

## TRAINING AGENDA: INITIAL SOS TRAINING

- I) Introduce myself and SOS Program
  - A) Describe VA Division of Izaak Walton League of America
  
- II) Describe SOS method
  - A) Explain what a watershed is
  - B) Describe point source vs. non-point source pollution
  - C) Explain difference between biological or chemical monitoring
  - D) Explain macroinvertebrates
  - E) Types of pollution
    - 1) Toxic
    - 2) Sediment
    - 3) Nutrients
    - 4) Bacteria (health hazard and not really identifiable with our method of biomonitoring)
  
- III) Safety – especially stress with children
  - A) Wash Hands – gastrointestinal
  - B) Cuts and Scrapes – peroxide
  
- IV) Discuss critters individually
  
- V) Discuss the importance of uniformity of method – QA/QC comparability
  
- VI) Demonstrate index value calculation and data sheets
  
- VII) Demonstrate and Describe Method
  - A) Inspect riffle
  - B) Pick riffle
  - C) Approach from downstream
  - D) Weight down bottom of net
  - E) Rub all cobbles & dig in substrate (20 secs)
  - F) Scoop forward
  - G) Release vertebrates
  - H) Carry carefully to streambank
  - I) ID and count
  - J) Additional samples if needed
  
- VIII) Demonstrate the habitat assessment part of the data sheet (tips at end of monitors guide)
  
- IX) Show the reference collection
  
- X) Discuss resources (books, contacts, partners)
  - A) DEQ
  - B) DCR
  - C) VDGIF
  - D) Forestry Dept.
  - E) SWCDS & NRCS
  - F) IWLA Chapters
  - G) Local colleges
  - H) VA SOS Staff

- XI) Cooperate with state and local decision makers
- XII) Why do we need to monitor?
- XIII) What happens to the data – how to pick a monitoring site (contact DEQ – avoid their sites)
- XIV) Establishment of Watershed Roundtables (encourage diverse participation – everyone has a skill to contribute even if they don't want to be a “front line monitor”)
- XV) What I want them to do now
  - A) Get certified
  - B) Report data
  - C) Become a trainer

## **Supplemental suggestions for the checklist for trainers (as written by Jay Gilliam)**

- It is not necessary to go into detail on the Izaak Walton League but please do mention that the Va SOS program is a project of the Virginia Division of IWLA and mention that there is a VaSOS Chapter and that memberships are welcome.
- You should be able to gauge how knowledgeable your attendees are. Use your own judgment as to what detail to go into about watersheds and point vs. / nonpoint pollution. I often tell the story of how I got interested in water quality monitoring. It is at this point that I talk about Virginia having 50,000 miles of perennial streams, the relatively small percentage of the total that agency personnel are able to monitor (20%). I always complement DEQ monitors but site their low numbers.
- Make the point that biomonitoring reflects what has happened over time (since the last event) whereas chemical monitoring gives you an instant “snapshot”. Talk about how the two types are complimentary.
- I explain “aquatic”, “macro”, and “invertebrate”. Mention that the majority of these are the juvenile stage of insects but that crustaceans and mollusks also exist.
- Most people have a valid understanding of toxic pollution. Explain how sediment and nutrients cause the biological community to be degraded. Make the point that bacterial contamination is not readily identified with biomonitoring methods and that it is a primary human health threat. Because of that we should always be careful to disinfect our hands and cuts or scratches.
- This makes a good lead in to safety procedures. Mention child safety.
- Discuss organisms and their identifying features. See my suggestions at the end of this document. Develop your own.
- Discussion of quality assurance can take place at any point in the training session but make sure that it is mentioned and emphasized. Make sure you are familiar with our Q/A plan. Also discuss the need to be certified as a monitor.
- Demonstrate the calculation and the collection method in whatever way is comfortable to you. Sometimes it helps for the trainees to have a prefilled sheet and demonstrate it on 18x24 laminated sheets.

- Show them a well preserved reference collection. Make sure this is well maintained. Stacey or Jay would like to see the collection that you are using for Q/A purposes. If any organisms are missing please mention this.
- Finish your session with an encouraging discussion of the value of citizen generated data. Touch on the importance of “citizen stewardship” and how they can be an important part of solving the problem of stream degradation.
- I often discuss how to choose sites in a particular watershed.
- I always try to end by saying that carefully developed laws and regulations are necessary and that they represent the standards of our community. I go on to say that EDUCATION (both formal and non formal) , BETTER DESIGN of treatment plants, agricultural operation, and urban development etc..., and finally COOPERATION between interested citizens, local governments, state agencies, businesses, farmers are necessary to compliment the existing laws and win the war against non-point pollution.
- I often try to get them to make some sort of commitment to follow through with practice and certification. Give them a list of experienced monitors who would accompany them on an event. Ask if anyone has any questions or concerns. Thank them for attending!

