is reviewing the TMDL program. The program may move in a different direction in the near future.

NONPOINT-SOURCE POLLUTION CONTROL

Nonpoint-source pollution is defined by EPA as pollution "caused by rainfall or snowmelt moving over and through the ground and carrying natural and human-made pollutants into lakes, rivers, streams, wetlands, estuaries, other coastal waters, and ground water. Atmospheric deposition and hydrologic modification are also sources of nonpoint pollution." While the Clean Water Act has been very effective at reducing point-source pollution into waterways, nonpoint-source pollution reduction has been more difficult. As the name implies, nonpoint-source pollution comes from diffuse sources, posing a challenge to reduction efforts.

Section 319 of the CWA attempts to control nonpoint pollution by providing funding to states to implement specific watershed protection projects, including wetland restoration and streambank stabilization.

WETLAND PROTECTION

Section 404 of the Clean Water Act authorizes the U.S. Army Corps of Engineers and EPA to regulate



activities that affect wetlands. Anyone who proposes an activity that would discharge dredged material or fill material into waters of the United States is required to apply for a permit from the Corps.

Citizen complaints can provide information about applications for permits to alter wetlands and can report violations of wetland law. Regulatory agencies are unable to discover and address every wetland violation that occurs. Citizen complaints often trigger enforcement actions. You can ensure that you are notified of permit applications in your area by contacting the Army Corps of Engineers at www.usace.army.mil.

STATE WATER QUALITY CERTIFICATION

The Clean Water Act gives states the authority to review federally permitted activities that may result in water pollution. The state may allow the project without changes, place conditions on the project to protect water quality, veto the project, or waive its authority. Applicants for Section 404 permits are subject to the state Section 401 water quality certification process. Citizens can take action against federal permit holders that do not comply with the Section 401 water quality conditions of their permits. Citizens also can take action against a state for certifying a federal permit

despite evidence that the permit will violate water quality standards. Ask your state water quality agency for information about its procedures for public notice.

FUNDING

The Clean Water Act also provides programs for funding projects to protect water quality. In many cases, EPA distributes money to the states, which then disperse the funds to local governments and nonprofit groups to implement projects. For more information, visit the Catalog of Federal Funding Sources for Watershed Protection at www.epa.gov/OWOW/watershed/wacademy/.

OTHER OPPORTUNITIES FOR CITIZEN INVOLVEMENT

To keep current watershed conservation laws in place and to pass better regulations and laws, citizens need to contact their national, state, and local elected officials and let them know that clean water is important. When specific bills are proposed that will either improve water quality or harm water protection, contact your officials and let them know what position you would like them to take to protect clean water.

In addition to tracking legislation, you can also track and provide comments on regulatory action taken on existing laws. For example, because the U.S. Environmental Protection Agency administers and enforces the CWA, the agency develops rules that specify how it will implement the law. When EPA proposes a rule in the federal register, the public is invited to comment. EPA then incorporates comments into the final rule.

For more information on pending legislation and rules related to national watershed policy, advocacy tips, and action alerts on the most current conservation policy opportunities, please visit the League's Web page at www.iwla.org and click on "Take Action."

CLEAN WATER ACT RESOURCES

"The Clean Water Act: An Owner's Manual." A handbook on the Clean Water Act, its provisions, and opportunities for citizen involvement. Visit www.rivernetwork.org.

"Understanding the Clean Water Act." This online course by River Network provides information on the CWA based on the act itself and on problems such as agricultural runoff. It includes a quiz and links to other resources. Visit www.cleanwateract.org.

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January 2006

**"...WHEN THE
LAWYER IS
SWALLOWED
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BUSINESS AND
THE STATES-
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OR CONTRIV-
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BANKS, HEAR
THE BIRDS
SING, AND
POSSESS
OURSELVES IN
AS MUCH
QUIETNESS AS
THESE SILENT
SILVER
STREAMS..."**

— Izaak Walton,
The Compleat
Angler

For more information,
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WATERSHED STEWARDSHIP ACTION KIT

Watershed Survey



A watershed survey is a good first step when beginning a stream or wetland monitoring program. Water quality is affected by land uses because anything on the land washes into waterways when it rains or snows. Therefore, a survey of land uses in the watershed can provide important information to identify potential sources of pollution. In addition, a survey allows watershed stewards to locate sites for additional monitoring, educate volunteers and the local community about potential pollution sources, and recruit new volunteers for an overall watershed conservation effort. Watershed surveys are inexpensive and require minimal equipment and volunteer training.

A watershed survey can be divided into three steps: a background investigation, a land-use survey, and a visual stream or wetland survey. The background investigation is an indoor activity to gather information about the stream or wetland and its watershed. A watershed visual survey involves walking or driving through the watershed and recording land uses and potential sources of pollution. A visual stream or wetland survey involves walking or canoeing the waterway and recording its condition.

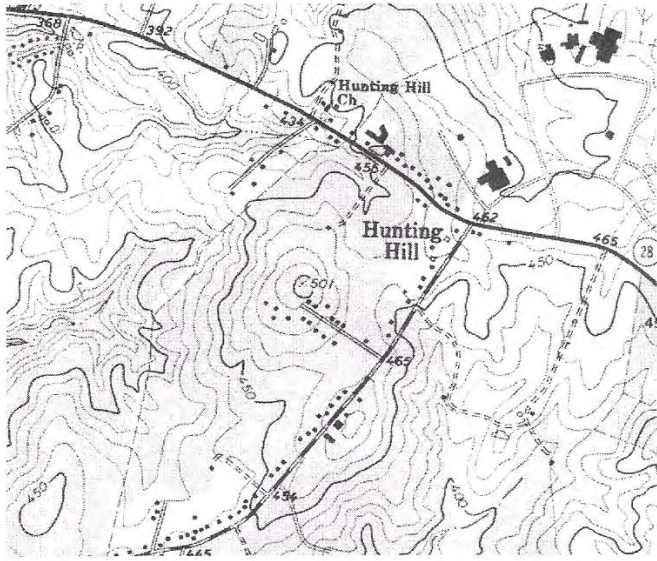
Always keep detailed records in a notebook or file folder of the information you uncover during your watershed walk. Information gathered in the field later can be transferred into a computer database for easy access. Organized and well-presented data about your watershed will help future court cases continue your conservation efforts and will help you create persuasive presentations about water conservation.

BACKGROUND INVESTIGATION

The background investigation is an important first step in conducting a watershed survey. Background information about the stream and its watershed only needs to be gathered once and the information will help you plan for field monitoring and future conservation activities.

