

Field Studies Information Sheet – January 2013

Port Metro Vancouver is continuing field studies in January 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 and continued from October 22 to November 30, 2012, with Project Definition Consultation.

The proposed Roberts Bank Terminal 2 Project will be subject to a thorough and independent environmental assessment.

Field Studies – January 2013

An overview of field studies that will be taking place in January 2013 is below.

Overview
Biofilm
Biofilm Study
Coastal Geomorphology
Continuous Measurement of Discharge Study
Erosion and Deposition Study
Wave Height Study
Coastal Seabirds
General Bird Abundance and Distribution Study
Impacts of Overhead Transmission Wires and Vehicular Traffic on Coastal Seabirds Study
Pacific Dunlin Genetic Structure Study
Use of the Fraser River Estuary and Upland Habitat by Overwintering Shorebirds Study
Marine Fish
Eelgrass Fish Community Study
Forage Fish Beach Spawn Study
Juvenile Salmon Study
Marine Invertebrates
Gravid Female Dungeness Crabs
Micro Invertebrates Study
Sea Pen Study
Terrestrial Wildlife
Barn Owl Collision Study
Nocturnal Agricultural Habitat Use by Dunlin
Upland Waterbirds: Waterfowl and Shorebird Abundance and Habitat Use Study
Water and Sediment Quality
Water and Sediment Quality 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/RBT2.

Study Name	Summary
<p>Biofilm Study</p> <p>(continued from December 2012)</p>	<p><u>Purpose:</u> This purpose of the study is to:</p> <ul style="list-style-type: none"> • Map the distribution of biofilm within the Fraser River Estuary during winter months; • Identify the major groups of organisms that make up biofilm during winter months; and • Identify the relationship between wintering shorebird distribution and biofilm distribution. <p><u>Study Area:</u> The study area includes Roberts Bank.</p> <p><u>Methods:</u> Biofilm samples will be collected from sampling locations around Roberts Bank, Boundary Bay and Sturgeon Bank. Samples will be collected using syringes and will be sent to a laboratory for analysis.</p> <p><u>Timing:</u> This study will continue in January 2013 and will take place during rare daylight low tide intervals.</p>
<p>Coastal Geomorphology – Continuous Measurement of Discharge Study</p> <p>(continued from December 2012)</p>	<p><u>Purpose:</u> The purpose of the study is to collect data relating to the 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"> • Sensors and probes will be installed within the study area. These will be connected to computers to collect and monitor data. • Boat-mounted sensors will be deployed within the study area to gather data. <p><u>Timing:</u> This study will continue in January 2013 and will take place during daylight hours.</p>

Study Name	Summary
<p>Coastal Geomorphology – Erosion and Deposition Study</p> <p>(continued from December 2012)</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> <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> This study will continue in January 2013 and will take place primarily during daylight hours. Some data collection outside of daylight hours may be necessary due to timing of tidal fluctuations.</p>
<p>Coastal Geomorphology – Wave Height Study</p> <p>(continued from December 2012)</p>	<p><u>Purpose:</u> The purpose of the study is to collect ongoing measurements of wave heights at three locations on the tidal flats at Roberts Bank.</p> <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> Wave sensors will be deployed on the seabed and will collect data and take continuous measurements of wave heights.</p> <p><u>Timing:</u> This study will continue in January 2013 and will take place during daylight hours.</p>
<p>Coastal Seabirds – General Bird Abundance and Distribution Study</p> <p>(continued from December 2012)</p>	<p><u>Purpose:</u> The purpose of the 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"> • Brunswick Marsh, • Roberts Bank causeway, and • The perimeter of the Deltaport and Westshore terminals. <p><u>Methods:</u> A team of two biologists will conduct bird observation surveys, where bird species will be identified and individual birds will be 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</p>

Study Name	Summary
	<p>and spray paint on the ground surface, or with a stake.</p> <p><u>Timing:</u> This study will continue in January 2013 and will take place during daylight hours.</p>
<p>Coastal Seabirds – Impacts of Overhead Transmission Wires and Vehicular Traffic on Coastal Seabirds Study</p> <p>(continued from December 2012)</p>	<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 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 January 2013.</p>
<p>Coastal Seabirds – Pacific Dunlin Genetic Structure Study</p>	<p><u>Purpose:</u> The purpose of the study is to determine whether Pacific Dunlin using Roberts Bank comprise a genetically unique group within the Fraser River Estuary.</p> <p><u>Study Area:</u> The study area includes intertidal mudflats within three sites of the Fraser River Estuary: Sturgeon Bank, Roberts Bank and Boundary Bay.</p> <p><u>Methods:</u> Blood samples from Pacific Dunlin will be obtained and used for genetic analysis of DNA to determine if distinct populations are present, and if so, whether they are segregated across sites within the estuary.</p> <p>All field crew are highly qualified for shorebird handling, and all blood samples will be taken by personnel with extensive experience in blood sampling of small birds.</p> <p><u>Timing:</u> This study will take place in January 2013 during morning hours, weather permitting.</p>
<p>Coastal Seabirds – Use of the Fraser River Estuary and Upland Habitat by Overwintering Shorebirds Study</p>	<p><u>Purpose:</u> The purpose of the study is to determine the abundance and distribution of overwintering shorebirds across the Fraser River Estuary and adjacent upland habitat.</p> <p><u>Study Area:</u></p>

