VIRGINIA SAVE OUR STREAMS

CMC Chesapeake Monitoring Cooperative

SOS HABITAT ASSESSMENT MANUAL

IZAAK WALTON LEAGUE OF AMERICA

www.IWLA.org/sos

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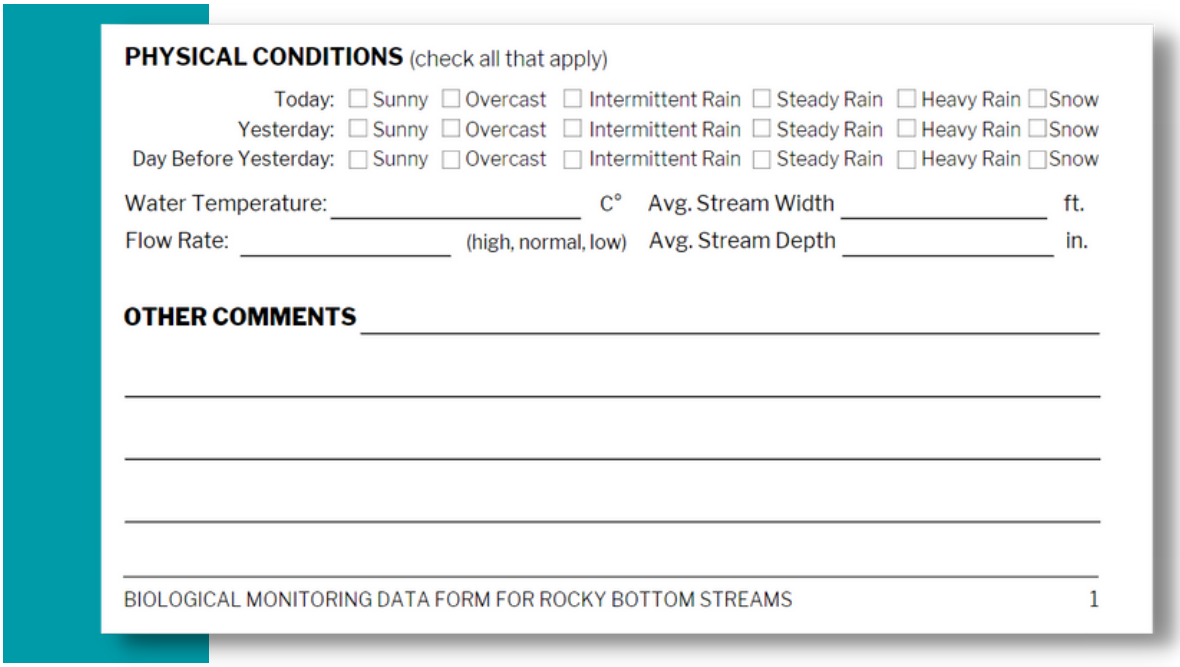
IWLA Overview

The Izaak Walton League is one of America's oldest and most successful conservation organizations. The Izaak Walton League has been at the forefront of every major clean water battle in the United States, from a decades-long push for federal water pollution control in the 1940s to efforts today to restore Clean Water Act protections for critical streams and wetlands. League leaders helped conceive the Wild and Scenic Rivers Act of 1968 and broke the political ground necessary for passage of the landmark 1972 Clean Water Act. Community members around the country use our pioneering Save Our Streams program to monitor local waterways, plan restoration projects, and report water quality problems. Today, our clean water priorities include engaging volunteer monitors nationwide, making volunteer monitoring accessible to all, and engaging youth in the outdoors.

The Izaak Walton League's **Save Our Streams program** is the only nationwide program training volunteers to protect waterways from pollution and bring information about water quality to their communities. The program began in 1969 when water pollution problems were easy to see – like massive oil spills and burning rivers. Early Save Our Streams volunteers cleaned up trash from their local waterways and reported problems like streams becoming clogged with silt. In the 1980s, the League recognized that with the right training, volunteers could collect scientifically valid data to assess water quality in local streams – a conviction that has proven true. Ever since, the League has been teaching volunteers to study stream health and report their findings to decision-makers. Today, trained volunteer stream monitors across the country are uncovering pollution problems and urging their local leaders to take action on water quality. The work of these volunteers also creates a critical record of water quality over time, making it possible to quickly identify pollution problems that develop in the future.

