Pollutant Source Identification Data Sheet Instructions

NOTE: This data sheet is set up to collect all necessary parameters to use the Spreadsheet Tool for Estimating Pollutant Loads (STEPL) program to calculate pollutant load estimates. Section 319 and 205(j) grantees should submit this form as part of a Quality Assurance Project Plan (QAPP) document to the Department of Environmental Quality (DEQ) Nonpoint Source (NPS) Program for approval. NPS Program staff is available to help select the appropriate pollutant source sections to include on the field data sheet.

Suggested Equipment checklist

- ☐ Maps with waterways and roads labeled
- ☐ Field data sheets (many copies or electronic data recorder)
- ☐ Clipboard
- ☐ Pens/pencils
- ☐ GPS unit
- ☐ Tape measure (100 ft)
- ☐ Folding ruler (6 ft)
- ☐ Camera with extra batteries
- ☐ Compass
- ☐ Waders, hip boots, or wading shoes
- ☐ Traffic cones
- ☐ Brush clearing tools
- ☐ First aid kit
- ☐ Insect repellant/sunscreen
- ☐ Lunch/snacks/water for long field day

General tips

Follow these guidelines to gather information for documenting nonpoint sources for inclusion in a watershed management plan. This form should be used to document pollutant sources and should not be used as a general watershed characterization form. For example, if you come across a road stream crossing and do not see any pollutant sources to document (e.g. no noticeable erosion), then you do not need to fill out this form for that site. While there is no section for documenting high quality areas for protection it would be beneficial to note those areas in the comment box at the end of the field form.

This form should be used as a walking inventory is conducted but could be used in conjunction with a driving or kayak inventory. It is unrealistic and unnecessary to try to walk an entire watershed to document all potential pollutant sources. Therefore, to be the most efficient with this form, it should be used in areas that have already been prioritized based on other methods (i.e., Total Maximum Daily Load areas and waters on the state's nonattainment list should be a priority as well as other known sources that have already been documented).

In general, face downstream when determining "left bank" or "right bank." The only exception is when you are documenting erosion locations at a road stream crossing, in which case always face the crossing to determine left/right bank.

Photographic documentation
Taking pictures and documenting where the pictures are taken is a highly useful tool and strongly recommended. Make an effort to get a representative set of photos for each site and take detailed notes.

Site specific information
As field inventories are conducted, site specific Global Positioning System (GPS) information should be recorded in the decimal degrees format using the World Geodetic System (WGS) 1984 geographic coordinate system.

Determining the number of "years present"
The number of years a problem has been present is needed to get an estimate of annual pollutant loads. Use your best professional judgment to estimate the number of years. It may be helpful to speak with nearby landowners or to look at aerial photos.

Determining erosion severity
Erosion severity has been divided into four categories: slight, moderate, severe, or very severe. Technically, the categories are based on the following rates:

Category	Erosion rate (feet/year)
Slight	0.01-0.05
Moderate	0.06-0.2
Severe	0.3-0.5
Very severe	> 0.5

Determining the severity of erosion is somewhat subjective. Use other observations throughout the watershed to determine if the erosion is slight, moderate, severe, or very severe compared to other locations. Gathering information from sites where Best Management Practices (BMP) can be implemented should be a priority activity. Funding BMPs at severe/very severe erosion sites will generally be favored over funding BMPs at slight/moderate erosion sites. Slight/moderate erosion sites should not be the main focus of inventory work.

Determining the "soil texture" type
Determining soil texture can be a difficult task and is a required parameter for calculating pollutant loads for potential nonpoint pollution sources. Therefore, soil texture has been divided into four categories. Choose between the following four general categories:

1. Clay – feels sticky, malleable material
2. Silt – feels smooth, very fine particles
3. Sand – feels gritty
4. Organic – muck, mixture of coarse leaf and wood material

Use the table to match the general soil texture category with the STEPL category.

General soil texture identified in field	**STEPL Category to use for calculations**
Clay	Clay
Silt	Silt loam
Sand	Fine sandy loam
Organic (mixture of detritus, sand, silt, and clay)	Organic

To fill out the data sheet and obtain the most accurate information in an organized manner, it is important to COMPLETELY fill out the data sheet. After field work is complete it may be difficult to determine if a blank field means that the item was not assessed or whether it was not applicable. Instead of leaving a field blank, write NA for items that were not applicable.

All length measurements should be made in feet and recorded to the nearest 0.1 foot. Do not record inches, even for measurements that are less than one foot. For example, record 0.5 feet instead of 6 inches. Measurements longer than 20 feet should be rounded to the nearest foot if you are not confident in the precision of the measurement.

