Sustainable **W**atershed **I**nitiative **F**or **T**hames River

(SWIFT)

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UAPP 411 - Regional Watershed Management

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Mission Statement

The focus of SWIFT is to dive into the 15-mile-long Thames River in Connecticut to examine the problems that this river experiences and discuss what steps can be taken to foster a collaborative effort that restores and protects the health of the Thames River watershed, ensuring its ecological vitality and sustainable use for generations to come.

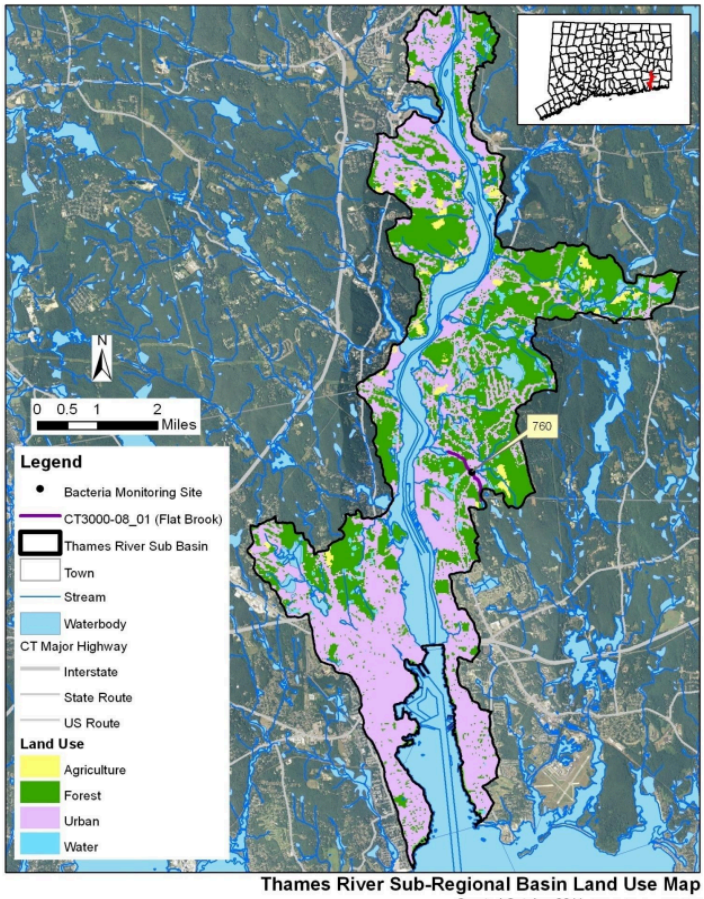
Background

Overview & History

The Thames River is a tidal estuary located in southeastern Connecticut, covering 19,477 acres along 15 miles. With headwaters at the intersection of the Yantic and Shetucket Rivers in Norwich, the river flows south before emptying into the Long Island Sound at the New London Harbor. There is a lot of activity surrounding the Thames River including the COVANTA waste-to-energy facility in Preston, the former DOW Chemical site in Gales Ferry, the U.S. Coast Guard Academy and Fort Trumbull in New London, and General Dynamic Electric Boat and U.S. Naval Submarine Base in Groton.

