



**Mount St Helens National Volcanic Monument – Teacher’s Corner 2011**  
Gifford Pinchot National Forest  
USDA Forest Service

## What’s Shaping this Habitat?

### Outdoor Activity

|                   |   |
|-------------------|---|
| Time Requirement: | 45 minutes to 1 Hour                      |
| Trail Used:       | Discovery Area and Birth of a Lake Trail  |
| Location:         | Coldwater Lake Recreation Area            |
| Group Size:       | Not recommended for groups larger than 40 |

This activity is organized to be sequential by step. This is a challenging activity that will test your students’ observational skills and deductive capabilities.

**Goal:** The student will understand the factors that led to the development of specific habitats on areas affected by the May 18, 1980 landslide.

### **Objectives:**

- 1) The student will use the scientific method to deduce a reasonable explanation.
- 2) The student will apply knowledge acquired during the activity.
- 3) The student will compare, contrast and sort observations.
- 4) The student will reach a conclusion and be able to support it with evidence in writing.

### **Washington Essential Academic Learning Requirements**

#### 1.1.5 Nature and Properties of Earth Materials

Understand how to classify rocks, soils, air and water into groups based on their chemical and physical properties.

- Describe the properties of minerals and rocks that give evidence as to how they formed.
- Describe how Earth’s water can have different properties.

#### 1.1.6 Characteristics of Living Matter

Understand how to classify organisms by their external and internal structures

- Describe how organisms can be classified using similarities and differences in physical and functional characteristics.

#### 1.2.1 Structure of Physical Earth/Space and Living Systems

Analyze how the parts of the system interconnect and influence each other

- Explain how the parts of the system interconnect and influence each other
- Describe the interactions and influences between two or more simple systems.

#### 1.2.4 Components and Patterns of Earth Systems

Understand the components and interconnections of Earth’s systems.

- Describe the interactions among the components of the Earth’s systems.

#### 1.3.1 Nature of Force

Understand factors that affect the strength and direction of forces.

- Observe and describe factors that affect the strength of forces.

### 1.3.2 Forces to Explain Motion

Understand how balanced and unbalanced forces can change the motion of objects.

- Investigate balanced and unbalanced forces acting on an object.

### 1.3.3 Conservation of Matter and Energy

Understand that matter is conserved during physical and chemical changes

- Observe and describe evidence of physical and chemical changes on matter.

### 1.3.4 Processes and Interactions in the Earth's system

Understand the processes that continually change the surface of the Earth.

- Describe how constructive and destructive forces change landforms.

### 1.3.8 Life Processes and the Flow of Matter and Energy

Understand how organisms, including cells, obtain matter and energy for life processes.

- Describe how organisms acquire materials needed for life processes.

### 1.3.9 Biologic Evolution

Understand how the theory of biological evolution accounts for species diversity, adaptation, natural selection, extinction, and change in species over time.

- Describe how individual organisms with certain traits are more likely to survive and have off-spring.

### 1.3.10 Interdependence of Life

Understand how organisms in ecosystems interact and respond to their environment and other organisms.

- Describe how energy flows through a food chain or web.
- Describe how a population of an organism responds to change in its environment.

### 2.1.3 Explaining

Apply understanding of how to construct a scientific explanation using evidence and inferential logic.

- Generate a scientific conclusion including supporting data from an investigation using inferential logic.
- Describe a reason for a given conclusion using evidence from an investigation

### 2.2.2 Limitations of Science and Technology

Understand that scientific theories explain facts using inferential logic

- Describe how a principle or theory explains a given set of facts.
- Describe how new facts may result in the modification or rejection of a theory.

### 2.2.5 Evolution of Scientific Ideas

Understand that increased comprehension of systems leads to new inquiry.

- Describe how scientific inquiry results in new facts, evidence, unexpected findings, ideas and explanations.

## What's Shaping this Habitat?

### Outdoor Activity

**Your Mission:** To examine the roles of landforms, water, plants and animals in the development and evolution of habitats on the May 18, 1980 landslide.

