Deltaport Third Berth
Adaptive Management Strategy
2007

HEMMERA

AMS Objective

- To provide practical advance warning of the potential for impacts on habitat from eutrophication and erosion during DP3 construction and operation

AMS Contributors

AMS developed by Hemmera with input from:

- Vancouver Port Authority
- Environment Canada (including CWS)
- Fisheries and Oceans Canada
- Natural Resources Canada
- Canadian Environmental Assessment Agency
- Geological Survey of Canada
- Precision Identification Biological Consultants (eelgrass specialists)
- Northwest Hydraulic Consultants (geomorphology)

AMS Project Team

Mike Geraghty (Hemmera)

Project Manager

Christine Lussier (Hemmera)

Water, Sediment & Benthos

James Rourke (Hemmera)

Birds

Derek Ray (NHC)

Coastal Geomorpholgy

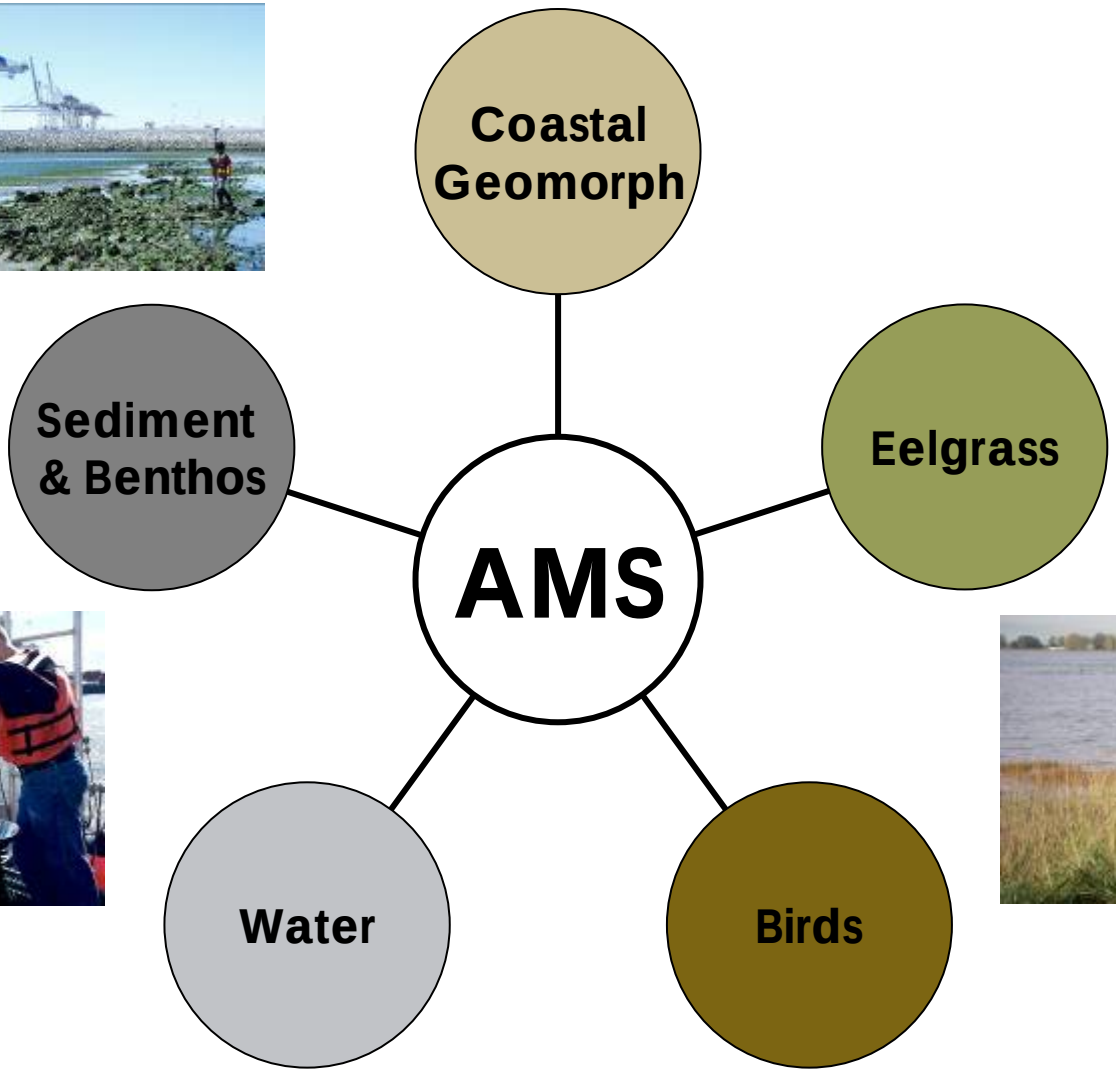
Cynthia Durance (Precision)

