

Fish Habitats



Photo Credit: Holly Church



Flathead Lake Biological Station

2020



What are two native trout that were used as a source of protein for the Salish, Kootenai, and Pend d'Oreille tribes?





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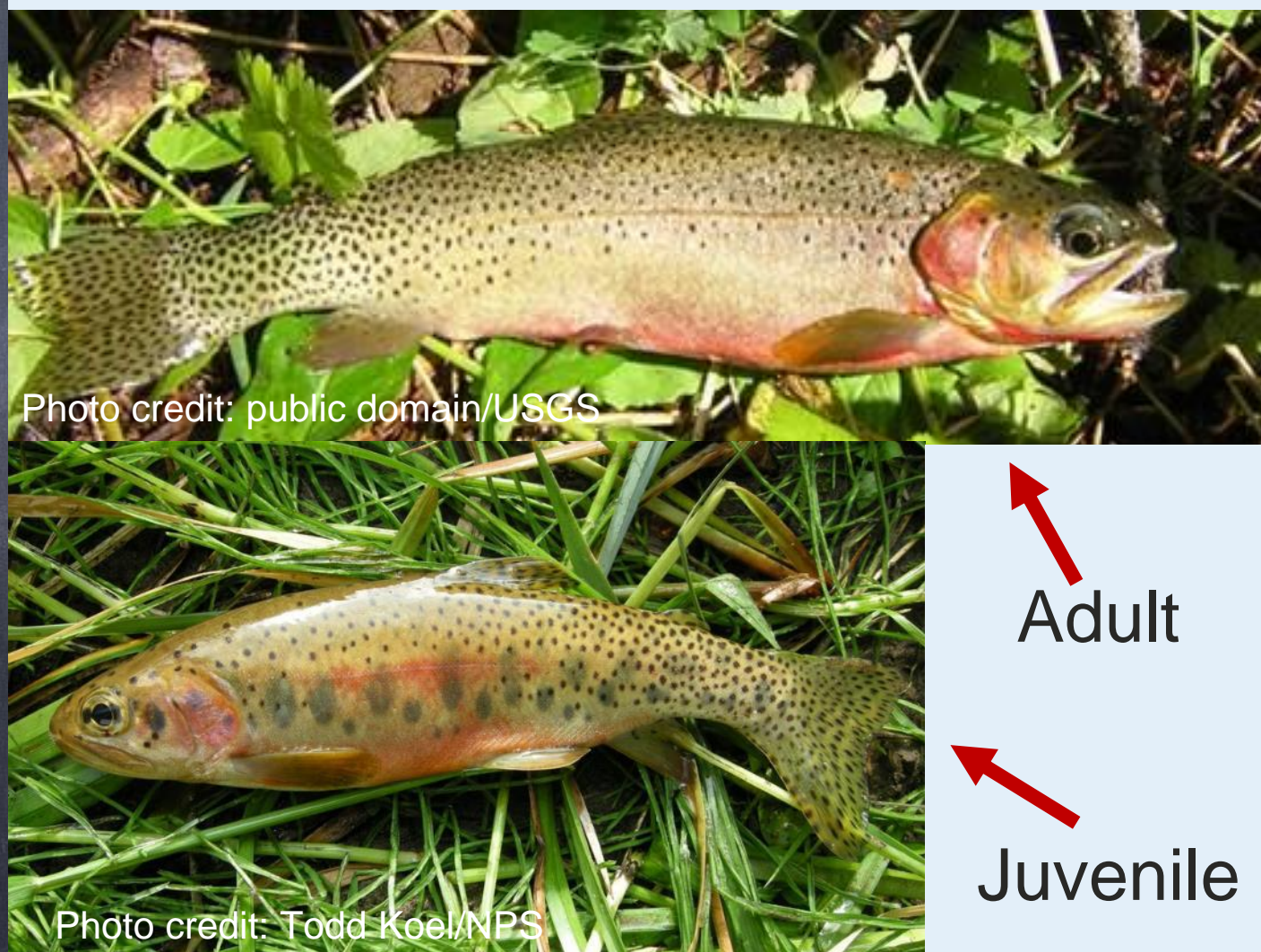


Bull Trout



[Click here to watch the Bull Trout: Road to Recovery video](#)

Westslope Cutthroat Trout



Adult

Juvenile



WHERE can you find these two
native fish?

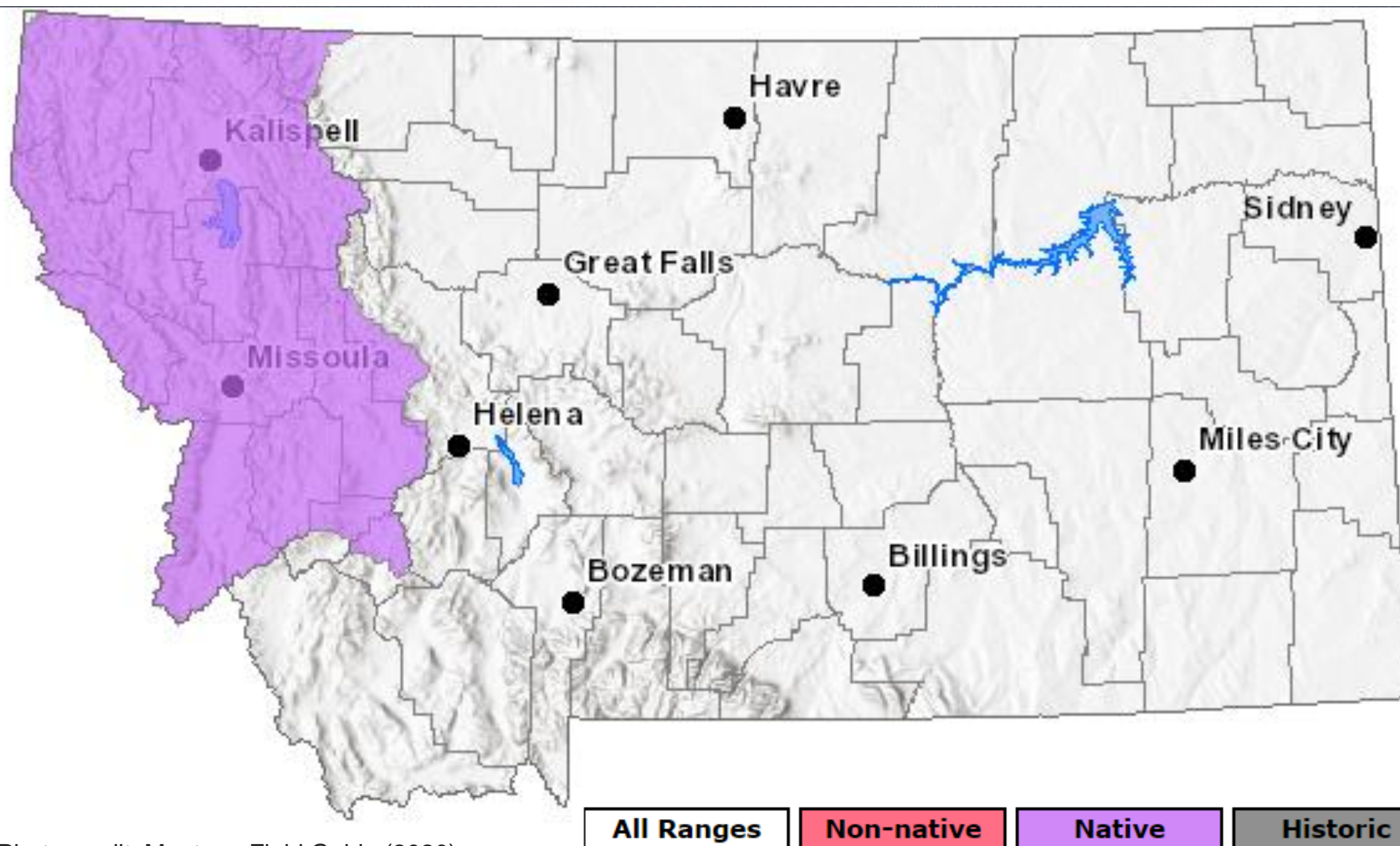




WHERE can you find these two native fish?



Bull Trout Distribution Map

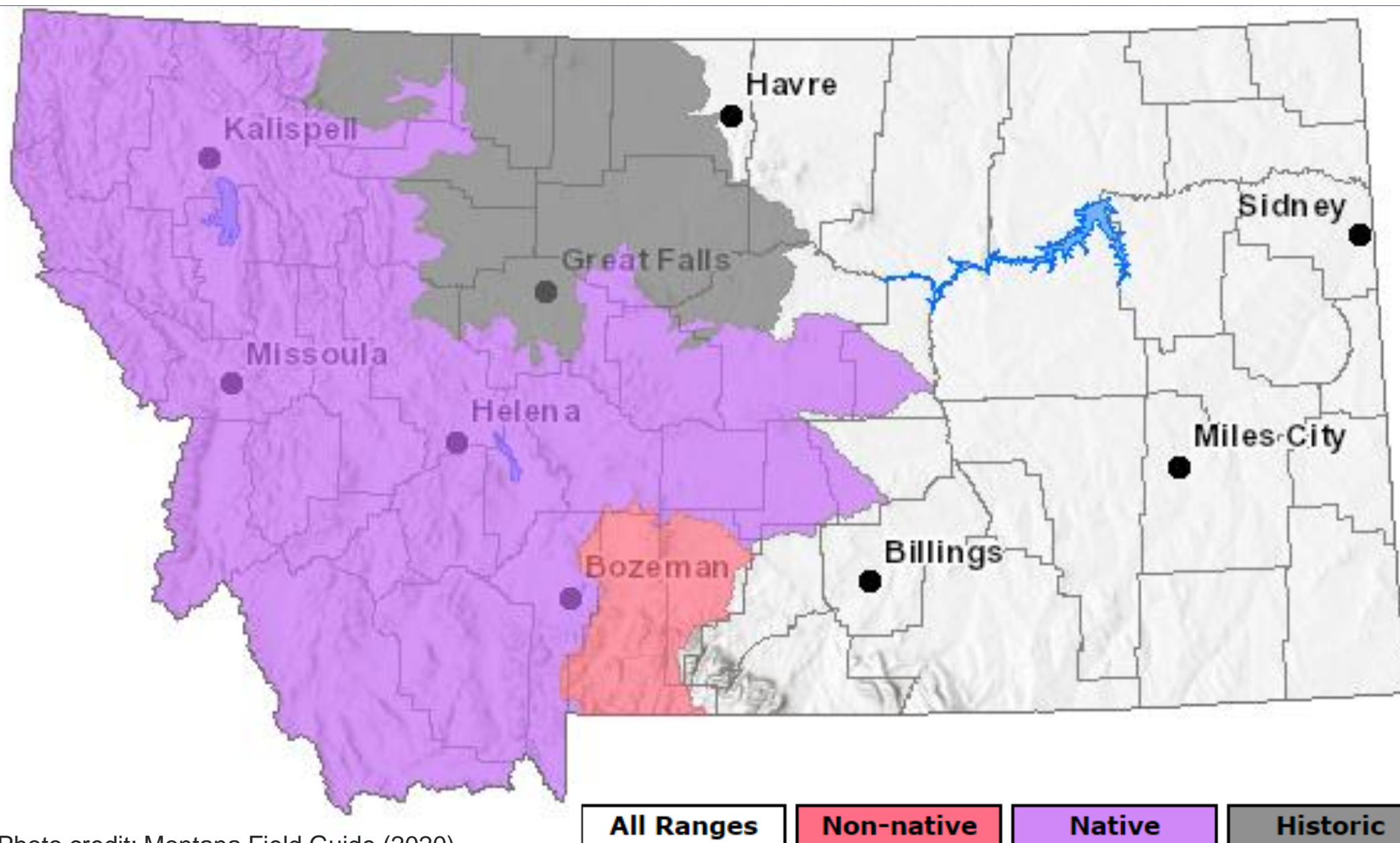




WHERE can you find these two native fish?



