
NAME

SCHOOL

DATE



FIELD JOURNAL

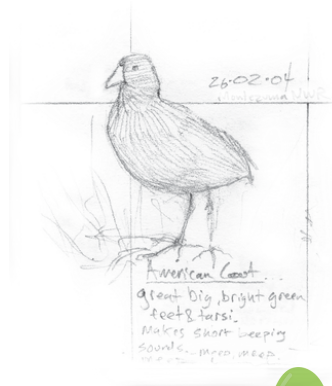
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WHAT IS A FIELD JOURNAL?

A field journal is any kind of notebook used to write or draw your observations of the natural world—the field. Scientists, artists, and more, use field journals to learn more about nature.

This field journal is for you to use during your NatureBridge program, as a way to save your memories. When you return home, you can create your own and use it to help you connect with your own natural spaces and community.



GROUP AGREEMENT

The Big Picture

- Be Safe (which includes being a good steward of yourself, each other, and this place)
- Learn Something (you are at school while you are with us!)
- Have Fun (meet new people, enjoy the national park)
- Respect means to take care of

Taking Care of the Environment and This Place

- Plants: This is their home! Be kind to them and don't pick living plants.
- Animals: Some we can interact with, some we need to leave alone. Always ask a NatureBridge staff person first. No matter what, never feed a wild animal or try to scare it on purpose.
- Buildings: They are very special and historic- over 80 years old. Take care of them like you would take care of your home. Everyone will be taking turns to help take care of buildings and keep them clean.
- Food: No food anywhere except in the dining hall! If you have food in your cabin or your bags it will attract mice and other animals. Bring extra food to us so we can store it and give it back when you leave.

Taking Care of Others

- Always use the BUDDY SYSTEM, including at night going to the bathroom.
- Only go in your own cabin; stay out of other cabins.
- Only go in your own cabin loop, unless accompanied by an adult.
- You will all be trying new things this week, which is hard sometimes. Take care of each other!
- Quiet hours are: 9:30 p.m. to 7 a.m.

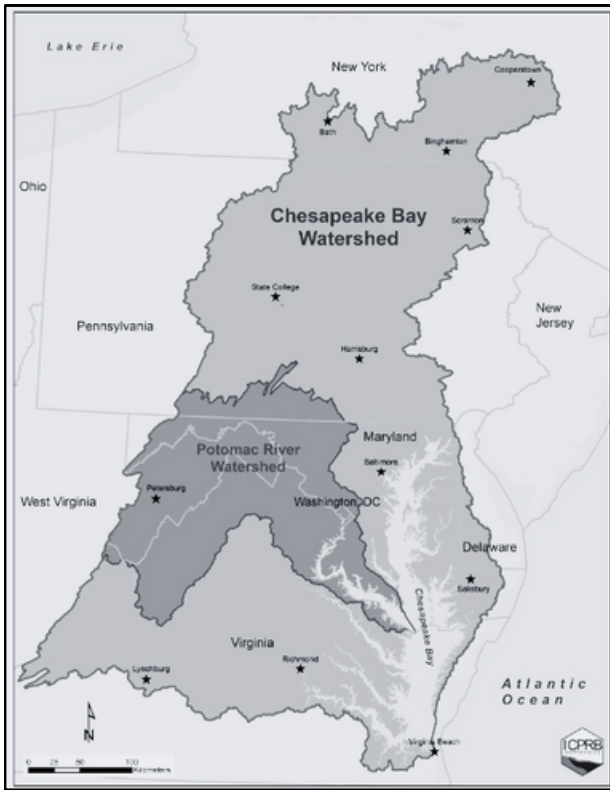
Taking Care of Yourself

- Eat, drink, sleep, use the bathroom!
- An adult must know where you are at all times, and you must have a buddy at all times.
- Stay in sight of adults, buildings, and cabin; boundary is forest edge.
- Hydrate yourself; you can fill up water bottles at the bathrooms or at the coolers at the Dining Hall.
- Ask your NatureBridge educator if you would like some sunscreen.
- You will have some free time each day at 4 p.m. to play games, read, relax, etc

This week, I agree to take care of...