Eelgrass

northwest hydraulic consultants nhc

Precision Identification Biological Consultants

Key Components of the AMS



AMS Schedule

Water & Sediment

Q1: Mar 22-24, 2007

Q2: Jun 20-21, 2007

Q3: Oct 1-2, 2007

Q4: Dec 10, 2007

Benthos

March 2007

Eelgrass

September 2007

Birds

Biweekly

Geomorphology

Crest Protection - quarterly

Erosion and deposition - quarterly

Sediment Grain Size – biannual (early spring/late summer)

Turbidity – continuous

Aerial Photography – annual (July)

AMS Review Process

Final Report Submission

Data Collection

Lab Analysis

Data QA Review

Data Compilation Data Evaluation

Report Preparation

Draft Report Submitted to VFPA/SAC

SAC Review

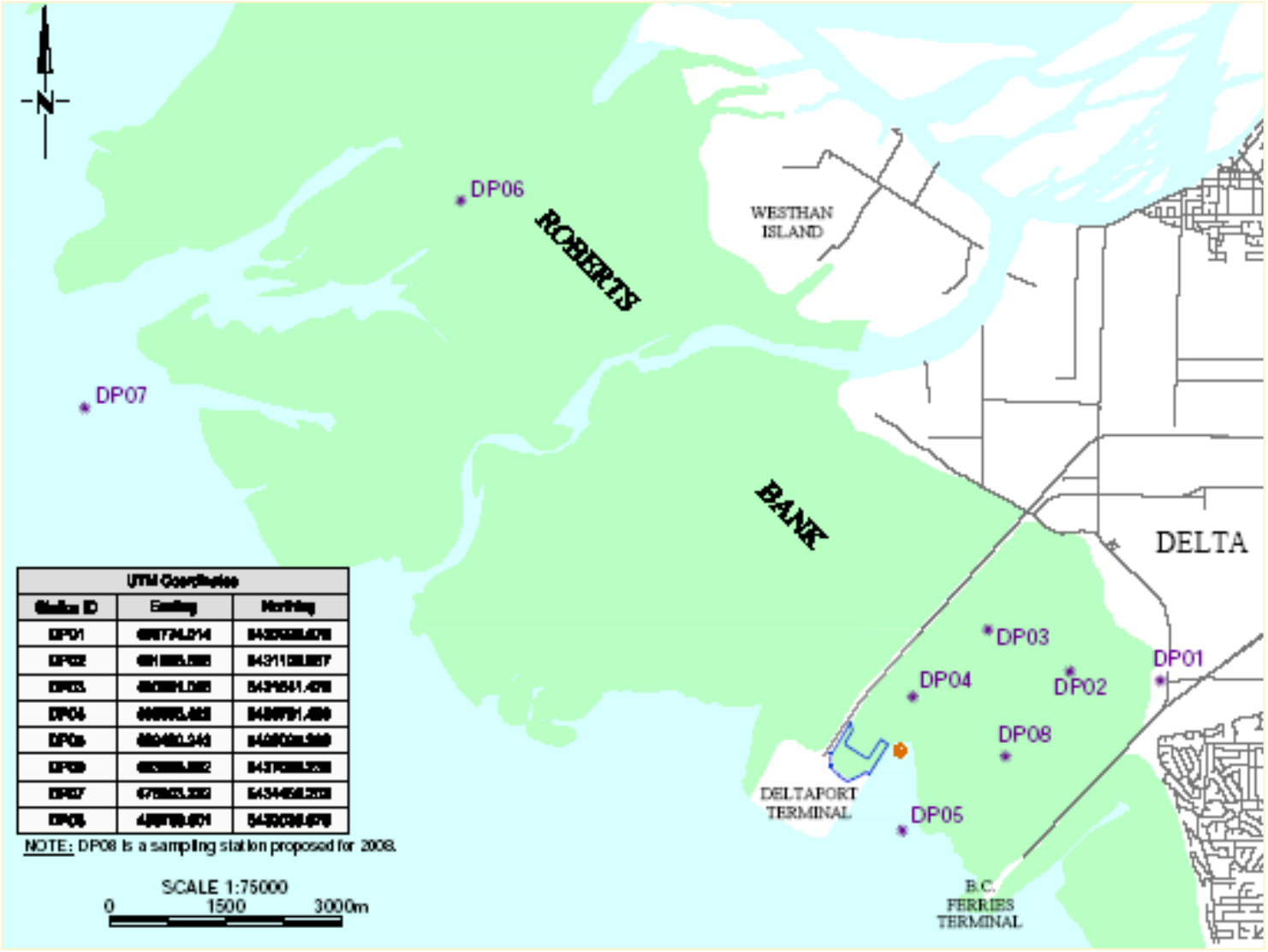
Response to Comments

Geomorphology Monitoring Locations

Geomorphology – Critical Take Aways

- Low magnitude of erosion/deposition (2- 4 cm), as predicted.
- Suspended sediment concentration is very low
- Drainage channels that formed adjacent to the Perimeter Dike have stabilized and beginning to recover
- Tidal flats near DP3 appear insensitive to typical storm events
- Little change to the Crest Protection Structure

Water, Sediment and Benthos Monitoring Locations



UTM Coordinates		
Station ID	Easting	Northing
DP01	[illegible]	[illegible]
DP02	[illegible]	[illegible]
DP03	[illegible]	[illegible]
DP04	[illegible]	[illegible]
DP05	[illegible]	[illegible]
DP06	[illegible]	[illegible]
DP07	[illegible]	[illegible]
DP08	[illegible]	[illegible]

Water Quality – Critical Take Aways

- No metals exceeded the federal CCME water quality criteria
- A few metals exceeded the provincial guidelines, but were within known ranges for seawater or were linked to suspended sediment
- Hydrocarbons were below laboratory detection limits and were dropped from the program

Water Quality – Critical Take Aways

- Nitrate levels met the federal CCME criteria
- Nutrient concentrations were typically higher in inter-causeway area than at reference stations
- Some parameters showed seasonal variation (e.g. a decrease in dissolved oxygen in late summer/early fall), but there were no trends suggesting eutrophication