### Possible Explanations of What is Shaping Habitat:

- #1) Landforms and water greatly influence the development of habitats.
- #2) Plants and animals greatly influence the development of habitats.
- #3) Landforms, water, plants, and animals greatly influence the development of habitats.

### Directions:

Begin this activity at the 'discovery area'. The trail is located on the far left side of the picnic area. Walk the trail to an area where you can see Mount St. Helens and cattail plants growing along the waters edge. When you arrive read the facts listed below and make observations about landscape features to answer the questions on this worksheet.

### Case Facts:

1. Prior to the May 18, 1980 eruption, Coldwater Lake did not exist. Coldwater Creek flowed down center of a forested valley in front of the jagged ridge, Minnie Peak, at the far end of this valley.
2. Between March 20 and May 18, 1980 magma rose into Mount St. Helens, and pushed rock and glacial ice on the north side out sideways 300 to 450 feet. This swollen area was called the **bulge**. The hole in the side of volcano reveals the where the bulge was located on the volcano before the eruption.
3. The May 18, 1980 eruption began when an enormous **landslide** fell from the swollen north side of Mount St. Helens. The landslide that traveled 5 ½ miles north and 13 ½ miles west down the Toutle River Valley. The landslide also flowed up 2 ½ miles up the Coldwater Creek valley towards Minnie Peak.
4. The landslide deposit in the center of the North Fork of the Toutle River Valley is 150 to 250 feet deep. The landslide deposit is composed of huge chunks of the volcano called **hummocks**. The large bumps or mounds on the valley floor, at this site, and rising out of Coldwater Lake are hummocks.
5. Prior to the May 18, 1980 eruption, thirty lakes and ponds existed within what is now the blast zone. As a result of the landslide, , more than 150 new lakes, ponds, and wetlands formed in the North Fork of the Toutle River Valley alone.
6. The hummocks area is the most biologically diverse landscape within Mount St. Helens National Volcanic Monument. Up to 150 plant species have inhabited the diverse habitats that developed in its wetlands, meadows and alder forests. It also hosts one of the largest populations of amphibians and herds of elk in the Pacific Northwest.

**Stop 1: Start at the far left side of the picnic area and walk down the discovery trail.**

1) Vegetation visible along this trail reveals four distinct habitats that developed in relation to their proximity to water. Draw a line to match the habitat with the dominant vegetation within it.

Moving Water Habitat  
Still Water Habitat  
Moist Soil Habitat  
Less Moist Soil Habitat

Cattails  
Alder Forest  
Algae  
Willow Tree Thickets

a) Habitats that form along the edges of watercourses are called riparian areas. Riparian areas are among the most biologically diverse landscapes within the Monument. Why? Circle answer.

- a. There are few habitats
- b. There are many different habitats
- c. They are large habitats

b) Examine several willow trees on the left side of the trail and you will see that their branches have been chewed off by beaver. How do you think the beaver changed habitat at this site? Circle “T” for true or “F” for false.

T or F      It created new breeding habitat for some amphibian and waterfowl species.

T or F      It reduced the amount of perching and nesting habitat for some bird species.

c) How will this habitat change if the beaver do not return to this site again?

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**Stop 2: Walk back to the Birth of the Lake Trailhead. Walk 100 yards and stop at the third boardwalk platform on the right side of the trail.**

2) Look at Mount St. Helens. The landslide fell from the north side of the volcano, but traveled farther west than north. What might have caused the landslide to flow further west than north?

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a) Face the trail leading to this viewpoint. What are the mounds beside the trail? \_\_\_\_\_

b) Face the lake and find the island. What is the island? \_\_\_\_\_

c) What does the island indicate about the impact of the landslide to this valley?  
\_\_\_\_\_  
\_\_\_\_\_

d) Look at the pre-eruption picture of the Coldwater Creek drainage taken from a road that was at this site. Compare the picture to your view today. Circle the answer that best explains what influenced the development of this new habitat?



