


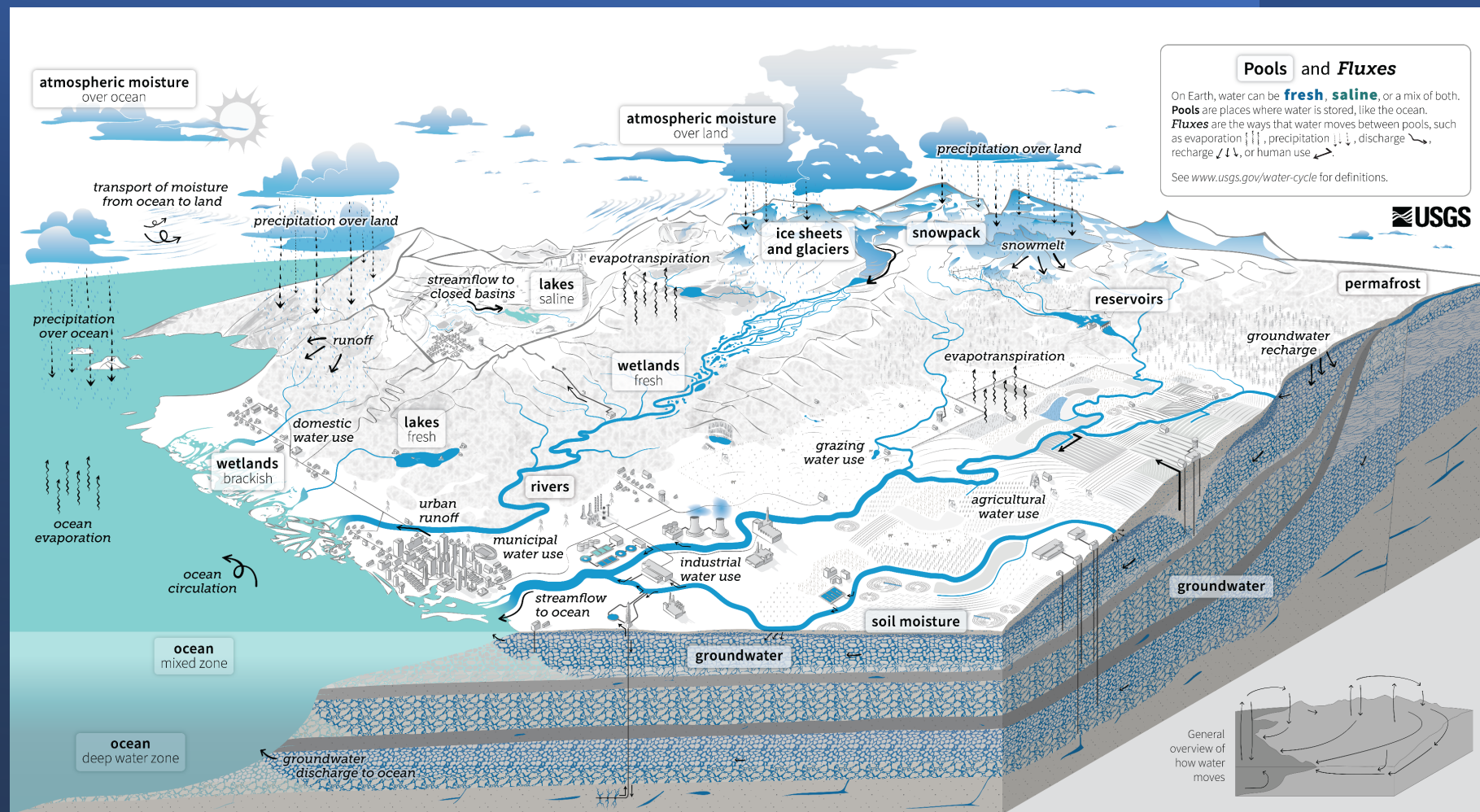
Watersheds 101

Hosted by: *Connecticut Equity and Environmental Justice Advisory Council – March 6, 2025*