WHERE ARE YOU NOW?

Chesapeake & Potomac River Watersheds



A **TRIBUTARY** is a river or stream that flows into a larger river or stream

An **ESTUARY** is a partially closed body of water where freshwater from rivers mixes with saltwater from the ocean

The Chesapeake Bay Watershed is the largest estuary in North America.

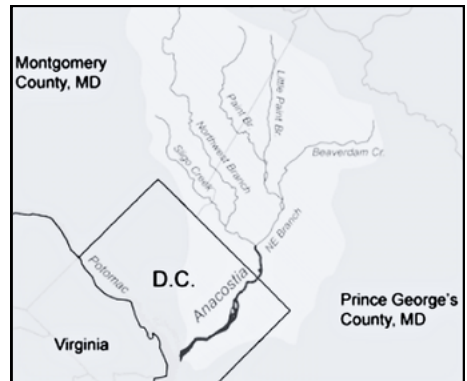
Where is Quantico Creek on this map?
Draw a Star

Where do you live within your local watershed? **Draw a star**

Rock Creek Watershed

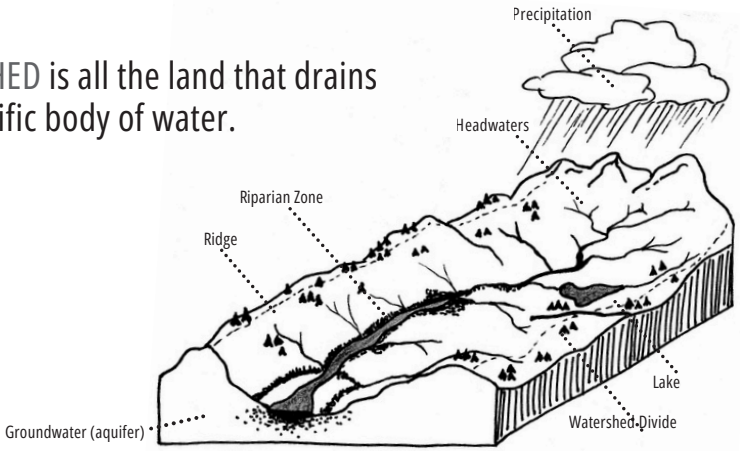


Anacostia River Watershed



WHAT IS A WATERSHED

A WATERSHED is all the land that drains into a specific body of water.



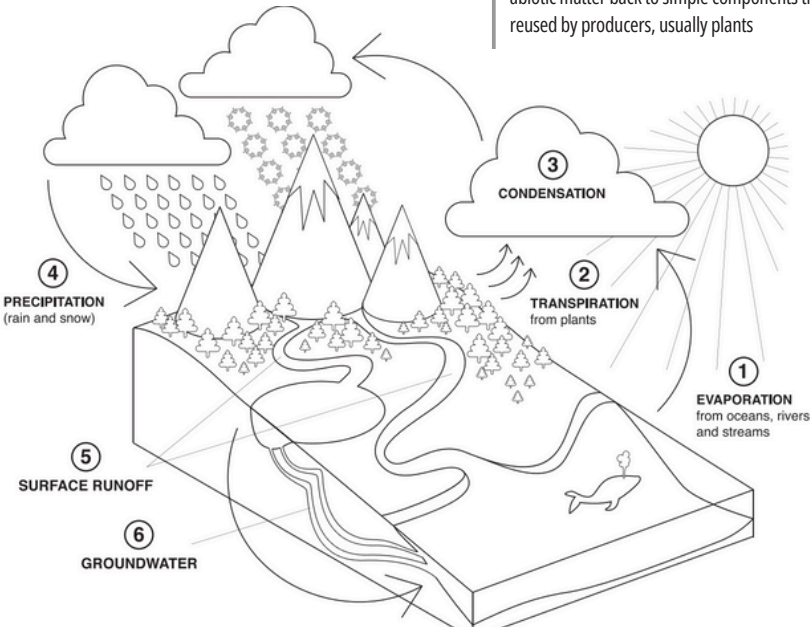
What impacts do humans have on their watershed?

