

Topo-Bathymetric Lidar to Support Enhanced Coastal Mapping for World Class Tanker Safety

Project Partner: Department of Fisheries and Oceans Maritimes Region

Nathan Crowell & Tim Webster
AGRG-NSCC

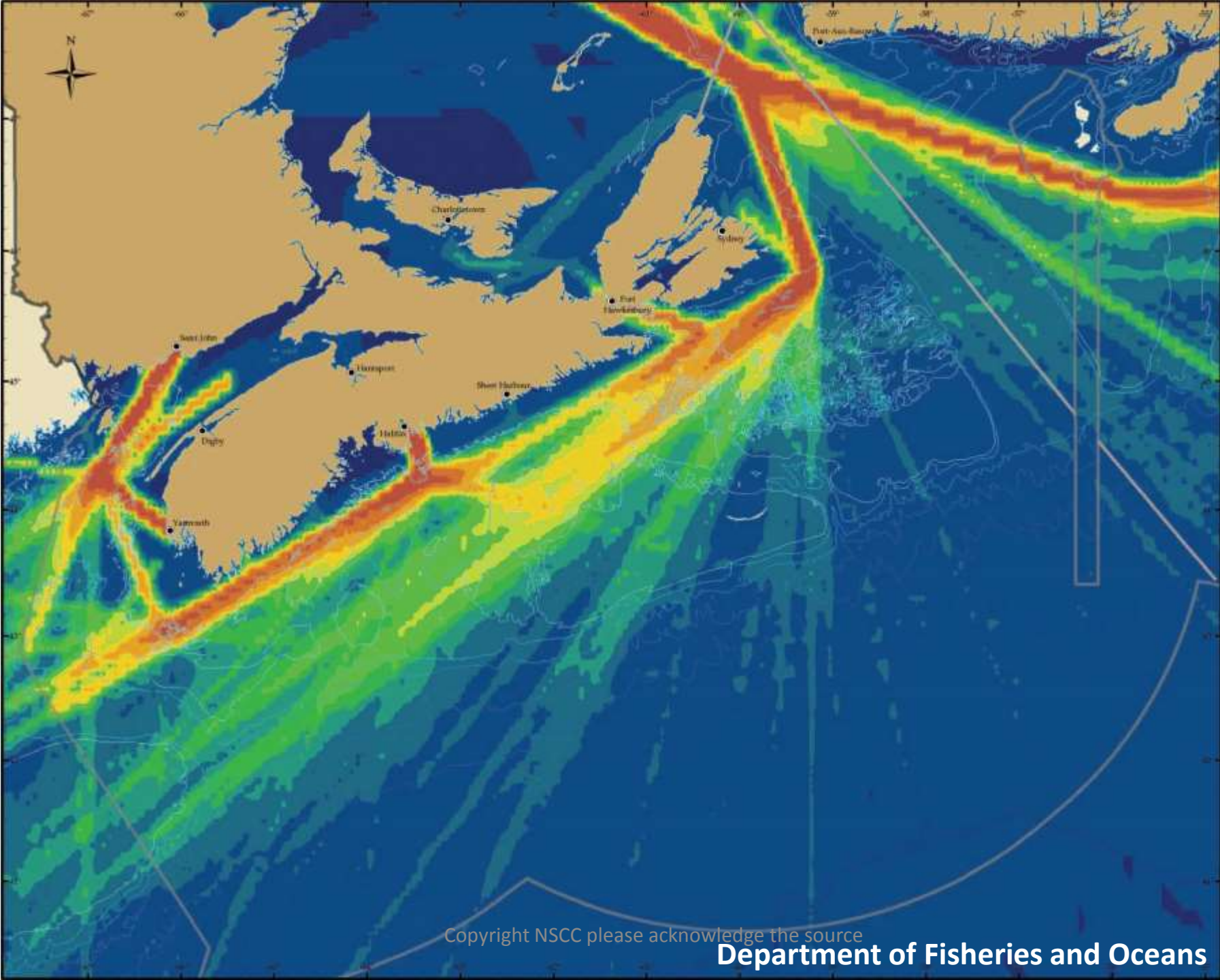
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World Class Tanker Safety

- **New measures will strengthen Canada's tanker safety system by:**
 - Preventing oil spills
 - Improving response and cleanup if a spill happens
 - Making sure polluters pay for cleanup and compensate for damages
- **Plans will take into account geography, environmental sensitivities, and oil tanker traffic volumes**

World Class Tanker Safety

- **The Government of Canada will begin establishing new area spill-response planning partnerships for each of the following regions that have high levels of traffic:**
 - **Southern British Columbia**
 - **Saint John and the Bay of Fundy, New Brunswick**
 - **Port Hawkesbury, Nova Scotia**
 - **St. Lawrence, Quebec**

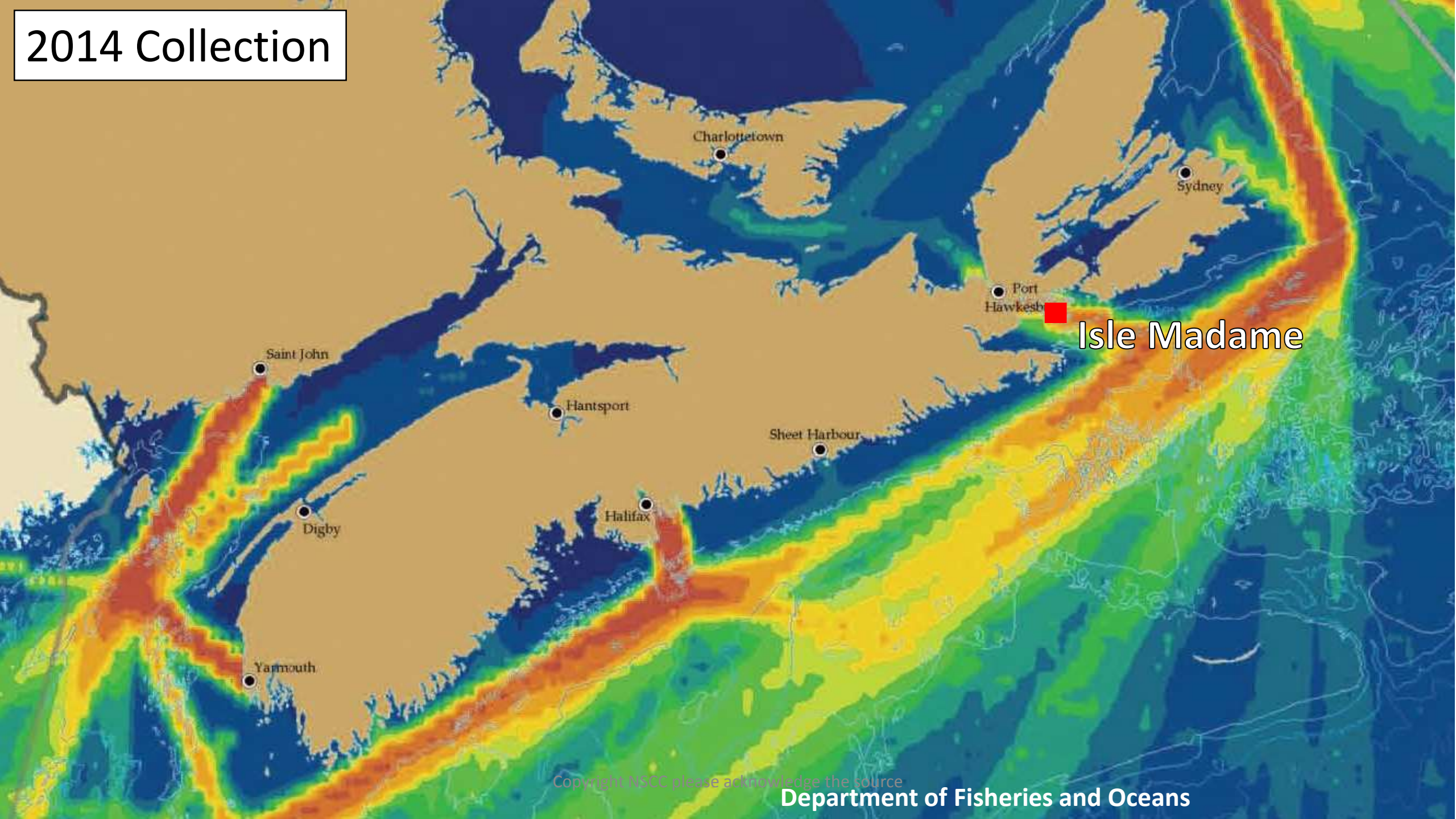


Commercial Shipping: Traffic Density (2000)
Navigation commerciale : densité du trafic maritime (2000)

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2014 Collection



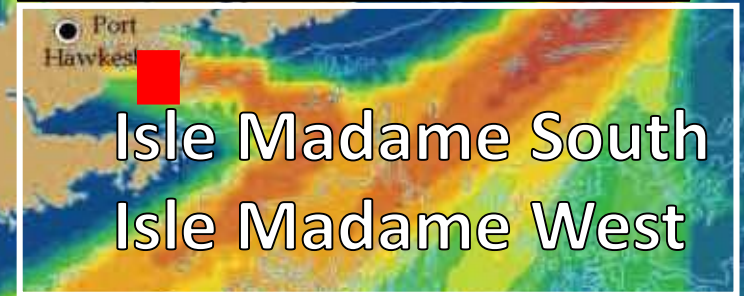
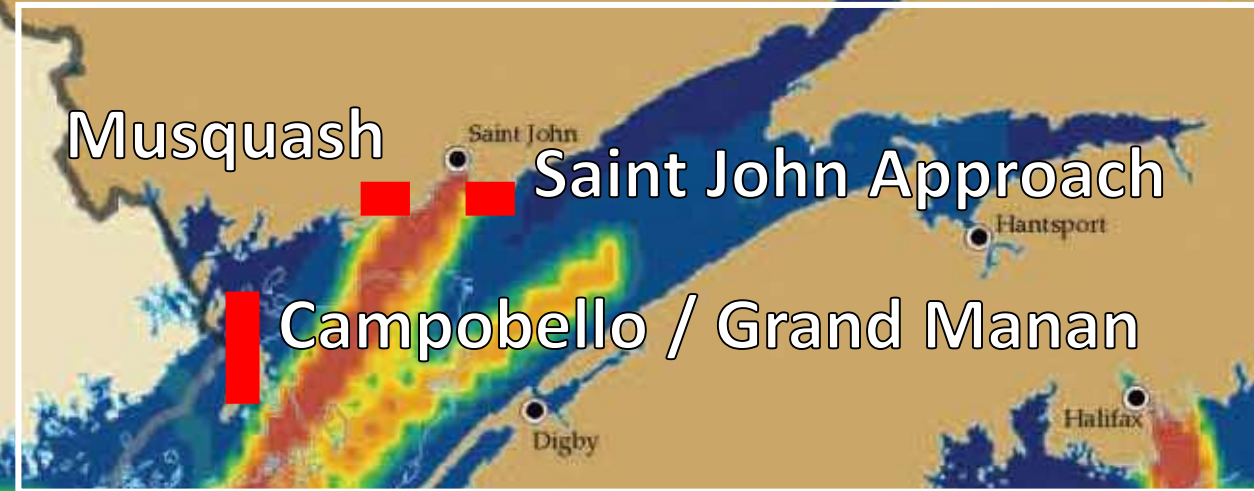
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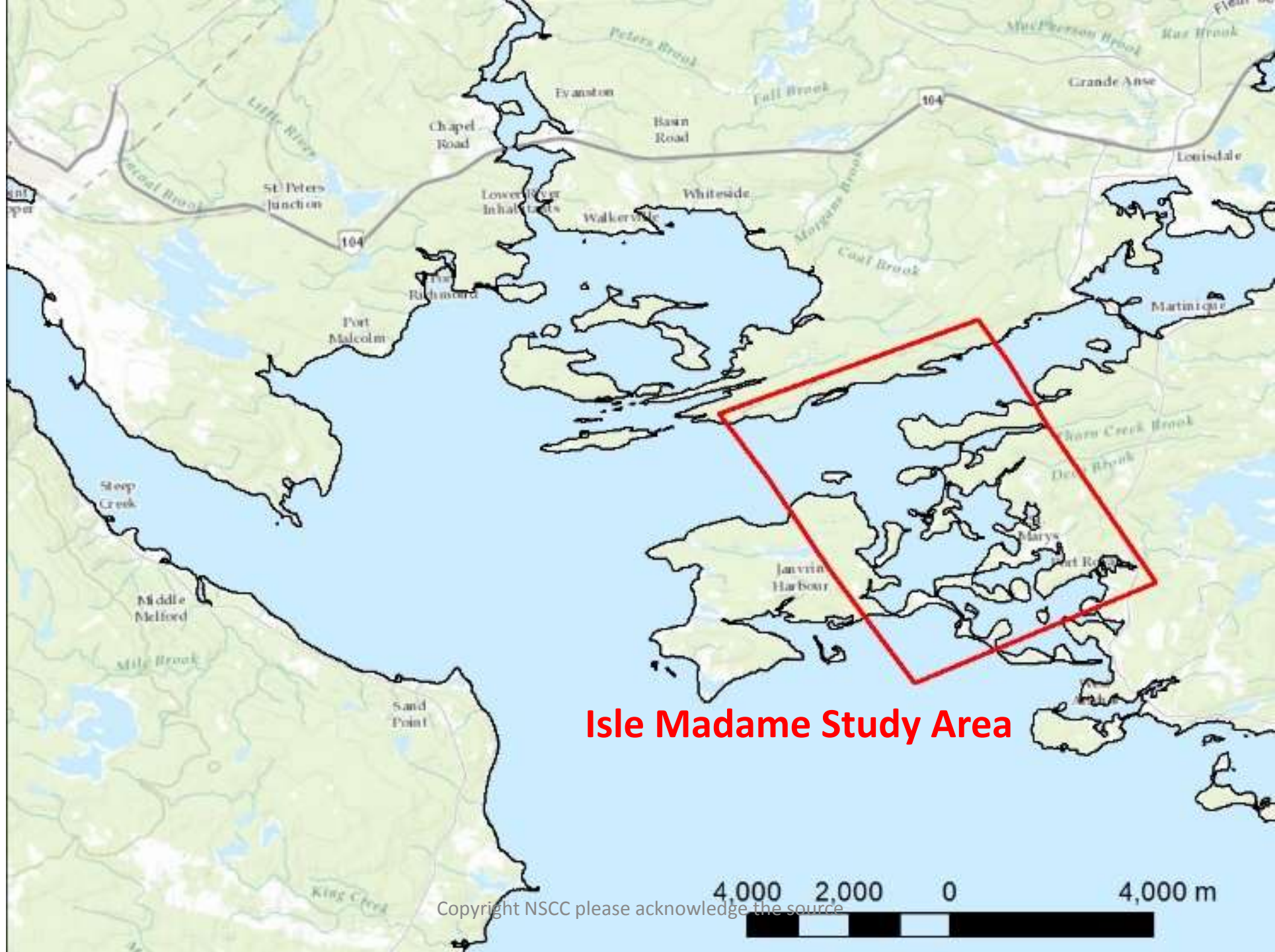
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2015 Collection

