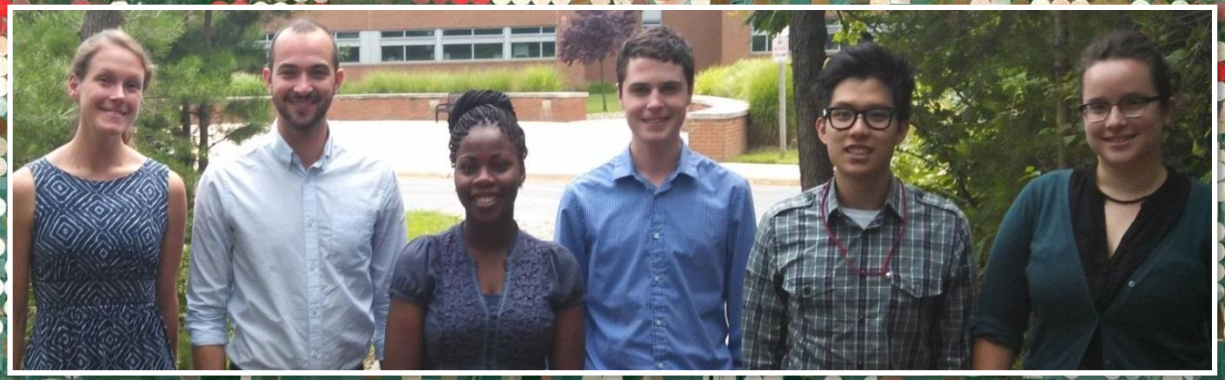
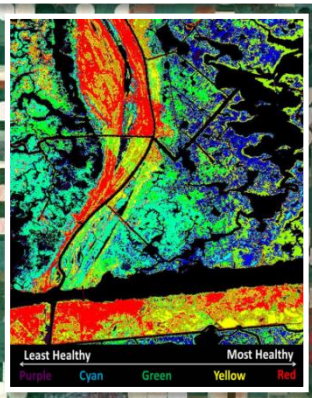
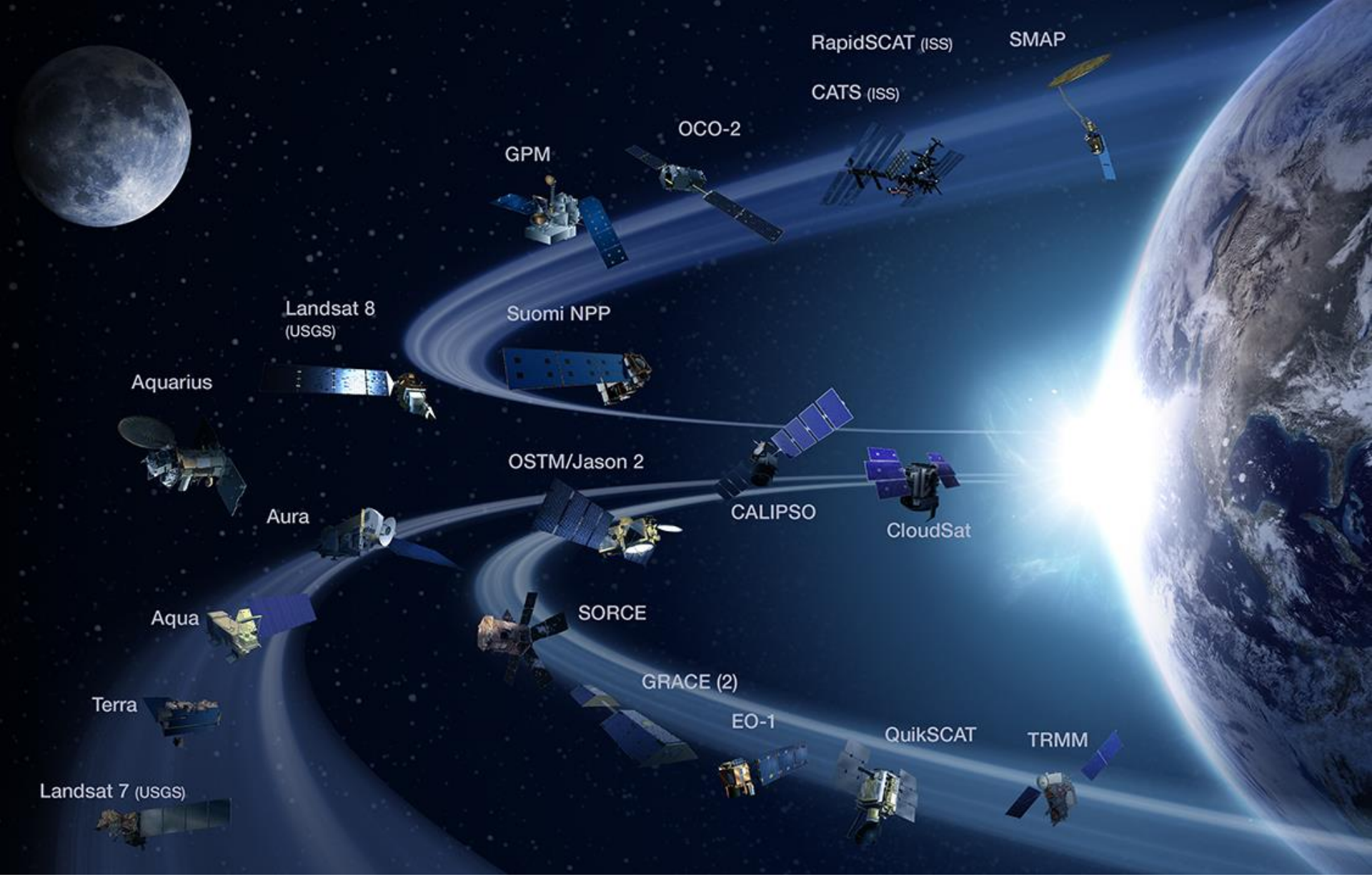
DEVELOP National Program





