Watershed & Water Cycle

A day on the Entiat River at Stormy Preserve:
Riparian Ecosystem structures & functions

Text and photos by Susan Ballinger, unless noted

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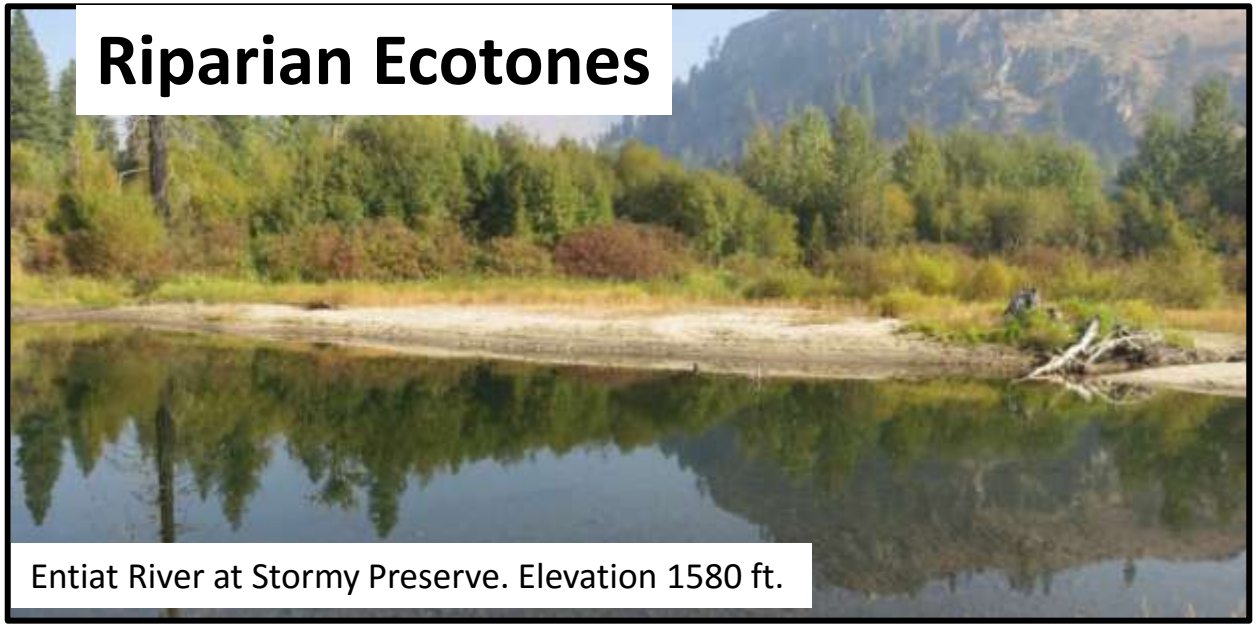
Riparian Ecotones

The land along a river is a transition zone between upland and wetland plant communities.

River water moves laterally as groundwater into riverbank soils, termed **riverine freshwater wetlands.**



Entiat River at Stormy Preserve. Elevation 1580 ft.

This upland plant community is called the **low montane forest.** Ponderosa pine is the dominant tree species. All soil moisture comes from local precipitation (rain and snow)

This wetland plant community is called **riparian.** Black cottonwood is the dominant tree species. Soils are moist year-round, fed by river water inflow (groundwater).

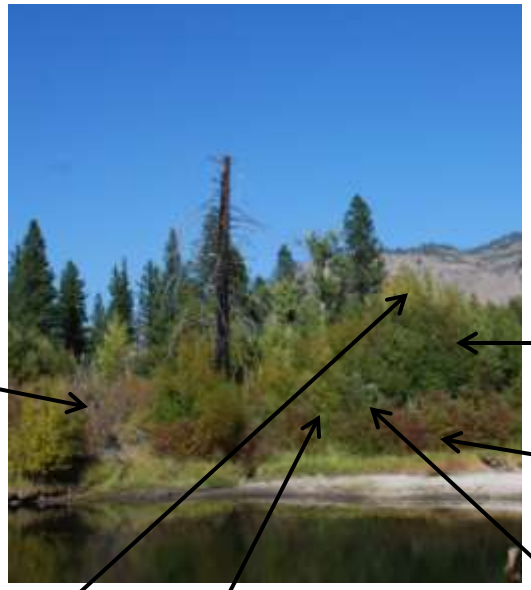
Competing for Space & Sunshine- Riparian Shrub Diversity

The shrub species are “clues” to the soil moisture conditions

Riparian shrubs are not limited by lack of water-

they compete with one another for space and sunshine

black hawthorn



aspen

redoiser dogwood

black cottonwood

river birch

mountain alder

The shrub species are “clues” to the soil moisture conditions


Douglas’ maple


Oregon grape


snowbrush ceanothus

The upland soils in the <u>low montane forest</u>
Support drought-tolerant shrubs that are dependent upon seasonal precipitation.
< 20 inches/year


bitterbrush

Important winter food for mule deer

serviceberry

Food Web

Riparian plant communities support land animals

Fruits and berries feed birds and mammals.