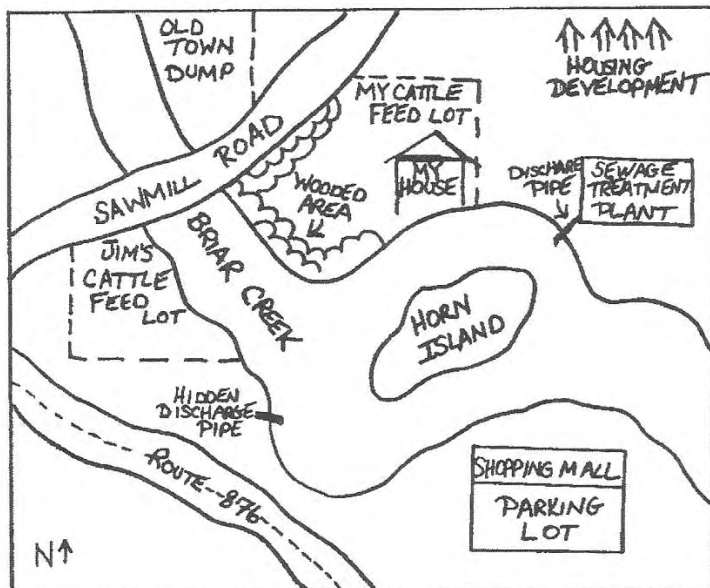
Your investigation should determine the size (area) of the water body, the boundaries of the watershed, and the general land use within the watershed. Information about industries discharging to the stream or wetland, current designated uses for the water body (such as fishing, swimming, drinking water), historical land uses, agencies that have jurisdiction over the water body, and the laws that protect it also will benefit your efforts.

Maps are critical tools that can help you determine watershed boundaries, drainage patterns, stream length, tributaries, inlets and outlets to wetlands, size and shape of wetlands, and surrounding land uses. Topographic maps are available from the U.S. Geological Survey at (800) USA-MAPS. These maps show roads, streams, landmarks, and elevations. Road maps also show the locations of streams and can be useful when driving or walking the watershed during the visual survey described below. The U.S. Geological Survey also has copies of the National Wetland Inventory (NWI) maps. NWI



maps are based on topographic maps and include information on the wetland boundaries, vegetation, and hydroperiod (includes the frequency, timing, duration, and amount of flooding). Hydrologic unit maps, also available from the U.S. Geological Survey, can help you determine watershed boundaries. The county environmental office or local conservation district may also have watershed maps available or may be able to produce watershed maps using Geographic Information Systems (GIS) software.

Information about historical land uses may require a visit to the local historical society or library. Look for



information about fish kills, chemical spills, floods, and other major events affecting the watershed. Residents also may be able to provide historical information.

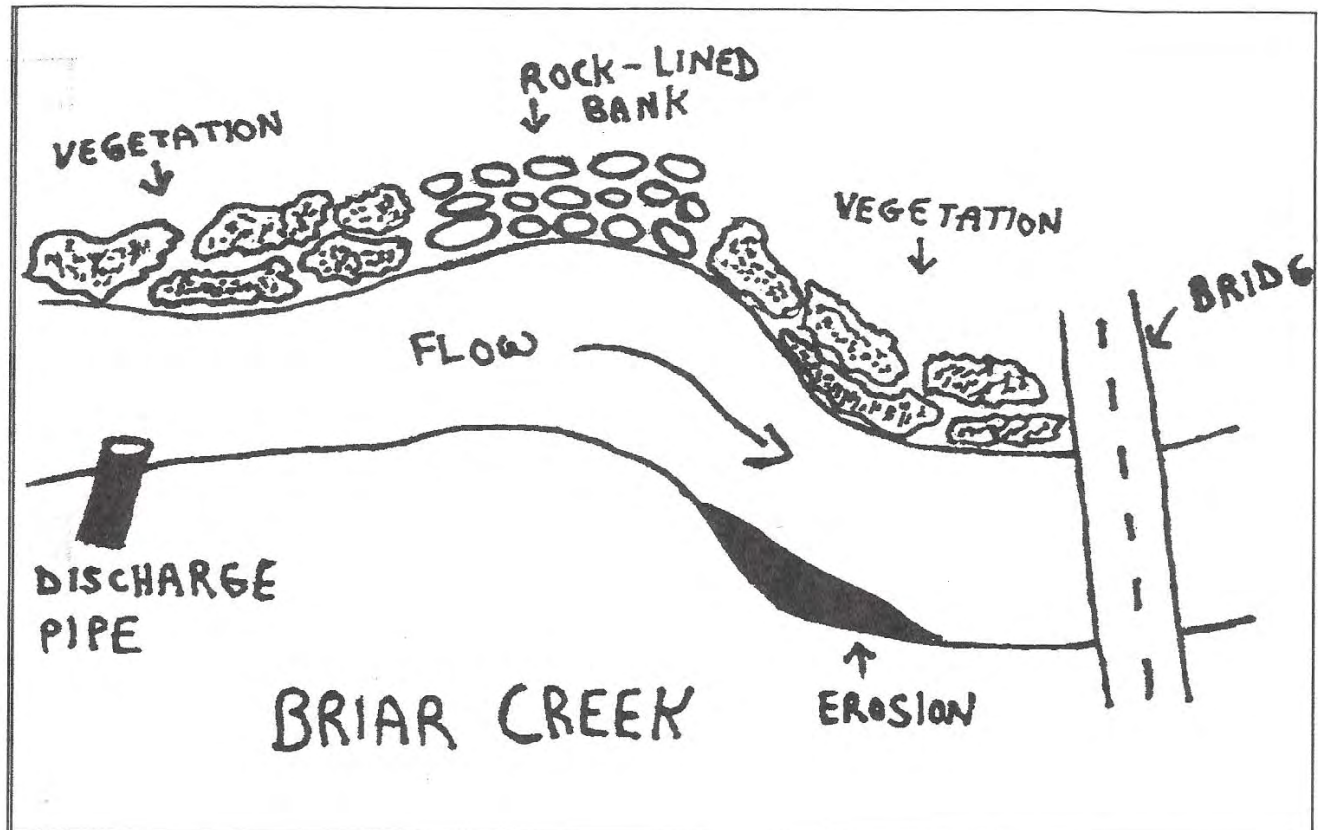
Under the Clean Water Act, state agencies and pollutant discharge permit holders are required to provide information about the quality of waterways to Congress and the public. Talk to your state and local environmental protection or water quality offices for more information about industries that discharge to the waterway and current designated uses of the stream or wetland. For information about Clean Water Act regulations and associated reports that affect streams and wetlands in your community, visit the Environmental Protection Agency's Web site at www.epa.gov/r5water/cwa.htm.

LAND USE SURVEY

A visual assessment of the watershed should take place at least once each year to observe changes over time in land uses and potential pollution problems. Ideally, the entire watershed should be surveyed. If you need to walk on private property, make sure that you have permission first. If you have limited time and volunteers, it is best to start assessing the watershed immediately adjacent to the water body and try to include as much of the surrounding watershed as possible. If you are unable to obtain permission to enter private property,

you may need to limit the survey to roads and other areas with public access. If there are several volunteers, assign a different segment of the watershed to each group. Each group should have a road map or topographic map of the area, a base map or blank paper to record land uses and sources of pollution, additional paper to take notes, and relevant information from the background investigation, such as the location of potential pollution sources. In addition, volunteers may want to bring a camera to take photographs of potential pollution sources.

