Michigan Tech Research Institute

Wetland status, change, and seasonal inundation dynamics for assessing the vulnerability of waterfowl habitat within the ABoVE study domain

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ABoVE ARCTIC – BOREAL VULNERABILITY EXPERIMENT

Project Overview

Objectives:

- Objective 1: Wetland type and surface inundation product development.
- Objective 2: Waterfowl habitat suitability assessment.

ABoVE Science Objectives:

- Ecosystem Dynamics
  - 7. Changes to Fish and Wildlife Habitat
- Ecosystem Services
  - 3. Subsistence

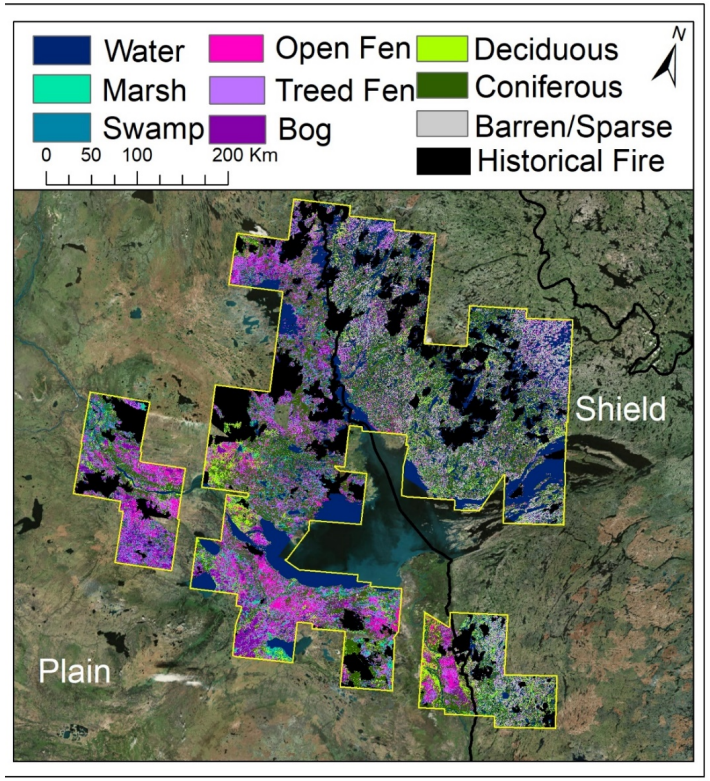
Remote Sensing:

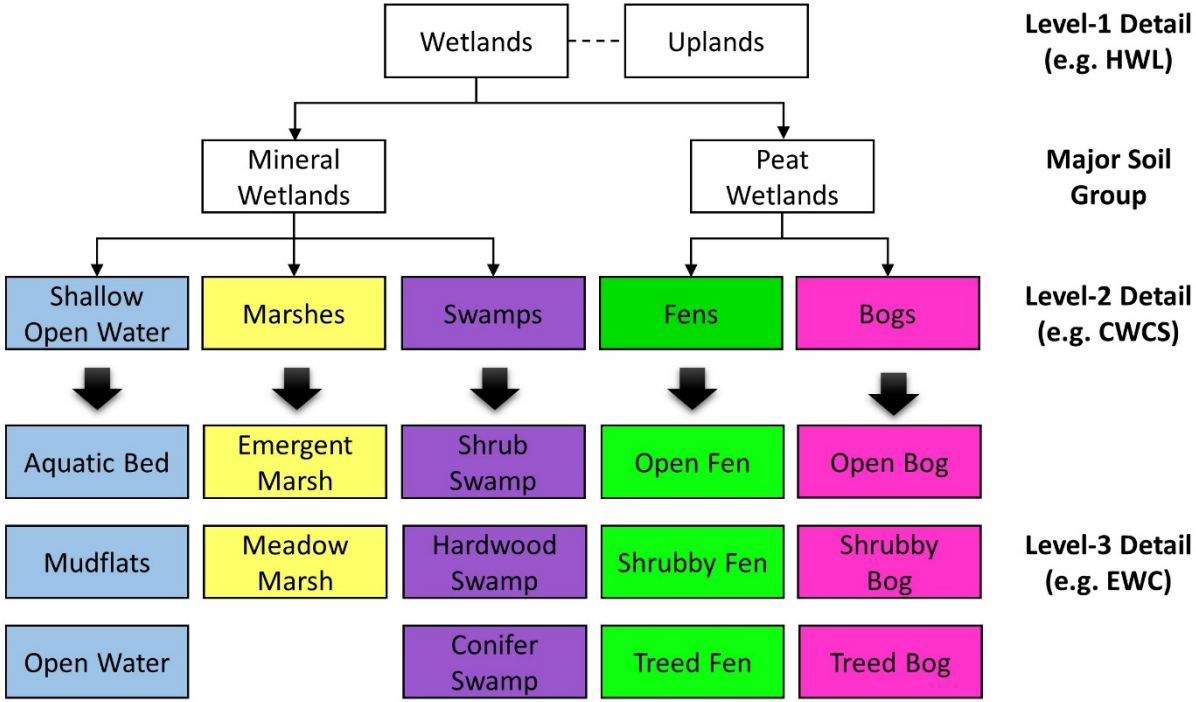
- Airborne remote sensing
  - UAVSAR for inundation and wetland type mapping
- Spaceborne remote sensing
  - L-Band SAR: PALSAR (for circa 2007 mapping)
  - C-Band SAR: Sentinel-1, Archival ERS-2
  - EO: Landsat TM, Landsat OLI, Sentinel-2
- Data products
  - Inundation extent maps
  - Wetland type maps for past and current conditions(c. 2007-2008 and c. 2017-2018)

