

STREAM TEAM

Inventory **GUIDE**

INVENTORY YOUR ADOPTED STREAM AND . . .

LEARN ABOUT YOUR STREAM'S HEALTH

IDENTIFY PROBLEMS THAT MAY NEED WORK

UNDERSTAND MORE ABOUT STREAMS IN GENERAL



◆ EDUCATION ◆ STEWARDSHIP ◆ ADVOCACY ◆

MISSOURI STREAM TEAM



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If you need assistance or would like more information, please call:

1-800-781-1989 (voice mail) or
573/751-4115 (ask for Stream Team)

You can also write to us at:

Stream Team
PO Box 180
Jefferson City, MO 65102-0180

Or e-mail us at:

streamteam@mail.conservations.state.mo.us

Or visit our website at:

<http://www.mostreamteam.org>

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STREAM TEAM

Inventory GUIDE

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INTRODUCTION

Congratulations and thank you for volunteering to join Missouri's Stream Team program. Your efforts will help develop a sense of river stewardship, heighten awareness of stream quality in your community, and provide a voice for streams.

This **STREAM TEAM INVENTORY GUIDE** provides information and guidance for on-site assessment of the condition of your adopted stream.

You will find short descriptions and pictures of what both healthy and abused streams look like. Nine different stream components are defined and used to assess stream quality.

An Observation Record (pages 12-13) and a Problem Identification Worksheet (pages 14-15) will help you learn more about your adopted stream's health and identify specific problems that need your attention.

Throughout this manual, key technical terms appear in ***bold italics***. These terms are defined in the Glossary at the back of the manual on page 16.

A topographic map is a helpful tool in completing your **INVENTORY**. Topographic maps can be purchased from:
DNR Division of Geology & Land Survey
PO Box 250
Rolla, Missouri 65402-0250
Phone: 573/368-2125

HOW TO USE THE INVENTORY MANUAL

Read the background information on each stream component (beginning on page 3) before starting your **INVENTORY**.

Assess and compare your adopted stream with the information provided here, and then write comments and observations about your stream on the Observation Record on page 12.

The more thorough you are, the more useful the **INVENTORY** will be. Be sure to make note of

major differences between one part of the stream and the next. Descriptions of the differences between the left and right banks will be especially helpful.

The next step is to evaluate your stream in each of the categories on the Problem Identification Worksheet on page 14.

Section by section, project by project, your Team will improve the overall health of your stream.

Keep this booklet to use in long-range planning and to

monitor changes in the problem areas you identify in your first **INVENTORY**. Compare the score your stream has today with a new score in three to five years.

After completing your **INVENTORY**, photocopy the Observation Record and the Problem Identification Worksheet and mail the copies (along with a completed Activity Report) to:
Stream Team
PO Box 180
Jefferson City, MO 65102-0180

LET'S GET STARTED

Turn to page 12 of this manual and fill out the Stream Identification section of the Observation Record. Identify your stream or river **reach** with landmarks such as bridges or access areas, and the length of the adopted reach (for example, "Hometown Creek

from Main Street Bridge to Neighborhood Park"), or with a **legal description** (township, range, section, quarter). Also note the county, the date on which you conducted the **INVENTORY**, your Stream Team number and name, other participants, and your means of travel while

conducting the **INVENTORY**. Review what you've learned from pages 3-11, and then use your new knowledge to complete the rest of your Observation Record and Problem Identification Worksheet.

Enjoy your day out on your adopted stream!

THE WATERSHED

A *watershed* is an area of land that drains water into a stream. This area can be quite small, a few hundred acres draining into a small creek, or very large, like the watershed of the Mississippi River which makes up a large part of the United States.

Normally, precipitation falling in a watershed ultimately reaches the stream, either directly, through surface runoff, or indirectly, by water seeping through the soil and entering the groundwater system. Whatever is in the watershed can also enter a stream through these methods.

