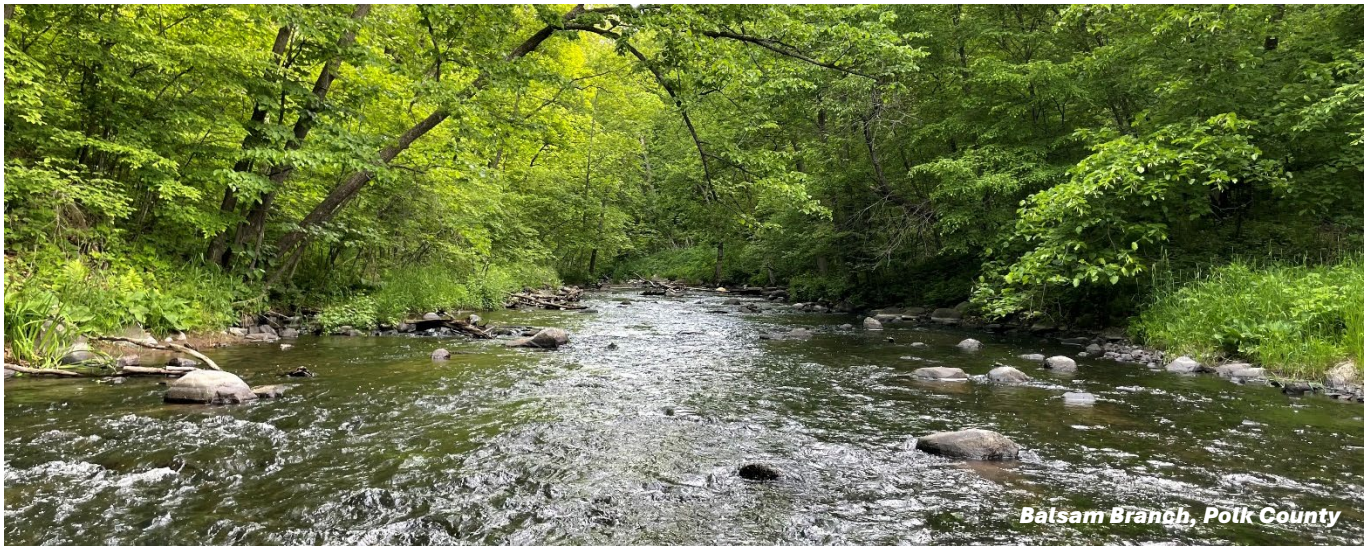
WAV Stream Habitat Assessment Training Guide (Level 2)

Purpose and goals

A healthy stream is a busy place. Wildlife find shelter and food near and in its waters. Vegetation grows along its banks, shading the stream and filtering pollutants before they enter the stream. Within the stream itself are fish, insects and other tiny creatures with specific needs:

- dissolved oxygen to breathe,
- rocks, overhanging tree limbs, logs and roots for shelter,
- vegetation and other tiny animals to eat,
- and special places to breed and hatch their young.

For any of these activities, they might also need water of specific temperature, depth, and flow velocity. Many land-use activities can alter these characteristics, causing problems within the entire habitat.



With over 45,000 miles of wadeable, perennial streams in Wisconsin, volunteers play an important role helping to gather stream habitat data in areas that biologists may not have visited or visited many years ago. Volunteers may also be able to visit their stream more often, documenting how the habitat may be changing over time as a result of land use activities in the watershed.

This method is based on the Qualitative Fish Habitat Assessment method used by Wisconsin Department of Natural Resources biologists to assess wadeable stream habitat. The goal is to assess seven physical habitat characteristics that impact a healthy fish community:

1) Width of undisturbed **riparian vegetation** along the stream
2) Extent of **erosion** along the stream banks
3) Extent of **fine sediments** covering the stream bed
4) Amount of **pool habitat** available for fish
5) Amount of **cover** available for fish
6) Frequency of **riffles or bends** (habitat diversity)
7) The **width to depth ratio** (wide and shallow stream vs. narrow and deep stream)

Using the Data

The WAV Stream Habitat Assessment method is useful as a screening tool:

1) to identify fish habitat stressors and beneficial habitat features along a stream,
2) to help identify priority areas for management and restoration, and
3) for volunteers to learn about fish habitat needs and stream ecosystems.

Each stream station will have a unique stream habitat rating ranging from 0 (Poor) to 100 (Excellent). This rating is an important baseline measure for future comparisons**. By comparing specific habitat parameter scores, between years at one site or between sites in small watersheds, the connection between land use and aquatic habitat can be better understood.**

Stream biologists use qualitative fish habitat assessment data at multiple stations throughout a watershed to identify whether the stream network has the physical habitat characteristics to support a healthy fish community. By combining this data with fish surveys, as well as other baseline water quality data, biologists can identify where stream restoration or land conservation practices are needed to improve stream habitat for fish and other aquatic life.