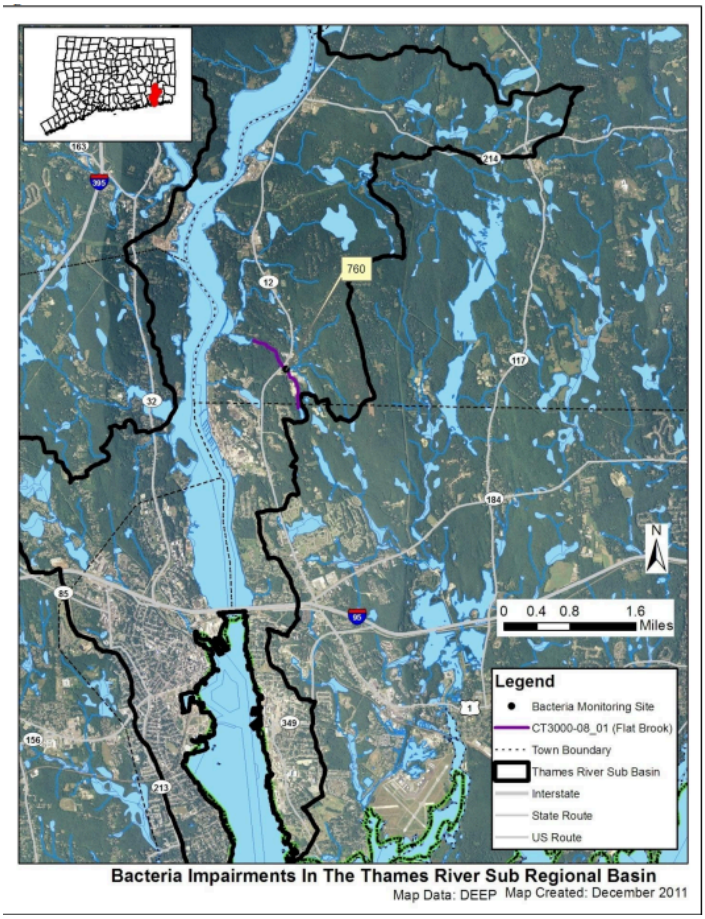
The area surrounding the river was first inhabited by Native American tribes, including the Pequot and Mohegans. They were reliant on the Thames for fishing, agriculture, and transportation. The river was previously named after the Pequot Tribe, before the European settlers arrived in the 17th century. The current namesake came about in the mid-17th century when English settlers colonized the area and likely named it after the river in London. They were drawn to the area due to the fertile land and abundant natural resources, eventually settling in Norwich and New London where they developed trading ports. The Thames River cemented its place in Connecticut's economy through the development of shipyards in the 19th and 20th centuries. The U.S. Navy established a naval submarine base along the river in Groton. At the turn of the century, General Dynamic Electric Boat was created in Groton becoming the largest manufacturer of submarines in the country, and developing into one of Connecticut's largest employers. In the early 2010’s, the Lower Submarine Base was identified as a superfund site due to contamination with PCBs, lead, metals, and pesticides.

The Thames River watershed land use breakdown is approximately 44% urban, 35% forest, 19% water, and 2% agricultural. With such a large percentage of urban usage, which includes the commercial and industrial sectors of the river, the need for environmental regulations becomes critical. There has been an increase in environmental action taken in the past decade to create a more ecologically sustainable Thames River.



Thames River Sub-Regional Basin Land Use Map

Created October 2011 MAP Data: DEEP



Bacteria Impairments In The Thames River Sub Regional Basin

Map Data: DEEP Map Created: December 2011

Policies & Mandates

State Laws:

- **Connecticut Environmental Protection Act**: Establishes a statewide policy for protecting air, water, and other natural resources, including the Thames River.
- **Connecticut River Protection Act**: Protects rivers and their tributaries, including the Thames River, from pollution and degradation.
- **Connecticut Endangered Species Act**: Protects endangered and threatened species within the state, including those that may be found along the Thames River.

Federal Laws:

- **Clean Water Act (CWA)**: Regulates discharges of pollutants into waterways, including the Thames River, and sets water quality standards.
- **Endangered Species Act (ESA)**: Protects endangered and threatened species that inhabit the river and its surrounding areas.
- **National Environmental Policy Act (NEPA)**: Requires federal agencies to consider the environmental impacts of their actions, including projects that may affect the Thames River.
- **Rivers and Harbors Act:** Prohibits the unauthorized obstruction or alteration of navigable waters, which includes the Thames River.

Governance Structure

The Thames River is not governed by one singular person or organization as several different organizations work on different areas of the river. A prominent group that works to develop sustainability plans and to protect the river and surrounding watershed is the Thames River Basin Partnership. A main project of the TRBP is “Improving Soil Health and Water Quality in the Thames River” which provides a plan to target the 2 major things that are vital to keeping a watershed healthy. Another project this group has is “Path to Reduce Pathogens in CT Agricultural Runoff”. This project plays a vital role in working directly with the Thames and working to ensure it is as healthy as possible.

Another organization that works with the river is The Connecticut Department of Energy and Environmental Protection. CT DEEP works to conserve, improve, and protect the natural resources and the environment in Connecticut. CT DEEP works to monitor rivers to get readings on the quality of the water. Some of the results from monitoring the river include water chemistry, water temperature, macroinvertebrate community, fish community, diatom community, and indicator bacteria.

