



# NWI Unfinished Business: The Current State of Wetland Mapping In Alaska

## Part 2

Wetland Mapping Consortium Webinar

February 12, 2020

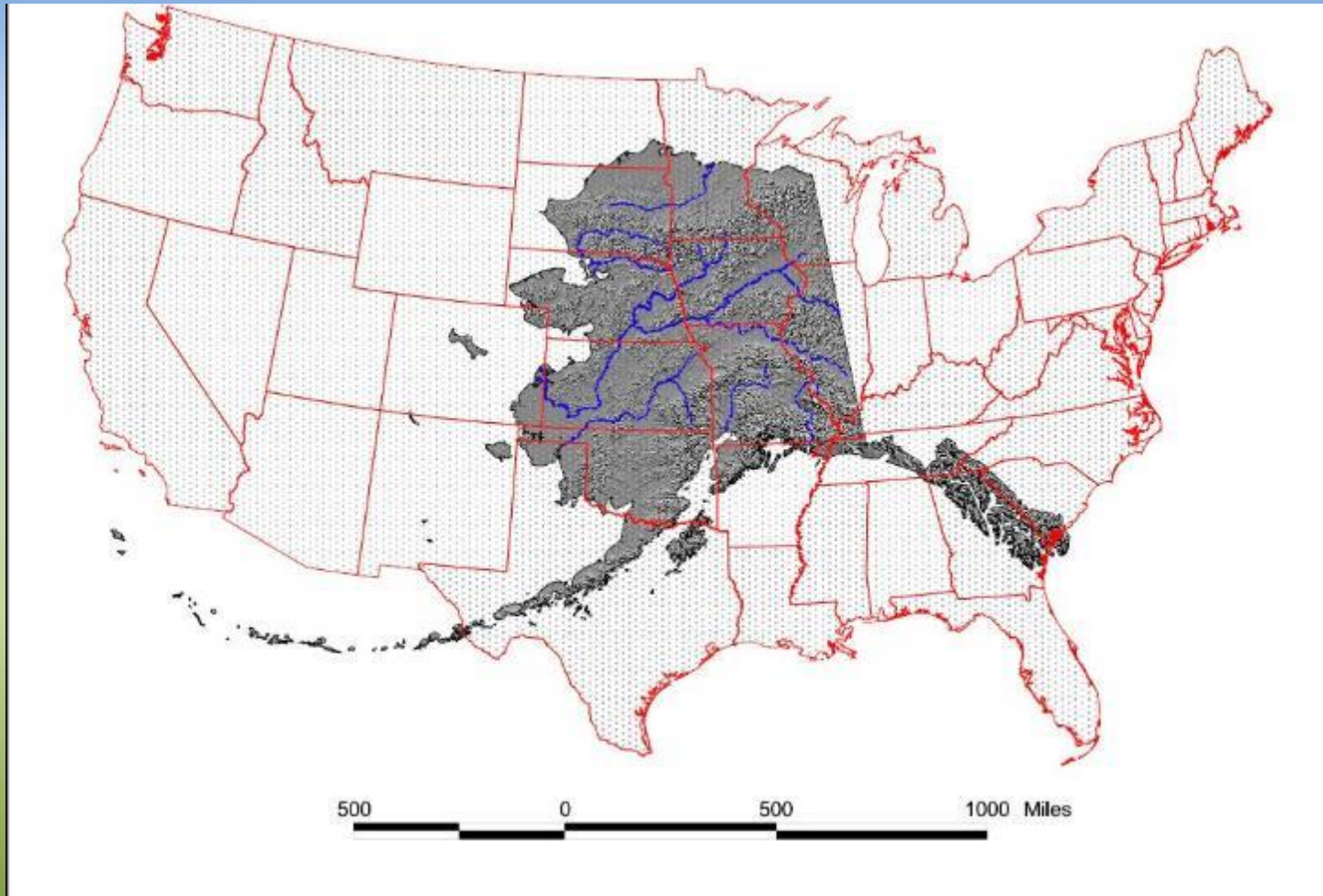
ASWM

GeoSpatialServices



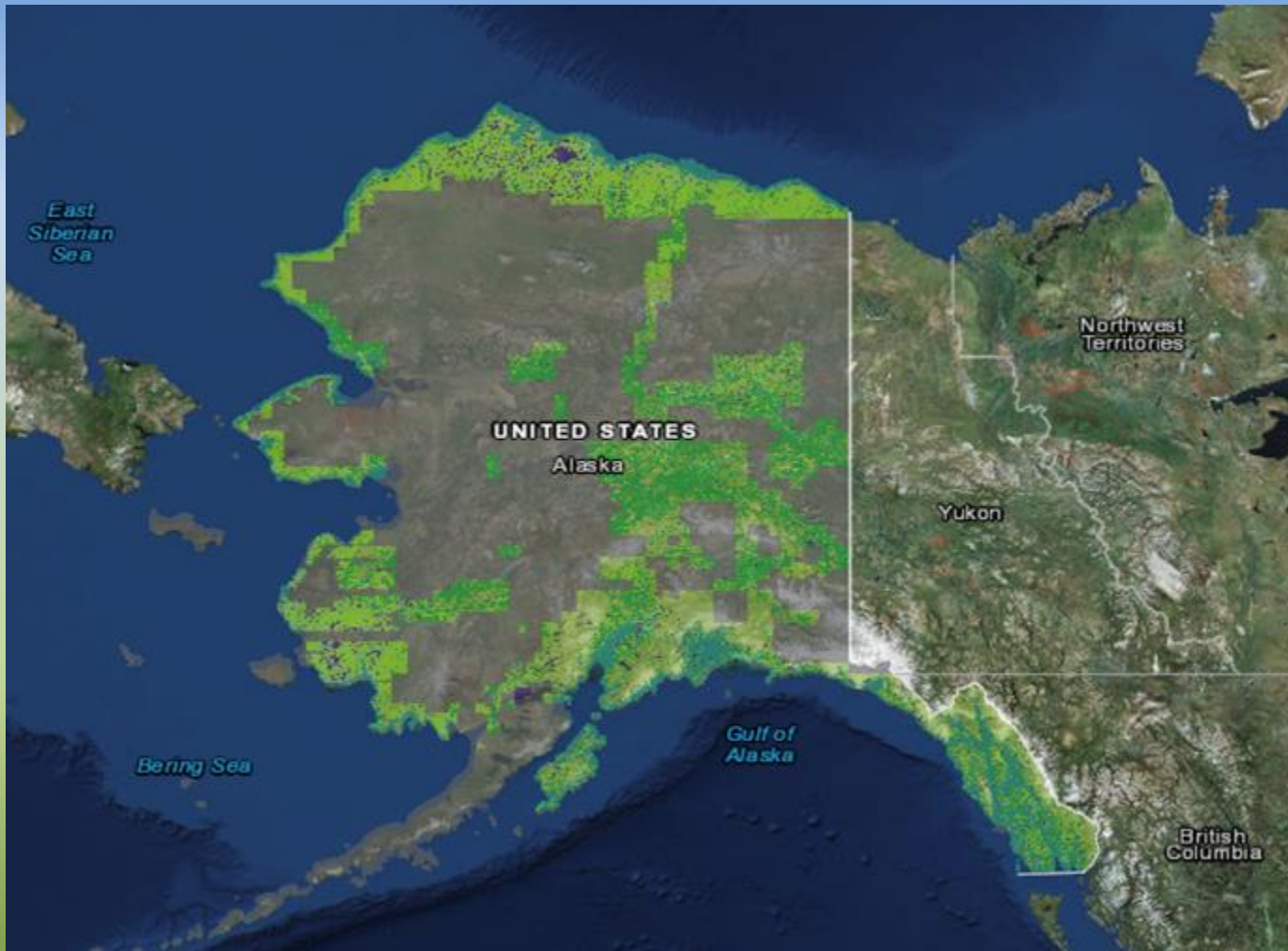
Andrew Robertson, Director  
aroberts@smumn.edu

