

## **Deltaport Third Berth Project Adaptive Management Strategy – 2008 Annual Report**

### **What is the Adaptive Management Strategy?**

The Adaptive Management Strategy (AMS) is one of several significant environmental programs being undertaken as part of the Deltaport Third Berth Project (DP3). It is a science-based approach to monitoring and managing the Roberts Bank ecosystem. The approach will allow for the early detection of changes in the inter-causeway ecosystem so that potential significant negative ecosystem trends that are attributable to the DP3 Project can be prevented or mitigated. The AMS was developed in conjunction with and approved by Environment Canada.

### **What is the Adaptive Management Strategy - 2008 Annual Report?**

The AMS 2008 Annual Report provides interpretation and discussion of the data that was collected in 2008, the second year of the AMS program. The results of the first year of the AMS program were presented in the 2007 Annual Report, which is available on the Port Metro Vancouver website as follows:

[http://portmetrovancover.com/Libraries/PROJECTS\\_Deltaport\\_Third\\_Berth\\_Project/080718\\_AMS\\_2007\\_Annual\\_Final.sflb.ashx](http://portmetrovancover.com/Libraries/PROJECTS_Deltaport_Third_Berth_Project/080718_AMS_2007_Annual_Final.sflb.ashx). The 2008 Annual Report also evaluates potential trends occurring in the inter-causeway area and includes recommendations for modification of the AMS work program to better investigate identified trends or to reduce the scope of work when no impacts are evident.

Environmental monitoring for the DP3 AMS program is conducted in the following areas:

1. Coastal geomorphology
2. Surface water quality
3. Sediment quality
4. Eelgrass
5. Other biota, including benthic community and bird populations

The AMS 2008 Annual Report was prepared by a multi-discipline environmental science and engineering team consisting of Hemmera, Northwest Hydraulic Consultants and Precision Identification Biological Consultants and was reviewed by the Scientific Advisory Committee (SAC). The SAC is a panel of independent scientists who review the scientific data and interpretations of those data submitted by Port Metro Vancouver, to develop an opinion as to whether a negative ecosystem trend is emerging in the inter-causeway area as a result of DP3, or if a threshold for any mitigation action has been exceeded.

## **Overview**

Based on the results of the first two years of monitoring for the DP3 AMS program, to date, it does not appear that the DP3 construction activities have contributed to significant negative ecosystem trends in the inter-causeway area. Significant findings from each of the AMS monitoring components are summarized in the following sections.

## **Coastal Geomorphology**

As was observed and reported during the 2007 AMS program, the results of the coastal geomorphology program for 2008 continued to indicate that the most dynamic areas within the inter-causeway were related to pre-existing processes, and were not related to DP3 construction activities. The exception to this was the formation of new drainage channels adjacent to the perimeter dikes in 2007. Based on the 2007 work, it appeared that these channels were stabilizing; however, additional monitoring was required to confirm this observation. The data collected and observations made during the 2008 coastal geomorphology program continue to indicate that the channels have stabilized. The channels did not expand in 2008 and the original steep-sided cross-section shape of the channels evolved into a gently-sloping rounded cross-section shape, typical of landforms that are no longer active. In addition, mapping of the area showed that the position of the channels had not changed between the 2007 and 2008 photography events of the area, and monitoring in the area indicated that there was a low level of erosion and deposition in the area of the channels. Continued monitoring of this area will be conducted during the 2009 AMS program.

## **Surface Water Quality**

Significant findings of the 2008 surface water quality monitoring program included copper, mercury and zinc guideline exceedances, and nutrient level variances between the inter-causeway area and the reference sites. Copper and/or zinc exceeded the applicable standards at three sampling locations: the two reference stations and the station that is located at the outflow of an agricultural ditch, which is not representative of water quality within the inter-causeway area. There were no copper or zinc exceedances at any of the other stations located within the inter-causeway area. Mercury exceeded the applicable guidelines at one reference station during the second 2008 quarter and at one inter-causeway sampling station during the third 2008 quarter. These exceedances are not considered to be attributable to the DP3 construction activities.