The United States Coast Guard Academy is located in New London, Connecticut along the Thames River. The academy has been here since 1932 after the land was donated by the residents in New London. The United States Coast Guard Research and Development Center is also located in New London. The Research and Development Center is the Coast Guard's main facility that does research, development, tests, and evaluations to support major missions within the Coast Guard. Both the RDC and the Academy will use the Thames River on a frequent basis in order to carry out research, training, and other daily activities/tasks.

The Department of the Navy and the New England District of the Army Corp of Engineers have done work with the Thames River dating back to 1836. The work was also modified in 1879. The most recent work was done in 1942. The work that was performed involved making the river channel deeper and adding several piers. This work allows for a 25 foot deep channel that is approximately 10.5 miles long and ranges east of Mamacoke Cove in New London to the mouth of the Shetucket River in Norwich Connecticut. The channel is 250 feet wide from Mamacoke Cove to Bartlett Crossover. The channel then changes to 200 wide to Nowwich. In 1980, part of the channel was deepened to 36 feet by the Department of the Navy and the Army Corps is responsible for maintaining this portion at 36 feet deep and 250 feet wide as it is required by military and commercial vessel traffic. Other work completed by the Department of the Navy took place in 1940 where the channel opposite of the U.S. Naval Submarine Base was widened from 250 to 350 feet wide. There are also training dikes that were built in the river which help keep sediment from settling at the bottom of the channel. These dikes include the Norwich Dike, Rolling Mill Dike, Trading Cove Dike, and Mohegan Dike running in length from 1,050 feet long to 3, 480 feet long. There was also work done which included the removal of obstructions in the mouth of the Shetucket River. The Army Corp of Engineers continues to work to monitor these channels and ensure they are maintained at their dimensions.

Problems

1) *Elevated Bacteria Levels*

The Thames Flat Brook tributary experiences elevated bacteria levels which impairs recreational activities and prohibits any contact with the water. A septic system North of Flat Brook was observed to have failed and is thought to be a potential cause of the bacteria increase evident in the Thames River. The drainage area in the Flat Brook tributary is considered an MS4 area, meaning there is a high chance of piped storm drainage entering the river. A possible cause of this is an improper connection between the wastewater systems and the stormwater drainage network, creating discharges that carry bacteria and contaminate the water. Since the Thames River flows through residential areas and 44% of the watershed is urban developed land, there is a high chance of polluted runoff entering the river, increasing total bacteria levels. One potential source of bacteria, although a small amount is from the 2% of surrounding land in the watershed occupied by agriculture.

Goal

Make changes to bring the bacteria levels down in the Flat Brook Tributary. To make this happen, the source of the bacteria in the Flat Brook tributary needs to be pinpointed so action can be taken to prevent that source from continuing to contaminate the river which would allow for restoration efforts to take place. While there are potential sources of bacteria that have been identified there has not been a concrete answer on what is the culprit. If the source is pinpointed further action can be taken and policies can be implemented to prevent this problem from occurring in the future and ultimately can improve the overall health of the watershed.

2) Heavy Metal Contamination

The water quality in the Thames River is heavily influenced by the current and past land use practices in the upper watershed region and by stormwater management and run-off issues that occur in communities surrounding the river. The water quality is severely affected by the heavy metals that have been found in the water. There are multiple sources of contamination along the 15-mile stretch of the river. The most northern possible source is the Covanta Energy SECONN incineration plant located on the banks of the river in Preston. This plant takes 240,000 tons of municipal solid waste per year and converts it into energy by burning it. This process releases pollutants into the atmosphere as it is historically known to release lead, cadmium, and mercury. With the river abutting the incineration plant, there is a high probability that these heavy metals will end up in the watershed. Further south on the Thames River is Naval Submarine Base New London. In the 1990s, the lower base stretching into the river was identified as an EPA superfund site due to the high levels of toxic contaminants and heavy metals. Since the beginning of the base operation in the 1800s, chemicals, and materials used in the production and maintenance of

naval submarines were dumped into the river and on the surrounding land. There are currently ongoing efforts to remediate the contaminated land.