# A Big Issue...

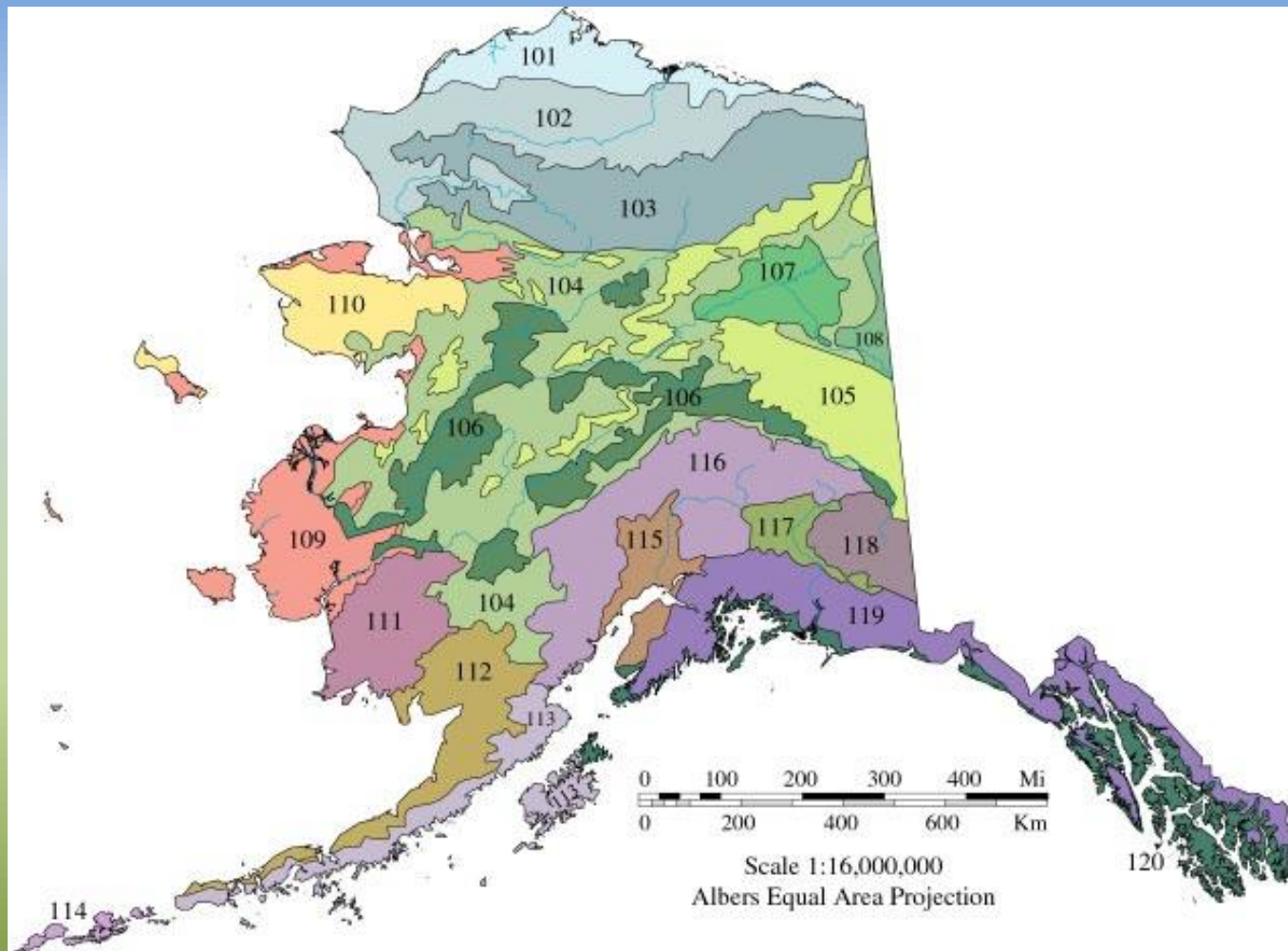




# An Even Bigger Issue...



# And Its Complicated...



