

3D Modeling with LIDAR



LIDAR Zones New Brunswick May 2003

Legend

★ HPN - High Precision Network

— roads

■ Lidar Coverage Zone



0 3.75 7.5 15 22.5 30 Kilometers



★ Cape Jourmain

Little Shemogue

Project Goals / Objectives



- 1) Explore the benefit of using LIDAR to create accurate 3D models of the area
- 2) Make a significant and useful contribution to the rest of the CCAF project

Data Sources

- ⌘ RAW LIDAR Data
- ⌘ Orthophotos
- ⌘ Topographic data
- ⌘ Satellite imagery
- ⌘ GPS Validation data
- ⌘ Digital photography
- ⌘ other



Literature Search

⌘ Searched the Library, Internet, AGRG

⌘ 38 resources including: Journals / Magazines / Books and other resources

⌘ Main topics included:

☑ Sea Level Rise

☑ LIDAR

☑ combination of the Two

Literature Review



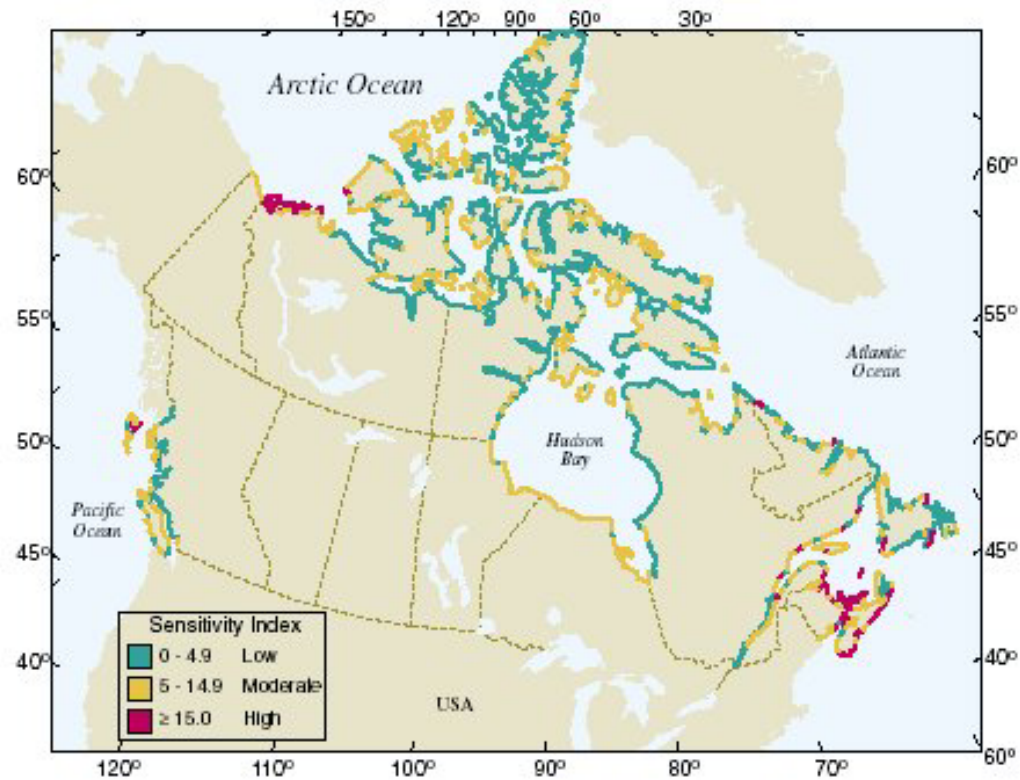
⌘ Sea Level Rise

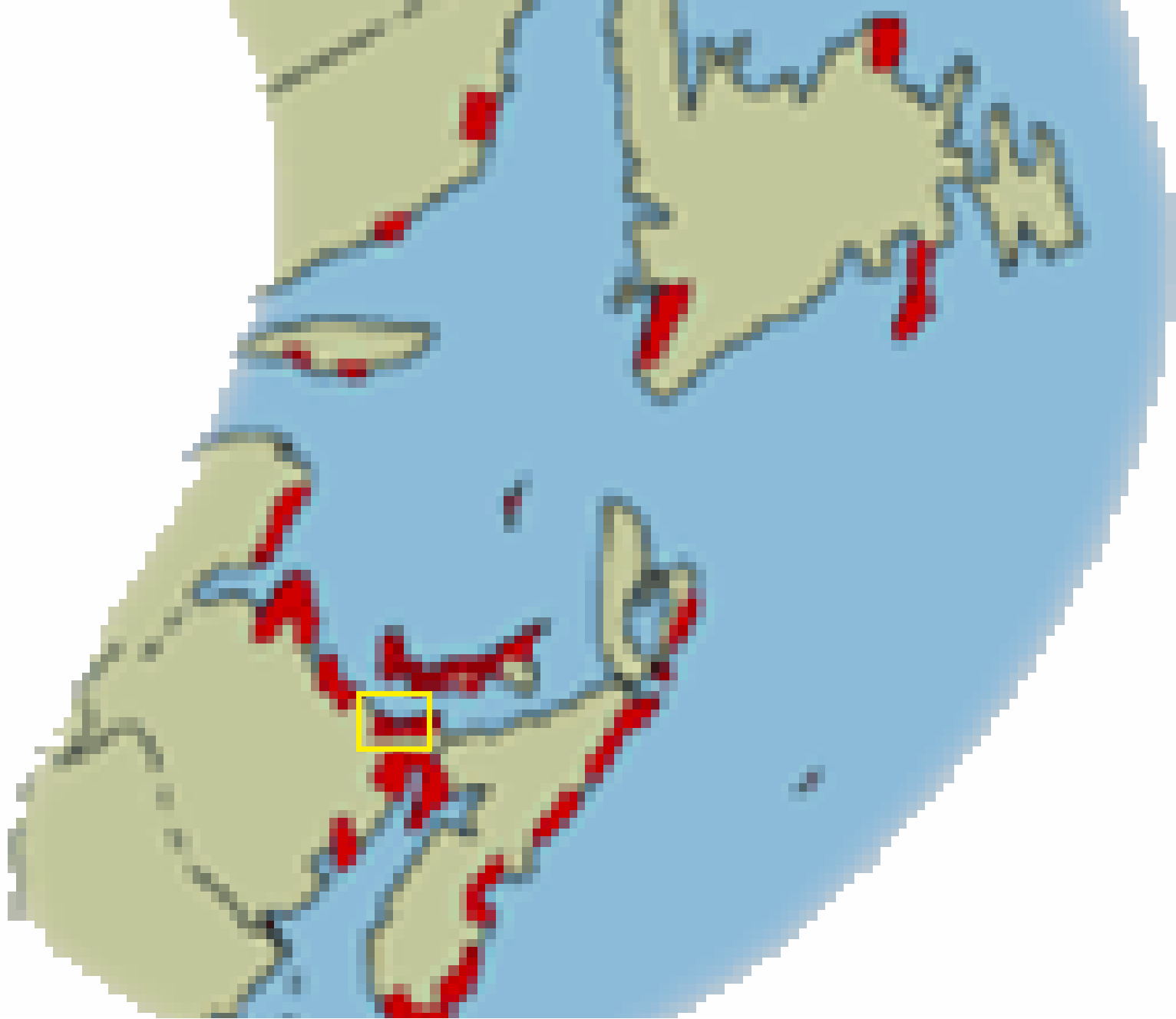
- ☒ Coastal Sensitivity to Sea Level Rise
- ☒ Global Warming
- ☒ Impacts And Adaptation

⌘ LIDAR

- ☒ Better DEMS
- ☒ AGRG past LIDAR Research
- ☒ LIDAR Data Integration
- ☒ LIDAR Limitations

Coastal Sensitivity to SLR





Sea Level Rise

- ⌘ Not a new issue
- ⌘ Global Wide Issue
- ⌘ Global Warming Accelerates SLR

- ⌘ Canadian coastline is one of the largest in the world
- ⌘ Govt. provides \$\$ for research
- ⌘ Coasts change through out time
- ⌘ Regional Scale



