

MICROORGANISMS: THE FOUNDATION OF AQUATIC ECOSYSTEMS IN A NORTHWEST U. S. CITY'S PARKS: A SNAPSHOT OF THE INVISIBLE WORLD. PART 1: INTRODUCTION, LOCATIONS AND METHODS AND MATERIALS.

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INTRODUCTION: Edmonds is a small city in the state of Washington in the U.S. Pacific Northwest at 47° 48' 25" N, 122° 20' 48" W. It is situated on Puget Sound north of the large metropolitan area of Seattle. The city has a fairly extensive semi-natural collection of parks, mostly second growth forests, portions of an old estuary and beaches along the Sound. We became interested in examining the microscopic fauna and flora of the area, but because of our own physical and temporal limitations we decided to select four locations for snapshot samples in May and June of 2021. Those that we eventually chose were a salt water site, the Fishing Pier on Puget Sound, and three freshwater systems located in Pine Ridge Park (Goodhope Pond), Edmonds Marsh, and Willow Creek. As the subject is huge, even in such restricted areas, there was no intention for any sort of complete survey, but we hope to provide an introduction to the environmental foundation for these areas and to emphasize their importance for the maintenance of these aquatic ecosystems.

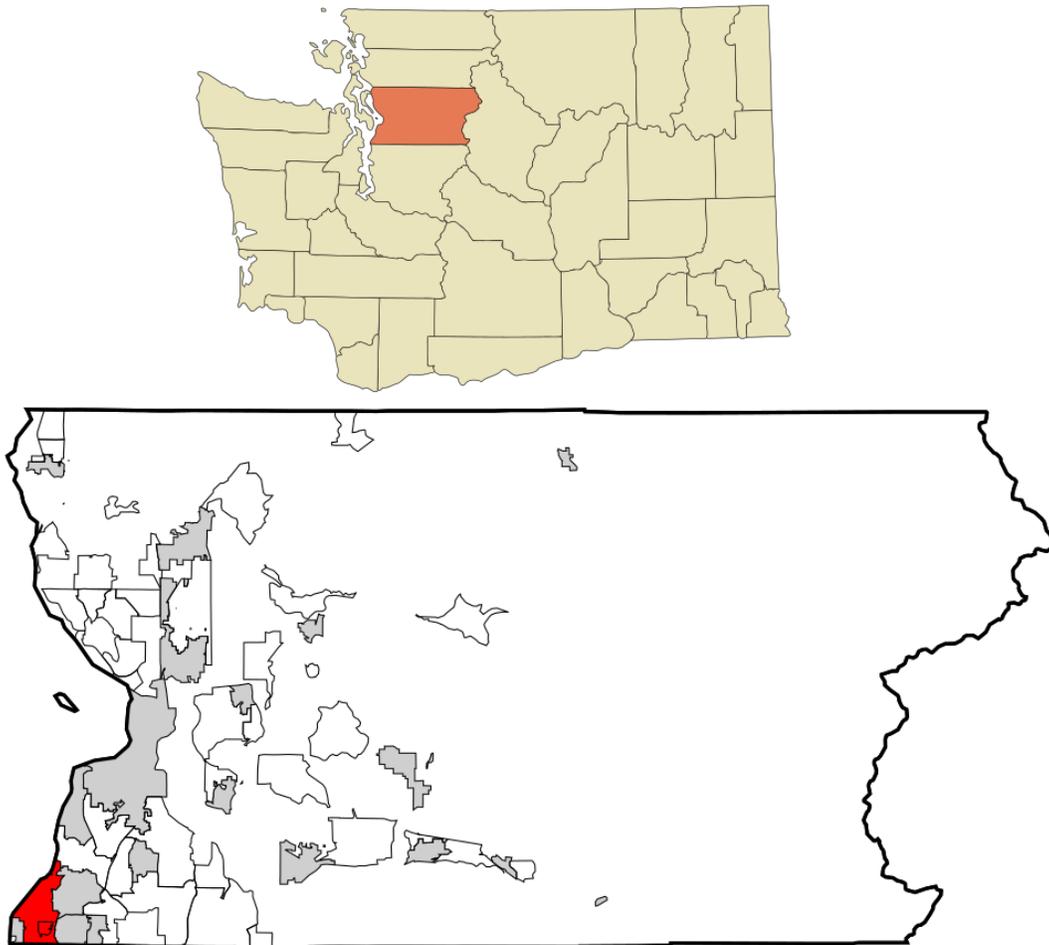


Figure 1. Snohomish County position in Washington State and location of City of Edmonds.  
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**SAMPLE SITES:** The preliminary sites sampled by Richman included Goodhope Pond on Pine Ridge Park, beach north of Brackett's Landing and a puddle next to Willow Creek, caused by overflow from the Willow Creek Hatchery, Of these only Goodhope Pond was selected as a final sample site. The Brackett's Landing site proved difficult to sample with a plankton net and the puddle at Willow Creek dried up when the salmon pond was drained. Our final sample sites were both relatively easy to reach and promising, The Fishing Pier at Edmonds was our only saltwater site, but was very easy to sample using a plankton net off the west edge of the pier. Tiffany did the sampling here on both sample dates and obtained a very concentrated sample that actually had to be diluted for study. The Edmonds Marsh was our second site and here we chose a site recommended by Joe Scordino at the inflow from the pipe under Highway 104. The reason for this selection was the fact that reaching water levels anywhere else in the Marsh was both