Not everyone lives next to a stream, but we all live in a watershed. Therefore, we are all connected directly to a stream, and what we do on that land will help or hurt that stream. The way we use the land within the watershed determines the quality and quantity



Not everyone lives next to a stream, but we all live in a watershed. And whether the watershed is rural or urban, all activities within that watershed contribute to stream harm or health.

of water in the stream.

A well-managed watershed is characterized by land uses that protect against soil erosion and heavy runoff. This, in turn, keeps *sediment* and other particles from entering streams. Some good

agricultural land-use practices include: *terracing*, *strip cropping*, and *no-till cultivation*. Careful urban land-use practices include: the construction of *settling ponds* adjacent to disturbed areas, using silt fences in construction sites, and maintaining well-vegetated *buffer strips* around development.

Poorly managed watersheds are characterized by land uses that do not protect against soil erosion and heavy runoff. Overgrazing, plowing up and down hills, uncontrolled urban runoff, mining, haphazard development, and activities that expose soil to erosive forces are characteristic of abused watersheds. Poorly managed watersheds rarely accompany good streams. Your county Natural Resource Conservation Service Office is a good source of information on watershed conditions.



A poorly-managed watershed will evidence heavy soil erosion. Agricultural areas show few soil conservation practices, and urban areas lack *Best Management Practices* during and after construction.

THE FLOODPLAIN

The *floodplain* of a river is a relatively level area on both sides of the stream channel that carries excess water the channel cannot hold. The floodplain allows the excess water to spread out, reducing the flood water's speed. As a result, less damage occurs downstream. If flood water is not allowed to spread out in the floodplain, the channel is forced to handle more of the flow, and excess erosion is likely to occur.

In relatively undisturbed Missouri watersheds, floods large enough to overflow into the floodplain occur about every two to two-and-a-half years. People, however, tend to forget the function of floodplains. Communities build roads, developments, and levees in the floodplains, resulting in property loss during floods. In addition, land-use practices in a watershed ultimately affect water quantity and quality in a floodplain. **Best Management Practices** (BMP) help to prevent excessive runoff, water pollution, and erosion.



The purpose of a floodplain is to allow excess water to spread out, reducing the floodwater's speed. As a result, less damage occurs downstream. In Missouri, floods large enough to overflow into the floodplain occur about every two to two-and-a-half years.



People tend to forget the function of floodplains and build roads, developments, and levees in the floodplains, resulting in property loss during floods.

THE WETLAND

Flood plains contain *wetlands* which function to slow and filter flood waters. Wetlands also provide habitat for a diversity of wild-life.

What constitutes a wetland? The three elements of a wetland are: *hydrology*, *hydric soil*, and *hydrophytic vegetation*. A wetland is periodically covered or saturated by surface or groundwater, has predominantly hydric (unoxidized) soils, and at least periodically supports hydrophytic (water-tolerant) vegetation.

The characteristics that distinguish wetlands from other *ecosystems* make it difficult to clearly define their boundaries. The eight types of natural Missouri wetlands are swamp, shrub swamp, forest wetland, marsh, wet meadow, fen and



Wetlands reduce flood severity, improve water quality, reduce runoff and erosion, and provide habitat for diverse wetland plants and waterfowl.

seep, pond and lake border, and streambed.

Missouri has lost more than 90% of its wetlands. The

Bootheel, which was once composed of wetlands, has been drained for agricultural use.

Today, resource agencies try to restore wetlands because of the important ecological roles they play. These roles include reducing flood severity, improving water quality, reducing runoff and erosion, providing habitat for diverse plant and animal life, and helping to sustain base flow of adjacent streams and rivers during drought conditions.

BMPs include leaving filter strips and field borders along wetlands and streams.



Floods or heavy rains will attempt to reclaim wetlands previously drained for agricultural use.

THE RIPARIAN ZONE

The *riparian* zone is the land immediately adjacent to a stream. Operationally, the riparian zone can be defined as a band 100-feet wide

on either side of the stream.

