

Riparian Rampage

The following activities are based on a nine day session with each activity lasting roughly an hour and a half. Day Six (visiting a different riparian habitat) can be omitted. All activities but Day One and Five require that students visit a riparian habitat.

****Each day includes 1-1 ½ hour (both in classroom & outdoors).**

Day One, Introduction to Riparian Habitats

Objective: Students will be introduced to what a riparian habitat is, why it is important and some vocabulary associated with it.

Method: Students learn what a riparian area is and discuss its importance. Students will familiarize themselves with words associated with riparian habitats.

Background: Riparian areas occur along the edges of wetlands or stream banks where the soil remains wet for most of the year. This allows a diverse plant community to occur. These areas are critical nesting resources for many types of birds. Trees and shrubs also provide important feeding sites for birds, browse for elk and deer, and winter food and shelter for small mammals. Vegetation along the banks provides shade, erosion control and shelter for aquatic wildlife. Woody and rock debris in the water provides cover and food for aquatic life and can cause riffles in stream which help aerate the water. Riparian areas provide many habitat needs to numerous types of wildlife and are important to a healthy ecosystem.

People also benefit from them. The vegetation along stream banks helps control flooding by slowing stream velocity and reducing erosion. Stream side vegetation can also slow the water to allow pollutants to settle out that might adversely effect water sources people use for drinking or irrigation of crops.

For more detailed information about riparian habitat and its benefits to wildlife and humans, please refer to the following resources: *The Wonders of Wetlands* by Kesselheim; *Project Wild Aquatic*; *Project Wet*; and *Living with Native Plants* by Bev Keating.

Materials: A small list of vocabulary words, based on students' ability level and background. Any information, i.e. magazine and newspaper articles, pictures, or video on riparian habitats.

Procedure: Ask students if they have ever heard the word "riparian". Explain what it means and discuss with them if they have ever been to this type of area. Spend some time talking about the vocabulary associated with riparian habitats. Then discuss why these areas are important to wildlife. Have students speculate on why they are important to people.

Evaluation: Have students explain what makes up a riparian habitat.

Day Two, Steam Web Basics

Objective: Students will learn about characteristics of a certain stream and their relationships to the rest of the environment.

Method: Students will use the Stream Measurement form to collect data about a stretch of stream and discuss the relationships between the water in a riparian area and the wildlife that depends on it. As a group students will discuss the "web of life"* concept as it relates to riparian areas and other types of habitat.

Background: Riparian areas come into being through the presence of water and woody vegetation. Riparian areas are heavily dependant on the water cycle. Water collects in simple or elaborate drainage systems via precipitation and/or ground water coming to the surface. This begins the many threads in the "web of life". Plants grow along the stream banks, providing food and shelter for aquatic and terrestrial wildlife. Small, shrimp-like aquatic invertebrates called scuds, may find protection under a sunken log, which is where a stickle back minnow might look for something to eat. The minnow then might become food for a belted kingfisher which nests in the trees next to the stream. The trees shade the water and drop branches and leaves into the stream, providing materials that protect and feed the scuds. Interdependencies in a riparian are endless and important to a healthy environment.

Materials: Stream Measurement Forms, string and weights to measure stream depth, measuring tape to measure stream width, waders (optional), rubber duck to measure stream velocity, chalk or dry erase board to draw a web of life.

Procedure: Discuss with students what makes up a riparian habitat and how these items relate to or depend on each other, i.e. fish eat scuds, scuds need water, water comes from evaporation and precipitation, etc. Ask students to list as many items as possible that are important to healthy riparian areas. Write these on the board in a web like design (see drawing). Name items students might not know about and ask them how they would fit into the web. A good example would be rocks and/or boulders. These cause rapids that aerate the water. This action produces dissolved oxygen in the water which is essential for all organisms that live under water, i.e. fish, scuds, crayfish. Lastly ask students how people fit into the web.

After designing a simple web on the board explain to students that they are going to be exploring a segment of a stream and taking basic measurements that have to do with the two main ingredient for a healthy riparian area, water and woody vegetation. Tell students that from these measurements they will determine what type of connections are ongoing at the site and what are missing due to the condition of the water and woody vegetation.

Note: if Pine creek at Turnbull NWR is used, students should note the lack of streamside vegetation and woody debris in and around the water. Students then should be able to draw conclusions about how this affects the "web" for this area; no shade from overhanging trees and shrubs increases water temperatures and reduces the accumulation of woody debris, which can

decrease dissolved oxygen and the number/type of aquatic invertebrates, which affects the populations of animals that feed on aquatic invertebrates and the species that feed on them. Break students into groups, assign a section of stream and have them collect data for the measurement form. Pick several students to stand in the water to assist group members in getting stream width and stream depth in areas that cannot be reached from the bank. Note: If the students will be visiting a different riparian area on Day Six, tell them to pay special attention to the information gathered this time so that it can be compared to Day Six's site.