GLSLCI – 2015 Annual Meeting and Conference

Sarnia, Ontario – 19 June 2015



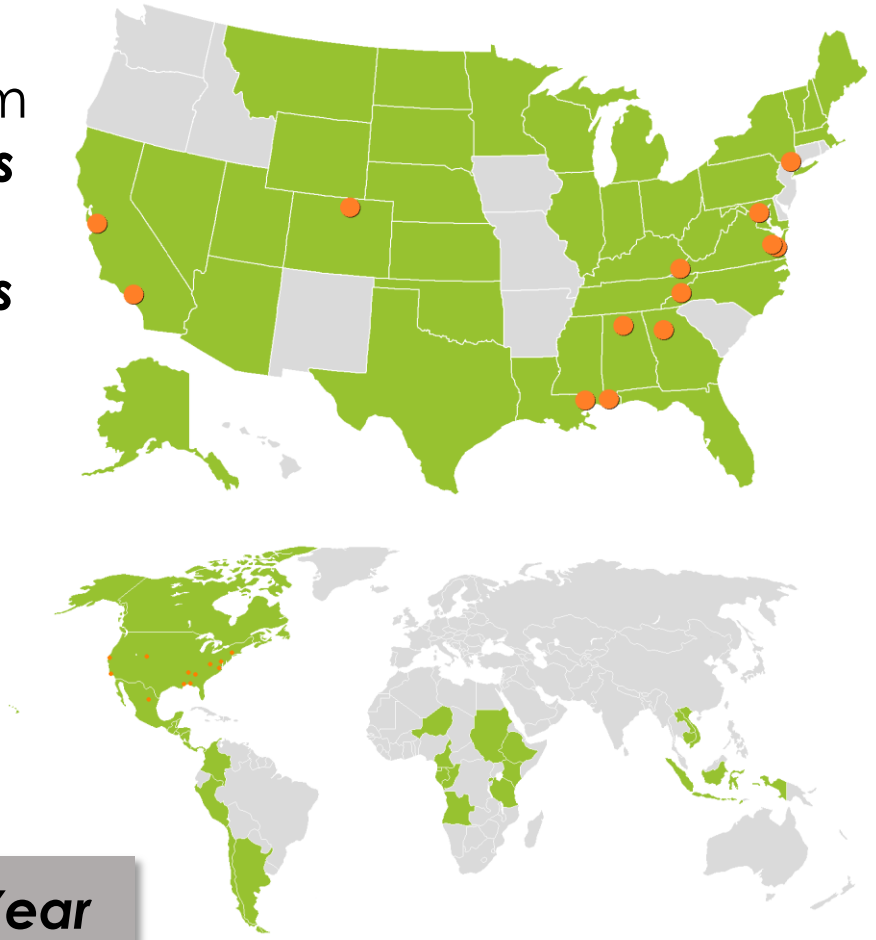
NASA Earth observations include a coordinated series of polar-orbiting and low inclination satellites for long-term global observations

DEVELOP National Program

What is DEVELOP?

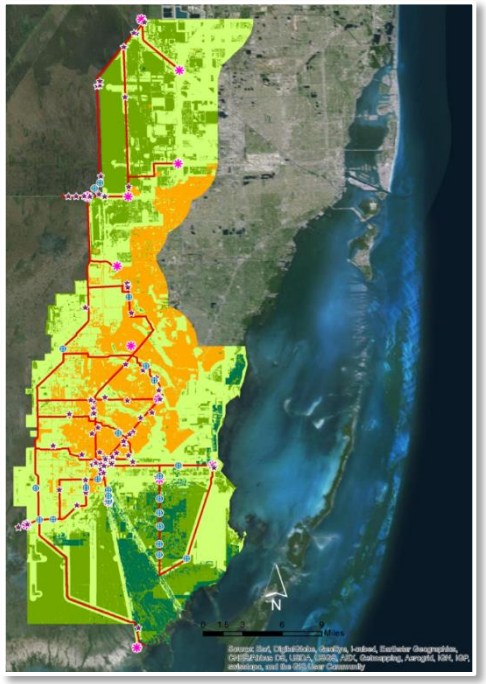
NASA workforce development program that ***collaborates*** with ***decision makers*** to conduct environmental research projects using ***NASA Earth observations***

2014 Summer Project Impact



350 Participants & 80 Projects Per Year

DEVELOP National Program



- Address ***community concerns*** relating to environmental issues
- ***Collaborate with local, state, regional, federal and/or international organizations*** who can benefit from using NASA Earth observations to ***enhance decision making***
- Utilize and highlight the **application of NASA Earth observations**
- ***Science advisors and mentors*** from NASA and partner organizations

Who can participate?