How does runoff play a role in stream health?

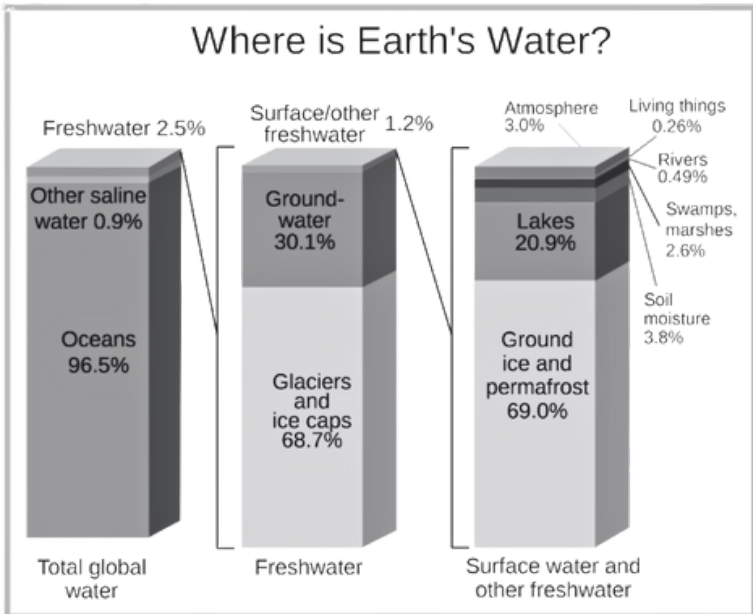
ALL THE WATER IN THE WORLD

WATER CYCLE

NUTRIENT CYCLING: the process of cycling biotic & abiotic matter back to simple components that can be reused by producers, usually plants



Where is Earth's Water?



EXPLORATION:

I notice:

I wonder:

It reminds me of:

ABIOTIC AND BIOTIC FACTORS:

All **Ecosystems** are made up of **Abiotic** and **Biotic Factors**. These factors interact with each other and changes to one can influence the other. Understanding how these factors work together can teach you about the health of the ecosystem as a whole.

Definition of Abiotic:

Definition of Biotic:

Examples of Abiotic Factors:

Examples of Biotic Factors:

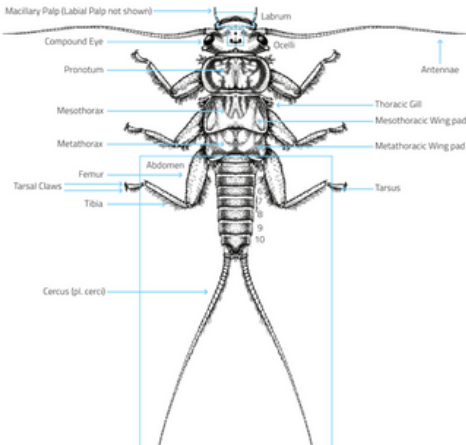
Give an example of an Abiotic and Biotic Factor interacting with each other.

Cultural: How do humans impact the interaction between Abiotic and Biotic Factors?

MACROINVERTEBRATES

Atlas of Common Freshwater

Macroinvertebrates.org
of Eastern North America



GLOSSARY

- abdominal gills** Gills located on the third and most posterior major body region.
- branched gills** Gills that have divisions or an offshoot off the main axis; branching.
- lateral filaments** Slender and thin appendages off the sides of the body.
- piercing mouthparts** Sharp or needle-like mouthparts for sucking nutrients such as blood or plant fluids
- portable cases** Protective retreats made from leaves, twigs, or sand that some caddisfly and midge larvae carry with them.
- tail filaments** An appendage located on the abdomen; used often for navigation and respiration.
- wing pads** Developing wings or the sheath of a developing wing.