Vegetation growing in this zone provides many benefits and is necessary for creating a healthy stream. For instance,



A healthy stream has a 50- to 100-foot-wide riparian zone of trees and understory vegetation that acts as a buffer between the stream and the land uses (either rural or urban) adjacent to it.



Row crops and pastures, or even urban parking lots and buildings, that replace trees and understory vegetation within the riparian zone, lead to erosion and unfiltered runoff, causing loss of aquatic and wildlife habitat and poor water quality.

riparian trees shade and cool the water from the scorching summer sun. Leaves and branches provide organic matter for the aquatic *food chain*. The trees' deep, dense root systems also help hold *streambanks* together. During floods, riparian vegetation slows the flow of water and protects adjacent fields from *floodplain scouring*. Riparian vegetation also provides habitat for wildlife. All streams are dependent on well-managed riparian zones. Re-establishing them may be a key step in restoring degraded streams.

Healthy, well-managed riparian areas have a variety of tree species and *understory vegetation*. In a well-managed riparian zone, understory vegetation covers, about 90% of the area. A healthy, well-managed stream has very little streambank erosion.

A poorly managed riparian zone generally has few trees or other vegetation. If trees are present, they are sparse, or the zone is less than 100-feet wide. In poorly managed urban riparian zones, trees are frequently replaced by parking lots, buildings, and other impermeable surfaces too close to the stream. Poorly managed rural streams may be characterized by cultivation or grazing through the riparian zone, right up to the edge of the stream. When livestock have complete access to the stream, trampling damage to stream banks is severe.

THE STREAMBANK

The streambank is the area from the water's edge to the top of the bank, usually delineated by a change in slope or vegetation. In some cases, however, the streambank may be difficult to distinguish from the riparian zone. The function of the

streambank to contain flowing water is obvious, but, like the riparian zone, stable banks offer additional benefits to the stream system.

Trees stabilize streambanks and shade the stream to moderate water temperatures. Leaf litter is a vital

source of soluble nutrients for plants; and a food supply for many aquatic insects. Streambank vegetation also attracts terrestrial insects, which may fall into the water and provide food for fish. Submerged roots provide excellent habitat for fish, frogs, beaver, muskrat, otter, and a variety of other animals.

Stable streambanks are characterized by being well-vegetated, with a variety of tree species. They exhibit minimal erosion. The roots of trees and other plants hold the soil and provide stability under normal conditions. Stability is also dependent upon the types of materials present in the banks. For example, a bank composed of compacted clay and tree roots will be much more stable than one made of sand and silt.

Unstable streambanks are characterized by a lack of vegetation, resulting in severe erosion.

Factors that can destabilize streambanks include:

- ◆ over-grazing in the watershed,
- ◆ cultivating too close to the bank,
- ◆ clearing trees and other vegetation from the streambank or riparian zone,
- ◆ changes made to the stream channel that increase erosive forces,
- ◆ changes in the watershed, such as increased pavement, that increase the volume and speed of water in the stream channel.

Unstable banks lose valuable soil, look terrible, and their eroded soils smother aquatic habitats downstream.



A wide variety of trees, brush, and other plants stabilize streambanks and provide nutrients and habitat for wildlife as well as shade for cooler water temperature.



Unstable streambanks lacking vegetation result in severe erosion of soils that smother aquatic habitats. A lack of shade will increase stream temperature and decrease needed oxygen.

THE STREAM CHANNEL

The stream channel is where water concentrates to flow downstream. Everything between the streambanks is considered part of the channel, even if it may be dry at a particular time. Gravel bars, for example, may be dry most of the time, and may even have established vegetation, but they are still part of the stream channel.

The stream channel is characterized by an elevation drop as the water flows downstream. This downhill slope is called the **stream gradient**. As water flows downhill it gains speed and thus energy. The higher the stream gradient, the greater the energy and speed of the flowing water.

