INDIVIDUAL AND CUMULATIVE IMPACTS OF ANTHROPOGENIC STRESSORS ON COASTAL ECOSYSTEMS: THE CASE OF SEPT-ÎLES, QC

Elliot DREUJOU [a] [b], Philippe ARCHAMBAULT [b], Christopher McKINDSEY [c]

[a] _Institut des sciences de la mer, Université du Québec à Rimouski, Rimouski QC (elliot.dreujou@uqar.ca)_
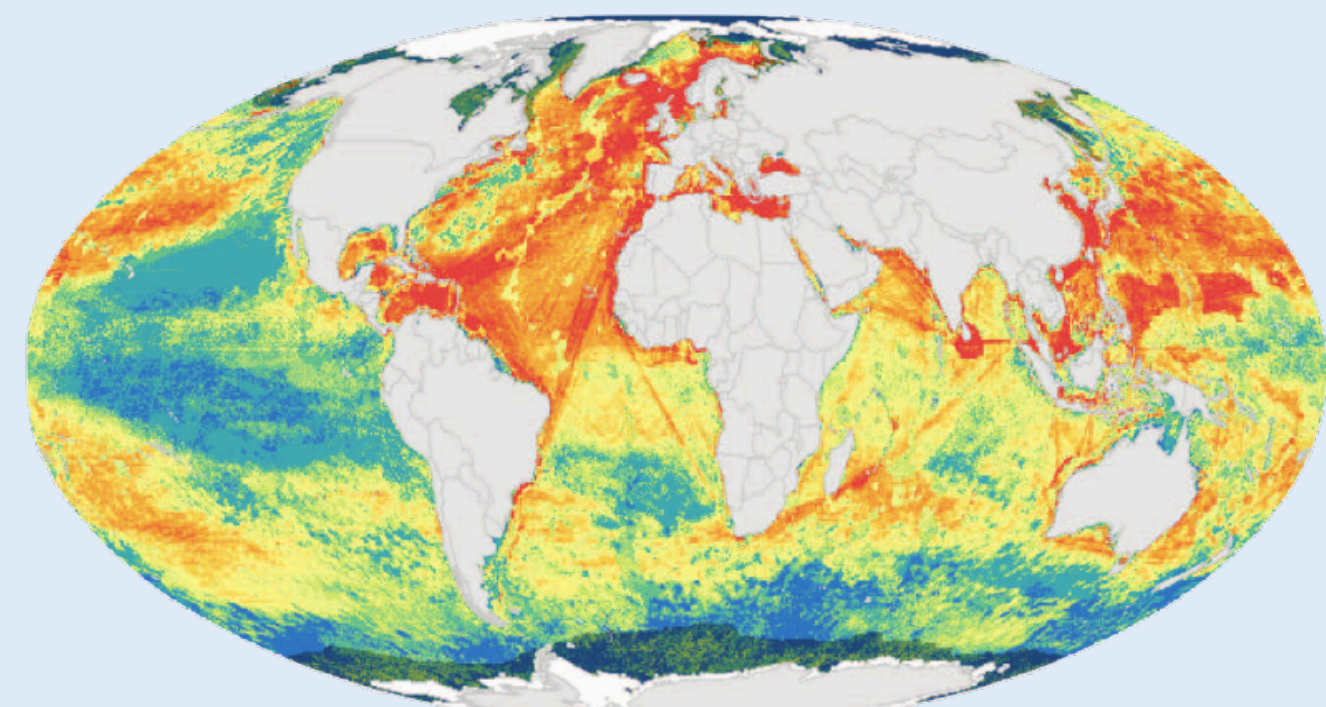[b] _Biology department, Université Laval, Québec QC_
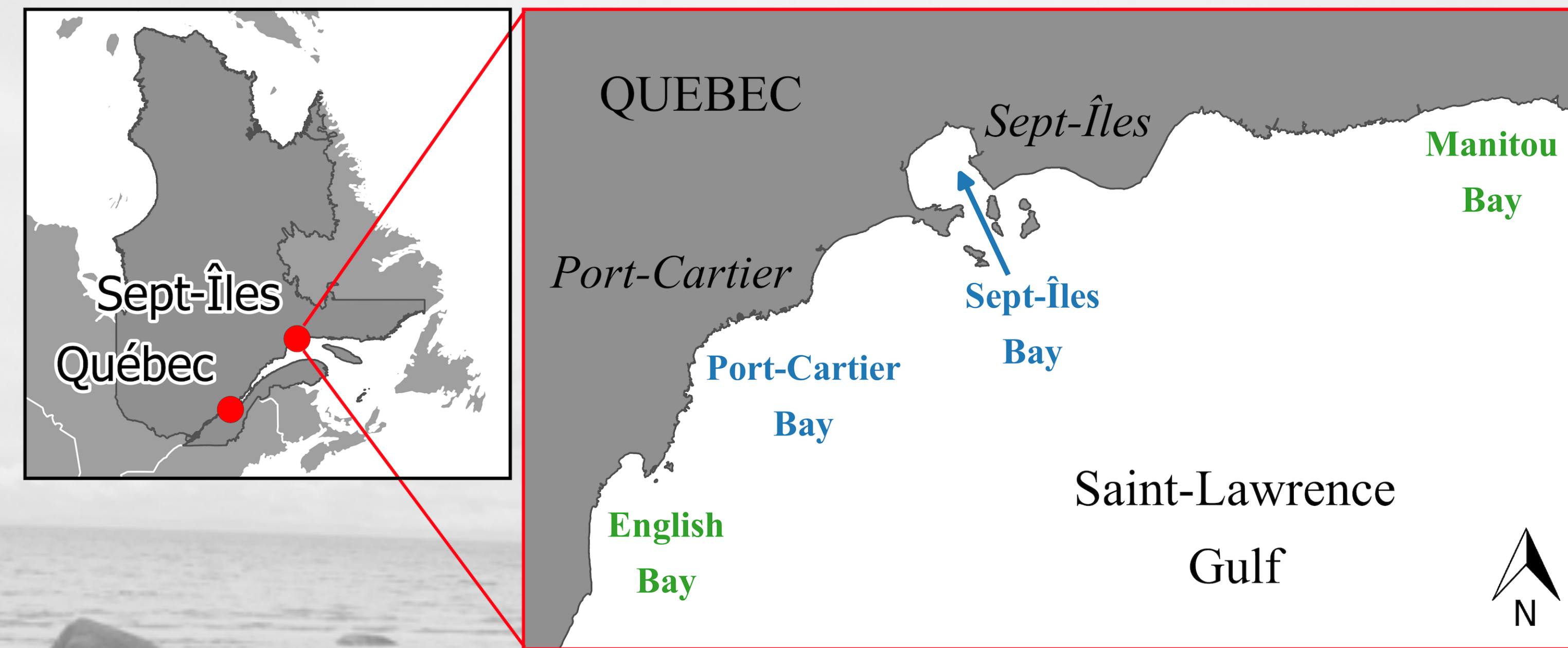[c] _Department of Fisheries and Ocean Canada, Institut Maurice-Lamontagne, Mont-Joli QC_