# And The Landscape is Changing...





# And The Landscape is Changing...



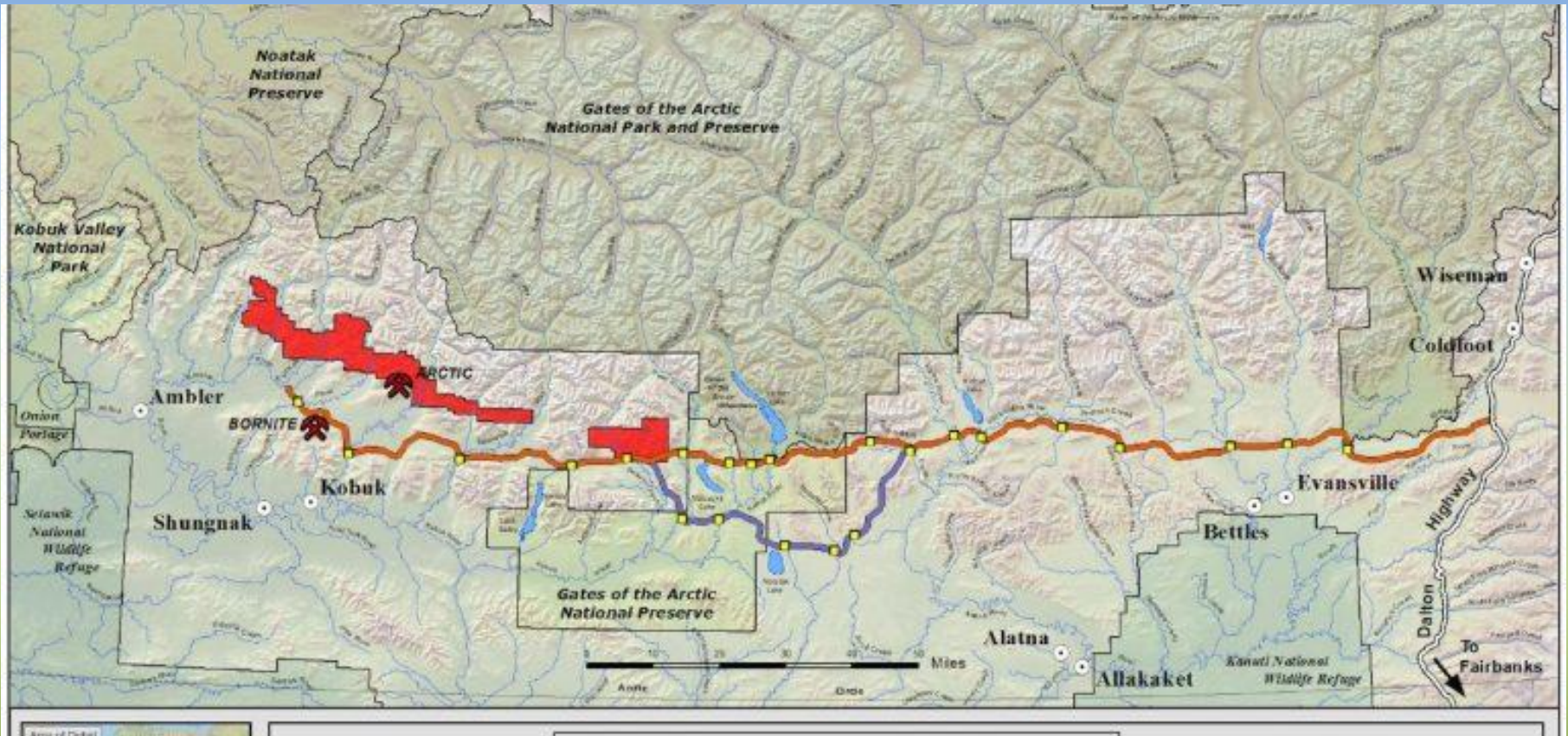