BoF Reconnaissance

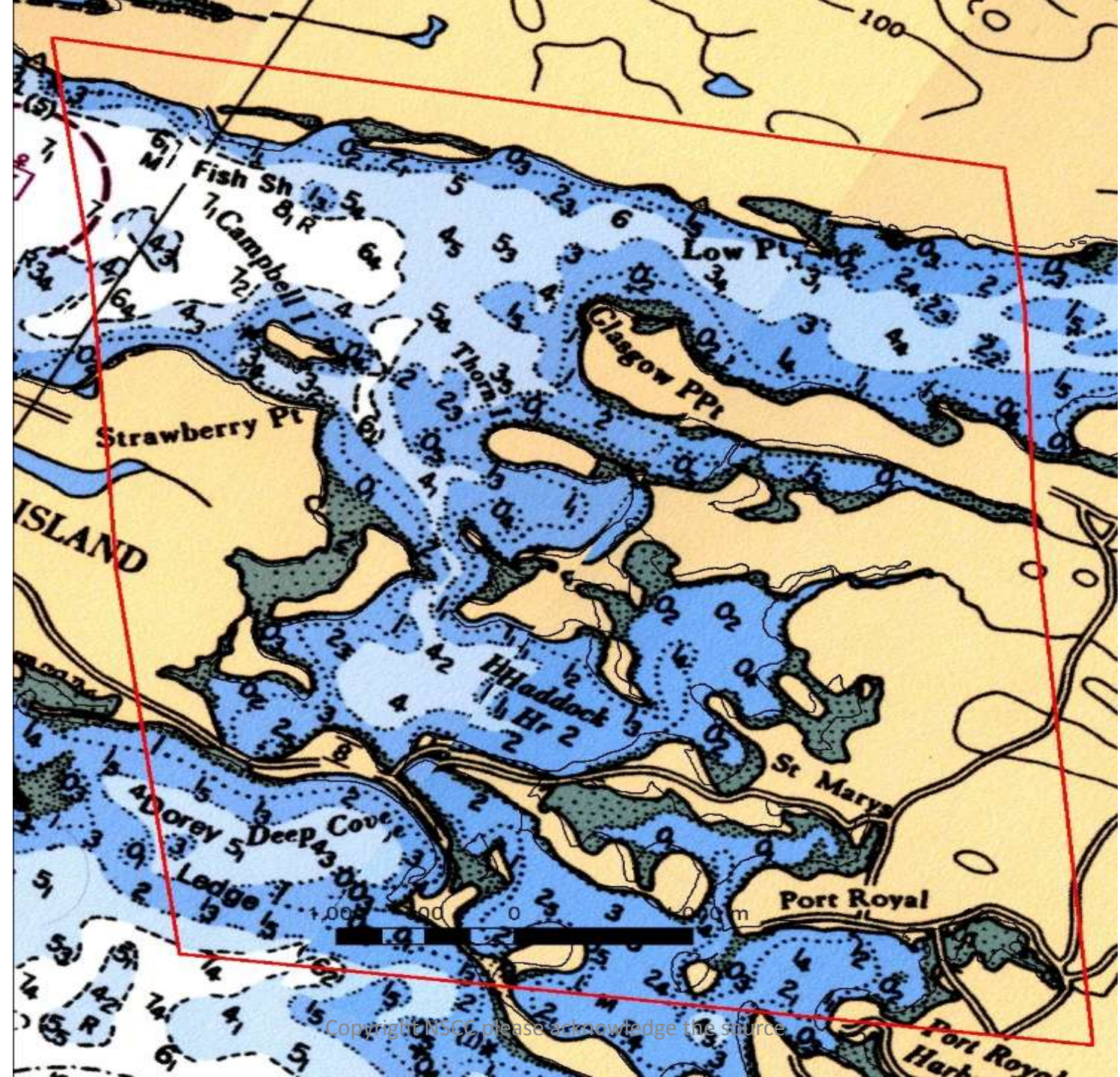
Isle Madame Expansion





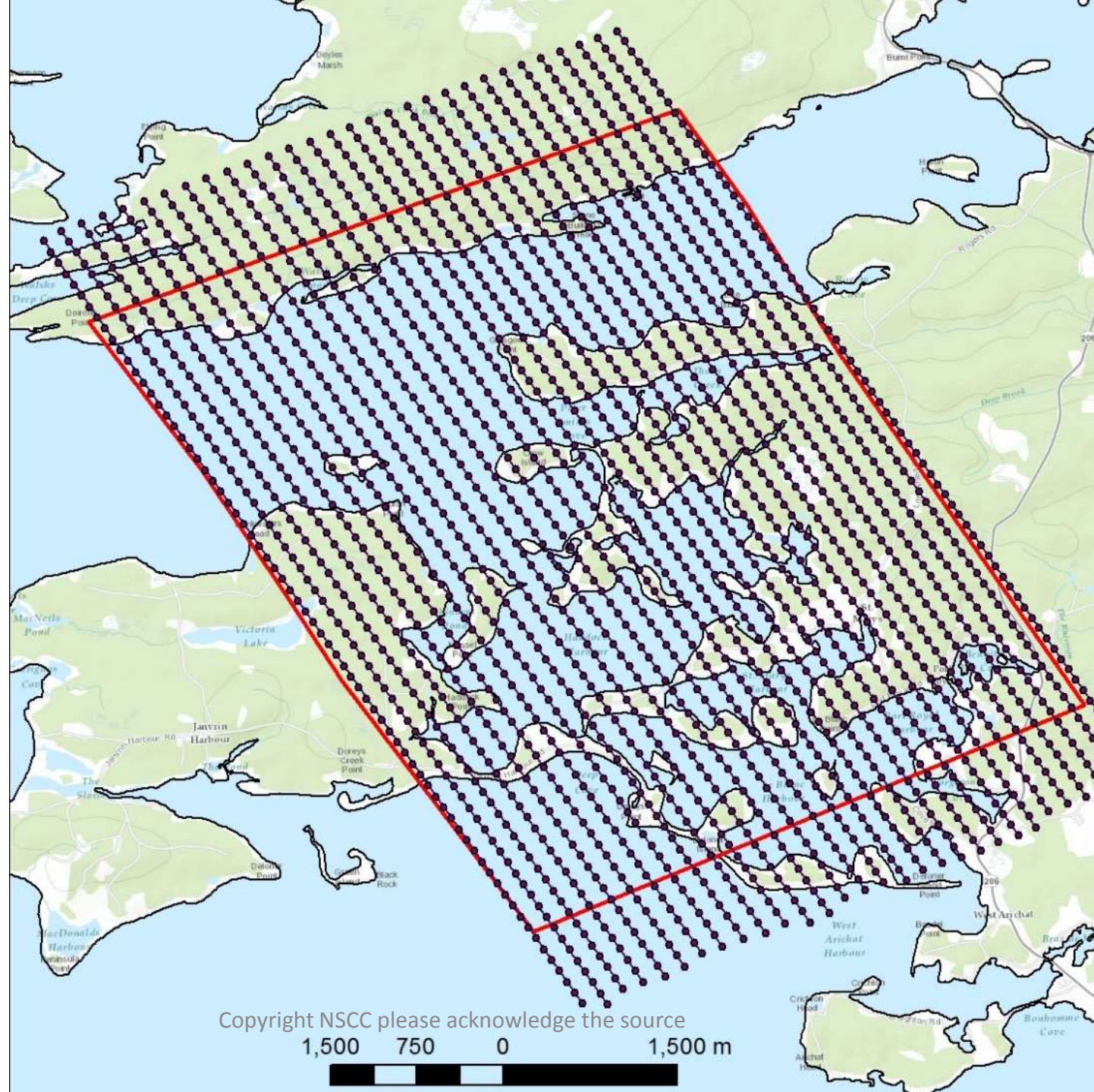
Isle Madame Study Area

CHS Chart Complicated Coastline



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2014 Mission Plan

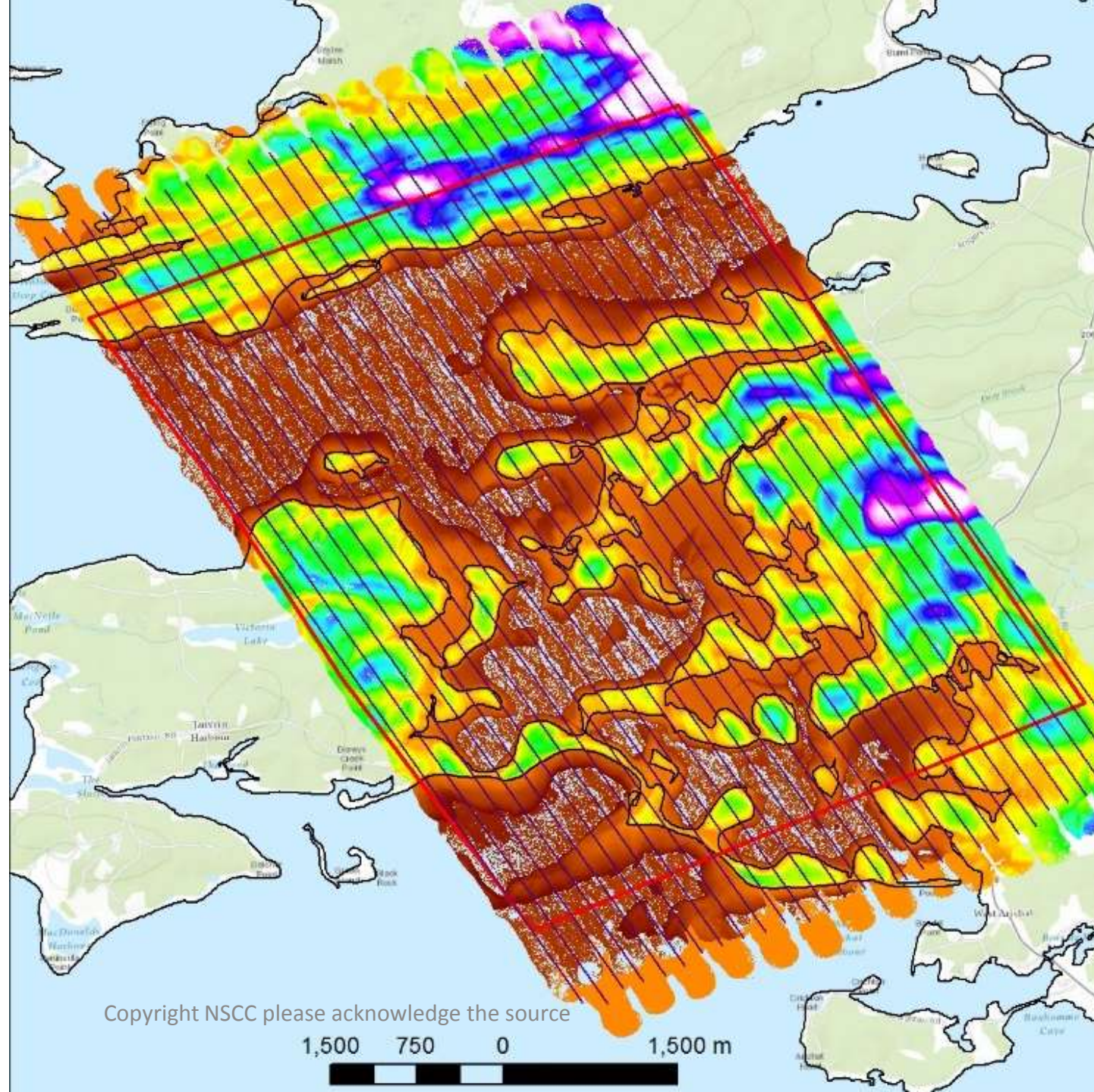


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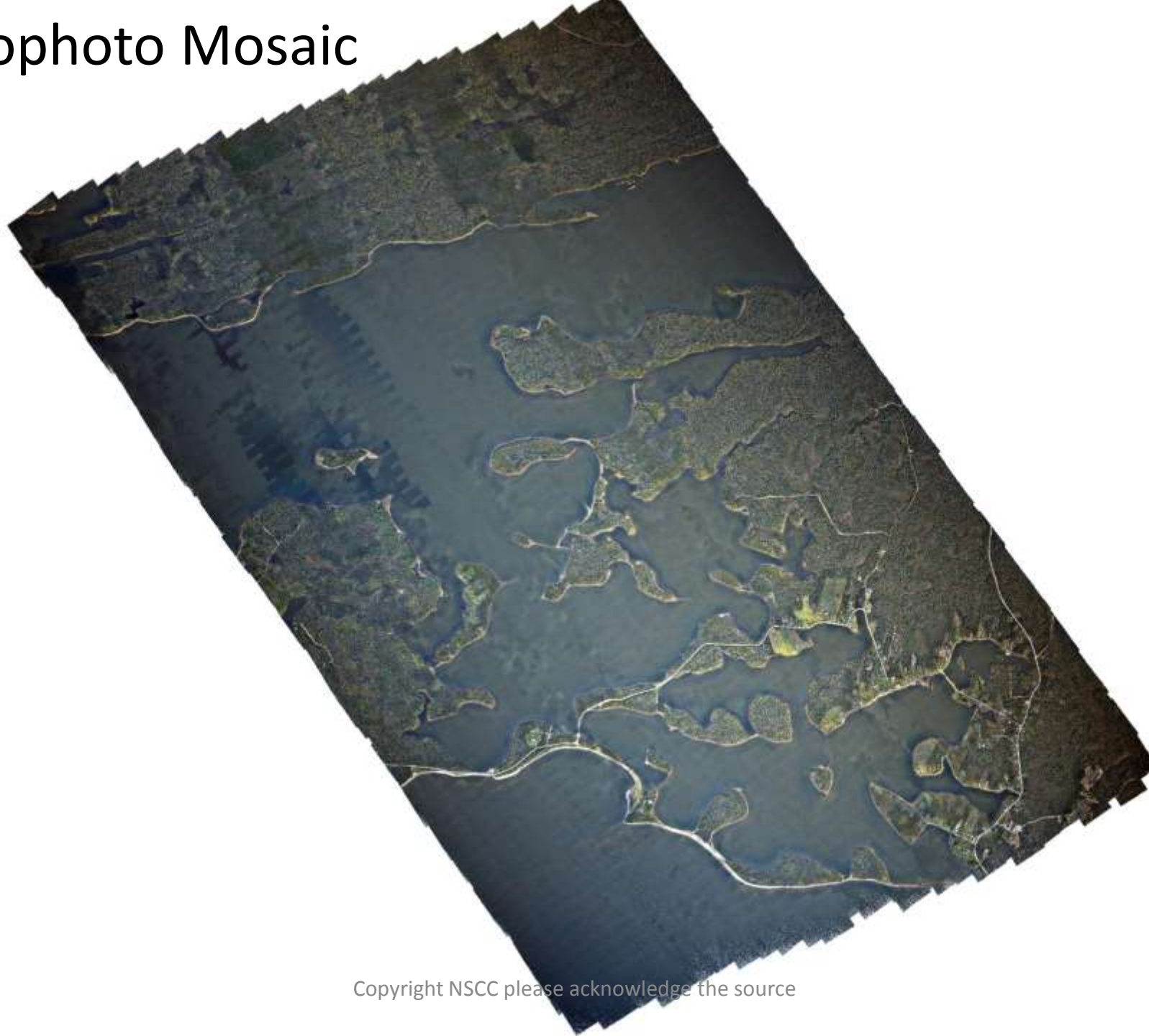
1,500 750 0 1,500 m



Topo-Bathy Lidar Returns

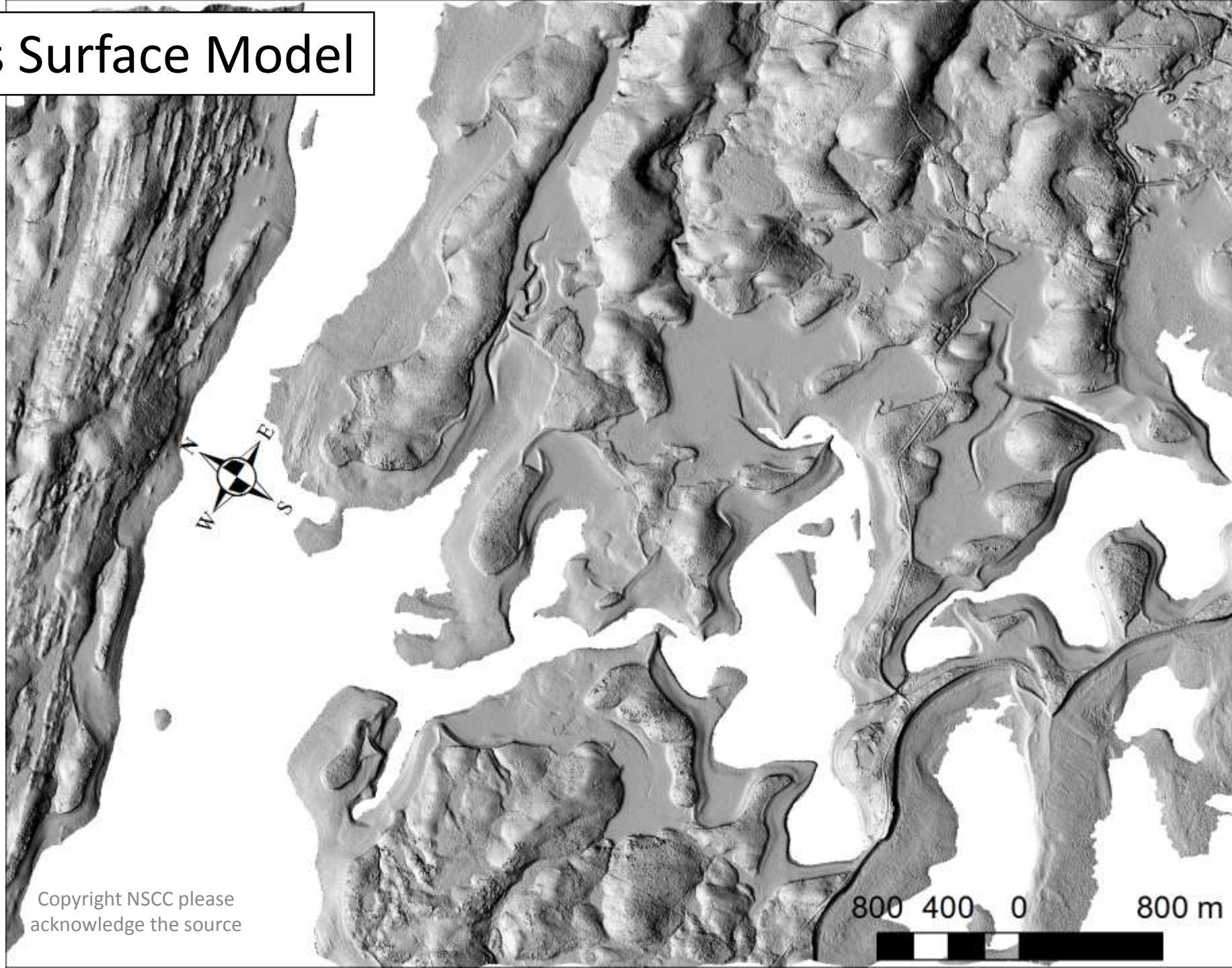


RCD30 Orthophoto Mosaic



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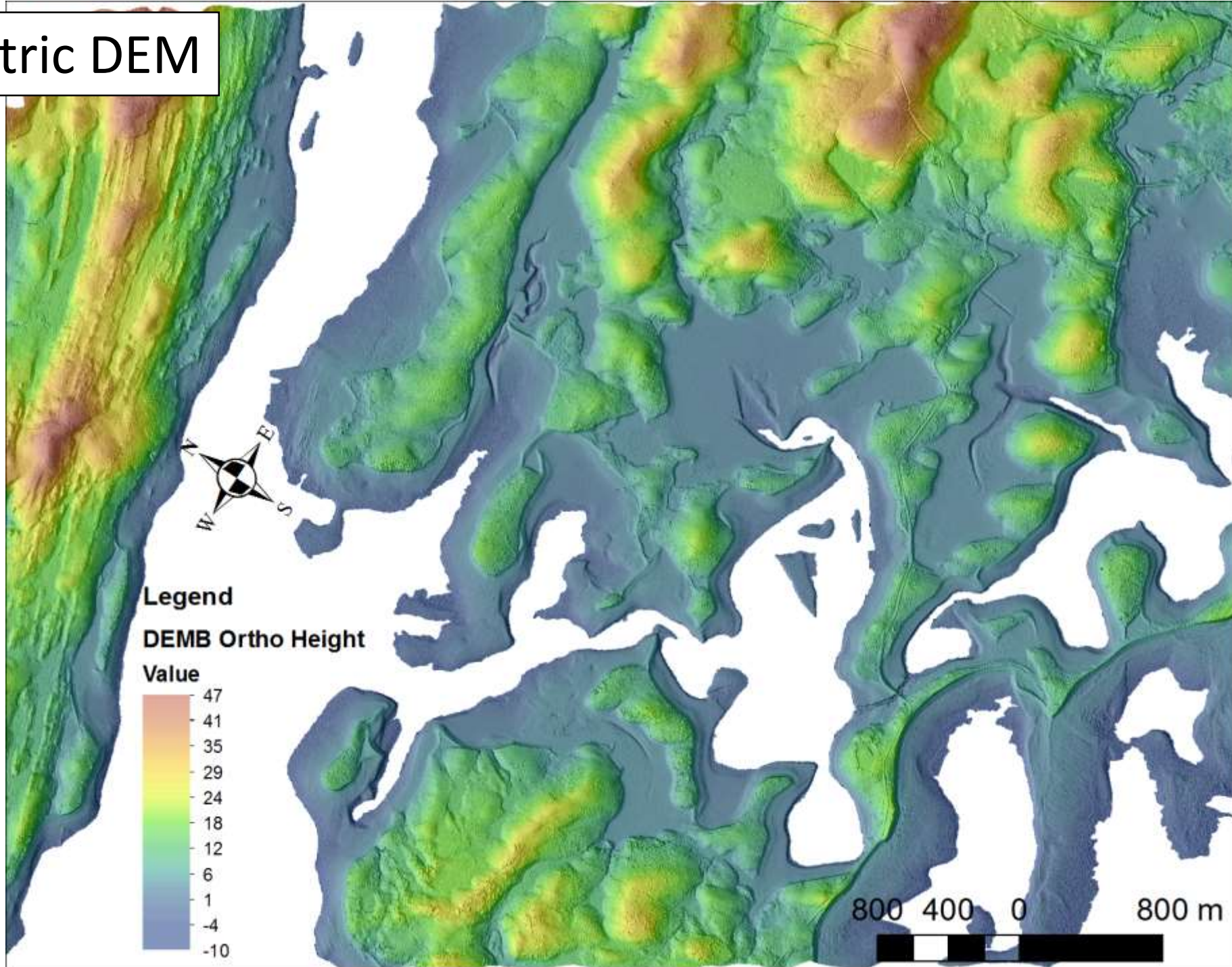
Seamless Surface Model



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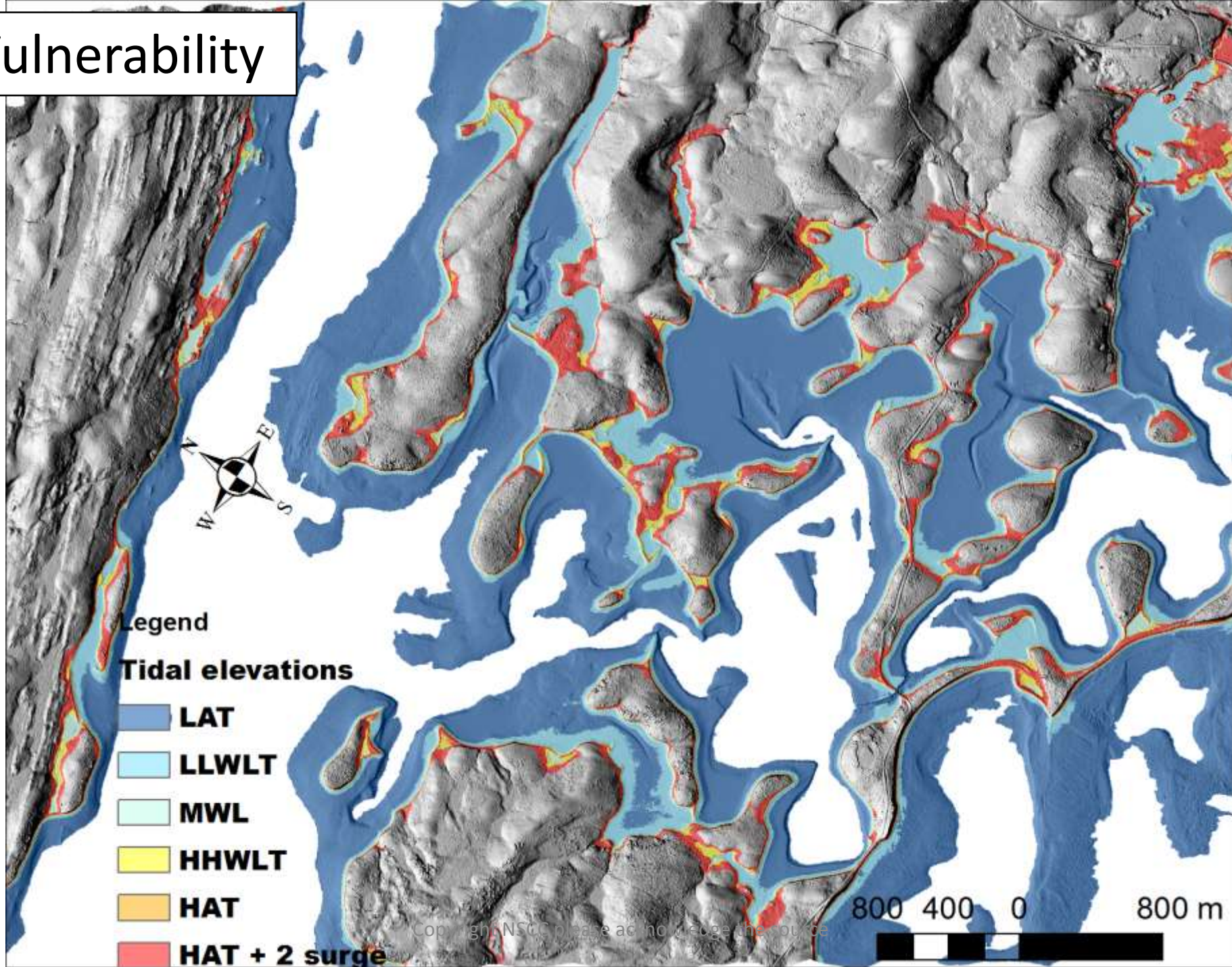
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Orthometric DEM