**Presented by
*Denise Savageau, Chair, Council on Soil and Water Conservation and
President of the CT Association of Conservation Districts***

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- A satellite image of Earth, showing the Middle East, the Mediterranean Sea, and the Red Sea. The image is darkened to serve as a background for text.
- Earth is known as the water planet
 - Over 75% of the Earth's surface is water, 70% is ocean
 - More than 97% of the water is in salty oceans and seas
 - 2% is frozen in glaciers
 - Less than 1% is fresh water found in rivers, lakes, streams, and aquifers



The Water Cycle

The water cycle describes where water is on Earth and how it moves. Water is stored in the atmosphere, on the land surface, and below the ground. It can be a liquid, a solid, or a gas. Liquid water can be fresh, saline (salty), or a mix (brackish). Water moves between the places it is stored. Water moves at large scales and at very small scales. Water moves naturally and because of human actions. Human water use affects where water is stored, how it moves, and how clean it is.

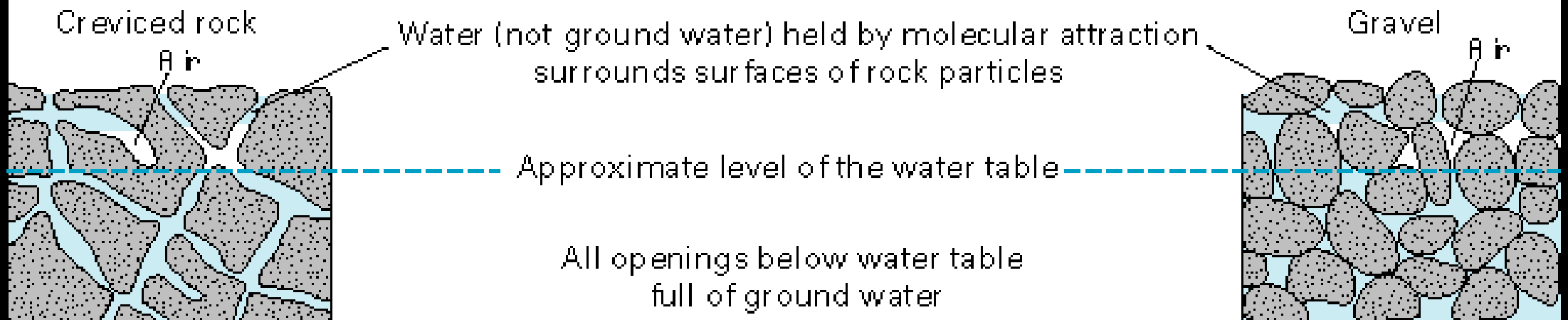
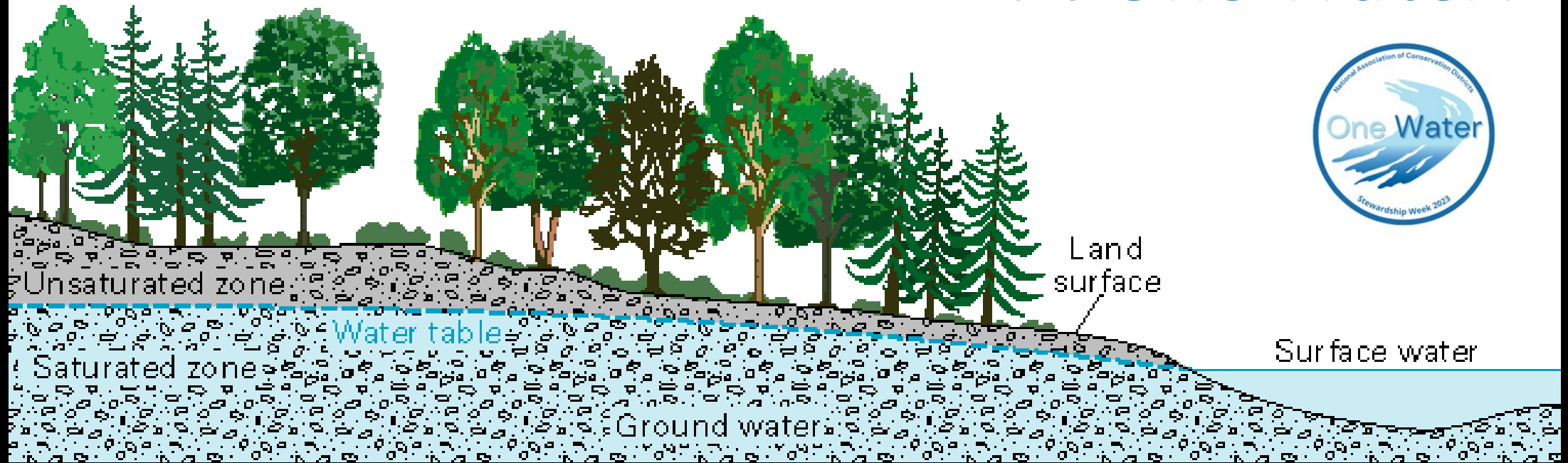
Pools store water. 96% of all water is stored in **oceans** and is saline. On land, saline water is stored in **saline lakes**. Fresh water is stored in liquid form in **freshwater lakes**, artificial **reservoirs**, **rivers**, and **wetlands**. Water is stored in solid, frozen form in **ice sheets** and **glaciers**, and in **snowpack** at high elevations or near the Earth's poles. Water vapor is a gas and is stored as **atmospheric moisture** over the ocean and land. In the soil, frozen water is stored as **permafrost** and liquid water is stored as **soil moisture**. Deeper below ground, liquid water is stored as **groundwater** in aquifers, within cracks and pores in the rock.