Most Missouri streams flow in **meandering** (curvy) patterns because this is the natural way for water to flow through flood plains with low to moderate gradients. Natural prairie streams, which flow down gentle slopes through erosive soils, meander a great deal. However, many of Missouri's prairie streams have been artificially straightened, or **channelized**. Ozark streams have much steeper gradients and numerous rock outcrops. This causes the



Channelized streams increase gradient and flow speed, eroding streambanks and degrading habitat.

stream to flow faster with fewer curves and carry larger **bed loads**.

Whether an Ozark stream or a prairie stream, channels and the forces that form them are important. **Pool** and **riffle** formation, streambank erosion, and a large number of stream problems are better understood if one appreciates the interaction of stream gradient, stream flow, and streambed and streambank materials.

Stable streams are characterized by a balance in streambed and streambank materials, stream flow, and gradient. When a channel is altered, the stream energy becomes unbalanced, often causing drastic changes upstream and/or downstream. For example, **gravel dredging** loosens the bed material, making it easier for the stream to pick up particles and deposit them in downstream pools.

Channelization, the straightening of a stream channel, increases the gradient and energy, since water in a straightened channel flows further downhill over a shorter horizontal distance than when it meanders. Greater energy and faster flow results in increased erosion, **down-cutting** of the stream bottom, and the degradation of fish habitat.

Channel paving creates a very erosion-resistant bed material. The stream can no longer scour pools and create riffles, making very poor habitat for aquatic organisms.

Dams and their impounded waters also drastically alter



Streams allowed to meander naturally are characterized by a balance in streambank material, gradient, and flow.

streams. Impoundment smothers a stream to the point where it cannot function as a stream, becoming more like a lake instead. Also, discharges from the dam impact downstream reaches that remain flowing. When water is released from the dam, the extreme change in elevation gives the water more energy than it would have in its natural state. This energy cuts deeper into the stream bottom and banks until the excess energy is dissipated. Finally, the effects of increased or decreased stream flows alter channel characteristics through erosion or deposition of materials, thus increasing or decreasing channel dimensions. Stream flow may also change due to flooding, or by changes in the watershed (such as paving and other development) that increase runoff.

A stream channel is efficient in its natural, balanced state. It is important to understand the interrelationships of gradient, stream flow, and bottom/bank materials because a change in any of these factors can cause dramatic changes both up and down the stream.

FISH AND WILDLIFE HABITAT

All life forms in and around the stream are dependent upon specific habitat for their existence. Each specific habitat determines the amounts and types of food, shelter, and spawning areas available. In turn, these will dictate which species will be able to live in and near a stream.

Four primary factors determine in-stream habitat quality:

1. Pools and riffles are the dominant habitat types in a stream ecosystem. The deep, slower-moving waters provide cover and quiet resting areas. These pools are the primary locations for structure. Riffles are shallow and faster flowing. They put oxygen into the water and are the primary habitat of insects and small fish, which feed larger predators such as sportfish. A healthy stream system has a consistent pool-riffle-pool sequence.

In an unhealthy system, pools can become degraded by filling up with sediment that eroded from



In-stream gravel mining destroys pools and riffles essential for aquatic systems.



Riffles provide oxygen and habitat for aquatic life.

the watershed and stream banks upstream, a process known as **channel filling**. Riffles can be destroyed by heavy equipment in the stream or headcuts moving through them.

2. Stream flow (water speed and regular flow volume) is the basis for all that takes place in the stream. It becomes especially critical during the spawning seasons and during the hot, dry summer months.

3. Structure (**rootwads**, logs, boulders, vegetation, etc.) is important because it gives shelter to all forms of aquatic life. Ample structure provides cover for fish, attachment areas for insects, and homes for reptiles, amphibians, and mammals.

4. A good stream bottom is one that is stable. Stable bottom material does not shift with normal stream flow. Material is neither being deposited nor eroded away. Such a bottom provides habitat for insects and crayfish, and essential

spawning ground for fish.

