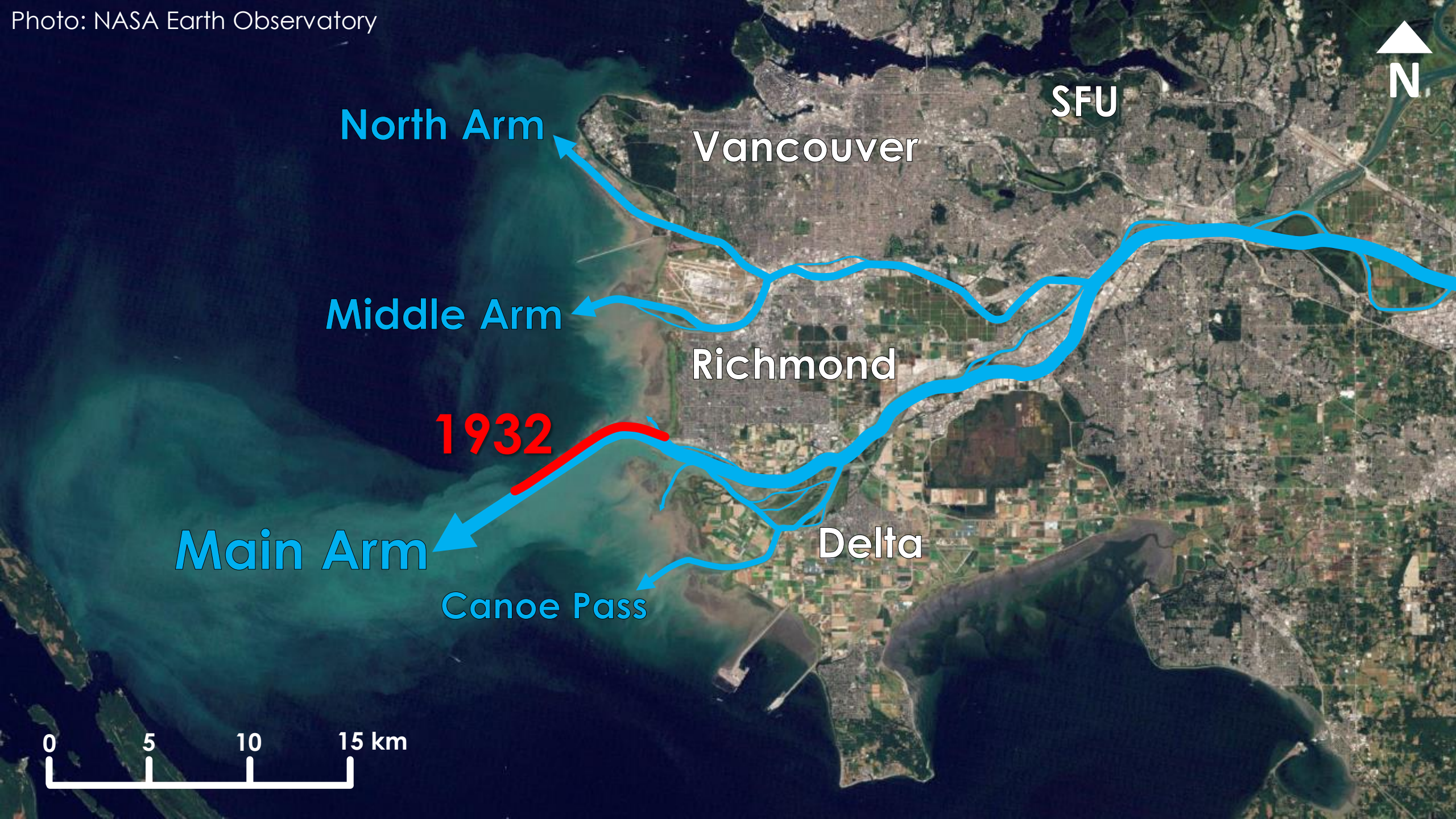


Research into the cause of brackish marsh recession in the Fraser River estuary

**Eric Balke, Brent Gurd, Sean Boyd, Richard Marijnissen,
Brad Mason, Kathleen Moore**

Photo: E. Balke



SFU

Vancouver

North Arm

Middle Arm

Richmond

1932

Main Arm

Delta

Canoe Pass

0 5 10 15 km



Sturgeon Bank
(Lulu Island)

Westham Island





Images: S. Boyd (L), S. Northrup (R)