Fluxes move water between pools. As it moves, water can change form between liquid, solid, and gas. **Circulation** mixes water in the oceans and transports water vapor in the atmosphere. Water moves between the atmosphere and the surface through **evaporation**, **evapotranspiration**, and **precipitation**. Water moves across the surface through **snowmelt**, **runoff**, and **streamflow**. Water moves into the ground through infiltration and **groundwater recharge**. Underground, groundwater flows within aquifers. It can return to the surface through natural **groundwater discharge** into rivers, the ocean, and from **springs**.

We alter the water cycle. We redirect rivers. We build dams to store water. We drain water from wetlands for development. We use water from rivers, lakes, reservoirs, and groundwater aquifers. We use that water to supply our **homes and communities**. We use it for **agricultural** irrigation and **grazing** livestock. We use it in **industrial** activities like thermoelectric power generation, mining, and aquaculture. The amount of water that is available depends on how much water is in each pool (water quantity). It also depends on when and how fast water moves (water timing), how much water we use (water use), and how clean the water is (water quality).

We affect **water quality**. In agricultural and urban areas, irrigation and precipitation wash fertilizers and pesticides into rivers and groundwater. Power plants and factories return heated and contaminated water to rivers. Runoff carries chemicals, sediment, and sewage into rivers and lakes. Downstream from these sources, contaminated water can cause harmful algal blooms, spread diseases, and harm habitats. **Climate change** is affecting the water cycle. It is affecting water quality, quantity, timing, and use. It is causing ocean acidification, sea level rise, and more extreme weather. By understanding these impacts, we can work toward using water sustainably.

It is *One Water*!





Connecticut is a state rich in water resources.

According to the CT Dept of Energy and Environmental Protection, within the State's borders there are approximately

450,000 acres of wetlands,

6,000 miles of streams and rivers,

over 2,000 lakes and reservoirs, and

600 square miles of estuarine water in Long Island Sound.



A watershed (aka drainage basin) is an area of land that drains to a common area. This is usually a body of water such as a river, lake or ocean. When the land area within a watershed gets precipitation, the runoff drains to that common water body.