Ripening times vary from June to September providing a consistent source of carbohydrates throughout summer

Insects feed on plant parts

Riparian Communities provide Bird Habitat

Neotropical migrant birds select Stormy Preserve each summer to nest.

Riparian shrub thickets provide:

- Shade and temperature regulation
- Safe nest locations, out of sight from predators
- Plentiful insect foods- main food during nesting & rearing
- Nest building materials
- Close source of water

Song sparrow

Photo: Rod Gilbert

Gray catbird

Photo: Lori Alysworth

Western tanager

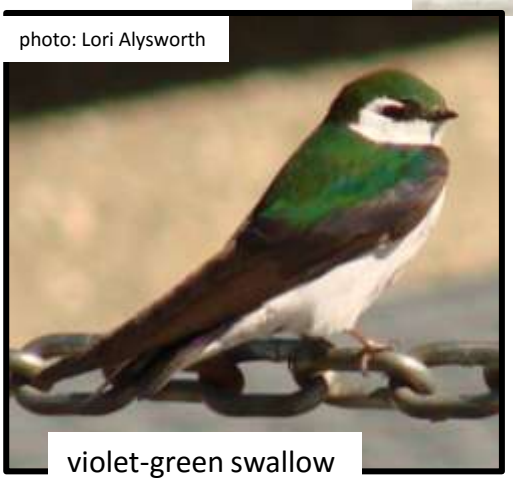


photo: Lori Alysworth

violet-green swallow

Photo: Rod Gilbert

Yellow warbler

Photo: Lori Alysworth

yellow-rumped warbler

Riparian Communities provide Mammal Habitat

Stormy Preserve serves as wildlife habitat for mammals

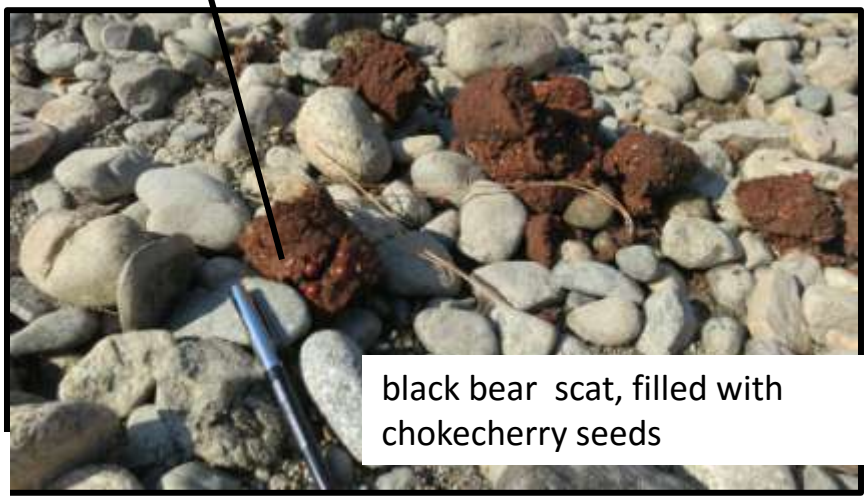
Mammals leave behind tracks and scat that tell us about their activity, food & water sources, and seasonal presence in a habitat.

