Welcome to Your Greenway Field Trip at Lake Sammamish State Park

Thank you so much for being part of this Greenway field trip! You will play an important role: helping the students stay safe while participating in the field trip activities. If you have any questions, don't hesitate to ask your Greenway Educator.

Greenway Educator Cell Phone Numbers:

Victoria Love: 206-373-1601
Mikaela Ebbeson: 206-678-2244
Lindsay Spangler (Coordinator): 206-373-1613
Becca Kedenburg (Manager): 206-678-3893

What's in This Packet?

- ⭐ Overview of the Day
- ⭐ In Case of Emergency
- ⭐ Chaperone Expectations
- ⭐ Student Expectations
- ⭐ *Forests and Fins* Investigation Stations
- ⭐ Key Terms
- ⭐ Map
- ⭐ Feedback Survey

SCAN ME
to provide feedback

⭐ Overview of the Day

- Your Greenway Educator will get your group ready for the field trip, including:
    - Introduction to the Mountains to Sound Greenway Trust
    - Overview of the day
    - Behavior expectations
    - Use the bathrooms
- Hike to your investigation site, divide students into four investigation groups, start the investigation
- Eat lunch (near the bathrooms)
- Continue investigations
- Whole-class discussion
- Departure

⭐ In Case of Emergency

Greenway Educators carry a first aid kit and are trained in Wilderness First Aid and CPR.

<u>The nearest medical facility:</u>

Swedish Medical Center
751 Northeast Blakely Drive
Issaquah, WA 98029
425-313-4000

⭐ Chaperone Responsibilities

We are so grateful for our adult chaperones! We ask that you:

- Help keep kids **safe** and **engaged**
- Use your cell phone only when necessary
- **Help guide your students** to use their science journals – there are clipboards and pencils in the Greenway backpack
- Encourage students to take turns using materials
- Help get everything back into the Greenway backpack by the end of the day
- **Ask us if you have questions or concerns!**
- **Give us any feedback** on the included evaluation form

⭐ Student Expectations

While we're in this outdoor classroom, we expect students to be **respectful** of others and of nature, to be **curious**, and to **try their best**. This means we:

- Listen to the speaker
- Stay with your group
- Use an "indoor voice"
- Stay on the trail
- Walk, don't run
- Be considerate to other hikers – let them pass you on the trail
- Treat living plants with respect – don't tear or pick plants
- Observe wildlife – don't touch animals, including any dogs on the trail

⭐ Forests and Fins Investigation Stations

The students will work in groups to study parts of the salmon stream habitat at several investigation stations. Please help them use the directions in their science journal (referenced in the following pages) to complete their investigations. In the science journal, each investigation has a few pages: Background Information, Directions, Data Analysis, and Thinking Questions. The Greenway backpacks have everything you need.

Macroinvertebrates: pages 5-9

Students will measure the health of the stream by collecting and identifying stream bugs (macroinvertebrates). The type and quantity of bugs they find will tell them something about the water quality because some bugs can only live in very clean water and others can handle pollution. *Please remind the students to be gentle with these small creatures!*

Student Directions:

1. **Read** the Background Info on page 5.

2. **Read** the step-by-step instructions in the journal to understand what you will be investigating.

3. From the Greenway backpack, you will need:
    - dip nets
    - ice trays or container (filled with water)
    - water bubbler (this will help provide oxygen for the bugs while you observe them in the container!)
    - macroinvertebrate identification materials

4. **Collect and identify (15 minutes)**: Your Greenway Educator will show you where and how to collect macroinvertebrates from the stream. *Hint: they often like to cling to woody material!* Do your best to figure out what they are called and which group they are in using the identification materials.

5. **Record** your findings on page 7.

6. **Analyze:** Use the tables on page 8 to calculate your data and determine the health of this stream.

7. Gently release the macroinvertebrates back into the stream!

8. Work as a group to answer the Thinking Questions on page 9.

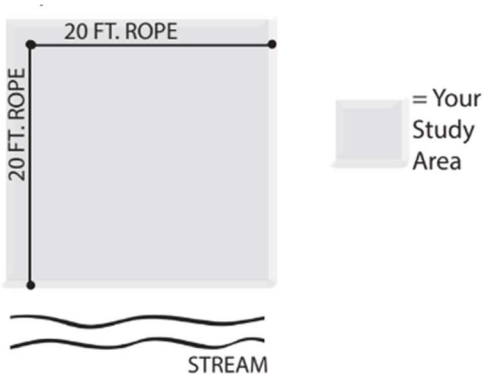
Riparian Zone: pages 10-14

Students will study the plants growing in the riparian zone, which is the area along the stream. Hopefully, they will observe lots of native trees and shrubs. They will use plant identification books/sheets to figure out what is growing in their study area and record that information. *Please remind the students to be gentle around the plants!*

Student Directions:

1. **Read** the Background Info on page 10.