Physical Conditions

The Physical Conditions section of the Biological Monitoring Data Form is used to provide additional context of conditions that may be impacting the data that are being collected. These variables are weather, water temperature, flow rate, average stream width, and average stream depth. There is also a section to leave any observations about the physical conditions or other observations that were not otherwise mentioned.



PHYSICAL CONDITIONS (check all that apply)

Today: ☐ Sunny ☐ Overcast ☐ Intermittent Rain ☐ Steady Rain ☐ Heavy Rain ☐ Snow
Yesterday: ☐ Sunny ☐ Overcast ☐ Intermittent Rain ☐ Steady Rain ☐ Heavy Rain ☐ Snow
Day Before Yesterday: ☐ Sunny ☐ Overcast ☐ Intermittent Rain ☐ Steady Rain ☐ Heavy Rain ☐ Snow

Water Temperature: _____ C° Avg. Stream Width _____ ft.
Flow Rate: _____ (high, normal, low) Avg. Stream Depth _____ in.

OTHER COMMENTS _____

BIOLOGICAL MONITORING DATA FORM FOR ROCKY BOTTOM STREAMS 1

Weather

It is important that monitors record the weather conditions for the day of the survey, as well as 48 and 72 hours before the survey day. The following categories are provided for today, yesterday, and day before yesterday:

- Sunny
- Overcast
- Intermittent Rain
- Steady Rain
- Heavy Rain
- Snow

Water Temperature

Water temperature should be recorded in degrees Celsius. Insert thermometer, so the bulb/tip is completely submerged and record reading when the reading stabilizes - about 2 minutes. Make sure thermometer is not touching the stream substrate.

Flow Rate

Monitors will want to consider the entire 100 meter stretch of stream to determine how the stream is flowing. It is important that volunteers compare the flow of the stream with past flow conditions of the same stream. Monitors should not be comparing the flow of the stream with another known waterway.

If it's the first time at a stream, volunteers are encouraged to use clues around them to observe stream flow. The more water there is in the stream, the higher the flow rate will be. If it looks like the stream is flowing over the natural streambank, the flow is most likely higher than normal. If there are exposed rocks, dirt, and streambed, the flow is most likely lower than normal. Volunteers may also use recent weather events (such as drought or heavy rainfall) to help infer streamflow. If uncertain, feel free to leave this field blank until you are more familiar with the stream. The following categories are provided:

- High
- Normal
- Low

Avg. Stream Width and Depth

For stream width and depth, volunteers are encouraged to work together to estimate the average width and depth across the 100 meter stretch.

Stream Conditions

Important Note:

This section is for subjective personal observations and will not be submitted to VA DEQ or the Chesapeake Bay Program. Here volunteers are encouraged to make estimates about subjective physical stream characteristics. This data will be used to help volunteers note changes over time that could be important to making conclusions about overall stream health.