Photo: Rod Gilbert

A thatching ant colony – black bear food

ripe chokecherries, mid-August

black bear track in sand



black bear scat, filled with chokecherry seeds

Riparian Communities provide Mammal Habitat

Beaver cut shrub branches litter the sandy beach

fresh raccoon prints, 10/5/12

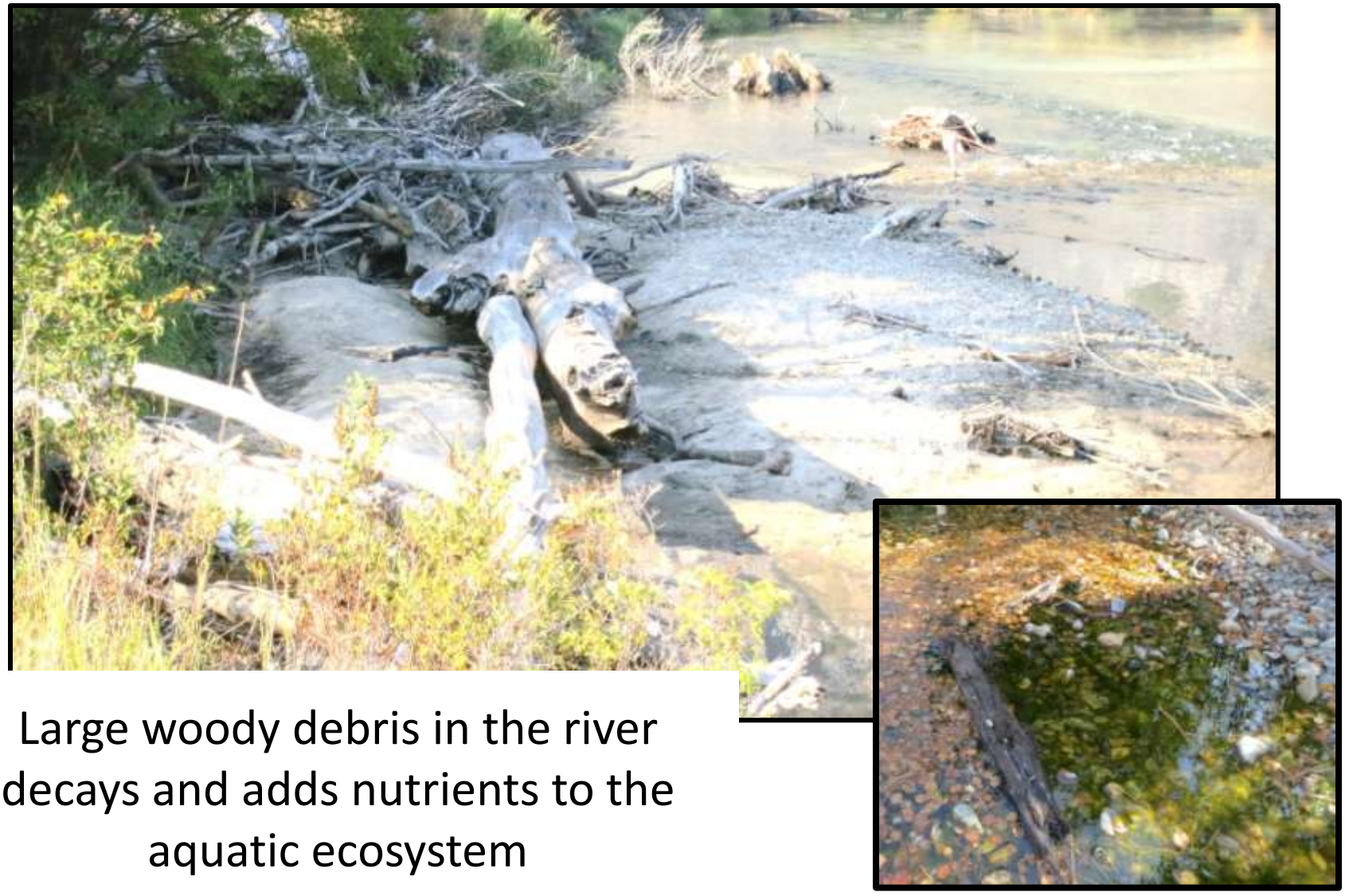
a mound of sand, evidence of a western pocket gopher tunneling underground searching for plant roots to eat. In spring, when groundwater levels are high, pocket gophers are forced up and out of their burrows. Coyotes then find easy prey.

Riparian Communities provide Aquatic Mammal Habitat

Beaver eat the inner living cambium layer of cottonwood, aspen, alder, birch, & willow. Beaver cut shrubs and trees for building materials and to keep their ever-growing incisors sharp.

