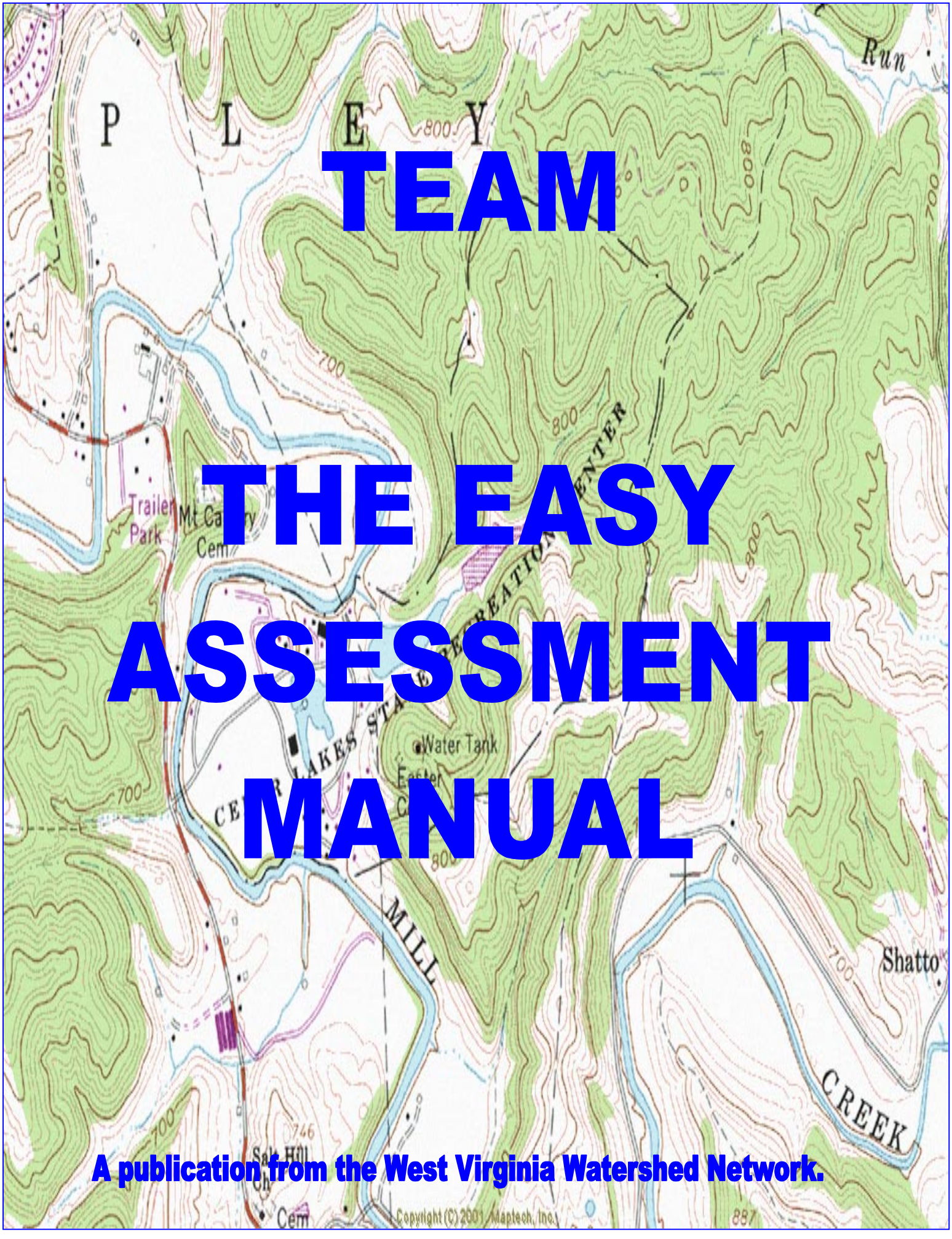

TEAM THE EASY ASSESSMENT MANUAL

A publication from the West Virginia Watershed Network.

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THE EASY ASSESSMENT MANUAL

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Introduction to the Team Survey Method

You and your neighbors have formed a watershed association and are well on your way toward identifying environmental problems and developing a watershed improvement plan. Perhaps the quality of the water in your stream has been degraded, and the water no longer supports fish or is safe for fishing, swimming or canoeing. There may be excessive silt in the stream, excessive flooding, bad odors coming from the water or perhaps your stream is in great condition or you do not know. However, before you begin your long- term stewardship plans for improving the health of your watershed, you must first gain a thorough knowledge of the physical condition of the streams in your watershed. It is important that the members of your community gain as much information as they can about the subtle characteristics and events impacting your stream. Gathering this kind of information does not require an exhaustive scientific study. The significant factors affecting the health of a stream can be identified through simple observations and by making careful documentation of those observations. This assessment tool has been named The Easy Assessment Method (TEAM) for several reasons:

- The program has been designed to provide people with an easy to follow step-by-step procedure.
- The primary purpose is to provide a tool for gathering important data about the general physical conditions of a stream system and the environmental problems impacting the stream channel and stream banks.
- Conducting a simple stream-walk is the major activity required to complete the survey.

All that is needed is a commitment from you, a few tools; packet of data sheets and maps, and a short training course. By completing The Easy Assessment Method for the streams within your watershed, critical baseline data can be gathered that will provide a blueprint you can work from. There are several benefits to using the TEAM approach:

- Gaining a comprehensive knowledge of the streams you are trying to protect.
- Generating a list of problems.
- Identifying patterns of degradation.
- Determining the severity of the problem.
- Assess in-stream and riparian zones.
- Comparing the health of different stream segments.
- Determining where more intensive chemical or biological monitoring is needed.
- Identifying restoration efforts required to improve stream quality.
- Prioritizing restoration projects
- Leveraging funds/grants for your future watershed work.

