

Why use Sediment Trend Analysis (STA®) in UXO Remedial Investigation/Feasibility Studies ?

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*Because Munitions and Explosives of Concern (MEC), Munitions Debris (MD)
and Munitions Constituents (MC) are inextricably linked to the sediments.....*

...and STA is the only method to know how an environment is working


—GeoSea®—

METHODS NOW IN USE

➤ In Situ Measurements

➤ Models



SOME FACTORS FREQUENTLY MEASURED OR MODELED TO STUDY SEDIMENT TRANSPORT

- **(1) river discharge**
- **(2) tides**
- **(3) waves**
- **(4) wind driven currents and return flows**
- **(5) bottom shear stress**
- **(6) meteorological parameters**
- **(7) bathymetry**
- **(8) extreme events**
- **(9) large numbers of factors that can't be measured**

***“Make things
as simple as
possible,
but not any
simpler.”***



Albert Einstein



SO WHAT'S MISSING?

- (1) rivers
- (2) tides
- (3) waves
- (4) wind driven currents and return flows
- (5) bottom shear stress
- (6) meteorological parameters
- (7) bathymetry
- (8) extreme events
- (9) large numbers of factors that can't be measured
- (10) THE SEDIMENTS!

METHODS NOW IN USE

➤ In Situ Measurements

➤ Models

WE NOW HAVE A THIRD METHOD

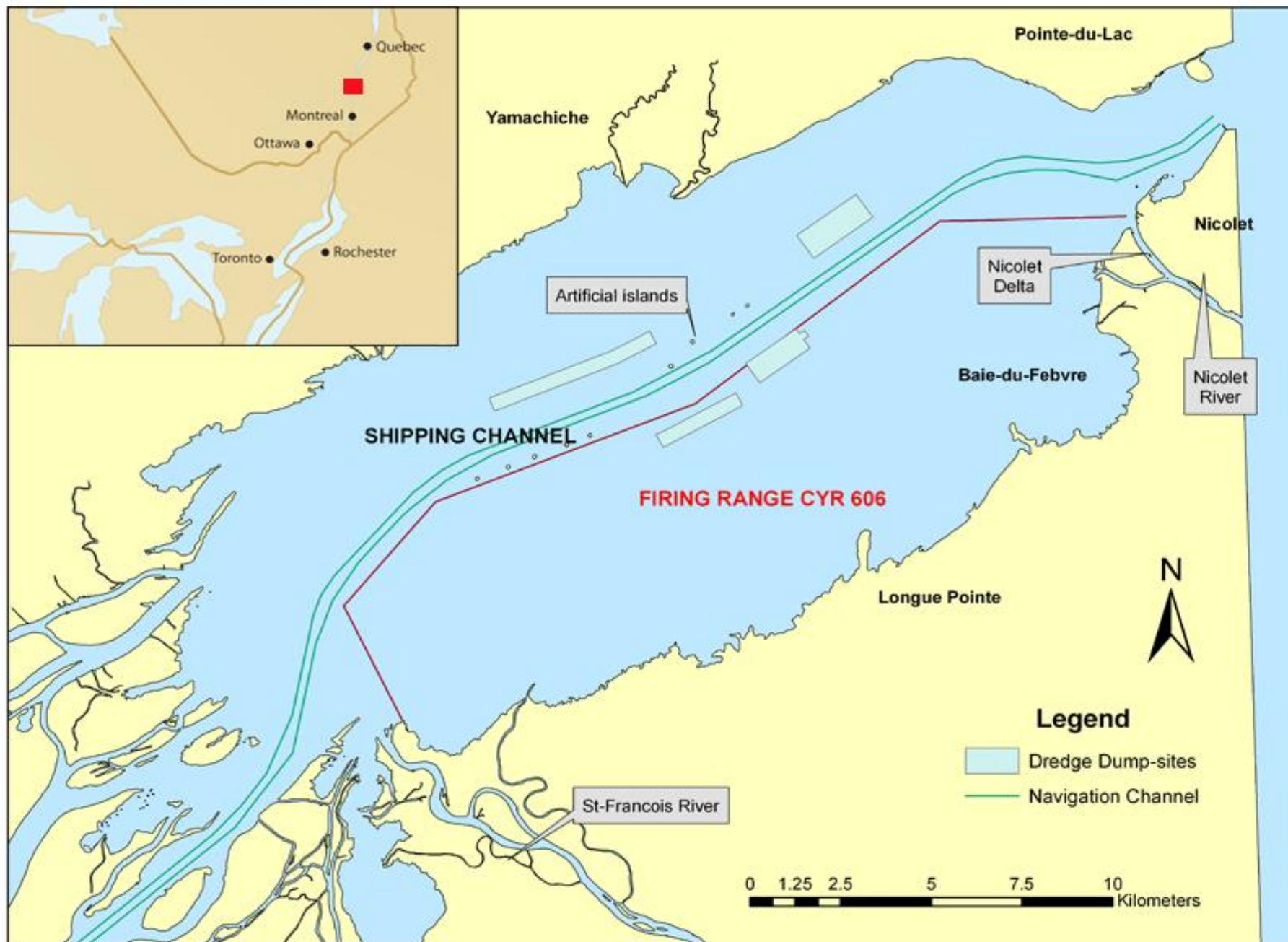
➤ Sediment Trend Analysis (STA[®])

WHAT IS SEDIMENT TREND ANALYSIS (STA[®])?

- STA[®] is a technique to recognize patterns of net sediment transport and their dynamic behaviour.