Beavers are river architects

Wood: Provides Habitat Functions in Rivers



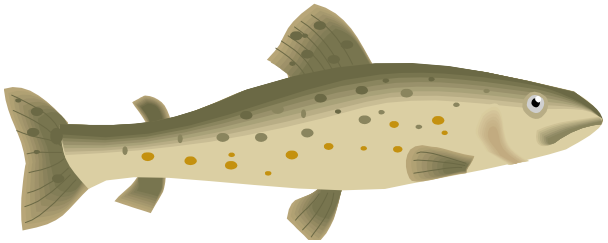
Large woody debris in the river decays and adds nutrients to the aquatic ecosystem

Producers in the Aquatic Nutrient Cycle

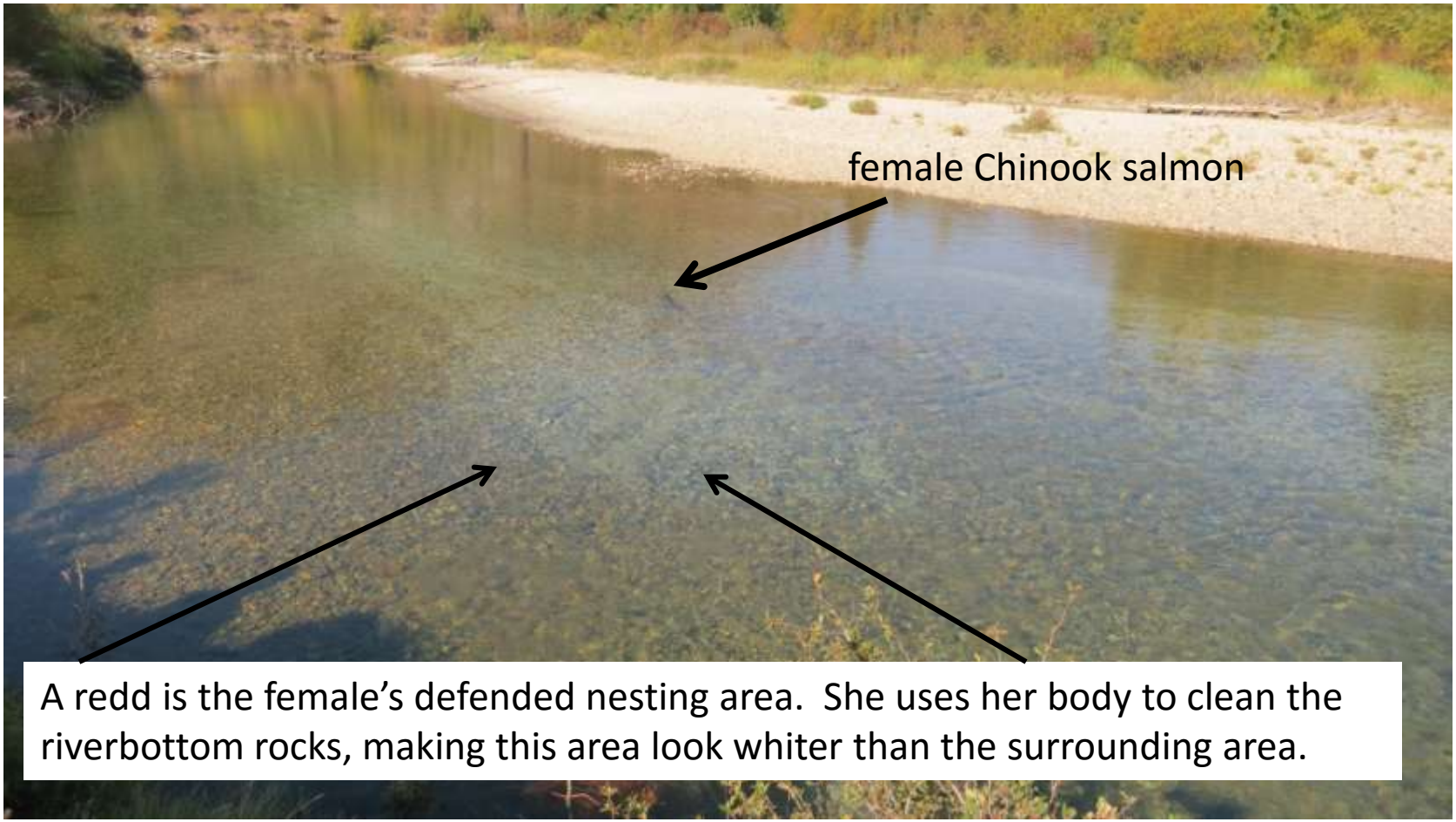
Riparian plant communities drop leaves into the river – Producers

Decomposers like fungi, bacteria, and blue-green algae feed on tree & shrub leaves creating a “film” of nutrient-rich food for aquatic macroinvertebrates.