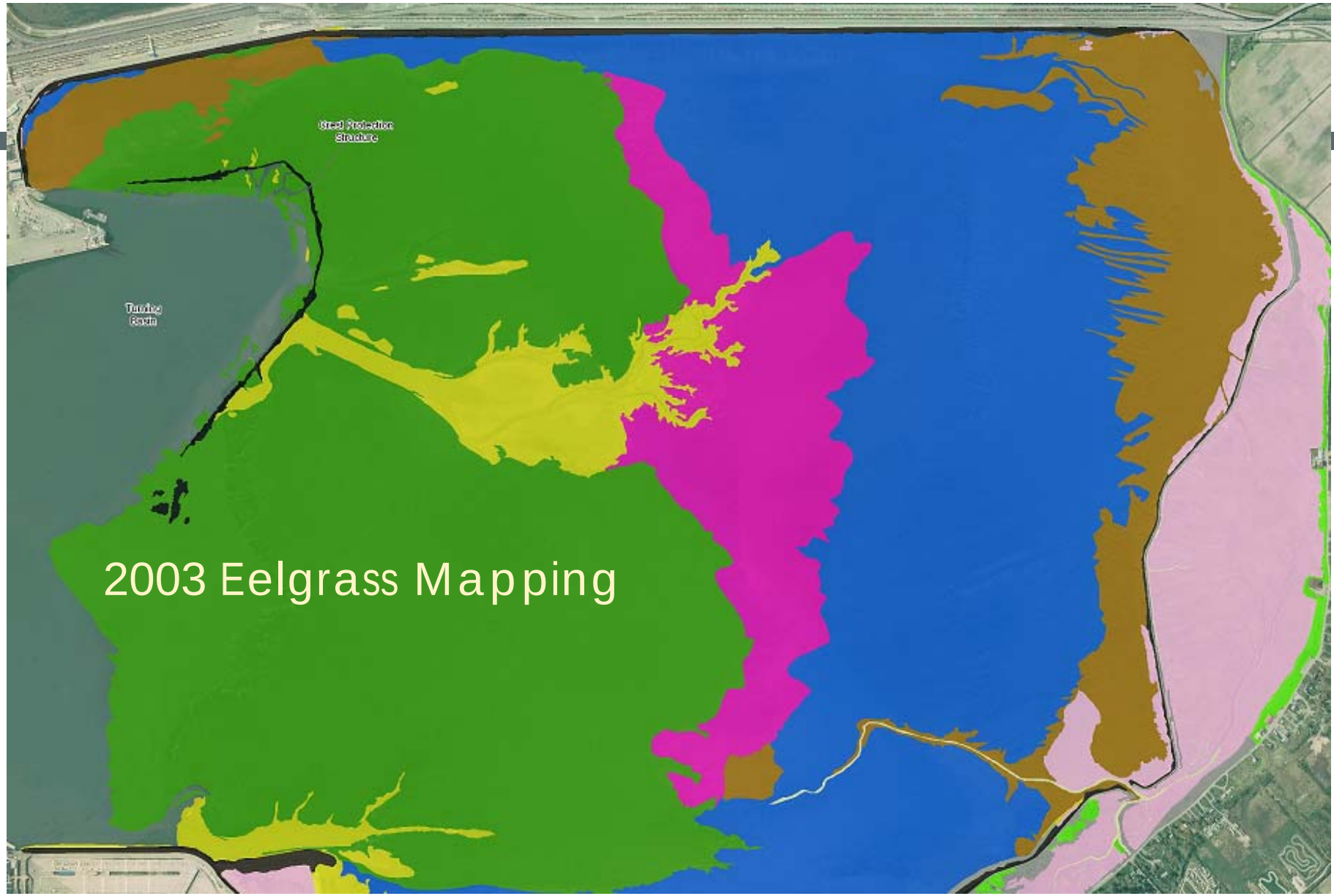
Sediment Quality – Critical Take Aways

- No parameters exceeded BC MOE sediment criteria for sensitive marine sites
- Metal concentrations in the intertidal zone were consistently lower in the inter-causeway area than at the reference station
- Nutrient concentrations varied seasonally, but there were no trends suggesting eutrophication