The following instructions for each section are organized in the same order as the field data sheet.

Be sure to fill in the general information at the top of each field sheet including watershed, tributary name, GPS coordinates, site identification, date, photo numbers (so later you can keep track of what photos went with each site), and the names/initials of the people in the field crew. Next, since this field form will only be used to DOCUMENT POTENTIAL POLLUTANT SOURCES, you will circle all of the appropriate source categories that apply to your location. Depending on what source(s) are circled, those are the sections that you will fill out completely. For example, if you are at a location and you observe gully erosion, streambank erosion, and livestock access, you would circle numbers 3, 5, and 6. Then you would fill out sections 3, 5, and 6 completely. You could observe erosion at a stream crossing and an adjacent streambank. Therefore, you would fill out section 1 and 5. If you observe streambank erosion only, then only circle number 5 and fill out the corresponding section.

SECTION 1. STREAM CROSSING

Type of crossing: A stream crossing could include a road stream crossing such as a bridge, culvert, or dam, but it could also include a ford (low-water crossings where vehicles drive across the streambed), an all-terrain vehicle (ATV) crossing, or a logging road.

Bridge/culvert obstruction: Determine if the stream channel is blocked by debris and select either none, partial, half, or full obstruction.

Road crossing surface: Mark if the road surface is paved, gravel or unimproved. Unimproved refers to any two-track or dirt road.

Approach material/slope/length: The approach refers to the section of road that slopes toward the crossing (Figure 1). Record the approach material (it is assumed that the left and right approaches are the same material). Determine the slope for the left and right approach (facing downstream). Measure the length of the left and right approach from the middle of the road stream crossing to the top of the slope leading down towards the structure. This is the distance the water would drain down the road to the structure.

http://www.northernmichiganstreams.org/rsxinfo.asp

Figure 1. Runoff from steep approaches on dirt roads can cause large amounts of sediment to enter watercourses during rain or snow melt.

Contributing to NPS pollution via: Circle all categories that apply.

1. Improper length: If the culvert is too short, there will likely be erosion around the culvert inlet/outlet and could possibly be eroding into the road. If the culvert is too long, the culvert outlet may be perched.
2. Improper width: To determine if the size of the culvert is appropriate or not, the general rule of thumb is that the culvert width should match the width of an upstream riffle. If no upstream riffle is present, then compare the width to a straight stretch upstream.
3. Deteriorating culvert: If the culvert material is severely cracked/rusted/eroded/broken, it could be contributing to NPS pollution.
4. Misalignment: A properly aligned culvert will be positioned to match the alignment of the existing watercourse to the greatest degree practical.
5. Perched culvert: If the crossing is perched (outlet elevated above downstream water surface), measure the vertical distance from the downstream water surface to the bottom of the stream crossing structure to the nearest 0.1 foot interval and write the perch height on the field form.

Soil texture: Determine if the soil is mostly clay, sand, silt, or organic material. See the bottom of page 2 for more guidance.

Years erosion present: Use your best professional judgment to determine the number of years the observed erosion has been present (see page 2). If erosion is observed at different locations around the road stream crossing, it can be assumed that all erosion is the same age. In order to determine the age of a road stream crossing it may be useful to speak with nearby landowners, the road commission or look at aerial photos.

Erosion location (10 possible locations): At one road stream crossing it may be possible to observe erosion at ten different locations (Figure 2). Fill in the column for each location of observed erosion. Write the word (slight/moderate/severe/very severe) that best describes the

overall extent of the erosion. Take width (at the top and bottom of the eroding area), depth, and length measurements for each erosion location.

NOTE: A roadside ditch at a road stream crossing that appears to be a result of the crossing would fall under a STREAM CROSSING and SECTION 1 should be filled out completely. If you observe a roadside ditch that is not the result of a crossing, then it could fall under SECTION 2. GULLY EROSION, or any other appropriate section.

