

**TREDS Final Project: New London Lighthouse Beaches**

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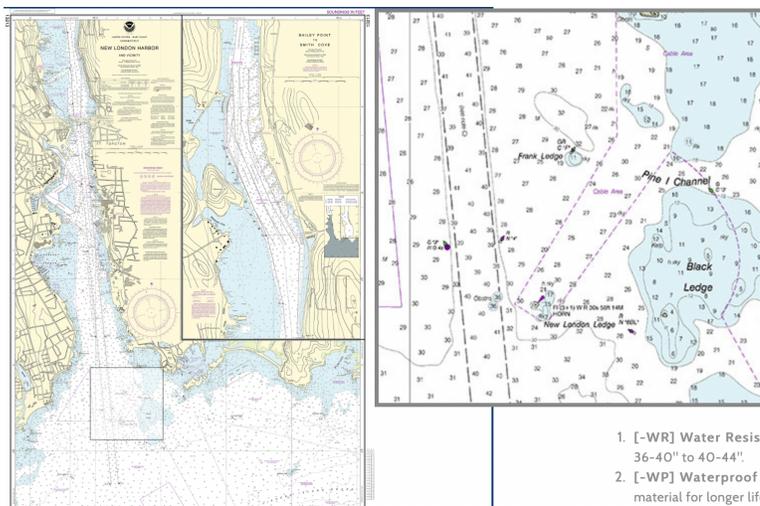
MARN/MAST 1001E

Prof. Syma Ebbin

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**Question One: Location and Map of Site:** Co-ordinates: 41 18 18 N 72 04 42 W

New London Harbor “Ledgelight” Lighthouse is located at the mouth of New London Harbor in the Thames River. The lighthouse was constructed in 1909 and consists of brick and granite. Below is a chart of the New London Harbor showing the exact location of “*New London Ledge*” just southwest of “*Black Ledge*.” The lighthouse is over 50 feet tall and is audible meaning it has a horn. The lighthouse is marked red with white trim and is characteristic of having three white flashes followed by a single red flash every thirty seconds as listed on the chart. The light became automated in 1987 and the lighthouse is maintained by the New London Ledge Lighthouse Foundation. The lighthouse was placed in this location to mark rocks which were previously marked by four buoys in 1794. In 1845, 1854, 1865, and 1890 requests were put in for a lighthouse in this location until one was finally erected in the early twentieth century. In addition to this location, water was also studied nearby at beaches including Osprey Beach, Pequot Point Beach, as well as the beach along Pequot Ave. just north of the lighthouse.



(Link to Chart)

<https://www.landfallnavigation.com/noaa-nautical-chart-13213-new-london-harbor-and-vicinity-bailey-point-to-smith-cove.html>.