The team should divide the stream, into segments and smaller reaches within the segments based upon the problem areas encountered. A team of two or more people can usually complete several miles of a stream segment in a day. A team needs the following tools to complete the survey:

1) Clipboards
2) Pencils, pens or sharpies to take notes
3) USGS topographical maps of stream segments
4) 100 ft. or more tape measure

5) Cameras and film
6) Packet of data sheets (sufficient copies: 25-50)
7) Water
8) First-aid kits
9) Proper clothing and footwear/waders
10) Permission from landowners - this may be achieved through letters sent by you informing your community that you will be in their area on the date you chose and what you will be doing, or you may want to inform them door to door.)
11) Markers to identify sites.

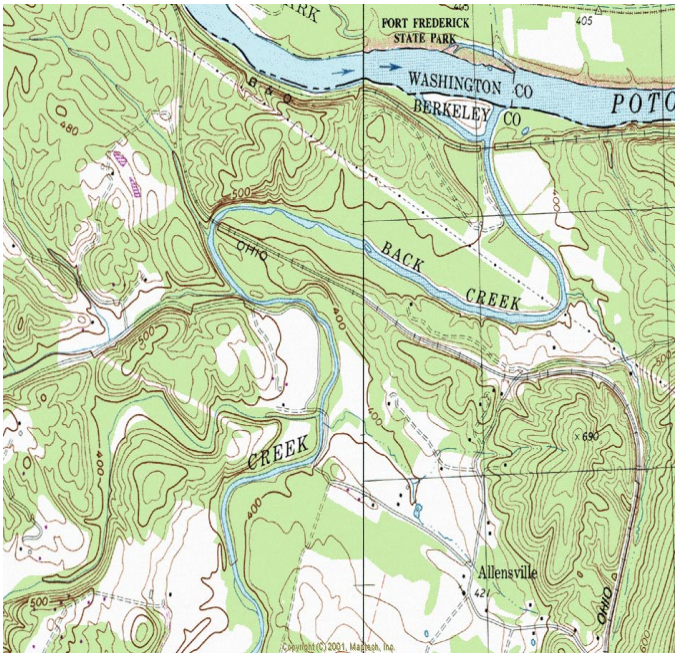
The entire stream will be divided into segments. Maps of those segments need to be prepared for recording the location of potential problems seen. The problems that you will be looking for include:

- Channelization
- Erosion
- Encroachment
- In or near stream construction
- Exposed pipe
- Pipe outfall
- Fish barrier
- Unusual conditions
- Trash dumping

A brief explanation of each of these problems and the background information you need for completing the field data sheets is provided prior to each type of data sheet found in this manual.

Team Survey Procedures In the office

1) **Get Permission From the Landowner's -** Before you go on a person's land, you need to have permission. Always get it before you venture on their land.
2) **Have Enough Data Sheets Ready -** Don't need more when you are miles from the copier.
3) **Get your Watershed Maps -** You will need maps, so before you get out in the field, you need to find your topographic maps. 'Topo' maps are available from outdoor stores, government agencies, bookstores, the Internet, computer software programs or other sources. The best maps are the 1: 24,000 scale (1- inch equals 2000- ft). For TEAM purposes, this may be too small. Consider blowing up to 1 inch equals 500' at the minimum and 1" equal 200' is optimal. Kinko's or other copying firms can make these sizes for a small fee. Once made, you should make copies for your records and for subsequent survey.



4) **Number your Maps -** You will need to label your maps to be able to refer back to those spots where you observe something. Maps should be numbered from the top of the watershed down. For

example, the first map on the mainstream should be map number one (001) the next, number two (002). Tributaries, if you decide to survey them could be numbered 101 for the first, 201 for the second and so on.

5) **Make Sure your Camera Has Film and is in Working Order -** If you find something needing work, a picture will help resource agencies to understand the problem and find the exact site.
6) **Get a weather forecast and dress accordingly -** Don't get cold and wet.

Team Survey Procedures In the Field

1) **Fill out the Header Information Sheet -** Each team should fill out the header information sheet for each day of surveying. The header information gives the data for the weather conditions, team members and the maps each team covered on the day. A description space is provided for a short description of the maps, if needed.
2) **Start Walking and Observing -** Start either at the top, bottom, left or right on the maps walk down or upstream. In other words, it doesn't matter where you start, just be consistent in your method. The numbering of the sites you identify will depend on the direction traveled, so it is important to maintain consistency.
3) **Document your Observations -** Using the appropriate problem identification form follow the procedure below:
    - Fill out the information using your best professional judgment and mark your location on the map using a marker (arrow, dot etc.) to point to the stream and identify the spot with a site number. Site numbers are consecutive for each map segment. So, with the map number and the site number, each observation is uniquely identifiable.
    - Be sure to write down, on your data sheet, the site number and map number.
    - Either before or after you photograph the site, note the number of the picture from the film on the form. At this point, the picture can be tied to the description, the description to the map, and the picture to the map.
    - If, at any point, you feel like you would like to comment on something you see, there is a comment form (or you can write your comments on the form you are using) that also identifies the site and map. You can use as much space as you need, but be concise.