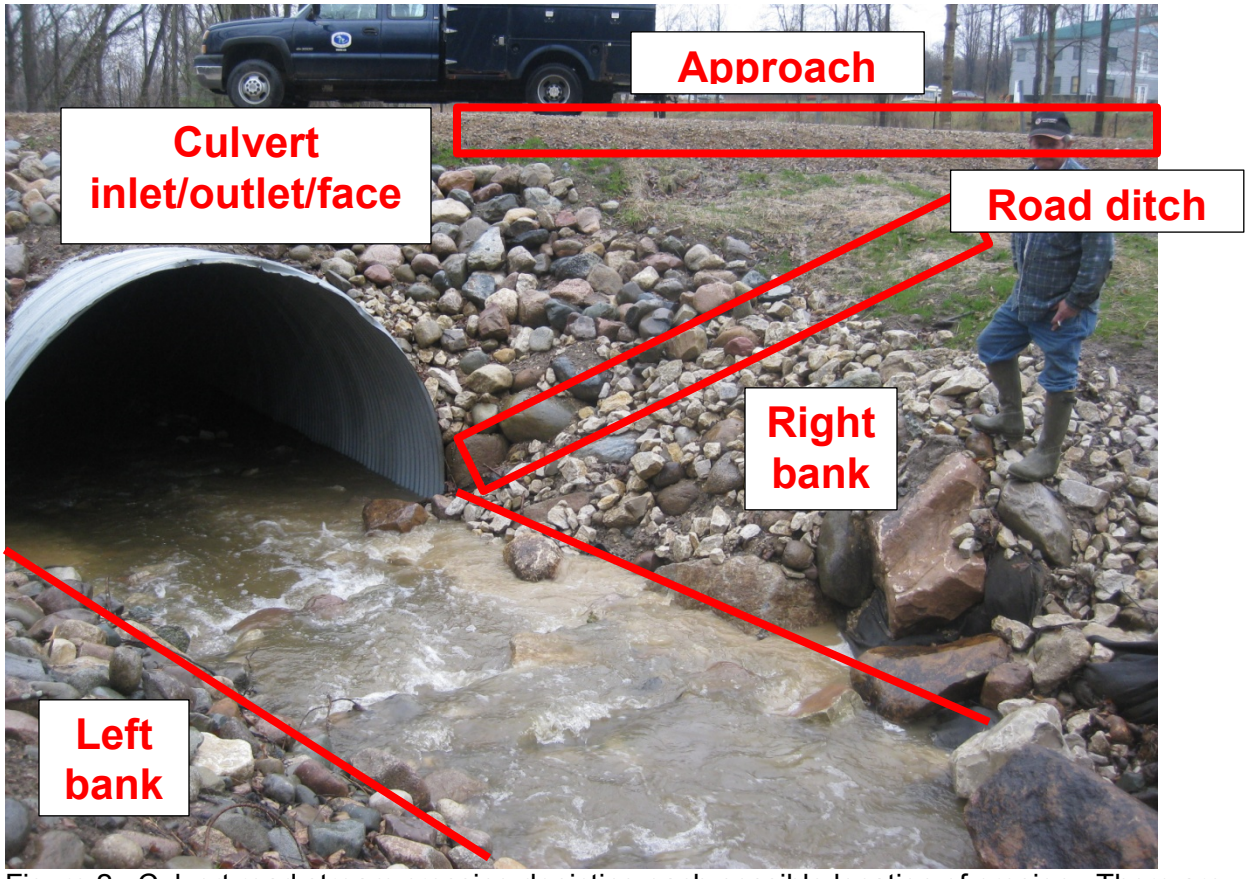


Figure 2. Culvert road stream crossing depicting each possible location of erosion. There are five possible locations of erosion on the upstream side of the road stream crossing, and the same five locations on the downstream side, for a total of ten possible erosion locations.

SECTION 2. ROAD RUNOFF

http://ridgetoriver.com/land_use.html

Figure 3. Road runoff has the potential to increase the amount of nonpoint source pollution that enters water bodies.

A road running parallel to (or close to) a water body would be the first indication that road runoff may be a potential pollutant source. A visual cue that it is a source would be rills (see definition page 8) running from the road surface (Figure 3 and Figure 4a).

Road surface: Circle the type of road surface. Unimproved refers to any two-track or dirt road.

Length contributing to runoff: Estimate the length of road contributing to runoff.

Distance of road from water: Estimate the distance of the road from the water body.

Years erosion present: Use your best professional judgment to determine the number of years the observed erosion has been present (see page 2).

Soil texture: Determine if the soil is mostly clay, sand, silt, or organic material. See the bottom of page 2 for more guidance.

SECTION 3. GULLY EROSION

Location: Face downstream and determine if the observed erosion is on the left bank or right bank.

Apparent cause: There are several possible causes of gully erosion. Some common examples include overland runoff due to poor vegetation cover, overgrazing, human activities, improper land use, or improper irrigation design.

Soil texture: Determine if the soil is mostly clay, sand, silt, or organic material. See the bottom of page 2 for more guidance.