Westham Island Marsh Leading Edge



Photo: E. Balke

Sturgeon Bank Marsh Leading Edge

Photo: E. Balke



Sturgeon Bank Marsh Leading Edge

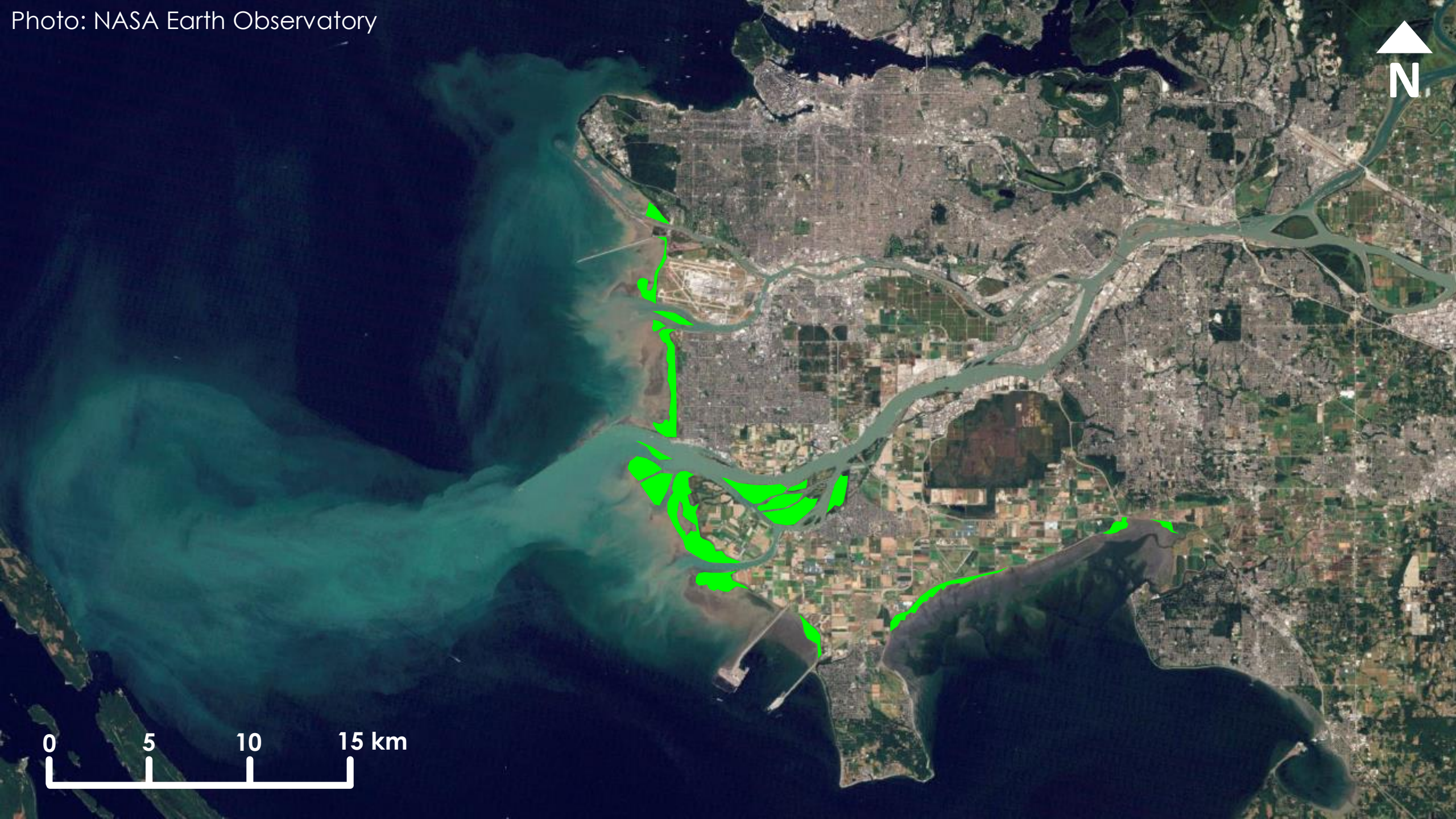


Photo: E. Balke



Photo: D. Hogan

Photo: NASA Earth Observatory



0 5 10 15 km



Sturgeon Bank
(Receded Marsh)



Westham Island
(Reference Site)