Team Survey Procedures After you Return

1) **Arrange your data sheets -** Each team should have a Header Form, problem identification forms, and optionally, a comment sheet. These need to be organized by team and header sheet, especially where multiple teams have been surveying.
2) **Label your film -** This should be done whenever the film is changed, but at least it needs to be labeled before the processing.
3) **Enter the data**

Channelization

One of the most prevalent causes of stream distress is caused by channelization. Channelization is the artificial creation of a stream channel in a place where it wasn't. The effects of channelization are subtle in some cases. In others it can be devastating. Many flood work projects in West Virginia result in channelization. The prevailing thought of many people is if you can move the water from your property faster, then you will not be as vulnerable to flooding in the future. Usually by straightening the stream, making it wider and creating a trapezoidal channel, the work is performed. While the intention is good, the results are not.

By straightening the channel, the slope of the channel is increased, the speed of the water increases, and the force of the water increases causing damages below the work site. Making a channel wider may increase the capacity to transport more water during flood flows, but is terrible for aquatic life during normal flows when the depth of the stream is lower. Most widening efforts are short lived as well. The stream will deposit sediment where the flow is slower causing a new channel to form within the widened channel. Maintenance costs are extremely high to keep the widened section's ability to carry the designed capacity. After each storm event the channel capacity is diminished and maintenance must be performed.

Trapezoidal channels are expensive to build. Most have 'armoring' to protect the stream banks from eroding and usually riprap is used to protect the sides. Other methods of armoring include concrete, stone, brick, and lumber and, even in some places, automobiles (or what's left of them). Most of these structures do not provide adequate cover and streamside vegetation to support the stream-life that should be taking root in or near the stream.

Another form of channelization seen in some of the more developed areas is the 'buried stream'. People, who would like to look at lawn, or build over the stream, may have built a culvert to transport the water through their property. As you observe the stream, channelization will be evident where it occurs. You should estimate the length and width of the channel, measure its depth, and identify the 'armor' that protects it, if any.

Erosion and Sedimentation

Erosion is naturally occurring in all streams. However, when the effect of manmade changes accelerates erosion, the affect can be disastrous. Streams try to find a balance between the sediment created by the erosive process and the stream's ability to carry that sediment away. When manmade changes affect this balance, erosion occurs. You will see erosion in the outside bends of streams, where obstructions occur and near manmade structures such as channel projects, bridges, culverts and road crossings, among others. Streamside grazing of livestock can also initiate erosion.

Erosion should be recorded when the ground is bare with no vegetation on it. Serious erosion could cause loss of property as the ground eats away causing loss of foundation for buildings, fencing or roadways. When noting erosion problems, the size of the erosion site should be estimated. The height, width and depth of the ground loss are important to determine the extent of the problem. You should identify any at-risk property near the site; of extreme importance are any homes, which may be at risk.

One of the problems sometimes associated with erosion is sedimentation. As soils are washed into the stream it deposits on the streambed and can cause several problems for the aquatic life and flow patterns of the stream. As deposition of sediment occurs, it can cause mid-stream sediment bars to form

or it will deposit on one side or the other of the stream. As the water hits this new impediment the course of the water may change and cause additional erosion on the banks.

This process is repeated down stream and can eventually have great impacts on the stream course and streamside areas. Aquatic life such as macro-invertebrates and fishes use the spaces between the rocks and cobbles to live and reproduce. As these spaces fill with sediment, the places for these animals are reduced. The impact on the aquatic life is great when they have no place to hide, reproduce and feed. Sediment can be seen behind obstructions such as rocks and logs. Description of sediment should include an assessment of the size of the sediment particles. Sometimes it will be fine like baby powder, or it can be as large as boulders in fast moving water.

A modified **Wolman Pebble Count** is the most accurate method for determining the composition of bed materials in your stream and it provides information about channel stability. Streambed composition and the stability of the channel play an important role in determining stream behavior. Pebble counts provide a simple yet quantifiable way to characterize the streambed. The method requires two people, one in the stream and one on shore. The person in the stream reaches down without looking, picks up the first particle he or she touches, and measures it along its intermediate axis (i.e., neither the shortest axis nor the longest). The onshore partner records the measurement. The in-stream observer then takes a step and repeats the process, continuing until 100 pebbles have been measured. (Particles too large or too embedded to pick up are measured in situ.)

Important note: Many times both erosion and sedimentation is associated with channelization, which is described in the previous section. The erosion and sedimentation discussed here refers to those processes when they occur separately from channelization. In this case both erosion and sedimentation are largely dependent upon the land uses that occur both adjacent to the stream and in its watershed.

Inadequate Riparian Buffer

Riparian forests refer to the areas of forested land adjacent to a body of water (streams, rivers, wetlands etc.), which forms the transition between the aquatic and the terrestrial environment. Forests are the natural riparian vegetation in this region. Although they comprise only about 5 percent - 10 percent of the land in the watershed, riparian areas play an extremely important role in maintaining the health of all streams and rivers. Riparian forests are integral to the health of our rivers and streams for many reasons:

1. **Filtering Runoff** - rain that runs off the land can be slowed and infiltrated in the forest, which helps settle out sediment, nutrients and pesticides before they reach streams. Infiltration rates 10-15 times higher than grass turf and 40 times higher than a plowed field are common in forested areas. Studies have shown dramatic reductions of 30 percent to 98 percent in nutrients (nitrogen and phosphorus), sediment, pesticides, and other pollutants in surface and groundwater after passing through a riparian forest. In addition, trees provide deep root systems, which hold soil in place, thereby stabilizing stream banks and reducing erosion.