Westslope Cutthroat Trout Distribution Map





WHERE and WHEN do these fish
spawn?





WHERE and WHEN do these fish spawn?



Spawning requirements:

- cold, tributaries
- gravel/cobble substrate
- swift water w/high oxygen
- low levels of sediment

Westslope Cutthroat Trout spawn during the Spring melt

Bull Trout spawn in the Fall

Westslope Cutthroat Trout



Photo credit: public domain/USGS

Bull Trout



Photo credit: Jim Mogen/USFWS



Which non-native trout are impacting the native trout populations?





Which non-native trout are impacting the native trout populations?



Hybridization

Westslope
Cutthroat Trout
+
Rainbow Trout
= fertile, weak
hybrid



Bull Trout
+
Brooke Trout
=
sterile hybrids



Predation

Brown Trout



Lake Trout



Eat native
trout in the
larger streams
& lakes

All four non-natives compete with native trout for food!

As you watch the Brown Trout spawning video, record **TWO** observations you have about its behaviors and/or environment.



Why do they spawn in swift moving water?

The native trout need the 4Cs to survive!



Fill in the blanks on your worksheet using the provided words.



Critical 4Cs

Challenges



COLD

Adult bull trout can tolerate warmer water up to 65 degrees, but younger fish can't survive temperatures above 60 degrees and prefer a chilly 50 to 55 degrees.

CLEAN

Bull trout require clean waters and are highly vulnerable to siltation, acid mine drainage, and other forms of water pollution.

COMPLEX

Bull trout streams and rivers need deep holes, overhanging banks, and woody cover where the big fish can hide from otters, bald eagles, and other predators.

CONNECTED

Most adult bull trout live in large lakes and rivers but need to swim far up tributaries to spawn. Adults and juveniles need to move downstream to the big waters.

WARM WATER

The combination of climate change and streamside vegetation removal is warming many streams in west-central Montana to temperatures well above what young bull trout need to survive.

SILT

Silt from old logging roads smothers and suffocates bull trout eggs and clogs upwellings and gravel where eggs need to nestle for incubation.

NON-NATIVE FISH

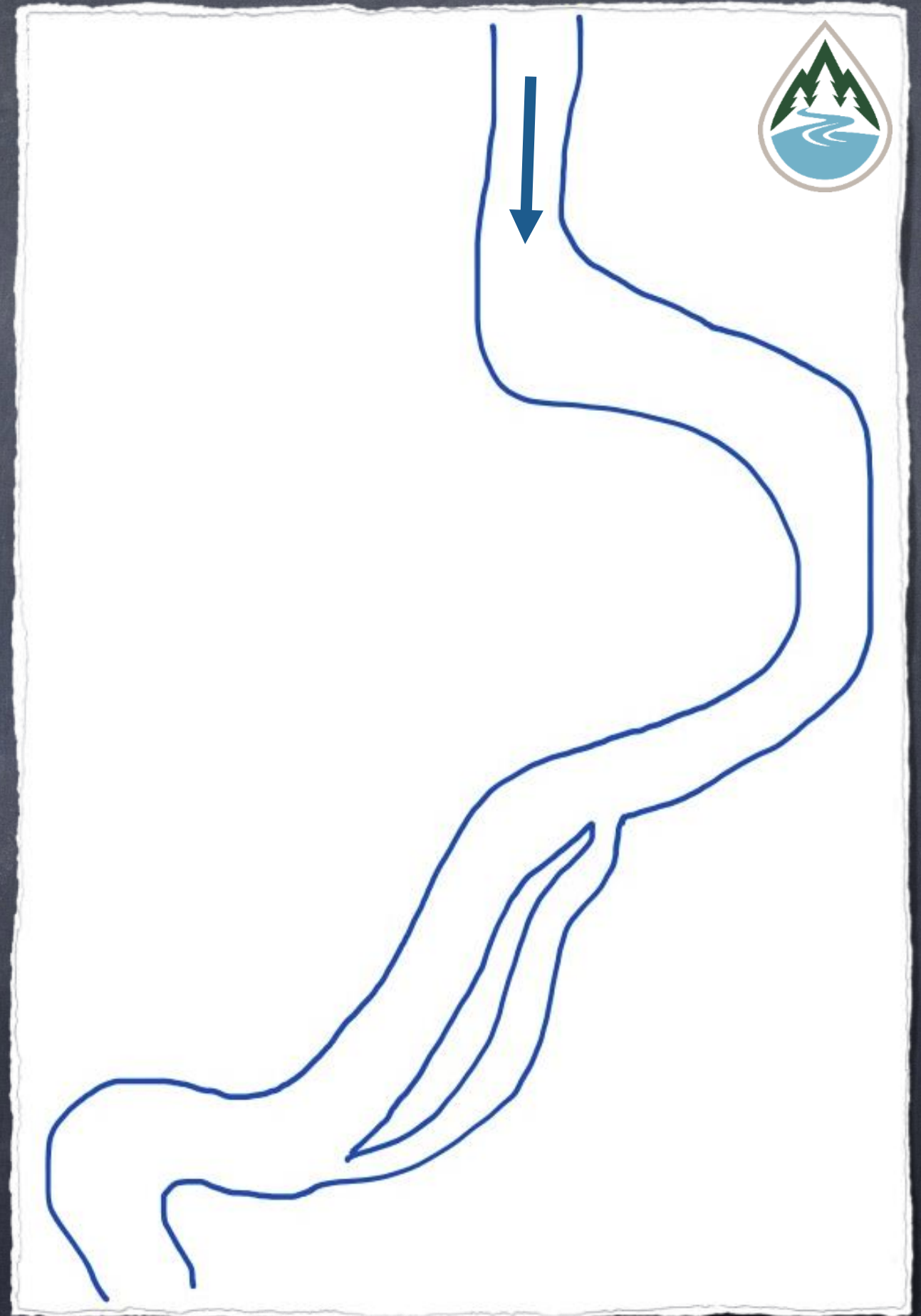
The biggest threats to bull trout in northwestern Montana are brook trout in tributaries and lake trout in lakes.

MIGRATION BARRIERS

Dams, "perched" culverts, and anything else blocking up- or downstream migration harms bull trout populations.

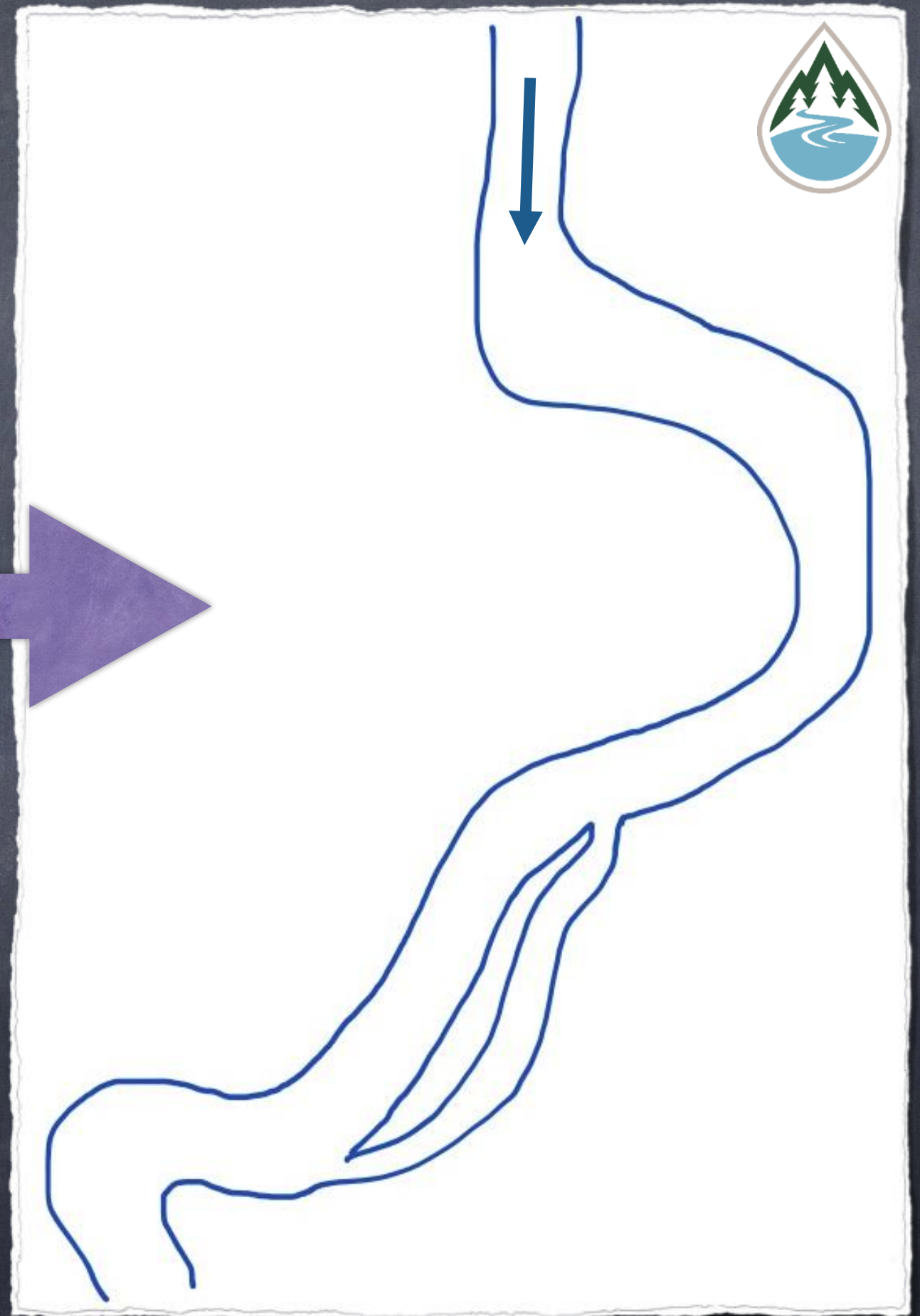
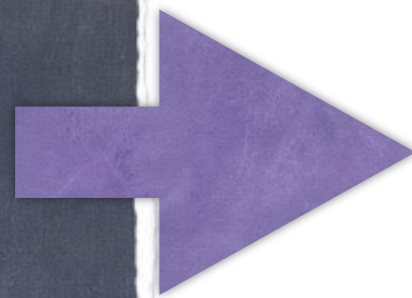
Primary Fish Habitats

In addition to the 4Cs, the native trout need 4 primary habitats to find food and shelter from predators.



