

**Field Studies Information Sheet – September 2012**

Port Metro Vancouver is continuing field studies in September as part of ongoing environmental and technical work for the proposed Roberts Bank Terminal 2 Project.

**Roberts Bank Terminal 2 Project**

The Roberts Bank Terminal 2 Project is a proposed new multi-berth container terminal which would provide more than two million TEUs (twenty-foot equivalent unit containers) of additional container capacity. The project is part of the Container Capacity Improvement Program, Port Metro Vancouver's long-term strategy to deliver projects to meet anticipated growth and demand for container capacity until 2030.

No decision has been made to proceed with the proposed Roberts Bank Terminal 2 Project. Port Metro Vancouver is undertaking a comprehensive multi-round, multi-year community, stakeholder and public consultation process regarding the project, which began in June 2011 with Pre-Consultation. The proposed Roberts Bank Terminal 2 Project will be subject to a thorough and independent environmental assessment.

**Field Studies – September 2012**

An overview of field studies that will be taking place in September 2012 is below.

<b>Overview</b>
<b>Water and Sediment Quality</b>
Water and Sediment Quality Study
<b>Marine Fish</b>
Marine Fish Habitat Characterization Study
<b>Marine Vegetation</b>
Eelgrass Study
Salt Marsh Study
Ulva Study
<b>Marine Invertebrates</b>
Juvenile Dungeness Crab Study
Sea Pen Study
Small Invertebrates Study
Cockles Study
<b>Coastal Seabirds</b>
Impacts of Overhead Transmission Wires and Vehicular Traffic on Coastal Seabirds Study
General Bird Abundance and Distribution Study
Shorebird Use of Fraser River Estuary during Southward Migration Study
<b>Coastal Geomorphology</b>
Continuous Measurement of Discharge Study
Sediment Concentration and Grain Size Study
Erosion and Deposition Study
<b>Marine Mammals</b>
Underwater Noise Study
<b>Terrestrial Wildlife</b>
Rare Plants Study
Barn Owl Study
<b>Freshwater Fish</b>
Fresh Water Fish Study

Some field studies may require access to public and private land. Port Metro Vancouver will obtain permission before accessing private property. As part of the Adaptive Management Strategy developed as part of the Deltaport Third Berth Project, Port Metro Vancouver will continue studies at Roberts Bank in addition to those outlined in this information sheet.

Port Metro Vancouver will produce monthly Field Studies information sheets summarizing work to occur each month. These updates will be available at [www.portmetrovancover.com/CCIP](http://www.portmetrovancover.com/CCIP).

Study Name	Summary
<p><b>Sediment and Water Quality – Sediment and Water Quality Study</b></p> <p>(continued from August 2012)</p>	<p><u>Purpose:</u> The purpose of this study is to collect data on sediment and water quality throughout the study area. Furthermore, the study will examine the connection between water and sediment quality and the health of:</p> <ul style="list-style-type: none"> <li>• Marine invertebrates;</li> <li>• Biofilm;</li> <li>• Eelgrass;</li> <li>• Sea pens; and</li> <li>• Biological resources and communities.</li> </ul> <p><u>Study Area:</u> The study area is comprised of three sites within the Fraser River Estuary:</p> <ul style="list-style-type: none"> <li>• Sturgeon Bank</li> <li>• Roberts Bank</li> <li>• Boundary Bay</li> </ul> <p><u>Methods:</u> Throughout the study area, sediment samples will be taken during daylight hours. Sensors (light and temperature) will be installed in the study area to collect data on water quality.</p> <p><u>Timing:</u> The study will continue in September 2012 and will take place during daylight hours.</p>
<p><b>Marine Fish – Marine Fish Habitat Characterization Study</b></p> <p>(continued from August 2012)</p>	<p><u>Purpose:</u> The purpose of this study is to:</p> <ul style="list-style-type: none"> <li>• Characterize marine fish habitat; and</li> <li>• Classify marine fish, macro invertebrates, marine vegetation and substrates.</li> </ul> <p><u>Study Area:</u> The study area will focus on Roberts Bank and the marine environment northwest of the current Deltaport Terminal.</p> <p><u>Methods:</u> To collect habitat and species information, video will be taken using an underwater camera towed by a small boat.</p> <p><u>Timing:</u> The study will continue in September 2012 and will take place during daylight hours.</p>

