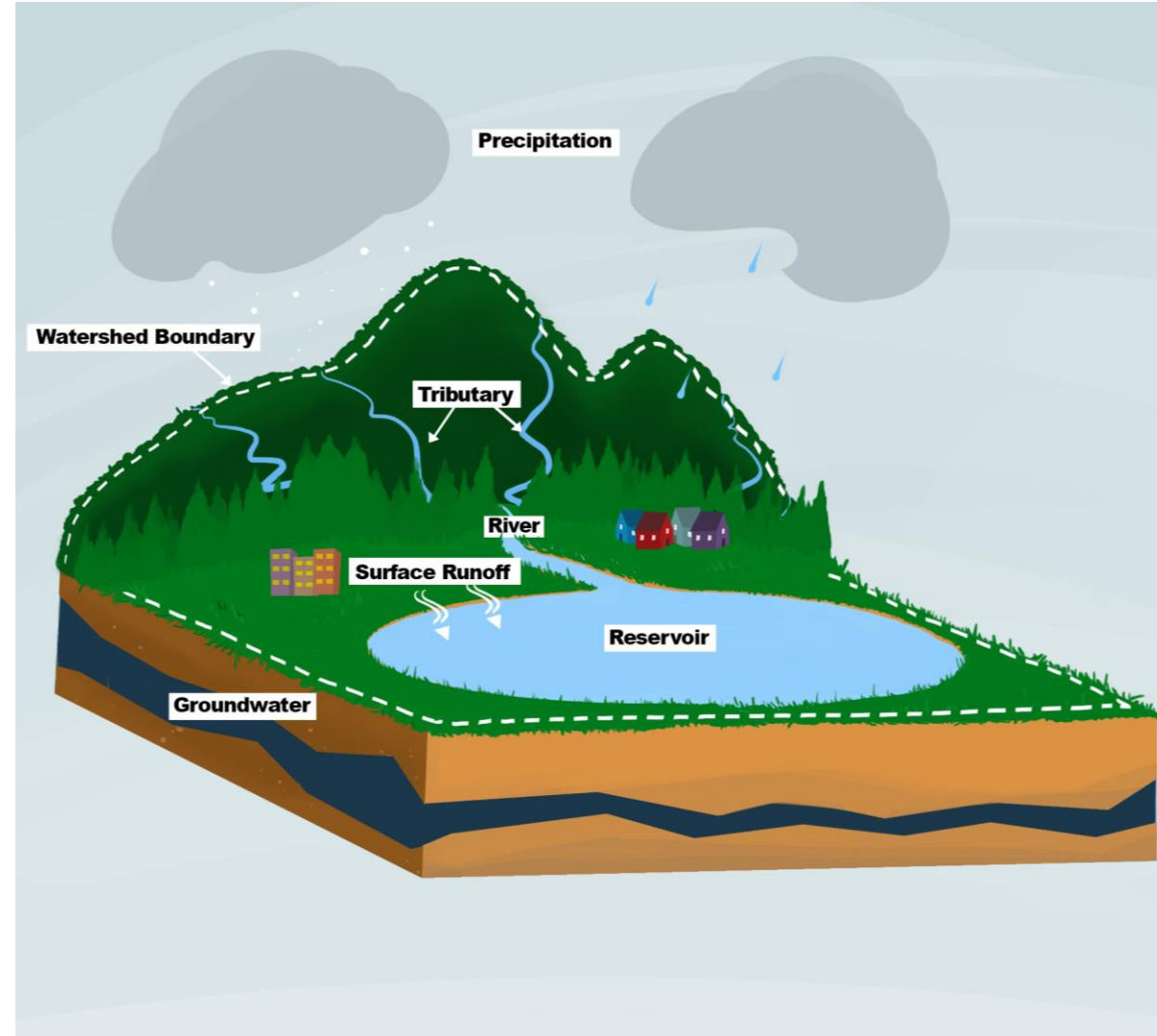# What is a Watershed?

What is a Watershed?

Definition: An area of land that drains into a specific body of water.