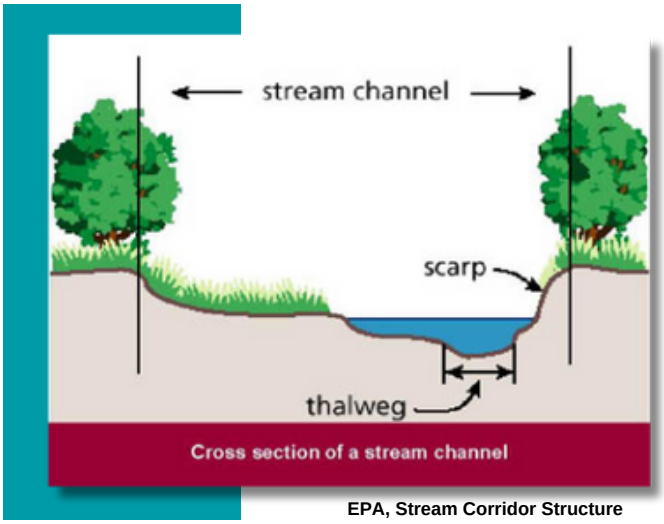
STREAM CONDITIONS

Fish water quality indicators:	**Barriers to fish movement:**	**Surface water appearance:**	**Streambed deposit (bottom):**
☐ scattered individuals ☐ scattered schools ☐ trout (pollution sensitive) ☐ bass (somewhat sensitive) ☐ catfish (pollution tolerant) ☐ carp (pollution tolerant)	☐ beaver dams ☐ man-made dams ☐ waterfalls (> 1 ft.) ☐ none ☐ other_____	☐ clear ☐ clear, but tea colored ☐ colored sheen (oily) ☐ foamy ☐ milky ☐ muddy ☐ black ☐ grey ☐ other_____	☐ grey ☐ orange/red ☐ yellow ☐ black ☐ brown ☐ silt ☐ sand ☐ other_____
Odor:	**Stability of streambed** (bed sinks beneath your feet in):	**Algae color:**	**Algae located:**
☐ musky ☐ oil ☐ sewage ☐ other_____ ☐ none	☐ no spots ☐ a few spots ☐ many spots	☐ light green ☐ dark green ☐ brown coated ☐ matted on stream bed ☐ hairy	☐ everywhere ☐ in spots ☐ % covered_____
Stream channel shade:	**Streambank composition (=100%):**	**Streambank erosion:**	**Riffle composition (=100%):**
☐ full (more than 75%) ☐ high (50% - 74%) ☐ moderate (25% - 49%) ☐ slight (1% - 24%) ☐ none	_____ % trees _____ % shrubs _____ % grass _____ % bare soil _____ % rocks _____ % other	☐ severe (more than 75%) ☐ high (50% - 74%) ☐ moderate (25% - 49%) ☐ slight (1% - 24%) ☐ none	_____ % silt (mud) _____ % sand (1/16" - 1/4" grains) _____ % gravel (1/4" - 2" stones) _____ % cobbles (2" - 10" stones) _____ % boulders (> 10" stones) (Not applicable to Muddy Bottom Streams)

Implementation Guidelines:

Walk the entire site before beginning the assessment program. The assessment reach is 100 meters (m), starting at your sampling riffle and working upstream.

Stream channel width is the space available to hold water. This may not be currently submerged but this shows signs of being submerged in times of high flow. The stream bank (or scarp) is the slope that connects the stream channel to the surrounding land.



EPA, Stream Corridor Structure


Rainbow Trout, Duane Raver


Largemouth Bass, Duane Raver


White Catfish, Duane Raver


Common Carp, Duane Raver

Fish Water Quality Indicators

Fish populations can give important clues about stream health. The following categories are provided (check all that apply):

- ☐ **Trout:**
  - Trout can be distinguished by their body shape and spots. Rainbow trout have a distinctive red line across the center of their body. They are usually around 11-18 inches long. Trout are **sensitive to pollution** and most commonly found in colder waters.

- ☐ **Bass:**
  - Bass are **somewhat sensitive to pollution** and average at 16 inches long. These fish live in areas high in aquatic vegetation, aquatic weeds, and tree limbs or logs. They use these to hide from predators and ambush prey. They have dark green backs that fade into white undersides.

- ☐ **Catfish:**
  - Catfish have a population that reaches waterways all over the world. They tend to be found in shallow, running freshwater. However, these fish are **pollution tolerant** and can survive in a multitude of places. Unlike other fish, catfish have distinctive whiskers around their mouths and have skin rather than scales.

- ☐ **Carp:**
  - The common carp are hardy, **pollution tolerant** fish that can be found all around the country. These fish can be identified by their large scales and two barbels on each side of the mouth. They average at 14 inches long.

- ☐ Scattered Individuals
- ☐ Scattered Schools

Barriers to Fish Movement

Fish movement is important for both stream and fish health. Beaver dams, man-made dams, and waterfalls with a drop of a foot or greater prevent fish from freely traveling the stream. The following categories are provided (check all that apply):

- ☐ Beaver Dams
- ☐ Man-made dams
- ☐ Waterfalls (>1ft.)
- ☐ None
- ☐ Other*

*If you notice any barriers to fish movement that do not fall into any of the categories above, please check "other" and provide a description.