- a. Groundwater within the landslide deposit slowly oozed out and created Coldwater Lake.
- b. The flow of water from Coldwater Creek was dammed by the landslide, which caused Coldwater Lake to form.
- c. None of the above.

**Stop 3: Turn right as you leave the platform. Turn right when you reach the boardwalk that passes over the lake. Walk to the end of the boardwalk.**

3) Did the formation of Coldwater Lake help or hinder the following animals? Circle help or hinder and explain why.

Help or Hinder      Amphibians  
Why? \_\_\_\_\_

Help or Hinder      River Otter  
Why? \_\_\_\_\_

Help or Hinder      Pocket Gophers  
Why? \_\_\_\_\_

a) Describe the differences in vegetation growing on the top and bottom of the hillsides on each side of lake.

\_\_\_\_\_  
\_\_\_\_\_

b) What might account for the differences in vegetation growing on the hillsides? Circle answer.

- a. Meadows formed in drier sites impacted by the lateral blast.
- b. Alder forests established along the lakeshore and spread uphill
- c. Moister cooler conditions on the right (north-facing) slope caused dense alder forests to form
- d. All of the above.

**Stop 4: Walk back to the main trail and turn right. Walk up the small hill and stop at the top of the hill at the viewpoint on the right side of the trail.**

4) The broad-leafed trees here are sitka and red alders. Compare the amounts and types of plants growing beneath the alder forest to those growing along the edge of the trail. What factors might account for the differences between the plant communities? Circle answer.

- a. Availability of Moisture.
- b. Amount of Sunlight and Temperature
- c. Availability of Nutrients and Organic Matter
- d. Answers a. and b.
- e. Answers a. b. and c.

**Stop 5: Walk until you find an odd-shaped conifer tree like the one in this picture.**

5) Odd-shaped conifer trees have been browsed by deer and elk. The trees response to br pressure is to produce more branches. Conifers are not preferred food sources due to the and poor nutritional value. Why do you think deer and elk are eating these foods? Circle a

- a. There is not enough food available for deer and elk.
- b. Deer and Elk populations are too large.
- c. The nutritional value of foods in the winter/spring is not high enough to support deer and elk populations.
- d. All of the Above.



a) Seeds “hitchhike” here inside the intestinal tracks of elk, and are deposited in “nuggets” of fertilizer. Fifteen native plants and non-native-invasive species growing in the Monument are known to have sprouted from elk poop. Circle the answer that reveals the power of poop!

- a. Elk preferences in diet change the composition of plant communities.
- b. Elk accelerate the pace of recovery by enriching ash and ‘planting’ plants.
- c. Elk introduce non-native invasive weeds that slow the pace of recovery.
- d. All of the above.

**Conclusions:**

Circle the best explanation or hypotheses (#1, #2 or #3) that describe what factor is shaping hummock habitats.

- #1) Landforms and water greatly influence the development of habitats.
- #2) Plants and animals greatly influence the development of habitats.
- #3) Landforms, water, plants, and animals greatly influence the development of habitats.

In complete sentences, explain the evidence you used to reach your conclusion.

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## Answer Sheet to What's Shaping this Habitat?

### Outdoor Activity

**Your Mission:** To examine the roles of landforms, water, plants and animals in the development and evolution of habitats on the May 18, 1980 landslide.

### Possible Explanations of What is Shaping Habitat:

- #1) Landforms and water greatly influence the development of habitats.
- #2) Plants and animals greatly influence the development of habitats.
- #3) Landforms, water, plants, and animals greatly influence the development of habitats.