Study Name	Summary
<p><b>Marine Vegetation – Eelgrass Study</b></p> <p>(continued from August 2012)</p>	<p><u>Purpose:</u> The purpose of this study is to identify the density and distribution of eelgrass within the study area and to determine if sea water temperature and/or light penetration impacts eelgrass growth.</p> <p><u>Study Area:</u> The study area is composed of two main regions at Roberts Bank:</p> <ul style="list-style-type: none"> <li>• The mudflats south of Canoe Pass (Brunswick Point) to the Roberts Bank causeway; and</li> <li>• The “inter-causeway” area which includes the mudflat between the Roberts Bank causeway and the BC Ferries terminal causeway.</li> </ul> <p><u>Methods:</u> Multiple methods will be used to identify the density and distribution of eelgrass:</p> <ul style="list-style-type: none"> <li>• Confirm and map the distribution of eelgrass habitat along the Roberts Bank mudflats at very low tides, and collect data;</li> <li>• Map the underwater distribution of eelgrass using an underwater video system towed by a slow moving boat; and</li> <li>• Water temperature and light intensity sensors will be anchored in the intertidal zone at Roberts Bank to collect data.</li> </ul> <p><u>Timing:</u> The study will continue in September 2012 and will take place during daylight hours.</p>
<p><b>Marine Vegetation – Salt Marsh Study</b></p> <p>(continued from August 2012)</p>	<p><u>Purpose:</u> The purpose of this study is to determine the:</p> <ul style="list-style-type: none"> <li>• Distribution of salt marshes;</li> <li>• Species present in salt marshes; and</li> <li>• Percent cover of salt marsh species.</li> </ul> <p><u>Study Area:</u> The study will focus on Roberts Bank.</p> <p><u>Methods:</u> The salt marsh study will be conducted by surveying known salt marsh areas at Roberts Bank. Teams will survey randomly generated sampling locations within salt marsh habitat during low tide. At each point information on salt marsh species, their density and spatial extent will be recorded using hand-held data entry system.</p> <p>Aerial surveys will be conducted to take specialized photos that will be analyzed to determine the total current extent of the distribution of salt marsh at Roberts Bank.</p> <p><u>Timing:</u> The study will continue in September 2012 and will take place during daylight hours.</p>

Study Name	Summary
<p><b>Marine Vegetation – Ulva Study</b></p> <p>(continued from August 2012)</p>	<p><u>Purpose:</u> Ulva is thin flat green algae, also commonly known as sea lettuce. The purpose of the Ulva study is to:</p> <ul style="list-style-type: none"> <li>• Determine the density of Ulva; and</li> <li>• Determine the percent cover of Ulva.</li> </ul> <p><u>Study Area:</u> The study will focus on Roberts Bank.</p> <p><u>Methods:</u> Teams will walk to randomly generated sampling location and quantify the percent cover and distribution of Ulva within the sampling locations.</p> <p><u>Timing:</u> The study will continue in September 2012 and will take place during daylight hours.</p>
<p><b>Marine Invertebrates – Sea Pen Study</b></p> <p>(continued from August 2012)</p>	<p><u>Purpose:</u> The purpose of the Sea Pen Study is to:</p> <ul style="list-style-type: none"> <li>• Determine the rarity or uniqueness of the Roberts Bank sea pen bed, both on a local and regional scale; and</li> <li>• Explore possible linkages between sea pen behaviour and sediment and water characteristics.</li> </ul> <p><u>Study Area:</u> The study area encompasses approximately 200 hectares of known sea pen habitat around the Deltaport Terminal.</p> <p><u>Methods:</u> Data will be collected using both boat-based and scuba diving methods.</p> <p>Sediment sampling will occur where divers collect sediment in three to five areas surrounding the sampling location.</p> <p>Additionally, acoustic sensors will be deployed at two locations within the study area, where they will be mounted to the sea floor for one month, in order to capture a robust snapshot of conditions.</p> <p><u>Timing:</u> The study will continue in September 2012 and will take place during daylight hours.</p>
<p><b>Marine Invertebrates – Small Invertebrates Study</b></p> <p>(continued from</p>	<p><u>Purpose:</u> The purpose of the small invertebrates study is to:</p> <ul style="list-style-type: none"> <li>• Count and identify small and microscopic marine invertebrates across the Fraser River Estuary; and</li> <li>• Identify the correlation between invertebrate diversity and density and shorebird usage throughout the Fraser River Estuary</li> </ul>