The primary factor determining streamside wildlife habitat is the riparian corridor. A healthy forest provides wildlife with nesting and foraging cover. It also produces a wide variety of food items, from nuts and berries to insects and rodents. In fact, timbered riparian corridors are Missouri's richest wildlife habitat and harbor most of our state's endangered species.

Excellent aquatic habitat includes deep pools and stable, shallow riffles. Adequate stream flow occurs throughout the year. In-stream cover is available in the form of submerged rootwads or trees, boulders, or undercut banks. Wildlife habitat consists of good riparian zone vegetation.

In degraded aquatic habitats, pools are shallow and filled in. Riffles may be destroyed or covered with sand or silt. Stream flow may be lacking during much of the year. No rootwads, trees, boulders or undercut banks exist.

SCENIC FEATURES

Most of us hold natural beauty in high regard. Rivers have a variety of physical and biological characteristics that make them appealing to a wide variety of users. While difficult to define, categorize, or

quantify, *aesthetic values* play a major role in our relationships with streams.

Some want a feeling of intimacy with a river, or closeness to wildlife, whereas others enjoy viewing sights along the valley

floor, at some distance from the river channel itself. Aesthetically pleasing streams leave one with a feeling of comfort, harmony, and satisfaction. Aesthetically displeasing streams may evoke emotions of frustration, despair, loss, or anger.

Two features of aesthetics are common to all river users.

1. Natural physical features dictate a stream's visual makeup. Unique geologic features, as well as the relative naturalness of the stream in general, are important. Streams that have natural channels, good water quality, stable banks, and healthy and abundant riparian vegetation will rank high in aesthetic value. Streams that have altered channels, poor water quality, bank erosion problems, and sparse riparian vegetation will rank poorly.

2. Lack of apparent human disturbance is often tightly bound to the aesthetic value of a stream. Many river users at one time or another wish they could go where no one has been before. Streams having less evidence of human influence often rank high in aesthetic value.

For others, occasional reminders of human use, especially of a pastoral nature, add to the aesthetic value of a stream. Streams that have litter, fences, livestock, discarded vehicles or appliances, utility lines or towers, buildings (especially unkempt or intrusive ones), or other negative evidence of human use may rank low in aesthetic value.



Lack of human disturbance, abundant riparian vegetation, and good water quality ensure that a stream ranks highly when considered for its scenic features.



Discarded appliances not only mar the scenic value of streams, but can contaminate waters with leaking motor oil or other compounds.

WATER QUALITY

The quality of the water in a stream is very important. Farmers use the water to produce food; businessmen use it for commerce. Most municipalities take stream water for their drinking water supply, as well as for cooking, bathing, and other household uses. It also supports fish, wildlife, and recreation. With all these beneficial uses, the need for good water quality is obvious.

Environmental professionals define good water quality as the physical, chemical, and biological properties water needs to sustain all the uses to which it may be put. However, the meaning of this definition sometimes isn't very obvious.

For example, distilled water is pure and clear, but is a very poor medium for supporting and sustaining fish populations. Water in northern Missouri streams is often more *turbid* than that in southern Missouri, due simply to the terrain over which the streams flow. However, a northern prairie stream can be as valuable a resource as a southern Ozark stream.

To judge the water quality in a stream, we must consider the properties of water: physical (water clarity and temperature), chemical (dissolved oxygen, pH, and chemical contaminants), and biological (vegetation, stream insects, and fish populations). These characteristics should be judged as they compare to natural conditions, as well as to the



A direct discharge from a pipe is **point source pollution** and can usually be traced and identified.



Stream Team trains Volunteer Water Quality Monitors how to sample streams biologically and chemically.

potential uses of the stream.