- Age 18 or older
- Interested in Earth science & remote sensing
- U.S. citizenship for NASA Centers

DEVELOP is an incubator and accelerator for NASA Earth science applications

GLSLCI & DEVELOP

GLSLCI and DEVELOP partnership facilitates a direct line of communication between decision makers in the Great Lakes region and NASA and other US Federal agency Earth observations and resources

Previous Projects:

- Extreme Precipitation Event Analysis
- Stormwater Runoff Impacts on Lake Erie
- Soil Erosion Potential in Duluth

Dr. Kenton Ross (NASA), Dave Ullrich (GLSLCI), and Ande Ehlen (DEVELOP) at 2012 GLSLCI Annual Meeting

GREAT LAKES CLIMATE

Impact of Decreasing Lake Water Levels on Georgian Bay Wetlands

- Emily Adams
- Lydia Cuker
- Kathy Currie
- Idamis Del Valle Martínez
- Lacey Freese
- Miriam Harris
- Janice M. Maldonado Jaime
- Pamela King
- Daniel Marx
- Stephen Zimmerman

Wetlands

- Interface of terrestrial and aquatic ecosystems
  - Control soil chemistry and development

Wetlands

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  - Control soil chemistry and development
- Estimated to provide over $10,000 USD per acre (C$ 12,330) in ecosystem services
- Decreased more than 50% in the Great Lakes Basin due to human development

Wetlands

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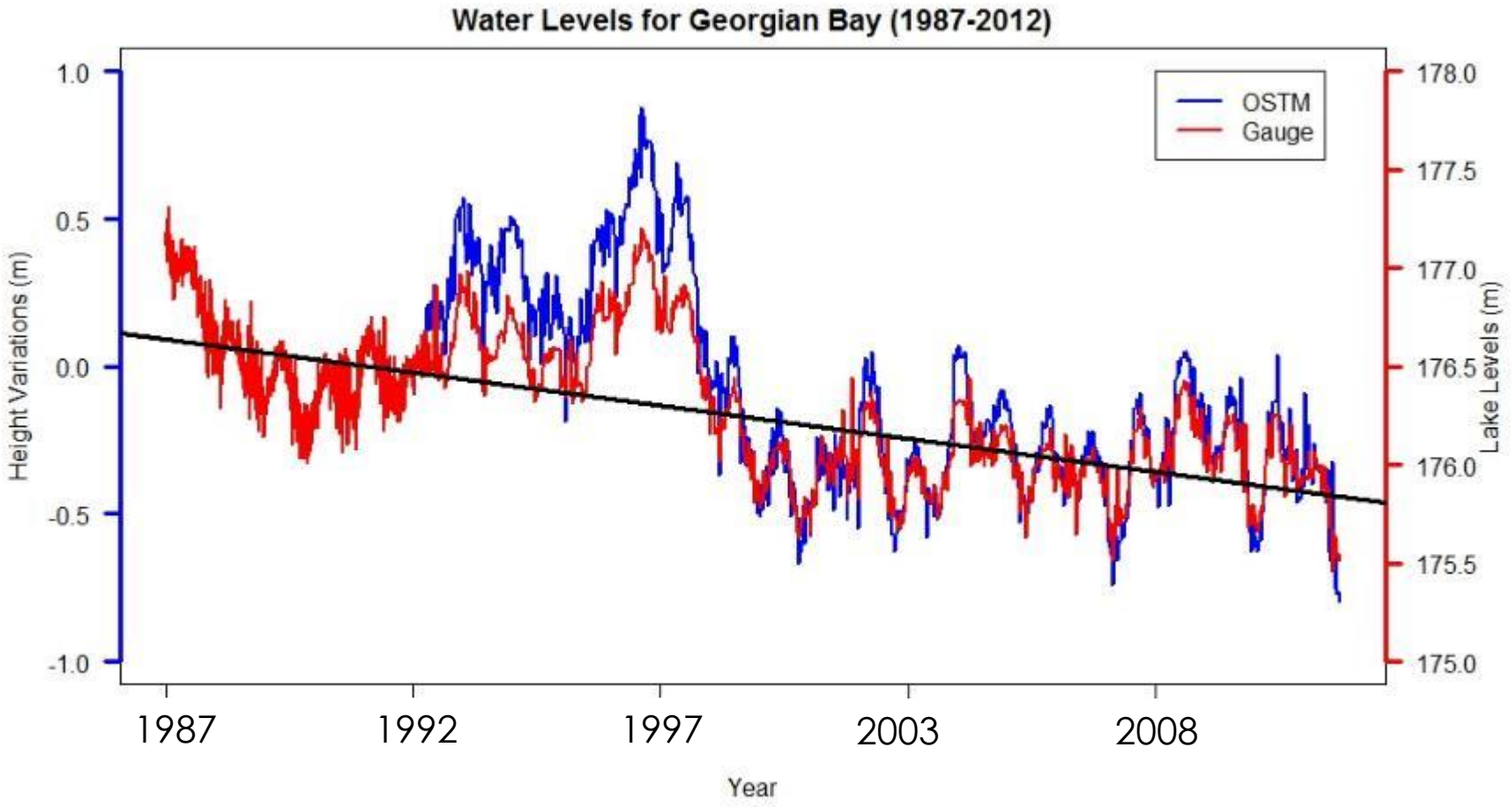
Great Lakes

- Largest source of fresh water
- A detailed, consistent, easily updatable, wetlands land cover classification for the region is lacking