2. **Locate the transect**: There will be two 20-foot-long ropes set up as a transect that matches the diagram below. This will be your study area.



3. **Identify and draw (15 minutes)**: Identify and sketch the plants in your transect. Do your best to identify the plants with the plant identification materials from the Greenway backpack. Draw and label the plants in the area on page 12. Try not to step on plants!

4. **Analyze:** Use the chart on page 13 to determine the quality of this riparian zone for salmon habitat.

5. Work as a group to answer the Thinking Questions on page 14.

Stream Channel: pages 15-18

Students will get more of a bird's-eye view of the stream. They will make a drawing of the stream, including things like the shape of the stream, how many logs are in the water, the speed of the water, evidence of erosion. They will also measure the velocity of the stream.

Student Directions:

1. **Read** the Background Info on page 15.

2. **Make observations and draw the stream (10 minutes)**. Be sure to consider the following:

- What's the shape of the stream? Is it curvy or straight?
- Which way is the stream flowing? Fast or slow?
- Add any woody material (logs) you see.
- Draw any pools and riffles you see.
- How big is the sediment on the bottom of the stream? (Try looking through the polarized glasses in your Greenway backpack).
- Do you see evidence of erosion, such as collapsing stream banks?
- If you see any salmon or other wildlife, be sure to include them!

3. Find the "Velocity" directions card in your Greenway backpack and measure the velocity as a group 3 times. (Use the back of your journal for calculations).

4. **Analyze:** Use the chart on page 17 to determine the quality of the stream channel.

5. Answer the Thinking Questions on page 18.

Water Quality: pages 19-22

Students will see if the water quality is low, medium, or high by measuring the temperature, dissolved oxygen (how much oxygen is available in the water), turbidity (how clear the water is), phosphate (a nutrient), and the pH (how acidic the water is).

Student Directions:

1. Each student/pair of students should select a water quality testing kit from the Greenway backpack. There are kits and directions for:

- Temperature
- pH
- Dissolved Oxygen
- Phosphate
- Turbidity

2. Everyone:

- Right away! **Read** your section of the Background Info (page 19).
- Now, **read** your yellow directions card from the testing kit you were given from the Greenway backpack, and take your measurements **(15 minutes)**.

3. Share and record all measurements on page 21(question 1).

4. **Analyze:** Use the table on page 21(question 2) to figure out if the water quality of this stream is high, medium, or low.

5. Work as a group to answer the Thinking Questions on page 22.

⭐ Key Terms

Data analysis means thinking about the information you have collected.

Dissolved oxygen (DO) is oxygen that is dissolved into the water. Salmon breathe oxygen using their gills. Colder and fast-moving water has more oxygen in it than warmer, slower water.

Erosion carries sediment from the stream bank into the stream, making the water cloudy and burying salmon nests (redds).

Indicator species, like macroinvertebrates, are species whose presence tells us about the quality of their habitat.

Introduced plants are native in other parts of the world and were brought to this region by people – by accident or on purpose. **Noxious weeds** are a type of introduced plant that significantly impact and degrade native plant and animal habitat. **Weeds of concern** are another type of introduced plants that can also impact and degrade an ecosystem, but less compared with noxious weeds.

Keystone species are species on which other species in an ecosystem largely depend, such that if it were removed the ecosystem would change drastically. Salmon are a keystone species.

Macroinvertebrates are small animals that are big enough to see without a microscope (*macro* = “big”) and that have no backbone (*invertebrate* = “backbone”). These include snails, insects, worms, crayfish, leeches.

Native plants are plants that have grown in their ecosystem for a long, long time.

pH is the measurement of how acidic or basic a liquid is. pH is measured on a scale of 0 to 14, where 0 is the most acidic (like lemon juice) and 14 is the most basic (like bleach). Our blood has a pH of about 7, which is neutral. Salmon need to live in water that is neutral.

ppm, or parts per million, is a way to measure how much of a nutrient is present in the water. For example, if we find 10 ppm of phosphate, that means there are 10 drops of phosphate for every million drops of stream water.

Pools are deep places in the stream where water moves slowly. Salmon fry live in the pools after they leave their nest (redd) in the gravel bed.

Riffles are small rapids in the stream where water moves quickly and bubbles over big rocks, logs, and sticks. The fast-moving water adds oxygen to the stream.

Riparian zone: the area next to a stream or lake. A healthy riparian zone is full of different kinds of native plants.