⌘ <http://gsca.nrcan.gc.ca/coastweb/sealevel/sealevel3.swf>

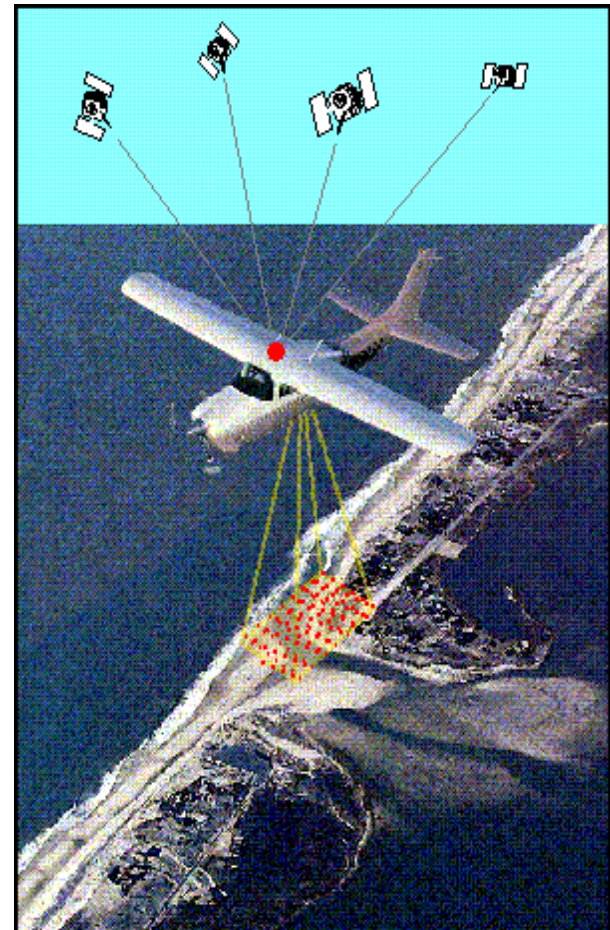
Impacts of SLR in coastal regions

- ⌘ The impacts of rising sea level and other aspects of climate change in coastal regions can include:
 - ☒ flooding of wetlands and adjacent shores
 - ☒ expanded flooding during severe storms and high tides
 - ☒ increased near-shore wave energy (Erosion)
 - ☒ upward and land-ward migration of beach profiles
 - ☒ saline intrusion into coastal freshwater aquifers
 - ☒ impacts on coastal ecosystems
 - ☒ damage to coastal infrastructure and broad impacts on the coastal economy

LIDAR

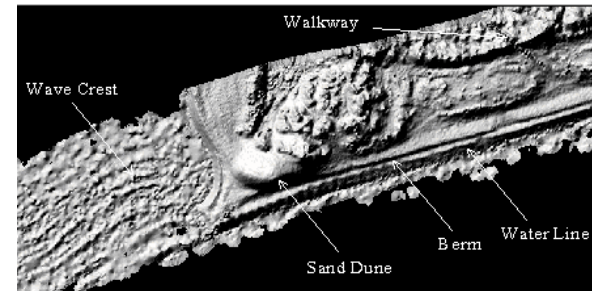
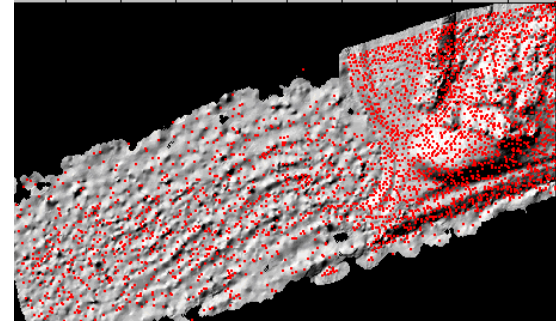
⌘ Improvements

- ☒ GPS
- ☒ IMU
- ☒ Sensor



LIDAR and Better DEMs

- ⌘ High resolution DEM
- ⌘ 3D modeling
- ⌘ Integrate other data



AGRG past LIDAR Research

- ⌘ History / Past Experience
- ⌘ Documented procedures
 - ☒ Validation methods
 - ☒ Flooding Applications
 - ☒ Storm Surge Applications
 - ☒ Wetland Applications
 - ☒ other



Applied Geomatics Research Group

Methodology



- ⌘ Ground Validation (GPS / Total Station)
- ⌘ Import Raw Data
- ⌘ Build Grid / DEM
- ⌘ Validate data
- ⌘ Create 3D Models
- ⌘ Integrate data and create GIS

Deliverables



⌘ Several GIS derived products such as

- ☒ DEM developed using ESRI tools
- ☒ 3D visualizations of the area
- ☒ Flood risk maps for different scenarios
- ☒ Analysis of the impact of sea level rise on natural and man made features
- ☒ Web-accessible GIS products
- ☒ other

Conclusions



Further Research



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