somewhat dangerous and disturbing to the Marsh itself. Samples were taken with the mosquito larva dipper by Richman both times. Willow Creek, our third sample site, flows into the Marsh on the SE side and was easily reached from a trail at Willow Creek Hatchery. The First sample was taken by Tiffany and the second by Richman. The fourth, and final sample was at Goodhope Pond in Pine Ridge Park. This was a little more challenging because the pond was slowly receding and by early August had completely dried up. Richman took both samples there. These were to prove the most productive of our freshwater samples.

**METHODS AND MATERIALS:** Richman made a few preliminary samples in April, 2021, and the final sites were selected for two snapshot samples on the 12<sup>th</sup> of May and 26<sup>th</sup> of June of this year. The saltwater site was sampled using a standard plankton net with 55 µm mesh dragged off the pier and the rest were sampled using a mosquito larval dipper with a 1.5 meter handle. In both methods we have a qualitative sample rather than a quantitative one. We took physical readings of the water during the May sample using a YSI Professional Plus Multiparameter Instrument data logger. We both used OMAX trinocular compound microscopes (binocular for viewing with attached electronic camera) to examine subsamples on microscope slides. Most photos were taken at 400X. Both of us took part of each sample and examined them separately. We examined subsamples of all the samples and photographed as many of the microorganisms encountered as we could. Identifications were made using standard references and Internet sites. We did the best we could to get most organisms identified at least to genus.



Figure 2. Fishing Pier on May 12, 2021. Photo by Mary Tiffany.



Figure 3. Edmonds Marsh at drain, May 12, 2021. Photo by Mary Tiffany.



Figure 4. Willow Creek, May 12, 2021. Photo by Mary Tiffany.



Figure 5. Goodhope Pond, May 12, 2021. Photo by Mary Tiffany.



Figure 6. Goodhope Pond, August 19, 2021. Photo by D. Richman.

Table 1. Physical Attributes for the sites taken May 12, 2021.

Site	Salinity	pH	Temperature
Fishing Pier	27.75 ppt	8.14	11.72 C
Edmonds Marsh	0.13 ppt	7.82	12.50 C
Willow Creek	0.12 ppt	7.95	11.67 C
Goodhope Pond	0.04 ppt	6.65	17.67 C

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Comments to the two authors welcomed via David Richman, email – tithonia65 AT gmail DOT com.

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