Water pollution, defined as the overabundance of one or more natural or man-made substances in water, is divided into two major types:

1. **Point source pollution** can be traced to a single source, such as a pipe, culvert, or ditch. Most people can identify point source pollution problems, such as discharges of off-colored liquids from pipes leading from manufacturing plants, or over-enrichment of a stream section traced to discharges from sewage outfalls.
2. **Non-point source pollution** originates from a geographically wider source and may be harder to trace. It often depends on natural forces, such as rain or wind, to deliver the pollutant to the stream. Soil from eroded fields, acid drainage from mines, and runoff from livestock feedlots are examples of non-point sources.

A visual inspection of a stream is usually the first step in determining water quality problems, but not all water quality problems can be detected this way. Note the

color and the smell of the water, the presence of a stream bed coating, excessive algae, foam, or anything unnatural. Although this is a critical portion of your Inventory, judging water quality requires experience and training. You may wish to attend Stream Team water quality workshops to become more knowledgeable.

Water of good quality has a natural clarity, a pleasant odor, and no apparent discoloration. Pipe or culvert discharges are absent or appropriately treated. Excessive inputs of sewage or sediment are absent. Chemical contaminants or fish kills have not been reported in the recent past.

Grossly polluted water may have a strong, unpleasant odor. There may be oil sheens on the water's surface. The stream bed may be covered with excessive algae growth, or there may be bright or unusual colors. The stream may or may not be receiving discharges from pipes or culverts. Past contamination or fish kills may have been documented.

OBSERVATION RECORD

STREAM IDENTIFICATION:

Identify your stream or river reach by name and with landmarks such as bridges or access areas, and the length of the adopted reach (example: "Hometown Creek from Main Street Bridge to Neighborhood Park"):

Legal description (from topographic map): Township_____ Range_____ Section_____ Quarter_____

County:_____ Inventory Date:_____

Stream Team Number:_____ Stream Team Name:_____

Inventory participants:_____

Means of travel while conducting inventory (foot, car, canoe, etc.):_____

STREAM DESCRIPTION:

Describe your stream's watershed (forested, urban, agricultural, etc.):_____

Describe your stream's floodplain (forested, urban, agricultural, etc.):_____

Describe your stream's wetland areas, if any (forested, urban, agricultural drained, etc.):_____

Describe your stream's riparian zone (forested, urban, agricultural, etc.):_____

OBSERVATION RECORD continued

Describe your stream's banks (forested, urban, agricultural, etc.): _____

Describe your stream's channel (channelized, paved, impounded, naturally meandering, etc.): _____

Describe your stream's habitat (good riparian corridor, rootwads, pool-riffle-pool ratio is consistent, etc.): _____

Describe your stream's scenic features: _____

Describe your stream's water quality: _____

Additional comments & field notes: _____

PROBLEM IDENTIFICATION WORKSHEET

INSTRUCTIONS:

Within each category, consider the list of potential problems and circle the problem level that you feel applies to your stream reach.

- 1 = no problems
- 2 = few or slight problems
- 3 = moderate problems
- 4 = several or serious problems
- 5 = severe or multiple problems

Space is available to add problems that may exist on your

stream but are not included in the list. This will help you to pinpoint specific problems and develop a work plan to improve your adopted stream.

You will be able to identify problem areas by noting any score of 3 or higher in each of the problems listed. If a section scores well but has one problem with a score of 3 or higher, addressing that specific problem could substantially raise the score for that section. Section by

section, project by project your Team will improve the overall health of your stream.

Keep this booklet to use as your reference manual and long-range planning guide. Take good notes and compare the score you give your stream today with its score in three to five years. Photos of problem areas will help you remember what your stream looked like before you began your work.