Drive or walk the watershed looking for land-use activities that might affect the stream or wetland. Construction sites, parking lots, other paved surfaces, areas of bare soil,



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Land uses and activities to look for on the watershed survey:

- Residential
- Commercial
- Industrial
- Forest
- Park
- Grazing land
- Cropland
- Animal feedlot
- Construction
- Logging
- Mining
- Recreation
- Trash dumps
- Sanitary landfills
- Oil and gas drilling
- Areas of exposed soil
- Sewage pumping stations

factories, landfills, trash dumps, gas stations, and manicured lawns all may be potential pollution sources. Draw a map of your watershed, including potential pollution sources, forested land, and other natural features.

Take additional notes documenting the exact location of each potential pollution source. Estimate and record percentages of land that are developed, farmed, or wooded. Record the date on maps, photos, and notes.

STREAM SURVEY

Before conducting a stream survey, obtain permission from landowners and locate safe access areas. Walk or canoe the stream once each season to assess the condition of the stream and potential pollution sources. If you have several volunteers, assign a different stream segment to each group. Provide each group with maps, blank paper, and relevant information from the background investigation such as the location of out-fall pipes for point-source discharges into the stream.

Draw a map of your stream segment. Mark the location of outfall pipes, bridges, and stream crossings. Also record areas of stream bank erosion, areas along the stream bank with little or no vegetation, concrete or rock-lined banks, other structures, and trash in or adjacent to the stream. Take photographs of these stream conditions and additional notes if needed.

Conditions and structures to note on the stream survey:

- Dams
- Bridges
- Waterfalls
- Beaver dams
- Concrete bank
- Concrete stream bottom
- Rock-lined bank
- Trash heaps
- Pipes discharging into stream
- Areas of bank erosion
- Fish kills
- Flooding
- Areas without water flow
- Presence of vegetation along stream banks

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In addition, note the location of any unusual water conditions. If you encounter unusual conditions, attempt to trace the problem to its source. Take the factsheet located in this publication called "Recognizing and Reporting Stream Pollution" with you into the field for more information about unusual conditions and how to address them.

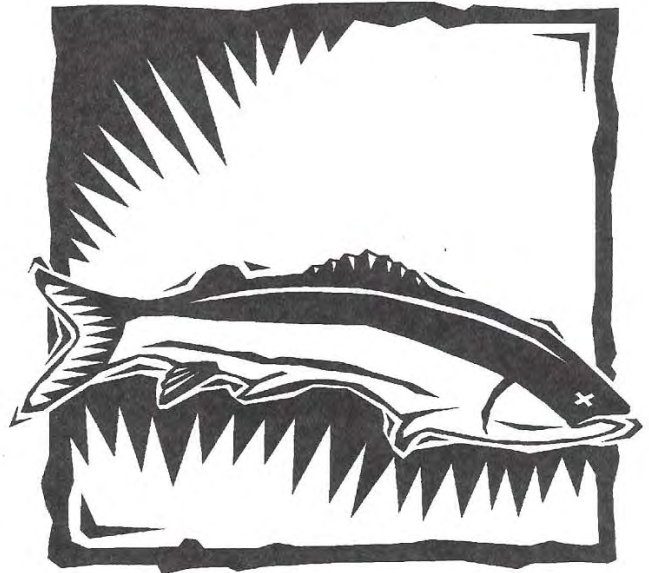
WETLAND SURVEY

Before conducting a wetland survey, obtain permission from landowners and locate safe access areas. Draw a map of your wetland. Walk around and through the wetland to get an idea of its size, vegetative communities, surrounding land uses, and potential wildlife habitats. Be sure to leave room between the wetland outline and the edge of the paper to sketch surrounding landscape features such as vegetative buffers, roads, fields, buildings, and any adjacent

water bodies. Include the date, location, a directional arrow pointing north, and a key describing the scale of the map and the various features. Mark the location of any inlets and outlets, groupings of trees, shrubs or grasses, areas of open water, areas of floating plants, areas of exposed soil, beaver dams, and any man-made features. Take photographs of the wetland and additional notes if needed.

Look for and record the following signs of wetland degradation:

- Silt, sand, or gravel deposits
- Turbid water (opaque and milky or light brown)
- Stream bank erosion upstream of wetland (look for newly exposed soils)
- Exaggerated flooding
- Large stands of invasive plant species (varies with location but may include purple loosestrife, phragmites or common reed, hydrilla, buckthorn, etc.)
- Nutrients (signs include algae blooms in freshwater systems and excessive foaming that can be present in upstream water)
- Chemical pollution (look for obvious discharges and iridescent sheens that break up in globules)

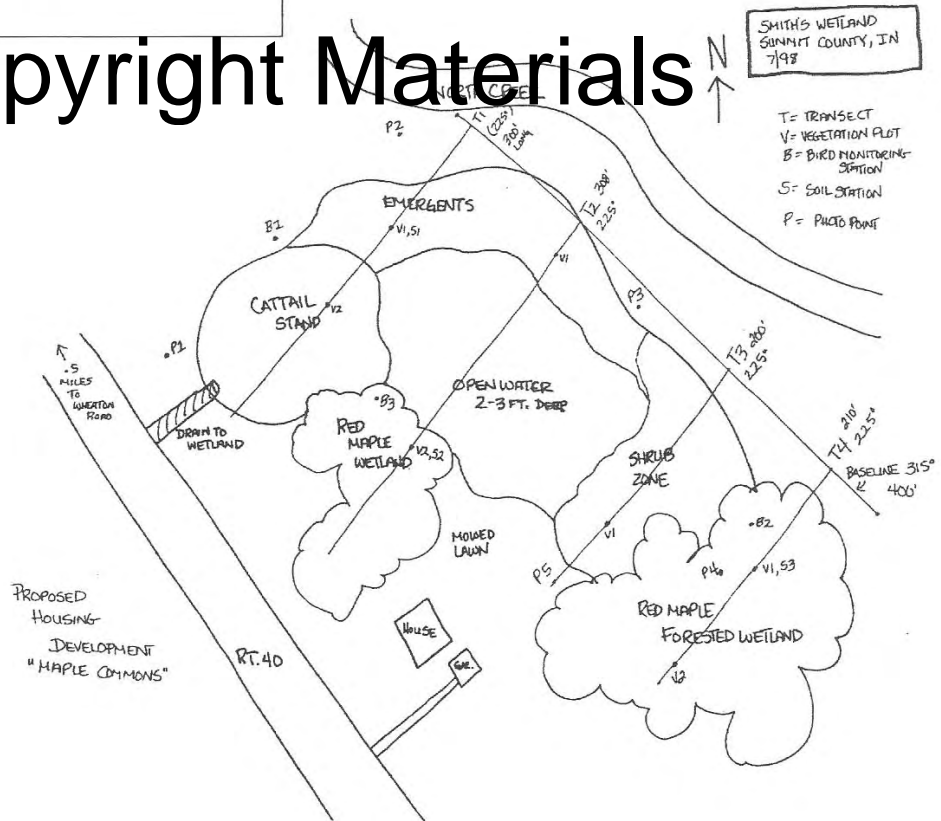


Look for and record the following potentially harmful activities that may be taking place in the wetland:

- Dumping of soil, gravel, or vegetation
- Grading (look for heavy equipment tracks and scraped soil)
- Draining or channelizing of water (look for pipes or ditches within the wetland)
- Impounding (look for dikes or culverts leading downstream of the wetland)
- Bulkheads built between shore and wetland
- Tracks of recreational vehicles
- Livestock access (observe cattle in the area or look for cattle tracks)
- Pipes or culverts transporting stormwater into the wetland
- Clearing (look for fresh or old stumps in an area with few or no remaining trees)
- Dredging (dirt mounds next to open water areas or evidence of heavy equipment)
- Heavy recreational use

For more information on wetland surveys and other types of wetland monitoring, refer to the League's *Handbook for Wetlands Conservation and Sustainability* or contact the League. A list of additional resources is available on the League's Web site at www.iwla.org/sos/resources.

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— Aldo Leopold, *A Sand
County Almanac*

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WATERSHED STEWARDSHIP ACTION KIT

A Guide to Watershed Cleanups



It is important to keep the area around your local waterways clean. When left on the ground, litter eventually will be blown or carried by wind or rain into a waterway, where it can interfere with spawning beds and injure fish, wildlife, and people. Litter can also block free-flowing water and hinder recreational uses.

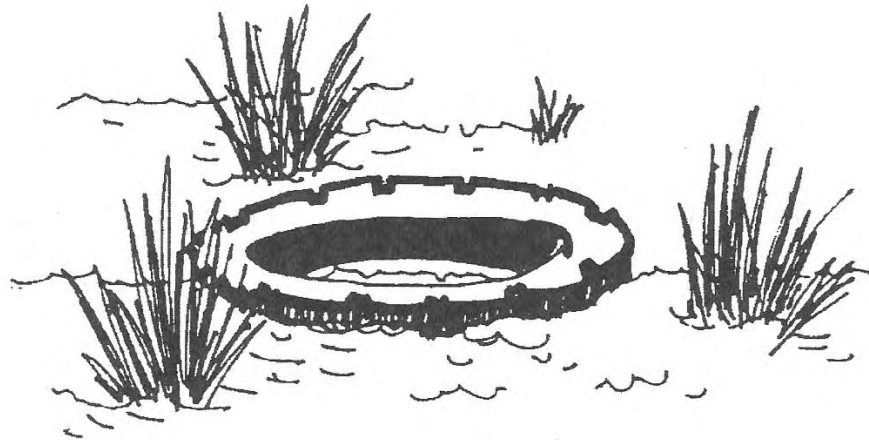
You can help keep local water bodies litter-free by conducting a watershed cleanup. A watershed cleanup is easy to plan and allows the entire community to participate. It can also be an excellent way to start the community working on larger, more comprehensive watershed conservation projects. This factsheet describes how to organize a fun and successful stream, wetland, or highway cleanup in your watershed.

ORGANIZING THE CLEANUP

The first part of organizing a cleanup is determining the person or group that will lead the cleanup effort. It is important to have one overall leader and several other people willing to work on the event. This group should meet to determine all of the tasks that will be involved in conducting the cleanup and to assign tasks to each person. Some of the tasks that need to be accomplished include:

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- Obtaining permission from property owners to access the site. If the site is a park or other public property, contact the park managers to request permission.
- Obtaining equipment and supplies. This includes determining what equipment will be needed and the cost of equipment and supplies, including food for volunteers and first aid supplies.
- Fundraising and soliciting donations of time and supplies.
- Publicizing the event. This includes greeting reporters who attend the cleanup and following up with reporters after the event.
- Manning the registration table at the event.



- Speaking about the project and reviewing safety information at the event.
- Taking pictures at the event.
- Following up with thank you letters to donors and volunteers.

The event leader may want to hold additional meetings and keep in regular contact with all people working on the event to track overall progress.

OBTAINING EQUIPMENT

The following is a list of suggested equipment and supplies needed for a cleanup. You can provide these items or ask volunteers to bring them.

- Work gloves
- Work boots
- Long pants and long-sleeved shirts
- Rakes
- Shovels
- Pitchforks
- Tin snips
- Heavy-duty rope
- Heavy-duty trash bags
- Orange safety vests
- Glass jars to dispose of hypodermic needles and other sharp objects
- Posterboard for signs
- Cameras and film
- Map of cleanup area
- First-aid kit
- Beverages and snacks
- Flagging or stakes
- Educational materials on watersheds and pollution prevention (copies of fact sheets from this *Watershed Stewardship Action Kit* would work well)

If there are large items such as cars and appliances that need to be removed, you may need heavy equipment to remove them. Trees or logs should only be removed if they are causing erosion and flooding problems or are restricting water flow. Contact your local government or state transportation agency. They might be willing to donate equipment and labor. Also, contact local construction contractors and developers who might want to lend a hand. Many local governments also can provide trucks, trash bags, maps, and

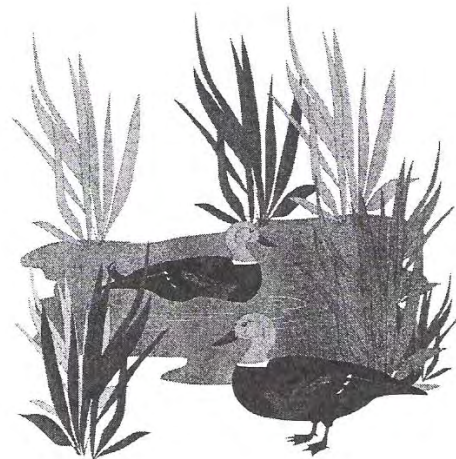
personnel. Contact your recycling coordinator or landfill staff for more information on how to recycle or dispose of items in your community.

FUNDRAISING AND SOLICITING DONATIONS

Little money, if any, is needed to hold a cleanup event. Ask local grocery stores to donate food and drinks for your volunteers. Manufacturers such as Pepsi and Coca-Cola routinely give free drinks to community projects. Dairies might donate milk and ice-cream. Local hardware stores, pharmacies, and other stores might donate rakes, trash bags, and gloves. If there are canoe liveries on your river or wetland, ask them to donate canoes to participants. This will allow people to reach floating trash safely. Be sure to explain that you will recognize donors both at your event and through all publicity prior to and following the event. Simply post a sign or banner (which you might be able to get donated as well) at your event that reads something like, "Beverages made possible by a generous donation from _____." Also, be sure to thank all donors in press releases, flyers, and community announcements.