After students have collected their data, discuss what they found and how it relates to the web that you designed earlier. Ask the students if they think their area is a healthy riparian habitat. Discuss why it is or isn't. Discuss with students ways that the area could be improved (fences to keep out livestock, tree planting, etc.) or potential ways the area could be harmed (logging too close to the stream corridor, pollutant from sources upstream, etc.)

Evaluation: From this day on have students keep a journal that they write in each day. Pick one to two questions for the end of each session and have the students respond to them. Each question should deal with what was covered that day, some examples would be. "List the "main ingredient" for a riparian area." or "Why is dissolved oxygen important in riparian habitats."

Day Three, Aquatics Study

Objective: Students will learn to identify certain aquatic invertebrate, and understand how their presence or absence relates to water quality and the health of a riparian area.

Method: Students will use dip nets to gather samples from a stream. Students will try to identify aquatic invertebrates in their samples by using field guides. Students will discuss the health of the stream as dictated by the presence or absence of certain aquatic invertebrate.

Background: In a riparian area, good water quality is very important to wildlife. The base of many food chains starts with the aquatic invertebrates. Many flying insects that are important food sources for birds and bats start their lives as aquatic invertebrates. If water temperatures are too warm or there is not enough dissolved oxygen in the water the population of aquatic invertebrates suffers and, in turn, the wildlife that depends on them have difficulties. Several organisms can be key indicators to water quality in a riparian area. The presence of caddis, stone and may fly larvae indicates that the water contains adequate amounts of dissolved oxygen, has a low amount of pollutants, and stays relatively cool. Leeches, scuds and snails are more tolerant of low oxygen, increased pollution, and warmer temperatures. The presence of these organisms will provide clues to the water quality, and the diversity of the food chain in the riparian. If some caddis flies are found, but there is an abundance of scuds and leeches then the water quality might be suffering. If all of the fly larvae are found along with leeches, scuds and snails it would indicate that the water quality is good and a diversity of life can be supported.

Materials: Aquatic invertebrate field guide, buckets, waders, dip nets, microscopes (optional)
a screen to catch anything floating downstream

Procedure: Discuss with students how they can determine water quality in a riparian habitat. Ask them how it relates to the “web” for this habitat. Explain to students the importance of water quality and the organisms that live in it and provide food for other animals. Talk with students about how the presence and absence of certain organisms in the water can provide clues to the health of a riparian area. Break the students into groups and provide them with the material to collect a sample from a creek. Tell the students that their goal is to find and identify aquatic invertebrates that will help them determine the condition of the stream. Pick several students to use the waders and get a sample from areas out from the stream bank. If microscopes are available have students pick several specimens to examine. Talk with students about why they are finding, or not finding certain organisms. Is there too much sediment from erosion? Not enough shade, signs of pollution, etc. After the students have fully examined these samples, and time-permitting, have students draw one of the organisms that they observed.

Evaluation: In their journal have students write about what they saw, and why. Did they find many different types of aquatic invertebrate because of good water quality, or only a few types.

Extension: Have students use Hach Kits to evaluate the physical properties of the water (e.g., pH, dissolved oxygen). Have the students discuss how pH, dissolved oxygen affect aquatic organisms and plants, which ultimately affect riparian-dependent wildlife species.

Day Four, Plant Study

Objective: Students will learn about several plant species in a riparian area and their importance.

Method: Students will explore and identify the vegetation in a riparian area and draw leaves from several different plants. Students will learn about how wildlife uses several plants in a riparian area.

Background: Riparian areas can support many different types of plants. Because of this diversity of plant life. Animals utilize this habitat in a variety of ways. The water birch is a tree that has multiple uses for wildlife. The red-naped sapsucker will peck holes in the bark for sap. These same holes provide food and nesting material for bald faced hornets. The thorns and berries of douglas hawthorn provide protection and food for small mammals and birds. Loggerhead shrikes will also use the thorns to impale their prey. Golden current is a shrub that also provides shelter and food for wildlife. Birds that are cavity nesters will use quaking aspen trunks as nesting sites. Mountain Alder is another species that birds, like Cedar Wax Wings, will use for food and shelter. Dead woody vegetation is just as important live woody vegetation. Dead standing trees are called snags and provide critical nesting and roosting habitat for some species of birds and bats. Downed woody debris, whether on the ground or in the water, provides cover for animals and decomposes, returning nutrients to the soil.

Materials: Plant guides for identification, crayons and /or colored pencils, leaf samples from three to five plants, bird guides (optional)

Procedure: Discuss with the students why the woody vegetation in a riparian area is important.

Take students to a site with several types and spend time talking about different examples. Use guide books if available. Have the students spend time drawing one or two leaves from each species. This can be done in the field or samples can be brought back to the classroom. Provide students some time to sit quietly in the area to listen and look for wildlife.

Evaluation: In their journals have students explain why the diversity of vegetation in a riparian area is important.

Day Five, Web of Life

Objective: Students will use the information from the past two sessions to show the connections and interdependencies that occur in a riparian area.

Method: Students will draw a web of life for a riparian habitat.