Primary Fish Habitats

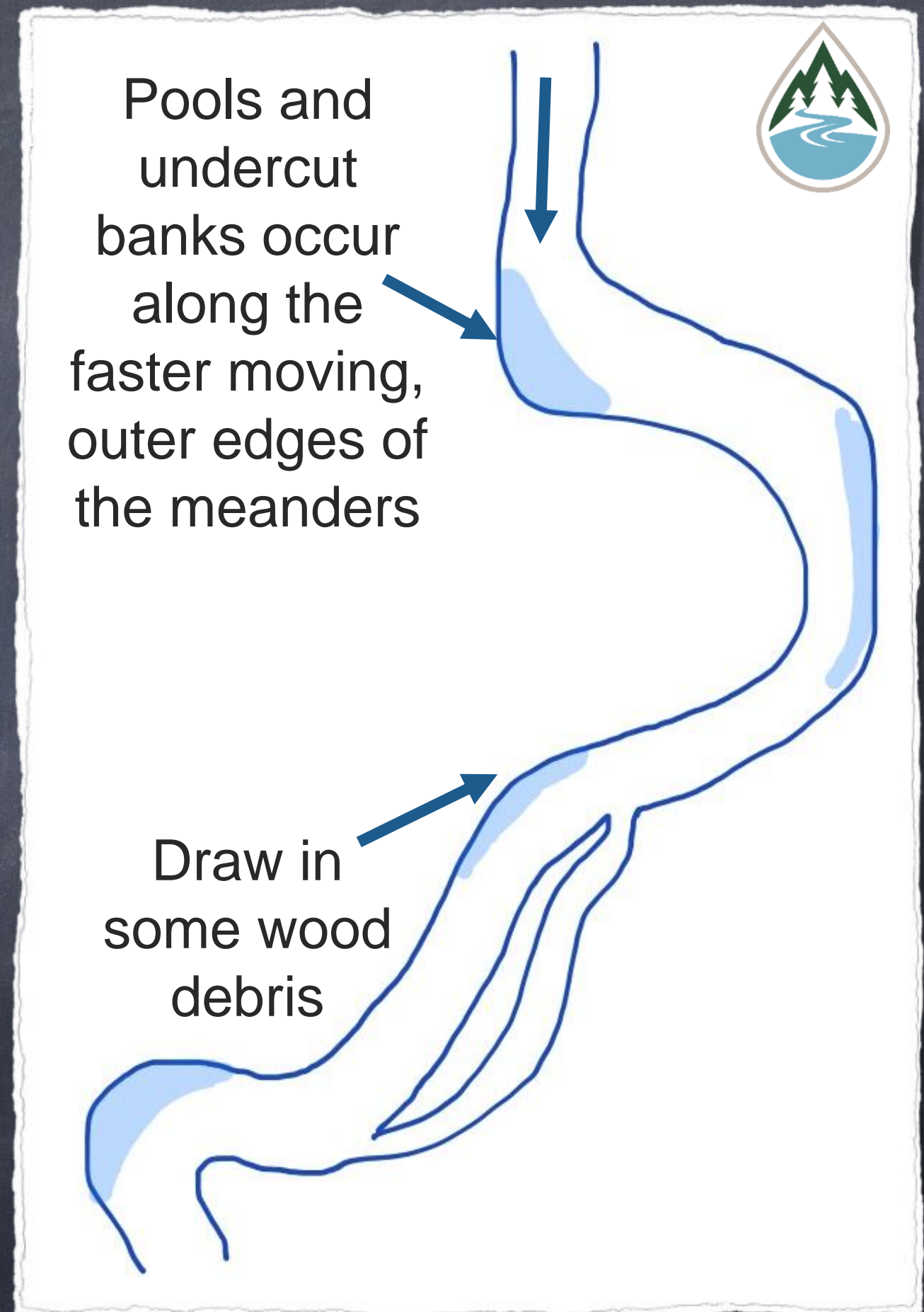
Color the river and write the descriptions for each primary habitat.



Primary Fish Habitats

#1. Adult Holding Habitat

Occurs in the deeper POOLS, undercut banks, and areas with wood debris

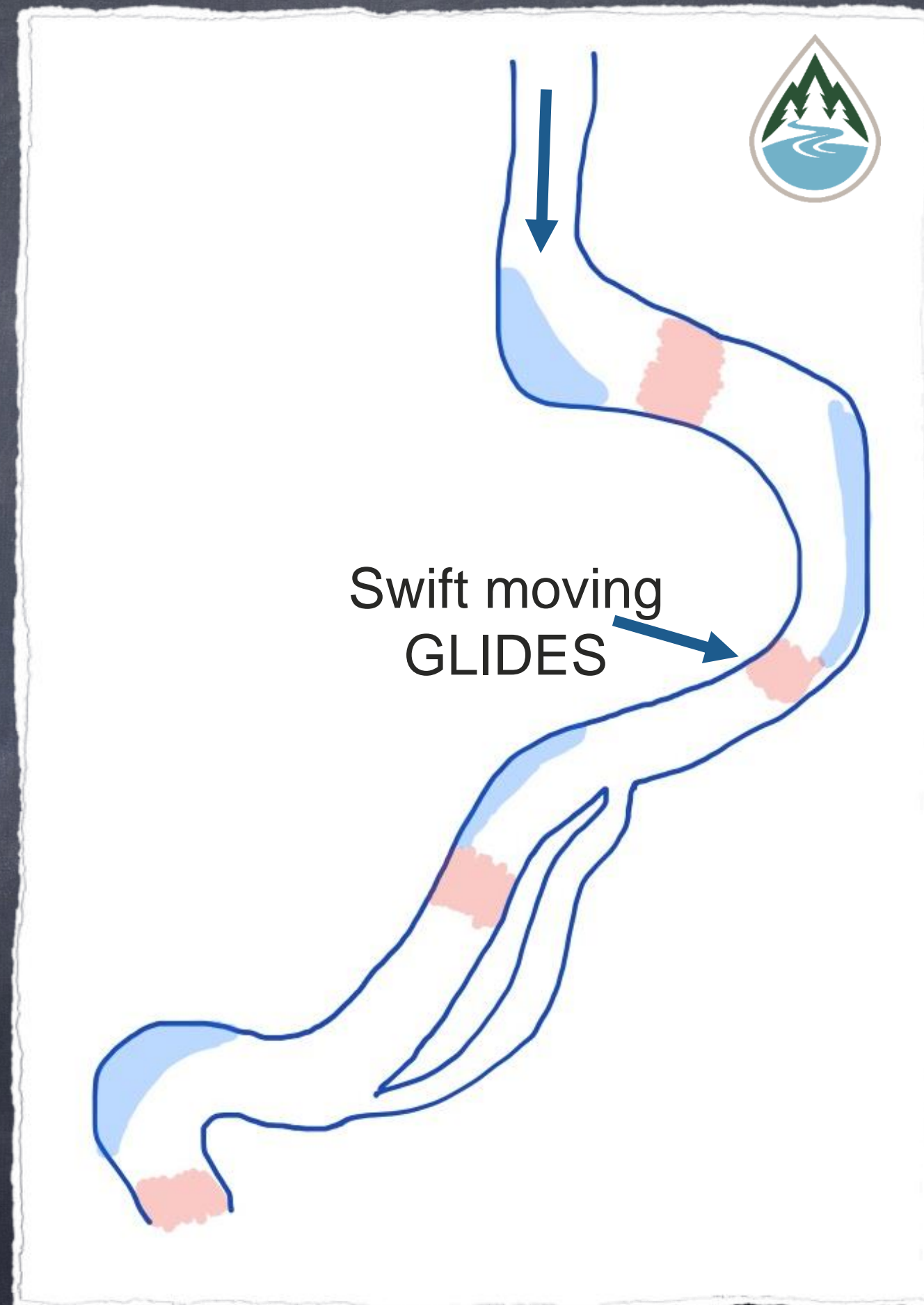
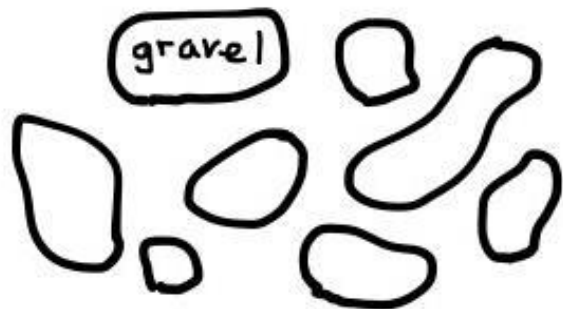