PUBLICIZE THE EVENT

After organizing the cleanup, send notices of your cleanup to local media outlets. Emphasize how the project will benefit the entire community. Remember to ask local civic groups, environmental organiza-



tions, and schools to participate and help publicize the event. Also, be sure to invite residents who live in the cleanup area. Local media often are happy to print or air announcements and may even do a story on your project. Invite a reporter to cover the event. Be sure to greet any reporters at the event and follow up with reporters after the cleanup.

AT THE EVENT

Post a sign at your cleanup site so volunteers know they are in the right place. Set up a table with food, water, and a greeter. The greeter should welcome participants and get their names, addresses (mailing and e-mail), and phone numbers so that you can contact them about future events.

You may want to start the cleanup effort with a brief program. Welcome and thank volunteers and discuss safety issues. You also can use this time to educate volunteers about watersheds and pollution prevention, to introduce your group and explain why the cleanup is important, and to thank volunteers and donors. If you are organizing the cleanup as part of a larger conservation effort, be sure to inform the volunteers of your other plans and activities, invite their participation in the larger effort.

Warn volunteers to be aware of slippery rocks, glass, poison ivy, ticks, snakes, and steep banks. Suggest that volunteers work in pairs. Also, take the time to teach volunteers how to use tools properly. If you suspect there are hypodermic needles in the area, you may want to assign one person with the task of collecting them and instruct other volunteers to mark their presence with flags or stakes. Refer to "Safety and Fun in Your Watershed" in this publication for more information on making the event safe.

If you are cleaning up a large area, you may want to separate the area into segments and assign team leaders. Deposit piles and bags of trash in previously designated spots for collection. You may want to keep separate bags for recyclable materials.

Make sure that you take plenty of pictures and document how many tons or bags of trash you collect. The

volunteers will feel proud of their accomplishment if you can quantify their hard work. Donors also like to know what you have accomplished with their support. Send information about the cleanup and pictures of the event in a thank you note to donors.

DON'T FORGET TO HAVE FUN!

Invite everyone back to a central location at the end of the day for a picnic or barbecue. You may want to arrange for music or a speaker to provide entertainment. A post-cleanup party can be your way of saying "thank you" and ensuring that the volunteers will be happy to help you again.

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WATERSHED STEWARDSHIP ACTION KIT

Stream Enhancement



NEVER IN HIS LIFE HAD HE SEEN A RIVER BEFORE - THIS SLEEK, SINUOUS, FULL-BODIED ANIMAL. ... ALL WAS A-SHIVER - GLINTS AND GLEAMS AND SPARKLES, RUSTLE AND SWIRL, CHATTER AND BUBBLE.

-Kenneth
Grahame, *The Wind
in the Willows*

STREAM ENHANCEMENT

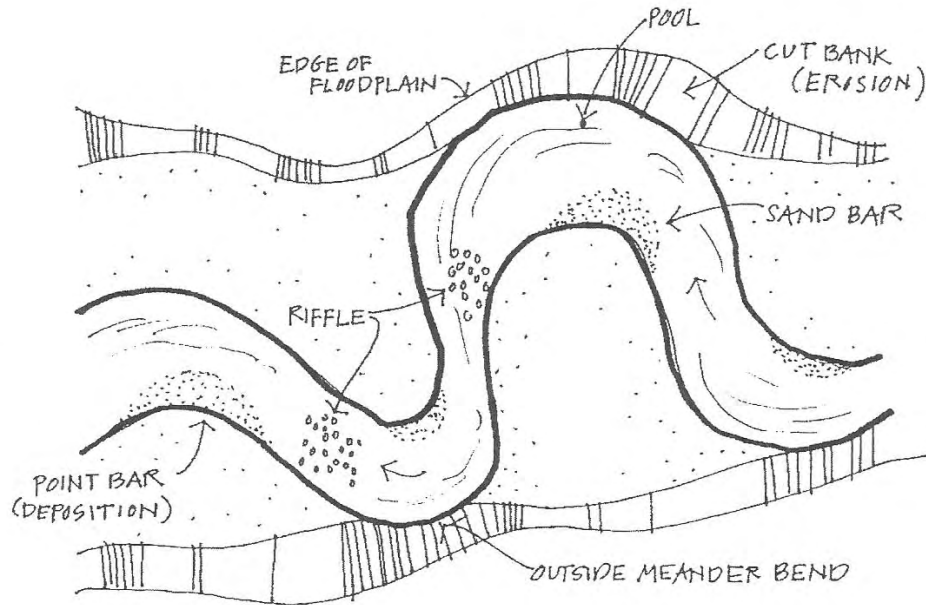
As you examine your watershed and assess the water quality of its streams, you might find eroding stream banks, areas devoid of vegetation, deep and narrow stream channels, or wide and shallow channels. These are some of the characteristics of streams adjusting to changes in the watershed or within the stream channel. It is possible to remedy stream degradation, and volunteers can help streams to readjust to the changing landscape.

EFFECTS OF DISTURBANCES ON STREAMS

Healthy streams recover from disturbances quickly by changing shape to accommodate increased stream flow. Healthy streams have vegetated banks, meandering channels, and in-stream habitat such as riffles, runs, and pools. These streams maintain a state of equilibrium between the rate of sediment erosion and deposition. Where land is being or has been developed, however, water runs off with increased speed and volume as a result of paved surfaces, stormwater tunnels, and land disturbances in the

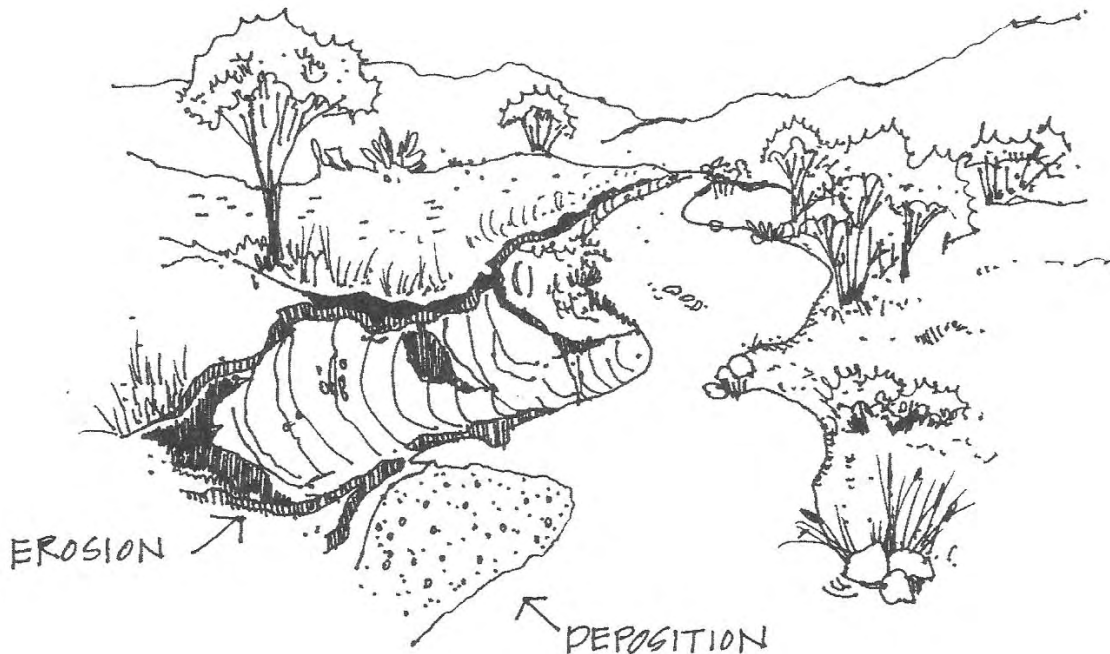
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STREAM IN DYNAMIC EQUILIBRIUM