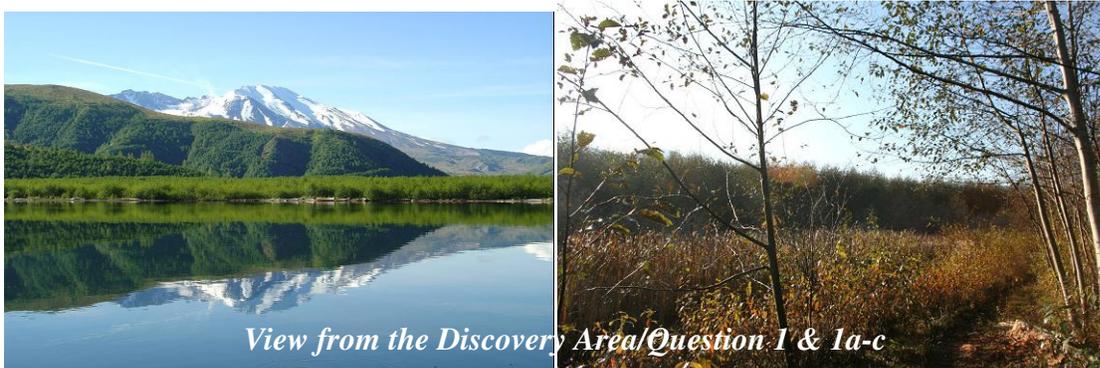
### Directions:

Begin this activity at the 'discovery area'. The trail is located on the far left side of the picnic area. Walk the trail to an area where you can see Mount St. Helens and cattail plants growing along the waters edge. When you arrive read the facts listed below and make observations about landscape features to answer the questions on this worksheet.

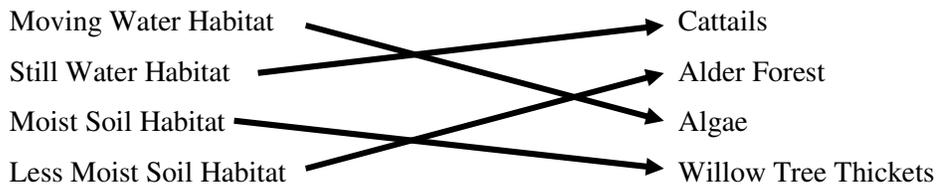
### Case Facts:

1. Prior to the May 18, 1980 eruption, Coldwater Lake did not exist. Coldwater Creek flowed down center of a forested valley in front of the jagged ridge, Minnie Peak, at the far end of this valley.
2. Between March 20 and May 18, 1980 magma rose into Mount St. Helens, and pushed rock and glacial ice on the north side out sideways 300 to 450 feet. This swollen area was called the **bulge**. The hole in the side of volcano reveals the where the bulge was located on the volcano before the eruption.
3. The May 18, 1980 eruption began when an enormous **landslide** fell from the swollen north side of Mount St. Helens. The landslide that traveled 5 ½ miles north and 13 ½ miles west down the Toutle River Valley. The landslide also flowed up 2 ½ miles up the Coldwater Creek valley towards Minnie Peak.
4. The landslide deposit in the center of the North Fork of the Toutle River Valley is 150 to 250 feet deep. The landslide deposit is composed of huge chunks of the volcano called **hummocks**. The large bumps or mounds on the valley floor, at this site, and rising out of Coldwater Lake are hummocks.
5. Prior to the May 18, 1980 eruption, thirty lakes and ponds existed within what is now the blast zone. As a result of the landslide, , more than 150 new lakes, ponds, and wetlands formed in the North Fork of the Toutle River Valley alone.
6. The hummocks area is the most biologically diverse landscape within Mount St. Helens National Volcanic Monument. Up to 150 plant species have inhabited the diverse habitats that developed in its wetlands, meadows and alder forests. It also hosts one of the largest populations of amphibians and herds of elk in the Pacific Northwest.

**Stop 1:** Start at the far left side of the picnic area and walk down the discovery trail.



1) Vegetation visible along this trail reveals four distinct habitat zones powered by water. Draw a line to match the habitat zone with the predominant vegetation within it.