Goal

Implement a way to get the sources of pollution to be eliminated and place fines for not following the guidelines. Continuing to fix the land around the river could also be a step in the right direction to reduce the contamination that is in the river. Implementations such as upgrading wastewater treatment facilities, installing riparian buffers and vegetation along the riverbank, and implementing stormwater management practices to filter such pollutants before they reach the river all may be considerable options. Finally, we must put in place monitoring devices from which we can draw data to see as to whether or not our implementations are working. If not, we may return to the drawing board and find other solutions to implement.

3) Impacted fish populations

The Thames has historically supported flourishing fisheries that were important to the Pequot people and other indigenous groups which were critical to the success of the early European colonists. However, the construction of dams in the watershed diminished the reproductive success of anadromous fish by blocking access to upstream spawning areas and altering the flow of the water near main stem hydroelectric plants. As a result, the migratory runs of fish present within the river are negatively impacted. Migratory fish present amongst the Thames include American Shad, Atlantic Salmon, and Shortnose Sturgeon. These fish are born in freshwater which they then migrate out to sea to feed, mature, and grow. From there, they then return to the rivers from which they are born to lay their eggs. Furthermore, water quality has declined as a result of the industrialization process which has led to large oxygen depletion zones and other

water quality issues that severely impacted the fish populations. Improving water quality and efforts to improve fish passage in recent decades have improved the outlook for many of these populations, but recovery is not yet certain.

Goal

Find and implement ways in which we can rehabilitate the migratory runs of the anadromous fish so that the level of reproduction amongst them can return to normal. Particular implementations may include flow modification by adjusting water releases from the dam to help mimic natural flow patterns, fish ladders, fish elevators, or fish tunnels to allow them to easily bypass the dam so that they may return to their spawn location. Also, we must look into solutions listed in our "Heavy Metal Contamination" section that we can put into place so we may reduce contaminants within the water to improve water quality for the present fish populations. Finally, we must put monitoring and research devices in place that will allow us to measure fish populations and water quality within the river so that we can know if our implementations were successful.

Refrences

About Us. CT.gov. (n.d.-a). https://portal.ct.gov/DEEP/About/About-Us

Butler, M. (n.d.). Accumulation and transport of nutrient and pollutant elements in riparian soils, sediments, and river waters across the Thames River Watershed, Connecticut, US.

Chemical cleanup at sub base nearly done. CT.gov. (n.d.). https://portal.ct.gov/OMA/In-the-News/2012-News/Chemical-Cleanup-At-Sub-Base-Nearly-Done

Coast Guard underway in Thames River. DVIDS. (n.d.). https://www.dvidshub.net/image/4811293/coast-guard-underway-thames-river

Environmental Protection Agency. (2017, October 20). New London Submarine Base Site Profile. EPA. https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.cleanup&id=0100261

Home. New England District. (n.d.). https://www.nae.usace.army.mil/Missions/Civil-Works/Navigation/Connecticut/Thames-River/

Migratory fish: Connecticut river conservancy. ctriver.org. (n.d.). https://www.ctriver.org/migratory-fish

Moser, E. (n.d.). Thames River users share successes and concerns of waterway navigation. https://www.theday.com/local-news/20221014/thames-river-users-share-successes-and-concerns-of-waterway-navigation/

Noble, W. (2021, November 8). *Did you know the USA has a thames too?*. Londonist. https://londonist.com/london/features/thames-river-connecticut-london

Partners in action quarterly report. (n.d.). https://thamesriverbasinpartnership.org/wp-content/uploads/2022/07/PartnersInAction-Spring-2022.pdf

Person. (2022, December 21). *Thames River Explorations - Digital Stewardship (TREDS)*. ArcGIS StoryMaps. https://storymaps.arcgis.com/stories/fdce9004ca8b44b8917c1dbb68457331

River and Stream Water Monitoring. CT.gov. (n.d.-c).
https://portal.ct.gov/DEEP/Water/Inland-Water-Monitoring/River-and-Stream-Water-Quality-Monitoring

Thames River Watershed Summary - Flat Brook. (n.d.-b).
https://portal.ct.gov/-/media/DEEP/water/tmdl/CTFinalTMDL/thamesflatbrook3000