CONTEXT

All marine ecosystems in the world are impacted by at least one anthropogenic stressor (_Halpern et al. 2015_). Tools to evaluate their impacts at a fine spatial scale (local to regional) are scarce but needed to allow local habitat and species conservation.

Sept-Îles is one of the most important and frequented harbour in North America and it hosts many industries (ore transformation…). To develop new methodologies this region has been chosen for the characterization of anthropogenic stressors on benthic ecosystems.

Cumulative impact scores for the world's ecosystems (Halpern et al. 2015)

How are coastal ecosystems impacted by multiple human activities ?
1. Determine current state of the ecosystems around Sept-Îles,
2. Characterize the sources and influences of anthropogenic stressors,
3. Develop local indicators of environmental status based on communities.

GOAL 1

Relationships between benthic communities and their habitat
➢ Evaluate biotic and abiotic components of studied ecosystems
➢ Describe species distribution according to the characteristics of their habitat
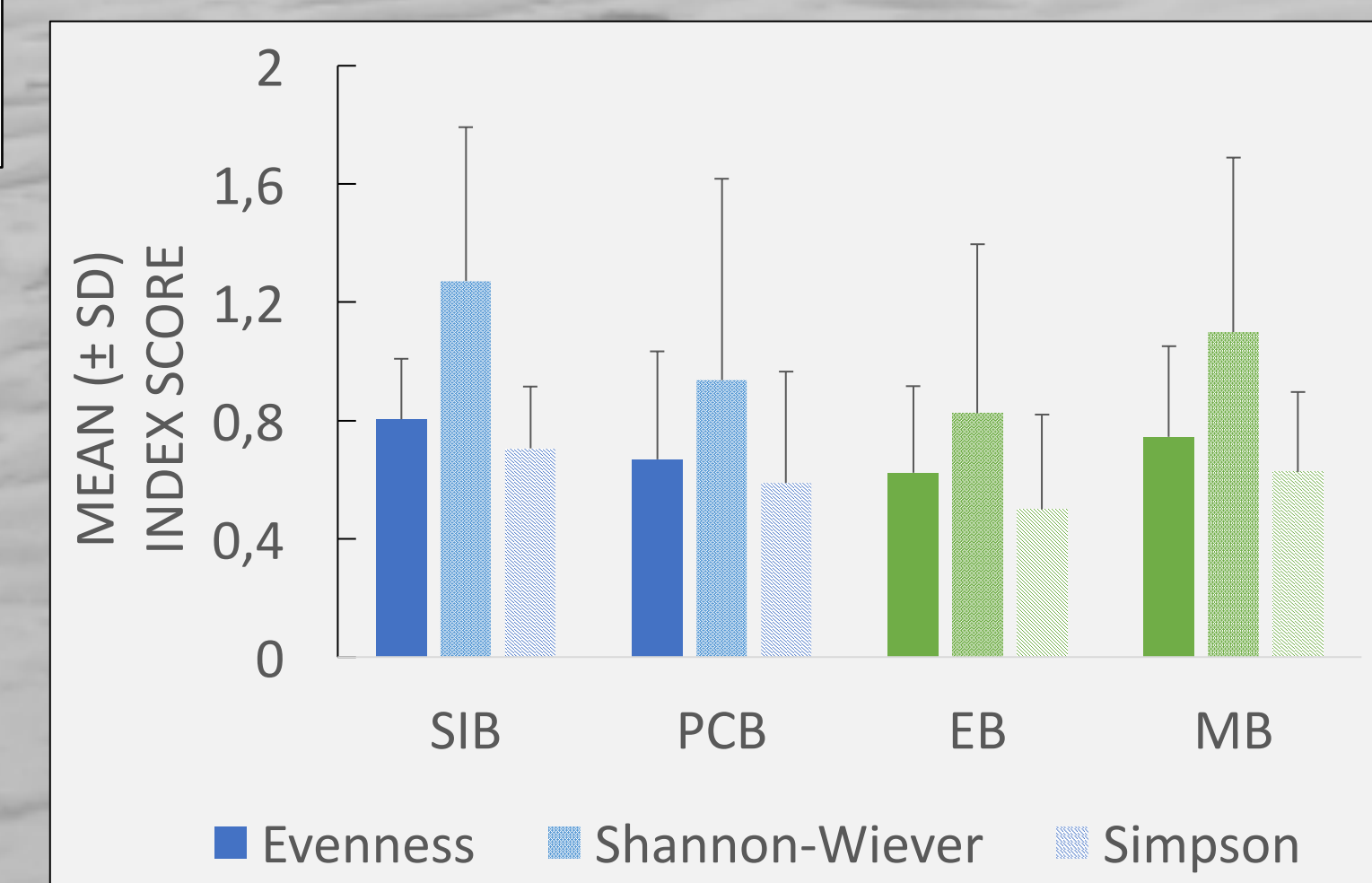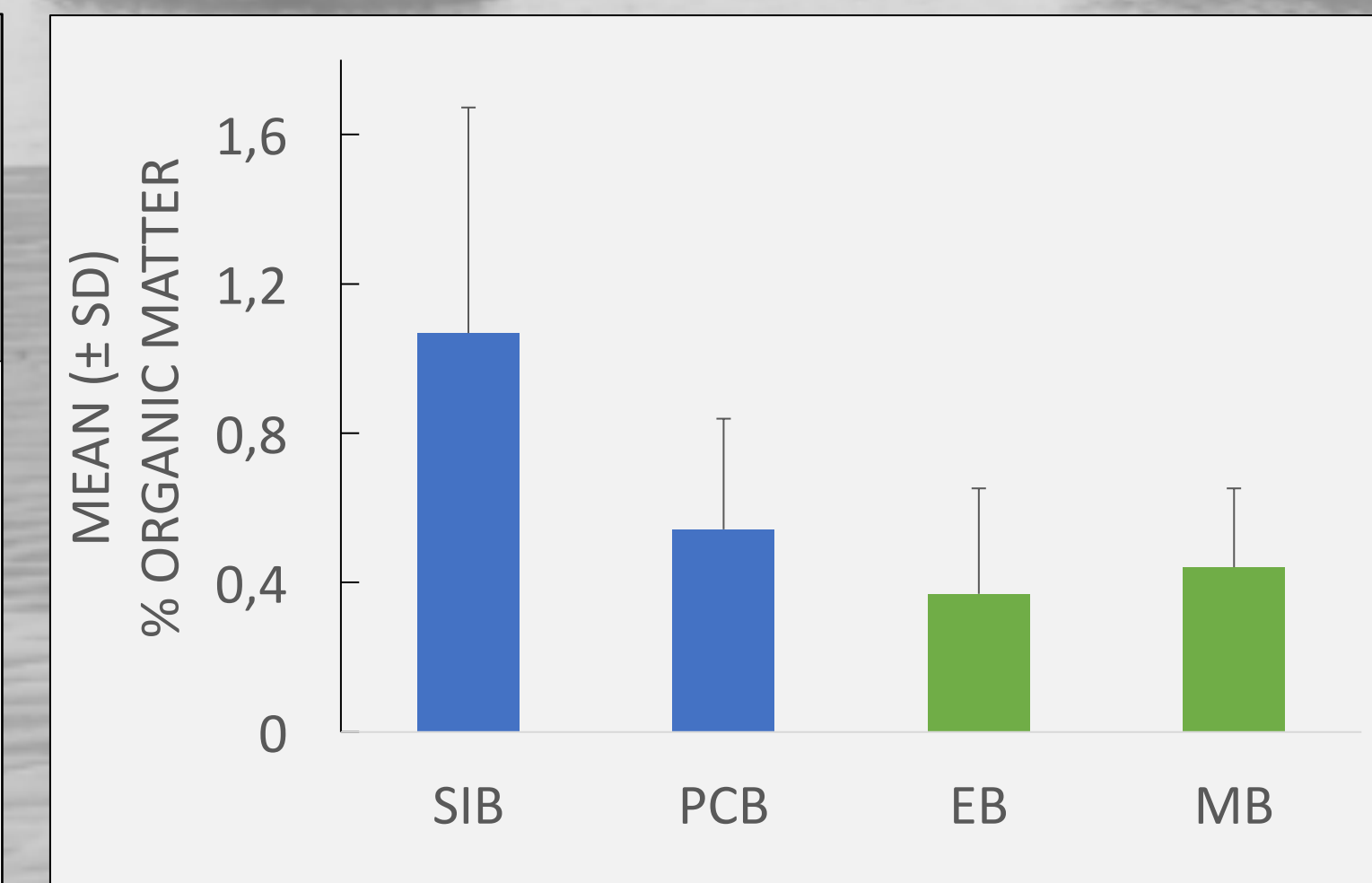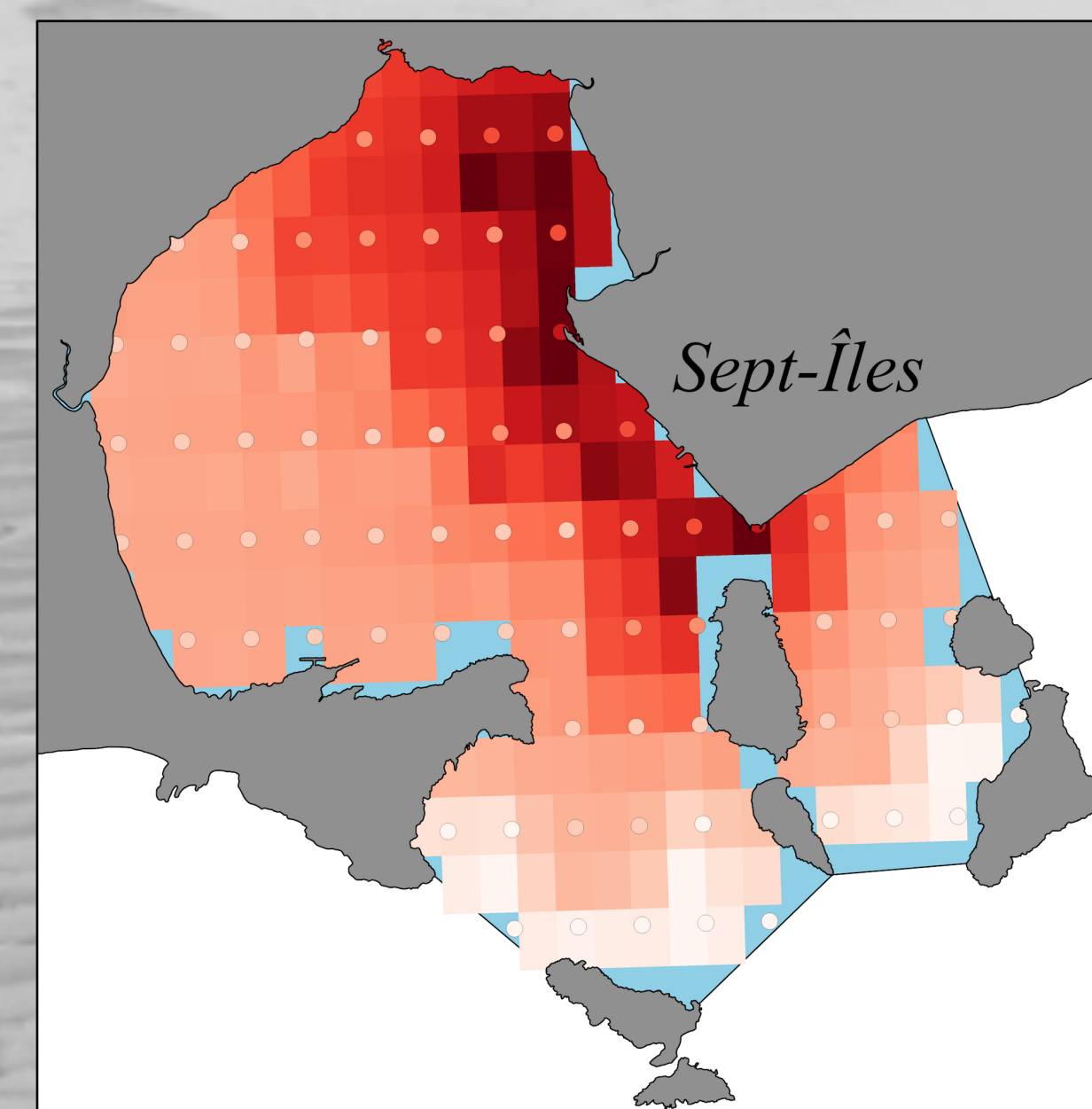➢ Compare natural and anthropic ecosystems