Atlas of Common Freshwater
www.Macroinvertebrates.org
of Eastern North America

What is a macroinvertebrate?

How might you test the overall health of Quantico Creek?

What is an **indicator species**?

CLAIM, EVIDENCE, REASONING

Question: (Must be answerable with the scientific evidence and materials available to us here and now. *"Does affect the of?"*)

Evidence: (Summarize/Describe the available evidence, or the data that you have collected.)

Reasoning: (What do we know about the world that links claim and evidence? Why is the evidence useful and sufficient? Define things; describe concepts.)

Claim: (Answer the question; what do you think? This is your Hypothesis.
"..... affects the because.....")

Rebuttal: (What alternative claims exist? Why is your claim better? How confident are you? What limitations/questions do you still have?)

EXPERIMENT DESIGN:

Date and Time:

Weather:

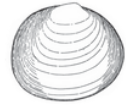
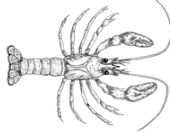
Site/Location: _____

CLASS 1: Animals intolerant of pollution

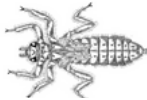


Mayfly	Caddisfly	Stonefly	Water Penny	Right-handed Snail

CLASS 2: Animals tolerant of a little pollution



Dobsonfly	Crayfish	Damselfly	Freshwater Clam
Cranefly	Dragonfly	Net-spinning Caddisfly	Scud