Surface Water Appearance

Surface water colors and appearances can be caused by both natural and man-made substances and can point to differences in stream health. Changes in surface water hints to changes in water composition. Make note if strange colors are present throughout the stream or in sections, such as immediately below a discharge pipe or highway culvert. The following categories are:

- Clear
- Clear, but tea colored
- Colored sheen (oily)
- Foamy
- Milky
- Muddy
- Black
- Grey
- Other*

To tell the difference between petroleum spills and natural oil sheens, poke the sheen with a stick. If the sheen swirls back together immediately, it's petroleum. If the sheen breaks apart and does not come back together, it is from bacteria, plant, or animal decomposition.

To tell the difference between naturally occurring and petroleum-based foam (soap or detergent) look closely at the bubbles with the foam. Petroleum-based foam bubbles will have a noticeable iridescent shine to them, while naturally occurring foam will not.

*If you notice anything about the water appearance that does not fall into any of the categories above, please check "other" and provide a description.

Streamed Deposit (bottom)

Similar to water color, colors on the stream bottom may have natural or human-induced causes. Changes in sediment type or stream bottom color may indicate changes in stream composition and water flow. Record the overall appearance of the stream bottom. The following categories are provided (check all that apply):

- ☐ Grey
- ☐ Orange/Red
- ☐ Yellow
- ☐ Black
- ☐ Brown
- ☐ Silt
- ☐ Sand
- ☐ Other*

Note on texture: Silt is a type of soil with a grain size larger than clay and smaller than sand. To help identify it in the field, wet silt is slippery and soapy but not sticky.

*If you notice anything about the stream bottom appearance that does not fall into any of the categories above, please check "other" and provide a description.

Odor

Water odor can be indicative of pollutants or biological processes. Any observed odors are important when assessing a stream. The following categories are provided:

- Musky
- Oil
- Sewage
- None
- Other*

It is important to differentiate whether the odor is coming from the water or the air.

***If you notice an odor that does not fall into any of the categories above, please check “other” and provide a description.

The Izaak Walton League of America recommends that volunteers do not enter water if they believe there is a petroleum or sewage spill in the water. Please report the occurrence to VA DEQ and your local county offices. Pollution problems can be reported here:

Report a Pollution Incident in Virginia

Report a Pollution Incident in Maryland

Stability of Streambed

An unstable streambed can be an indicator of erosion or a stream with the potential to erode. Noticing this can be an important step in understanding how susceptible a stream is to erosion. This can be found by estimating **how many of the spots where you are stepping are sinking beneath your feet.** The following categories are provided:

- No spots
- A few spots
- Many spots

Algae Color

Visible algal blooms can be caused by different species, both harmful and non-harmful. Harmful blue-green algaes are hard to specify based on looks alone. They can appear blue-green, green, yellow, brown, white, purple, or red. Color alone is not an accurate way to tell if the bloom is toxic or dangerous, but it can help to identify the type of algae present. **It is recommended that volunteers don't touch algae, as it may be harmful.** The following categories are provided:

- Light green
- Dark green
- Brown Coated
- Matted on Streambed
- Hairy

Algae Located

A large amount of algae may indicate too many nutrients in the water. Large amounts of algae in the water for an extended period of time can block sunlight needed by underwater plants and use up dissolved oxygen in the water. Sometimes more algae will appear in the spring after snow melt releases extra nutrients into the stream. Volunteers are encouraged to check any category that applies as well as writing in the percent covered. The following categories are provided:

- ☐ Everywhere
- ☐ In spots
- ☐ % covered _____

For the following fields, monitoring teams should come to a consensus together to estimate the approximate percentages for the categories listed. For the streambank and riffle composition fields, all percentages in the field should add up to 100%. For example, a streambank could consist of about 50% shrubs, 35% trees, 12% grass, and 3% rocks.