2. **Nutrient Uptake** - tree roots take up Fertilizers and other pollutants that originate on the land. Nutrients are stored in leaves, limbs and roots instead of reaching the stream. Through a process called "denitrification," bacteria in the forest floor convert harmful nitrate to nitrogen gas, which is released into the air.
3. **Canopy and Shade** - cool stream temperatures maintained by riparian vegetation are essential to the health of aquatic species. Shading moderates water temperatures and protects against rapid fluctuations that can harm stream health and reduce fish spawning and survival. Elevated temperatures also accelerate algae growth and reduce dissolved oxygen, further degrading water quality. In a small stream, temperatures may rise 1.5 degrees in just 100 feet of exposure without trees. The leaf canopy also improves air quality by filtering dust from wind erosion, construction or farm machinery.
4. **Leaf Food** - leaves fall into a stream and are trapped on woody debris (fallen trees and limbs) and rocks where they provide food and habitat for small bottom-dwelling creatures (i.e. crustaceans, amphibians, aquatic insects and small fish), which are critical to the aquatic food chain.
5. **Habitat** - riparian forests offer a tremendous diversity of habitat. The layers of habitat provided by trees, shrubs, and grasses and the transition of habitats from aquatic to upland areas make these areas critical in the life stages of many hundreds of species. Forest corridors provide crucial habitat for songbirds, some of which are now threatened due to loss of habitat. Also, many ecologically important species such as herons, wood ducks, black ducks, as well as amphibians, turtles, foxes and hawks and eagles utilize the riparian forest. Streams that travel through woodlands provide more habitats for fish by providing suitable spawning habitat for trout, bass, perch, and other species. The decline of these species in some areas is partly due to destruction of habitat, which for some, extends well into our smaller streams. Trees and woody debris provide valuable cover for small fish and other aquatic organisms along the stream bank as well. Degradation of any portion of a stream can have profound effects on living resources downstream. While the overall impact of these riparian forest corridors may be greatest in headwaters and smaller order streams, there is a clear linkage all the way to the oceans.

Characteristics of an adequate buffer are: the vegetation is undisturbed by grazing, mowing, construction, logging or other activities for at least 40 feet, 60 feet or more is considered optimal, and the trees are mature enough to provide shade. Land uses include human activities and natural or semi-natural land cover types along the stream at the station. Determining correctability will depend on how permanent the disturbance to the buffer zone is. For example, if the zone is mowed then to stop mowing is an easy correction. However, if there is a building or parking lot or some kind of permanent structure then it is uncorrectable.

Pipe Outfalls and Exposed Pipes

Pipe Outfalls

In 1977, the Clean Water Act was authorized, making it illegal to discharge pollutants directly into a surface body of water without a **National Pollution Discharge Elimination System** (NPDES) permit. Certain standards have been set for the amount of a given pollutant that can be discharged into a stream in order to minimize the impacts to stream health. Prior to the passage of the Act, millions of homes and businesses sent their wastewater through pipes directly into streams. Since that time, many communities, individual homeowners and businesses have not been able to afford the installation of wastewater treatment facilities and thus straight pipe their sewage into streams.

Any open-ended pipe extending from the stream bank is more than likely disposing of some sort of wastewater, or toxic substance into the stream. These pipes may carry sewage from a septic tank or other sources. They may carry discharges from a small industrial site, agricultural site or carry stormwater runoff. It may be fairly easy to distinguish what kind of effluent is emitted from the pipe. Observe the color. Check the odor of the

water coming from the pipe, or in the stream below the outfall point. In many cases, you can determine the source of the pipe by simply looking in the direction from which it is coming. Sometimes a little investigation will need to be done to check the source of the pipe.

Pipes that carry stormwater runoff should not be considered harmless. We have come to understand that rainwater flowing across lawns and city streets can pick up trace amounts of pesticides, herbicides, petroleum residues from vehicles and many other non-point sources of pollution. The combined flow from several communities can add considerable amounts of toxins into our streams. This is why it is important to identify and monitor all outflow pipes.

Exposed Pipes

A major portion of the infrastructure of our society is the network of pipes carrying drinking water, natural gas, stormwater runoff and sewage. These pipes are laid in the ground connecting homes and industries to and from water treatment plants, wastewater treatment plants or natural gas pumping stations. These pipes are often laid in the ground under or across streams and rivers.

If you see pipes of any length, width, or composition exposed in or near your stream, you want to record the location of those pipes. If a given exposed pipe is observed to be crossing the stream, denote the length of the exposed portion of the pipe and its diameter. The same applies to any pipes running parallel to the stream channel along the stream bank. Look closely to see if a given pipe shows any signs of fracture, or has any apparent discharge leaking from a fracture or natural joint.

Try to determine what kind of material the pipe is carrying. Small diameter pipes of just a few inches, frequently, carry natural gas, though some main-line natural gas pipes can be a foot or two in diameter. If you detect any odor or hissing sounds coming from the pipe, make a note. If you have concerns about a possible natural gas leak, notify your local gas company immediately. Larger-diameter pipes often carry stormwater runoff or sewage. You can check with your local Public Service District to get a map of existing pipes and manholes. Be sure to check the area around the pipes for odors and check the appropriate box. Also, if you detect a leak from the pipe, check the color and odor of the effluent and the color and odor of the stream water below the pipes.

Encroachment and Construction

Encroachment

Encroachment is the intrusion of structures/ buildings, roads, and porches into the immediate flood plain area adjacent to the stream or in the stream. Landowners and developers frequently build buildings and roads very close to or in streams for a multitude of purposes. These purposes can include a lack of available space between the stream and a road or the stream and a hill, or the desire to expand one's property.