Watershed

- WS1. Watershed lacking forest cover
- WS2. Watershed cropped and lacks soil conservation practices
- WS3. Watershed overgrazed
- WS4. Watershed mostly urban structures (streets, parking lots, buildings, etc.)
- WS5. Watershed with construction activity
- WS6. _____

No Problem - Severe Problem

- 1 2 3 4 5
- 1 2 3 4 5
- 1 2 3 4 5
- 1 2 3 4 5
- 1 2 3 4 5
- 1 2 3 4 5

Floodplain

- FPI. Levees separating the river channel from the floodplain
- FP2. Farming in the floodplain
- FP3. Buildings, parking lots, and other development in the floodplain
- FP4. _____

- 1 2 3 4 5
- 1 2 3 4 5
- 1 2 3 4 5
- 1 2 3 4 5

Wetlands

- WL1. Wetlands drained for agriculture
- WL2. Wetlands developed (buildings, shopping malls, subdivisions, etc.)
- WL3. No filter strips between wetland and stream
- WL5. _____

- 1 2 3 4 5
- 1 2 3 4 5
- 1 2 3 4 5
- 1 2 3 4 5

Riparian Zone

- R1. Riparian zone cleared
- R2. Riparian zone grazed
- R3. Farming to the streambank
- R4. Buildings, parking lots, and other development up to the streambank
- R5. _____

- 1 2 3 4 5
- 1 2 3 4 5
- 1 2 3 4 5
- 1 2 3 4 5
- 1 2 3 4 5

Streambanks

- SB1. Streambank lacking natural vegetation (trees, grass, brush, etc.)
- SB2. Streambank erosion
- SB3. _____

- 1 2 3 4 5
- 1 2 3 4 5
- 1 2 3 4 5

PROBLEM IDENTIFICATION WORKSHEET continued

Stream Channel

No Problem - Severe Problem

| | |
|---|-----------|
| SC1. Stream channelized | 1 2 3 4 5 |
| SC2. Stream meander altered | 1 2 3 4 5 |
| SC3. Stream impounded with dam | 1 2 3 4 5 |
| SC4. Stream cleared and snags removed | 1 2 3 4 5 |
| SC5. Stream paved | 1 2 3 4 5 |
| SC6. Channel filling with gravel, sand, or silt | 1 2 3 4 5 |
| SC7. Heavy equipment in stream channel | 1 2 3 4 5 |
| SC8. Water withdrawals | 1 2 3 4 5 |
| SC9. Sand and gravel dredging | 1 2 3 4 5 |
| SC10. _____ | 1 2 3 4 5 |

Fish and Wildlife Habitat

| | |
|--|-----------|
| AH1. Pools filled in | 1 2 3 4 5 |
| AH2. Riffles destroyed | 1 2 3 4 5 |
| AH3. Flow interruptions or withdrawals | 1 2 3 4 5 |
| AH4. Lack of submerged logs, rootwads, boulders, vegetation, or undercut banks | 1 2 3 4 5 |
| AH5. Unstable stream bottom | 1 2 3 4 5 |
| AH6. Barriers to fish movement | 1 2 3 4 5 |
| AH7. _____ | 1 2 3 4 5 |

Scenic Features

| | |
|---|-----------|
| SF1. Stream channel alterations | 1 2 3 4 5 |
| SF2. Litter | 1 2 3 4 5 |
| SF3. Car bodies, old refrigerators or other trash used to protect against erosion | 1 2 3 4 5 |
| SF4. Livestock access to stream | 1 2 3 4 5 |
| SF5. All-terrain vehicle use within sight of stream channel | 1 2 3 4 5 |
| SF6. Utility lines or towers | 1 2 3 4 5 |
| SF7. Cabins or other buildings within sight of stream channel | 1 2 3 4 5 |
| SF8. Ongoing construction or other development within sight of stream channel | 1 2 3 4 5 |
| SF9. _____ | 1 2 3 4 5 |

Water Quality

| | |
|--|-----------|
| WQ1. Point source discharge (specify: _____) | 1 2 3 4 5 |
| WQ2. Excessive sediment | 1 2 3 4 5 |
| WQ3. Feedlot runoff | 1 2 3 4 5 |
| WQ4. Acid mine drainage | 1 2 3 4 5 |
| WQ5. Sewage outfall | 1 2 3 4 5 |
| WQ6. Heavy metal contamination | 1 2 3 4 5 |
| WQ7. Pesticide contamination | 1 2 3 4 5 |
| WQ8. Fish kills | 1 2 3 4 5 |
| WQ9. _____ | 1 2 3 4 5 |

GLOSSARY

Aesthetic value - those characteristics of a stream, such as beauty, that make it conducive to human enjoyment.