Primary Fish Habitats

#2. Spawning Habitat

Occurs in the GLIDES or the transition zones from the pools to the riffles

○ = Dissolved oxygen

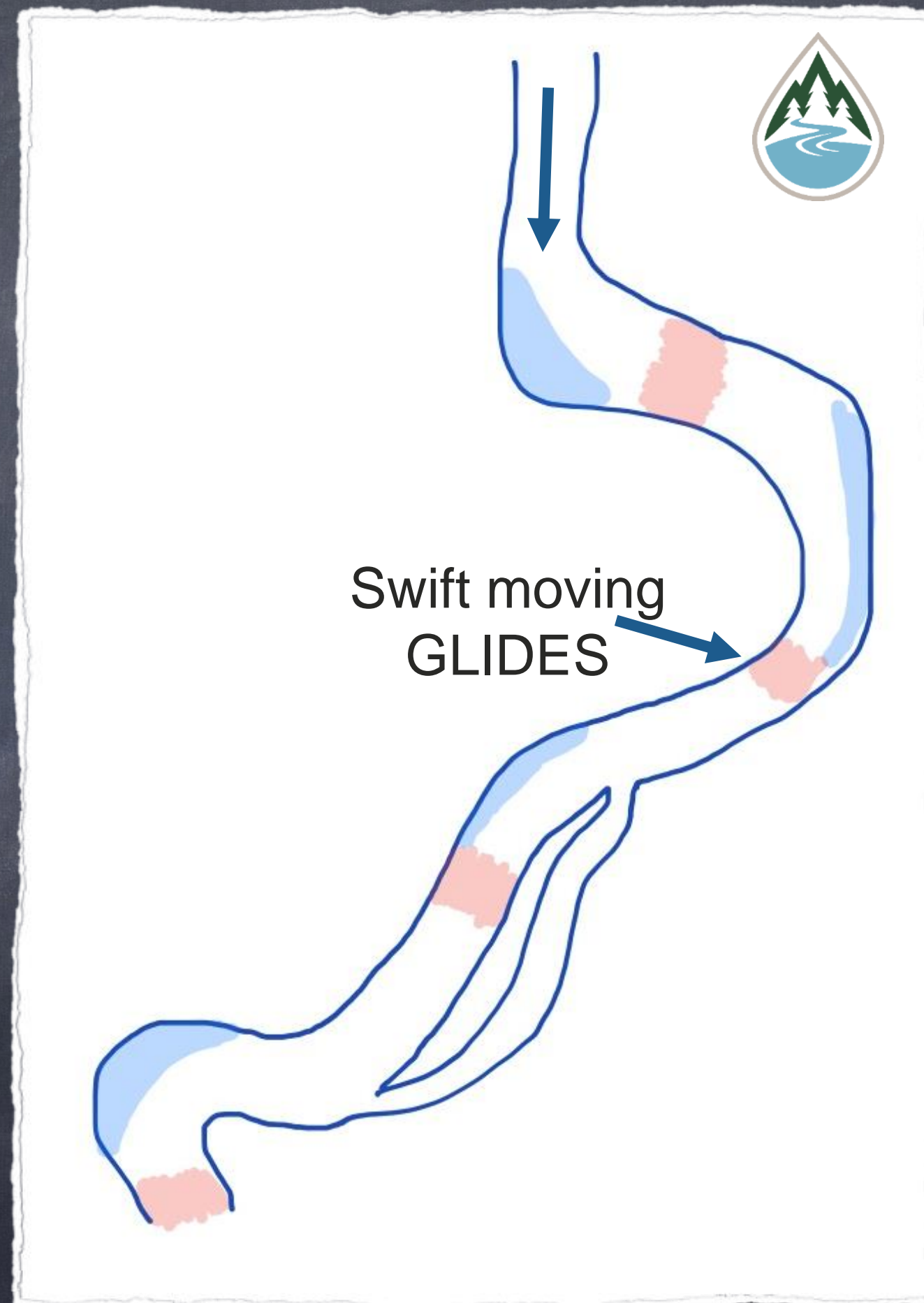
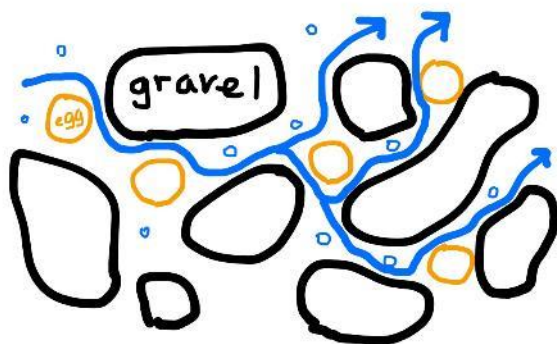


Primary Fish Habitats

#2. Spawning Habitat

The eggs need cold, oxygen-rich water that flows in and around the gravel redd

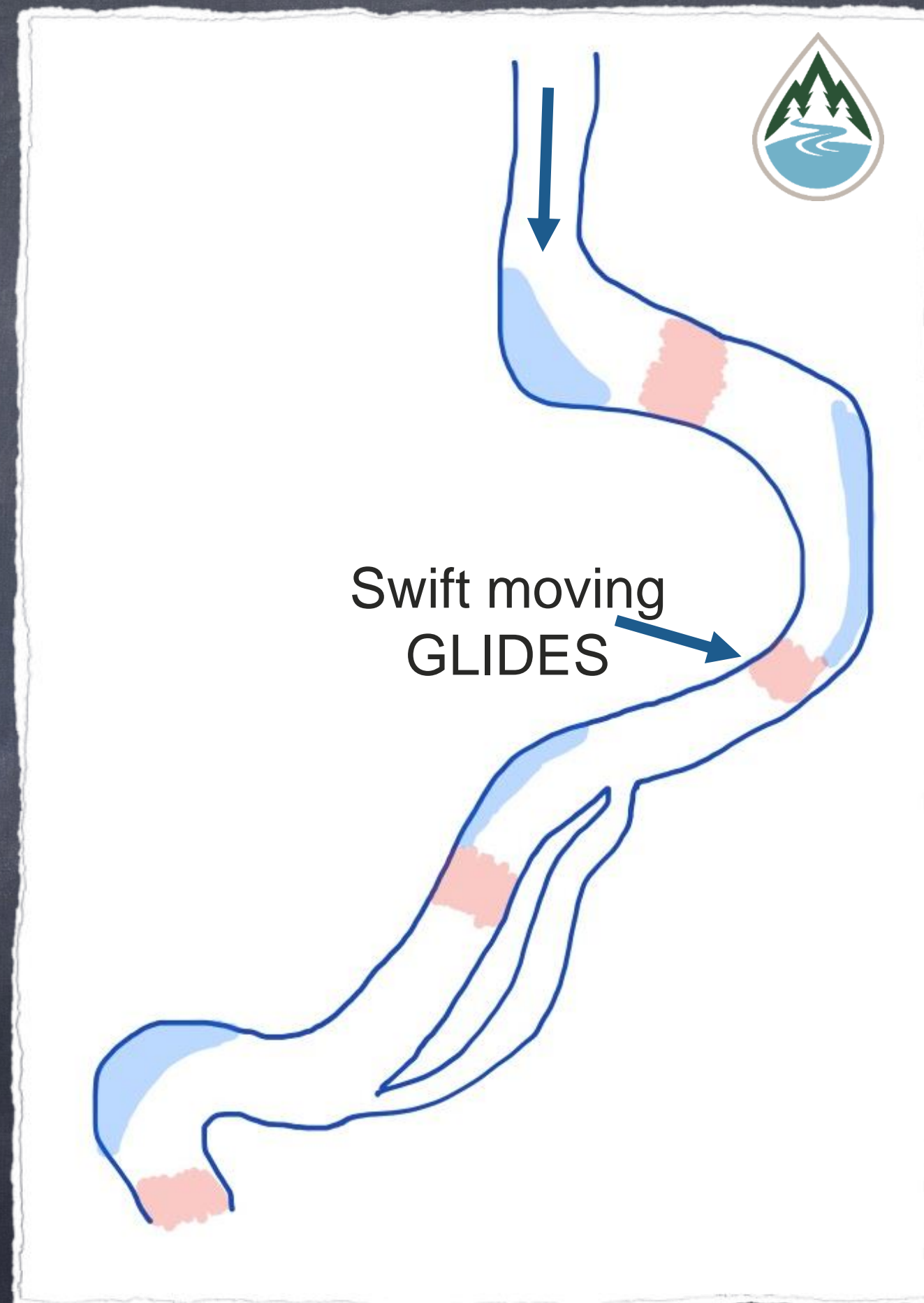
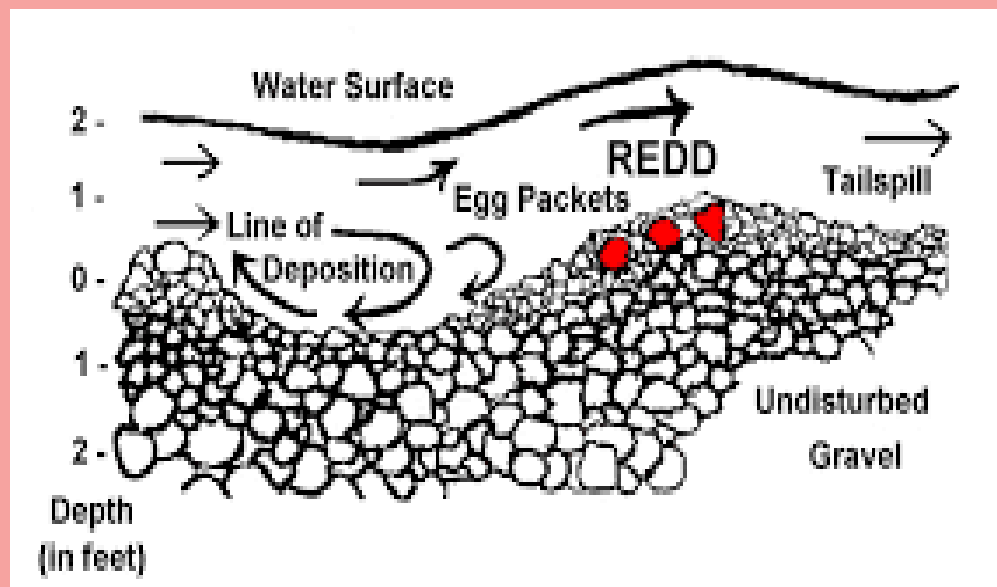
○ = Dissolved oxygen