Water Levels in the Great Lakes

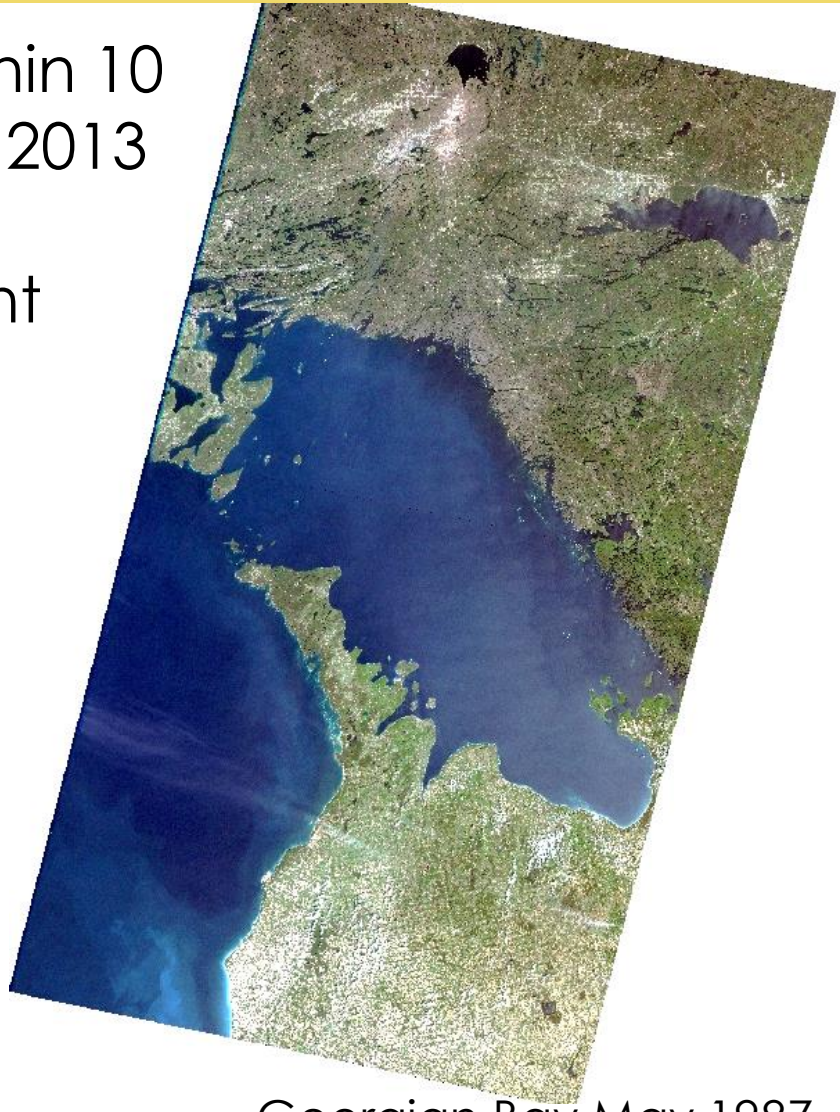
- Natural fluctuations due to climate variability
  - Vegetation adapts to these changes



Objectives

1. Classify land cover types within 10 km of Shoreline for 1987 and 2013

2. Georgian Bay Wetland extent change maps



Georgian Bay May 1987
(Landsat 5 TM)

