Habitat Sense Station

The Intro/Objectives

Host: This video is going to help guide you through the process of hosting the Habitat Sense Station.

The objectives of the Habitat Sense Station are to:

- Understand how fish use stream habitat to get food, water, shelter, and space.
- Learn how to survey stream habitat and quantify the different habitat components.
- Discuss the features of a stream and how land management can affect stream habitat.

2. The Bullet List

Host: Introduction

- When the students arrive, introduce yourself and the other station members including their name, career, and agency.
- Ask students "what is habitat?", and ask a question that prompts them to understand why watershed health is important to fish habitat.

State "The goals and objectives of the Habitat Sense Station

1. The Stream Complexity exercise will simulate the 4 basic things all living things need to survive. Food, water, shelter, and space. Fish need those things too.

    a. Have the students get into the stream and pretend they are fish. They will select a spot in the creek that they think will provide their fish with food, water, shelter, and space.
    b. Make sure they have space and remind them they need to stay in the same location throughout the exercise.
    c. Then an aquatic safe solution with fluorescein is poured into the creek so that students can visually see the areas of varying flow velocities.
    d. Then you will throw goldfish crackers or something else simulating food. Students will maintain their position and try to gather as much food as possible.
    e. You will ask them if their fish has shelter from predators and identify who will likely get eaten.
    f. Once this exercise is complete review some of the factors that contribute to good or poor habitat for their fish.

**After the Stream complexity exercise divide students into three groups.

2. The Habitat Unit exercise, will allow students to collect fish habitat data.

a. Worksheet Data collected will include;
    i. water temperature in degrees Celsius
    ii. Identifying the features of habitat types such as pool, riffle, and glide
    iii. Estimating and measuring the length and widths of the habitat unit and finding the maximum depth, as well as pool tail-crest if it's a pool.
    iv. evaluating substrate size variations , what sizes they have in their reach, and uses for fish.
    v. They will evaluate if substrate is embedded and what that might mean for fish and macro-invertebrates.
b. Students will count pieces of woody material and discuss the ways that wood contributes to stream complexity.
c. Students will be provided a description of the various types of fish cover and asked to identify if they are present in the reach and identify dominant and subdominant cover types within their habitat unit.
d. Students will evaluate if erosion is occurring and discuss how streambank cover and land management affects erosion.
e. If there is time students can draw a map of their unit and can conduct a pebble count, where substrate size is measured.

3. Conclusion/outro

Host: "In conclusion, summarize the lessons learned at the Habitat Sense Station."

Fish like all aquatic species need complex habitat to meet their needs throughout their lives. The health of the watershed directly affects the type and quantity of food available; the quality, quantity and velocity of the water, as well as wood and other features that provide adequate aquatic habitat. The use of Best Management Practices can protect processes in the watershed that sustain stream complexity and reduce the risk of stream simplification which contributes to reduced fish production. Consequently, the preservation and restoration of natural stream functions benefits both fish and landowners.

In the development of the land use scenarios at the Watershed Wonders Station discuss things they might want to think about to protect the stream habitat and ways to restore stream banks and fish habitat in degraded areas.

Extra Material to be provided to Resource Professional

1. Stream Complexity - Four Basics

- Then we help students get into the stream and find their little habitat space. Usually need an upstream and downstream boundary. Remind them they need some space. They will have to keep their feet in the same place.

- One of us is upstream and pours a solution with fluorescein, a really cool bright green dye, across the stream. We tell them to watch how the water flows, the fastest area is the thalweg, watch how different things slow the flow down. How much energy would it take for a small fish to hold? Do you think different sized fish use areas with different velocities?
- Then we tell them to roll up their sleeves and get ready to feed. The upstream person throws "fish food", we like to use goldfish crackers. They might throw out a cup or two. The fish need to grab as much food as they can.
- Great, how did you do? Some sites better than others. Now there is a predatory bird coming overhead, where is your shelter? It needs to be close so you can dart in. Then we point out which fish would likely get eaten.
- We ask them to keep their food and count it. As they get out we ask how many they got, what made their feeding spot good or bad. We have them put their goldfish in a bag or bucket – we let them dry and can reuse them!
- Some of the points about the flow and feeding exercise: Stream complexity is important to providing places for more fish. Harder to catch food in faster water and in colder water, need slower flow, but enough to bring food to you. Fish has to balance energy to hold in faster water. Fish don't fight for food coming downstream, they maintain their space. And they need shelter. They see how there are a lot of things to consider for a good feeding area.

2. The Habitat Unit exercise

I. Now we break them into groups, we usually have 3 groups and 3 resource specialists. Groups should be about 6-7 students.
   a. Each group goes to a habitat unit, which we decide upon earlier. We ask students to get out their Fish Habitat worksheet and start filling out the top part. This might be the type of data you would collect for a summer job and need to be sure that has some basic info about who is collecting data, where, and when. We like to have them guess the water temperature in degrees Celsius.
   b. We start filling out the data form. We look at the habitat unit and go over what is a pool, riffle, glide. What is this habitat type?
   c. Now we have them estimate the habitat dimensions in meters. Then give them the measuring tools and set different students to the task of measuring the length, widths, and finding the maximum depth, and pool tail-crest if it's a pool.
   d. Next they look at the substrate size. We have them take turns reading from the help sheet, gravel 2-64 mm. Do we have gravels in our reach? What are gravels used for? Macroinvertebrates, used for spawning, smaller fish can hide in gravels.
   e. Then they look at embeddedness, or how much of the larger substrate is covered with fines. This decreases space for macroinvertebrates and fish, and they might not be able to use for spawning.
   f. We have the students find and count the number of pieces of woody material. Wood gives the stream complexity, slows flow, protects banks, provides food etc. How do

different land use practices affect the amount of wood in the stream. We can look at wood in natural streams to see how wood functions in streams.

g. The next thing we look at is important. What provides cover for fish in the stream, protects them from predators, gives the stream complexity, and breaks up the flows. We go through each cover type and they look to see if they have it in the reach. They need to identify the dominant and subdominant cover types.
h. We then look for eroding banks and measure how much of the bank is eroding. We can talk about what causes erosion, how land management may cause erosion.
i. We have them look at bank cover or if there is vegetation or large substrate that is keeping the banks from eroding. Again we can talk about land management. Show them how having intact riparian vegetation can keep the banks from eroding.
j.

3. If time allows

There are a few more things they can do if there is time. They can do a pebble count or sketch their stream reach. We teach them how to set up random transects for doing a pebble count and show them how to measure the intermediate axis of substrate. Then they each randomly select and measure some substrate. This is a more quantitative way to assess substrate composition than what we did earlier.