CLASS 3: Animals tolerant of pollution

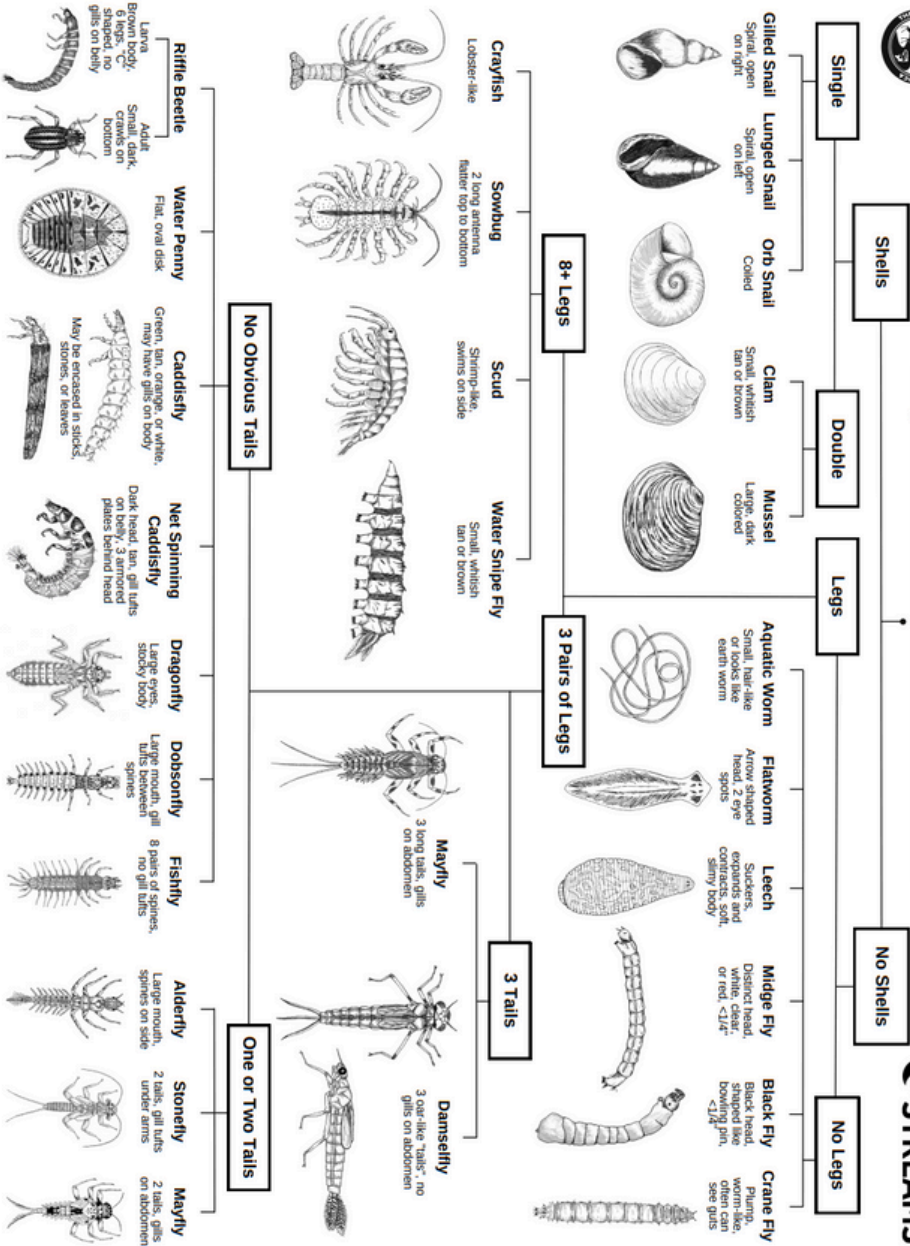


Leech	Mosquito	Blackfly	Midge	Aquatic Worm	Left-handed Snail

MACROINVERTEBRATE KEY



Key to Stream Macroinvertebrates



DATA COLLECTION

Date and time: _____

Site/Location: _____

Weather

Sunny Partly Cloudy Windy Light Rain Storm

Weather, Past 2-5 days

Sunny Partly Cloudy Windy Light Rain Storm

Dominant Substrate

Boulder Gravel Silt Sand Mud

pH (Parts Hydrogen)

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
fish die				rain			healthy			plants			fish die		

Dissolved Oxygen (mg/L)

0	1	2	3	4	5	6	7	8	9	10	11	12
too low for fish to live				stressful for fish			fish can grow and thrive		very healthy for fish			

Turbidity (cm)

0	5	10	15	20	25	30	35	40	45	50	55	60
Very Unhealthy											Very Healthy	

Temperature

< 13°C (55.4°F)	13-20°C (55.4-68°F)	20-32°C (68-89.6°F)	>32°C (89.6°F)
Cold Range	Ideal	Warm Range	Unhealthy

Nitrogen (ppm or mg/L)

0	2	4	6	8	10	12	14
Natural		Eutrophication could occur			Max allowed in drinking water	Harmful to Humans	

What happens when there are too many nutrients in the water?

How do humans impact water quality?

EXPERIMENT DEBRIEF:

Claim: _____ **affects the** _____ **because** _____

Evidence to support this claim: i.e. is there an observed pattern or trend?

-
-
-
-

Reasoning : In conclusion, our data suggest:

Rebuttal: Were there variables you were unable to control (confounding variables) that might affect your results? – reword to water quality and is Quantico Creek Healthy

What new questions came to mind in analyzing your results?

Big Picture: What story about our watershed does your data tell?

i.e. what relationships and connections did you observe in relation to stream health?

Why is this important?

REFLECTION: Day 1

Today I enjoyed when we.....

This week, I will support my team by.....

This week, I will support myself by.....

During my NatureBridge trip, I'm looking forward to.....

REFLECTION: DAY 2

Today I enjoyed when we.....

Something I learned about myself is.....

I am a scientist because.....

I am connected to my watershed because.....

HOW CAN I MAKE A DIFFERENCE?

Individuals, communities, and environments are interconnected; you make a difference in your daily life by protecting the balance between the three! **Every action counts.**



CLIMATE ACTION:

When I return home I will...