Watersheds are the lifeblood of the water bodies they drain to such as Long Island Sound. The health of the receiving water body is determined by the health of the watershed and the land within its boundaries.

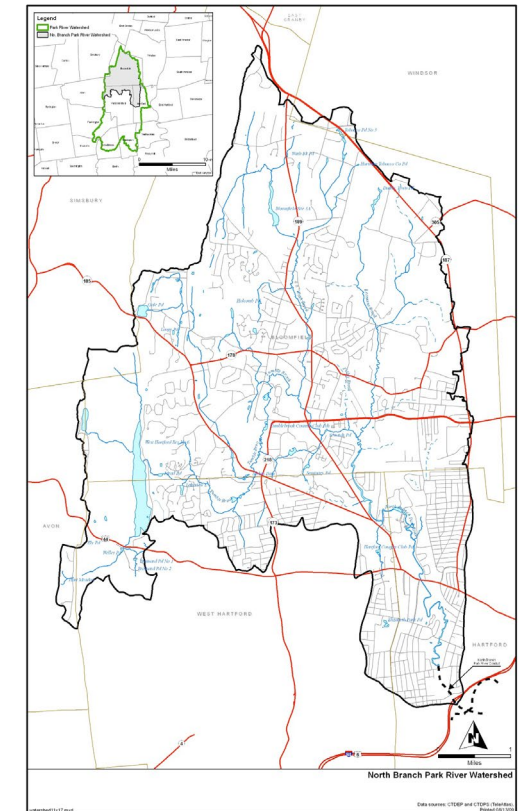
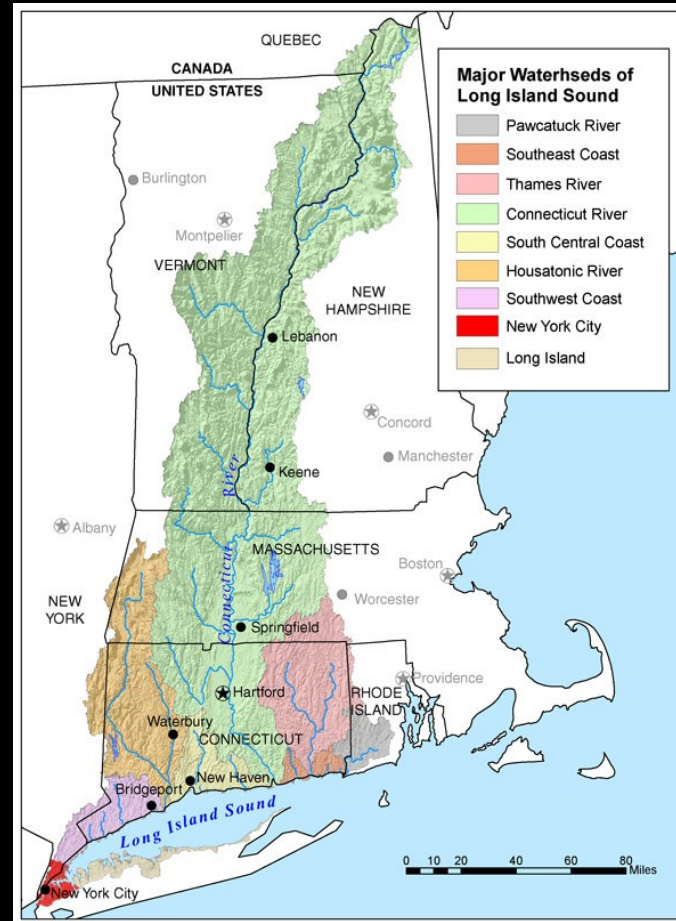
Water resource planning and management is often done at the watershed level.