NYC Watersheds: Croton, Catskill, Delaware

- NYC residents receive drinking water from these upstate watersheds every day

- Forests cover approximately 75% of the NYC watersheds

- DEP works collaboratively with watershed partners and communities to manage and protect water quality in the watersheds

- Because our watersheds are so healthy, they are great trout habitat!

Which Watershed Looks Healthier To You?

Image credit: Human Rights Watch

Water from NYC Watersheds is Filtered by Forests

Let's find out why these forests are important for us and our trout!

Our Trout Don't Lie!

- Trout are an ***indicator species*** and help us determine the health of the stream

- Trout, like many other animals, are also residents of our planet and rely on us to protect their waterways

- What are some of the water quality parameters that trout are most sensitive to?

NYC
Environmental Protection

Trout and Water Quality

- Trout are sensitive to:

  - Temperature

  - Dissolved oxygen levels

  - Sediment and turbidity

  - Nutrients (e.g. nitrogen and phosphorous)

  - Contaminants

  - pH

- Trout eat aquatic macroinvertebrates (macros), which have varying levels of pollution tolerance

- DEP ecologists survey trout and macros in watershed streams because when they are healthy, they can be confident that the watershed is healthy

NYC
Environmental
Protection

Trees and Trout

- Forests help protect trout from:
    - Sediment in the water (stabilize stream banks)
    - Nutrient runoff from fertilizer and animal waste (filter runoff)
    - Pollutants from roadways and industry (filter runoff)
- Trees shade the river, keeping it cool in the summer for cold-water fish like trout
- Downed trees and roots give trout places to hide from predators
- Fallen leaves provide a food source for the bugs that trout eat

NYC
Environmental
Protection

Why Are Forest Ecosystems Important?

Forest Ecosystems

- Forests are important because they:
  - Stabilize soil and prevent erosion
  - Provide a home for native plants and animals
  - Filter our air and provide us with oxygen
  - Give us happiness and enjoyment
  - Regulate the water cycle – help to create rainfall
  - Purify the water which makes sure we have clean water to drink!

- We call these benefits *ecosystem services*

- Can you think of any human activities that impact forest ecosystems?

NYC
Environmental
Protection

Land Uses That Impact Forests and Watershed Health

- Agriculture

- Impermeable surfaces

- Houses and lawns

- Factories and industrial areas

Agriculture

- Can increase **erosion** leading to more sediment in water

- Can cause **nutrient runoff**
  - Nitrogen-> Nitrates
  - Phosphorus-> Phosphates

- Can cause **pesticide runoff**

- ...and more!

- Trout are very sensitive to high levels of sediment, nutrients (especially forms of nitrogen), and pesticides in their water

Wikimedia Commons

Impermeable Surfaces

- **Impermeable** surfaces like paved roads, parking lots, and sidewalks do not allow water to seep into the ground or **percolate**

- Water moves much faster – leading to **higher turbidity** in streams making it harder for aquatic animals to breathe

- **Runoff** from impermeable surfaces often contains contaminants (oil residue, chemicals, nutrients)

Houses and Lawns

- Many lawns use chemicals and fertilizers that can **run off** into our streams

- Forests and other ecosystems are better able to filter contaminants from water

- Lawns provide little to no habitat for insects and pollinators (a **biological desert)**

Wikimedia Commons

Factories and Other Industrial Areas

- Can create concentrated air and water pollution

- Contaminants in **runoff** and discharge from factories are especially dangerous when directly next to water bodies

- Pollution from chemicals, sediments, and noise is toxic and hurts animals like trout

- Warm water discharges can also be harmful

Can We Keep Our Watersheds Healthy?

- Raise your hand if you like…
    - Food
    - Electricity
    - Having a roof over your head
- The real question is…how can we provide the resources we need and keep our watersheds healthy?

Conserve Our Forests!

- All four of the land uses we talked about can result in **deforestation**

- NYC DEP and partners work together every day to preserve forests around watershed streams and reservoirs

- Our three watersheds cover 2000 square miles of land and 60% is privately owned

- We work with landowners to make sure forests are protected through **best management practices** while still supporting watershed communities and their economies

Best Management Practices for Forest Protection

- Keep steep hillsides forested to avoid erosion

- Keep factories away from water bodies

- Support agriculture that uses fewer chemical fertilizers and pesticides

- Repair and preserve **riparian buffers**: nature is our best water filter

- What else can you do to protect our trout and watersheds?