Study Name	Summary
(continued from December 2012)	<p>The study area includes mudflats within three sites of the Fraser River Estuary—Sturgeon Bank, Roberts Bank and Boundary Bay—as well as the uplands immediately adjacent to the mudflats at Roberts Bank.</p> <p><u>Methods:</u> Shorebirds will be simultaneously counted at all sites to assess abundance and relative use of mudflat and upland habitats. Surveys of the mudflats will occur every two to three weeks, and will be supplemented with monthly terrestrial surveys.</p> <p><u>Timing:</u> This study will continue in January 2013 and will take place primarily during daylight hours.</p> <p><u>Note: this study is being coordinated with the Terrestrial Wildlife – Upland Waterbirds: Waterfowl and Shorebird Abundance and Habitat Use (see below)</u></p>
<p>Marine Fish – Eelgrass Fish Community Study</p> <p>(continued from October 2012)</p>	<p><u>Purpose:</u> The purpose of this study is to document the diversity and condition of the fish community living within eelgrass beds.</p> <p>The study will:</p> <ul style="list-style-type: none"> • Identify potential trends in fish habitat use within the eelgrass beds in the area of the proposed Roberts Bank Terminal 2 Project; and • Draw linkages between eelgrass health, fish community composition and other parameters such as temperature and salinity. <p><u>Study Area:</u> The study area consists of the dense bed of eelgrass located to the north of the existing Deltaport Terminal at Roberts Bank.</p> <p><u>Methods:</u> Large nets will be deployed from a boat at four sites during high tide over the eelgrass bed. Fish will be identified, counted, measured and released.</p> <p><u>Timing:</u> This study will continue in January 2013. Studies will take place during the day and in the evening.</p>
<p>Marine Fish – Fish Beach Spawn Study</p> <p>(continued from December 2012)</p>	<p><u>Purpose:</u> This purpose of the study is to:</p> <ul style="list-style-type: none"> • Identify suitable fish (surf smelt and sand lance) beach spawning habitat along the length of the Roberts Bank causeway; • Document habitat characteristics of suitable spawning beaches; and • Collect sediment for grain size analysis and egg examination. <p><u>Study Area:</u></p>

Study Name	Summary
	<p>The study area includes the western side of the Roberts Bank causeway.</p> <p><u>Methods:</u> Sediment samples will be collected and examined for fish eggs and grain size. Any eggs found will be analyzed to identify approximate time of spawning events.</p> <p><u>Timing:</u> This study will continue in January 2013 and will take place during daylight hours.</p>
<p>Marine Fish – Juvenile Salmon Study</p> <p>(continued from October 2012)</p>	<p><u>Purpose:</u> The purpose of this study is to document the use of habitat by juvenile salmon along the Roberts Bank causeway. It is also to collect data on juvenile salmon movements. The study will assess the presence, abundance and condition of juvenile salmon, and assist in developing a long-term monitoring strategy.</p> <p><u>Study Area:</u> The study area consists of the portion of Roberts Bank to the north and south side of the existing Deltaport Terminal and Roberts Bank causeway.</p> <p><u>Methods:</u> Two methodologies will be used to assess juvenile salmon habitat use and movement:</p> <ul style="list-style-type: none"> • Deploying large nets at six sites representing different habitat types (such as sand, pocket beach, rip rap etc.) along the causeway. Fish will be identified, counted, measured and released. • Deploying directional nets at the same six sites along the causeway during different tides to document juvenile salmon movements. <p><u>Timing:</u> This study will continue in January 2013. Studies will take place during the day and in the evening.</p>
<p>Marine Invertebrates – Gravid Female Dungeness Crabs</p>	<p><u>Purpose:</u> The purpose of the study is to:</p> <ul style="list-style-type: none"> • Determine the presence of gravid female crabs within the study area; • Quantify the habitat preferences and depth distribution of gravid female crabs within the study area, during the winter brood season (October-March); and • Determine the density of gravid female crabs within the study area, during the winter brood season. <p><u>Study Area:</u> The study area includes the proposed terminal and dredging footprint of the Roberts Bank Terminal 2 Project.</p> <p><u>Methods:</u></p>