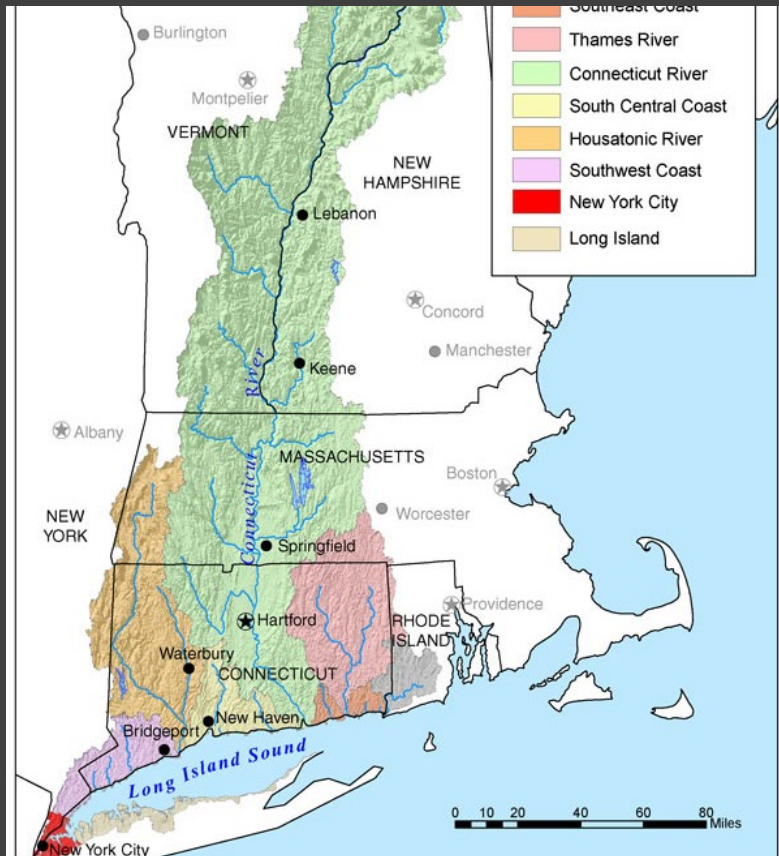
**Watersheds can be very large
such as the Long Island Sound
Watershed that starts in
Canada and ends in Long
Island Sound ...**

**... for small like the Park River
Watershed in Hartford, CT**

**To better understand
watersheds UConn has a great
story map on the Long Island
Sound Watershed and it's
smaller subwatersheds**

<https://storymaps.arcgis.com/stories/1d4b55a254524c34a458ff7384de8028>





Connecticut River after Storm Irene resulted in major flooding in Vermont and Massachusetts and a sediment plume entering Long Island Sound

Watershed Management

Uses drainage areas rather than political boundaries for planning and management

Balances conservation and development needs of the community

Coordinates land use planning and management between state and local governments in the watershed

Uses long range planning to protect resources for future generations

Engages local community members in planning and implementation

Watershed management deals with the impacts of land use including:



Conversion of natural lands to impervious areas

Degradation of soils and forestland across the landscape

Loss of wetlands and riparian vegetation

Channelization of streams

Increases in stormwater runoff; quantity and quality


Reduction of infiltration

Nutrient and toxic pollutant loading

Septic system failures

All within the context of climate change and loss of biodiversity





Watershed Management employs best land use practices to protect natural lands and the ecosystem services they provide to ensure clean abundant water.

No Net Loss of Forest

Land Preservation

Riparian and Inland Wetlands Protection

Minimize Impervious Cover

Nonpoint Source Pollution Control

Distributed Energy Generation

The best and most cost-efficient way to protect water resources, including drinking water supplies, local streams, and Long Island Sound, is to protect the land in the watershed.