Bed loads - particulates that are transported rolling and bouncing along the channel bottom in the lower layers of the stream.

Best Management Practices (BMP) - methods used to minimize negative impacts of particular land uses, and generally agreed by experts to be superior to other such methods.

Buffer strip - band of permanent vegetative cover bordering cropped land that slows runoff water and traps silt, sand, and organic debris.

Channel filling - filling of a stream channel with deposited sediment.

Channelized - artificially straightened stream channel.

Channel paving - lining of a stream channel with concrete, asphalt, or other material.

Down-cutting - erosion of a stream bottom.

Ecosystem - an ecological community, together with its environment, functioning as a unit.

Floodplain - relatively level area on both sides of the stream channel that carries excess water the channel cannot hold.

Floodplain scouring - erosion of a floodplain by floodwaters.

Filter strip - band of vegetation acting as a filter for runoff into stream.

Food chain - succession of organisms in an ecological community.

Gravel dredging - mining of gravel from a stream channel using heavy equipment.

Hydric soil - soil that has characteristics

(presence of unoxidized material) indicating conditions in which soil oxygen is limited by saturation for long periods during the growing season. Soil that is wet during the growing season.

Hydrology - properties, distribution, and effects of water on the earth's surface, in the soil and underlying rocks, and in the atmosphere, or the study thereof.

Hydrophytic vegetation - plants that tolerate standing water for part to all of the year. Examples are cattails, bulrushes, cordgrass, bald cypress, willows, and arrowhead.

Legal description - location identified by township, range, section, quarter, etc., as specified on a USGS topographic map.

Meandering - sinuous, following a winding and turning course.

No-till cultivation - method of planting crops that involves no seedbed preparation other than opening the soil to place individual seeds in small slits; usually no cultivation during crop production; chemical weed control is normally used.

Non-point source pollution - contamination not traceable to a single origin; originates from a geographically wider area, and may depend on natural forces, such as rain or wind, to reach the stream.

Point-source pollution - contamination traceable to a single source, such as a pipe, culvert, or ditch.

Pool - that portion of a stream that is deep and slow moving.

Reach - segment of river or stream.

Riffle - that portion of a stream that is shallow and fast flowing.

Riparian - adjacent to or on a streambank. In general usage, refers to the land adjacent to a river, and anything in or on it.

Rootwad - root mass of a tree.

Sediment - solid material that has been transported by flowing water.

Settling pond - pond designed to catch runoff and slow water flow enough to cause sediment to settle out of suspension.

Sewage outfall - location at which sewage effluent runs into a stream by means of a pipe or channel.

Streambank - sides of the stream that contain the flow, except during floods.

Stream gradient - elevation drop as water flows downstream in the stream channel.

Strip cropping - strips of grass or other close-growing vegetation left unplowed between bands of cropped land. Surface runoff is intercepted by the strips, slowed, and its sediment deposited.

Terracing - wide parallel ridges constructed on sloping farmland perpendicular to the slope. This slows runoff water and reduces erosion.

Turbidity - solid particles suspended in water cause light rays passing through the water to scatter. Thus, turbidity makes the water appear cloudy.

Understory vegetation - low-growing vegetation beneath a forest canopy.

Watershed - entire area of land that drains water into a given stream.

Wetland - area periodically covered or saturated by surface or groundwater, having predominantly hydric (unoxidized) soils, and at least periodically supporting hydrophytic (water-tolerant) vegetation.