Sediment Trend Analysis (STA[®]) in support of UXO/contaminant risk analysis and remediation

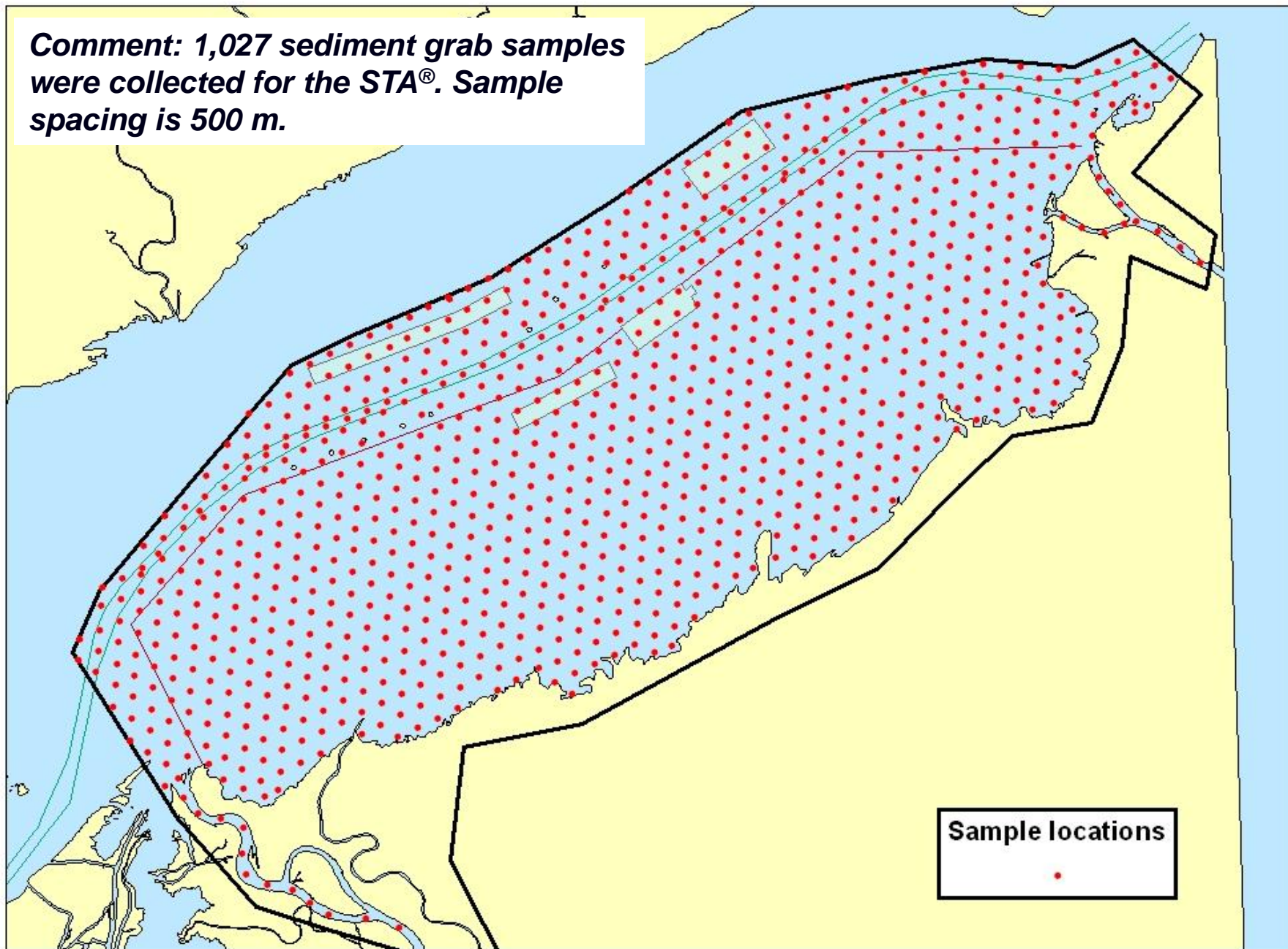
*An Example from: Lac Saint Pierre, Quebec
(UXO Program, Canadian Department of National Defence)*