FIELD GUIDE: ANIMALS (Not to scale)



Red-tailed Hawk



Bald Eagle



Black Vulture



Pileated Woodpecker



Box Turtle



Painted Turtle



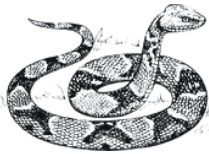
Red Fox



Grey Squirrel



Northern water snake



Copperhead Snake



Fence Lizard



Five-lined Skink



Salamander



Pickerel Frog



Leopard Frog



Green Frog



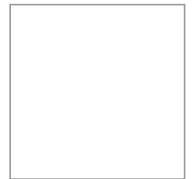
American Robin



Swallow-tail butterfly



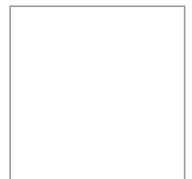
Wolf spider



Ticks



Fish



VOCABULARY

Abiotic: anything that is not alive or never was alive (such as air and water)

Adaptation: a physical trait or behavior that helps an organism survive

Biodiversity: the variety of different living things in a particular environment

Biotic: anything that is or once was alive (such as animals and dead leaves)

Carbon: a common element that often bonds with other elements such as hydrogen and oxygen and is present in all living things

Carnivore: an animal that eats mostly meat

Climate Change: changes in long-term weather patterns (climate) due to many factors

Consumer: an organism that needs to eat other organisms and can't produce its own food

Decomposer: an organism that consumes dead or decaying material, breaks it down, and returns the organic nutrients to the environment

Ecology: the study of the natural environment and of the relationships of organisms to one another and their surroundings

Ecosystem: all the interconnected parts, physical and biological, of a particular area

Erosion: the carrying away of land or soil by wind, water, or ice

Estuary: a partially closed body of water where freshwater mixes with the saltwater from the ocean

Eutrophication: when water contains excess nutrients (esp. nitrogen) leading to increased plant and algal growth.

Food Web: a way of representing various paths of energy moving through an ecosystem through the consumption of food

Geology: a science that deals with the history of the Earth, especially as recorded in rocks

Habitat: the place where an organism lives, which provides what it needs to survive

Herbivore: an animal that eats mostly plants

Invasive: a non-native species whose introduction causes environmental harm

Invertebrate: an animal without a backbone

Life Zone: a region characterized by specific plants and animals

Macroinvertebrate: an invertebrate that can be seen without any extra magnification

Migration: the patterned movement of organisms to follow food sources or better weather conditions

Native: organisms that originated in the district or habitat in which they live

Omnivore: an animal that eats both plants and animals

Population: the individuals of a certain species living in a certain area

Producer: an organism that makes its own food (such as plants)

Riparian: relating to or living on the edge of a waterway (such as a stream or lake)

Run off: draining away of water from the surface of an area of land, a building, etc.

Stormwater: rain or melted snow that flows over the land's surface, picking up pollutants like oil, chemicals, and pet waste

Stewardship: the careful and responsible management of something entrusted to one's care

Succession: a change in an ecosystem as organisms, especially plants, respond to and modify their environment

Symbiosis: an interdependent relationship between species

Tributary: a river or stream flowing into a larger river or lake

Vertebrate: an animal with a backbone

Watershed: all the land that drains into a specific body of water

Weather: the condition of the atmosphere due to wind, temperature, clouds, precipitation, and barometric pressure



BE PREPARED!

BACKPACK CHECKLIST

Have the following items with you every morning:

- Backpack with room for lunch
- Water bottle filled with water
- Rain gear and appropriate weather layers
- Sun protection, including sunscreen and hat
- Field journal along with pen or pencil
- Bandana (crumb catcher)
- Medication (inhalers and EpiPens)
- Empty bladder (go to the bathroom)
- Positive Mental Attitude
- _____



LEAVE NO TRACE

Please practice "Leave No Trace" principles.

Learn more at Int.org.

STAY CONNECTED WITH NATUREBRIDGE

NatureBridge is a proud partner of the National Park Service

Field guide images by the following:

- Dr. Ayana Elizabeth Johnson • Joseph Kinyon
- NatureBridge staff, including Ingrid Apter, Rachel Loud, Anjanette Garcia, and Estrella Risinger

NatureBridge is a 501(c)(3) nonprofit organization that relies on the generous support of donors.