Primary Fish Habitats

#2. Spawning Habitat

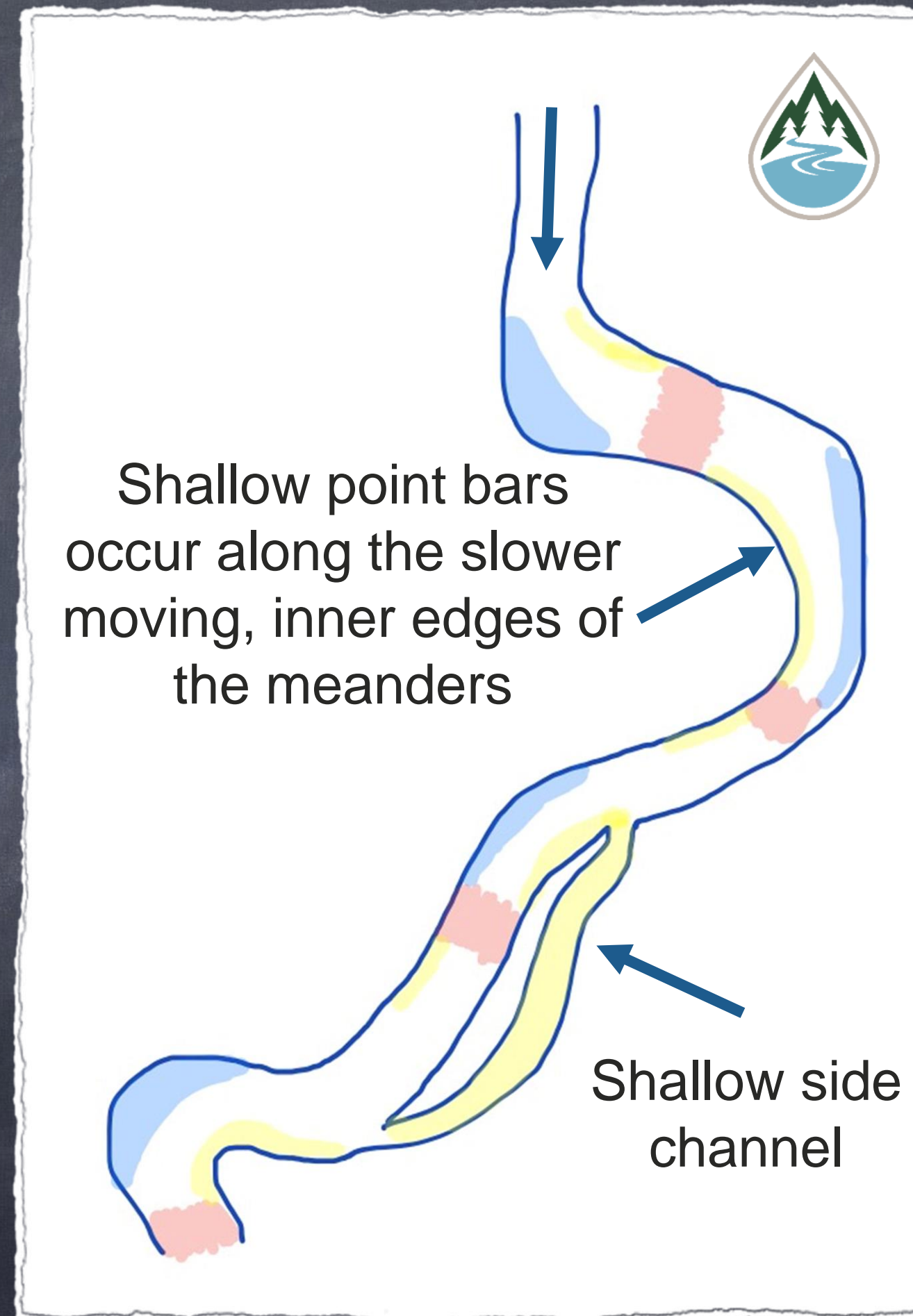
The eggs need cold, oxygen-rich water that flows in and around the gravel redd



Primary Fish Habitats

#3 . Alevin, Fry & Juvenile Rearing Habitat

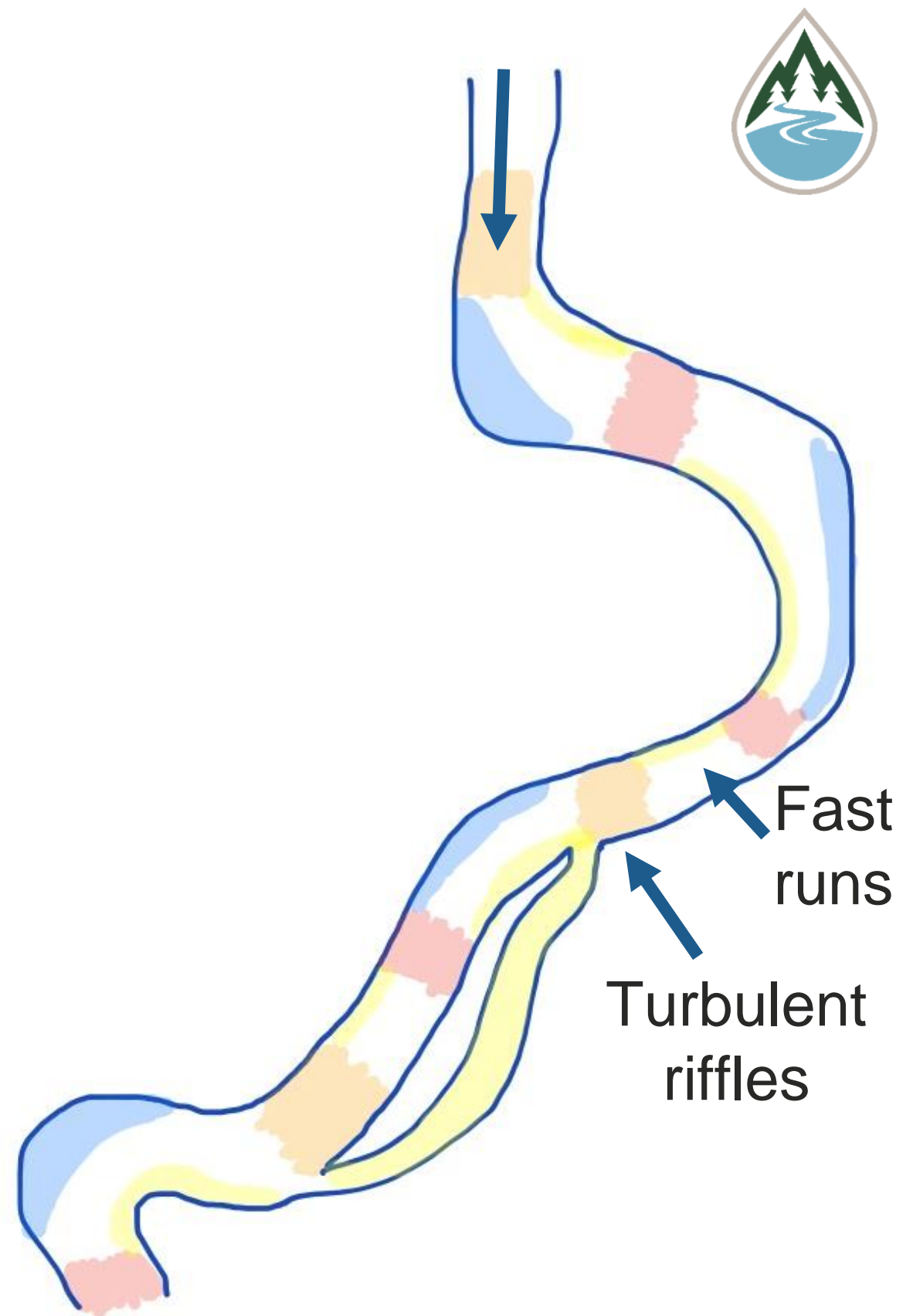
Occurs along the shallow edges, side channels, & under woody debris.



Primary Fish Habitats

#4 . Feeding Habitat

Occurs along the bottom of the **RIFFLES** and **RUNS** where many aquatic insects live.

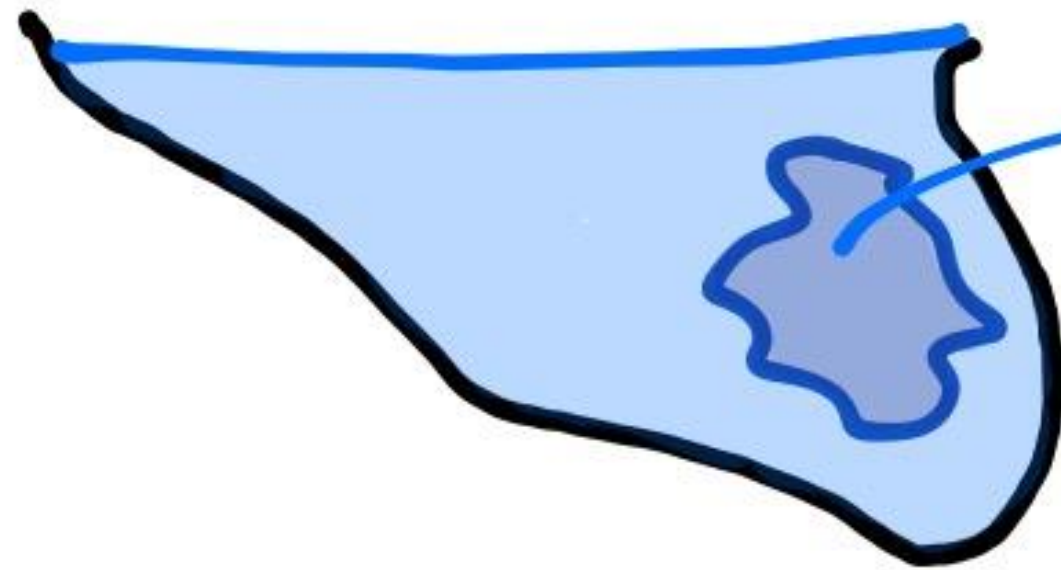


Matching

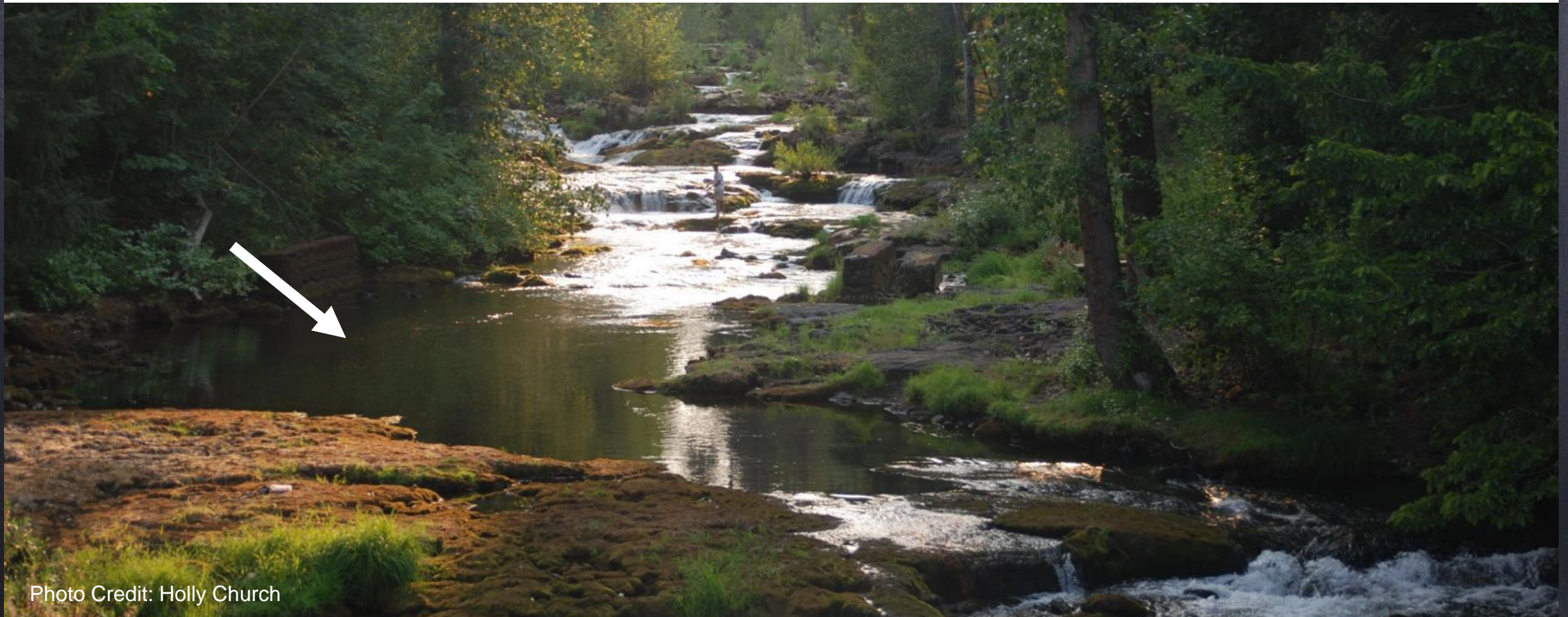


Work with a partner to match the stream habitats to the provided descriptions.