**Question 2: Summary of Data Collected:**

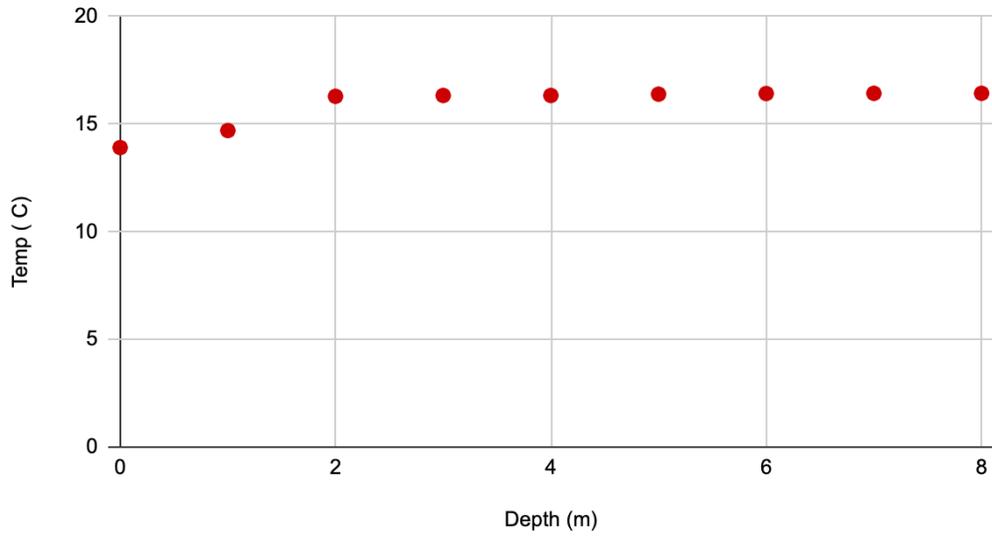
**New London Harbour Light**

**Date: November 4th, 2021 - Temperature: ~ 31 - 52 C**

<b>Depth (m)</b>	<b>Temp: ( C)</b>	<b>Salinity (ppt)</b>	<b>D.O. Sat. (%)</b>	<b>D.O. (mg/L)</b>
<b>Surface</b>	<b>13.91</b>	<b>22.79</b>	<b>93.8</b>	<b>8.38</b>
<b>1</b>	<b>14.70</b>	<b>25.3</b>	<b>90.7</b>	<b>7.27</b>
<b>2</b>	<b>16.29</b>	<b>30.57</b>	<b>89.4</b>	<b>7.27</b>
<b>3</b>	<b>16.33</b>	<b>30.72</b>	<b>90.1</b>	<b>7.33</b>
<b>4</b>	<b>16.33</b>	<b>30.73</b>	<b>90.3</b>	<b>7.34</b>
<b>5</b>	<b>16.39</b>	<b>30.92</b>	<b>89.3</b>	<b>7.20</b>
<b>6</b>	<b>16.42</b>	<b>30.96</b>	<b>88.7</b>	<b>7.23</b>
<b>7</b>	<b>16.43</b>	<b>30.97</b>	<b>90.1</b>	<b>7.31</b>
<b>8</b>	<b>16.43</b>	<b>30.97</b>	<b>89.6</b>	<b>7.28</b>

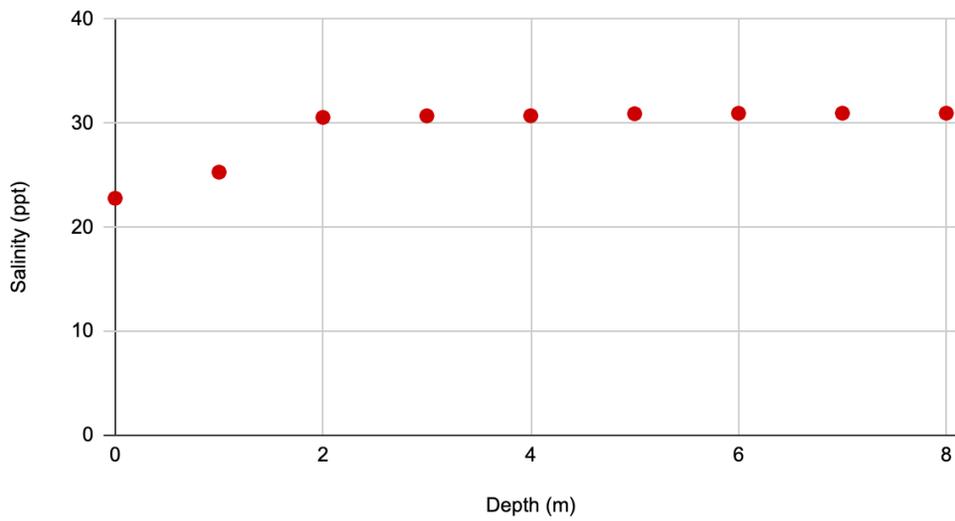
## Temperature vs Depth

Temp ( C ) vs Depth ( m)



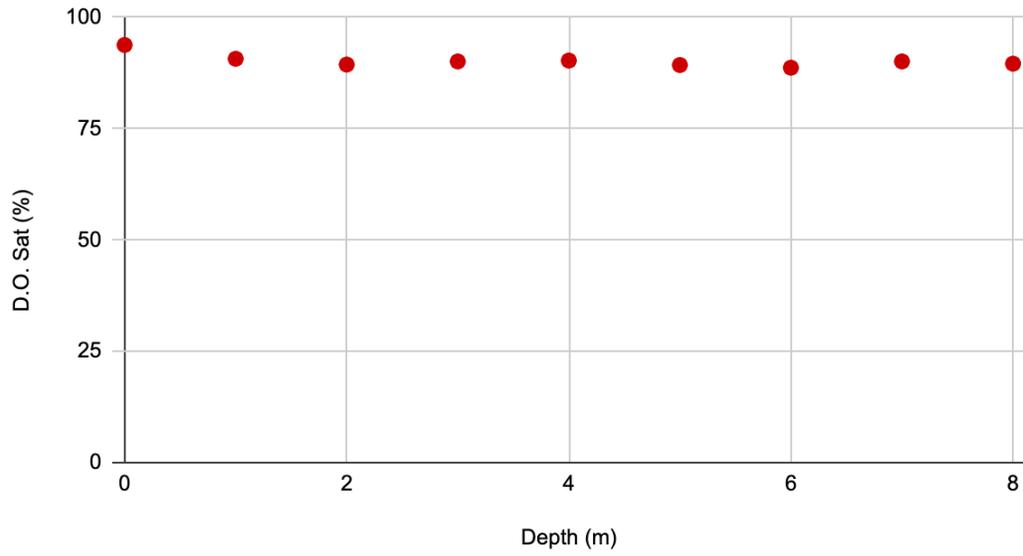
## Salinity (ppt) vs Depth (m)