GOAL 2

Impact of anthropogenic stressors on benthic ecosystems
➢ Define the sources of each anthropogenic stressor
➢ Characterize which environmental parameters are impacted by the studied stressors
➢ Study the links between spatial distribution of stressors and communities

GOAL 3

Predict impacts of human activities at a fine spatial scale
➢ Test the applicability of methods developed at large spatial scales and other systems for a local assessment (~ 100 m)
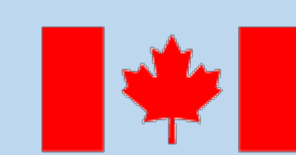➢ Develop new models and indicators of environmental status specific of Canadian ecosystems

PERSPECTIVES

Data on Sept-Îles benthic ecosystems and results on anthropogenic stressors gathered during this project will be highly useful for environmental impact assessments. Indices and methods will be developed to assess environmental status at a local scale. Future research on different regions of the Saint-Lawrence coast will allow us to test them on a larger range of ecosystems.

To go further:
- Halpern et al. 2015. _Nat Commun_.
- Korpinen & Andersen 2016. _Front Mar Sci_.
- Côté et al. 2016. _Proc R Soc B Biol Sci_.
- Judd et al. 2015. _Environ Sci Pol_.
- Hayes et al. 2015. _Ecol Ind_.
- Niemi & McDonald 2014. _Ecol Evol Syst_.