Methodology

Data Acquisition

Land Cover Classification
Landsat 5
July 1987

Landsat 8
June 2013

ASTER DEM

Water Levels
TOPEX/Jason-1
OSTM/Jason-2
In situ water level gauges

Data Processing

Top of Atmosphere Corrected

Mosaicked Landsat Scenes

Study area defined by 10 km buffer around shoreline

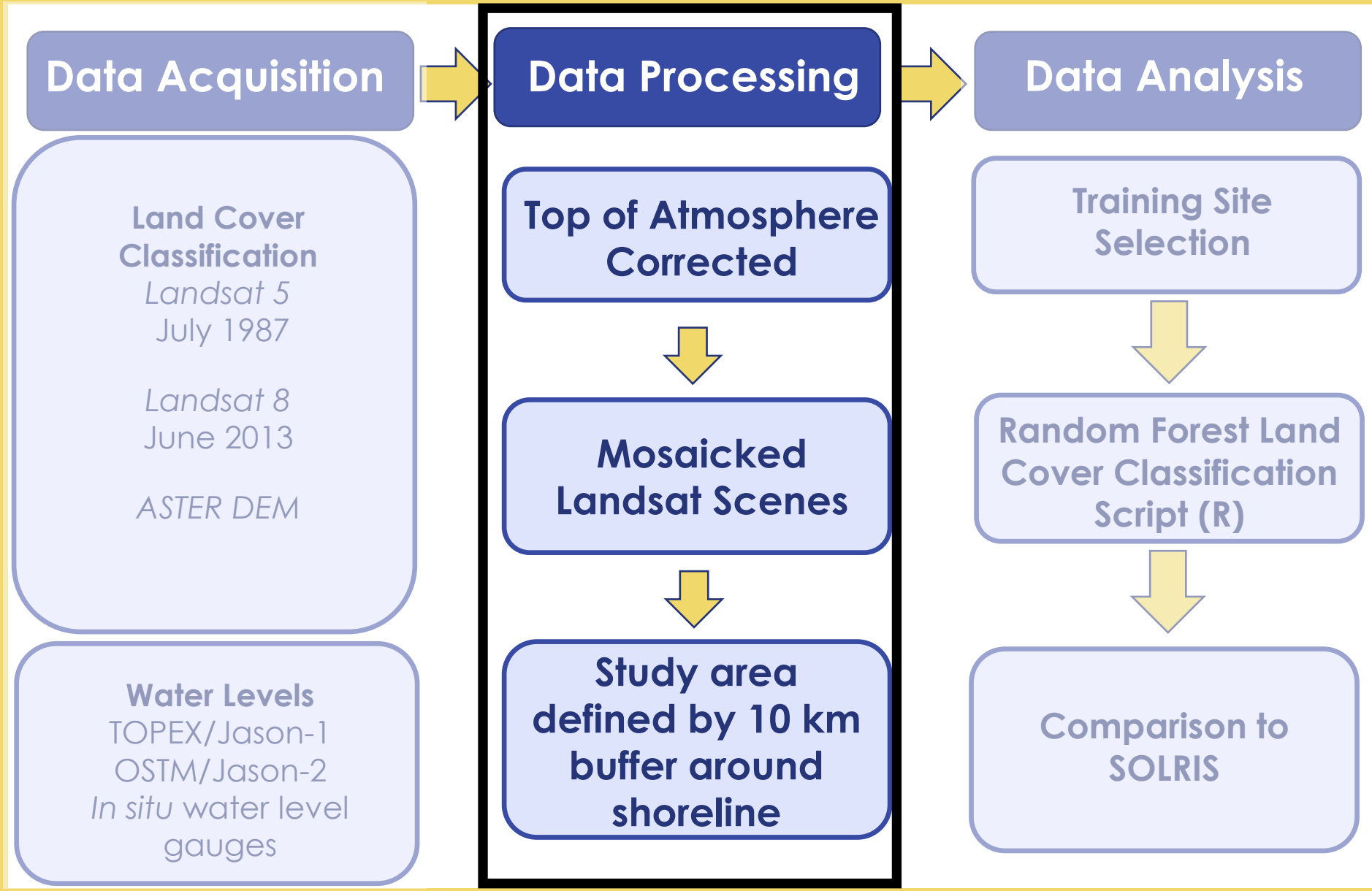
Data Analysis

Training Site Selection

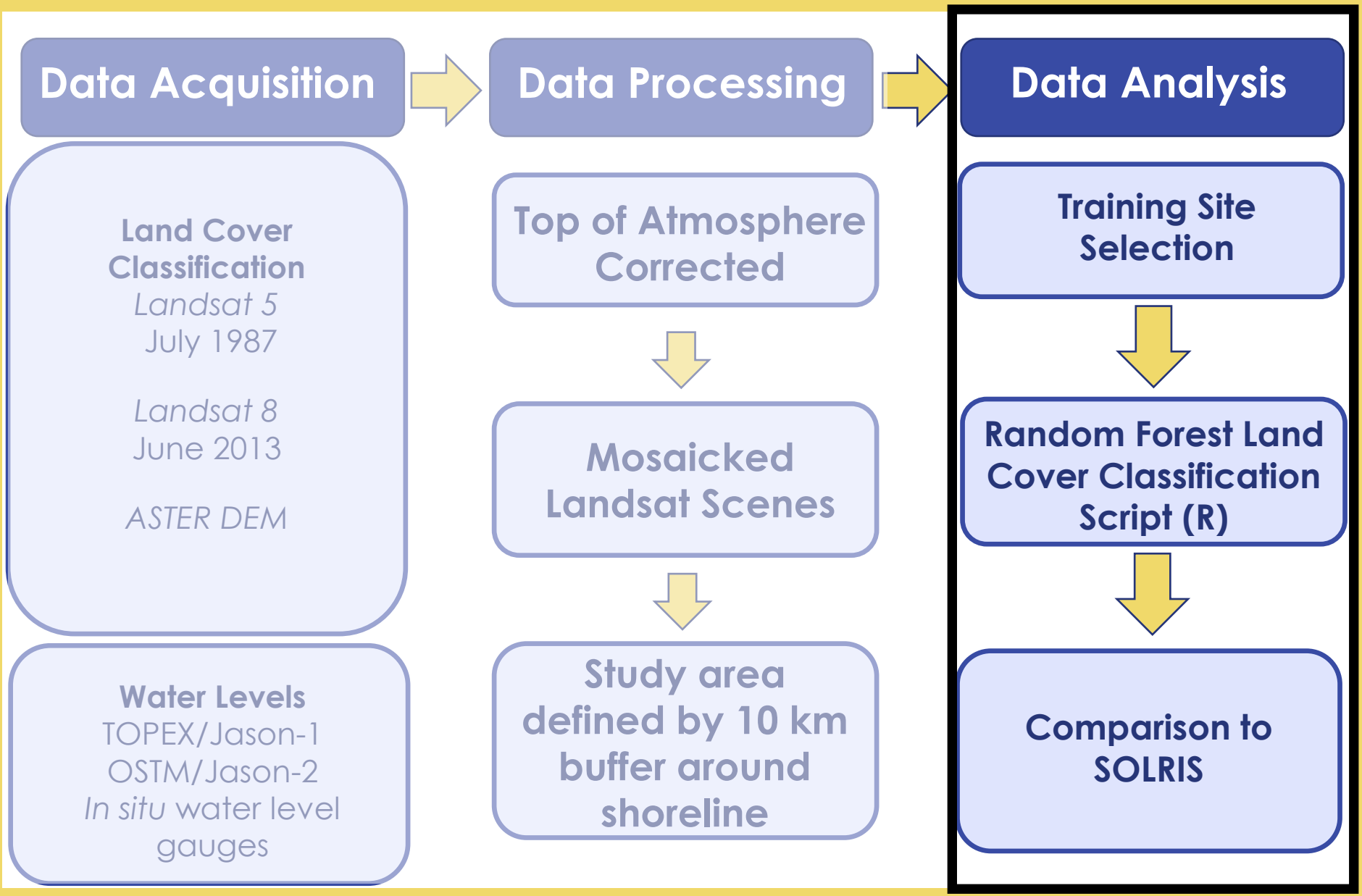
Random Forest Land Cover Classification Script (R)