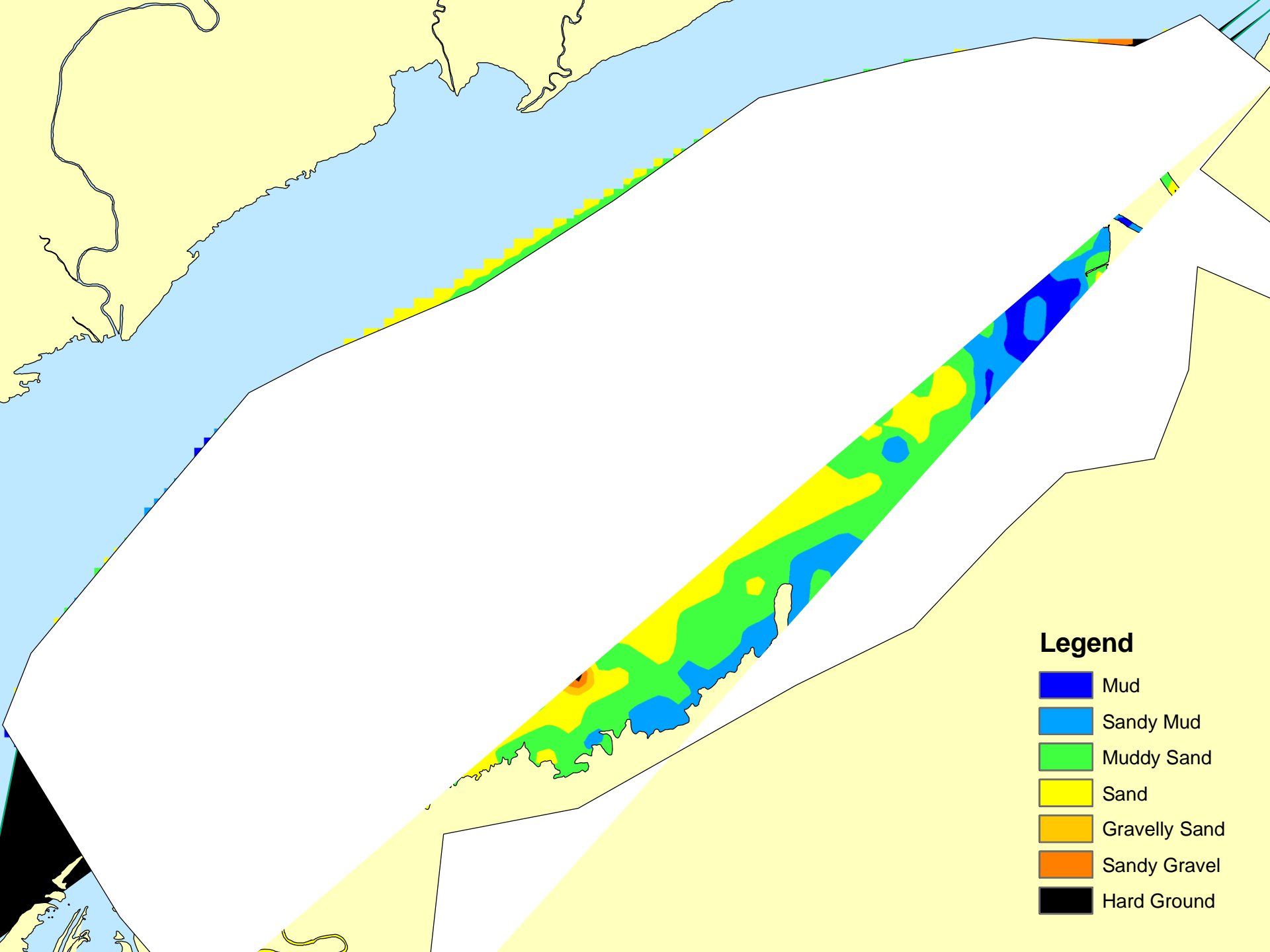


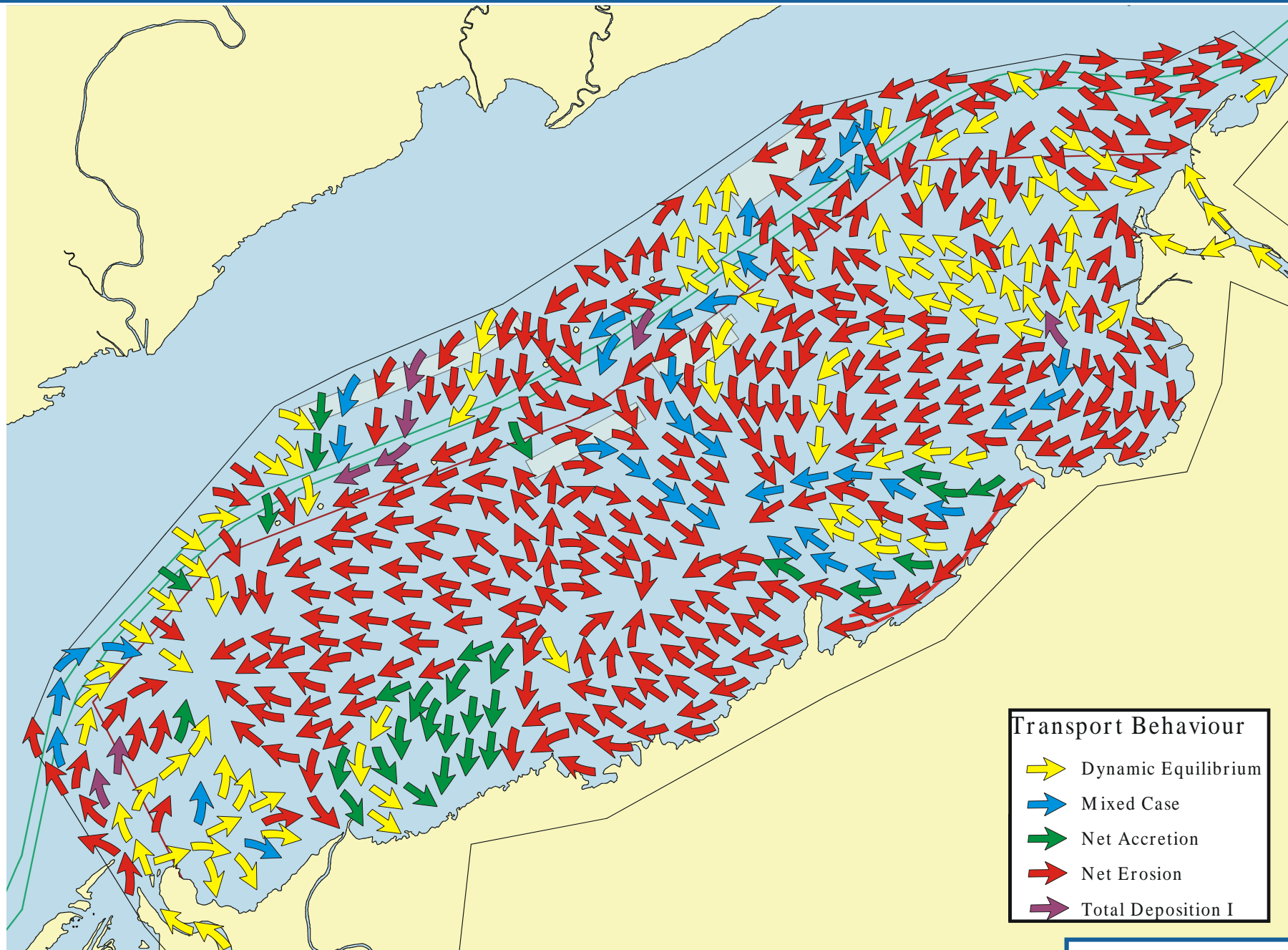


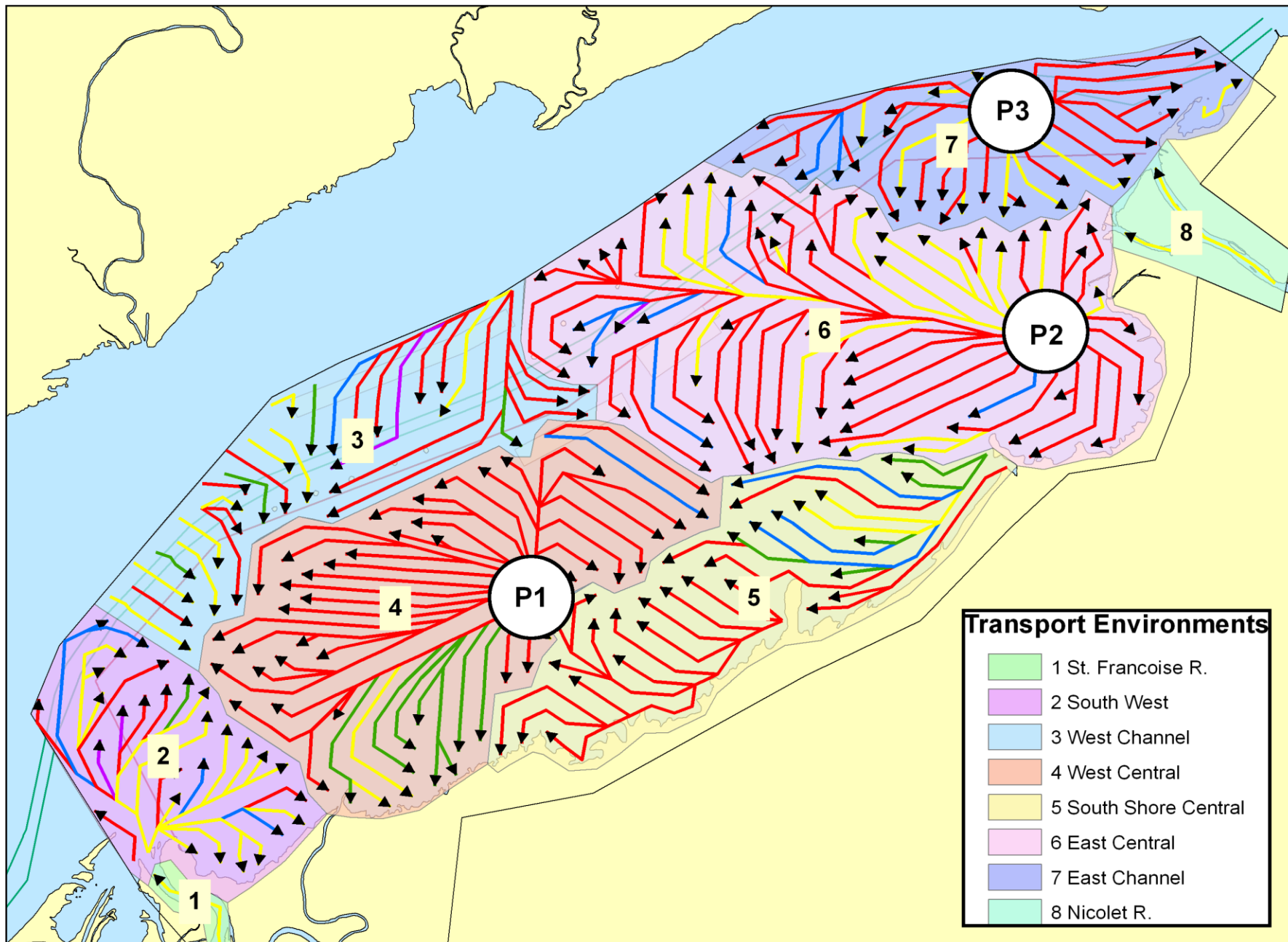