At Home

- Less lawn, more garden and natural areas – native plants
- Eliminate fertilize and chemical inputs on lawns
- Practice outdoor water conservation
- Leave lawn clippings and mulch in leaves to improve soil health and water filtration and infiltration.
- Good Housekeeping – properly handling chemicals and waste

Towns

- Promote low impact development
- Wetland and riparian zone protection
- Implement BMPs for stormwater management
- Low impact landscaping with native plants
- Less curbing, more infiltration
- Open space protection
- Good Housekeeping – including maintenance of storm drains

Businesses

- Good Housekeeping – keep dumpster area free of litter
- Low impact landscaping with native plants
- Practice outdoor water conservation
- Restoring/maintain riparian buffers
- Maintenance of stormwater infrastructure

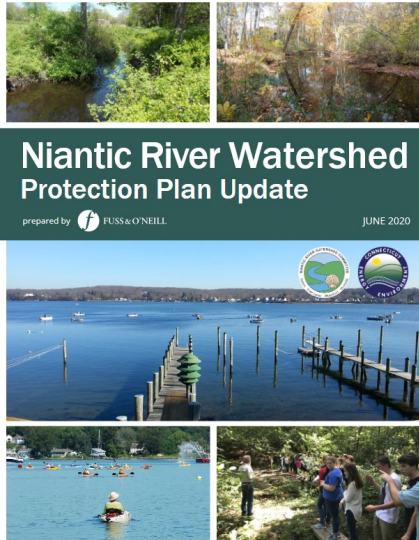
Communities

- Supporting the town's stormwater management programs
- Promoting community forests
- Protecting open space
- Supporting Good Housekeeping by the town (e.g. storm basin cleaning)
- Participating in Plan of Conservation and Development and other town planning processes
- Supporting environmental education

NORTH BRANCH PARK RIVER WATERSHED MANAGEMENT PLAN

ABOUT **COMMUNITY** MAPS PROCESS GREEN INFRASTRUCTURE PROJECTS 2024 PLAN UPDATE

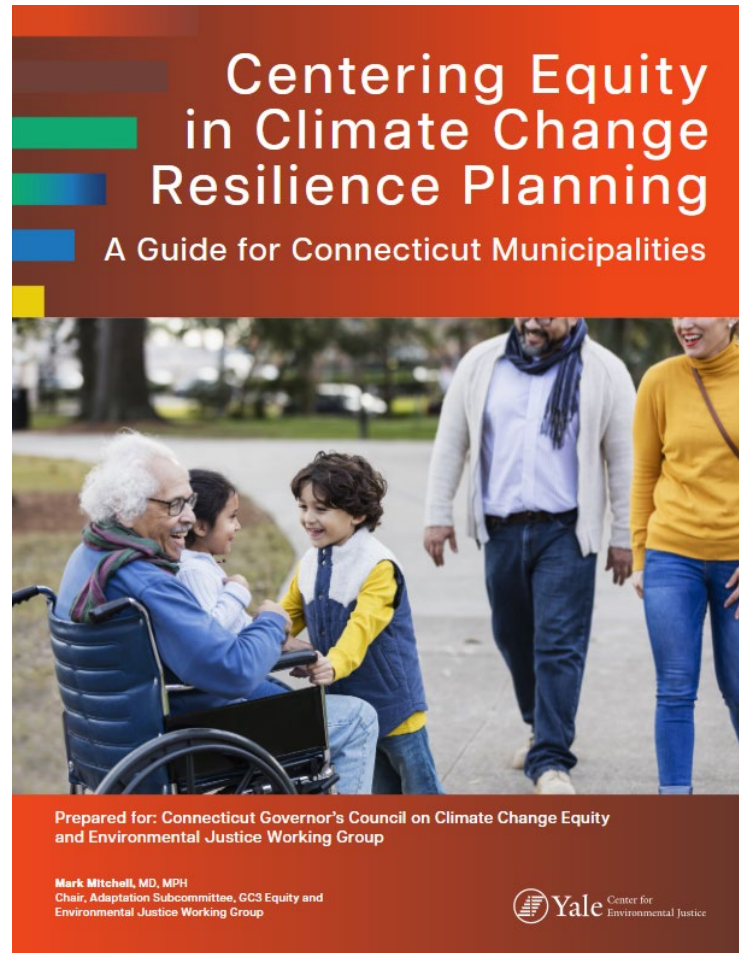
Project Advisory Committee Project Partners Outreach and Engagement [SIGN UP FOR EMAIL UPDATES](#)