Stream Channel Shade

This section is referring to the percentage of shade/cover directly over the stream. The following categories are provided:

- Full (more than 75%)
- High (50% - 74%)
- Moderate (25% - 49%)
- Slight (1% - 24%)
- None

Streambank Composition (=100%)

Streambank composition can hint to surrounding soil health, erosion levels, and overall health of the stream. The following categories are provided:

- _____ % trees
- _____ % shrubs
- _____ % grass
- _____ % bare soil
- _____ % rocks
- _____ % other
- None

Streambank Erosion

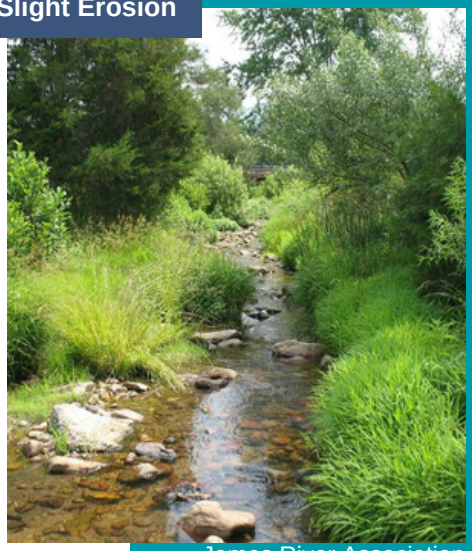
Streambank erosion is the wearing away of the stream sides. Some signs of erosion are exposed plant roots, exposed soil, and bare, vertical banks. Ranges listed are the percent of original surface material that appears to be gone. The following categories are provided:

- Severe (more than 75%)
- High (50 % - 74%)
- Moderate (25% - 49%)
- Slight (1% - 24%)

Severe Erosion

Pimmit Run, Ivy Main

Slight Erosion



James River Association

Riffle Composition (=100%)

Riffles are very important to stream health, as this is where macroinvertebrates live. A higher percentage of cobbles and gravel can point to an increased presence of macroinvertebrates. The following categories are provided:

- _____ % silt (mud)
- _____ % sand (1/16” to ¼” grain)
- _____ % gravel (¼” to 2” stones)
- _____ % cobbles (2” to 10” stones)
- _____ % boulders (> 10” stones)

***Note*: Riffle composition does not apply to muddy bottom streams.**

Land Use in the Watershed

Introduction to Land Use in the Watershed Section

Land Use in the Watershed is an important section to help determine what could be causing potential pollution, erosion, and other environmental conditions at the sampling site. Monitors are expected to take into account a one-mile radius around the sampling site. Monitors are encouraged to explore maps and other online resources to help gather this information. For land uses that aren't present, leave the line blank.

LAND USES IN THE WATERSHED (UPSTREAM AND SURROUNDING SAMPLING SITE)

Indicate whether the following land uses within a one-mile radius of your sampling site have a high (H), moderate (M), slight (S), or no (N) potential impact to the quality of your stream.

____ Oil & gas drilling	____ Urban uses (parking lots, highways, etc.)	____ Agriculture (type:_____)
____ Housing developments	____ Sanitary landfill	____ Trash dump
____ Forestry	____ Active construction	____ Fields
____ Logging	____ Mining (type:_____)	____ Livestock pasture
		____ Other_____

COMMENTS: Describe the amount and type of litter in and around the stream and indicate the current and potential future threats to the stream's health.

_____

_____

Please send your datasheets to your regional coordinator or submit them online at www.vasos.org. If you have any questions about this protocol, please contact the VA SOS Coordinator at vasos@iwla.org. Data sheets must be stored for five years after sampling. If you are unable to keep your datasheets, please contact the VA SOS Coordinator.

BIOLOGICAL MONITORING DATA FORM FOR ROCKY BOTTOM STREAMS 5

Information in this manual provided by:
The Department of Health, British Columbia Forest Service, Washington Department of Fish & Wildlife, Michael Bruton, and Maine Department of Inland Fisheries & Wildlife.

Contact Us

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Find us online at www.vasos.org

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