Erosion top/bottom width/depth/length: Measure the top and bottom width of the erosion area along with the depth and length. Measurements should be rounded to the nearest 0.1 foot.

Years erosion present: Use your best professional judgment to determine the number of years the observed erosion has been present (see page 2).

SECTION 4. INADEQUATE RIPARIAN BUFFER

Only fill out this section if there is an inadequate buffer and there is opportunity to restore the riparian area. For example, if the lack of buffer is due to a roadway and runoff is observed, then SECTION 2. ROAD RUNOFF should be filled out, not this section. The adequacy of a buffer will depend on soil type, slope, and upland land use so an adequate buffer width at one site may not be the appropriate width at a different site. For example, the Natural Resources Conservation Service filter strip standard requires a minimum of 20 feet between water bodies and cropland. However, if the riparian area is steeply sloped, the filter strip may need to be wider than 20 feet.

Existing buffer/filter strip dimensions: Facing downstream, estimate the current width and length of the buffer area on the left bank and the right bank. If there are miles of inadequate buffer than estimate current conditions as best as you can. Aerial photos may help get a more accurate estimate.

Length of buffer needed: Estimate the length of buffer needed on the left bank and right bank. If miles of buffer are needed it is suggested to take a GPS reading at the upstream point and at the downstream point and use aerial photos in conjunction with walking the site to get an accurate estimate.

Estimated contributing acreage: Use aerial photos to estimate the amount of acreage contributing nonpoint source pollution for the left and/or right bank.

Riparian habitat: Circle the description of habitat for each bank.

Upland land use: Determine the current upland land use on the left and right bank. This refers to the area beyond the riparian zone.

SECTION 5. STREAMBANK EROSION

Location: Face downstream and determine if the observed erosion is on the left bank or right bank.

Length/height of erosion: Measure the length and height of the eroding streambank in feet.

Erosion severity: Determine the severity of the erosion. “Slight” erosion would be indicated by some visible bare bank. A mostly bare bank would be “moderate” erosion. A bare bank with

rills (see definition at bottom of page 8) present would indicate “severe” erosion. If an undercut bank or washout is observed, that would indicate “very severe” erosion.

Soil texture: Determine if the soil is mostly clay, sand, silt, or organic material. See the description at the bottom of page 2 for more guidance.

Apparent cause: There are several possible causes of streambank erosion. For example, streambank erosion can be the result of a systemic or local action. The erosion could also occur at a storm water outfall, or some other type of structure. A systemic cause could be unstable hydrology. An access point (either human or animal) or a log jam could cause local streambank erosion. If the cause of erosion falls into the “local” or “other” category, be sure to include details on the line provided on the form.

SECTION 6. LIVESTOCK ACCESS

Location: Face downstream and determine if the observed livestock access is on the left bank or right bank.

Aquatic vegetation/algal blooms: Determine if there is: no increased plant/algal growth, slight, moderate, or extensive growth downstream of the livestock access to the water.

Soil texture: Determine if the soil is mostly clay, sand, silt, or organic material. See the description at the bottom of page 2 for more guidance.

Number/type of animal: Determine the approximate number of animals that have access to the watercourse and write down what animals are present. It is important to estimate the number of animals to get an idea of how significantly the livestock access could impact water quality.

Erosion type (select all that apply): If you observe livestock access, but no erosion, then circle “none” for the erosion type. If you observe erosion, determine if the type of erosion is a rill, streambank, or gully (can circle more than one category if applicable). A rill is the initial sign of erosion and is most common on slopes. Rills are much smaller than a gully (Figure 4a). Determine if the rill exhibits minor, moderate, or severe erosion. For streambank erosion that is a direct result of livestock access, measure the height and length of the eroding bank and determine the erosion severity (Remember, if the streambank erosion is not associated with livestock access, then if would fall under SECTION 4. STREAMBANK EROSION, not SECTION 5. LIVESTOCK ACCESS). A gully erodes sharply into the soil and it is often difficult to step across (Figure 4b). Measure the top/bottom erosion width, depth, and length.

http://en.wikipedia.org/wiki/Rill

http://www.fs.fed.us/GRAIP/gallery/Gully1.jpg

Figure 4. An example of a rill (a) compared to the size of a gully (b).

Years erosion present: Use your best professional judgment to determine the number of years the observed erosion has been present (see page 2).

Length of access: Estimate the total length of streambank where the livestock have access and round to the nearest 0.1 foot.

SECTION 7. AGRICULTURAL RUNOFF

Location: Face downstream and determine if the observed agricultural runoff is on the left bank or right bank.