For more information,
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ERODING STREAMBANK



watershed. The high, fast flows that result from runoff can erode banks, carry pollutants, and smother aquatic life with excess sediment. Streams without vegetation on the banks are even more susceptible to erosion and flooding. In heavily farmed areas, vegetation is often removed from the stream banks to make room for more cropland. When livestock are allowed to wade into streams, they also erode the banks and damage water quality.

WHEN THE SOLUTION IS THE PROBLEM

Throughout history, people have settled in the floodplains of streams and then tried to keep them from flooding or changing shape. Traditional engineering practices are designed to prevent flooding and erosion by lining streams with concrete and building reservoirs and levees. A major problem with these structural techniques is that they replace dynamic living streams with concrete ditches devoid of life. In addition, these projects require extensive maintenance and are very expensive to install and repair. Concrete channels collect sediment along the bottom and need

to be dredged. Natural streambanks that are located downstream from engineered streambanks often erode because water deflected off the hard, man-made surface hits the softer, natural surface with more force.

STREAM RESTORATION VERSES ENHANCEMENT

Stream restoration means returning an ecosystem to a close approximation of its condition prior to disturbance. Ecological restoration may no longer be possible or desirable. Landscape changes in the watershed may no longer support previous conditions, especially in areas where land-uses and infrastructure such as roads, buildings, and water-control structures have been built. Nevertheless, stream conditions can be enhanced through structural and non-structural techniques.

Structural enhancement involves recreating the shape of the stream bank and often includes adding materials such as rock to harden the bank. Riprap and/or large boulders are used to anchor the toe (the bottom of the bank), redirect erosive flows away from a

portion of the bank, or armor the entire bank. In-stream work involves placing structures within the stream to help re-create fish habitat such as pools and riffles. Non-structural work includes incorporating conservation measures to minimize the effects of land use, such as prescribed grazing or planting riparian vegetation. These types of enhancement projects can help to improve or protect an ecosystem. Maintenance and monitoring are important components of successful stream enhancement.

In many situations, a stream will be able to recover and develop a more natural appearance and structure on its own if disturbances are removed. Therefore, changing land-use practices or protecting land along stream corridors might be enough to see a stream on the road to self-recovery. This approach, however, could take a hundred years or longer for the stream to stabilize, making a combination of structural and non-structural techniques more desirable.

BIOENGINEERING TO ENHANCE STREAMS

Bioengineering is a stream enhancement technique that uses natural materials such as vegetation, rock, and soil to stabilize stream banks. Steep banks are graded back to a gentler slope to encourage growth of vegetation. Cuttings from native vegetation that root

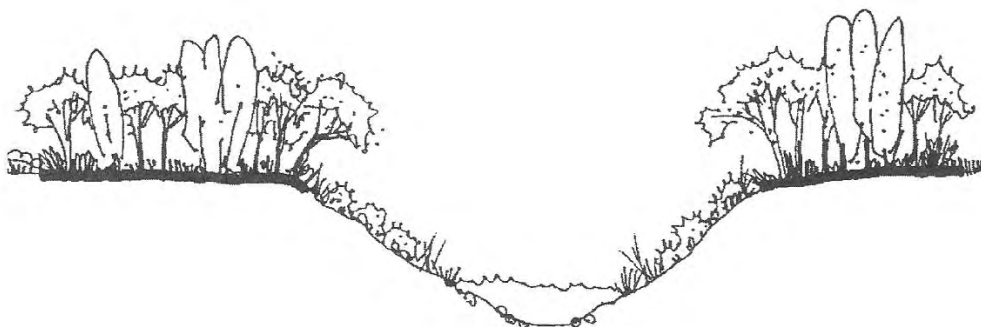
easily are installed in specific patterns to maximize bank stability. Dead vegetation and rocks can provide additional support. Trees, shrubs, and grasses often are planted adjacent to the stream to improve wildlife habitat and provide additional stabilization. In cases of extreme erosion, some structural components such as supporting walls of logs, tree revetments, or dirt-filled wire crates (gabions) can be used with vegetation to prevent or control erosion.

There are many advantages to choosing bioengineering rather than traditional engineering techniques. Bioengineering projects cost much less than structural engineering projects and are easier to maintain. Bioengineering stabilizes stream banks, creates habitat for aquatic organisms, and improves water quality. Plants that are used to stabilize stream banks also provide food for aquatic organisms as well as shade, which lowers the water temperature and increases the water's capacity to store dissolved oxygen that is vital to aquatic life. In addition, streamside vegetation is aesthetically pleasing. Properly installed bioengineering techniques actually reduce downstream flooding and erosion.

Many bioengineering projects can be installed with the help of volunteers. Volunteers can maintain and monitor enhancement projects after installation, and trained volunteers can assist professionals with project design.

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VEGETATION STABILIZES STREAMBANKS AND ENHANCES WILDLIFE HABITAT



ENHANCING RIPARIAN BUFFERS

Vegetation growing by the stream in the riparian corridor provides shade and food necessary for aquatic habitat. Establishing or expanding stream corridor vegetation is a simple and effective step toward improving water quality. A buffer is especially important for streams adjacent to farmlands; vegetation in these areas helps trap and break down pesticides, fertilizers, and other pollutants before they enter the stream. In urban areas, buffers help to catch sediment and slow runoff from paved surfaces that can cause erosion.

Organizing a riparian buffer planting can be a fun, easy, and cost-effective way to improve stream water quality. Selecting vegetation that is appropriate to the specific conditions of the site is crucial to the success of the project. Factors to consider when selecting vegetation include soil moisture, available sunlight, elevation, potential for animal damage (such as grazing or rubbing by deer), and plant competition. Choosing the right time to plant and providing regular follow-up maintenance are also essential to the project's success.