Study Name	Summary
August 2012)	<p><u>Study Area:</u> The study area is comprised of three sites within the Fraser River Estuary:</p> <ul style="list-style-type: none"> <li>• Sturgeon Bank</li> <li>• Roberts Bank</li> <li>• Boundary Bay</li> </ul> <p><u>Methods:</u> To quantify and identify small marine invertebrates, sediment cores will be sampled at 250 locations.</p> <p><u>Timing:</u> The study will continue in September 2012 and will take place during daylight hours.</p>
<b>Marine Invertebrates – Cockles Study</b>	<p><u>Purpose:</u> The purpose of the cockles study is to:</p> <ul style="list-style-type: none"> <li>• Survey cockle populations in the Fraser River Estuary; and</li> <li>• Examine and quantify the chemical composition of cockle tissue samples.</li> </ul> <p><u>Study Area:</u> The study area is comprised of three sites within the Fraser River Estuary:</p> <ul style="list-style-type: none"> <li>• Sturgeon Bank</li> <li>• Roberts Bank</li> <li>• Boundary Bay</li> </ul> <p><u>Methods:</u> The cockle study will be conducted by walking 200 meter transect lines at predetermined sampling locations and digging for cockles at reference points every 50 meters. The locations will be identified using a combination of factors, including local knowledge, and information from previous studies. Sampling locations, in which cockle populations are found will be recorded with a handheld GPS.</p> <p>During field sampling, 20 cockles from one point along each transect will be collected. Soft tissue will be harvested from each individual for analysis of tissue chemistry at each sampling location.</p> <p><u>Timing:</u> The study will occur in September 2012 and will take place during daylight hours.</p>
<b>Coastal Seabirds – Impacts of Overhead Transmission Wires and Vehicular Traffic on Coastal Seabirds Study</b>	<p><u>Purpose:</u> Bird diverters are special units installed on power lines that help birds see power lines and avoid potentially fatal collisions. The purpose of the study is to calculate the effectiveness of existing bird diverters, while identifying opportunities to further reduce bird collisions with transmission wires and vehicular traffic.</p> <p><u>Methods:</u> The study will examine flight patterns, distribution, abundance and behaviour of</p>

Study Name	Summary
(continued from August 2012)	<p>birds as they cross the Roberts Bank transmission line. Where bird collisions do occur within 20 metres of the transmission wire and road, birds will be collected and studied.</p> <p><u>Timing:</u> Flight surveys will be undertaken every two weeks at each station. Assessments will occur during daylight hours, weather permitting. This study began in mid-April and will continue in September 2012.</p>
<p><b>Coastal Seabirds – General Bird Abundance and Distribution Study</b></p> <p>(continued from August 2012)</p>	<p><u>Purpose:</u> The purpose of this study is to determine and observe Coastal Seabirds, Shorebirds and Waterfowl abundance and seasonal distribution at Roberts Bank.</p> <p><u>Study Area:</u> The study area includes:</p> <ul style="list-style-type: none"> <li>• Brunswick Marsh;</li> <li>• Roberts Bank Causeway; and</li> <li>• The perimeter of the Deltaport and Westshore terminals.</li> </ul> <p><u>Methods:</u> A team of two biologists will conduct bird observation surveys, where bird species will be identified and individuals counted.</p> <p>The biologists will use binoculars and spotting scopes to count and identify species.</p> <p>There are 13 observation points and each one will be identified with flagging tape, and spray paint on the ground surface or with a stake.</p> <p><u>Timing:</u> The study will continue in September 2012 and will take place during daylight hours.</p>
<p><b>Coastal Seabirds – Shorebird Use of Fraser River Estuary During Southward Migration Study</b></p> <p>(continued from August 2012)</p>	<p><u>Purpose:</u> The purpose of this study is to determine the abundance and distribution of shorebirds across the Fraser River Estuary during the southward migratory period</p> <p><u>Study Area:</u> The study area is comprised of mudflats within three sites of the Fraser River Estuary:</p> <ul style="list-style-type: none"> <li>• Sturgeon Bank</li> <li>• Roberts Bank</li> <li>• Boundary Bay</li> </ul> <p><u>Methods:</u> The number and distribution of bird use will be assessed by counting droppings at low tide within 1m<sup>2</sup> quadrants.</p>

Study Name	Summary
	<p><u>Timing:</u> The study will continue in September 2012 and will take place during daylight hours.</p>
<p><b>Coastal Geomorphology – Continuous Measurement of Discharge Study</b></p> <p>(continued from August 2012)</p>	<p><u>Purpose:</u> The purpose of the study is to continuously monitor discharge in Canoe Pass during the summer high flow season.</p> <p>Specifically, the study will collect data relating to flow discharge in Canoe Pass.</p> <p><u>Study Area:</u> The study area includes Canoe Pass (the southern-most arm of the Fraser River).</p> <p><u>Methods:</u> Multiple methods will be used to collect data:</p> <ul style="list-style-type: none"> <li>• Sensors and probes will be installed within the study area. These will be connected to computers to collect and monitor data.</li> <li>• Boat-mounted sensors will be deployed within the study area to gather data.</li> </ul> <p><u>Timing:</u> The study will continue in September 2012 and will take place during daylight hours.</p>
<p><b>Coastal Geomorphology – Sediment Concentration and Grain Size Study</b></p> <p>(continued from August 2012)</p>	<p><u>Purpose:</u> The purpose of the study is to continuously monitor sediment concentration in Canoe Pass.</p> <p>Specifically, the study will determine the amount of sediment that exits Canoe Pass and arrives at Roberts Bank.</p> <p><u>Study Area:</u> The study area includes Canoe Pass (the southern-most arm of the Fraser River).</p> <p><u>Methods:</u> To determine the amount of sediment present, a sensor will be installed and used to collect data on the number of particles in the water. Samples will be collected to help determine sediment concentration and grain size.</p> <p><u>Timing:</u> The study will continue in September 2012 and will take place during daylight hours.</p>
<p><b>Coastal Geomorphology – Erosion and Deposition Study</b></p>	<p><u>Purpose:</u> The purpose of the study is to measure and collect data on the short-term changes in the sediment surface of the tidal flats.</p>