This type of development can be damaging to streams and the structures by reducing the available space for the stream to move during its natural process of meandering and absorbing high water events. Streams, which are allowed to meander without

intrusion by man, can better withstand and remain healthy during a variety of flow levels. Where man interferes with this process; excessive erosion can occur causing problems for those who live down-stream and the aquatic life, which live in the stream.

In addition, encroachment can result in more damage to buildings and culverts from floodwaters. When looking for encroachment, you will be noting any structures or roads that are influencing the stream flow.

In or Near Stream Construction

Active land disturbances, such as construction, which includes earth moving or the movement of soil in or near the stream, pose a severe threat to the health of those streams. In-stream activities disturb both the stream banks and streambed, disrupting aquatic life and increasing turbidity by stirring sediment. There is also the potential of fluids leaking from equipment and polluting the stream.

Earth disturbance activities, such as construction, near the stream (in the riparian zone) pose the largest threat when rainfall washes soil into the stream increasing turbidity and sedimentation. Again, sedimentation affects aquatic life by reducing spawning areas and dwelling spaces, decreasing oxygen levels and killing the critters, decreasing species diversity, and possibly introducing toxic chemicals into the stream.

Appropriate best management practices can be used during construction to minimize the impacts on water quality. These practices can include silt fence, straw bales, revegetating and mulching, sediment ponds, and various other measures to either keep the soil in place on the land, or at least prevent the soil that moves from entering the stream.

If necessary, contact your local Division of Forestry office for any suspected forestry related violations, or you local DEP Environmental Enforcement office for all other suspected violations. When providing information to enforcement personnel, be clear and concise, provide a good description of the suspected problem and always provide them with accurate location information.

Barriers to Fish Movement, Trash Dumps and Unusual Conditions

Fish Barrier - Fish move throughout the stream for various reasons: for food, spawning, escaping predators and avoiding stressful conditions. Restricting the ability of fish to move makes them vulnerable to predation or pollution or interrupts an important part of their life cycle. Barriers to fish movement can also prevent re-colonization of an area after something has killed off the fish that had existed there before. Most of the barrier types are fairly obvious, however the "road crossing" type would usually refer to low water bridges. These bridges can act as dams on the upstream side and like waterfalls on the downstream side.

Trash Dumping – Trash is a common scene throughout our region along highways, streams and in many other areas humans frequent. Many times trash does not cause a serious environmental threat, however, when trash is dumped in large quantities, or large items such as tires, appliances, car parts etc. become lodged in the stream, the results can cause

serious damage to the stream channel. You should note trash dumping only when you believe there is a serious threat to the stream; either by causing channel instability or possible leachate pollution from a large trash dump area.

Unusual Conditions – This refers to anything that looks unnatural or unusual occurring in or around the stream. Descriptions of some commonly seen conditions are provided below.

Scum - Any floating or submerged substance that is not algae.
Unnatural Foam - Floating substance that is solid white or greater than three inches high or that has an unnatural or sewage odor.
Excessive Algae - Algae that forms a thick coat (1/2 inch or more) covering rocks and stream bed and/or is hairy strands that "flow" with the current.
Water Color - Water color is caused by a variety of both natural and unnatural conditions.
Water Clarity - Water is not always crystal clear, and for a variety of reasons (many sediment related) water can take on a number of shades. Water can be "murky" (can still be seen through but not clearly) or "turbid" (can not be seen through at all) and anywhere in-between.
Red Flock - A red or orange precipitate or discoloration of the rocks in the stream.
Sewage Discharge - Check to see if there are straight sewer pipes from residences, discharge pipes from a sewage treatment plant or seepage from the ground from failing septic systems.
Oil - Appears as a multi-colored sheen on the surface of the water.

WV DEP – Environmental Enforcement Field Offices

Environmental Enforcement conducts a variety of inspections and associated assistance activities at regulated facilities to ensure compliance with Chapter 22, Articles 11-15. These include reconnaissance inspections, compliance evaluation inspections, compliance sampling inspections, groundwater inspections, and pre-closure inspections. EE's 49 employees are based out of four regional and two satellite offices throughout West Virginia. The offices and the counties they cover are as follows:

Counties: Wyoming, Fayette, Monroe, Summers, Greenbrier, Nicholas, Clay, Braxton, Webster, Raleigh, McDowell, and Mercer	**Southeast Regional Office** 116 Industrial Drive Oak Hill, WV 25801-8329 Telephone: (304) 465-1919 Fax: (304) 465-1524	**Counties:** Kanawha, Boone, Wayne, Cabell, Logan, Mingo, Putnam, and Lincoln	**Southwest Regional Office** General Delivery Putnam Village #18 Teays, WV 25569 Phone: (304) 757-1693 Fax: (304) 757-3873
Counties: Calhoun, Roane, Jackson, Mason, Wood, and Wirt	**Parkersburg Office** 231 Ohio Avenue Parkersburg, WV 26101 Phone: (304) 420-4635 Fax: (304) 420-4554	**Counties:** Monogalia, Marion, Taylor, Barbour, Harrison, Doddridge, Gilmer, Upshur, and Lewis	**Northwest Regional Office** 1304 Goose Run Fairmont, WV 26554 Phone: (304) 367-2724 Fax: (304) 367-2727
Counties: Preston, Tucker, Pendleton, Hardy, Grant, Randolph, Jefferson, Berkeley, Morgan, Pocahontas, Mineral, and Hampshire	**Northeast Regional Office** 1 Depot Street Romney, WV 26757 Phone: (304) 822-3551 Fax: (304) 822-7331	**Counties:** Marshall, Ohio, Brooke, Wetzel, Hancock, Tyler, Pleasants, Ritchie	**Wheeling Office** 303 Methodist Building Wheeling, WV 26003 Phone: (304) 238-1075 Fax: (304) 238-1006