Outcome: Demonstrated use of products to advance modeling of wetland habitat change and dynamics for sustainability and distribution of waterfowl populations

Wetland Mapping

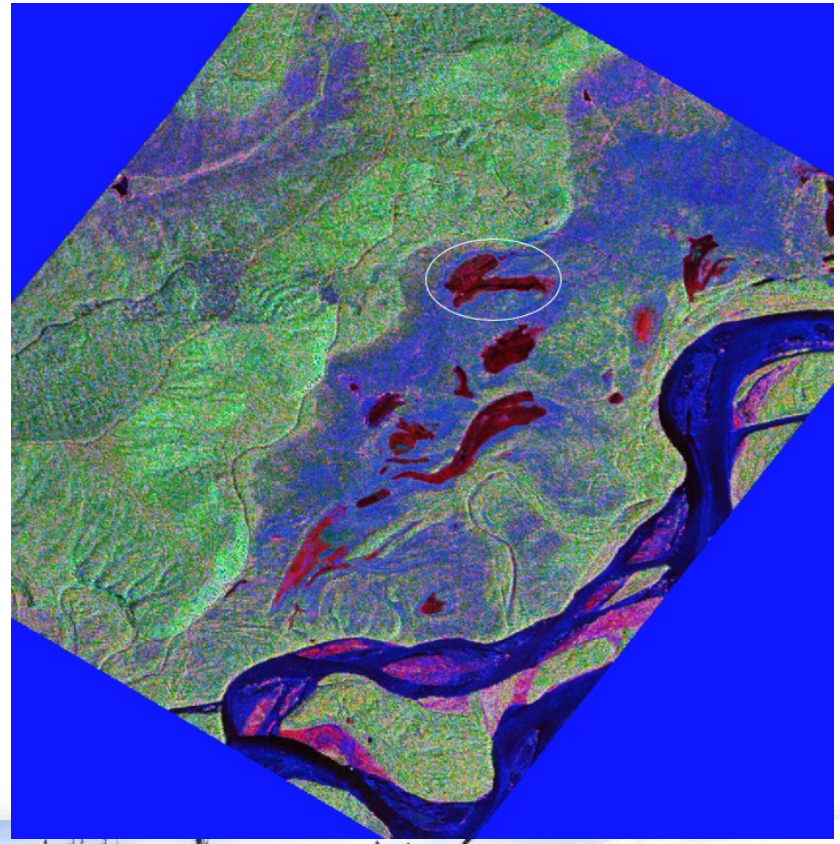
- Focusing on wetland types critical for waterfowl habitat (modified Enhanced Wetland Classification)
- Developing methods from using electro-optical & SAR, with extensive field data