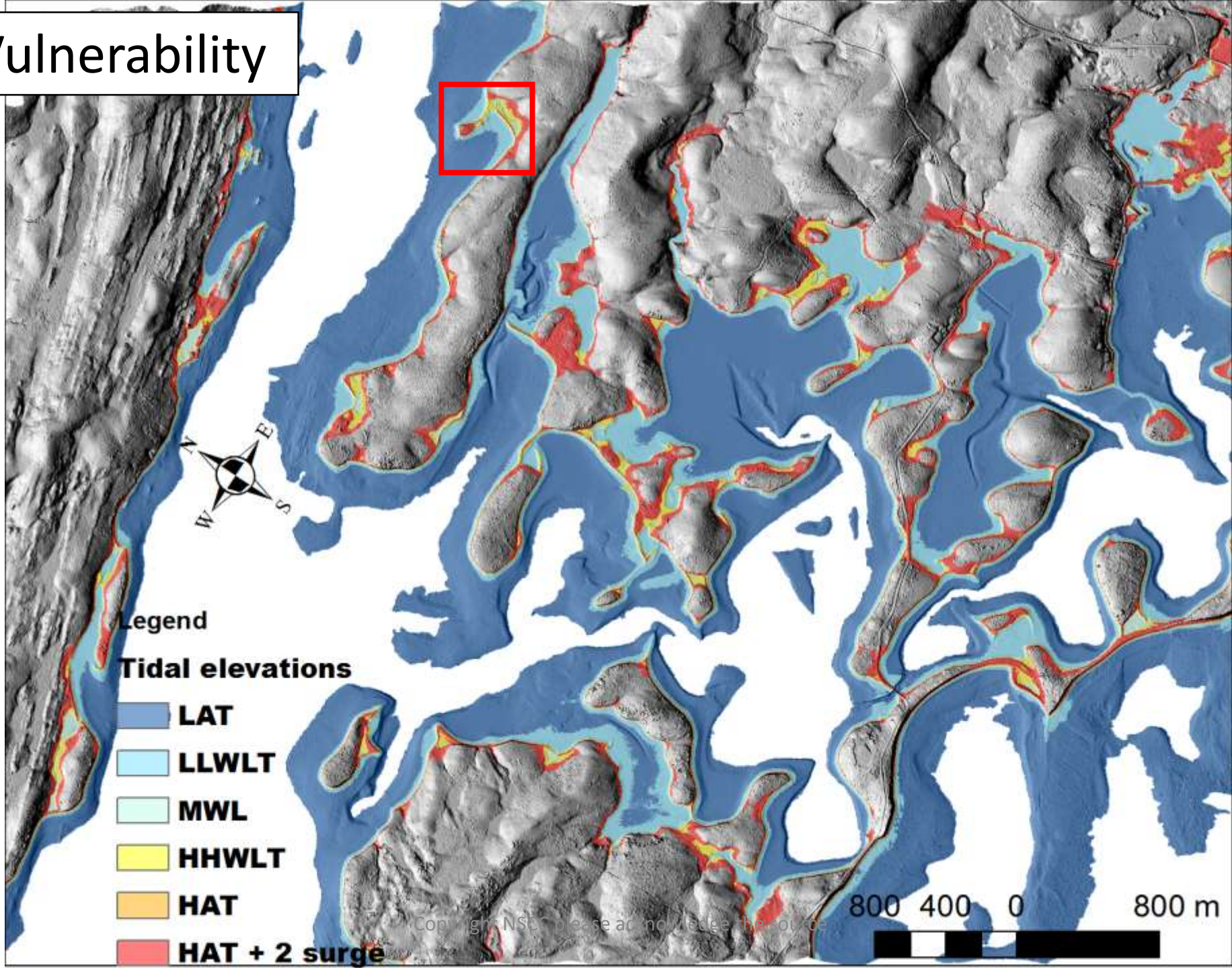
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Coastal Vulnerability



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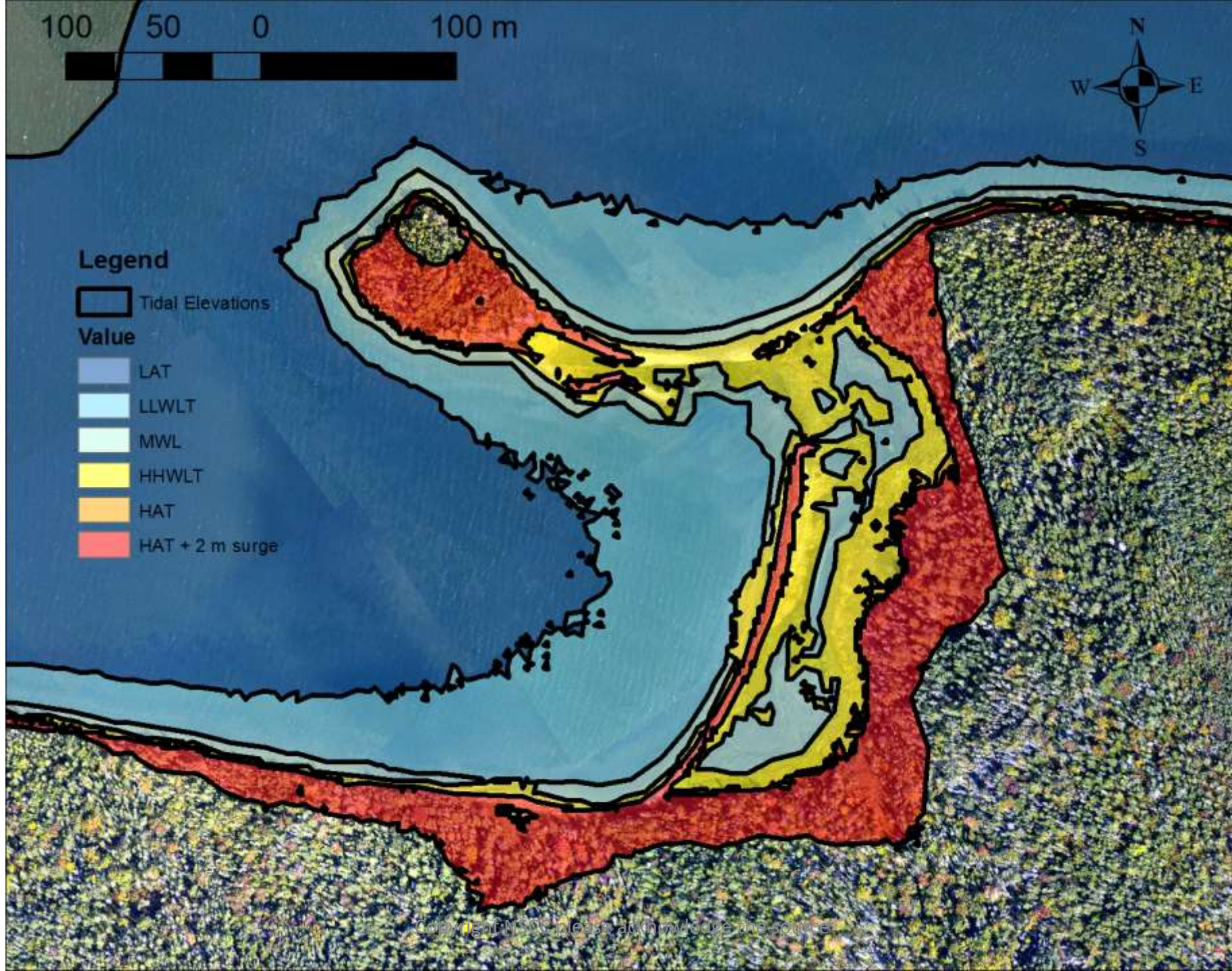
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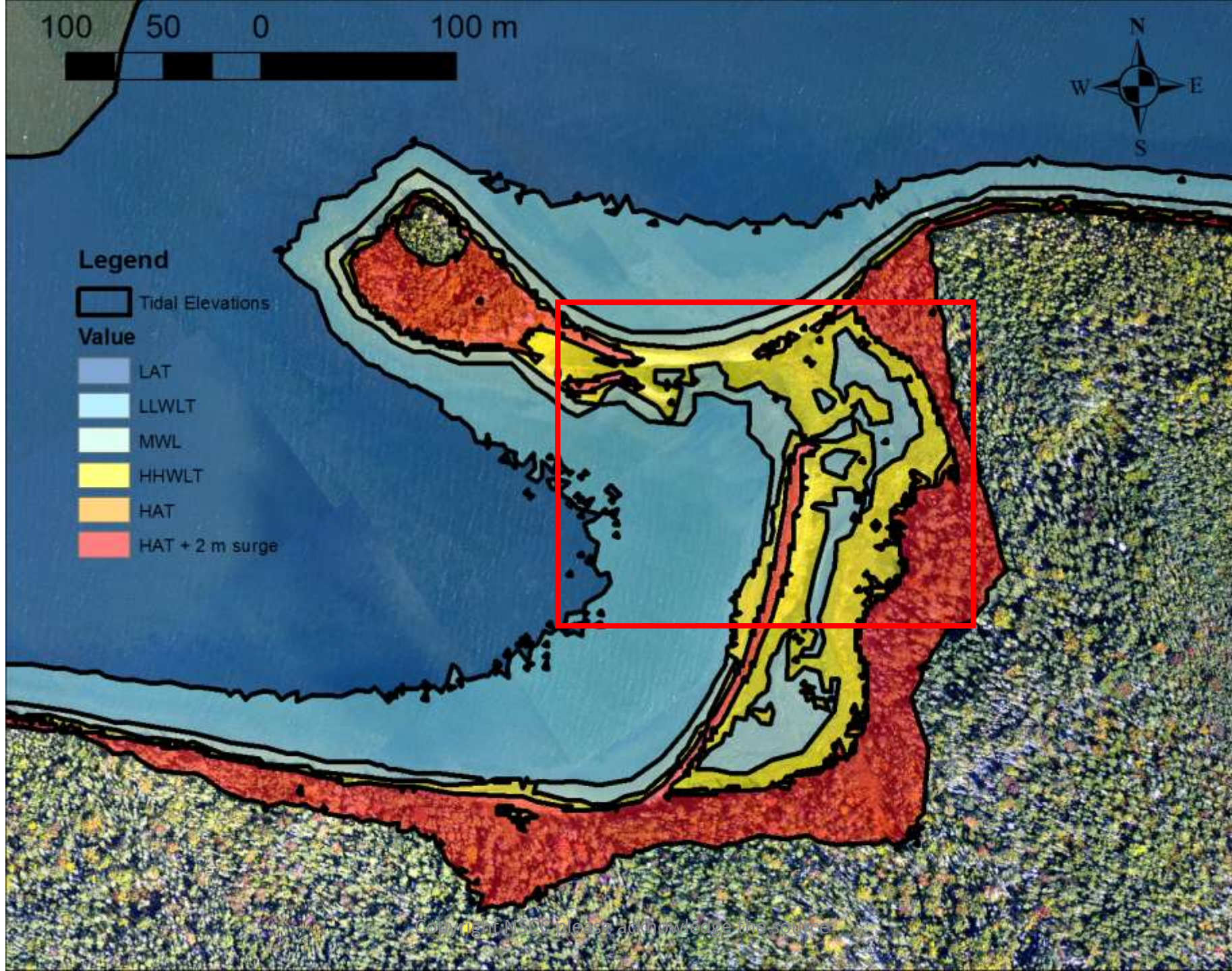
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Habitat Classification



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Legend
30 15 0

30 m
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Habitat Classification

Legend

-  Spartina
-  Shrub
-  Submerged vegetation
-  Sand
-  Sub sand
-  Turbid water
-  Wrack line
-  Cobbles
-  Dark bottom