Use shrubs and trees that are native to the area. Locally obtained plants are generally better adapted than plants obtained from distant sources. Consult with local experts to determine which native plants have deep, branching roots, provide good shading, and live long. It is important to determine which plants root easily and can develop roots from all plant parts, including buried twigs. For sources of native plants, visit the Izaak Walton League's Web site at www.iwla.org/sos/resources or contact your state or local native plant society.

Control or removal of invasive plants may be an impor-

tant part of a stream enhancement strategy. Non-native vegetation often prevents growth of native plants that are needed by riparian wildlife. Invasive plants can be controlled physically, chemically, or biologically. There are advantages, disadvantages, and important considerations associated with each technique. Please feel free to contact the Izaak Walton League for additional information.

GET INVOLVED IN LAND-USE PLANNING

Establishing riparian buffers and installing bioengineering techniques to stabilize stream corridors, create habitat, and filter contaminants from surface water and groundwater are most effective when combined with a sound land-management plan. Land-uses affect the quality and quantity of water reaching streams and other water bodies. The land-use planning process incorporates several opportunities for public participation in decision-making.

Each town, city, or county usually has a land-use plan. If a town does not, it's probably time to develop one. This plan is a guide for where homes, businesses, and parks are to be developed and built. It also includes conservation areas such as wetlands, streams, historic sites, and other areas of importance. A community's plan can be found at the planning or zoning office, at the planning commission, or in the community's public library.

Although the land-use plan guides development, the legal means of managing growth and development can be found in zoning ordinances and subdivision regulations. Zoning, for example, sets rules for the location of land uses, density of dwellings or businesses, height of buildings, and other restrictions. Subdivision rules govern the layout of each grouping of homes or commercial buildings within each zone. Subdivision ordinances govern such things as how far back from the street houses must be, the amount of parking, and the width of streets.

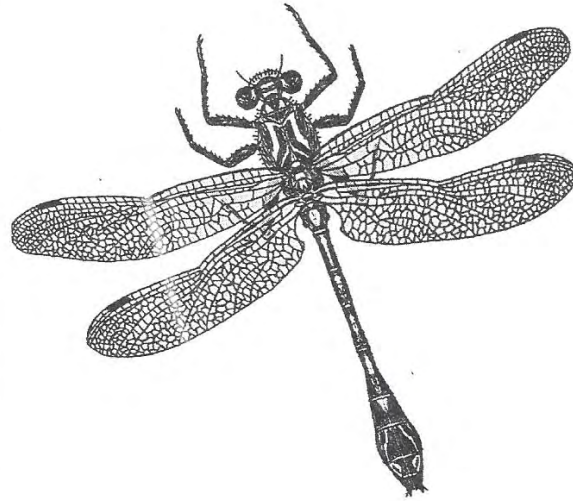
Many communities have outdated standards in their ordinances that may hinder watershed



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The following are ways in which volunteers can play an important role in watershed enhancement:

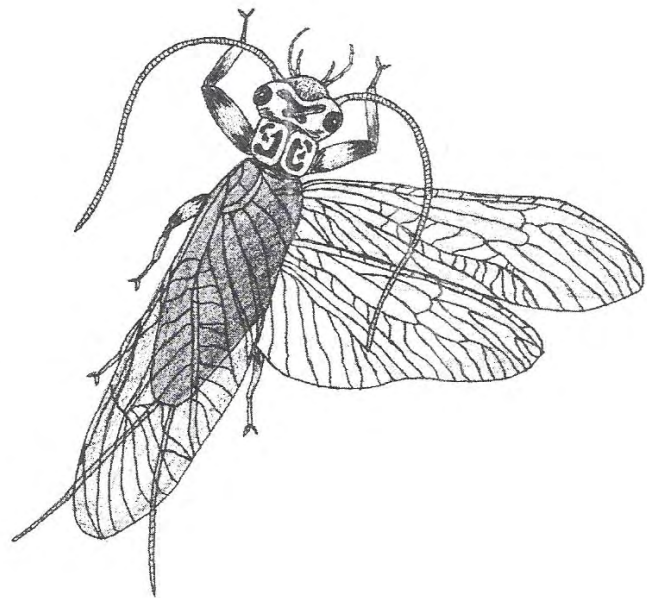
- Monitor and assess streams to prioritize areas for enhancement.
- Work with local experts to design bioengineering projects.
- Help install, maintain, and monitor stream bank stabilization projects.
- Organize watershed cleanups (See “A Guide to Watershed Cleanups” in this publication).
- Plant native trees, shrubs, herbs, and wildflowers throughout the watershed.
- Remove invasive species that have little value for local wildlife, can crowd out native species, and can increase stream erosion problems.
- Fence livestock out of streams.
- Conserve wetlands and other natural areas in the watershed.
- Participate in public meetings about zoning and land-use planning.
- Get involved with local planning and conservation task forces and commissions.
- Run for an elected position within your community.



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protection efforts. For example, subdivision ordinances may require roads that are wider than needed by the community. Reducing road width could allow more rainwater to filter through the ground before reaching streams and other waterways.

There are many opportunities for citizens to get involved with local land-use planning. Citizens can attend planning commission meetings. At these meetings, the planning commission makes recommendations to the county or town council concerning changes in land-use plans or zoning and requests by developers for particular projects. Citizens may also consider sitting on a commission or task force that is reviewing local planning regulations. They can also participate in the process for reviewing and making changes to the local land-use plan or zoning ordinance, which usually occurs every few years.





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WATERSHED STEWARDSHIP ACTION KIT



Safety and Fun in Your Watershed

There are several important things to remember when you are working outside. If you follow these safety tips, you will have a fun and enjoyable experience.

BEFORE YOU GO

Remember to tell a friend or relative the date, time, and location of your watershed activity. Work with a partner so if you are injured, someone can go for help.

Find the phone number and location of the nearest medical center to your work site. Carry a cellular phone with you and note the location of a pay phone. Remember that cell phones do not always work in rural areas, so do not rely on them at all times.

Bring a first aid kit that includes these items:

- Adhesive and cloth bandages
- Antiseptic spray or ointments
- Surgical tape
- Hydrogen peroxide
- Tweezers
- Cotton balls
- Aspirin or non-aspirin pain reliever
- Bee-sting neutralizers

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Review safety rules and tips with everyone in your work group before each outdoor project.

SAFETY RULES

The League recommends that groups never get into a stream when the water is at flood stage or is flowing much more swiftly than normal. It is better to delay monitoring or cleanup projects than to risk personal harm. Water should always be below the knee level of the people who will be in the water. Remember that the knee level of children may be much lower than the knee level of adults. Avoid steep and slippery banks.

When in contact with water, keep your hands away from your eyes and mouth, as not all pollution can be seen or smelled, and waterborne diseases are often transferred by way of eyes or mouth. Always wash your hands thoroughly with soap and water after being in contact with stream or river water. You may also want to bring antibacterial hand gel to the field site for use immediately after water contact.