## *Monitors reminder of physical characteristics of aquatic macroinvertebrates*

**Stoneflies** -- Have two wire like tails. Never have gills on their abdomen. Will do “pushups” in the ice cube trays when oxygen levels fall. Some folks say that stoneflies look “Egyptian” (scarabs?).

**Mayflies** -- Have three wire like tails. There are several exceptions that only have two but these are easy to detect because they have gills on their abdomen. The most common of these exceptions is the flatheaded mayfly, which has large eyes on the top of its head. This mayfly has prominent gills that flutter in the ice tray.

**Caddis flies** -- Caddis are often fat and segmented. They often have a greenish color although this is often dependent on what they have been eating. There is one caddis that is bright orange or bright yellow. This one (I call it my “neon” caddis) is seldom as large as my other caddis and not fat. We differentiate the net spinning caddis because of its much higher tolerance for water pollution.

**Net spinning Caddis flies** -- Can be brown to green depending on what it has been eating. Has two “tufty” tails. Most importantly it is the only caddis to have significant gills on its abdomen (may require magnification). Does not make a case. Often this one will do the “caddis fly dance”. Ask your trainer to demonstrate.

**Beetles** – **Adult riffle beetles** are the only one of the critters that we observe that spends its entire life cycle underwater. They are small black beetles usually found under the net. **Water pennies** are small and copper colored. They are unlike anything else you might find. **Beetle Larvae “Elmidae”** are what I call my apostrophe or comma bug. They often have the size and shape of these punctuation marks. Some folks say they look “crunchy” and if you look real close they have rings like a raccoon’s tail and a pulsating anal gill at the posterior end. **“Other” beetle larvae** are very diverse in appearance and less common. These are best determined by using your dichotomous key in the beginning of your monitors guide.

**Snails** – **Gilled snails** must filter their oxygen and food from the water. They require relatively good water quality. Holding one in front of your face with the pointed or helix end pointing upwards, the opening will be to the right. **Lunged or Pouch snails** will open to the left and can exist in poorer water quality. They don’t filter out food or oxygen.

**Megaloptera** – That got your attention! This is the scientific name for the Order that includes **Hellgramites, Fish flies, and Alderflies**. Since they are all grouped together in the modified method you don’t really need to distinguish between. Just for your knowledge: The primary difference between **Hellgramites** and **Fish flies** is that the **Hellgramites** have cottony gills on their abdomen and **Fish flies** have a smooth abdomen. Also, a full grown Fish fly will never be as large as a full grown Hellgramites. Another common name for a Hellgramites is a Dobsonfly. **Alderflies** look similar to the others but they have a single spiky tail that looks like a stinger. **Alderflies** are less likely to be found than the other two families.

**Damselflies and Dragonflies** – **Damselflies** have 3 characteristic paddle shaped “tails”. In other words their three “tails” are shaped like the blade of an oar. These are actually supplemental gills and not true tails. Damselflies are fragile or “spindly” looking and have large eyes.–

**Dragonflies** are mainly identified by the shape of their bodies. They range from slightly oval shapes to round. On close inspection you will notice a hinged lower jaw the projects back along the underside of the thorax.

**Sow bug** – The Sow bug is an isopod and a crustacean. It is closely related to the terrestrial roly-poly bug or pill bug. It had many more than the six legs of the insects. It is often gray in color but that can vary.

**Scud** – The Scud is an amphipod and also a crustacean. It looks like a shrimp and swims sideways. In clear water the scud will often be translucent.

**True Flies** – These critters are characterized by having no legs in their juvenile form and being somewhat like a grub worm or maggot. **Atherix (Water snipe)** come to a point at one end and have “feathery” projections on the posterior end (hairy antlers). **Crane flies** have a distinct maggot like appearance and can be almost as long as your index finger. There is on family that can pump one end of itself into a golf ball shape. **Horseflies** are found less often and come to a point on both ends. There are other rare types that can be mistaken for large midges or small worms.

**Midges** – These are usually the very smallest of the critters an almost always will be found under the net when they are present. They do not vary in width from one end to the other. One type of midge can be coral red.

**Black flies** – These are also mostly found under the net when present. Usually very small, they have a distinctive “bowling pin” or “club” shape. When they are placed in the ice cube tray they usually attach themselves to the wall of their space. They have suckers on both ends and can march along in the fashion of an inchworm. If populations increase significantly you should suspect a new source of nutrients to the stream.

**Aquatic Worm** – Looks very similar to a earthworm except lighter pink and smaller.

**Plan aria or Flatworms** – These are different terms for the same organism. Gray to brown, unsegmented, soft, flat, eye spots on top of head. Undulating motion.

**Leeches** – Flattened body similar to Flatworms but segmented. No eye spots but suckers at both ends of underside.