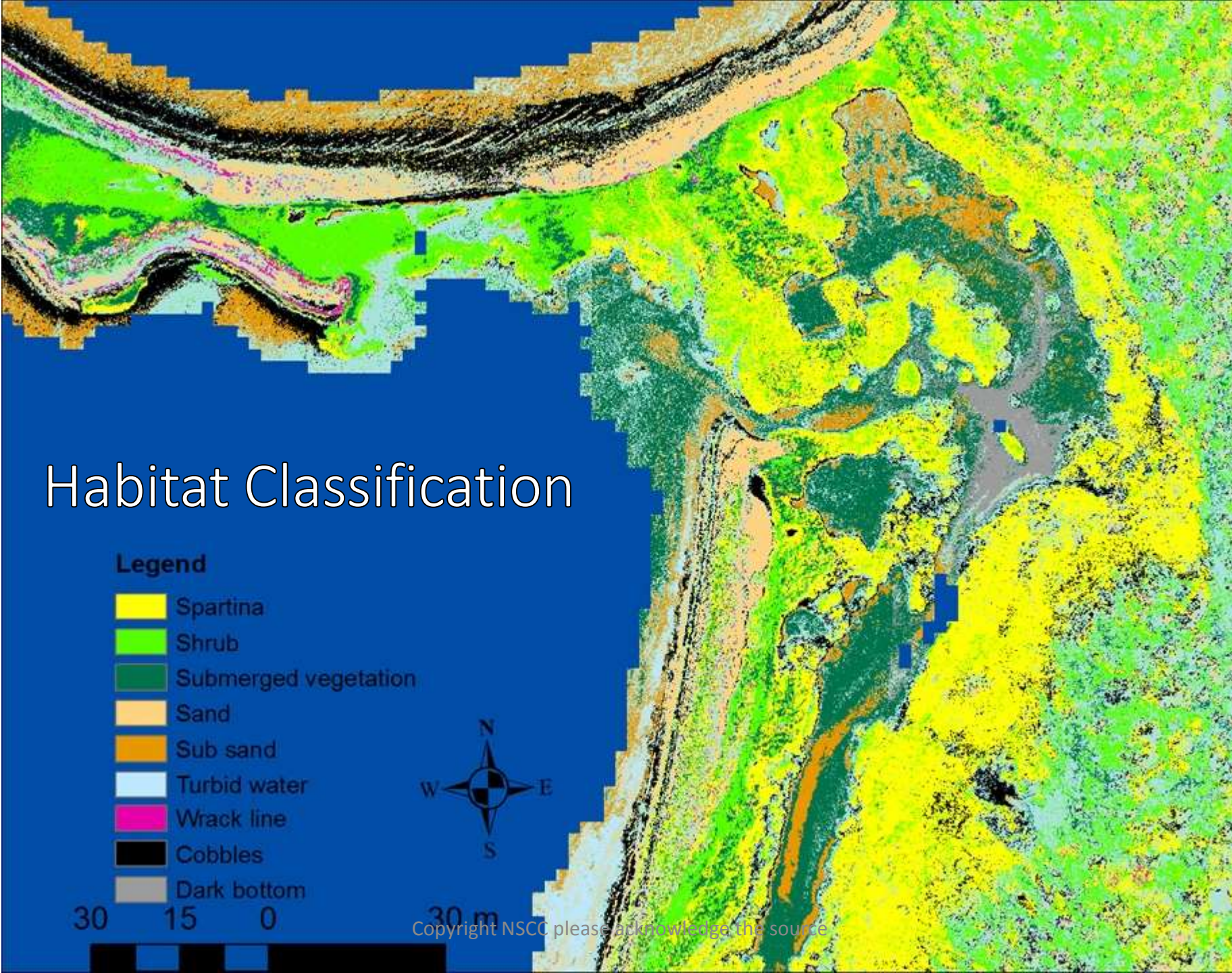


30 15 0

30 m

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Classification

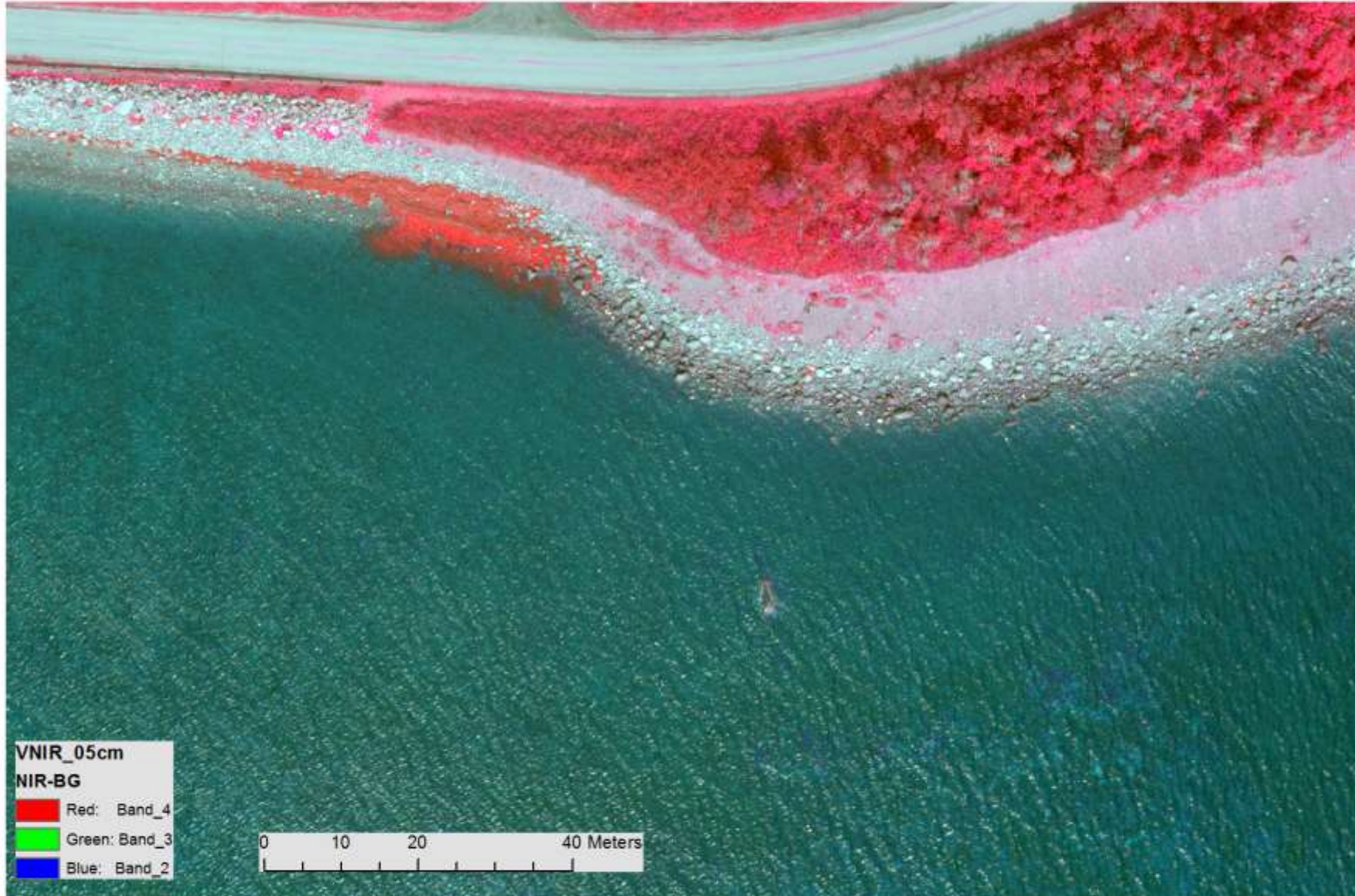


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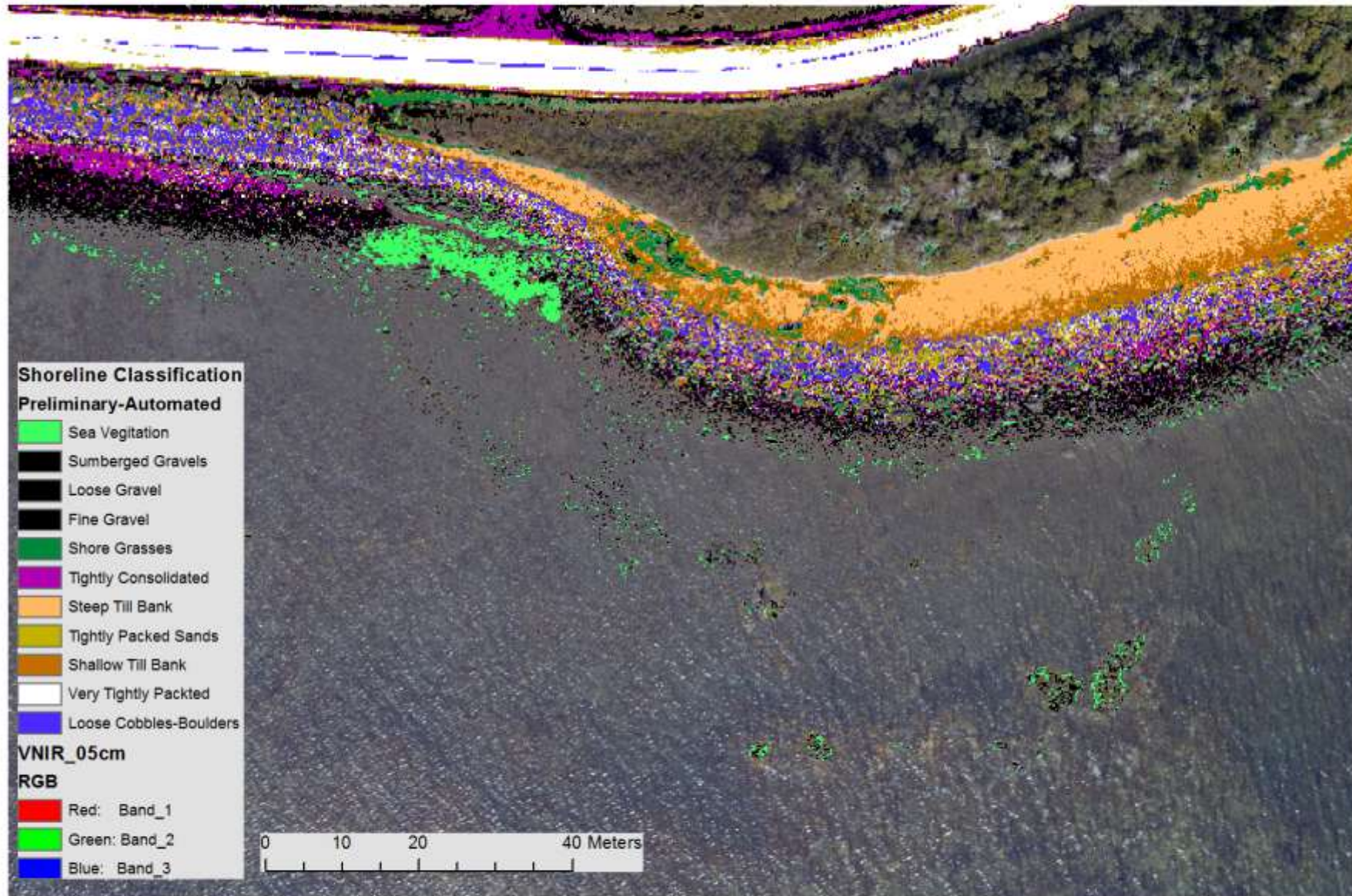
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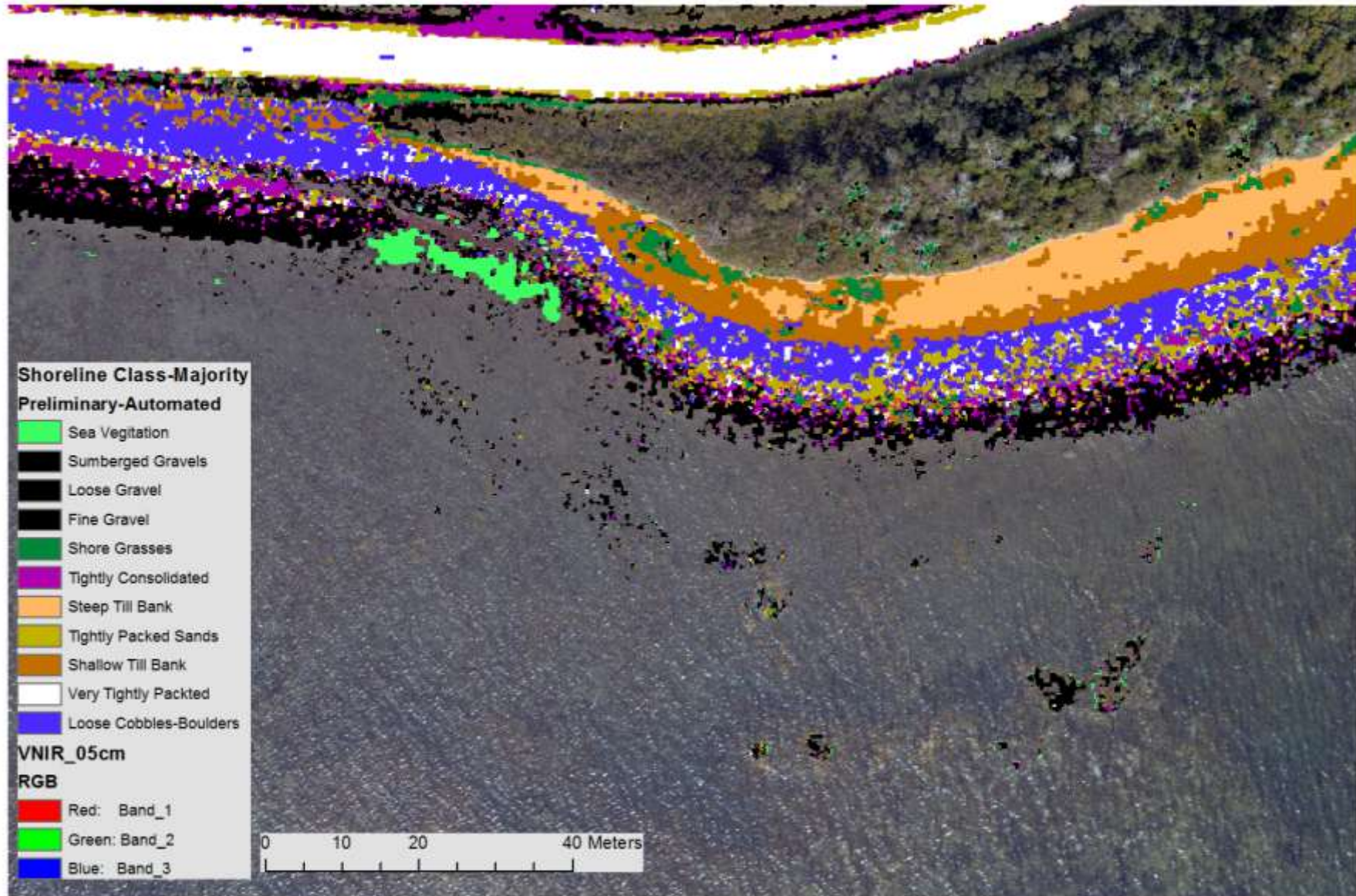


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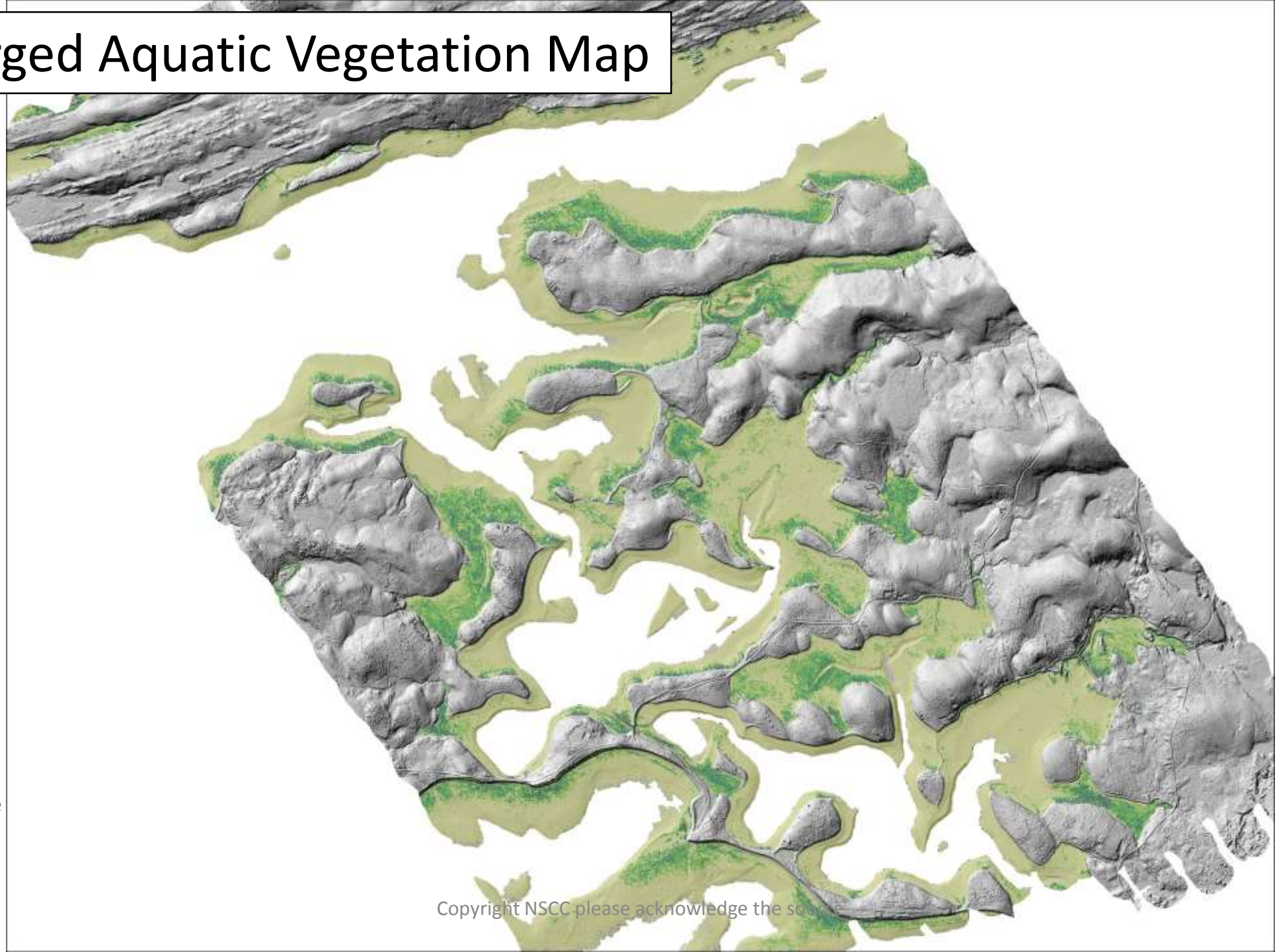


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Submerged Aquatic Vegetation Map



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Infrastructure Identification



Infrastructure Identification



8.91 m

9.32 m

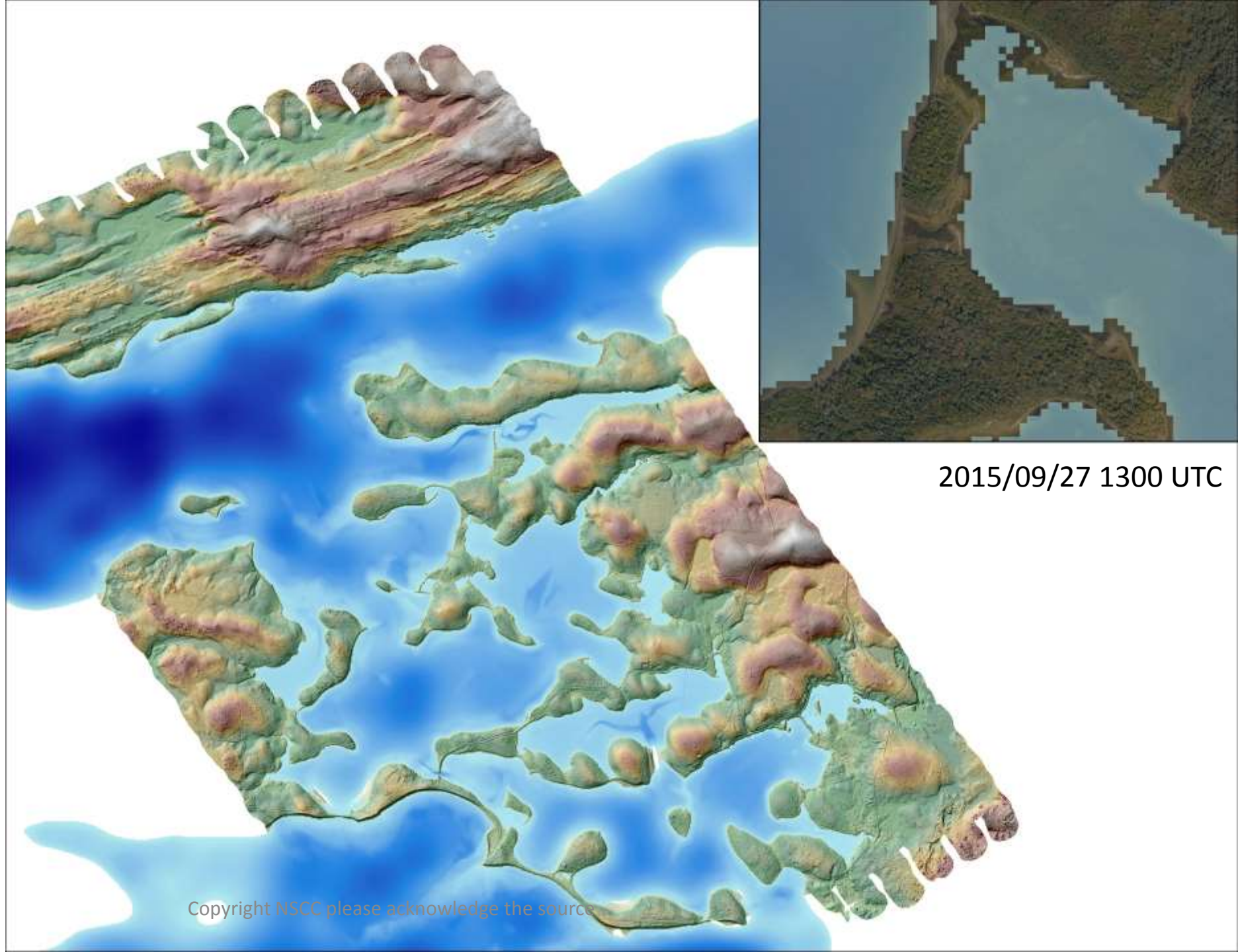
15.35 m

Hydrodynamics

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Hydrodynamics

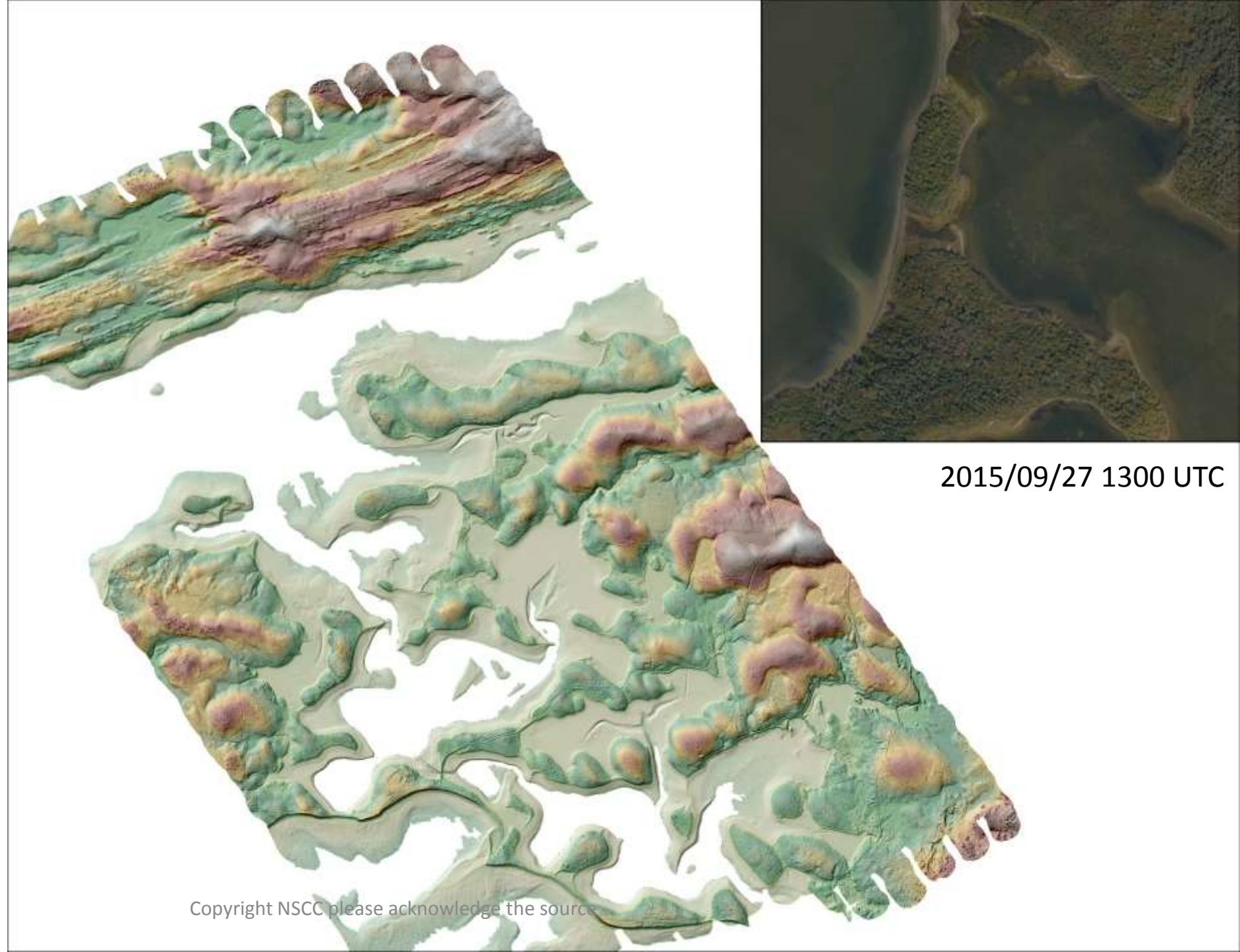


2015/09/27 1300 UTC

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Hydrodynamics



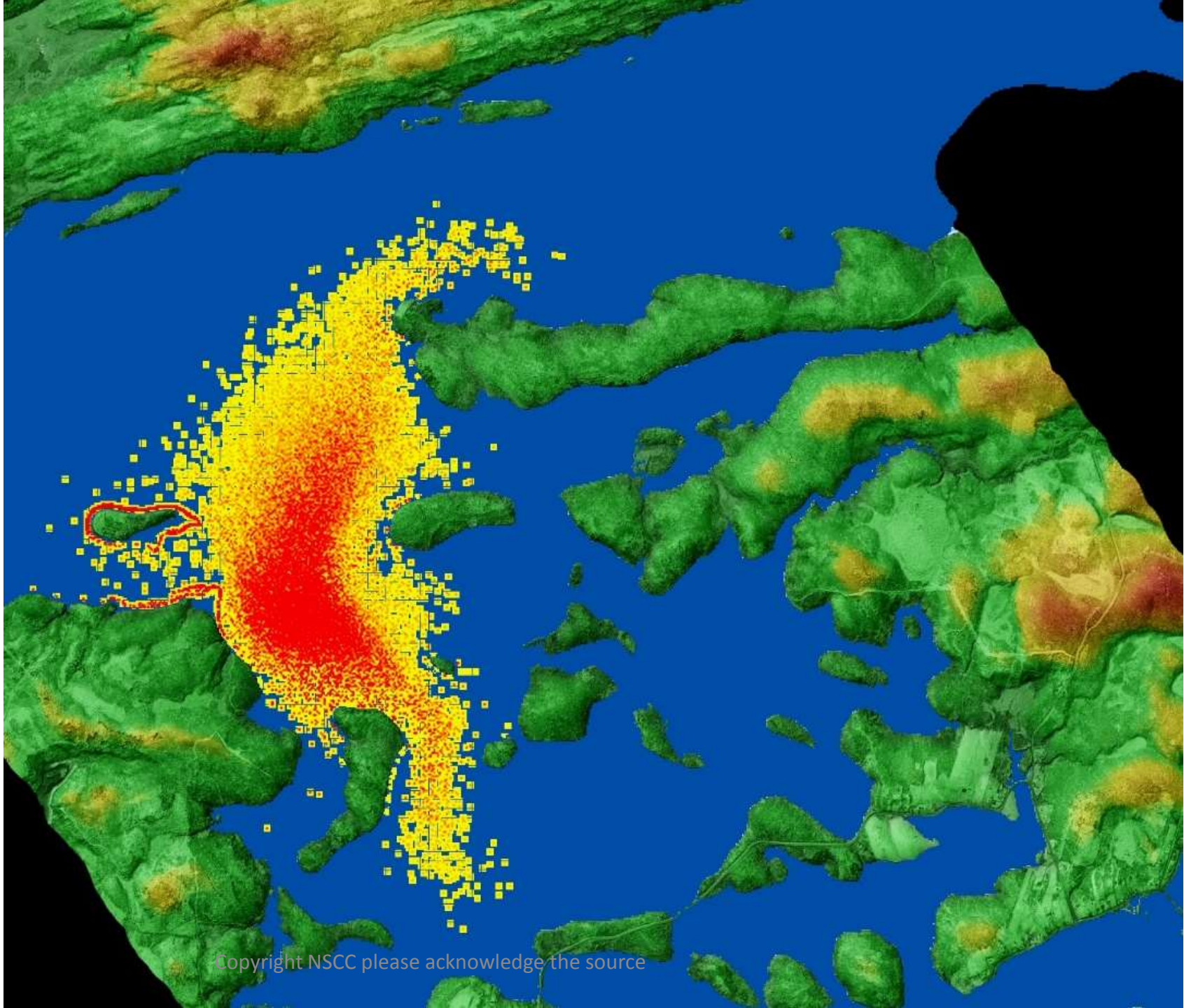
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Particle Tracking