Comparison to SOLRIS

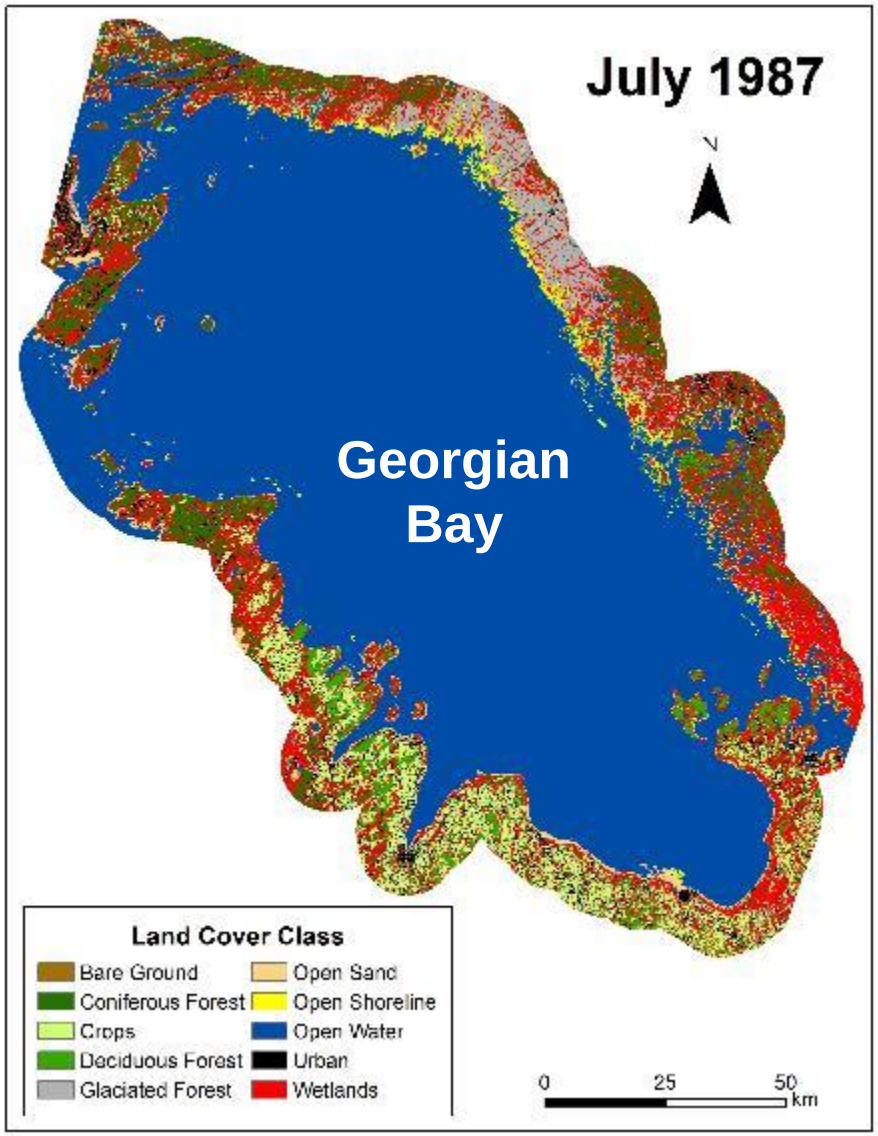
Methodology

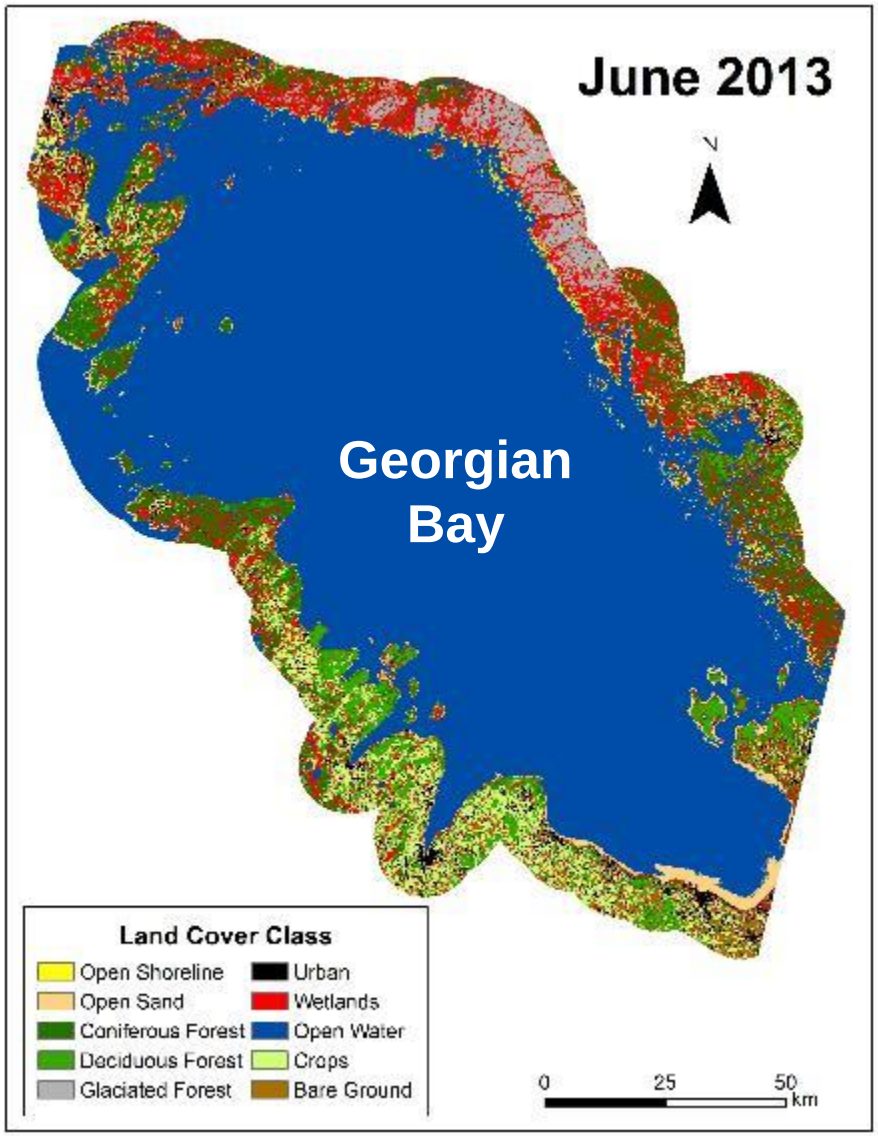


Methodology

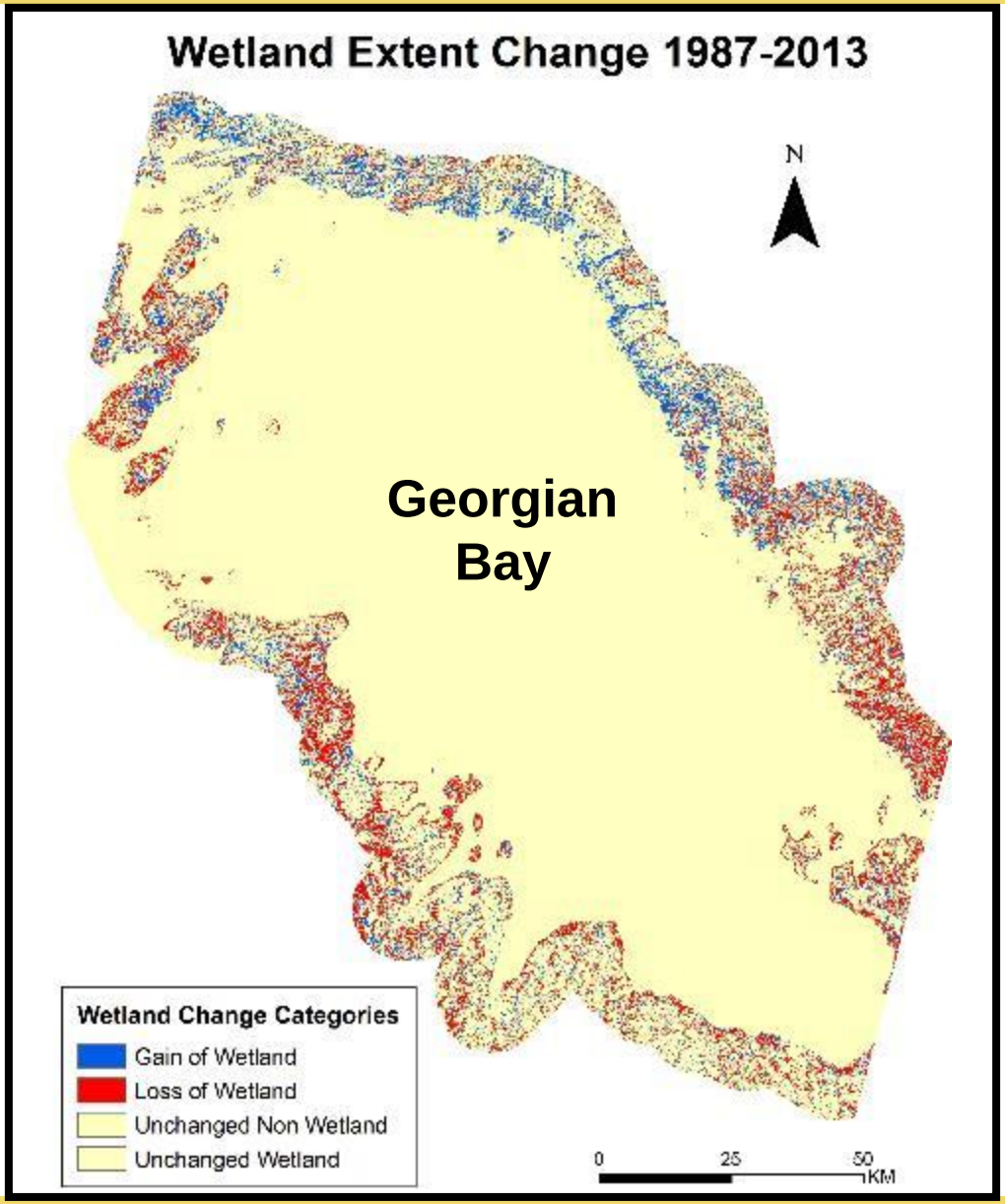


Results: Classified Maps Georgian Bay





Results: Wetlands Extent Change Maps



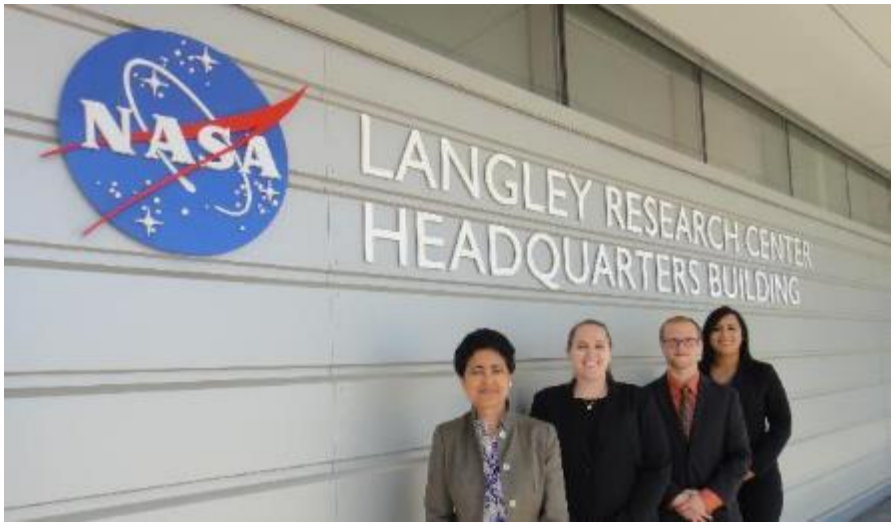
Conclusions

- Georgian Bay: 1987-2013
  - 7% Wetland Gain
  - 10.8% Wetland Loss
  - 3.8% net loss = 430 km^2

Benefits of Research

- More cost effective, replicable methodology for land classification maps over large spatial scales
- Facilitate comparison of wetlands extent over time
- Insights on impact of changing water levels to wetlands health