You can clearly see a vertical structure to the habitat. The big trees on the right side of the trail are Red Alders that prefer sites that are less wet. The small trees or shrubs on the left side of the trail are Willow Trees that prefer moister conditions. Cattails, to the left of the willows, prefer shallow still or slow-moving water, while the submerged vegetation like algae grow in the deeper open water have strong anchor-like roots to survive in moving water.

a) The edges of watercourses are called riparian areas. Riparian areas are among the most biologically diverse landscapes within the National Monument. Why? Circle answer.

- a. There are few habitats
- b. There are many different habitats
- c. They are large habitats

Riparian areas are biologically rich due to the variety of habitats created in part by varying amounts and depths of water. Distinct habitats host unique groups of plants and animals. Up to 150 plant species have inhabited its lakes, wetlands, meadows and alder forests found on the hummocks, in contrast to 32 plant species found on the pumice plain where water is scarce.

b) Examine several willow trees on the left side of the trail and you will see that their branches have been chewed off by beaver. How do you think the beaver changed habitat at this site? Circle “T” for true or “F” for false.

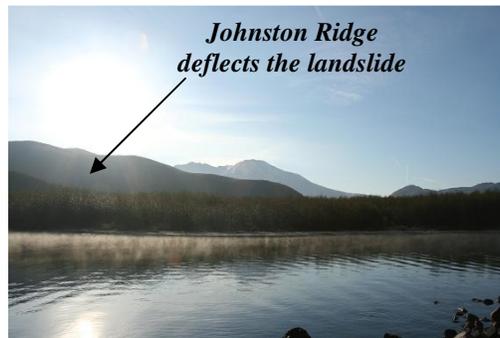
T or F It created new breeding habitat for some amphibian and waterfowl species.

T or F It reduced the amount of perching and nesting habitat for some bird species.

c) How will this habitat change if the beaver do not return to this site again?

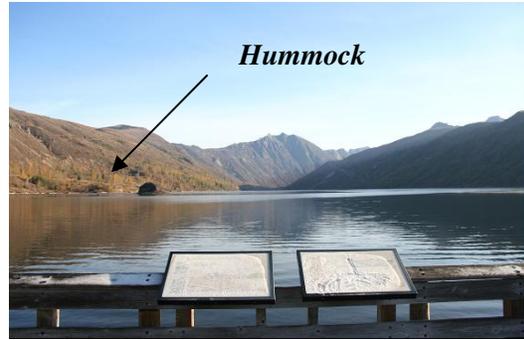
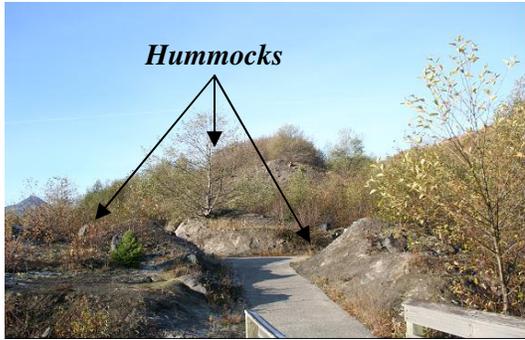
The more open environment caused by the removal of the willow trees allowed for increase populations of algae, plankton, plant and insects. This benefited amphibians by creating more breeding habitat and food sources. Waterfowl benefited from the removal of willow because more nesting habitat was created. However, the loss of willow trees adversely affected birds that nest and perch on willows. It also reduced forage for deer and elk—willows are preferred food sources. As the willow canopy returns, habitat for some amphibians and waterfowl may be adversely impacted. However, the willow canopy will provide nesting habitat for perching birds, as well as forage for deer and elk.

**Stop 2:** Walk back to the Birth of a Lake Trailhead. Walk 100 yards and stop at the third boardwalk platform on the right side of the trail.



2) Look at Mount St. Helens. The landslide fell from the north side of the volcano, but traveled farther west than north. What might have caused the landslide to flow further west than north?