Study Name	Summary
(continued from August 2012)	<p><u>Study Area:</u> The study area includes the tidal flats in the vicinity of the Roberts Bank causeway.</p> <p><u>Methods:</u> Depth of disturbance rods will be installed in the sediment and monitored on a monthly basis to assess changes in the elevation of the sediment surface.</p> <p><u>Timing:</u> The study will continue in September 2012 and will take place during daylight hours.</p>
<p><b>Marine Mammals – Underwater Noise Study</b></p> <p>(continued from August 2012)</p>	<p><u>Purpose:</u> The purpose of this study is to capture baseline data on ambient underwater noise levels and marine mammal presence at Roberts Bank.</p> <p><u>Study Area:</u> The study area is the waters in the vicinity of Roberts Bank.</p> <p><u>Methods:</u> To capture baseline data on ambient noise levels at Roberts Bank, one underwater noise monitoring sensor was deployed on the sea floor in July and will continuously record both ambient noise levels and marine mammal vocalizations.</p> <p><u>Timing:</u> The study will continue in September 2012 and will take place during daylight hours.</p>
<p><b>Terrestrial Wildlife – Rare Plants</b></p> <p>(continued from August 2012)</p>	<p><u>Purpose:</u> The purpose of the study is to:</p> <ul style="list-style-type: none"> <li>• Determine ecosystems that may be present in the study area;</li> <li>• Describe any wetlands in the study area; and</li> <li>• Determine if rare plants occur in the study area.</li> </ul> <p><u>Study Area:</u> The study area is 10 kilometres-long, and will include a 500-metre buffer on either side of the existing Roberts Bank rail corridor. .</p> <p><u>Methods:</u> Multiple methods will be used to collect data:</p> <ul style="list-style-type: none"> <li>• Air photos will be obtained and scanned into a model for three dimensional viewing;</li> <li>• Surveys will be conducted by walking through each high-potential site identified through air photo analysis;</li> <li>• Data will be collected and digital photos of each plot will be taken; and</li> <li>• Full plant specimens will not be collected – if a rare species is encountered it will be photographed.</li> </ul>



Study Name	Summary
	<p><u>Timing:</u> Data collection and survey work will continue in September 2012.</p>
<p><b>Terrestrial Wildlife – Barn Owl Study</b>  (continued from August 2012)</p>	<p><u>Purpose:</u> The purpose of this study is to collect baseline data on barn owl use of habitats in the study area.</p> <p><u>Study Area:</u> The study area is 10 kilometres-long, and will include a 500-metre buffer on either side of the existing Roberts Bank rail corridor between the shore end of the Roberts Bank causeway and east end of Fisher Yard.</p> <p><u>Methods:</u> Roadside surveys will be conducted along existing infrastructure to understand barn owl use of open habitat near existing road and rail lines. Biologists will record:</p> <ul style="list-style-type: none"> <li>• General barn owl behaviour;</li> <li>• Number of barn owls (plus location); and</li> <li>• Age of barn owl (if possible).</li> </ul> <p><u>Timing:</u> The study will continue in September 2012 and the study will occur at dusk.</p>
<p><b>Freshwater Fish – Freshwater Fish Study</b>  (continued from April 2012)</p>	<p><u>Purpose:</u> This purpose of the study is to:</p> <ul style="list-style-type: none"> <li>• Provide a description of freshwater fish habitat and fish within the project study area; and</li> <li>• Assess potential impacts from the proposed Roberts Bank Terminal 2 Project on freshwater fish.</li> </ul> <p><u>Study Area:</u> The proposed study area includes freshwater ditches and streams along the 3.6 kilometer length of the rail corridor between 64th Avenue and 72nd Street, plus the turnouts at the east end of Fisher Yard located immediately east of 72nd Street.</p> <p><u>Methods:</u> Fish will be identified, counted, measured, and released live at the site of capture. Any other aquatic organisms (e.g., amphibians) will be identified and released.</p> <p>In addition to undertaking field investigations of fish and fish habitats within the study area, the field crew will identify and characterize aquatic habitats.</p> <p><u>Timing:</u> This study will commence again in September 2012 and assessments will occur during daylight hours, weather permitting.</p>

**For Further Information**

For further information, please visit our website at [www.portmetrovancover.com/CCIP](http://www.portmetrovancover.com/CCIP) or contact us:

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