WV Division of Forestry District Offices

District I Route 2, Box 1100 Fairmont, WV 26554 367-2793	**District II** 1 Depot Street Romney, WV 26757 822-451	**District III** P.O. Box 38 State Route 20 French Creek, WV 26218 924-6266	**State Tree Nursery** 101 Allison Drive P.O. Box 8 West Columbia, WV 25287 675-1820
District IV 330 Harper Park Drive, Suite J Beckley, WV 25801 256-6775	**District V** P.O. Box 189 878 E. Main Street, Rear Milton, WV 25541 743-6186 or 743-6254	**District VI** 2309 Gihon Road Parkersburg, WV 26101 420-4515 or 420-4516	**Division of Forestry** 1900 Kanawha Blvd., East Charleston, WV 25305-0180 558-2788

Glossary of Terms

Bottom Width - Bottom width of stream or channel
Contamination that occurs when rainwater or snowmelt washes over the land, picking up soil particles and pollutants which either infiltrate into groundwater or run off into streams and rivers.
Corrugated metal pipe/culvert - A metal pipe, which has a ridged or furrowed surface.
discharged directly into the stream. This usually only occurs during or right after a storm.
Downcutting - Erosion of the stream bank that is cutting downward or deepening the channel.
Earthen channel - Ditches or channel excavated by man for the flow of water.
Effluent - Wastewater, either treated or untreated that is discharged into the environment.
Excessive Algae - Algae that forms a thick coat (1/2 inch or more) covering rocks and stream bed and/or is hairy strands that "flow" with the current.
Gabion - A wire mesh cage, usually rectangular, filled with rock and used to protect stream channel banks and other sloping areas from erosion.
Industrial - A pipe that discharges treated wastewater from an industrial source such as a chemical or manufacturing plant.
Length - Length of stream affected by riprap, gabions, or other substance, or length of man-made earth channel
Nonpoint source pollution - Pollution that enters a water body from diffuse origins in the watershed.
Oil - Appears as a multi-colored sheen on the surface of the water.
Red Flock - A red or orange precipitate or discoloration of the rocks in the stream.
Riprap - Rock, cobbles or boulders placed on the stream bank and other sloping areas to protect these areas from erosion or the action of water.
Scum - Any floating or submerged substance that is not algae.
Sewage Discharge - Check to see if there are straight sewer pipes from residences, discharge pipes from a sewage treatment plant or seepage from the ground from failing septic systems.
Sewage overflow - Typically, the same outfall or pipe that transports stormwater, also transports sewage overflow. Sewage overflow occurs when more water is routed into a town or city's municipal waste treatment plant than that plant can handle. The overflow bypasses the treatment process and is
Stormwater - Rainwater that runs over streets, parking lots and the land in general into storm drains. This water is then conveyed, by pipe, to the river or stream as a discharge.
Too Fast - A high water condition where the current is too swift and there is inadequate cover on the bottom to break up the current and allow fish to move along the bottom. This is typically seen where the streambed is bedrock and the stream gradient and water levels are high.
Too High - If something blocking the stream is high enough or wide enough to prevent fish from jumping over it.
Too Shallow - A low water condition where fish must stay in isolated pools and any flow between the pools is too low to allow fish to swim.
Unnatural Foam - Floating substance that is solid white or greater than three inches high or that has an unnatural or sewage odor.

Water Clarity - Water is not always crystal clear for a variety of reasons, also, in some cases water can be extremely clear due to some type of toxic pollution. Water may be "murky" (can still be seen through but not clearly) or "turbid" (can not be seen through at all).
Water Color - Water color is caused by a variety of both natural and unnatural conditions.
Water Drop - A direct vertical drop from a waterfall or a culvert. A drop of a foot or more should be enough to prevent most fish from traveling upstream. However during high water this drop will be reduced or disappear.

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Web Sites

American Rivers
1. http://www.americanrivers.org/streamrestorationtoolkit/conductingasurvey.htm

Know Your Watershed
2. http://www.ctic.purdue.edu/KYW/resourcelinks.html

Watershed Tools
3. http://www.epa.gov/OWOW/watershed/tools/

Volunteer Monitoring Manual: The Visual Assessment
4. http://www.epa.gov/volunteer/stream/vms32.html

Georgia's Adopt-A-Stream
5. http://www.riversalive.org

West Virginia Watershed Resource Center
6. http://www.wvwrc.org

Topographic Mapping Software from MapTech

USGS Topographic Mapping Software available from MapTech: Three CDROMS ($49.95/each) cover the entire state of West Virginia, or you can purchase the section you need. They are divided as follows:

- West Virginia – Metro Valley and Southwest
- West Virginia – Eastern Gateway and Greenbrier Valley
- West Virginia – Northern Panhandle and Mid-Ohio Valley

Minimum system requirements: Windows 95, 98 or NT; 486 CPU or higher; CDROM Drive; 16 MB of RAM; 256-color monitor; Mouse or drawing object. For more specific information on the software, or to purchase on-line, visit the MapTech web site at http://maptech.com.

Appendix – The Field Data Sheets

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Submit your survey data sheets, photos and field notes to the address below.