The landslide fell from the north side of Mount St. Helens and slid into Johnston Ridge. The landslide bounced off of Johnston ridge and was deflected westward into the North Fork of the Toutle River valley.



a). Face the trail leading to this viewpoint. What are the mounds on each side of the trail?

Hummock--big intact chunks of Mount St. Helens that rode along on the top of the landslide.

b) Face the lake and find the island. What is the island? It is the top of a submerged hummock.

c) What does the island indicate about the impact of the landslide to this valley?

Hummock island provided evidence that the landslide flowed a considerable distance up the valley now occupied by Coldwater Lake.

d) Look at the pre-eruption picture of the Coldwater Creek drainage taken from a road that was at this site. Compare the picture to your view today. Circle the answer that best explains what influenced the development of this new habitat?



a. Groundwater within the landslide deposit slowly oozed out and created Coldwater Lake.

**b** The flow of water from Coldwater Creek was dammed by the landslide, which caused Coldwater Lake to form.

c. None of the above.

The landslide flowed 2 ½ miles up the Coldwater Creek drainage and filled the valley with hummocks. The 150 to 250 foot deep landslide deposit became a natural dam that blocked the flow of Coldwater Creek. Springs, snowmelt and rain continued to feed Coldwater Creek. Water began to pool behind the massive landslide deposit, and a new lake began to form. Coldwater Lake is 4 ½ miles long, ½ mile wide and is up to 205 feet deep.

**Stop 3:** Turn right as you leave the platform. Turn right when you reach the boardwalk that passes over the lake. Walk to the end of the boardwalk.



3) Did the formation of Coldwater Lake help or hinder the following animals? Circle help or hinder and explain why.

Help or Hinder      Amphibians

Why? Frogs, toads, salamanders, and newts require aquatic habitats to survive. The sheer size of this new lake benefited many species.

Help or Hinder      River Otter

Why? River Otter may have occupied the Coldwater Creek prior to the eruption due the presence of fish, but the lake habitat is far larger, so it beneficial.

Help or Hinder      Pocket Gophers

Why? Meadow habitats where gophers thrive were buried beneath the landslide or lake. This new habitat was detrimental to pocket gophers.

a) Describe the differences in vegetation growing on the top and bottom of the hillsides on each side of lake.

There are many trees growing on the lower portion of the hillsides. The trees are largest near the lake shore and tend to be smaller further up the hillside. Grassy meadow-like habitats dominate the upper portions of the hillsides.

b) What might account for the differences in vegetation growing on the hillsides? Circle answer.

- a. Meadows formed in drier sites impacted by the lateral blast.
- b. Alder forests established along the lakeshore and spread uphill
- c. Moister cooler conditions on the right (north-facing) slope caused dense alder forests to form
- d. All of the above.

Water accounts for the differences and amounts of vegetation growing on the hillsides. Grassy-meadows dominate the top of the hillsides due to the absence of water. The alder forests spreading up the hillsides started along the shoreline and spread outward from this moist epicenter. As alder forests spread they greatly accelerate the pace of recovery in areas impacted by the lateral blast. Today over 20% of the landslide is covered with alder forests, largely due to the creation of 150 new aquatic epicenters that are fueling spectacular change.

**Stop 4: Walk back to the trail intersection, turn right and walk up the small hill. Stop at the top of the hill at the viewpoint on the right side of the trail.**



4) The broad-leafed trees here are sitka and red alders. Compare the amounts and types of plants growing beneath the alder forest to those growing along the edge of the trail. What environmental factor(s) might account for the differences between the plant communities beneath the forest and along the edge of the trail? Circle answer.

- a. Availability of Moisture.
- b. Amount of Sunlight/Temperature
- c. Availability of Nutrients and Organic Matter
- d. Answers a. and b.
- e. Answers a. b. and c.