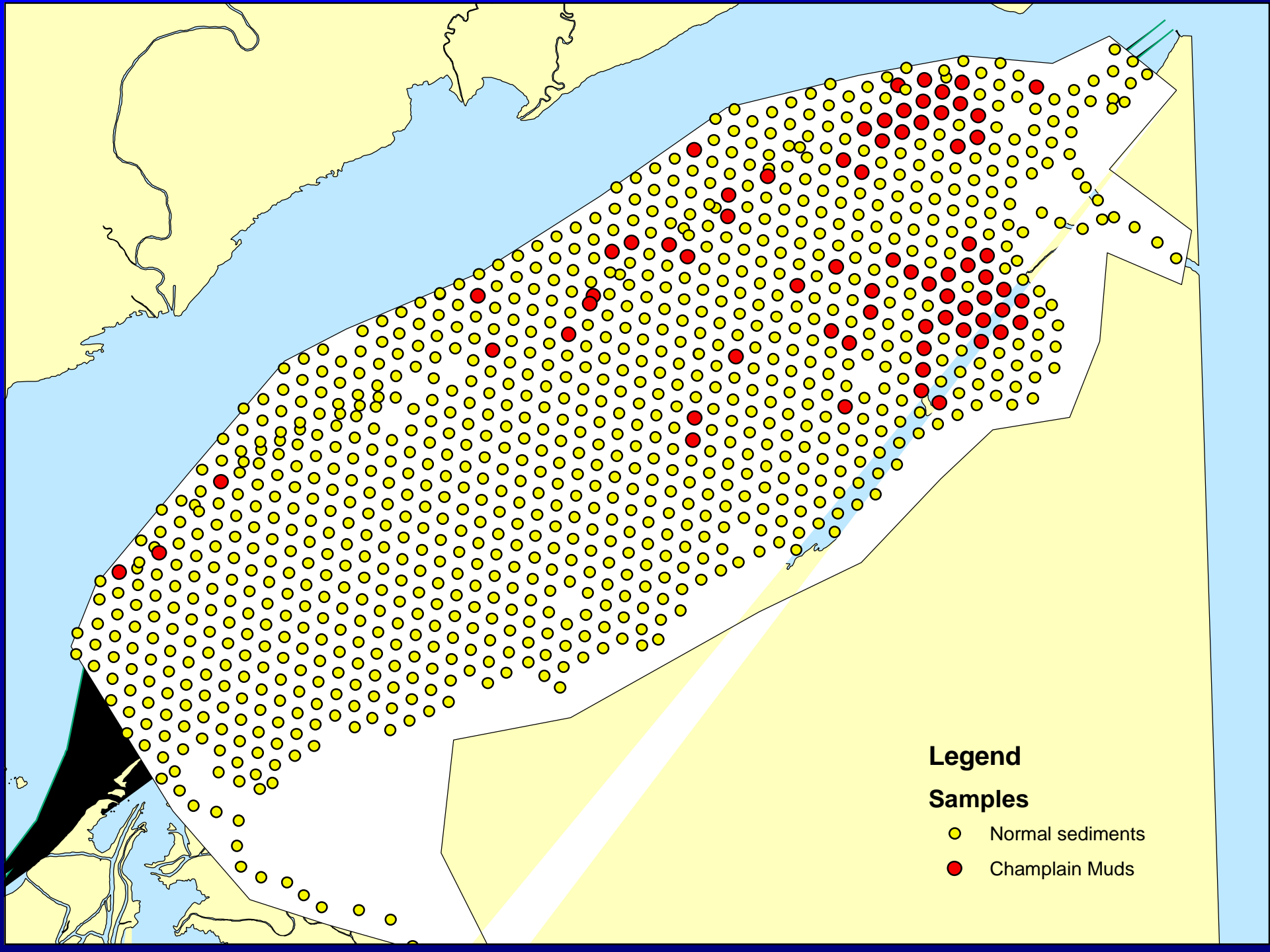
Comment: 1,027 sediment grab samples were collected for the STA®. Sample spacing is 500 m.