**"THE ULTIMATE
TEST OF A
MORAL SOCIETY
IS THE KIND
OF WORLD IT
LEAVES TO ITS
CHILDREN"**

- Dietrick
Bonhoeffer

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If the water is posted as unsafe for human contact or appears to be severely polluted, (strong smell of sewage or chemicals, unusual colors, lots of dead fish) do not touch the water. If these signs of severe pollution are not present, but you are unsure of conditions or would like additional protection, take the following precautions:

- Wear rubber boots high enough to keep water from coming in contact with your skin.
- Wear heavy rubber gloves that go up to your shoulders (available at most automotive supply stores). Surgical gloves will not work. They can be punctured easily by snags or sharp objects, and they are not long enough to protect your arms.
- Wear a protective covering for your mouth such as a painter's mask (available at most drugstores or hardware stores). You can get sick if you breathe in vapors from sewage-contaminated water.
- Report any pollution problems to your state's water regulatory agency.

OTHER AREAS OF CONCERN

Snakes: Snakes can be a concern when you are in an aquatic environment, especially slow-moving waters with overhanging vegetation. To avoid an encounter with a snake, observe the following rules:

- Check rocks, logs, and stubs for snakes. Snakes must get out of the water to dry their skin and will lie on flat surfaces exposed to sunlight.
- If you have to approach the water through high grass, thump the ground in front of you with a stick. Snakes will feel the vibrations and move away. Snakes are deaf and respond only to vibrations.

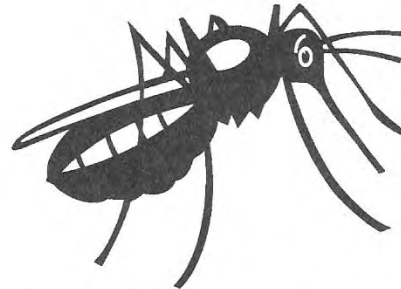


- If you come upon a snake at close range, simply move away. The snake probably will leave the area when it no longer perceives you as a threat. Remember, you are much bigger than the snake, and it is more afraid of you than you are of it. Allow the snake a chance to back off, and it usually will.

Most snakes associated with aquatic environments are not poisonous. However, because it's difficult to distinguish between poisonous and non-poisonous snakes without getting too close, the best advice is to stay away from them all. If a snake bite does occur, follow these simple steps:

- Elevate the bitten area. Do not apply ice or a tourniquet to the wound. Do not cut the wound open or attempt to suck out the venom.
- Remain calm. Take a few deep breaths and keep movement to a minimum. Walk calmly to your vehicle and have your partner carry your equipment.
- Remove all watches and jewelry if bitten on the hand or arm. Snake venom will cause the bitten area to swell.
- Seek immediate medical attention.

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Insects: If you are allergic to any type of insects, bring your antidotes or medicines. Ask other members of your group about their allergies before you go to the site. If a volunteer gets an insect bite that swells up to an unusual size or has severe redness, seek medical attention immediately.

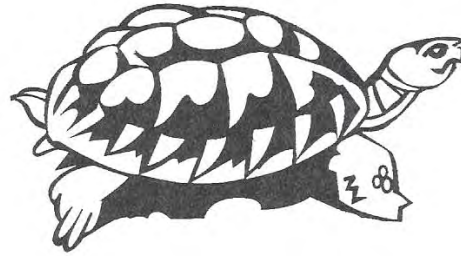
Many people have concerns about West Nile virus. Female mosquitoes transmit the virus primarily among birds. Occasionally, mosquitoes transfer the virus from birds to humans, most of whom experience no symptoms. About one in five infected people

develop West Nile fever, which resembles the flu. Infections can be fatal in people with weak immune systems, but this is rare. To avoid mosquito bites, wear long sleeves and pants. Avoid areas of standing water during dawn and dusk, when mosquito activity is at its peak. Consider using mosquito repellants that contain DEET. Do not spray DEET underneath clothes. For more information on West Nile virus, see the U.S. Environmental Protection Agency factsheet “Wetlands and West Nile Virus” online at www.epa.gov/owow/wetlands/facts/WestNile.pdf, or contact the Izaak Walton League.

Ticks: Ticks are prevalent in grassy or woody areas. It is important for volunteers to check their bodies for ticks. Feel along the scalp for any loosely attached bumps. If it is a tick, do not pull it out. Yanking the tick may cause an infection if its head remains in the scalp. Grasp the tick with tweezers and gently twist it counterclockwise for several rotations until the tick is free. Swab the area with hydrogen peroxide to clean the area. If you want to kill the tick, burn it with a match or suffocate it with nail polish or petroleum jelly after it has been removed from the skin.

One type of tick, called a deer tick, can carry a serious illness called Lyme disease. Deer ticks resemble common ticks except they are much smaller (only a few millimeters across.) Symptoms of Lyme disease include chills, malaise, and fever. Often the first sign of Lyme disease is a bull’s-eye shaped mark on the skin, but this is not always present. Treatment requires a shot of prescribed antibiotics. If not treated, this disease can remain in your body for a lifetime. If you exhibit any of the symptoms, it is recommended that you see your doctor and ask for a Lyme disease test.

Alligators and turtles: In southern states, you may encounter alligators and large aquatic turtles. These animals are not dangerous if left alone. Alligators under 18 inches in length are juveniles and may be near their mothers. Female alligators are very protective and may be dangerous. If you see alligators, leave the area immediately. Snapping turtles and soft-shelled turtles usually will move out of an area if the water is disturbed. Although turtles are not poisonous, treat a turtle bite with the same care as a snake bite.



Bears: Black bears and grizzly bears live in forested areas around the United States. Black bear encounters are more prevalent in the eastern United States, while grizzlies may be encountered in the Northwest.

- When in an area with the potential for bear encounters, make sure you stay with a group of people and make noise to alert the bear of your presence. It is also a good idea to carry bear pepper spray, just in case.
- If you see a bear and it does not see you, quickly leave the area while keeping your distance from the bear, giving it plenty of room to escape should you startle it.
- If you encounter a bear and it sees you, do not run. You cannot outrun a bear. Stay calm and slowly back away from the bear. Look for an escape route that gives the bear plenty of space; try to stay out of its “comfort zone” and avoid direct eye contact.
- Climbing trees to escape is a common suggestion, but be aware that bears can follow you up a tree.
- If a bear should charge you, do not run. Drop to the ground and cover your head, face, and neck with your arms for protection. If you are wearing a backpack, make sure it faces the direction of the bear so it can absorb punishment from any attack. Bear attacks are often “hit and run” and don’t last very long. Lay motionless and give the bear time to leave the area. Seek medical treatment as soon as possible for any injuries.
- If you feel an attack is predatory, disregard the above strategy and fight back with everything you have. This also applies to mountain lion attacks. Seek medical treatment immediately and report the attack to wildlife authorities.
- Never go near a cub because the mother bear is always nearby and will become very aggressive in trying to protect her young.

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