Study Name	Summary
	<p>SCUBA dive surveys will be used to record the number of gravid female Dungeness crabs and general habitat characteristics.</p> <p><u>Timing:</u> This study will begin in January 2013 and will take place during daylight hours.</p>
<p>Marine Invertebrates – Micro Invertebrates Study</p> <p>(continued from December 2012)</p>	<p><u>Purpose:</u> The purpose of the study is to determine the density and diversity of small marine invertebrates (meiofauna and macrofauna) living in the sediment at Roberts Bank, Sturgeon Bank and Boundary Bay. This study will also look at the role of small marine invertebrates as food for coastal birds.</p> <p><u>Study Area:</u> The study area includes:</p> <ul style="list-style-type: none"> • Roberts Bank • Sturgeon Bank • Boundary Bay <p><u>Methods:</u> Invertebrate field samples will be collected from a total of 60 intertidal sampling locations. Samples will be collected using syringes and will be sent to a laboratory for processing and analysis.</p> <p><u>Timing:</u> This study will continue in January 2013 and will take place during rare daylight low tide intervals.</p>
<p>Marine Invertebrates – Sea Pen Study</p> <p>(continued from December 2012)</p>	<p><u>Purpose:</u> The purpose of the study is to explore possible linkages between sea pen behavior and sediment and water characteristics.</p> <p><u>Study Area:</u> The study area includes approximately 200 hectares of known sea pen habitat around the Deltaport and Westshore terminals at Roberts Bank.</p> <p><u>Methods:</u> Acoustic sensors will be deployed at two locations within the study area where they will be secured to the sea floor for one to two months to capture a robust account of the conditions in and around sea pen habitat.</p> <p><u>Timing:</u> This study will continue in January 2013 and will take place during daylight hours.</p>
<p>Terrestrial Wildlife – Barn Owl Collision Study</p>	<p><u>Purpose:</u> The purpose of this study is to estimate the number and distribution of Barn Owl collisions with vehicular and rail traffic and to identify opportunities to further</p>

Study Name	Summary
(continued from December 2012)	<p>reduce such collisions.</p> <p><u>Study Area:</u> The study area includes 10 metres on either side of the Roberts Bank causeway, and 10 metres on either side of the existing rail right-of-way for a length of 10 kilometres from the base of the causeway, east towards 72nd Street.</p> <p><u>Methods:</u> Bird surveys will be undertaken every four days along the length of the study area. Where bird collisions do occur within 10 metres of the road, birds will be collected and studied.</p> <p><u>Timing:</u> This study will begin in January 2013 and will take place during daylight hours.</p>
<p>Terrestrial Wildlife – Nocturnal Agricultural Habitat Use by Dunlin</p>	<p><u>Purpose:</u> The purpose of this study is to:</p> <ul style="list-style-type: none"> • Determine the nocturnal use of agricultural fields by Dunlin (a coastal bird); and • Determine any effects from increased road and rail noise on Dunlin in the study area. <p><u>Study Area:</u> The study area includes previously identified agricultural fields along the existing Deltaport Way and BC Rail line from the base of the Roberts Bank causeway to the junction of Ladner Trunk Road and Highway 91. The study area will also survey points on Westham Island to act as a reference area with no project-related train or road traffic.</p> <p>*Property owners of the agricultural fields within the study area are being notified by Port Metro Vancouver.</p> <p><u>Methods:</u> Agricultural fields will be observed for Dunlin through the use of night vision technology, audio playback equipment and light sources. Field observations will take place from public roadsides.</p> <p><u>Timing:</u> This study will begin in January 2013 and will take place at night.</p>
<p>Terrestrial Wildlife – Upland Waterbirds: Waterfowl and Shorebird Abundance and</p>	<p><u>Purpose:</u> The purpose of the study is to document the use of upland terrestrial (land-based) habitat by wintering waterfowl and shorebird species.</p> <p><u>Study Area:</u> The study area will be centred on the rail corridor and will extend to a maximum of</p>

Study Name	Summary
<p>Habitat Use</p> <p>(continued from December 2012)</p>	<p>2.5 kilometres from the rail line, starting from the shore end of the causeway to the junction of Ladner Trunk Road and Highway 91.</p> <p><u>Methods:</u> Biologists will conduct waterfowl and shorebird surveys at designated observation stations. Binoculars and spotting scopes will be used to count birds and identify them to species when possible.</p> <p><u>Timing:</u> This study will continue in January 2013 and surveys will be conducted on a weekly basis during daylight hours.</p> <p><u>Note: this study is being coordinated with the Coastal Seabirds – Use of the Fraser River Estuary and Upland Habitat by Overwintering Shorebirds Study (see above).</u></p>
<p>Sediment and Water Quality – Sediment and Water Quality Study</p> <p>(continued from December 2012)</p>	<p><u>Purpose:</u> The purpose of the 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"> • Marine invertebrates, • Biofilm, • Eelgrass, • Sea pens, and • Biological resources and communities. <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"> • Sturgeon Bank • Roberts Bank • Boundary Bay <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> This study will continue in January 2013 and will take place during daylight hours.</p>

For Further Information

For further information, please visit our website at www.portmetrovancover.com/RBT2 or contact us:

Phone: 604.665.9337

Fax: 1.866.284.4271

Email: container.improvement@portmetrovancover.com