Watershed Planning Involves the Entire Community – including our EJ communities

Community engagement should:

- Reconnect communities to water resources establishing a “Sense of Place”
- Involve community leaders/groups to facilitate community engagement efforts
- Be inclusive from the start of the planning process listening to community needs and interests
- Clearly define roles of everyone involved in the watershed planning process
- Provide for exchange of placed based information/knowledge that flows both ways



Links on DEEP Website to Participation Documents

<https://portal.ct.gov/deep/climate-change/gc3/public-participation-documents>

Equitable Climate Action/Watershed Planning Is:

Relationship-Oriented: Treat the process as "living," meaning it is a moment within our long-term future with climate change and the relationships established with stakeholders are ongoing.

Community-Led: Leadership teams should center representatives from groups most affected by climate change. Knowledge will be co-developed with the community through joint-fact finding of latest science as well as the knowledge of lived experiences.

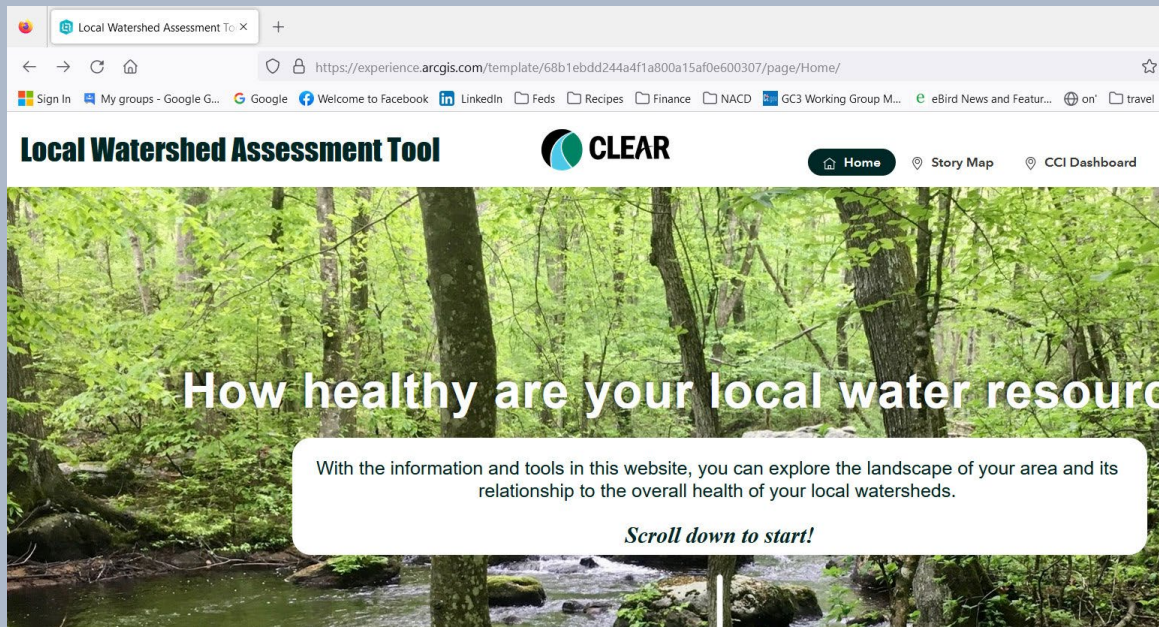
Compensation-Based: Compensate people for their time and support community-led organizations within the process.

Driven by Meaningful Participation: Plan for barriers to participation and allot abundant time to practice listening and incorporating input. Be open to and welcome changes to the plan based off of community feedback.