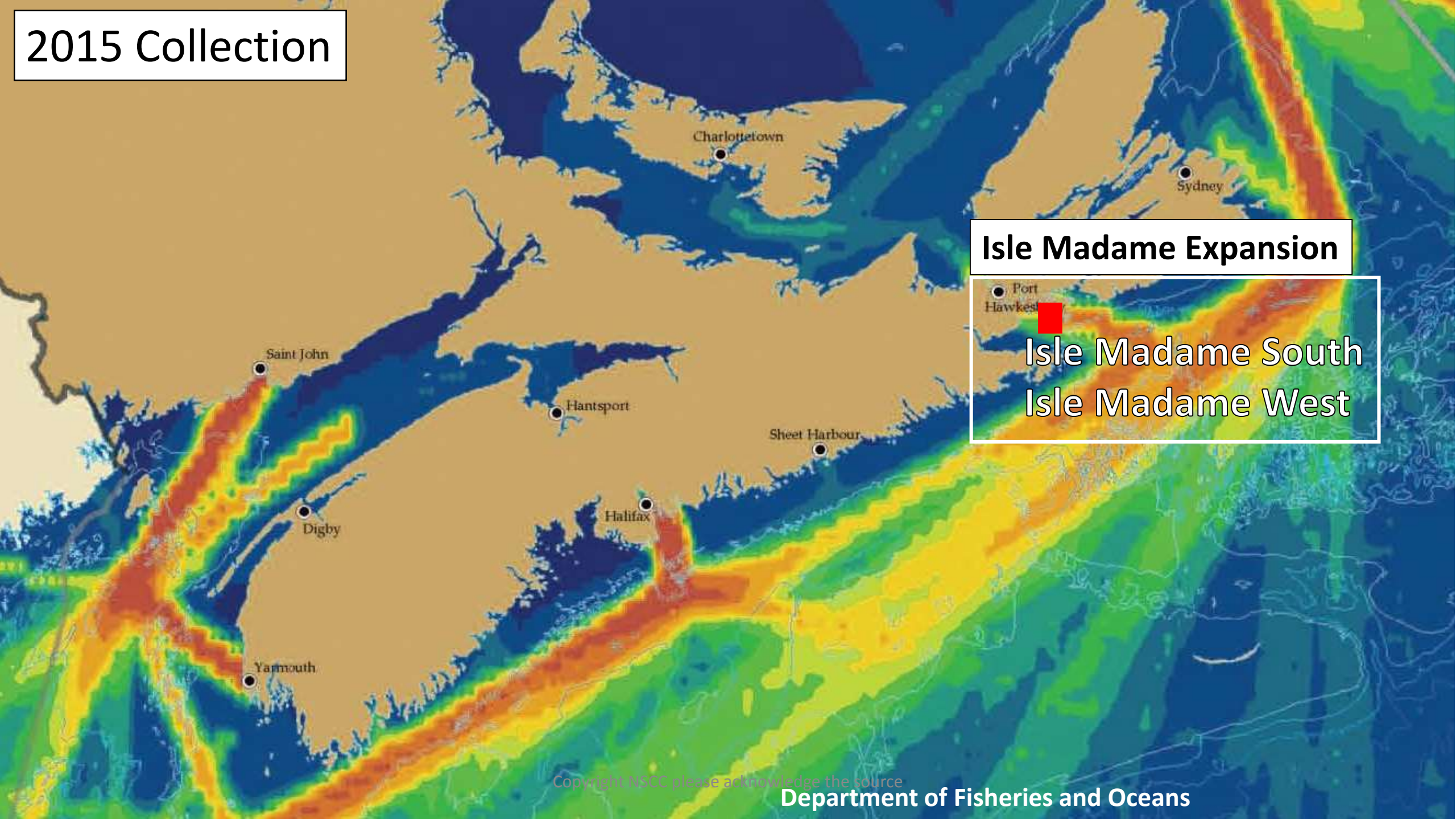
Particle Tracking



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2015 Collection

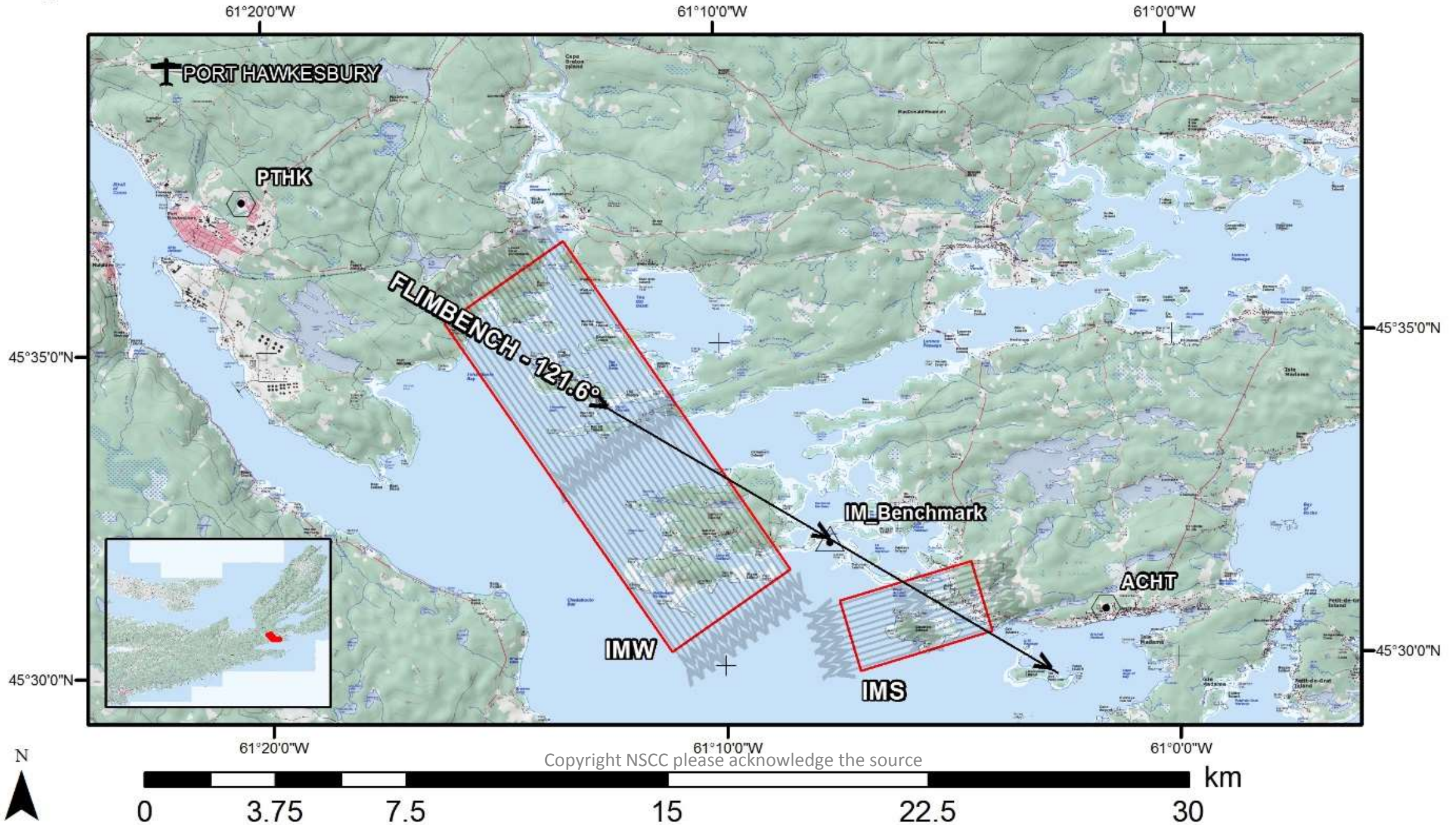


Isle Madame Expansion

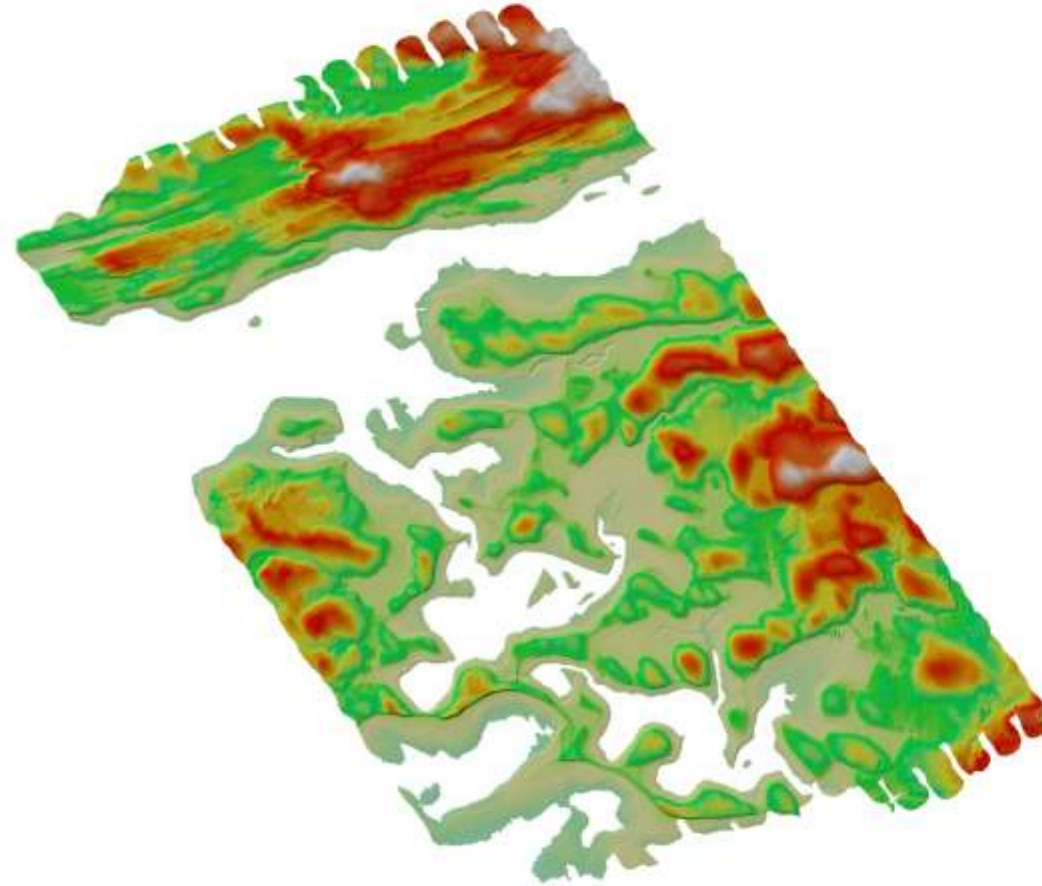
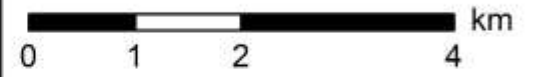
Port Hawkes
Isle Madame South
Isle Madame West

Flight Plan: DFOTS

AOI: IMW / IMS



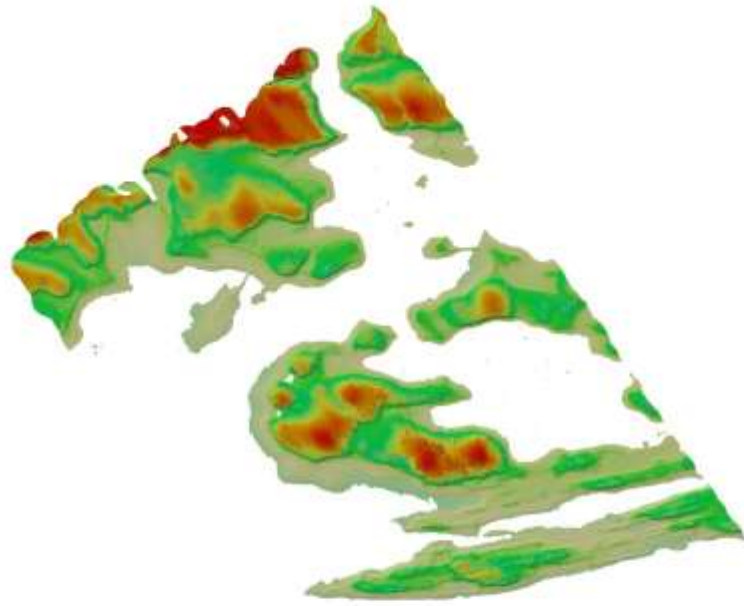
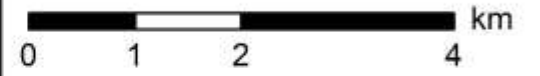
Isle Madame



Color Shaded Relief

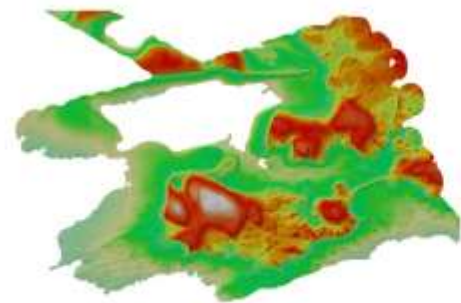
Penetration: 6m

Isle Madame



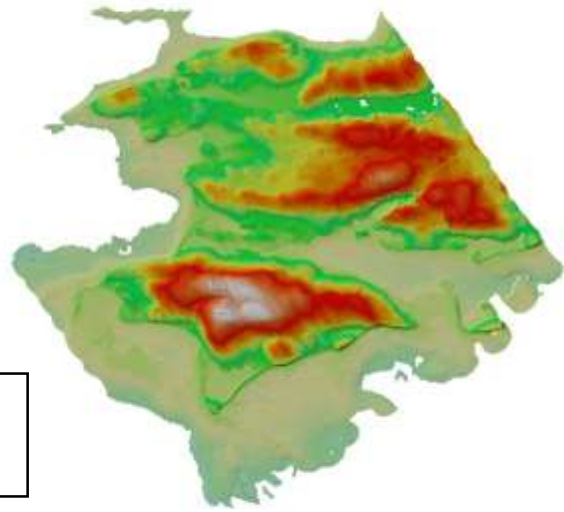
Isle Madame South

Penetration: 10 m

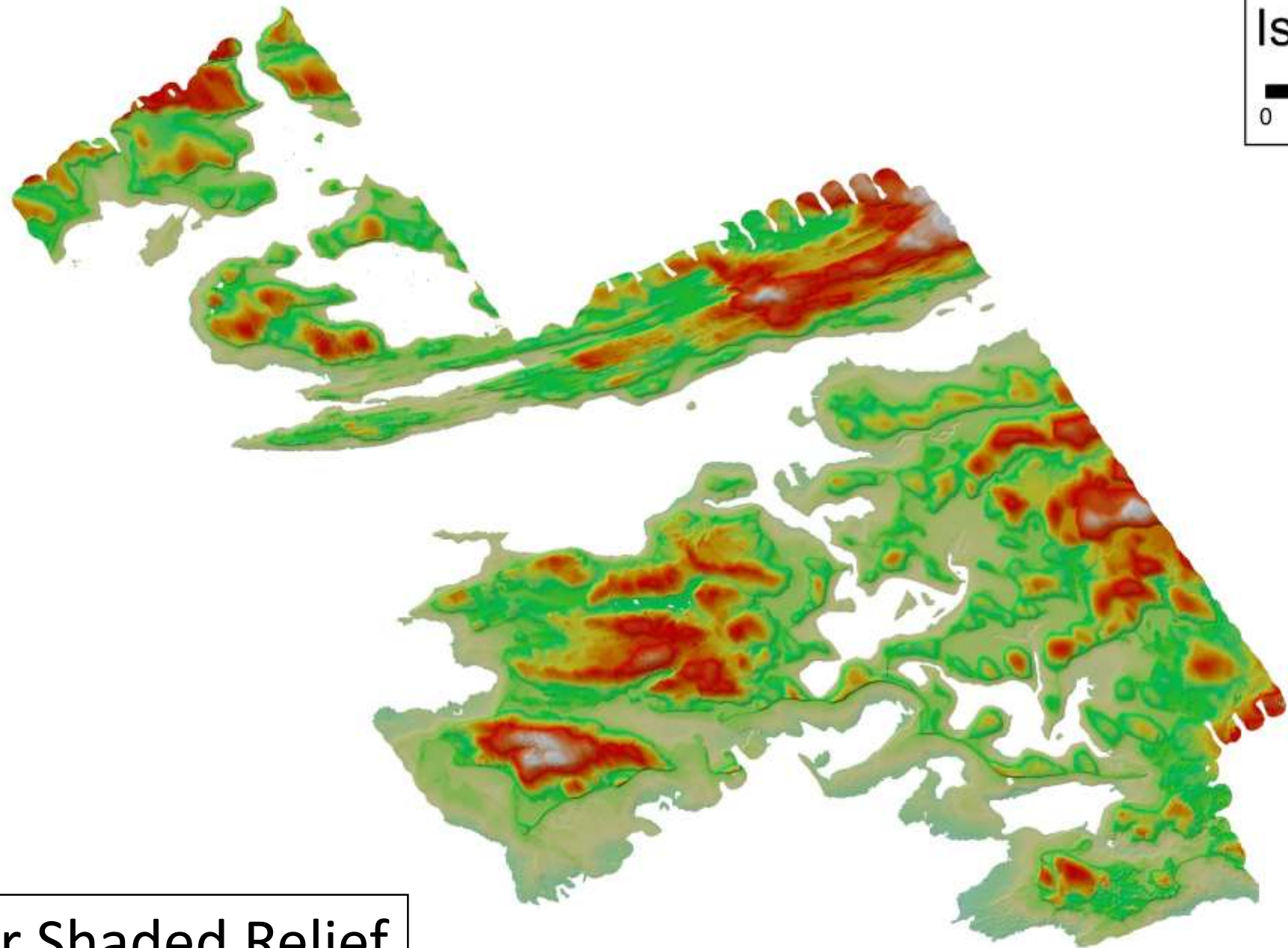
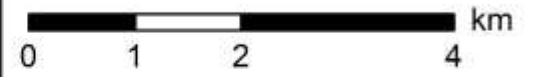