# And The Landscape is Changing...





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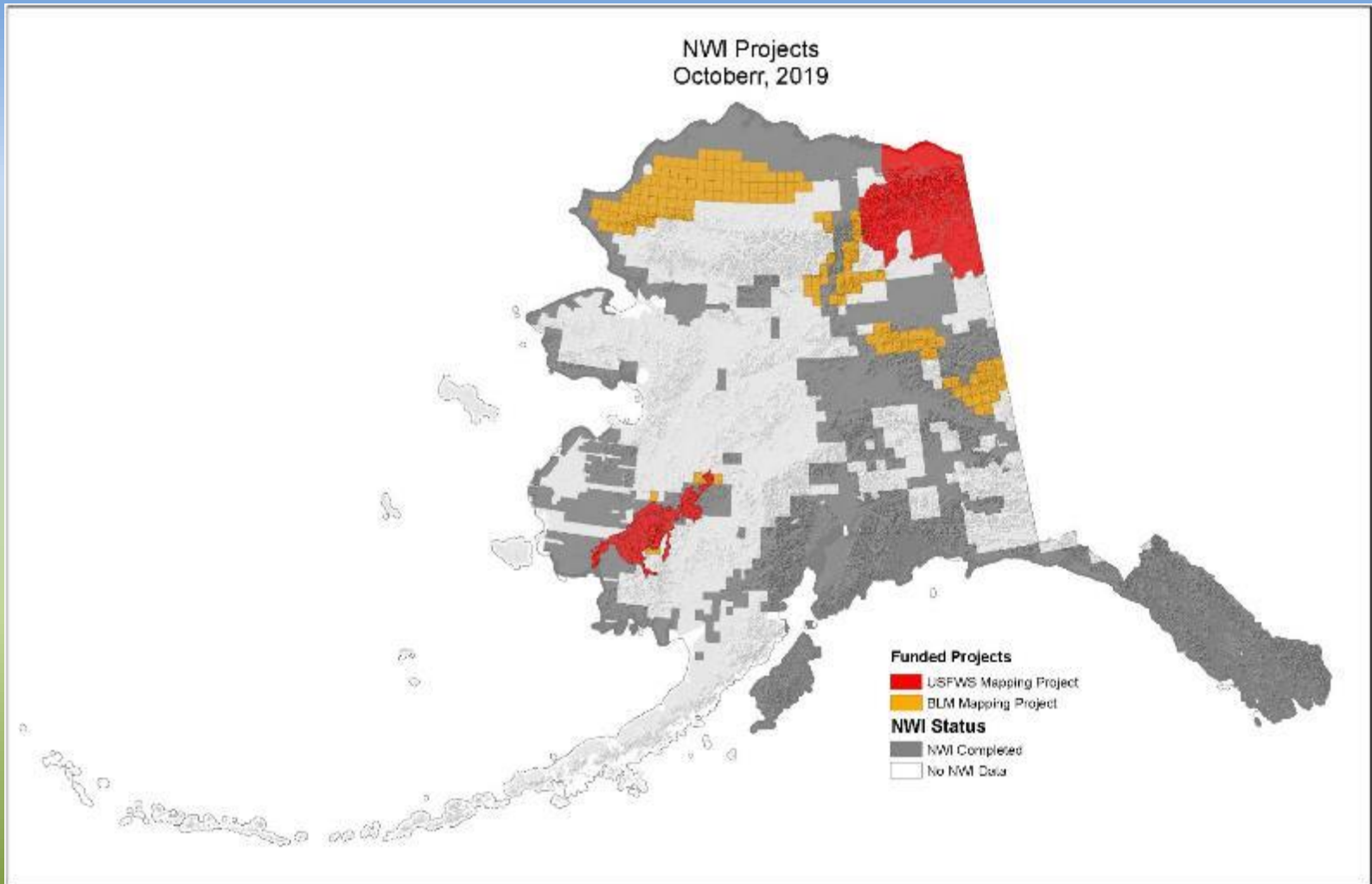