Equipment Needed

- WAV Stream Habitat Assessment Datasheet
- Hip boots or waders
- Clipboard
- Pen/pencil
- D-net labeled with decimal feet or a meter stick
- Measuring tape reel in decimal feet units
- Calculator
- Marking flags (optional)
- Compass (optional)

Timing

Complete the assessment between May 15 – September 15, ideally in summer

Ideally aim to do your habitat assessment in the summer (July or August) when aquatic plants are fully grown. Aquatic plants provide additional cover for fish.

If stream flow is consistently low and nearly dry in the summer, remember that you can complete your habitat assessment any time between May 15 -September 15 and include in the comments when the stream dried up that year.

Complete the assessment every 2 years

Generally, volunteers should plan to complete an assessment every other year. If the stream is “flashy” (flow increases rapidly after a storm - commonly due to urban stormwater runoff), or if the stream is actively changing due to land use activities, then assessments can be completed every year to document impacts to the stream habitat.

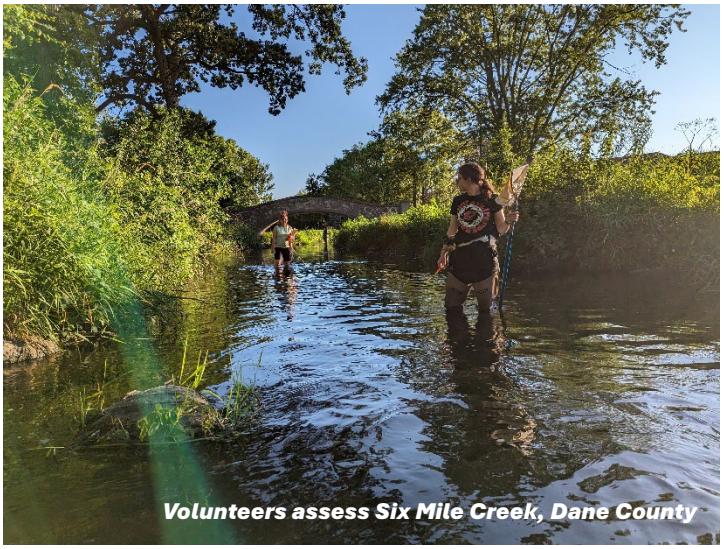
Schedule at least 2 hours to complete the assessment

The amount of time will vary depending on the size of the stream. Wider streams will require volunteers to walk and assess a longer distance of the stream’s length.

Important Reminders

***Always bring a partner with you to complete a habitat assessment. This is a requirement:**

- for safety,
- to take measurements over long distances, and
- to make subjective decisions about habitat ratings as a team.



Volunteers assess Six Mile Creek, Dane County

***Only complete the assessment if the stream is wadeable and less than 33 feet wide.** This assessment is not designed for large rivers or unwadeable streams, as it requires volunteers to walk in the water a significant distance upstream or downstream.

You should be able to safely walk in the stream for all or most of your full stream length (35 x stream width). During your stream walk, you can expect to encounter some minor obstructions that your team may need to navigate around, including:

- Mucky stream bottoms
- Deep pools
- Downed trees
- Beaver dams or small natural dams

If you aren't sure, talk to your WAV Coordinator, WAV Extension staff, or your local DNR stream biologist for suggestions on where to complete a stream habitat assessment.

***Stop the assessment if you encounter unsafe conditions, such as high flows, or are not able to safely get around an obstruction. If this occurs:**

- Always submit your assessment to SWIMS, even if it is incomplete.
- Write in the fieldwork comments:
    - The reason you were unable to finish the assessment.
    - An estimate of how far (in feet) you walked from your starting point.

***Remember that you must remain in the stream and you may not step onto the land that borders the stream unless the land is public access or you have permission from the property owner.**

- Review the DNR's stream access laws.
- If you have a way of communicating with nearby property owners, consider sending them a note to let them know you plan to walk the stream as part of the Water Action Volunteers program. They may be interested in joining you!

Method

To complete your assessment, you will be using the *WAV Stream Habitat Assessment Datasheet*. The datasheet includes a space to write your fieldwork comments and observations, a worksheet to record your in-stream measurements, and a chart to calculate final ratings for the seven habitat parameters.

Use the worksheet page to record data for the seven habitat assessment parameters for all 10 transects within your stream assessment length. Following this worksheet will ensure your measurements of the habitat in each transect are accurate and averaged equally into your final stream habitat score.

Step 1: Calculate the assessment length and transect spacing

The length of stream that you will be assessing depends on the size of your stream. The wider the stream, the longer the distance you will assess to ensure you are capturing the range of fish habitat conditions along a meandering stream. **First calculate the stream assessment length by multiplying the stream width at your starting point by "35"**.

> *Example: A 15 ft wide stream will have an assessment length of 525 ft (15ft x 35 = 525ft).*

Assessing habitat by walking 525 ft along the stream may seem like a long distance! So, to make the assessment more manageable and to ensure your final fish habitat ratings address each part of the stream equally, **divide your stream length into 10 equal sections called *transects***.