Isle Madame West

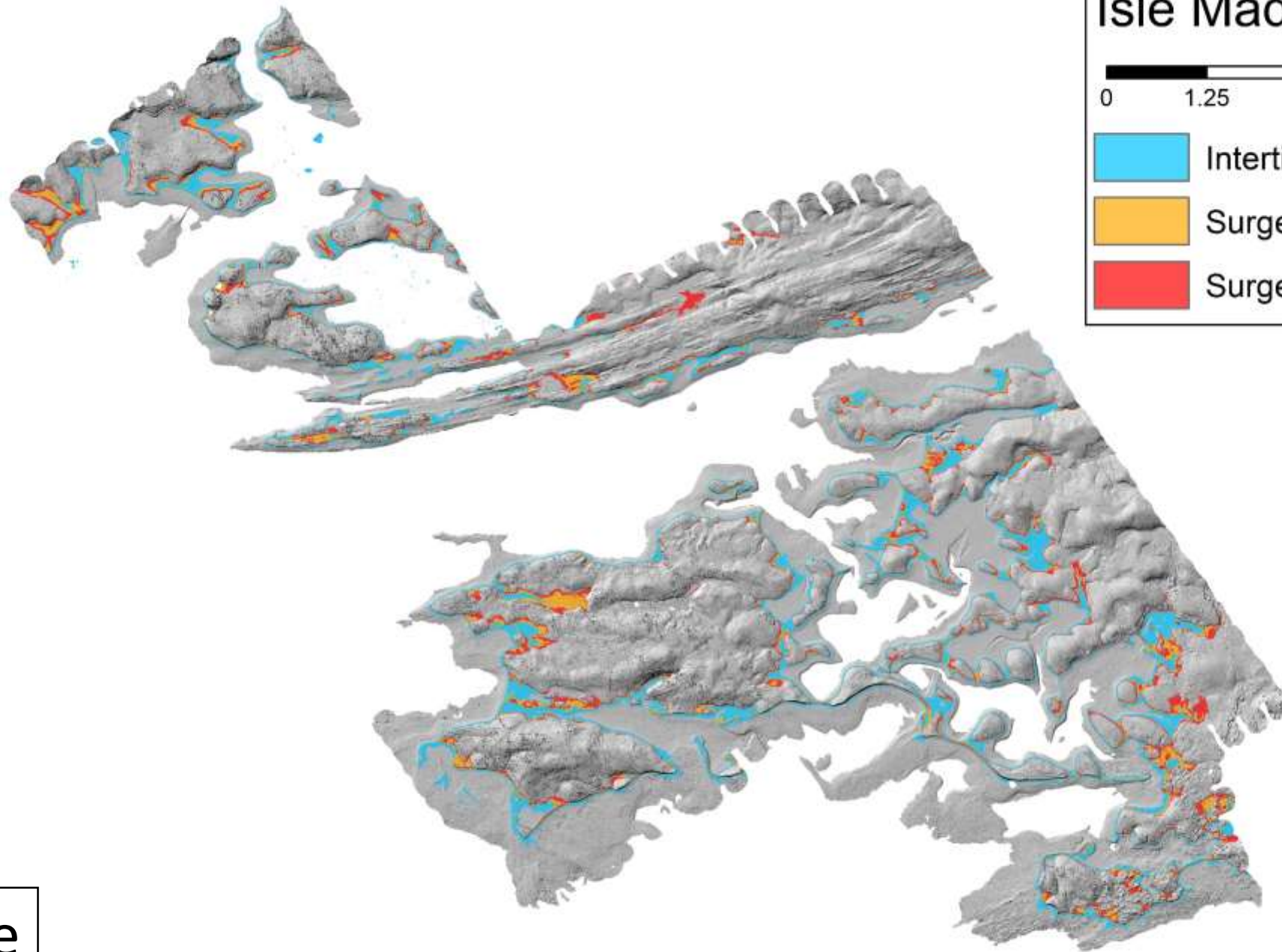
Penetration: 9 m



Isle Madame

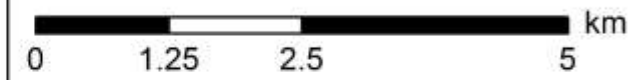





Color Shaded Relief



Isle Madame

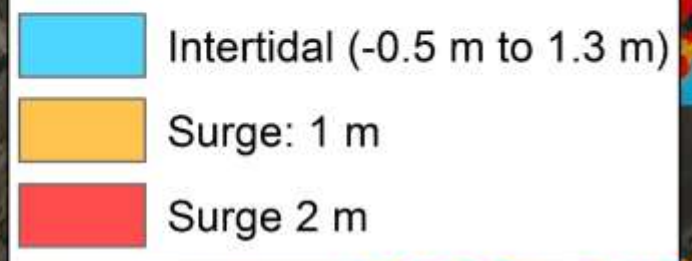
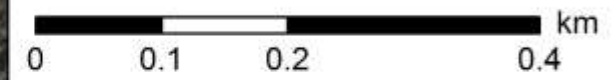
N



-  Intertidal (-0.5 m to 1.3 m)
-  Surge: 1 m
-  Surge: 2 m

Tidal Range

Isle Madame



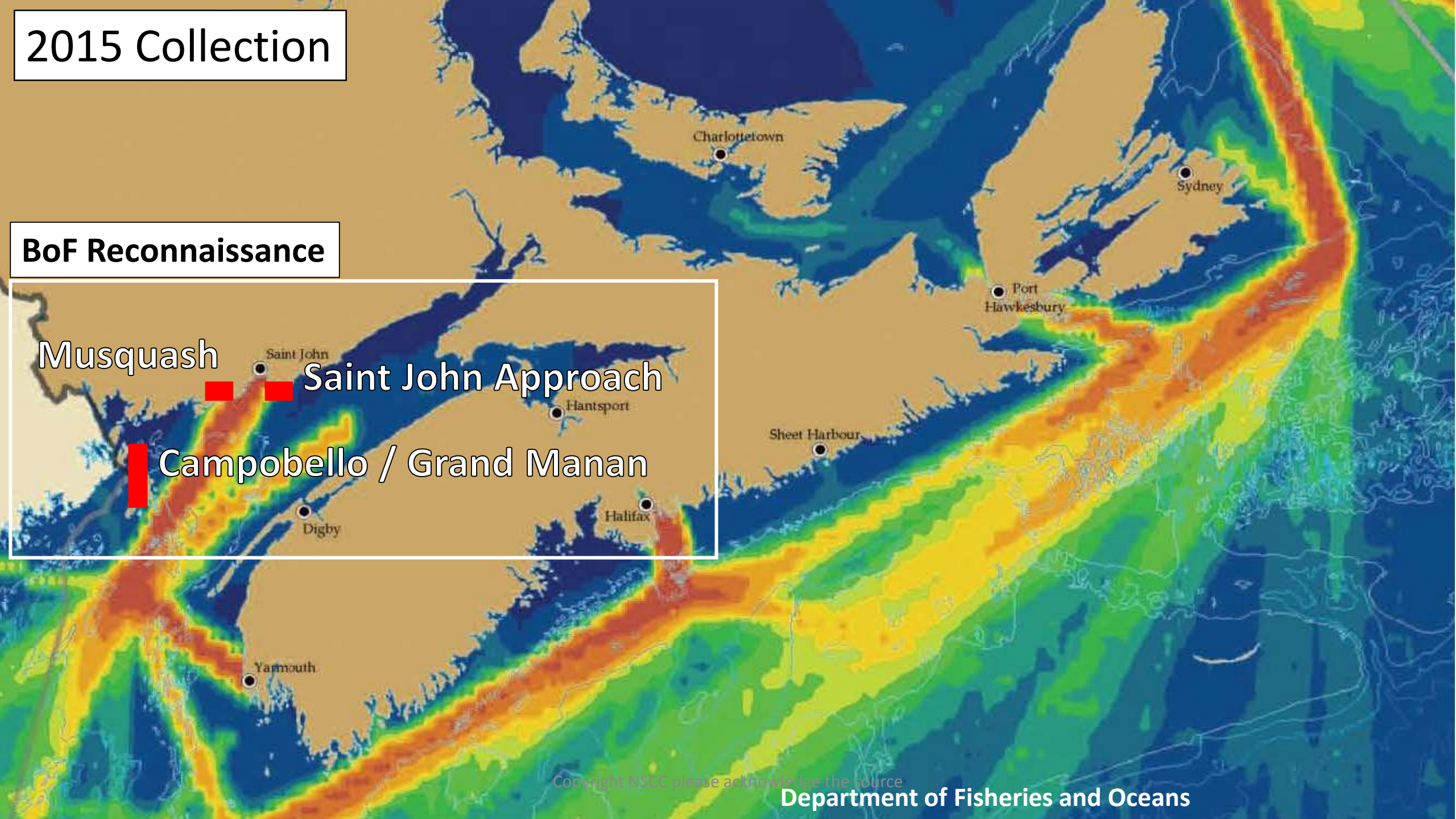
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Tidal Range



2015 Collection

BoF Reconnaissance



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Department of Fisheries and Oceans