Pool



Faster water
along outer
edge



Glide

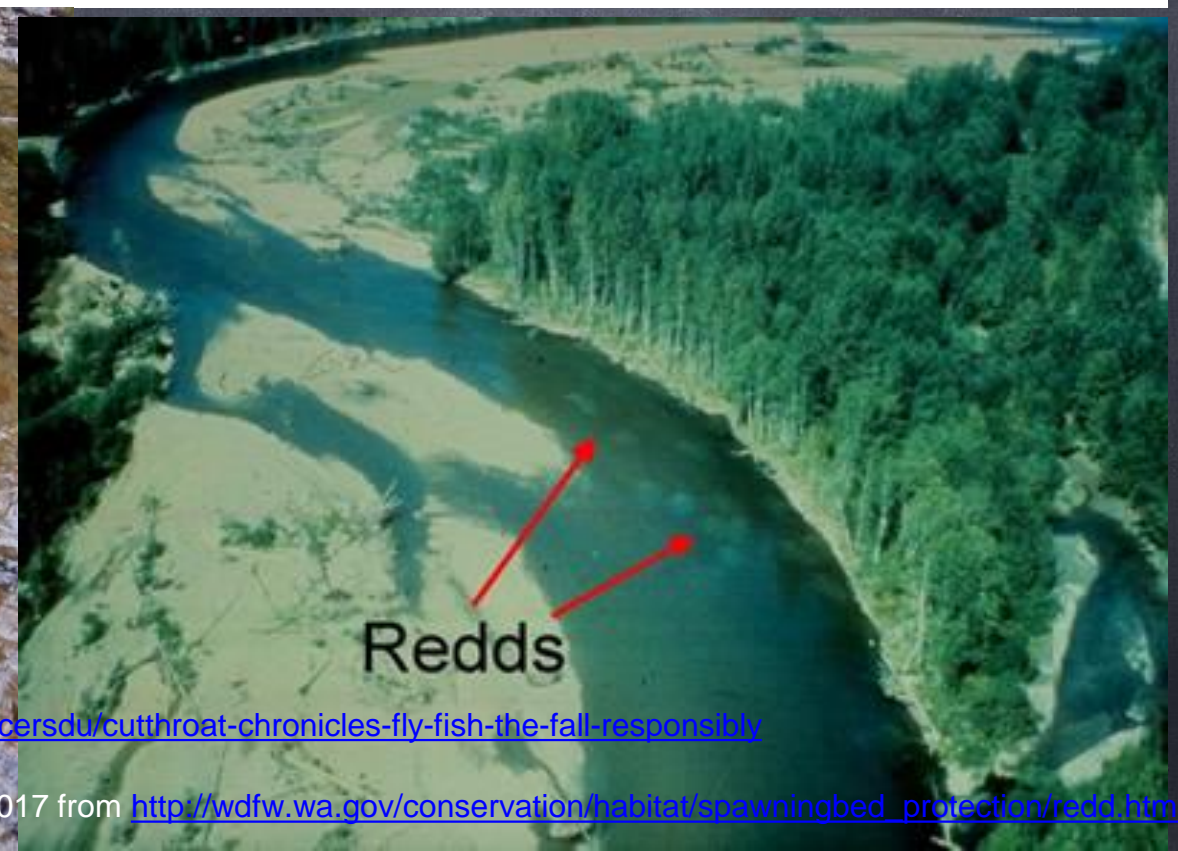
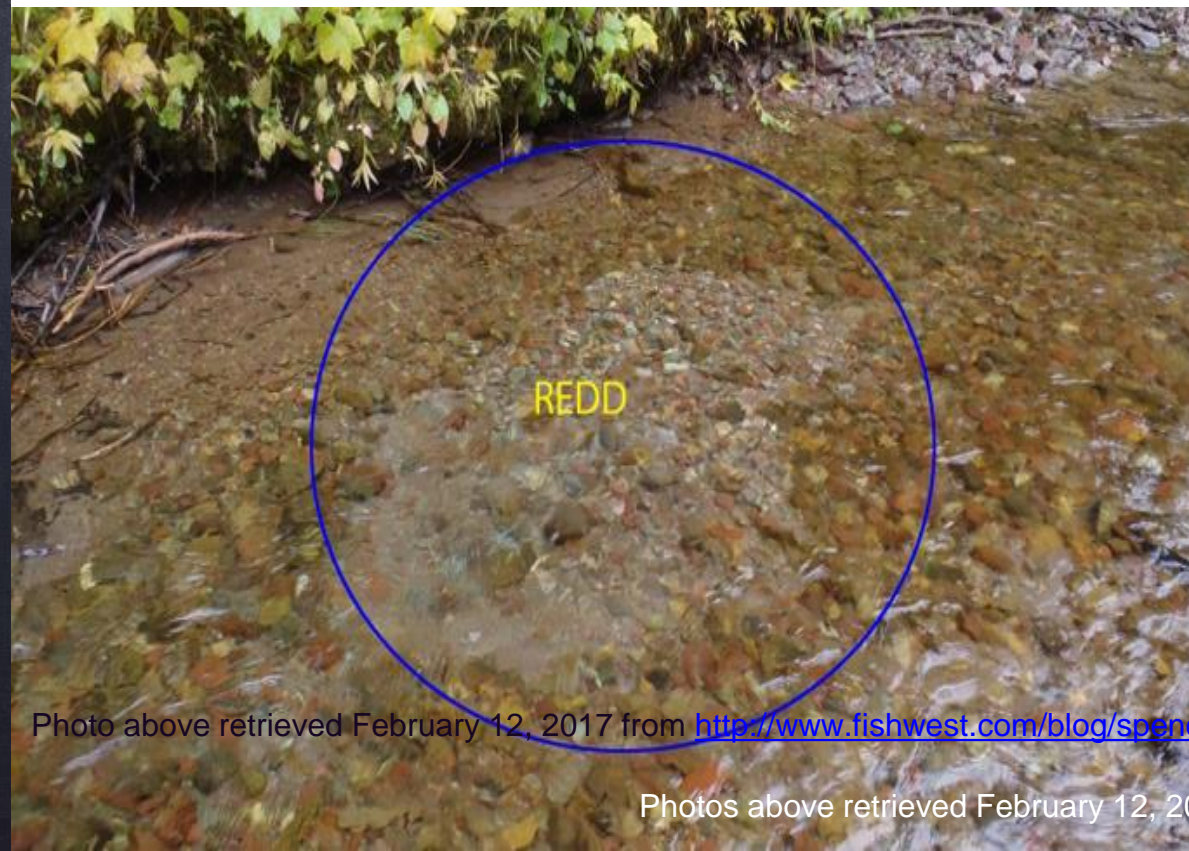
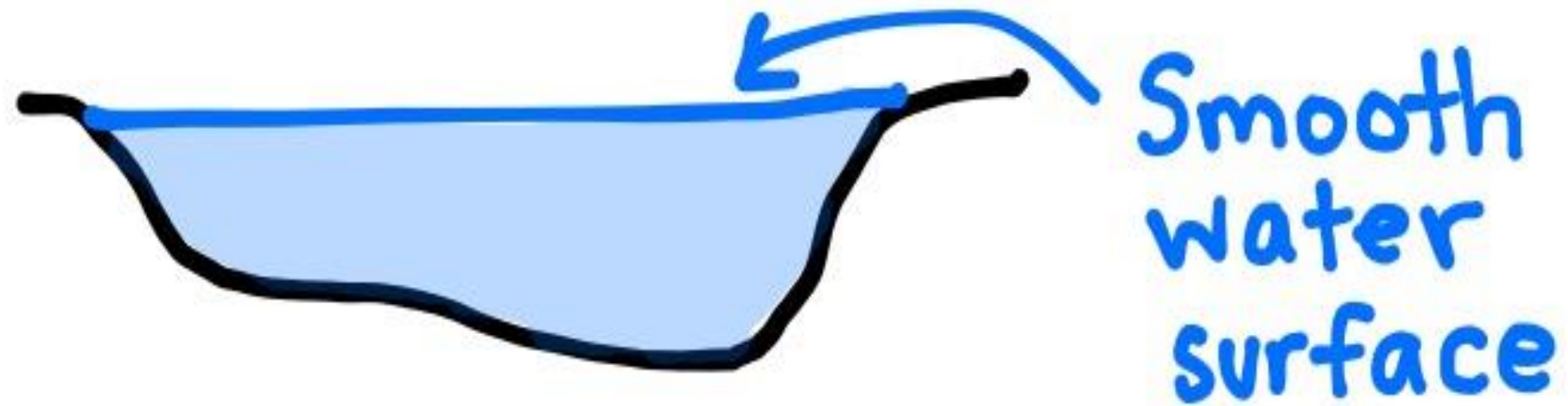
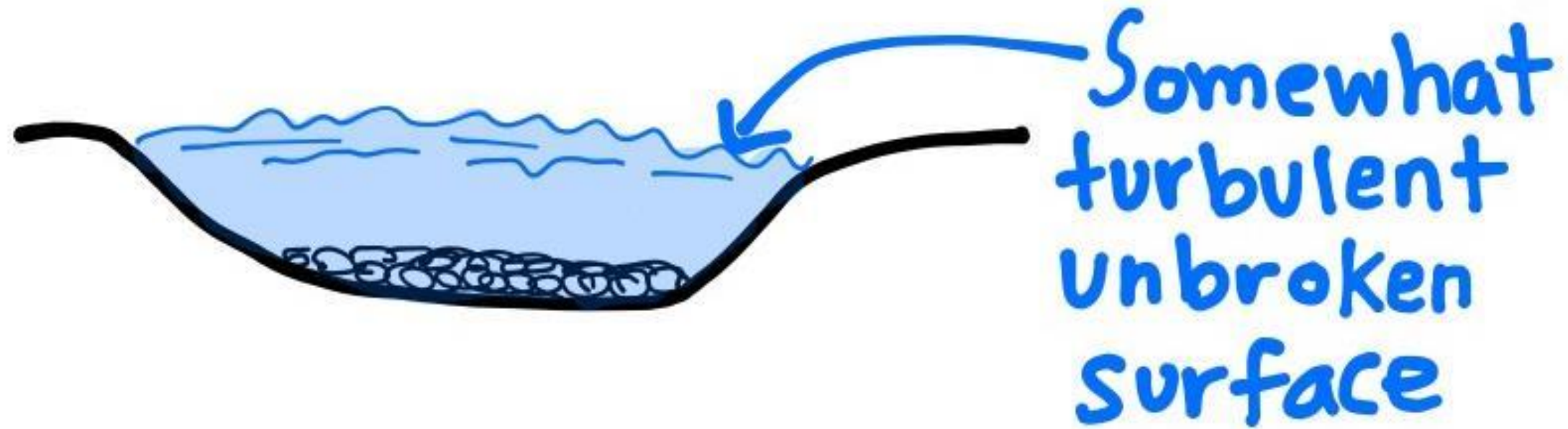