Potential pollutant source (circle all that apply): If you observe a potential nonpoint agricultural source of pollution, determine if it is from cropland/pasture manure runoff, cropland erosion/runoff, or feedlot erosion/runoff (circle more than one category if applicable). For cropland/pasture manure runoff, determine if the erosion/runoff severity is slight, moderate, severe, or very severe. For cropland erosion/runoff, the type of tillage needs to be identified. The field form separates tillage practice into three general categories: no-tillage, reduced tillage, and conventional tillage. Descriptive text and pictures for tillage examples that fall into these categories are provided (Figure 5). Also, determine the type of crop, estimate acreage of the source (again, may be more accurate to utilize aerial photos), and erosion/runoff severity (slight, moderate, severe, or very severe). For feedlot erosion/runoff, estimate the number of animals and note the type of animal. Estimate the distance of the source from the water (round to the nearest 0.1 foot). Determine if the severity of the erosion/runoff is slight, moderate, severe, or very severe. Estimate the area of the source in acres. To estimate acreage it may be easier to use aerial photos to obtain accurate size estimates for lots. Estimate the percent of the feedlot that is paved and select the appropriate range.

http://www.ars.usda.gov/images/docs/9372_9566/image003.gif

General photo depicting a side-by-side comparison of a no-till field versus conventional tillage practices.

No-till fields: crops are planted without disturbing the soil through tillage


http://www.extension.iastate.edu/CropNews/2009/0302alkahsi.htm

No-till soybeans planted in corn residue.

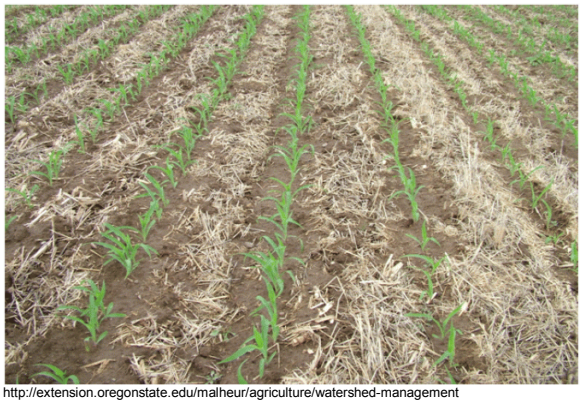

http://www.ok.gov/conservation/Conservation_Districts/Garfield_County_No-Till_Conference_2011.html

No-till soybeans growing in wheat residue.

Strip tillage (falls into no-till category): a form of tillage where only narrow strips are tilled


http://www.extension.org/pages/28317/reducing-tillage-to-save-fuel

Strip tillage was used to prepare this field for corn planting.


http://extension.oregonstate.edu/malheur/agriculture/watershed-management

Strip tilled corn planted in wheat residue.

Reduced tillage: method of soil tillage which leaves at least 30% crop residue on the soil surface

http://farmconnection.wordpress.com/

After planting – corn (circled in red) growing after being planted into 30% soybean residue.

http://www.extension.umn.edu/cropenews/2008/08MNCN28.html

Before planting – surface residue coverage after stalk chopping and chisel plowing in a field of corn residue.

Conventional tillage: the traditional method of farming in which the soil is prepared for planting by tillage practices that result in less than 30% residue cover

http://www.tifton.uga.edu/sewrl/radio/gibbover.htm

http://oregonprogress.oregonstate.edu/spr99/images/snapbeans.jpg

http://www.avanzi.unipi.it/ricerca/quadro_gen_ric/solil_tillage/image_soli_tillage/Image15.jpg

Figure 5. Tillage practices vary in the amount of crop residue left on the field.

SECTION 8. TILE OUTLET

Location: Face downstream and determine if the tile outlet is on the left bank or right bank.

Flowing?: Determine if anything is flowing out of the tile outlet and circle YES or NO as appropriate.

Discharge color/odor: If the outlet is flowing, choose from the discharge color and odor categories on the field form to best reflect the properties of the discharge.

Erosion: If erosion is observed, circle YES. If no erosion is evident, circle NO.

Erosion width/length/height: If erosion is observed, measure the top/bottom erosion width, length, and height of the erosion location.

Soil texture: Determine if the soil is mostly clay, sand, silt, or organic material. See the bottom of page 2 for more guidance.

Years erosion present: Use your best professional judgment to determine the number of years the observed erosion has been present (see page 2).

COMMENT BOX

Additional comments: Use this space to sketch a picture of the site, write additional comments about the potential pollution source, write additional site descriptions, or make notes regarding potential best management practice solutions.