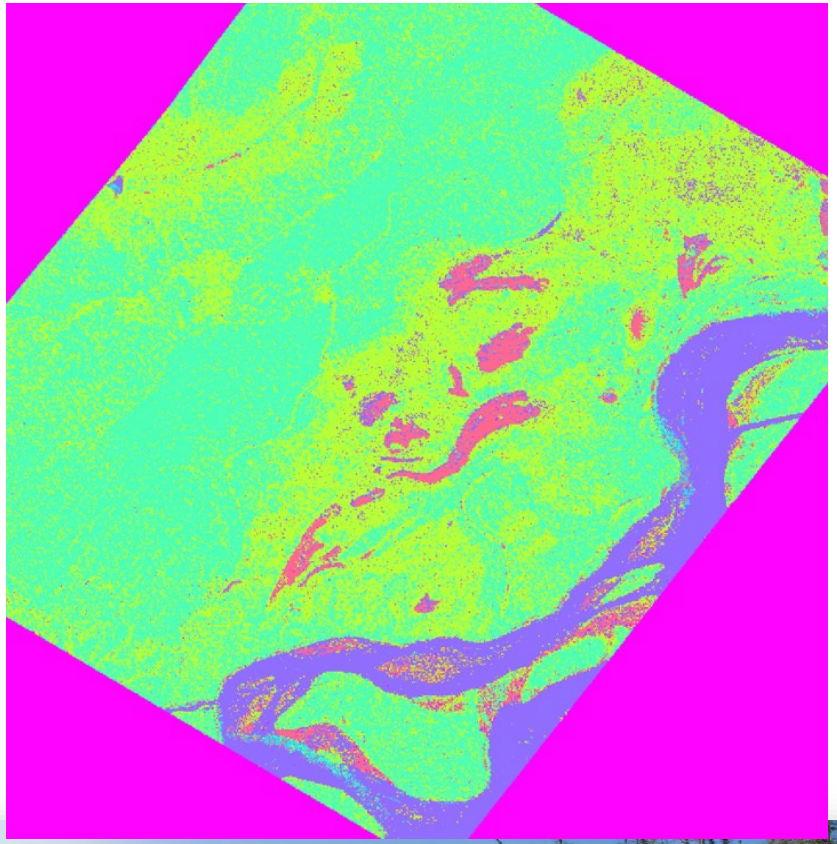


Inundation Classification

- Example from Bonanza Creek Apex using UAVSAR polarimetric decompositions to delineate inundated conditions