Photo above retrieved February 12, 2017 from <http://www.fishwest.com/blog/spencersdu/cutthroat-chronicles-fly-fish-the-fall-responsibly>

Photos above retrieved February 12, 2017 from http://wdfw.wa.gov/conservation/habitat/spawningbed_protection/redd.html

Run



Riffle

Run

Riffle

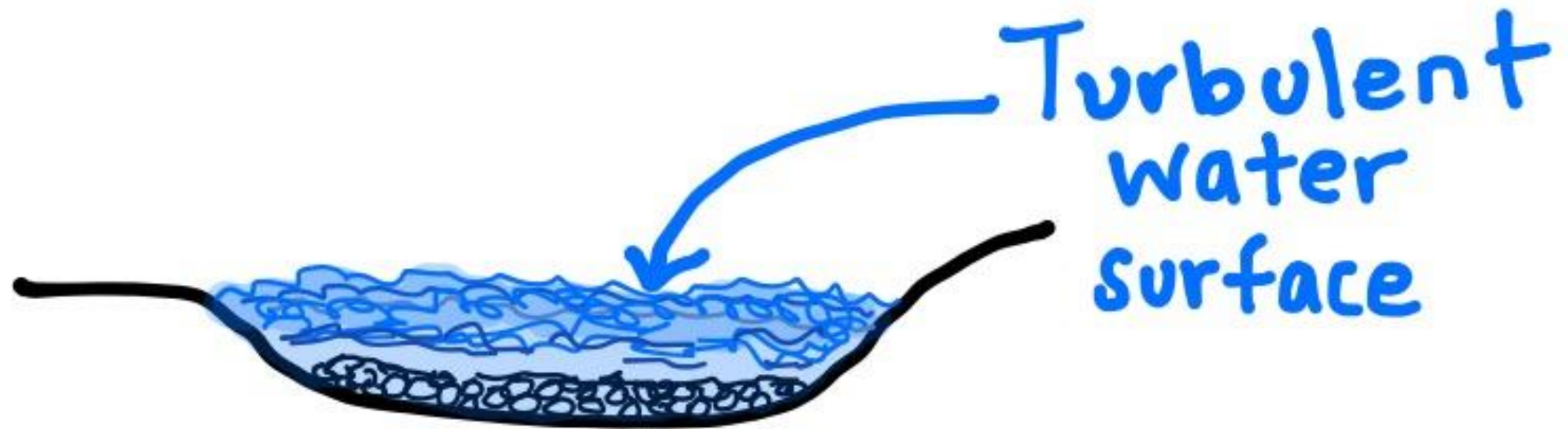


Photo Credit: Holly Church



Photo Credit: iStock photo

Quiet Water



Still
water
along
margins

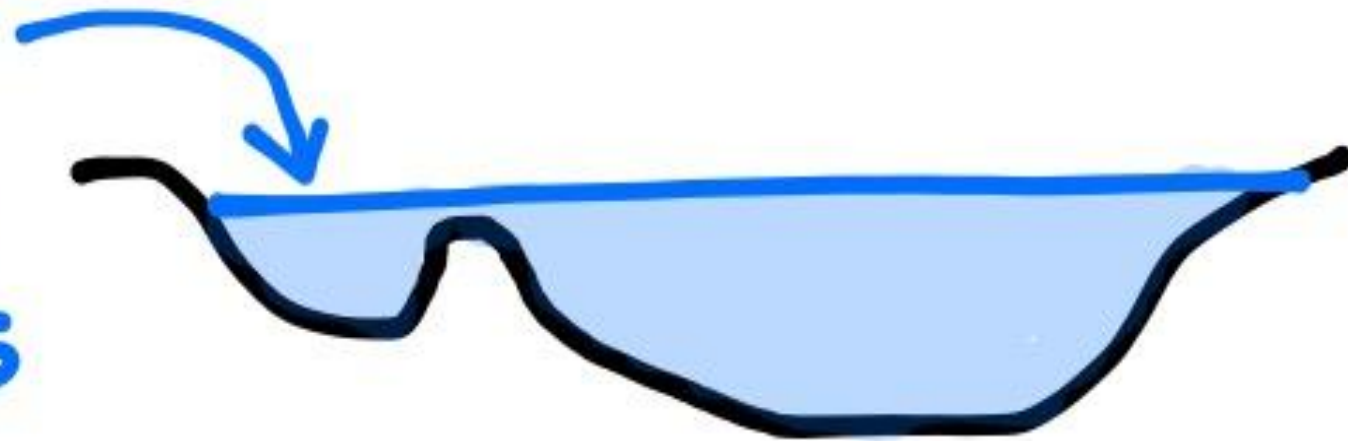


Photo Credit: Holly Church



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Undercut Bank

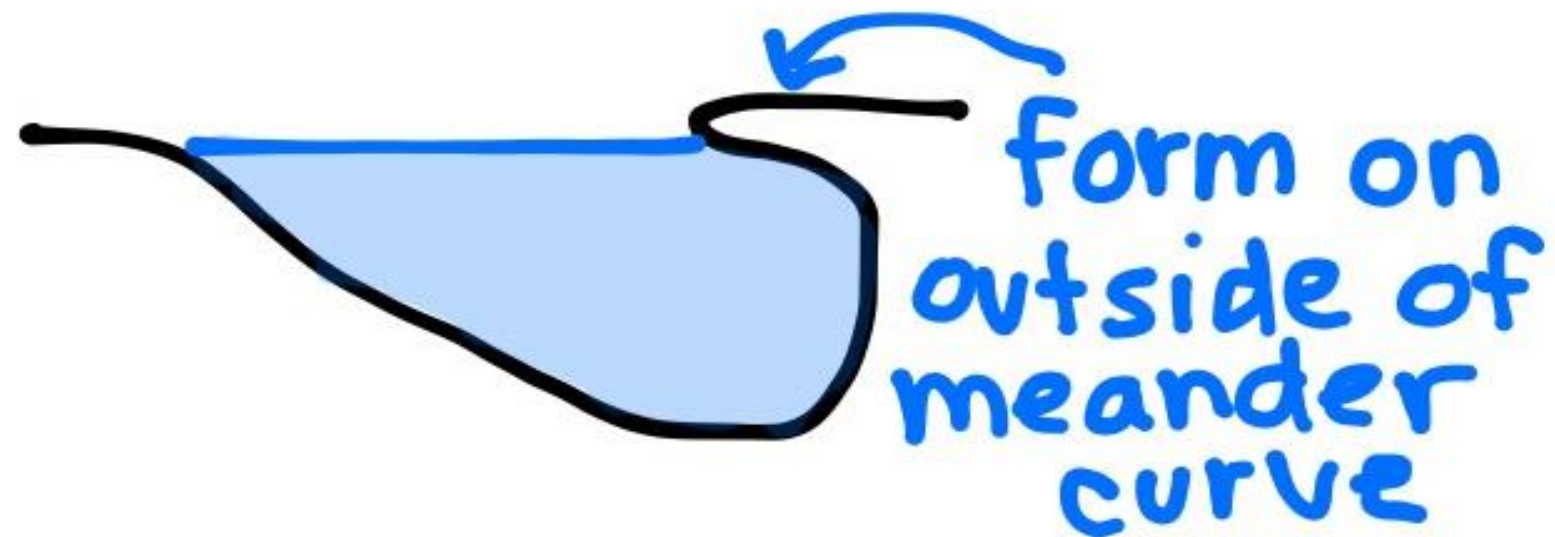
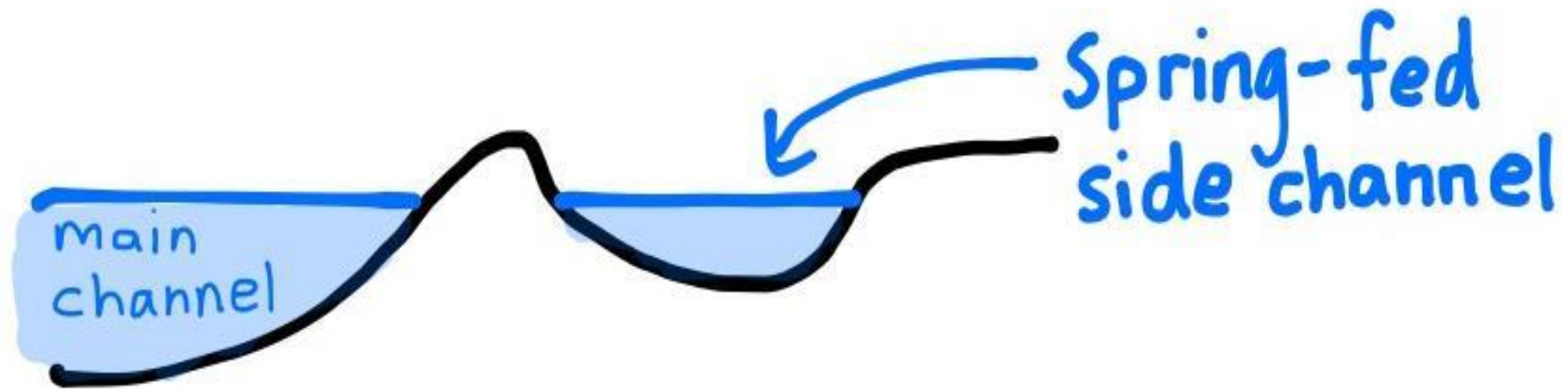