Background: In a healthy riparian habitat many components are connected and dependant upon each other. The belted kingfisher eats minnows, which are dependant on the scuds, which need

- To be ...

Day Six: Comparison of Two Riparian Areas

Day Seven: Site Prep for Planting

Day Eight: Planting Day

So, why is increased sedimentation a concern? Increased sediment loads can:

- Smother fish eggs
- Fill in pools
- Block or fill in side channel habitat
- Decrease hiding and resting cover for fish
- Decrease water depth
- Increase water temperatures
- Decrease winter survival rates

What we have done:

- Revegetated eroding banks and degraded riparian areas
- Moved streamside campsites and roads further away from the river
- Will do road improvements by replacing culverts and installing water bars and ditches
- Closed a road no longer in use
- Fenced riparian areas and provided cows with water access points

What can you do?

- Educate people on the importance of LWD for fish and the riverine ecosystem.
- Encourage people to leave dead and dying trees in the riparian area.
- Encourage people to leave LWD in the water.

A clean and tidy river isn't what's best for the river and riparian area.

Human-caused sources of sedimentation into waterways

- Roads
- Improper road drainage systems
- Overgrazing in riparian areas
- Stream channelization
- Improper timber management techniques
- Heavily used campsites
- Walking on eroding banks

**Some wildlife species
that use snags or downed
logs as roosts or dens:**

Townsend's big eared bat

Big brown bat

Red bat

Some myotis bat species

Eagles

Osprey

Black bears

Raccoon

Marten

Fisher

Lynx

Bobcat

Western gray squirrel

Many species of rodents

Why is Large Woody Debris (LWD) important?

- LWD helps create pool habitat.
- Fish use this pool habitat for resting and hiding cover.
- Pools serve as a depositional area for small substrate such as gravel.
- Salmon often spawn in these pool tailouts.
- LWD catches other LWD which create more stable log jams.

Healthy riparian areas provide:

- Forage and browse for fish and wildlife
- Hiding cover for wildlife
- Shade
- Opportunities for large wood recruitment into the river
- Bank stabilization and sediment control
- Help regulating stream temperatures which is important for fish and other aquatic organisms
- Areas for water storage during floods and drought
- Water filtration
- Fawning and nesting areas for wildlife
- Wildlife migration corridors
- Habitat for many rare plant species

**Some bird species
that nest in snags:**

Western screech owl
Flammulated owl
Spotted owl
Barred owl
All woodpeckers
Wood duck
Barrow's goldeneye
Common goldeneye
Bufflehead
Common merganser
Hooded merganser
White breasted nuthatch
Red breasted nuthatch
Pygmy nuthatch
Western bluebird
Mountain bluebird
Tree swallow

WATER QUALITY

STREAM ANALYSIS

1. Is this stream healthy? Put an X by the stream tests that show healthy levels to support life:

Temperature: _____

PH: _____

Dissolved oxygen (DO): _____

2. Do you think these readings are going to be the same all year long? Why or why not?

3. What kinds of life depend on this stream? (hint: think of organisms other than just animals!!)

4. Circle the body of water you think this stream flows out to:

Snake River

Columbia River

Pacific Ocean

5. What are some ways this stream could get polluted?

6. What is ONE thing you can do or change at home to help keep our water clean?



Stream Study

General

Stream _____ Refuge _____ County _____

State _____ Site # _____ Date _____ Time _____

Names _____

Weather today _____

Channel Characteristics

1. Air Temperature _____

2. Water Temperature _____

3. Wind Speed _____

4. Stream Velocity in feet per second – *time it takes a float to travel 10 ft.*

10 ft. divided by _____ (sec.) = _____ ft./sec.

5. Flow based on your estimation of year-round average (circle)

high *average* *low*

6. Describe what the streambed is made up of: _____

7. Describe the smell of the water: _____

8. Water appearance: green _____ tea brown _____ milky _____ cloudy _____
 foam _____ oil slick _____ muddy _____ clear _____
 other _____

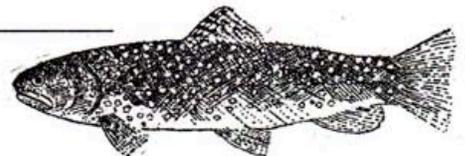
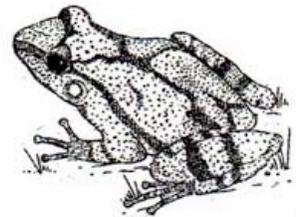
9. Algae – is there algae growing on the streambed? Y or N

What color is it? _____

10. Dissolved Oxygen _____

11. pH _____

12. Notes: _____



Habitat Characteristics

Describe any aquatic plants present _____

Describe the riparian area. Is it made up of trees, shrubs, grasses or a combination of all three?
What species can you identify? _____

Is the stream shaded by overhanging vegetation? (circle) **mostly** **partly** **barely**

Do you notice any stream bank erosion upstream? **Y** or **N**

Sketch your stream site here.....