Benthos – Critical Take Aways

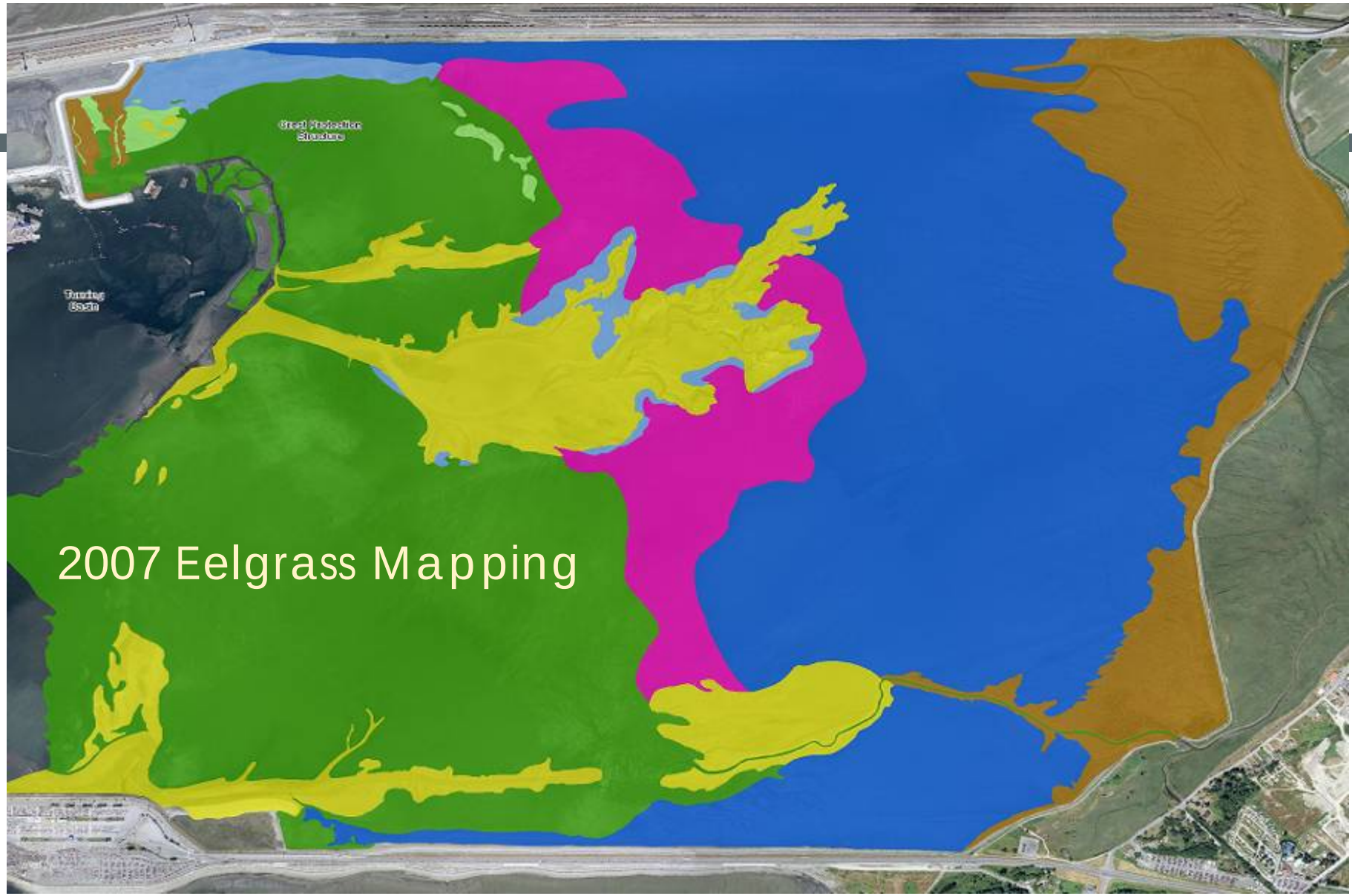
- The benthic invertebrate populations in both the inter-causeway area and the reference area appeared diverse, healthy, and well established
- Data from Year 2 and 3 of the AMS are required to evaluate year to year changes in the benthic community structure

Eelgrass Monitoring Locations



2003 Eelgrass Mapping

Precision Identification
Biological Consultants



2007 Eelgrass Mapping

Precision Identification Biological Consultants

Eelgrass – Critical Take Aways

- Eelgrass community is healthy
- Epiphytes within normal range and no *Beggiatoa*
- No impacts from DP3 construction on measured growth parameters
- Eelgrass is recovering in the area of the drainage channel
- Net increase in eelgrass habitat from 2003

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Bird Monitoring Transects

Bird Surveys – Critical Take Aways

- There were no observed impacts to herons, Brant geese, shorebirds (sandpipers and dunlin), coastal waterbirds or other birds

Recommended Adaptations

Surface Water, Sediment, and Benthos

- Hydrocarbons dropped
- Add DP08 for benthos
- Additional 2008 benthos sampling

Coastal Geomorphology

- Discontinue turbidity monitoring at the end of 2008
- Add 8 DoD rods to monitor the area of the new drainage channels
- Reduce Crest Protection monitoring to 2 times per year

Birds

- Surveys reduced from every 2 weeks to every from 4 weeks, except during spring sandpiper migration
- Winter surveys Dec to Feb reduced to one tidal event
- Ferry causeway dropped and TFN reduced
- Windshield surveys for Brant geese and herons at key periods

Eelgrass

- No Changes

AMS 2007 Summary

- There were no erosion or geomorphological changes of concern
- The sediment, water, benthic invertebrate, eelgrass, and bird data showed no evidence of adverse impacts from DP3 construction and no evidence of a trend towards eutrophication in the inter-causeway area