Great Lakes Climate I Team (L to R): Kathy Curie, Janice M. Maldonado Jaime, Emily Adams, Daniel Marx, Miriam Harris and Lydia Cuker



Great Lakes Climate II Team (L to R): Miriam Harris, Emily Adams, Stephen Zimmerman, Idamis Del Valle Martinez

Collaborate & Participate

Ways to Get Involved

- **Propose a project**
  - Identify a decision support need and end-user for a DEVELOP project
  - Template available for project proposal
- **Encourage people to apply**
  - Online application (*dates below*)

What we look for in a good project idea:

- Achievable with NASA Earth observing resources over a 10 to 30-week period
- Addresses an actionable community concern
- Robust communication with end-user
- Specific study region rather than a large area
- Expectations are clear

Apply:

develop.larc.nasa.gov/apply.html

Fall 2015 Term

Application Window:
25 May – 3 July 2015

Term Dates:
14 Sep – 20 Nov 2015

Proposal Deadline for Spring 2016 Projects:

28 August 2015

Thank You!

Jamie Favors
james.e.favors@nasa.gov

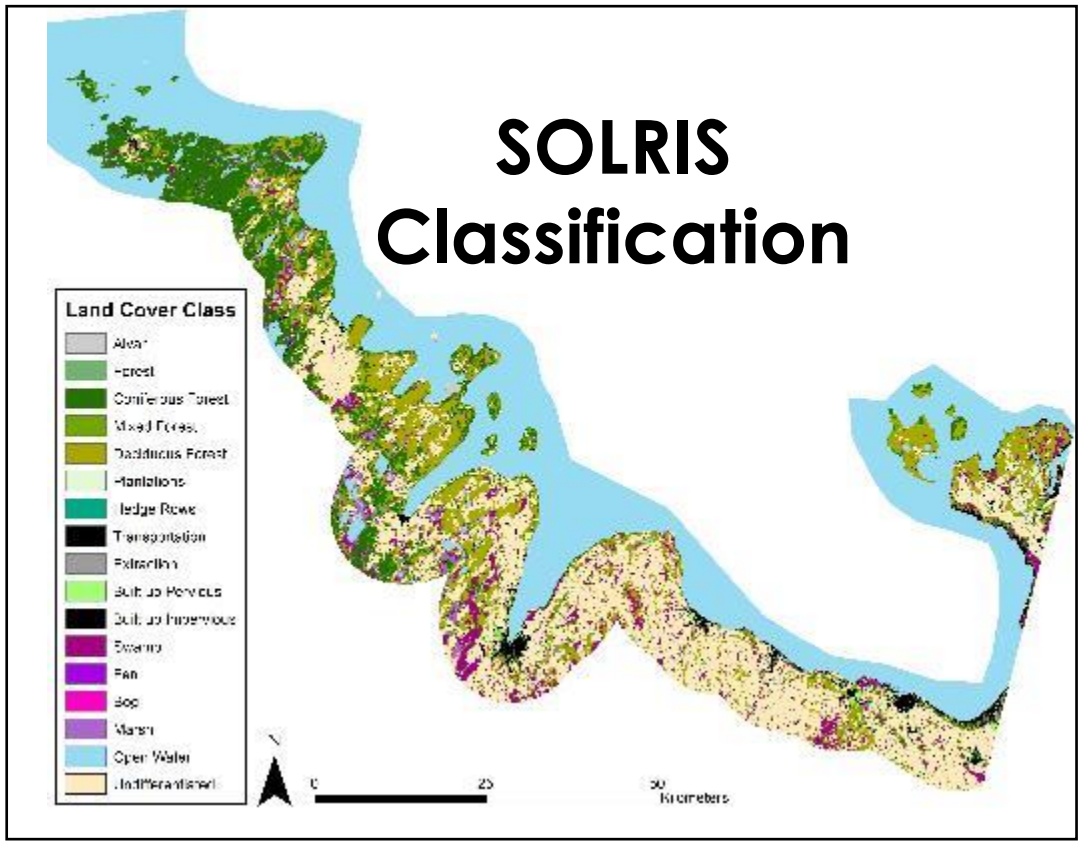
Emily Adams
emily.c.adams@nasa.gov

http://develop.larc.nasa.gov/

Results: Comparison with SOLRIS

- South Georgian Bay
  - 2013 Classified map vs. 2008 SOLRIS map

Overall: 64% Similar



- Biases
  - Lower Resolution
    - 5000 m^2
  - Not time co-incident
  - Also a land cover classification map