Turbidity is the measurement of how cloudy or clear water is. The cloudier the water, the more turbid it is. The cloudiness is caused by little particles of soil and plants in the water. The particles make it hard for salmon to breathe (imagine trying to breathe in a sandstorm).

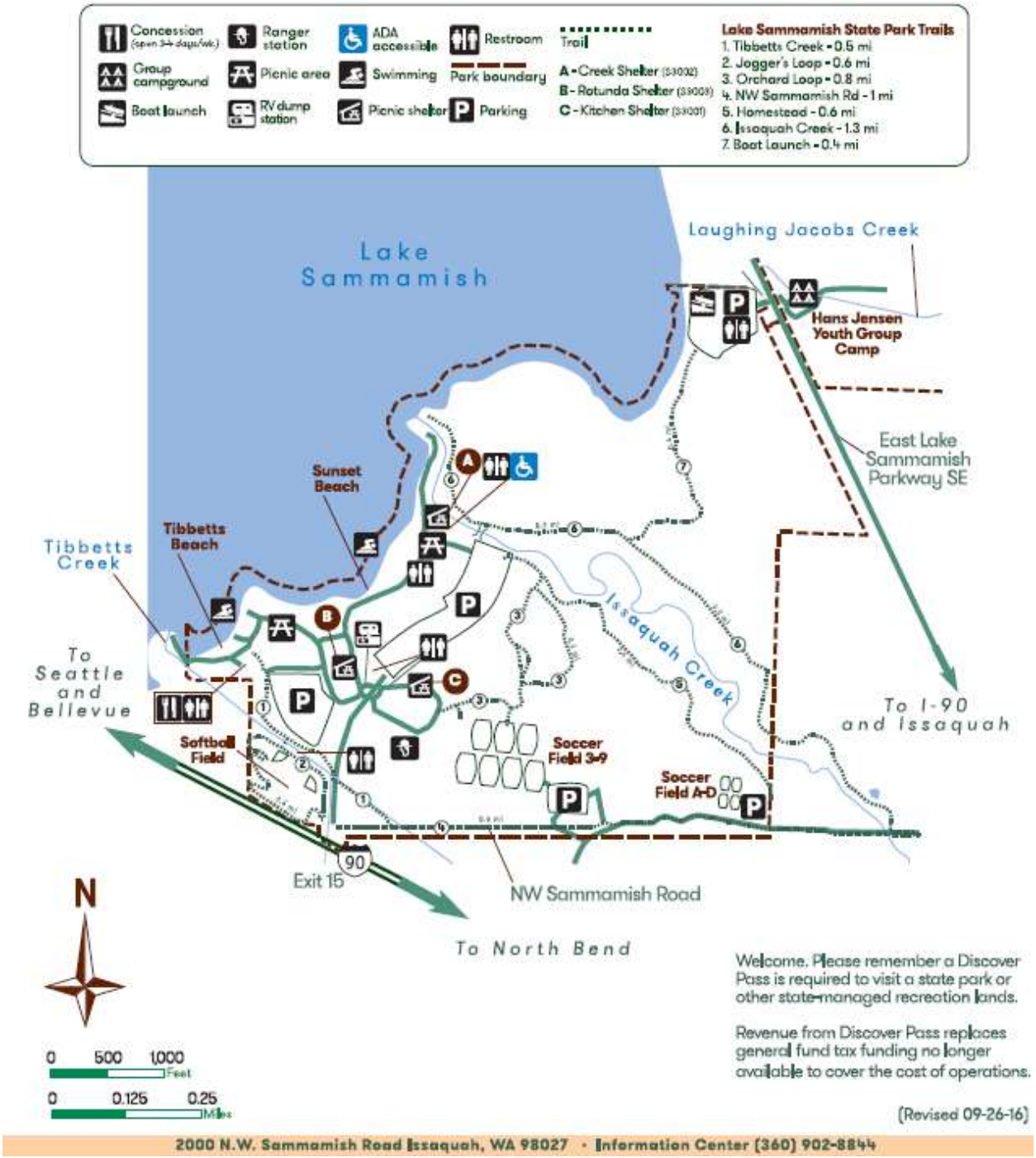
The **velocity** of a stream is how fast the water is moving.

Water temperature is important to measure because fish are ectothermic, meaning they can't regulate their body temperature. Salmon need cold water so that they don't get too hot, and because it has lots of oxygen in it.

Woody material are logs and large sticks that have fallen into the stream. Woody debris provides shade and shelter for young salmon, decomposes, and adds nutrients to the water, and interrupts water flow to form pools and riffles.

⭐ Map

Lake Sammamish State Park



Welcome. Please remember a Discover Pass is required to visit a state park or other state-managed recreation lands.

Revenue from Discover Pass replaces general fund tax funding no longer available to cover the cost of operations.

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