Salinity (ppt) vs Depth



## Dissolved Oxygen Saturation (%) vs Depth (m)

D.O. Sat. (%) vs Depth

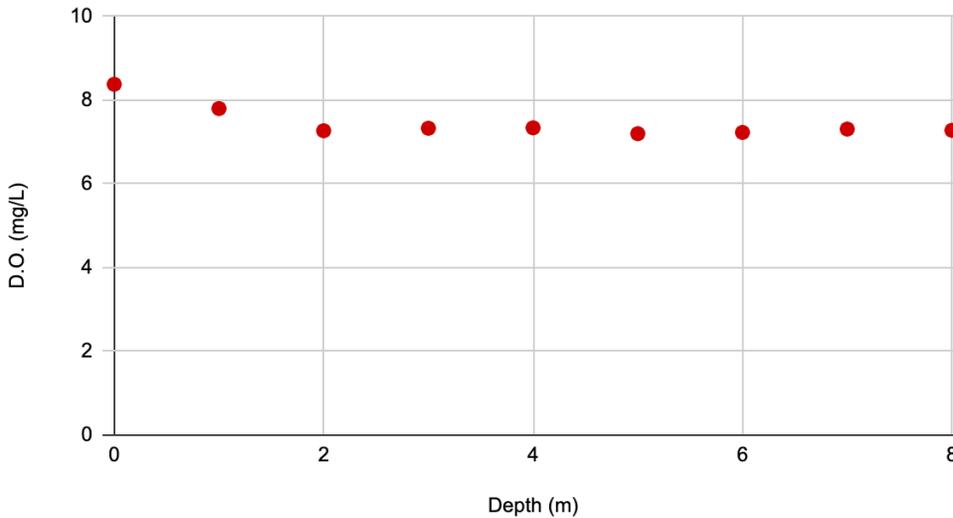


## Dissolved Oxygen ( mg/L) vs Depth (m)

According to the Save the Sound calculations, dissolved oxygen in the ocean is at a healthy state if the amount is between 5-14 mg/L. 3-5 mg/L is considered stressful and 0-3 mg/L is lethal.

New London Harbour Light has about an average of 7.4 mg/L of D.O. which is healthy!

Depth (m) vs. D.O. (mg/L)



## Nitrate Concentration in New London Harbour Light from the Top/ Surface Level

Sample	Colorimeter Reading	Multiple by 4.4	NO <sub>3</sub> - Concentration (mg/L)
Top	0.01	X 4.4	0.044
Top	0.01	X 4.4	0
Top	0.01	X 4.4	0.044

- After performing 3 different colorimeter reading trials for accuracy, the surface level had an average of 0.30 mg/L of nitrate concentration.
- The nitrate concentration is below 0.5 which is considered to be normal.

## Phosphate Concentration in New London Harbour Light

The phosphate concentration level is normal.

Sample	Colorimeter Reading = PO4 Conc. (mg/L)
Top	.12
Top	.06
Top	.11

## Sediment Analysis at NL Harbour Light: Type of Sampler: Gravity Core

	Odor	Sediment Size	Color
Top:	Odorless	Silt	Dark Olive
Middle:	Light Salt Smell	Silt	Light Grey
Bottom:	Light Salt Smell	Clay	Dark Grey

## Coliforms New London: 68 total



### **Question 3: Ej reports neighborhoods at risk:**

Using the data collected on the Project O cruises along with the EPA EJScreen, Neighborhoods at Risk, I have found some environmental justice that was concerning. The data had shown that the more depth of the surface increased, the more temperature had increased and the salinity increased as well, compared to D.O salinity it decreases each time the temperature is high and that happened in the New London harbor light. Neighborhood at risk researches had shown that in 2019 that people of color are about 29.6% that are there in the new London county and families that are in poverty are about 8.7% and people that are without health insurance which is a high percentage in that county. It also showed that families with poverty and families with children in poverty is about 1,044 in New London county but it's about 79 thousands in the U.S. in total that has been determined in 2019 and most of them need help in shelter and health insurance and jobs and they need environmental justice. It has been stated that Black people are exposed to greater danger and racism and every form of pollution because of the color face more exposure to every source but white people are less exposed to any type of danger or to any type of pollution. New London county has the largest percentage and share of the single mothers families that are suffering from poverty which is about 13.1%.