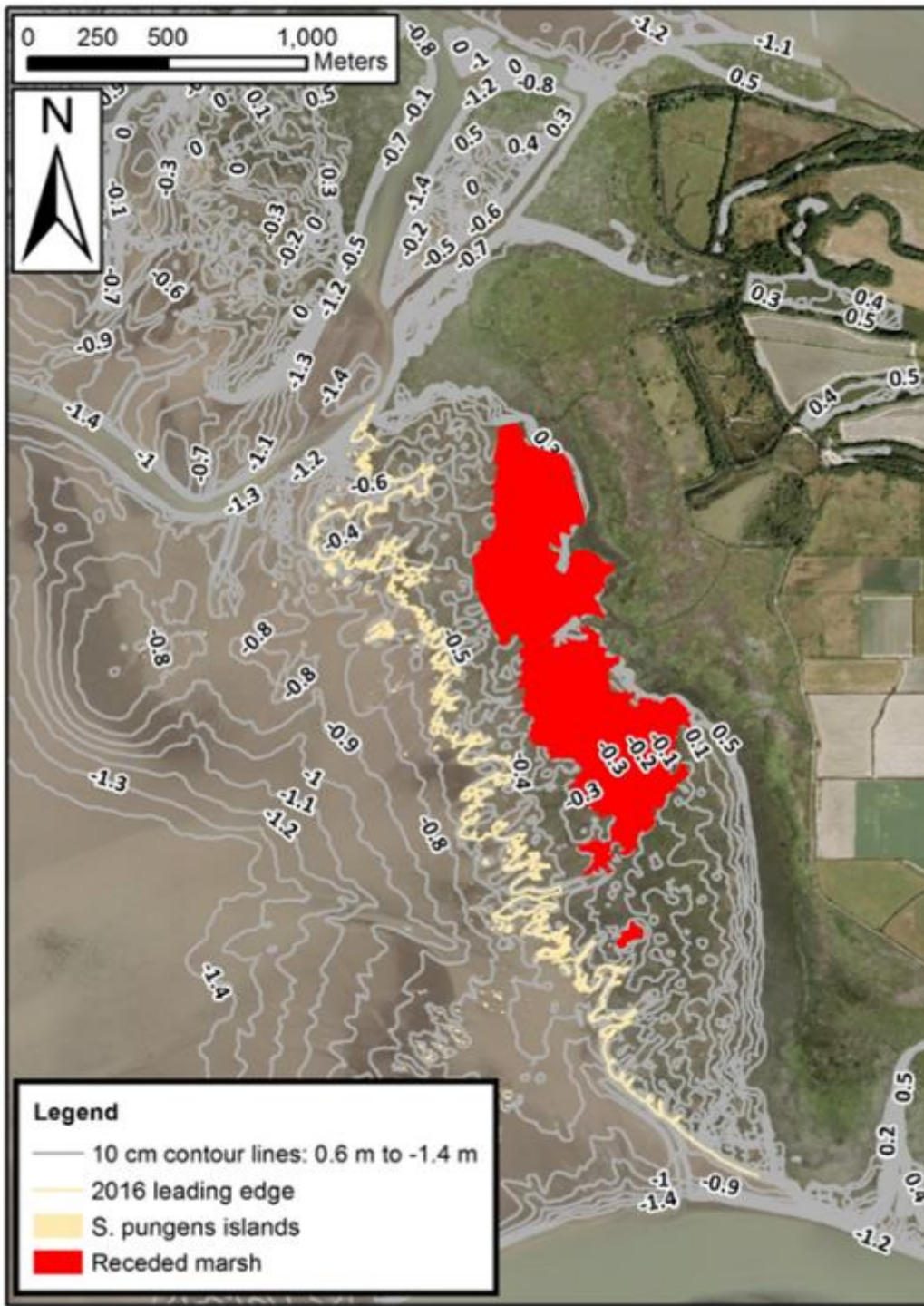
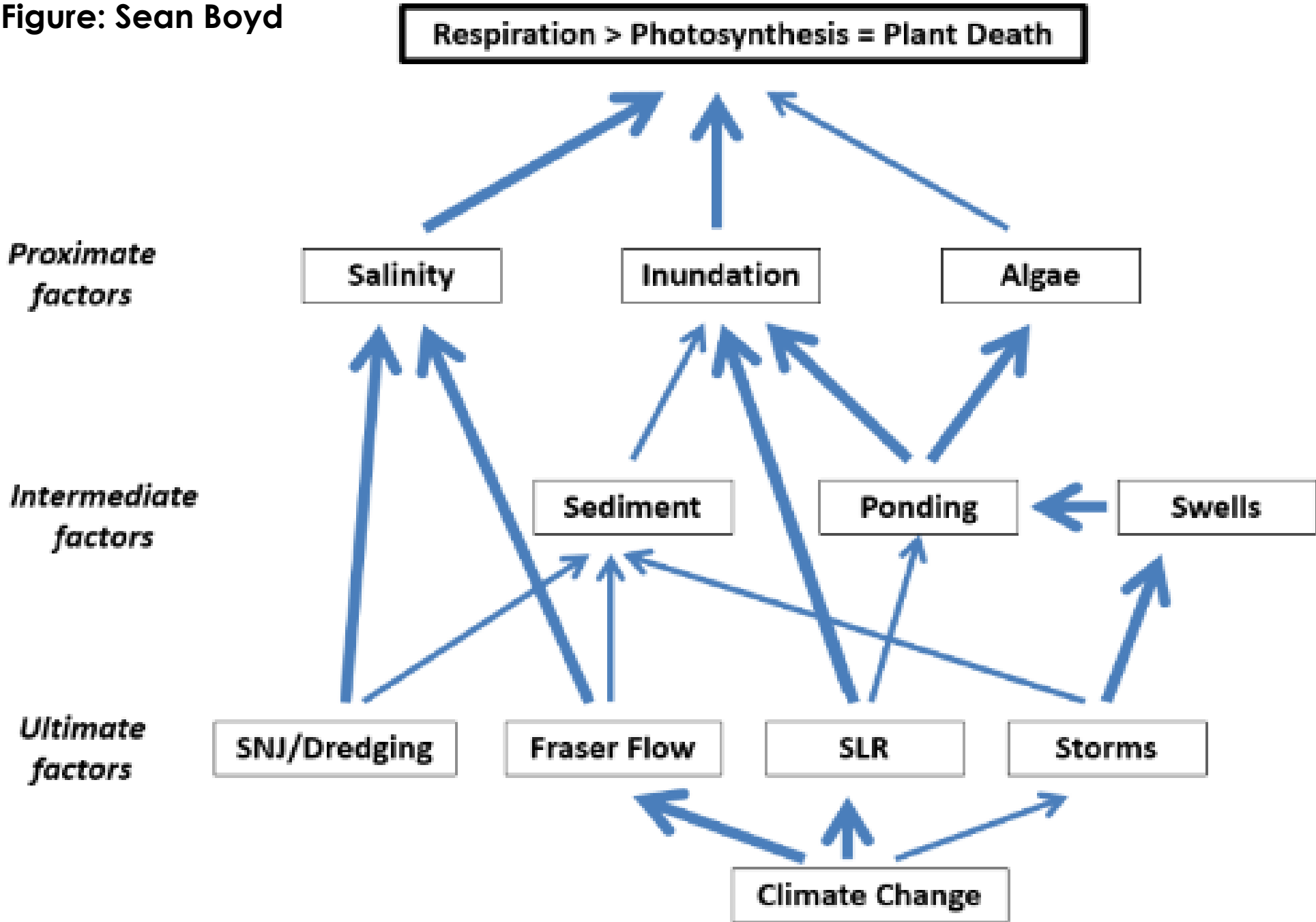