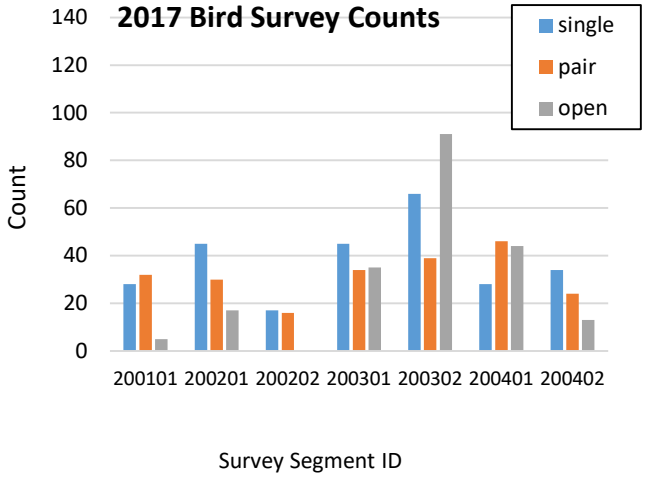


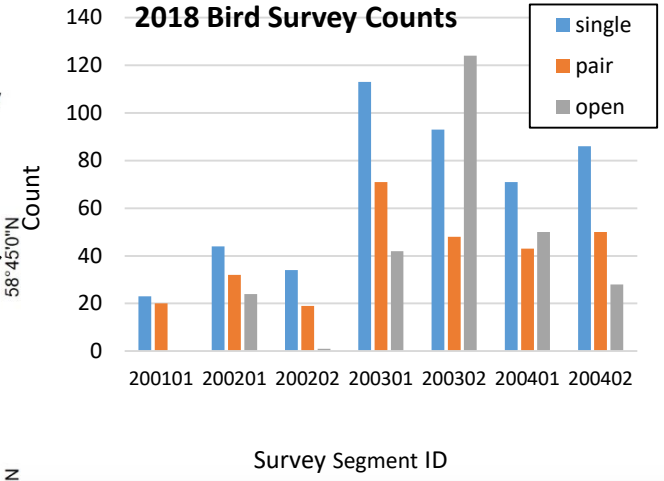
- Classification example: Flooded grassy areas (red), open water (blue), dry low vegetation (greenish yellow), forest (green), & mudflats (yellow)

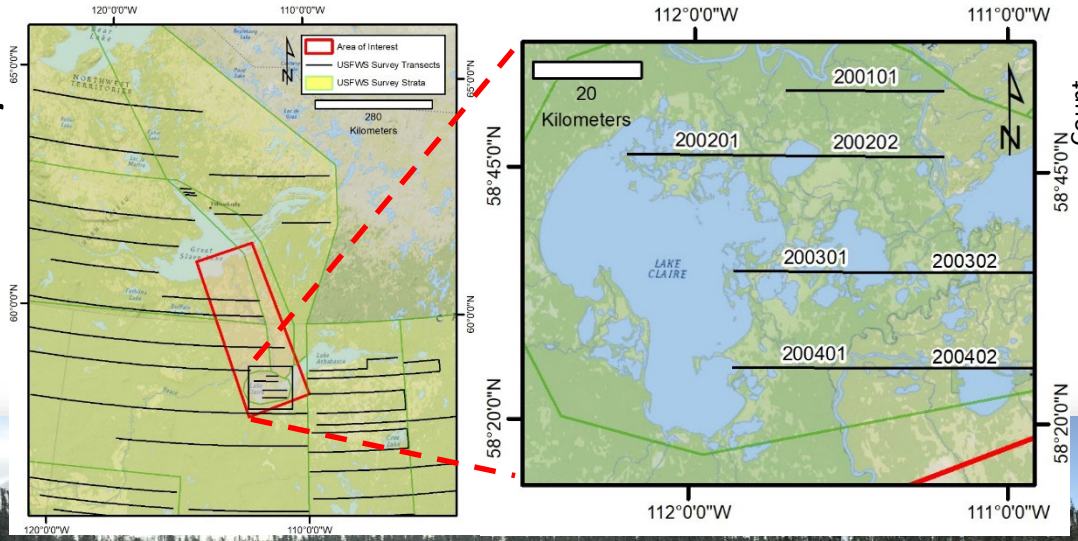


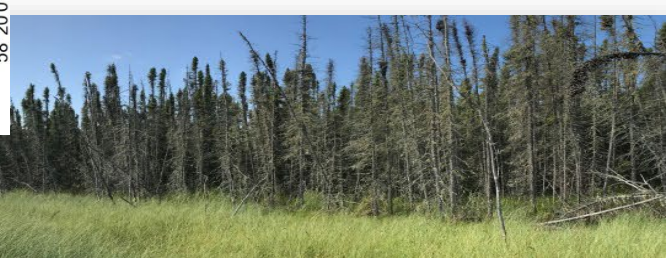
Habitat Suitability Modelling

- Expectation that improved wetland characterization will be useful for forecasting habitat suitability and, hence, waterfowl distribution and trends under climate change.
- Project products on wetland type, change, and inter- and intra- annual inundation dynamics will be used to assess the utility of remote sensing-derived products for assessing spatial and temporal dynamics in habitat suitability based on waterfowl abundance metrics.









Stakeholder Engagement Activities

1. Introduce stakeholders to current (ABoVE) and future (NISAR) NASA projects
   - *Identify specific products and project activities that provide the basis for stakeholder engagement*
   - *Identify target organizations for stakeholder engagement*
2. Provide periodic updates on project progress
3. Organize workshops to evaluate project products in regions of interest
4. Stakeholder engagement in field truth for product cal/val and product evaluation
5. Training activities