### **Question 4: Location hazards and potential risks (RG)**

New London lighthouse beaches are very vast and open with the surrounding area being heavily confined with houses and lighthouses within the adjacent as well. The amenities include restaurants, houses and private/public beaches. In terms of environmental hazards, the only major ones that could impact the water and the surrounding areas are restaurants and the waste that accompanies those restaurants, such as the access oil being potentially dumped into the water,

also table scraps also being dumped into the water could affect the organisms that are in their own habitats, it could incentivise the fish to think that food is handed to them and they do not need to find their own anymore which could lead to a dependency that disrupts the flow of the ecosystem only if that restaurant stops feeding them. Prior to what the land masses and the beaches looked like, they were all just beaches with lots of woods and trees that housed wildlife, the lighthouses however some were still there, and the new london lighthouse has been around a very long time. As time went on the water near the beaches rose and weathering took place, weathering rocks and the land masses making them smaller and more rigid. Most of the beaches near the lighthouse adject are residential high income to medium income housing right on the water, and most of the daily occurrences are residential sided which could mean that some of the liquids and solids from humans can be dumped or misplaced into the water such as plastic and wastes that are not supposed to he in the water, influencing higher numbers within the waters chemical makeup, and lower numbers within the population of wildlife living in those waters as well. The demographic seems to be high to medium income families, the beach houses are not cheap by any means, and there are many of them lined up one by one lining the beaches, as I said before this could be a potentially hazardous issue for the wildlife as humans aren't really mindful creatures, and climate change/global warming is being caused by them, which is an indication that the waters they live by may not be as glamorous on the surface as in the water itself.

#### **Question 5: New Questions and Future Data**

Although the recorded data and results help us understand what is going on around the New London Lighthouse House Beaches, new questions and data will be needed to understand these results more and more. A new question or comparison that should be investigated based on the research presented is how the data of the New London Lighthouse Beaches' water is compared

to other parts of the Thames River. Is the temperature consistent throughout other parts of the Thames River or different? The way we would be able to collect this data is by measuring the temperature by a depth of 1 meter per measurement of other parts of the Thames River and comparing it to the results of the New London Lighthouse Beaches. Just like temperature; salinity, dissolved oxygen saturation, and dissolved oxygen could all be measured throughout the Thames River and compared to the current data of the New London Lighthouse Beaches. Comparing the data of the New London Lighthouse Beaches to Winthrop Cove, Eastern Point Beach, and Electric Boat would allow us to dive deeper into the data and see certain trends and differences between all of these. Another question that could be investigated to build on these results is: What is causing there to be higher temperatures and higher salinity in the New London Lighthouse Beaches. Usually, this data wouldn't make sense. Usually the deeper the water, the colder the temperature. As well, if temperature increases, salinity should decrease because the water is less dense in warmer temperatures. The data that was recorded tells us that the warmer the temperature, the higher the salinity. To answer this question and build on these results, data that could be collected is new trials. To make sure the data is correct, there would need to be more trials in order to show consistency in the data. This is because one always wants to make sure that the data is correct before taking it as true and solidified data. And if the data becomes solid and true, what is causing this odd data? Is it the particular weather and rainfall that is causing this?

### **Question 6: Action Project**

Local communities in New London can have a big impact on the many beaches found in the lighthouse point area but many of the beaches in this area are inaccessible to the general public and cost a good chunk of money to be a member of. Guthrie Beach is a members only

private beach that has a one-time fee of \$10,000 and a \$500/year membership fee. Osprey Beach is another member only club that costs \$600/year. To be granted membership to these private beaches you must know another member to get in. Mitchell college is another semi-private beach that is only accessible to current students, staff, and alumni. Pequot Point Beach is now considered a public beach but was once private. The private beaches are quite expensive and not everyone has the money to pay to be a member. This also means that they are protected from public abuse and remain upkeep because people are willing to pay to go to a nicer, cleaner beach. One way to improve the conditions for the local community would be to schedule community beach debris clean ups on a regular basis to prevent marine pollution. This would most likely benefit the beaches in the area because it allows the whole community to get involved in removing trash from the local coastlines and therefore keeps the water safe from pollution. Another way to improve conditions of these beaches is to get a group of volunteers to participate in a beach habitat restoration (based on the wildlife occupying the beach) or a water quality testing to monitor the environment that the beach provides. Probably the biggest way to improve the conditions of these beaches is to establish protection laws for the streams of the watershed. For example, a lot of the pollutants on the private beaches in this area most likely come from the Thames River watershed. If more laws and policies were established in the watershed it would benefit the quality of the beaches because they would become less polluted. In a similar way, the beaches themselves could also benefit from policies that control stormwater runoff (example: the sewers that have signs that say they dump into long island sound). If there were policies put in place to control the stormwater runoff within the community, then the beaches would greatly benefit from it because they would become even less polluted. All these actions would greatly

improve the conditions of the beaches in this area and should be considered by both the private beach clubs as well as the DEEP and state officials.

## References

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