2015 Early Products: Saint John Approach



2015 Early Products: Saint John Approach



2015 Early Products: Saint John Approach

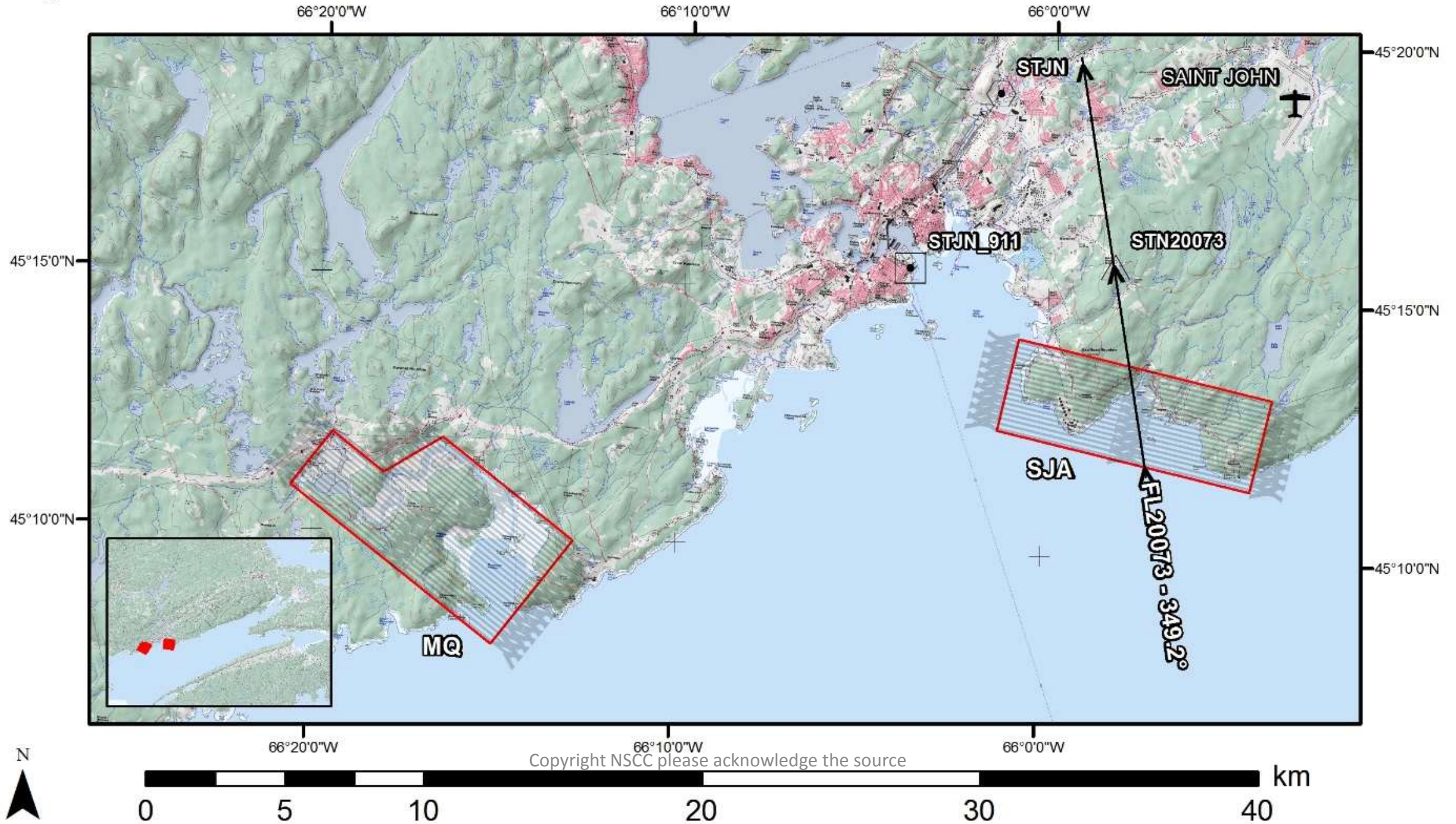


2015 Early Products: Saint John Approach

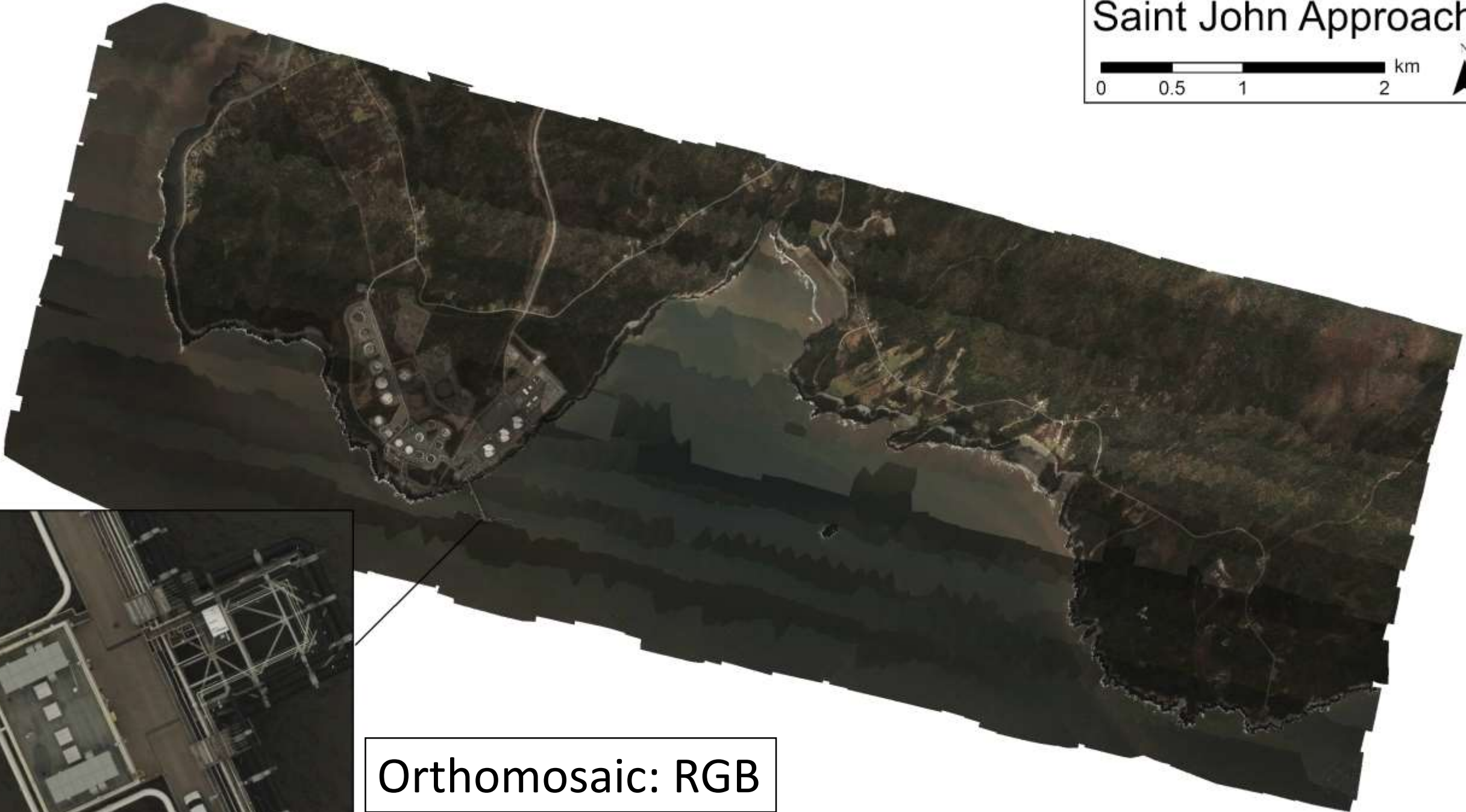


Flight Plan: DFOTS

AOI: SJA / MQ

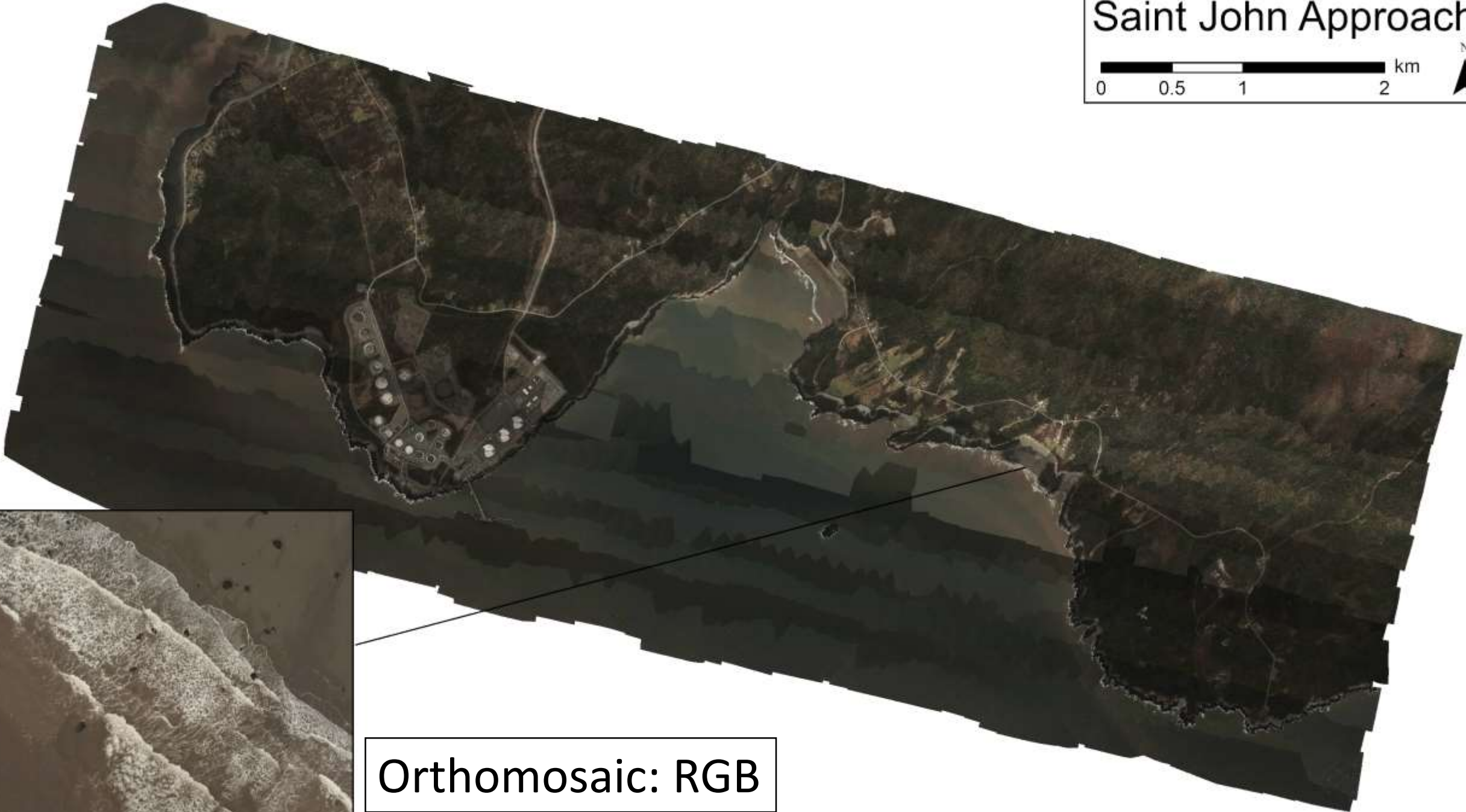


Saint John Approach



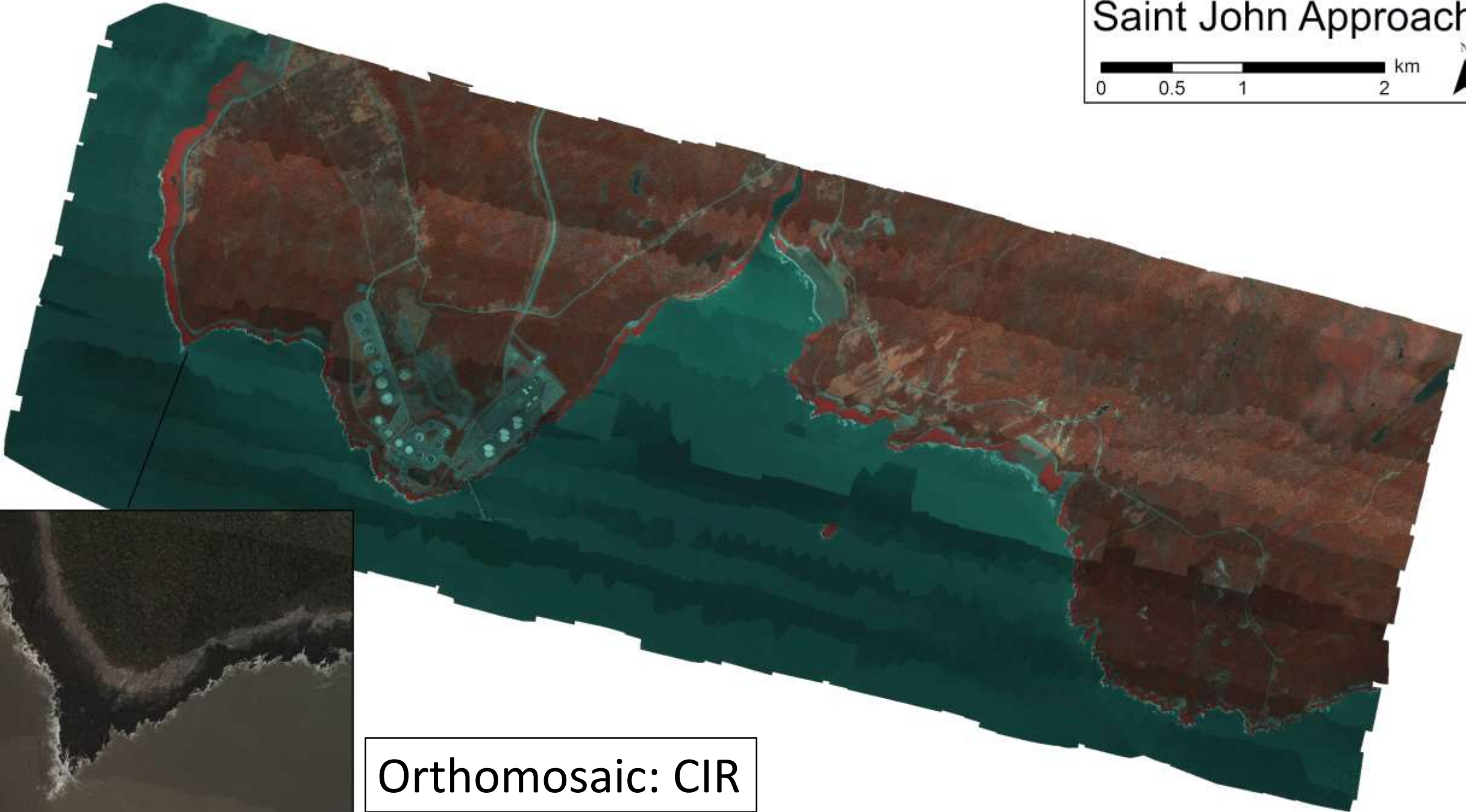
Orthomosaic: RGB

Saint John Approach



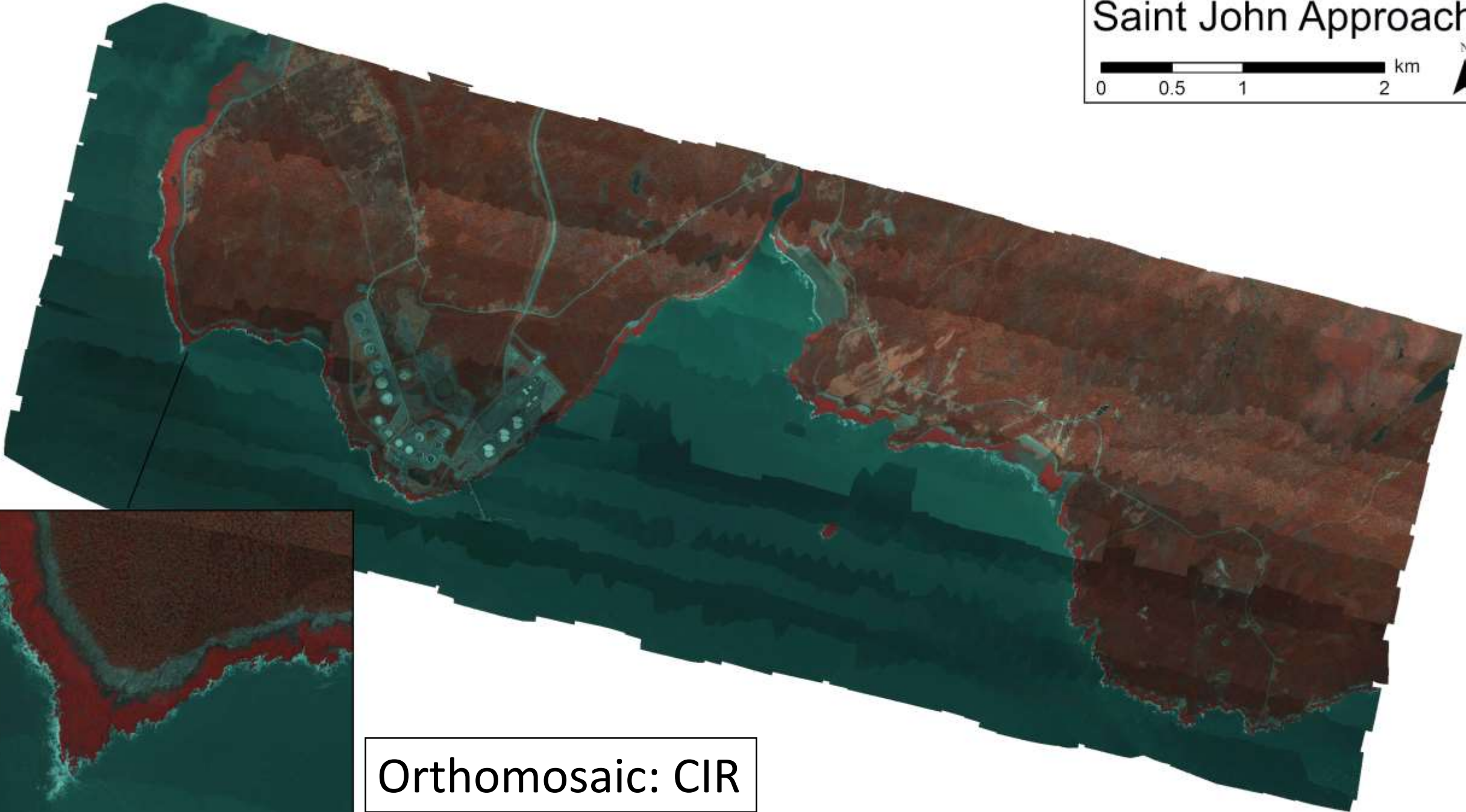
Orthomosaic: RGB

Saint John Approach



Orthomosaic: CIR

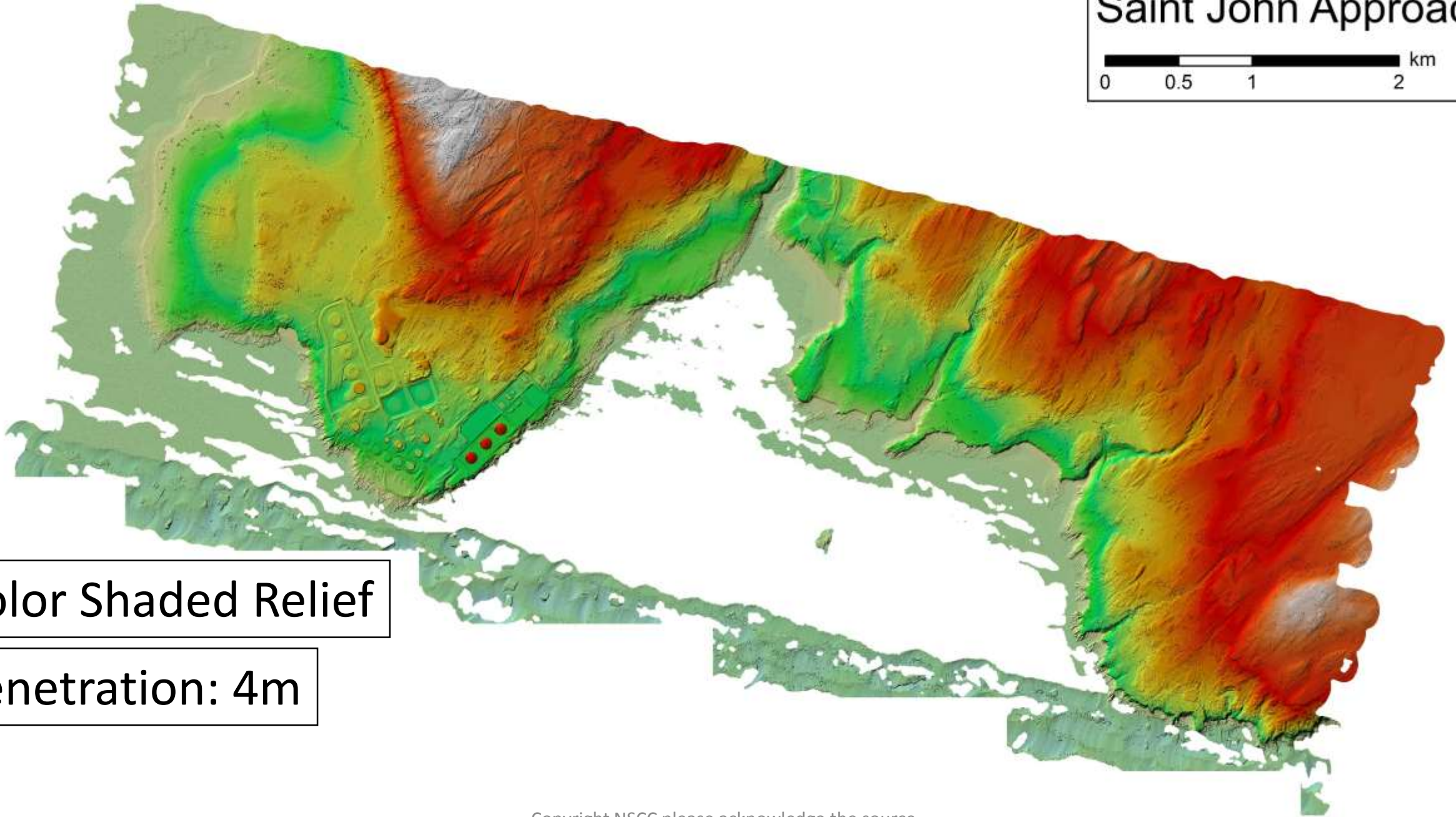
Saint John Approach



Orthomosaic: CIR

Saint John Approach

0 0.5 1 2 km



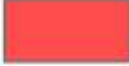


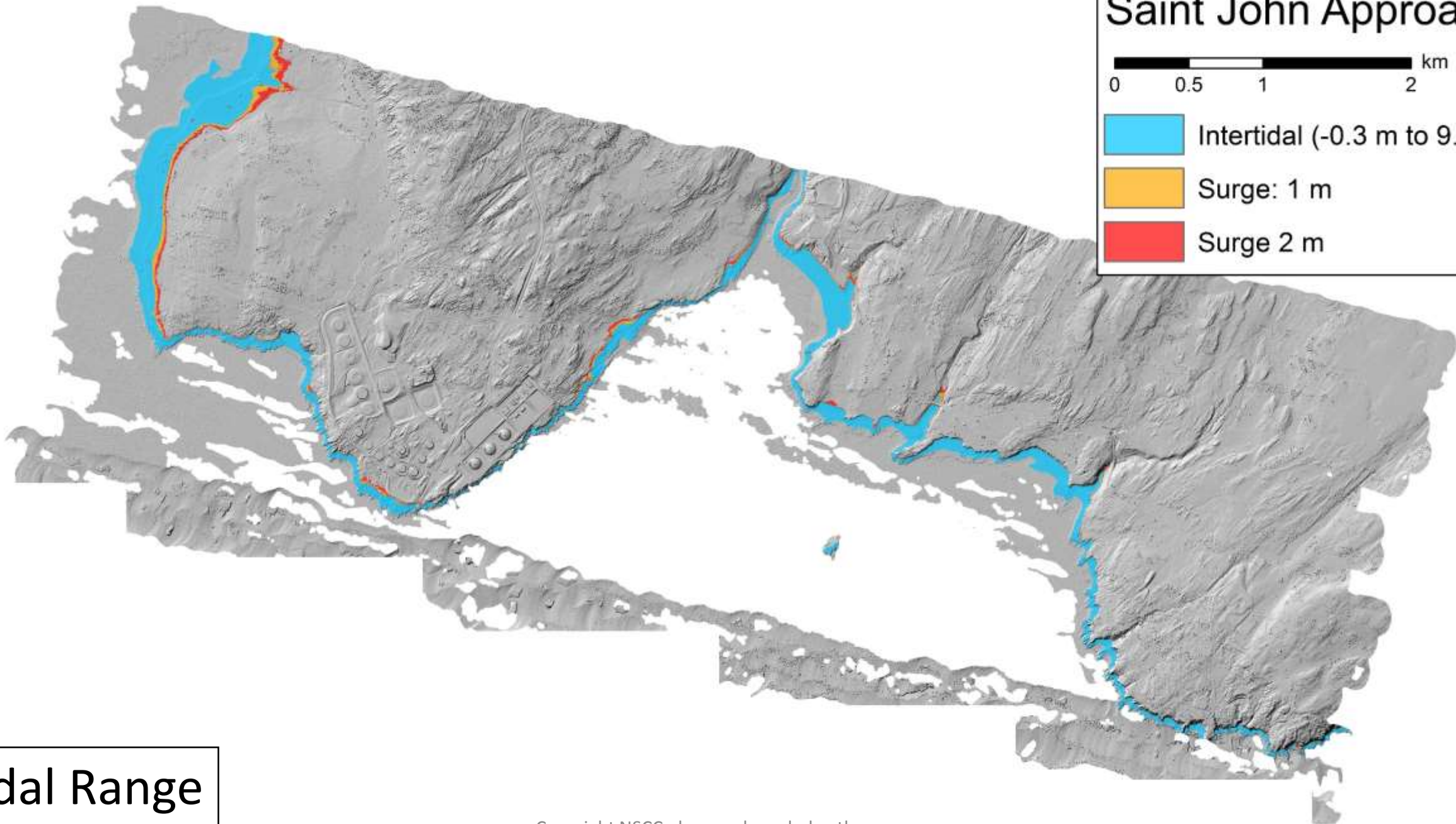
Color Shaded Relief

Penetration: 4m

Saint John Approach

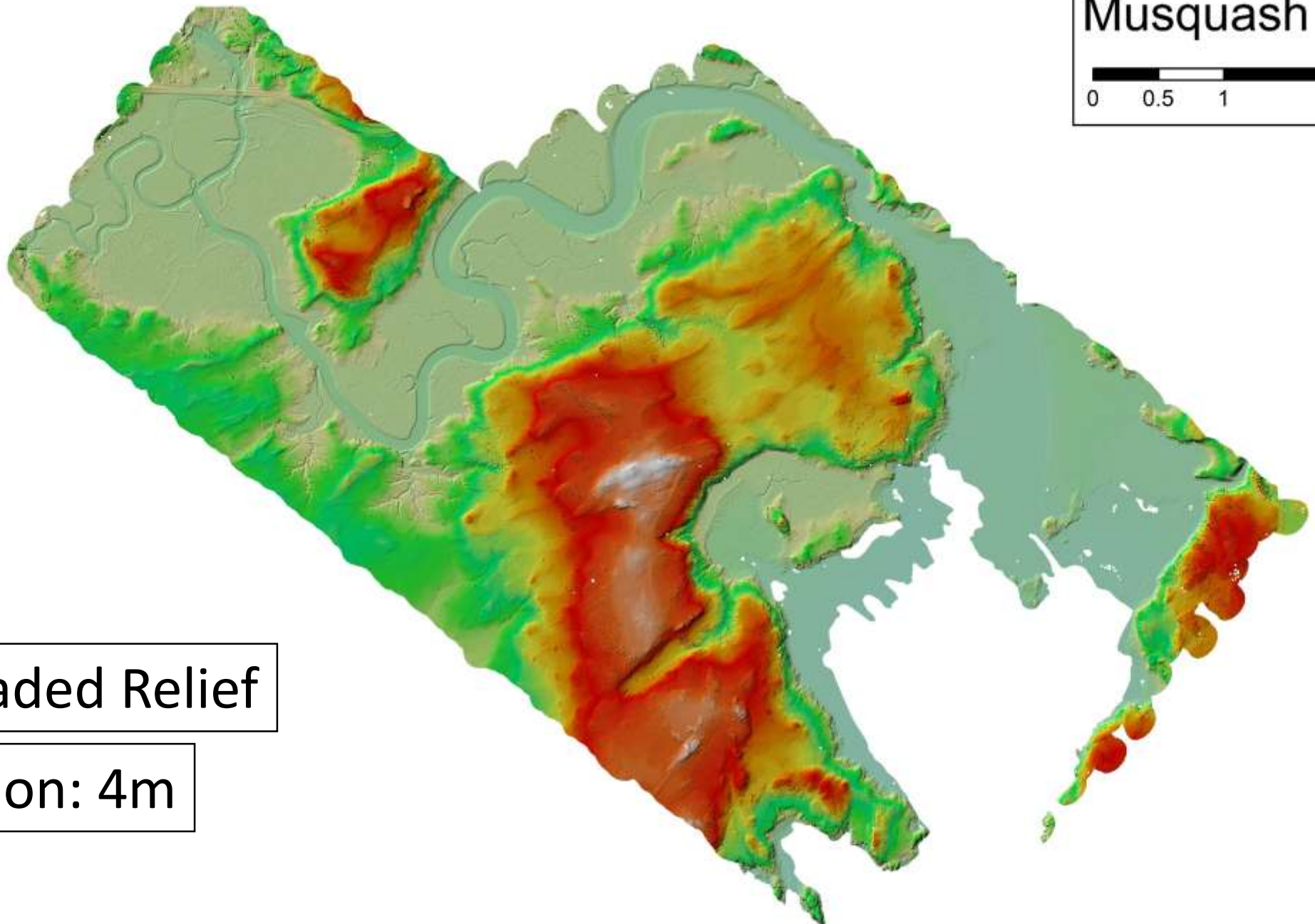
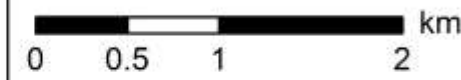