The availability of moisture, amount of sunlight, and availability of nutrients and organic matter all directly affect the amounts and types of plants growing in the different habitats. The dense concentration of hardy weeds and grasses growing along the edge of the trail can establish in warmer, drier, nutrient-poor sites. Leave-litter accumulates beneath the sun-loving weeds, but in far smaller amounts, retains less moisture due to higher evaporation rates. As alder trees established and grew taller than the alder forest soon out-competed and shaded out the surrounding sun-loving weeds. Shade from the developing alder forest reduced the amount of evaporation and temperatures. A moist layer of nutrient rich organic matter developed as leaves, twigs, and catkins from the alder's accumulated.

**Stop 5: Walk until you find an odd-shaped conifer tree like the one in this picture.**

5) Odd-shaped conifer trees have been browsed by deer and elk. The trees response to bro pressure is to produce more branches. Conifers are not preferred food sources due to thei and poor nutritional value. Why do you think deer and elk are eating these foods? Circle an



- a. There is not enough food available for deer and elk.
- b. Deer and Elk populations are too large.
- c. The nutritional value of foods in the winter/spring is not high enough to support deer and elk populations.
- d. All of the Above.

If deer and elk are feeding so heavily on food sources with poor nutritional value, it indicates that during critical stress periods such as late winter or early spring that there may not be enough food available. This also indicates that the deer and elk populations are too large for the available habitats, especially during the winter/spring when animals are competing for foods with low nutritional values.

a) Seeds “hitchhike” here inside the intestinal tracks of elk, and are deposited in “nuggets” of fertilizer. Fifteen native plants and non-native-invasive species growing in the Monument are known to have sprouted from elk poop. Circle the answer that reveals the power of poop!

- a. Elk preferences in diet change the composition of plant communities.
- b. Elk accelerate the pace of recovery by enriching ash and ‘planting’ plants.
- c. Elk introduce non-native invasive weeds that slow the pace of recovery.
- d. All of the Above.

## Conclusions:

After documenting and describing your observations, choose the best possible explanation or hypothesis (#1, #2 or #3) that describes the change in the number of ecosystems.

a). Circle the explanation you think is best:

#1) Landforms and water greatly influence the development of habitats.

#2) Plants and animals greatly influence the development of habitats.

#3) Landforms, water, plants, and animals greatly influence the development of habitats.

*Landforms created by the 1980 landslide set the stage for distinct habitats to form. The uneven topography—high hummocks and depressions beside them led to the creation of one hundred fifty new ponds and wetlands. The landslide also acted as an earthen dam, which blocked Coldwater and Castle Creeks and enabled two massive lakes to form. In areas where water could not collect meadows formed. Some areas are still barren because the hummocks are so hard that plants root systems are still unable to penetrate the hard rock.*

*Some plants and animals species are having an enormous impact on hummock habitats. Deer and elk have dramatically changed the composition of plant communities through their browsing preferences. Beaver and their dam-building activities change pathways of succession with massive impacts to wetlands. Alder trees improve growing conditions by adding nutrients and organic matter to the sandy rocky ground, and create new habitats for shade-loving plants. Shade also edits sun-loving plants from the understory of the alder forest.*

*Water is powering the return of life on the hummocks! 150 new pond, wetlands, and lakes formed on the hummocks. This increase in aquatic habitat has fueled spectacular ecological communities. The hummocks are the most biologically diverse landscape within the Monument. Vibrant wetlands host one of the largest populations of amphibians in the Pacific Northwest, as well as diverse populations of waterfowl and migratory birds. As plants established along the moist shoreline in the 1980's vegetation spread outward. The alder forest growing here started beside the wet shoreline and spread outward from these moist epicenters. As alder forests spread outward from one pond, they soon began to merge with alder stands growing away from adjacent wetlands, creating dense alder forests. Today over 20% of the landslide is covered with alder forests, largely due to the creation of these new aquatic habitats, and these forests are now spreading up the valley walls—greatly accelerating the pace at which life returns in the surrounding blown down forest. Stable water sources like ponds flourish, but in areas with moving water—like the Toutle River which chronically disturbs the landscape.*

## Instructional Sequence for “What’s Shaping this Habitat?”:

### **Before Hiking the Trail or Leaving the Parking Lot:**

- 1) Students ability to successfully complete this activity will be greatly enhanced if they have obtained a basic understanding of the May 18, 1980 eruptive events prior to conducting this activity. Teachers are encouraged to drive to the Johnston Ridge Observatory to explore the visitor center before conducting this activity.