Macroinvertebrates: Primary consumers in the Aquatic Nutrient Cycle



Visit in the fall to see the Entiat River nesting habitat to several Chinook Salmon *redds*



A redd is the female's defended nesting area. She uses her body to clean the riverbottom rocks, making this area look whiter than the surrounding area.

Secondary Consumers in the Aquatic Nutrient Cycle

bald eagles feed on decaying salmon carcasses in fall

belted kingfisher female

Common merganser female

Fish-eating bird species documented feeding in the Entiat River at Stormy Preserve

photos by Rod Gilbert

Elements of a Functioning Aquatic Ecosystem

This Entiat River Reach provides needed structural features
for salmon eggs and young fish

High mountain peaks where summer snow melt provides a continuous in-flow of cold clear water.

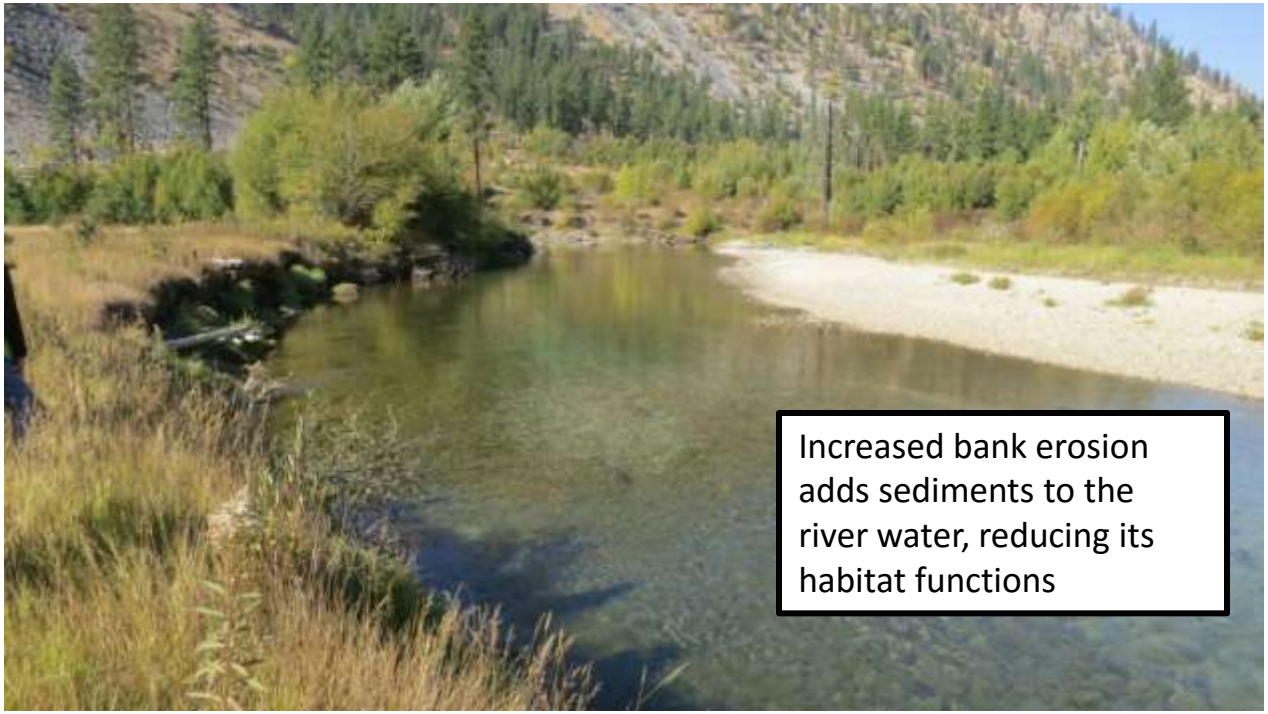
Shade from riparian plants to keep water temperature cool in order to have high dissolved oxygen.

Large woody debris and log jams that create quiet pools of water during high spring flows where young fish can rest

The right-sized gravel that will protect pea-sized eggs. Sand is too fine and larger rocks allow eggs to be swept away during high flows

When Things go Wrong:
Non-functioning Aquatic Ecosystems

Stormy Preserve's past land use history resulted in river banks susceptible to rapid erosion and down-cutting during high spring flows



Without the native riparian plants holding tight to riverbank soils, bank erosion results in steep-sided, receding shorlines. One solution is to armor the shoreline with large woody debris.

Plan to visit Stormy Preserve to savor the Entiat Riparian Ecosystem each season of the year.