Photo Credit: USGS (public domain)



Photo Credit: USGS (public domain)

Spring-fed Channel



Woody Debris

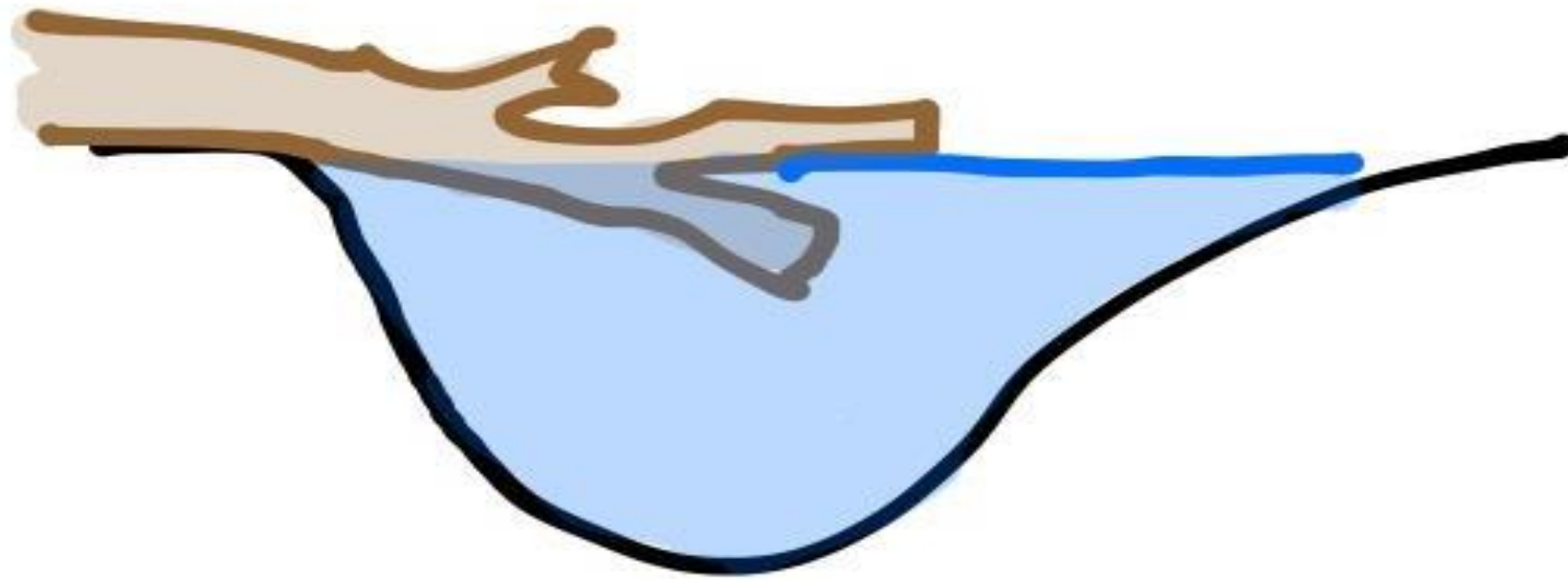


Photo Credit: Holly Church



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Beaver Pond

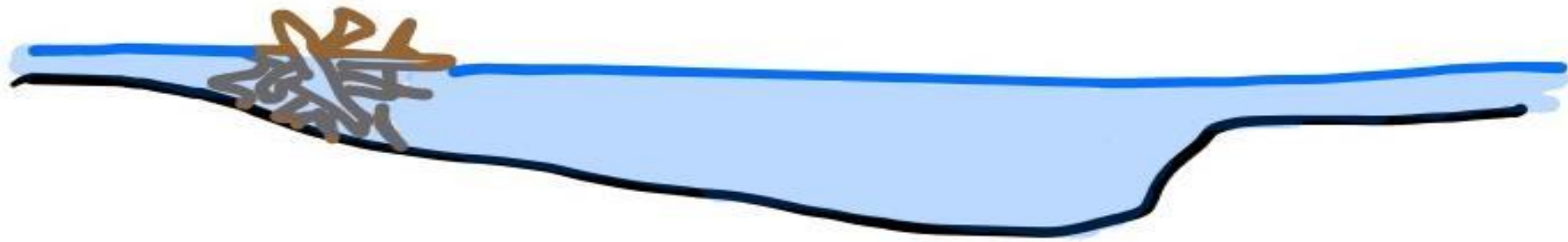
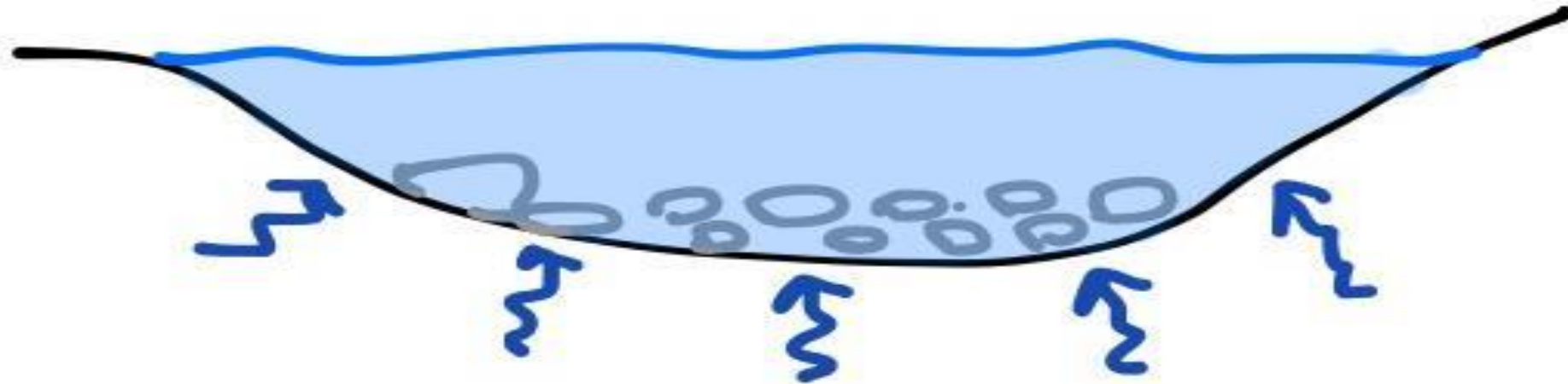


Photo Credit: Cheryl Renolds (CC BY-SA 3.0)



Photo Credit: Richard Wang (CC BY-SA 3.0)

Groundwater Upwelling Area



Algae often grows where nutrient-rich groundwater upwells

Complete the Table



Indicate whether you would expect to find the stream features in each of the 4 primary fish habitats.

Make a Prediction



SCENARIO:

Changes to local climate cause the amount of annual precipitation to drastically decrease, which in turn decreased the amount of spring melt and water flowing through the local tributaries throughout the year.

Would the native trout populations increase or decrease?

WHY?

What would happen to the complexity and connectivity of the stream habitats? BE SPECIFIC.

Think-Pair-Share



List all of the potential ways humans could negatively impact the native trout populations.

Problem Solve



Create a solution to one of the possible human impacts.

YOUR GOAL: To maintain the stability of the native trout populations over time.

What do you propose?

Individual Reflection



Why is habitat complexity and connectivity in the streams critical for native trout reproduction and survival?

Be specific and provide details from this activity to explain.

References



Slide 1: White Salmon River: Holly Church

Slides 3 & 8: Bulltrout: NPS (public domain) <https://www.nps.gov/articles/saving-bull-trout.htm>

Adult Westslope Cutthroat Trout: USGS (public domain) https://commons.wikimedia.org/wiki/File:Westslope_cutthroat_trout_USGS.jpg

Juvenile Westslope Cutthroat Trout: NPS (public domain) <https://www.nps.gov/yell/learn/nature/westslope-cutthroat-trout.htm>

Slides 5-6: Map of Bull Trout Distribution: Montana Field Guide (2020) <http://fieldguide.mt.gov/speciesDetail.aspx?elcode=AFCHA05020>

Map of Westslope Cutthroat Trout Distribution: Montana Field Guide (2020) <http://fieldguide.mt.gov/speciesDetail.aspx?elcode=AFCHA02088>

Slide 10: Rainbow Trout: USFWS (public domain) [https://commons.wikimedia.org/wiki/File:Rainbow_trout_\(26809663537\).jpg](https://commons.wikimedia.org/wiki/File:Rainbow_trout_(26809663537).jpg)

Brooke Trout: NPS (public domain) <https://www.nps.gov/yell/learn/nature/eastern-brook-trout.htm>

Brown Trout photo: USFWS (public domain) https://commons.wikimedia.org/wiki/File:Brown_trout_01.jpg

Lake Trout: USFWS (public domain) https://commons.wikimedia.org/wiki/File:Lake_trout_fish_underwater_close_up_head.jpg

Slide 12: Four Cs diagram: fwp.mt.gov/mtoutdoors/HTML/articles/2018/Bulltrout.htm

Slide 22: Trout Lake Creek: Holly Church

Slide 23: Photo above retrieved February 12, 2017 from <http://www.fishwest.com/blog/spencersdu/cutthroat-chronicles-fly-fish-the-fall-responsibly>

Slide 23: Photos above retrieved February 12, 2017 from http://wdfw.wa.gov/conservation/habitat/spawningbed_protection/redd.html

Slide 24: Middle Fork Flathead River: Holly Church

Slide 25: White Salmon River: Holly Church

Slide 25: Blue River Colorado, iStock photo: <https://like-a-river.com/what-kind-of-stream-are-you-the-quiz/stream-type-c-riffles-pools-and-point-bars/>

Slide 26: Swan River and Middle Fork Flathead River: Holly Church

Slide 27: Stream Bank Erosion: USGS (public domain) <https://www.usgs.gov/media/images/stream-bank-erosion-mobilizes-sediment-can-be-transported-downstr>

Indian Creek stream erosion: USGS (public domain) <https://archive.usgs.gov/archive/sites/ks.water.usgs.gov/mill-creek-sediment.html>

Slides 28-29: Wood debris and Beaver Creek: Holly Church

Slide 30: Beaver Dam: Cheryl Renolds (CC BY-SA 3.0) https://commons.wikimedia.org/wiki/File:Beaver_Dam_Sonoma_Creek,_Sonoma_Thanksgiving_2009.jpg

Beaver Dam in Yellowstone: Richard Wang (CC BY-SA 3.0) https://commons.wikimedia.org/wiki/File:Beaver_dam_in_Yellowstone.jpg

Slide 31: Upwelling area along Middle Fork Flathead River: Holly Church