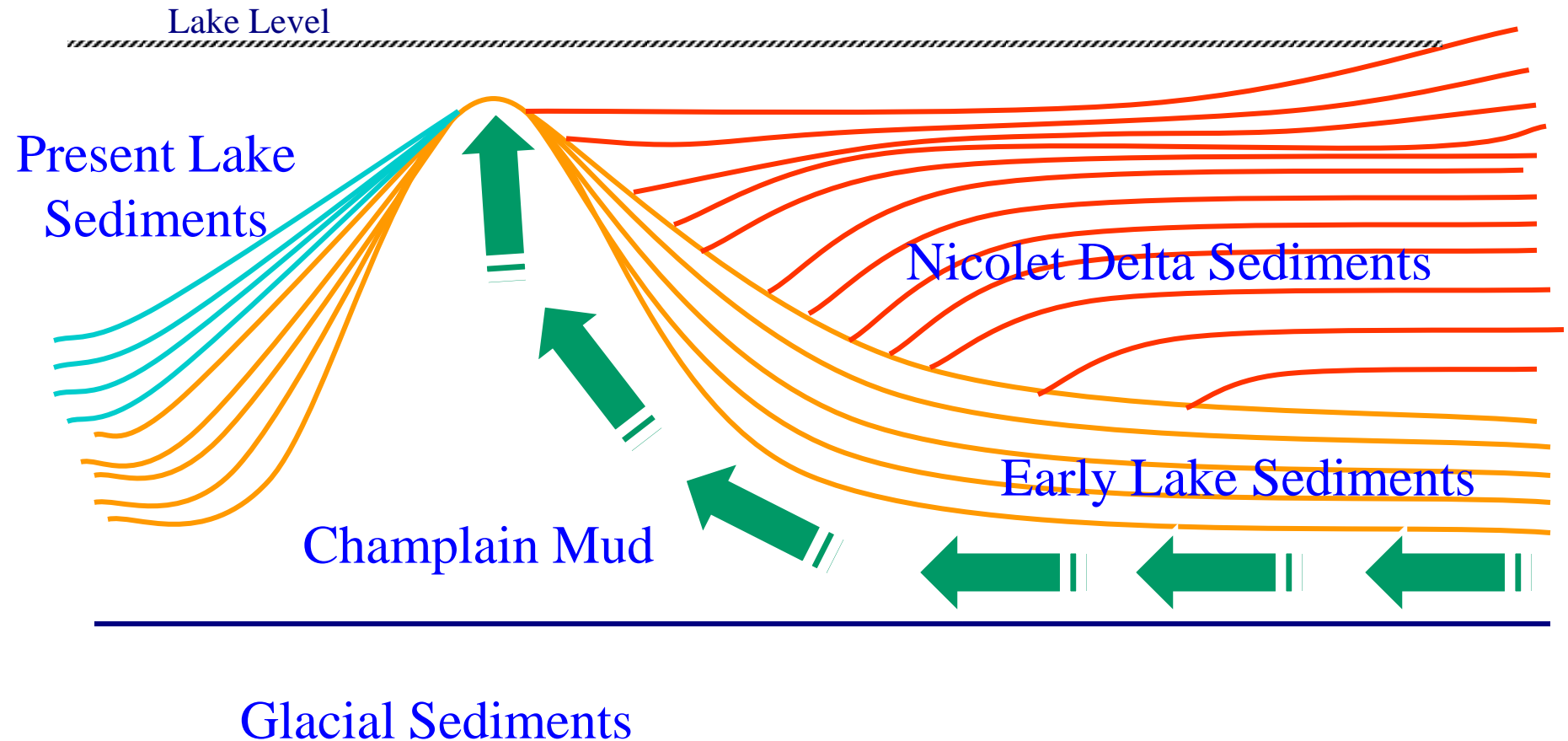




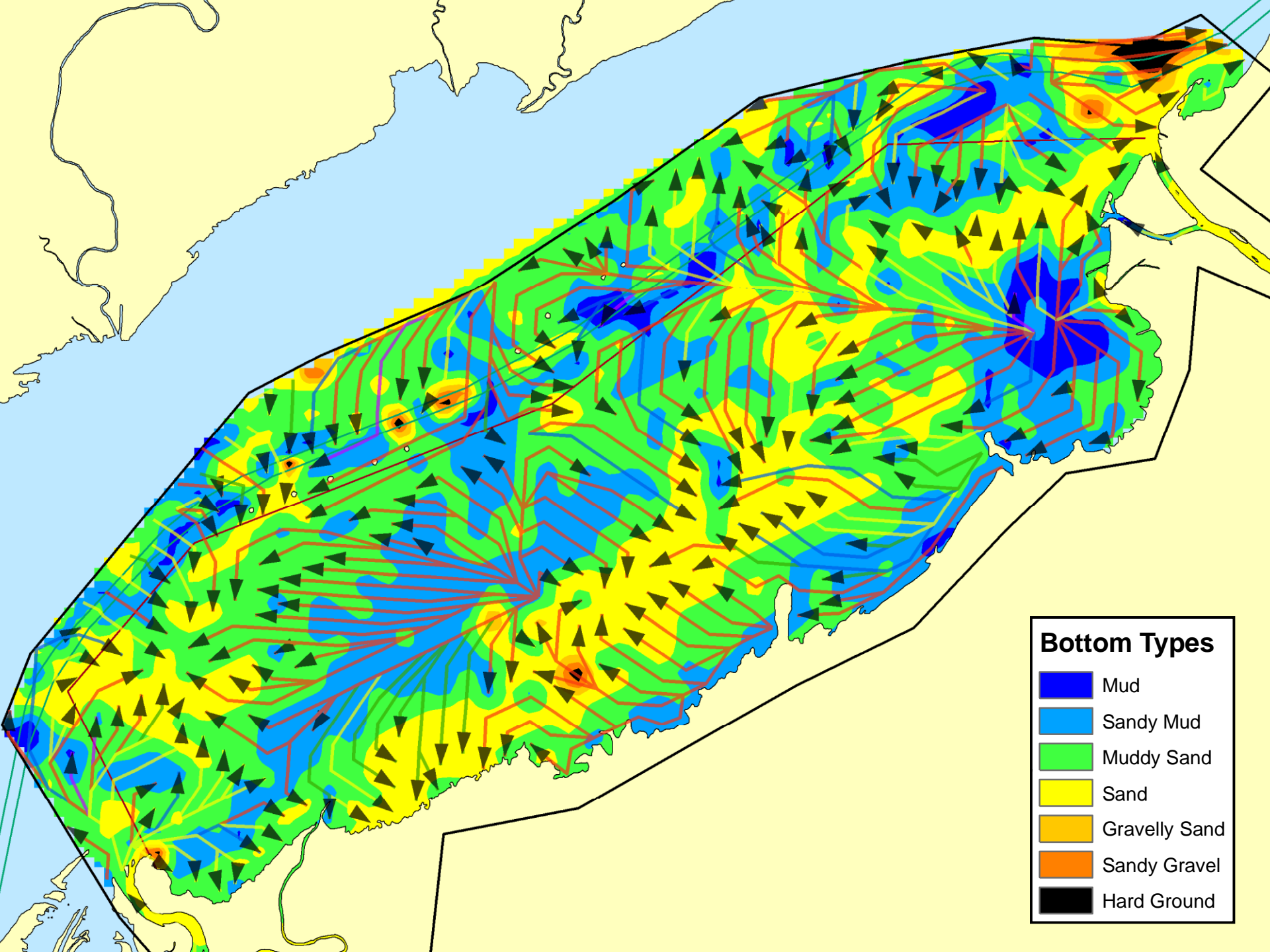


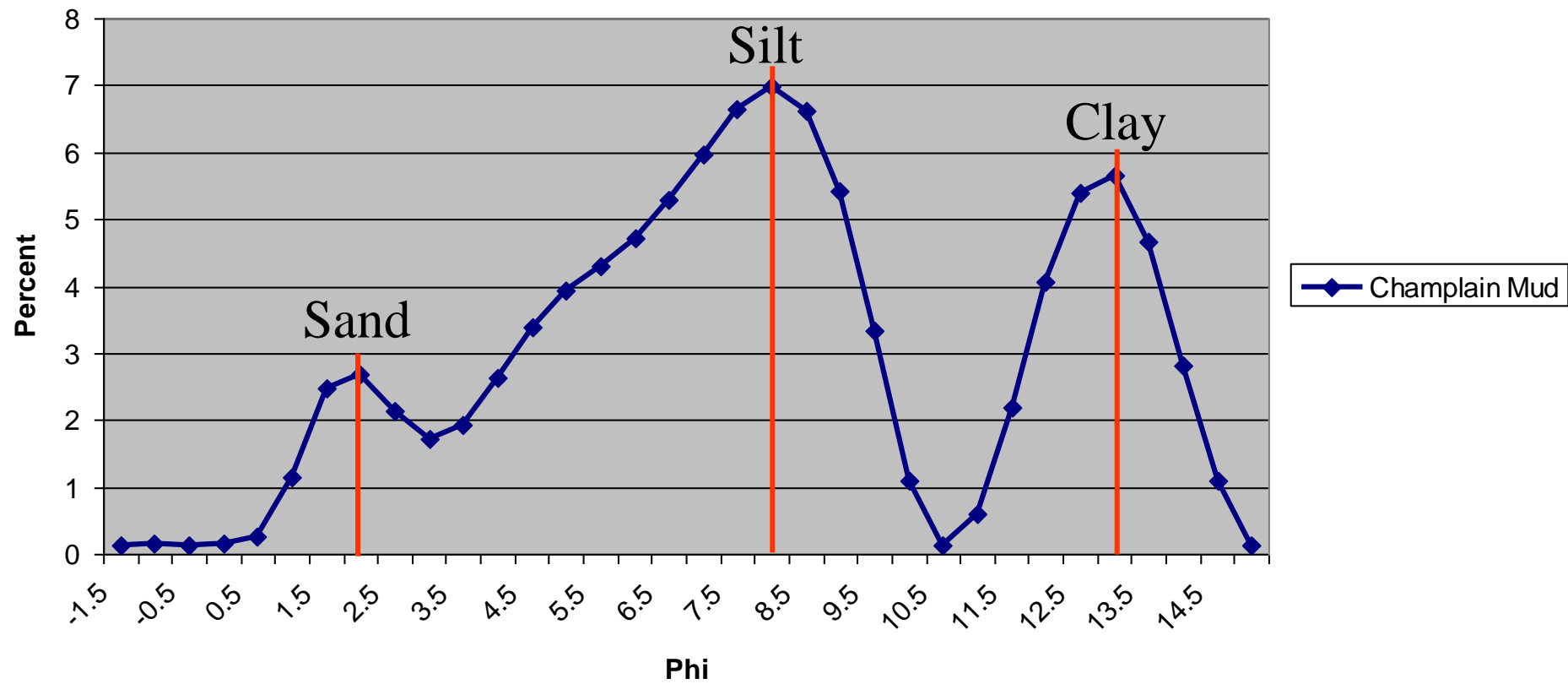


FORMATION OF A CHAMPLAIN MUD DIAPIR

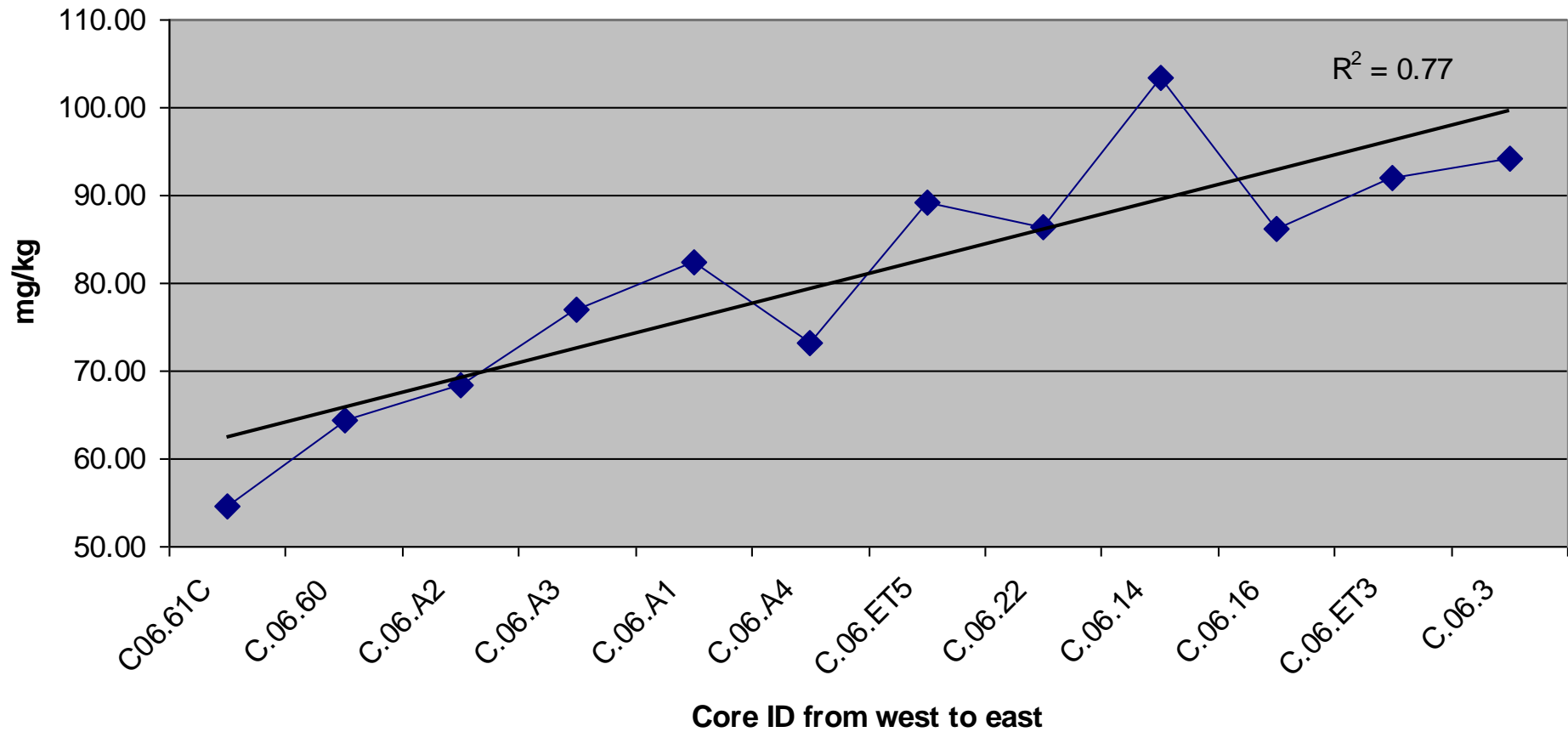




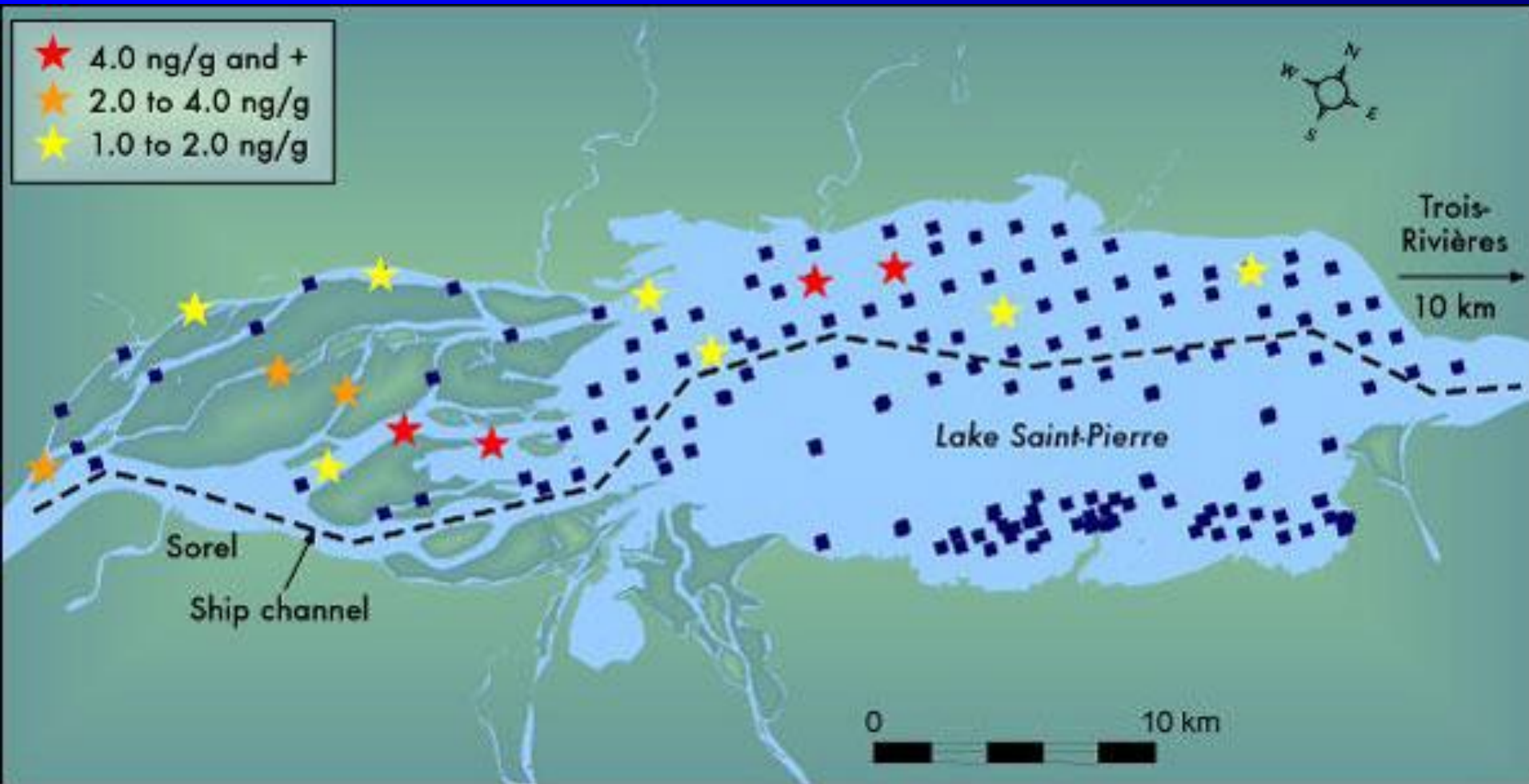


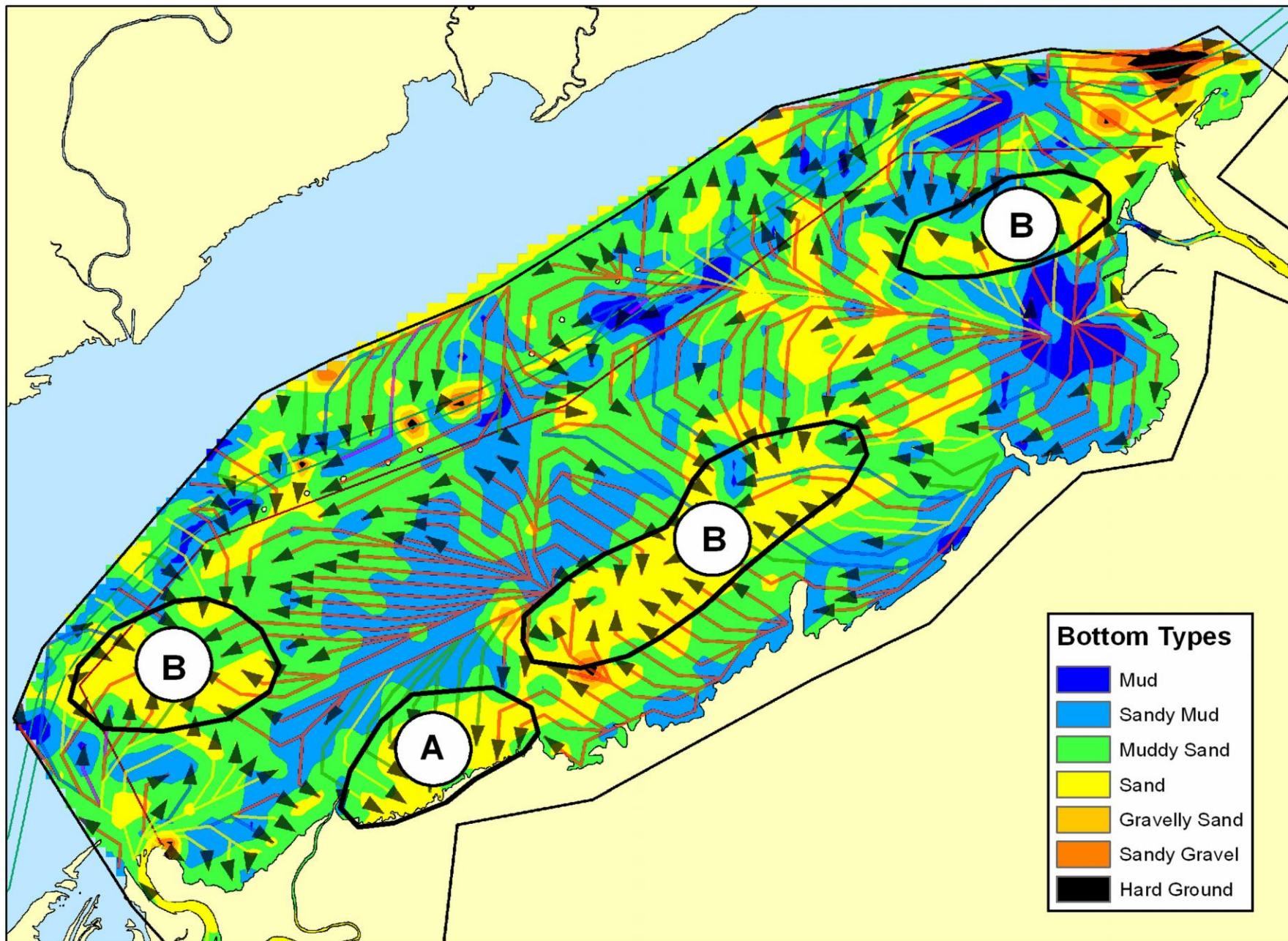


Average values of Cr from west to east (ending at the Parting Zone in Baie-du-Febvre). (DND data)



Concentrations of PBDE47 (polybrominated diphenyl ethers) (Env. Canada Website)





STA[®] PROVIDES ANSWERS

➤ *Are sediments inside the firing range contaminated due to military activities?*

NO

➤ *Will UXO clearance activities (BIP or dredging) negatively affect the physical environment?*

NO

➤ *Will shells and associated UXO materials accumulate at preferred locations?*

YES

➤ *Are there savings (\$\$) to be had using STA[®]?*

ABSOLUTELY!

—GeoSea[®]—



IN CONCLUSION

- STA[®] provides a genuine understanding of how an environment is working.
- With this understanding decisions can now be made to reduce risk and unnecessary expenditures.
- STA[®] is clearly defensible and easily accepted by stakeholders.
 - 1: No prior assumptions have been made in carrying out the technique.
 - 2: It is easy to accept that sediments do move about and that grain size distributions will be changed by that movement.
 - 3: The data required (i.e., the grain-size distributions) cannot be disputed.
 - 4: The derived patterns of transport account for all the data and are themselves self-validating.

➤ *In 26 years of STA[®] projects around the world, the results have NEVER been wrong.*

(Such a statement cannot be made for any other technique to “UNDERSTAND” sediment transport)