WV Dept. of Environmental Protection
Save Our Streams Program
601 57th Street, SE
Charleston, WV 25304

E-mail: timothy.d.craddock@wv.gov

Daily Team Survey Header Information

Stream Name(s):		Date:
Watershed:		
Current Weather Conditions:		
Weather Conditions Previous 48 Hours:		
Topographic-quads used in today's survey		
Team members participating in today's survey		
Comments about today's survey:		
Contact Information		
Affiliation (Group Name):		
Mailing address:		
City:	State:	Zip Code:
Phone and/or fax number:		
E-mail's/web page:		

Once you have completed your TEAM survey, submit each field data sheet, the header information corresponding to them, photographs, comment sheets, and the topo-maps with the locations of problem areas marked, to the Citizens Monitoring Coordinator at the address below. The information will be reviewed, a map created and a resource person will help you interpret and identify plausible solutions to the problems you may encounter.

West Virginia Save Our Streams
1201 Greenbrier Street
Charleston, WV 25311
(304) 558-2108

If you have questions send an e-mail to tcraddock@mail.dep.state.wv.us

Channelization Field Data Sheet

Stream Name:							Site Code:		
Topo Quad Name:							Photo #:		
Date:	TEAM Members:								
Latitude:				Longitude:					
Type of Channelization (check all that apply).									
Concrete				Riprap					
Gabion baskets				Earthen channel					
Other (describe):									
Looking downstream from the channel structure is erosion occurring?							Yes	No	
Estimate the extent of the stream bank erosion within this reach on both the left and right sides using either a percentage estimate, or an actual measurement in feet/meters of the area eroded.									
Left stream bank				Right stream bank					
Is the channelization part of a road and/or bridge crossing?							Yes	No	
Is vegetation growing in the channelized areas?							Yes	No	
Looking downstream from the channel structure is sedimentation occurring?							Yes	No	
Estimate the extent of the sediment deposition within this reach using either a percentage estimate, or an actual measurement in feet/meters of the depositional areas.									
Left side of channel				Right side of channel					
Estimate the severity of channelization within this reach using the scale below.									
Severe Channelization				Moderately Channelization			Slight Channelization		
10	9	8	7	6	5	4	3	2	1
Additional comments:									

Erosion and Sedimentation Field Data Sheet

Stream Name:							Site Code:		
Topo Quad Name:							Photo #:		
Date:	TEAM Members:								
Latitude:				Longitude:					
Downcutting is occurring, and is due to which of the following (check all that apply)?									
Bend in channel				Road crossing					
Steep sloping stream bank				Pasture/crop field					
Natural causes				Other (describe)					
Widening is occurring, and is due to which of the following (check all that apply)?									
Bend in channel				Road crossing					
Steep sloping stream bank				Pasture/crop field					
Natural causes				Other (describe)					
Estimate the severity of erosion or erosion potential in this reach using the scale below.									
Severe Erosion				Moderate Erosion			Slight Erosion		
10	9	8	7	6	5	4	3	2	1
Length of erosion area in reach				Average exposed bank height					
Are sediment depositional features observed within this reach (check all that apply)?									
Gravel bars				Sand bars					
Filling in of pools and/or riffles				Other (describe)					
Estimate the severity of sediment deposition in this reach using the scale below.									
Severe Sedimentation				Moderate Sedimentation			Slight Sedimentation		
10	9	8	7	6	5	4	3	2	1
Pebble Count Results									
% Slit/clay				% Cobble					
% Sand				% Boulder					
% Gavel				% Bedrock					
Land Uses – indicate the land uses that are observed within this reach. Using the following scale estimate the impact you believe the land use is having on this stream segment; (3) High Impact, (2) Moderate Impact, (1) Slight Impact, and (0) No Impact.									
Pasture field				Suburban/homes					
Crop field				Urban/businesses					
Mining				Roads/road crossings					
Logging				Construction					
Other (describe):									
Additional comments:									

Inadequate Riparian Buffer Field Data Sheet

Stream Name:				Site Code:	
Topo Quad Name:				Photo #:	
Date:	TEAM Members:				
Latitude:		Longitude:			
Looking downstream, is the buffer inadequate on the right side, left side, or both sides?					
Right Side		Left Side		Both Sides	
If possible, measure the width of the buffer zone on the sides you indicated above.					
Right side width		Left side width			
Estimate the amount of shading that this section of stream reach receives. Your estimate should reflect full-leaf conditions when the sun is at its highest point (noon) in the daytime sky.					
Excellent	Good	Marginal	Poor		
< 80%	80 – 60%	60 – 40%	> 40%		
Describe the condition of the riparian buffer zone by indicating the % and types of vegetation present (trees, shrubs, herbaceous, grasses, or no vegetation "bare soils"). Keep in mind that a healthy buffer zone should have a diverse representations in all layers of the canopy.					
Trees		Shrubs		Herbs/grasses		Bare soils	
Does the buffer zone contain mostly native vegetation?				Yes	No
If (yes) describe the dominant types of vegetation:					
If (no) describe the non-native "invasive" species that you are aware of:					
Land Uses – indicate the land uses that are observed within this reach. Using the following scale estimate the impact you believe the land use is having on this stream segment; (3) High Impact, (2) Moderate Impact, (1) Slight Impact, and (0) No Impact.					
Pasture fields		Suburban/homes			
Crop fields		Urban/industrial			
Mining		Roads/road crossings			
Logging		Construction			
Other (describe):					
Additional comments:					