Nutrient levels varied across the sampling stations. At the reference stations, dissolved oxygen and ammonia concentrations were elevated relative to the inter-causeway stations. The elevated ammonia concentrations are likely due to Fraser River inputs. Nutrient levels were elevated at the station that is located at the

outflow of an agricultural ditch, and the elevated concentrations are considered to be due to agricultural inputs. Phosphate and nitrate concentrations were elevated at the intertidal inter-causeway sampling stations, which may be a function of greater biological activity in the sheltered inter-causeway area compared with that at reference stations. The data collected to date do not suggest a trend towards eutrophication in the inter-causeway area.

### **Sediment Quality**

The 2008 AMS program for monitoring sediment quality did not identify any metals parameters in exceedance of the BC Contaminated Sites Regulation sediment quality guidelines, and there was no evidence of metals impacts from the DP3 project. As for surface water, nutrient parameter levels in sediments collected within the inter-causeway area were consistently higher than at the reference stations; however, this difference may be a function of greater biological activity in the sheltered inter-causeway area as opposed to being specifically related to DP3 construction. There is no evidence, at this time, of a trend towards eutrophication within the inter-causeway area; however, surface water and sediment quality monitoring will continue throughout the 2009 AMS program, and will continue to assess the potential for negative trends to develop as a result of the DP3 construction.

### **Eelgrass**

The 2008 eelgrass program indicated that eelgrass habitat was in good condition in the inter-causeway area. The productivity of eelgrass was greater in 2008 than in 2007 and 2003 at all study sites except one where the density of eelgrass converted from continuous to patchy. The one area of exception was located in the intertidal zone of the inter-causeway, adjacent to the Deltaport Causeway. This area is located adjacent to the dendritic channels in the inter-causeway area that originally developed during the 1980s. A sand lobe complex associated with the dendritic channels has continued to increase in area, and the reduction in eelgrass productivity at one study site is likely due to sediment deposition occurring from the evolution of the sand lobe complex.

As was reported in the AMS 2007 Annual Report, some reduction in eelgrass distribution had occurred in the area of the new drainage channels adjacent to the DP3 footprint, as a result of DP3 construction activities. Not only have these channels stabilized, as reported above, the eelgrass habitat in the area has also recovered. The distribution has changed; however, the net area occupied by eelgrass at this location is comparable to the area mapped in 2003. It is also possible that the eelgrass habitat will expand to cover substrate that is currently unvegetated. Further monitoring of this area is part of the continuing AMS program, which will allow for a continued assessment of eelgrass habitat in this area.

## **Benthic Community**

Based on the results of the benthic community sampling conducted during the 2008 AMS monitoring program, the benthic invertebrate populations at both the inter-causeway stations and at the reference stations appear to be diverse and the data do not suggest a trend towards eutrophication. The Scientific Advisory Committee has recommended the addition of a ninth sampling station to the 2009 AMS program. The new station will be in the vicinity of the new drainage channels located adjacent to the DP3 footprint and will aid in the continued assessment of the recovery of this area.

## **Bird Populations**

The birds observed at Roberts Bank have been organized into six categories for the purposes of the AMS program, including great blue herons, brant geese, shorebirds (including western sandpipers), coastal waterbirds, raptors, and 'other' birds. The results of the second year of AMS monitoring support the 2007 AMS finding that impacts to birds within the intercauseway area appear to be limited to direct habitat loss from the DP3 project footprint, as was predicted by the environmental assessment. As observed during the 2007 survey period, the 2008 monitoring indicates that in response to this habitat loss, birds use alternative habitat available within the inter-causeway area.

## **Additional Information**

Detailed information on the AMS program, the findings of the 2008 field program, and the recommendations for changes to the AMS program for 2009 are contained in the 2008 Annual Report, which can be accessed through the Port Metro Vancouver website at [www.portmetrovancover.com](http://www.portmetrovancover.com).

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