NYC
Environmental
Protection

You Play a Critical Role in Managing the Health of the Water System and Watershed!

- If you litter, the future will be bitter

- Leave only footprints, take only memories (conserve our wild spaces)

- Save it for a sunny day (creating more wastewater when it's raining can lead to sewage overflows into local waterways)

- Trash it, don't flush it (grease should go in the trash, not down the drain since it clogs our pipes)

- Only flush the 4 Ps (pee, poop, puke, and (toilet) paper)

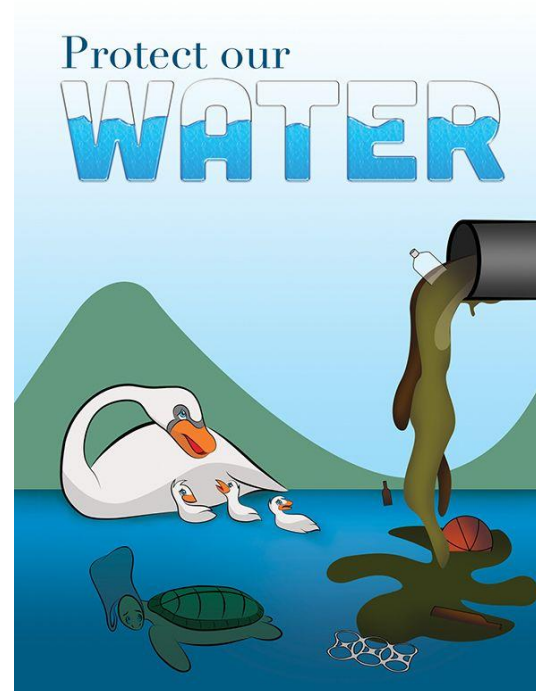- If it's yellow, let it mellow. If it's brown, flush it down. (conserve water at home)
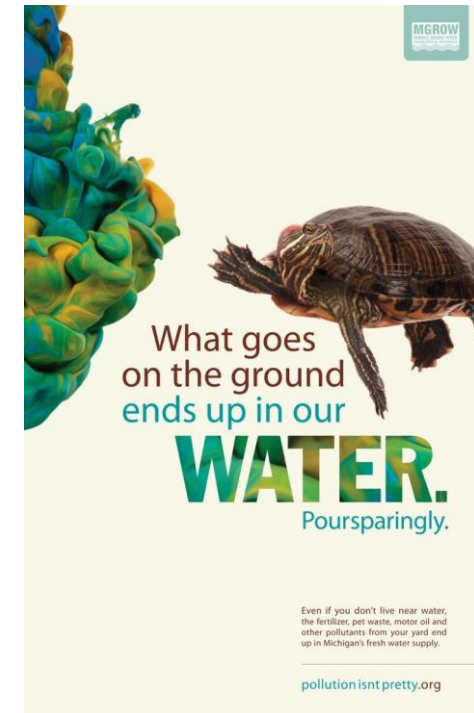
Activity

- Create a Public Service Announcement!
- Invent your own tagline and campaign to help protect the health of our trout and our watersheds

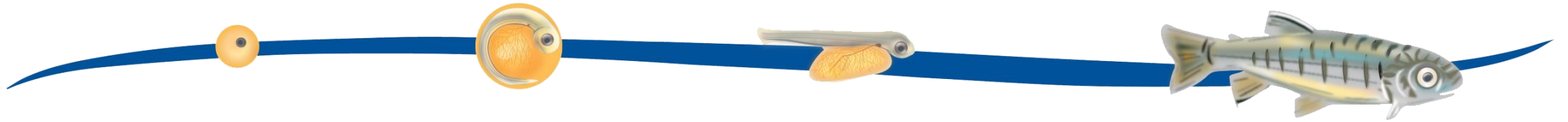*Mediterranean Association to Save the Sea Turtles*

Johanan Colon

Pollutionisntpretty.org

TROUT IN THE CLASSROOM

Learn more at **nyc.gov/dep/education** or contact the Education Office at educationoffice@dep.nyc.gov.