Pipe Outfall Field Data Sheet

Stream Name:	Site Code:
Topo Quad Name:	Photo #:
Date: TEAM Members:	
Latitude:	Longitude:

Type or possible source of the pipe outfall (check all that may apply).			
Sewage overflow		Straight pipe	
Stormwater		Industrial	
Agricultural		Other (describe):	
Pipe Construction			
Earthen channel		Corrugated metal	
Concrete		Smooth metal	
Pipe Location (facing downstream)			
Left bank		Right bank		Other area	
Pipe diameter		Pipe length		Discharge velocity	
Is there a discharge coming from the pipe outfall?			Yes	No

Discharge Color				Discharge Odor			
No color/clear		Orange/red		Musky		Rotten egg	
Brown		Yellow		Sewage		Fishy	
Green		White/gray		Chlorine		None	
Black		Other		Other (describe):			
Is there surface foam with the discharge?				High		Moderate		Slight		None	

Is there a coating on the streambed associated with the discharge?	Yes	No
If (yes) describe the coating:		
Additional comments:		

Exposed Pipe Field Data Sheet

Stream Name:			Site Code:
Topo Quad Name:			Photo #:
Date:	TEAM Members:		
Latitude:		Longitude:	

Type or possible source of the pipe outfall (check all that may apply).							
Sewage overflow				Straight pipe			
Stormwater				Industrial			
Agricultural				Other (describe):			
Pipe Construction							
Earthen channel				Corrugated metal			
Concrete				Smooth metal			
Exposed pipe location within this stream reach.							
Along stream bank				Across top of stream			
Along stream bottom				Exposed manhole			
Other (describe):							
Pipe diameter				Length of exposed pipe			
Is there a discharge or evidence of discharge coming from the pipe?					Yes	No	
Discharge Color				Discharge Odor			
No color/clear		Orange/red		Musky		Rotten egg	
Brown		Yellow		Sewage		Fishy	
Green		White/gray		Chlorine		None	
Black		Other		Other (describe):			
Is there surface foam with the discharge?				High	Moderate	Slight	None

Is there a coating on the streambed associated with the discharge?	Yes	No
If (yes) describe the coating:		
Additional comments:		

Encroachment and Construction Field Data Sheet

Stream Name:			Site Code:
Topo Quad Name:			Photo #:
Date:	TEAM Members:		
Latitude:		Longitude:	

What type of encroachment is occurring (check all that apply)?					
Roads (paved/unpaved)		Road crossing/bridges			
Low water crossing/bridge		Residential development			
Industrial development		Unknown structures			
Other structures (describe):					
Distance from the stream		Length of area affected			
Are stream bank erosion and/or sedimentation occurring at the site?			Yes	No	
What type of construction activity is occurring (check all that apply)?					
Highway (paved/unpaved)		Utility			
Road crossing/bridge		Logging			
Residential development		Industrial development			
Mining activities		Bank stabilization			
Other activities (describe):					
Is sediment entering the stream from the construction activity?			Yes	No	
Are there sediment/erosion control structures (BMP's) in place at the site?			Yes	No	
Distance from the stream		Length of area affected			
Can you identify the company performing the work?			Yes	No	
If (yes) record the contact information in the spaces below.					
Additional comments:					

Fish Barriers and Trash Dumping Field Data Sheet

Stream Name:			Site Code:
Topo Quad Name:			Photo #:
Date:	TEAM Members:		
Latitude:		Longitude:	

FISH BARRIERS					
Type of barrier (check all that apply).					
Manmade dam		Beaver dam			
Road crossing		Low water bridge			
Natural waterfall		Debris			
Channel		In-stream impoundment			
Other barriers (describe):					
How much of the stream is blocked due to the barriers?					
Total blockage		Partial blockage			
Is the blockage a result of the water flow?				Yes	No
If (yes) describe the flow conditions.					
Too high		Too shallow		Too fast	

TRASH DUMPING							
Describe the types of trash observed (check all that apply).							
Residential			Industrial				
White products			Yard waste				
General litter (bottles, paper etc.)			Construction				
Floatable			Furniture/appliances				
Tires			Car parts				
Other (describe):							
Land ownership	Public		Private		Unknown		
Is the trash dump confined to a single area or does it occur throughout the reach?							
Left side		Right side		Both sides		Other areas	
Limited area			Throughout reach				
Estimate or measure the amount of the reach (ft.) affected.							
Estimate the amount of trash within the reach (tons/lbs).							

Additional comments:

Unusual Conditions Field Data Sheet

Stream Name:	Site Code:
Topo Quad Name:	Photo #:
Date:	TEAM Members:
Latitude:	Longitude:

Describe or use the boxes below to record the unusual conditions you observe.							
Description:							
Scum				Unnatural foam			
Excessive algae				Red/orange Flocculates			
Sewage discharge				Oil/chemical			
Water Color				Water Odor			
Brown		No color		Rotten egg		Musky	
Green		Tea color		Sewage		Chemical	
White/gray		Orange/red		Other (describe):			
Black		Other					
Water Clarity	Clear	Murky	Milky	Muddy			

Land Uses – indicate the land uses that are observed within this reach. Using the following scale estimate the impact you believe the land use is having on this stream segment; (3) High Impact, (2) Moderate Impact, (1) Slight Impact, and (0) No Impact.			
Pasture fields		Suburban/homes	
Crop fields		Urban/industrial	
Mining		Roads/road crossings	
Logging		Construction	
Other (describe):			

Describe what you feel are some potential causes of the unusual conditions:
Additional comments: