**Project Dashboard**

Evaluation of natural bioremediation potential of Arctic beaches (149103)

**Project Overview**

Type of application: **New**

|  |  |
| --- | --- |
| Proponent name: | Lyle Whyte |
| Company: | McGill University |

**Schedule:**

|  |  |
| --- | --- |
| Start Date: | 2019-06-14 |
| End Date: | 2022-09-14 |
| Operation Type: | Annual |

**Project Description:**

The warming Arctic climate results in annual reductions of sea-ice. With decrease in Northwest passage ice cover, the amount of shipping traffic is increasing. Unfortunately, a consequence of more shipping is an increased risk that shipping fuel will be accidentally released into the vulnerable Arctic environment. In southern latitudes, naturally occurring bacteria in the environment can consume shipping fuels as food sources. However, it is unknown if naturally occurring bacteria living in Arctic beaches can do this in the colder Arctic conditions. The objective of this research is to determine if naturally occurring Arctic bacteria have the ability to degrade shipping fuels under Arctic conditions. It is important to know this so that in the event of a future accidental shipping fuel spill in the Arctic, we will know exactly how to respond to minimize negative environmental impacts. Research to be conducted in Resolute Bay for this project will involve collecting beach sediment samples for microbial and chemical analysis in our laboratory at McGill University, as well as a field research portion that will take place over a two-month period in summer of 2019. Following consultation with the local Hunter and Trappers association, this field research has been planned so as not to interfere with hunting activities, and to have no negative impacts on environment or wildlife. Sampling chambers will be buried in the sediment of a beach in the Resolute Bay area in early July and will be retrieved in late August. These sampling chambers are approximately the dimensions of a small school ruler (2 cm x 10 cm), and contain an adsorptive material holding 0.1 mL of shipping fuel. The beach will remain fully accessible to the community, as the sampling chambers will be buried. The total volume of fuel will be removed together with the sampling chamber. After the two-month incubation, we will retrieve the sampling chambers and determine which beach bacteria were able to break down the shipping fuel, and how fast they were able to do so. Ultimately, our objective is to produce a catalogue of fuel degrading bacteria that are active on Arctic beaches, and to determine if their activity alone would be enough to clean up a spill, or if additional remediation treatments would be required. Nunavut residents will be employed as wildlife guides (protecting us from bears) and research assistants to guide us with installing the sampling chambers. Their valuable knowledge of local boating practices and beach usage will help us to choose the best locations for sampling. As the Whyte lab research group is in Resolute Bay every year, we look forward to giving annual presentations to the community on the importance and progress of our experiments.

**Personnel:**

|  |  |
| --- | --- |
| Persons: | 6 |
| Days: | 14 |

**Project Map**

**List of all project geometries:**

|  |  |  |
| --- | --- | --- |
| **ID** | **Geometry** | **Location Name** |
| 5115 | point | Resolute Bay |
| 5116 | polygon | potential beach sites |

**Planning Regions:**

Kivalliq

**Affected Areas and Land Types**

Inuit Owned Surface Lands

Municipal

Extablished National or Territorial Park

Settlement Area

North Baffin Planning Region

**Project Land Use and Authorizations**

**Project Land Use**

Bulk Sample

**Licensing Agencies**

NRI: Scientific Research Licence

**Other Licensing Requirements**
No data found.

**Material Use**

**Equipment**

|  |  |  |  |
| --- | --- | --- | --- |
| **Type** | **Quantity** | **Size** | **Use** |
| No records found. |  |

**Fuel Use**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Type** | **Container(s)** | **Capacity** | **UOM** | **Use** |
| No records found. |  |  |

**Hazardous Material and Chemical Use**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Type** | **Container(s)** | **Capacity** | **UOM** | **Use** |
| No records found. |

**Water Consumption**

|  |  |  |
| --- | --- | --- |
| **Daily Amount (m3)** | **Retrieval Method** | **Retrieval Location** |
| 0 |  |  |

**Waste and Impacts**

**Environmental Impacts**

None. The small amount of shipping fuel inside the sampling chambers will be removed from the beach together with the sampling chambers. The majority of this research involves strategic sampling of beach sediment for analyses in the laboratory. Less than 10kg of sediment will be sampled in total.

**Waste Management**

|  |  |  |  |
| --- | --- | --- | --- |
| **Waste Type** | **Quantity Generated** | **Treatement Method** | **Disposal Method** |
| No data found. |  |