Designed to Address History: Be honest about how planning and local government decisions of the past have created challenges including systemic racism, environmental injustice, and climate injustice.

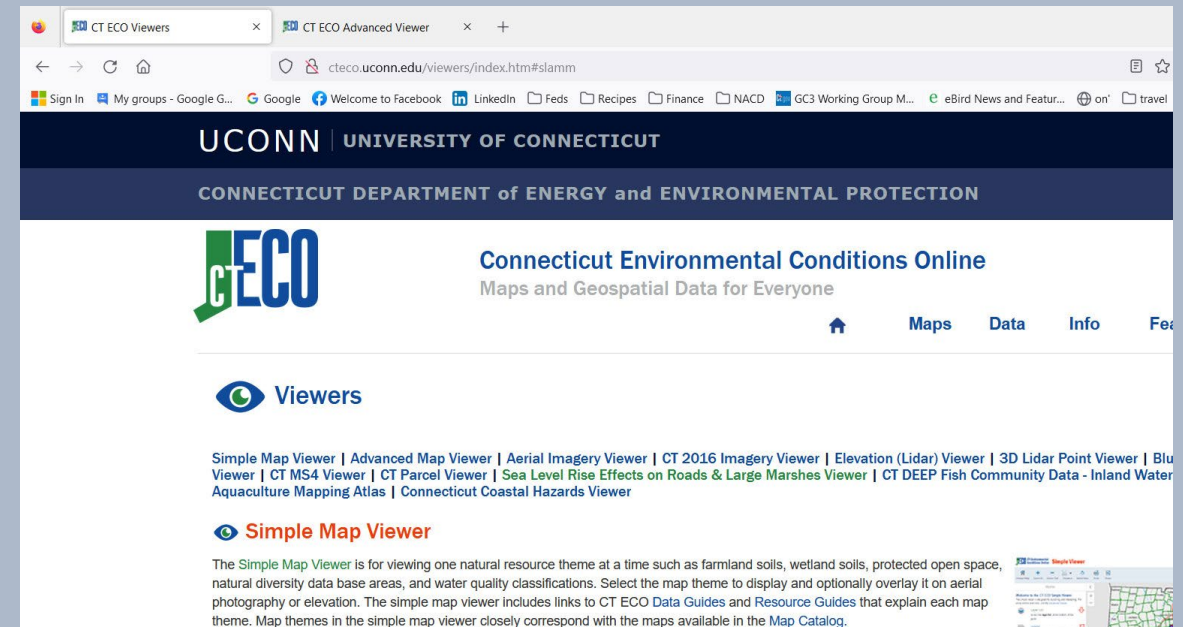
New tools are available for local governments for assessing watershed health and looking at real-time flood and drought conditions. These can be used for better planning and management, including emergency preparedness, by town planners, land use officials, and community leaders.

Local Watershed Assessment Tool – UConn Clear



<https://experience.arcgis.com/template/68b1ebdd244a4f1a800a15af0e600307/page/Home/?org=UConnCLEAR>

CT ECO Online Mapping – UConn and CT DEEP



<http://cteco.uconn.edu/viewers/index.htm#slamm>

Funding Opportunities for Watershed Planning

- EPA 319 program – through CT DEEP

<https://portal.ct.gov/deep/business-and-financial-assistance/grants-financial-assistance/clean-water-act-section-319-nonpoint-source-grants>

- EPA Long Island Sound Partnership

<https://longislandsoundstudy.net/about/grants/>

For more info on DEEP Funding Opportunities

<https://portal.ct.gov/deep/business-and-financial-assistance/grants-financial-assistance/grants-and-financial-assistance>

For more information on water resources and watershed management visit the following websites

Connecticut Conservation District:

<https://www.conservect.org/>

Council on Soil and Water Conservation
at:

<http://www.ctcouncilonsoilandwater.org/>

CT Department of Energy and
Environmental Protection

<https://portal.ct.gov/deep/water/watershed-management/watershed-management>



Questions?

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