

Environmental Observatory for the bay of Sept-Îles

WATER QUALITY

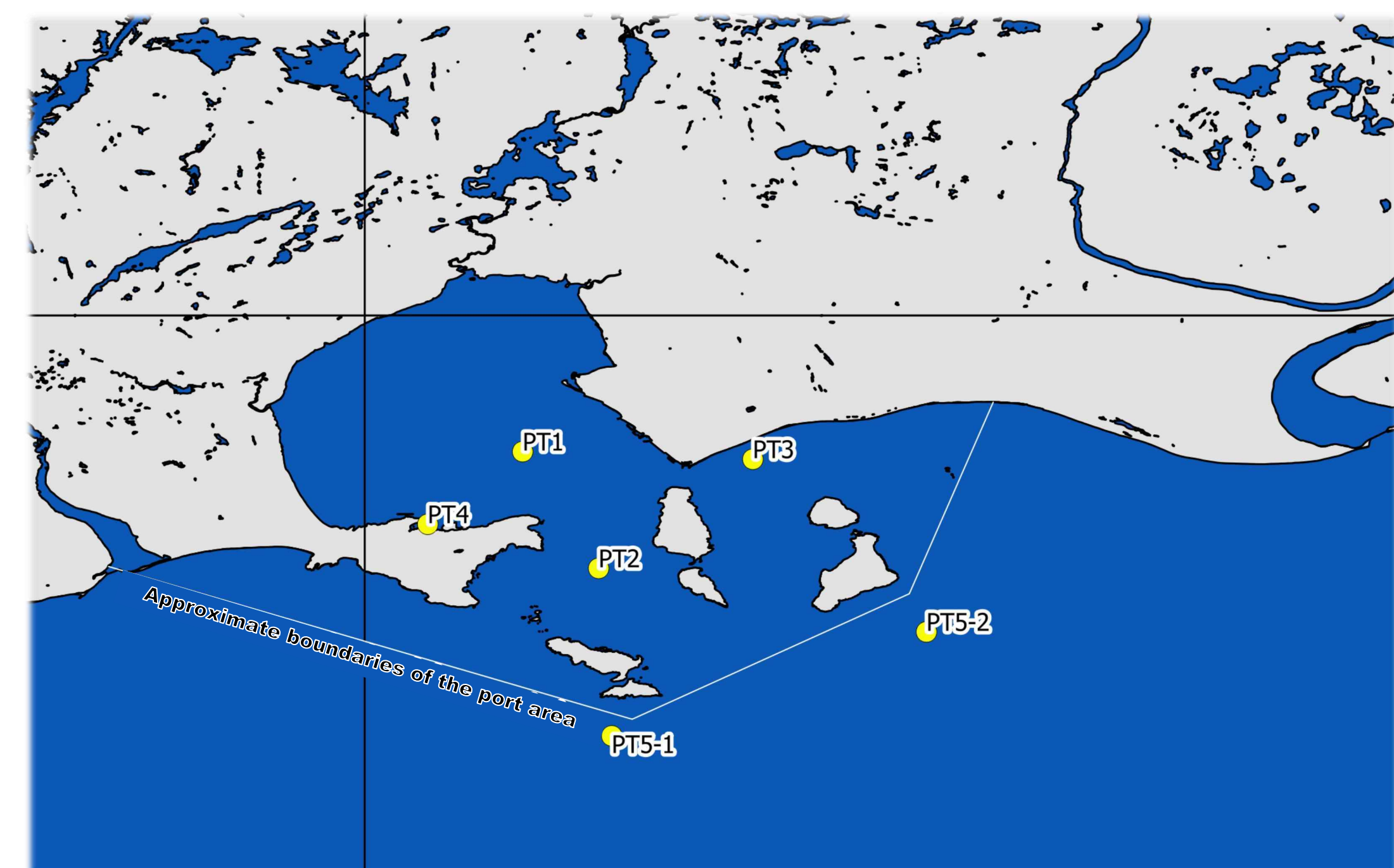
OBJECTIVES

- Evaluate water quality in the Bay of Sept-Îles
- Ensure that the sampled parameters meet MDDELCC quality criteria and Canadian guidelines



SAMPLING PLAN

- Where: Within Port of Sept-Îles boundaries
- When: Fall 2013 and 2014



EQUIPMENT

- Direct field measurements with a YSI multi-parameter probe capable of simultaneously measuring temperature, conductivity, dissolved oxygen, and salinity.
- ⇒ 4 sampling depths: water surface/7.5 m/15 m/30 m (or bottom)



- Water samples taken with a NISKIN sampling bottle for subsequent laboratory analyses: Physical and chemical parameters (pH, COD, turbidity, etc.); nutrients (phosphorus, nitrogen, etc.); biological parameters (fecal coliforms, aerobic and anaerobic heterotrophic bacteria (AAHB), etc.)
- ⇒ At 3 depths: surface/7.5 m/15 m



SAMPLED PARAMETERS

Parameter	Description
Temperature	Affects the water's physical properties and influences the development and movement of living organisms
Dissolved oxygen	Essential to the respiratory functions of aquatic organisms and therefore an indicator of water quality
Salinity	Proportion of dissolved mineral salts in the water. Used to determine whether water is fresh, brackish, or saline
Conductivity	Measure of water's capacity to conduct an electric current, which serves as an indirect measurement of the water's ion content
pH	Indicates how acidic the water is
Turbidity	Measure of how cloudy the water is
Suspended and dissolved solids	Come from a range of sources, both natural (shore erosion) and anthropogenic (municipal and industrial effluent, agricultural runoff, and particulate matter from the air)
Chemical oxygen demand (COD)	Amount of oxygen required to oxidize the organic and inorganic matter in the water Indicator of the amount of pollutants in wastewater or industrial effluent
Oxidation state of the system (BOD5 and BOD5C)	Parameters used to monitor organic pollution from urban and industrial effluent
Chlorides	Ions in the environment in the form of highly water-soluble salts
Fluorides	Fluoride ions, omnipresent in the lithosphere (soil, freshwater, salt water, plants, and many types of food)
Sulfates	Naturally present in water, but can also come from agricultural runoff and water treatment plants
Total oils and fats	All oils and fats from animals (food industry), plants (plant decomposition), and minerals (from petroleum distillation)
Petroleum hydrocarbons (C ₁₀ -C ₅₀)	Organic compounds from petroleum distillation
Metal and metalloids	Naturally present in the environment, but may also come from the mining, metallurgy, or steelmaking industries, vehicle emissions, or coal-fired power plants
Total phosphorus and phosphate	Nutrients naturally present in water, but may also come from septic systems, wastewater treatment plants, and industrial, agricultural, and logging waste
Ammoniacal nitrogen and Kjeldahl nitrogen	Nutrients naturally present in water, but may also come from industrial waste (treatment plants), fertilizers, breakdown of organic matter, and excretions of zooplankton
Nitrites and nitrates	Nitrification products produced by nitrifying bacteria, naturally present in the environment, but may also come from municipal and industrial wastewater, agricultural runoff, leach fields, or vehicle exhaust
Chlorophyll	Pigment essential for photosynthesis present in plants and algae
Bacteria (total coliforms, fecal coliforms, E. coli, facultative aerobic and anaerobic bacteria, bacterial species)	Fecal coliforms are one of the categories making up total coliforms, which in turn belong to the enterobacteria family Their presence in water is a sign of organic matter enrichment. Certain fecal coliforms, such as E. coli (sometimes present in the environment via domestic and agricultural waste water), are pathogenic organisms that represent a health risk. Measuring AAHB gives a rough idea of how contaminated the environment is but does not identify the source. Identifying bacterial species makes it possible to check the type and quantity of bacteria present.

PHOTO CREDIT

¹ and ³ Claudy Deschênes / ², ⁴, ⁶ and ¹⁰ Kim Aubut Demers / ⁵ Port de Sept-Îles / ⁷ INREST
⁸ <http://www.aquasonic.com.au/product/ysi-85-10-dissolved-oxygen-mon/>
⁹ <https://www.hydrobios.de/product/plastic-water-sampler-pws-2/>

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