> *Example: Our 15 ft wide stream has a 525 ft assessment length. So, we will measure our habitat parameters along 52.5 ft long transects (525ft ÷ 10 = 52.5 ft).*

Calculate your assessment length:

Stream width at starting point =		stream width (ft)
Stream width × 35 =		stream assessment length (ft) *(minimum 300ft to maximum 1300ft)*
Stream assessment length ÷ 10 =		transect spacing (ft)

Step 2: Walk upstream assessing six of the seven habitat parameters in each transect

Riparian buffer width (ft)

In each transect, look at the riparian area on each side of the stream. If the undisturbed buffer appears to be less than 33ft wide *and you have permission to access the land from the property owner*, use your tape measure to measure the width on each side. Otherwise, make a visual assessment.

Bank erosion (ft)

In each transect, measure the height of any eroded banks on each side of the stream with your marked D-net or meter stick.

Pool area (%)

In each transect, observe the number of pools (or measure their lengths) to determine the percentage (%) of the transect that is comprised of pools. **Pools are deeper areas with slow-moving water compared to the rest of the stream. The water on the surface is calm.** They are often found in bends of the stream, and behind obstructions.

Width : depth ratio — In each transect, measure the stream width and the depth of the thalweg. **A thalweg is the main path of deepest, fastest water.**

Fine sediments (%) — In each transect, observe the stream bottom to determine the percentage (%) made up of fine sediments (silt, sand, clay).

Cover for fish (%) — In each transect, look for places that provide fish with cover and measure the depth of the water to confirm it is at least 0.7 ft deep (about 8 inches). Determine the percentage (%) of the transect that is comprised of fish cover.

Step 3: Return downstream measuring the distance between riffles OR bends

Riffle:Riffle or Bend:Bend ratio — Walk the entire length of your station back to your starting point, measuring the distance between riffles OR bends. High gradient, fast flowing streams are likely to have more riffles compared to low gradient, slow flowing streams.

If measuring riffles (walking downstream), measure from the bottom of a riffle to the top of the next riffle. **A riffle is a shallower than average part of the stream with turbulent water**, typically flowing over rocks and pebbles.

If measuring bends, measure from the middle of a bend to the middle of the next bend. **A bend is a curve in the stream where the direction changes by at least 60 degrees.** If helpful, you can use a compass while walking in the stream to help you measure the curves (optional).

Step 4: Calculate averages for the full station length and determine a final rating score

Use your completed transect worksheet to calculate averages for each parameter across the entire station length. Then fill out the final page with your final rating scores for each parameter.

Step 5: Take 1 good photo that sums up your stream

Think of what you saw the most along the stream and take a photo. Sometimes this will be a photo of some nice habitat, while other times it will be a section with a heavily eroded bank.

Step 6: Write a few sentences that summarize your fieldwork observations

Detailed field observations are an important component of the WAV Stream Habitat Assessment to provide context behind your ratings. Plan to write a paragraph that summarizes your main observations:

- ☐ Indicate whether you are doing the assessment UPSTREAM or DOWNSTREAM of your starting point (Station ID point).
- ☐ Note any major obstructions that prevented you from completing the full survey, and if applicable, include the approximate distance from your starting point that you had to end the survey.
- ☐ Describe the overall condition of the stream habitat in a few sentences. You can include any concerns you observe that might need action, as well as describe any beneficial riparian plants and habitat features.

Example 1: *"We walked UPSTREAM just north of the bridge. There were no major obstructions. Overall, the stream habitat is fairly poor due to significant bank erosion along the entire stream length, a mucky stream bottom, and limited riparian buffer. The water is murky. The stream has a good riparian buffer with grasses, brush and box elders on both sides through the first transect, and then a wire fence and what appears to be cattle grazing on the land beyond. There were some downed trees and undercut banks with vegetation providing good fish cover, and a good number of pools for fish. The stream had no riffle habitat. Water levels seemed a bit lower due to the drought this summer, but still deep enough for fish."*

Example 2: *"Our survey started at the riffle upstream of a big bend with a steep bank. The survey ended downstream of the bridge at the first bedrock riffle. Lots of riffles and runs were present. The stream bottom was dominated by rock,*

especially cobble size. Areas of bedrock were also present. Water levels and flow were low due to the drought this year. Side channels were also present. There were many wetland plants on the edge of the stream. Our survey ended early due to a snarl of downed alder trees about 500 feet down the stream."

Final Stream Habitat Rating

Congratulations on completing the WAV Stream Habitat Assessment! Your ratings and fieldwork observations provide a valuable description of the physical habitat characteristics of your stream that could support aquatic life. A stream with diverse habitat features combined with good water quality can support a healthy and diverse community of fish, macroinvertebrates, and other aquatic and terrestrial life.

Your Stream Habitat Score:

Excellent	75 - 100
Good	50 - 74
Fair	25 - 49
Poor	0 - 24