-  Intertidal (-0.3 m to 9.0 m)
-  Surge: 1 m
-  Surge: 2 m



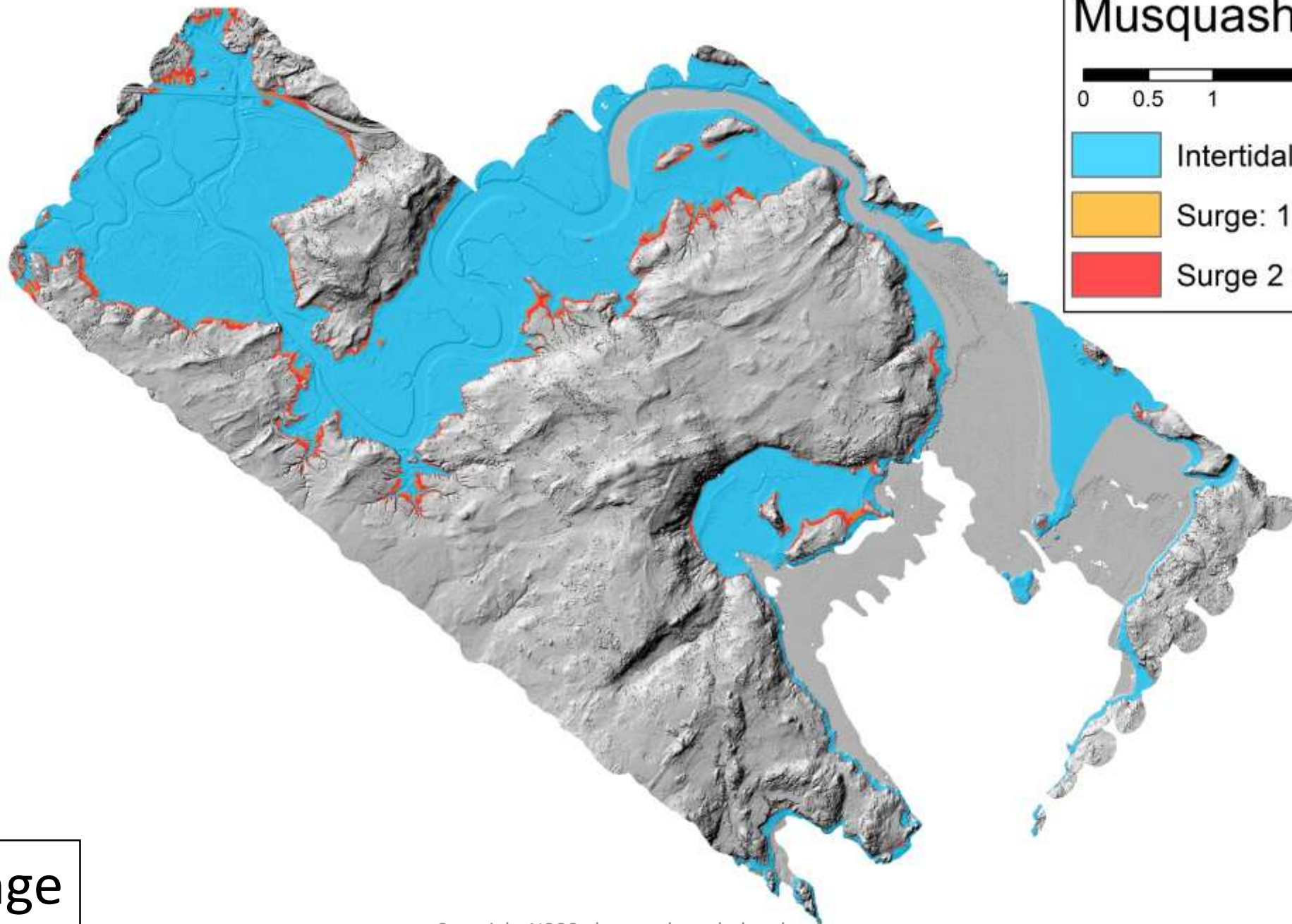
Tidal Range

Musquash Marsh



Color Shaded Relief




Penetration: 4m



Musquash Marsh

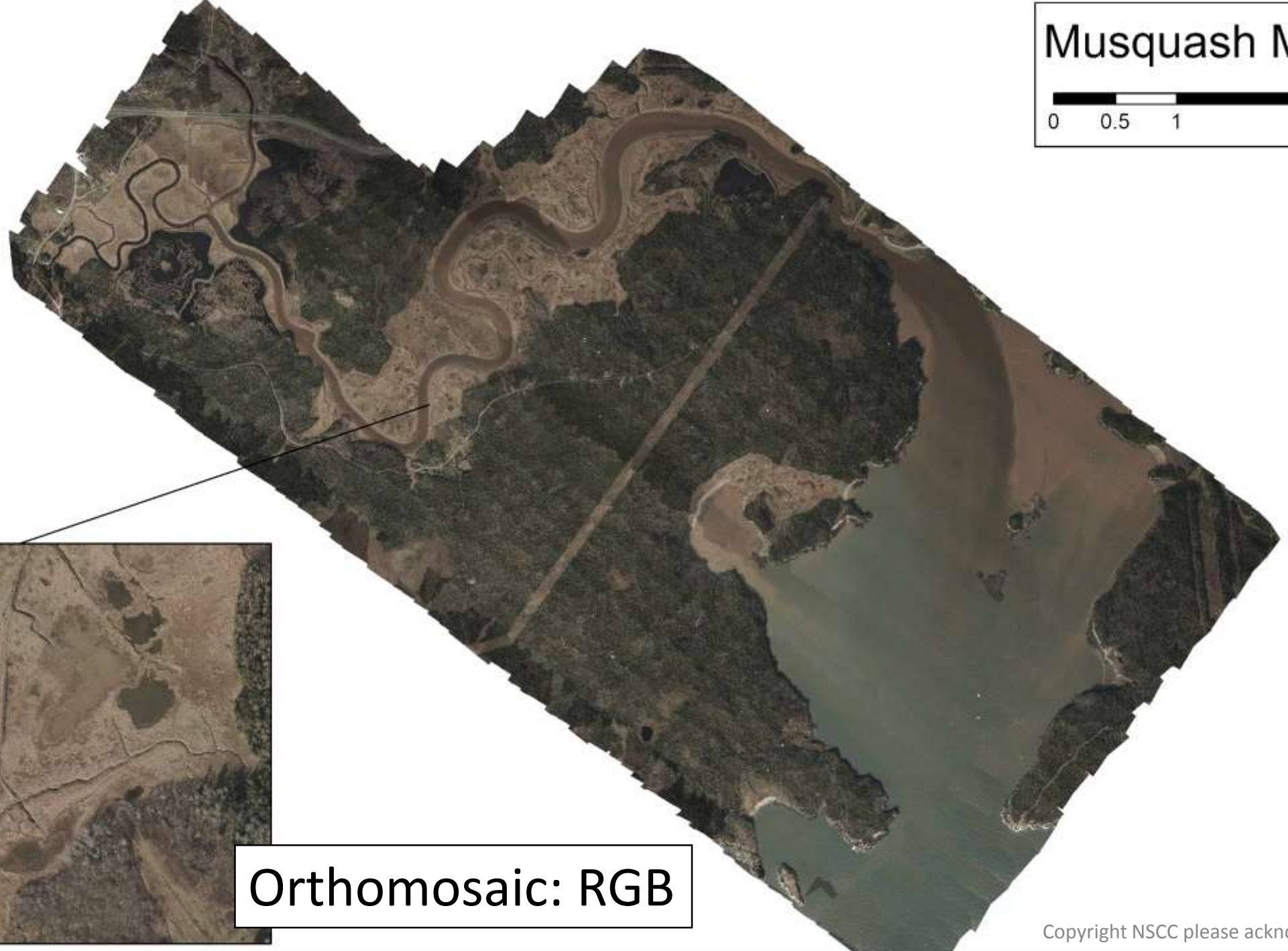
0 0.5 1 2 km



-  Intertidal (-1.5 m to 7.6 m)
-  Surge: 1 m
-  Surge: 2 m

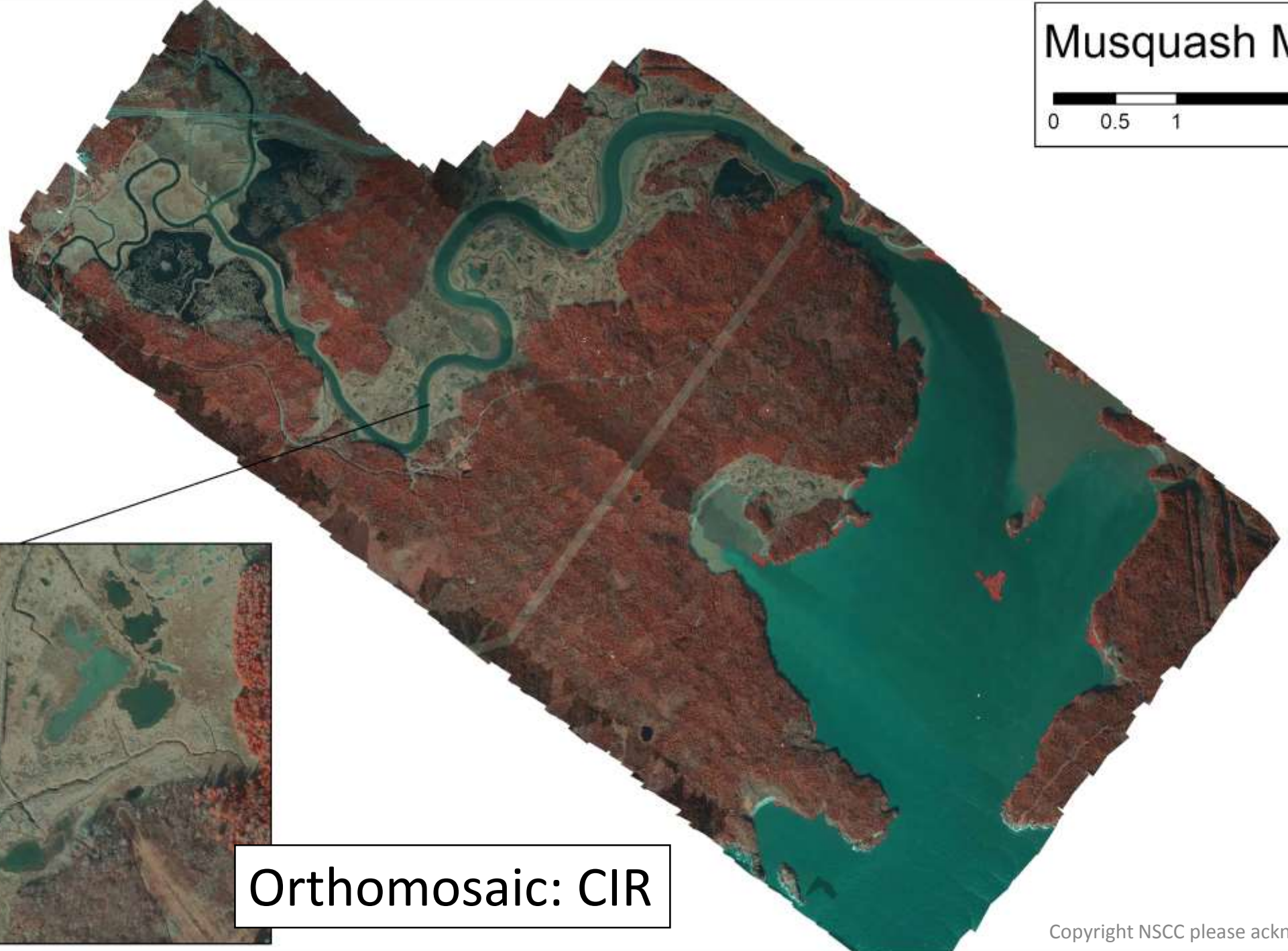
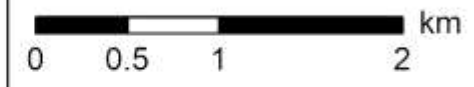
Tidal Range

Musquash Marsh



Orthomosaic: RGB

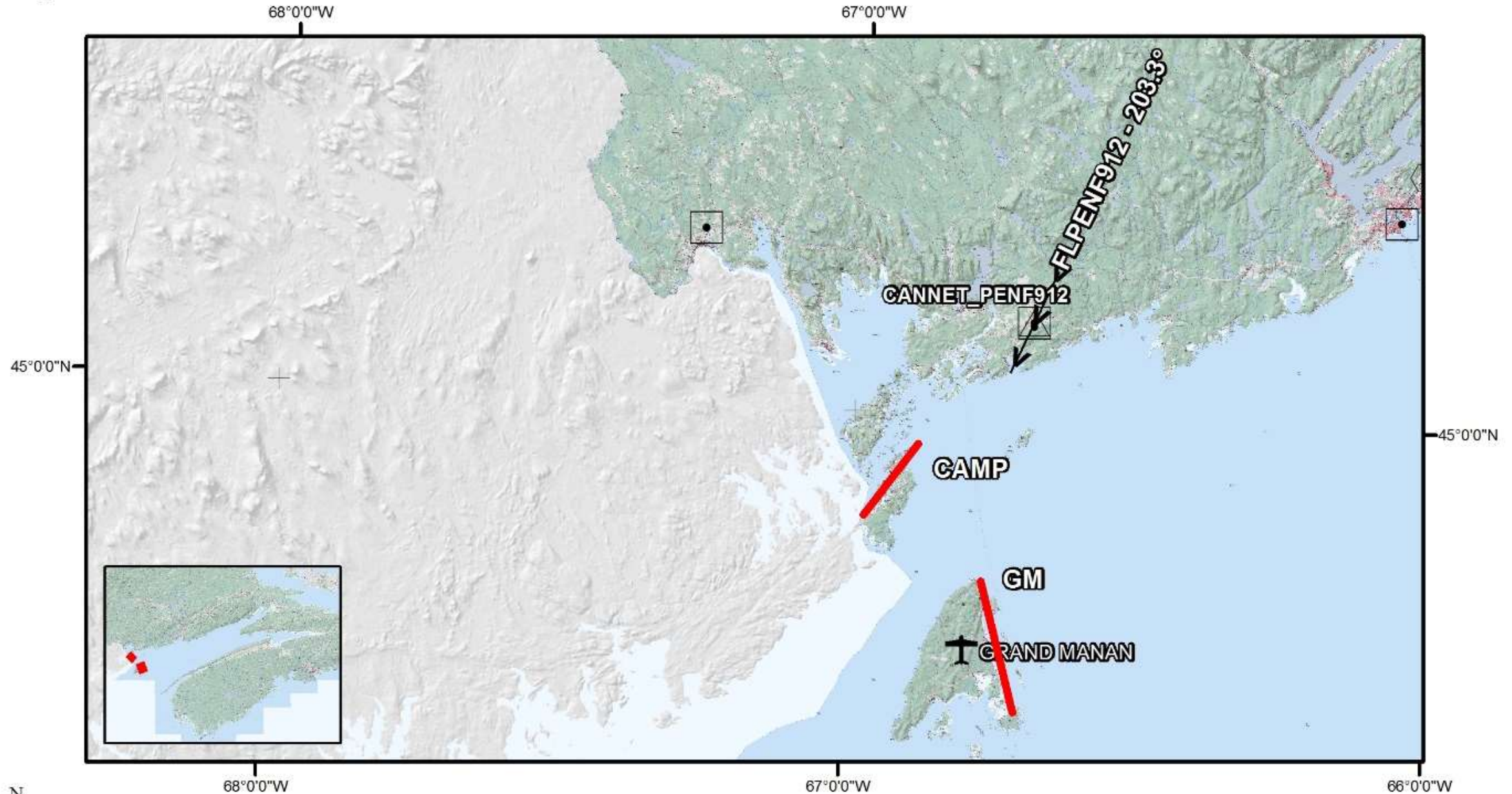
Musquash Marsh



Orthomosaic: CIR

Flight Plan: DFOTS

AOI: CAMP / GM



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Campobello



Grand Manan

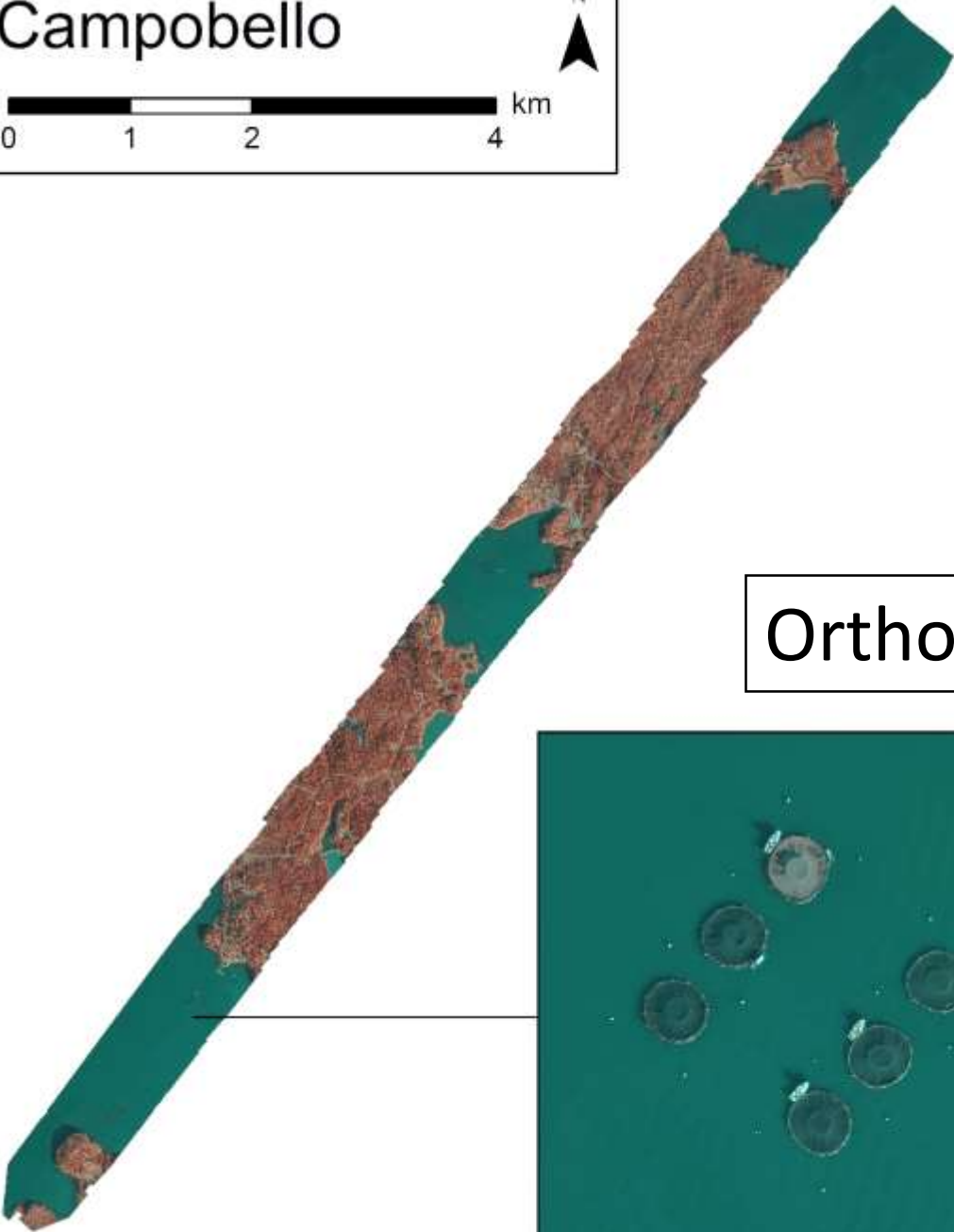


Orthomosaic: RGB



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Campobello



Grand Manan



Orthomosaic: CIR



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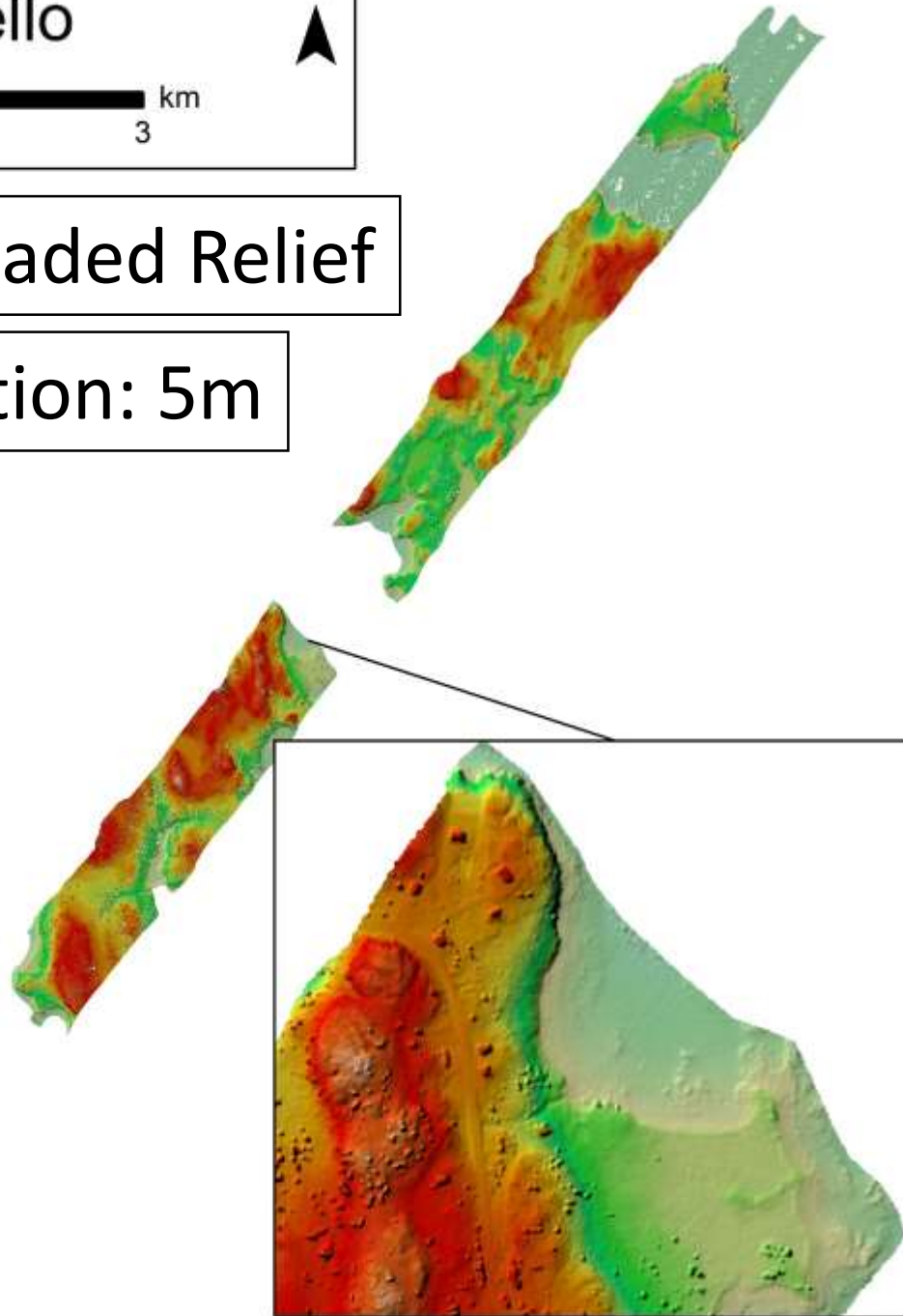
Campobello



0 0.75 1.5 3 km

Color Shaded Relief

Penetration: 5m



Grand Manan



0 2 4 8 km

Color Shaded Relief

Penetration: 7m



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Conclusions

- **The Chiroptera II is able provide critical data to support oil spill response measures.**
- **Elevation and photo data can be used to produce:**
 - **Navigational aids for complex coastlines**
 - **Habitat classification maps**
 - **Infrastructure identification maps**
 - **Coastal composition maps**
 - **Hydrodynamic / Particle tracking models**
- **Future survey missions will focus on additional sensitive areas within the Bay of Fundy.**



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