If you plan on going to the Johnston Ridge Observatory prior to hiking the trail, have your students watch the 16-minute movie entitled ‘Message from the Mountain’ first. As the students exit the theater have them gather around relief model with the colorful lights to familiarize the students with geographic extent of the May 18, 1980 eruption.

If driving directly to the Coldwater Lake Recreation Area review the “case facts” at the trailhead to familiarize students with the terminology and facts related to the May 18, 1980 eruption.

- 2) Make sure that students are dressed appropriately for the weather conditions before they exit the bus, and explain that each student will need a pencil, a clipboard or notebook to write on, and a copy of the ‘What’s Shaping this Habitat?’ worksheet.. **Inform the students that they will be hiking within a research area. Hiking in this area is a privilege and that student behavior will determine if future groups will be able to use this site. Off trail travel, the collection of rocks, plants, and wood, and disturbing research sites (removing tags, pipes or flagging marking boundaries) is strictly prohibited (\$100 fine).**
- 3) Make sure that all of the chaperones and teachers have a copy of the answer sheet to the worksheet. Chaperones will play a critical role in aiding students to successfully complete this activity. The answer sheet also has pictures of landscape features that students will be looking for along the trail.
- 4) Inform the students that you will lead the way because there are specific points along the trail where they will be stopping to observe geographic features and complete answers to questions on their worksheets. Proceed to the far left side of the picnic area and walk down the discovery trail.

### **On the Trail:**

- 1) Read the directions on the worksheet and explain that the students are to make observations and use the “case facts” provided to answer **question 1 & 1a-b.** Use the photo below to orient students to the habitat features related to the questions. Allow 5 to 10-minutes for students to answer the questions.



- 2) Walk back the way you came to the Birth of the Lake Trailhead (the other end of the discovery trail tends to be very muddy) and proceed 100 yards down trail and stop at the third boardwalk platform on the right side of the trail. There are two interpretive signs at the platform which provides a view straight down the length of Coldwater Lake. Explain that the students are to make observations and use the “case facts” provided to answer **question 2 & 2a-c**. Allow 5 to 10-minutes for students to answer the questions. Use your answer sheet to orient students to features designated in the questions if weather conditions limit visibility or if students are not clear where to look.



- 3) Turn right when you return to the main trail. Turn right again when you reach the boardwalk section passing over the lakes surface and proceed to the end of the boardwalk. Answer **questions 3 & 3a**. Allow 5 to 10-minutes for students to complete the questions.
- 4) Return to the paved trail, turn right and walk up the small hill. As you crest the top of the hill turn right onto the spur trail leading to a viewpoint. Stop at the top of the hill at the viewpoint on the right side of the trail. Identify the alder trees surrounding the site (single tree trunks are red alder. Multiple branching trunks at the base of the tree are sitka alders). Point out the plant growth along the edges of the paved trail and have the students compare the type and amount growing there to the plant communities within the understory of the alder forest. Answer **questions 4 and 4a**.



- 6) Walk another 75 to 100 yards down trail and stop where there is a good example of an odd-shaped conifer tree like the the one in the picture. Allow 5 to 10-minutes for students to complete **questions 5a-b**.



- 7) Veer left as you return to the bus (a trail veering to the right leads to a parking lot and boat launching area). Use great caution once you reach the parking lot—students may try to dash to the bus without looking out for on-coming traffic. Consider stationing several adults in key locations to ensure student safety. Review the answers in route back to school.