Figure: Sean Boyd



Sturgeon Bank Marsh Recession Project

- Multiple government ministries/departments (FLNRO, ECCC, VFPA)
- Three years of funding
- Four graduate projects

Understand the Recession

- Air photo analysis
- Satellite imagery analysis
- *B. maritimus* corm surveys
- Sediment pits



Present Environment

- Water meters
- Marsh leading edge mapping
- LIDAR, elevation measurements/monitoring
- Surveys of adjacent marshes

Experiments

- Reciprocal Transplant Experiment
- LWD anchoring
- Goose exclosures



Photo: E. Balke

Recession Hypotheses

1. Erosion
2. Sea-level rise
3. Increased salinity
4. Nutrient inputs
5. Herbivory by geese

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Legend

Marsh change 1985-2015

- Marsh lost
- Marsh remaining

Google Satellite

0 0.75 1.5 2.25 3 km



A



Legend

Elevation change [m]

- -0.5
- -0.25
- 0
- 0.25
- 0.5

Background: Google Satellite

0 1 2 3 4 km



A



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Photo: E. Balke

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Photo: J. MacDonald

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Photo: E. Balke

Moving Forward

- 1) Analyze data, prepare report, publications
- 2) Monitor marshes
- 3) Additional hypotheses? Further research?
- 4) How to restore with climate change and sea-level rise?



Photo: E. Balke

Acknowledgements



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada



Questions?

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Photo: E. Balke