# And The Landscape is Changing...



# Current Mapping Projects





# Target Mapping Unit

5 acre TMU



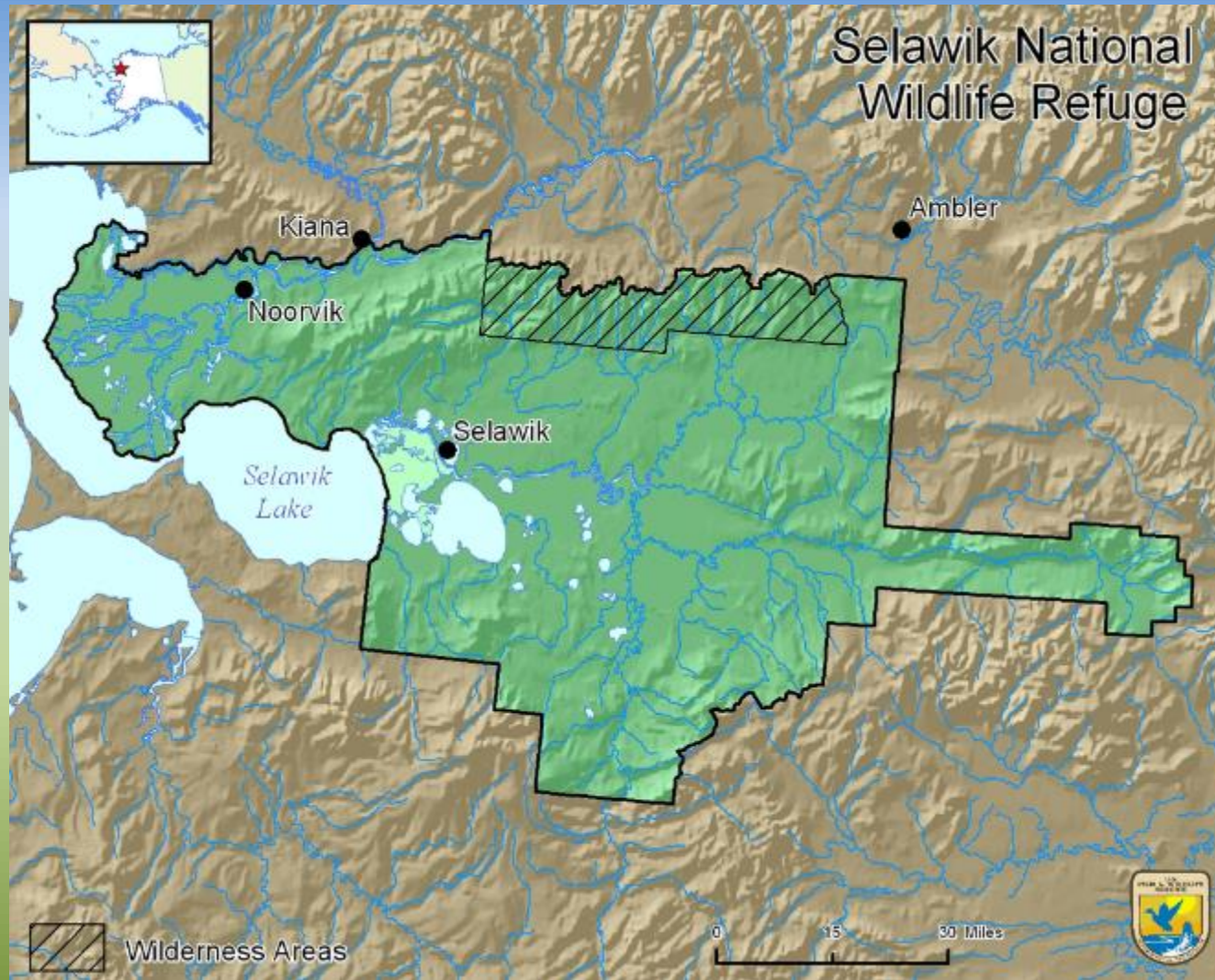
1 acre TMU



Both are NWI Compliant Products



# Selawik Wildlife Refuge Update





# NWI 2.0 Combined NHD and NWI

## What is NWI 2.0

- Sometimes called the Surface Waters and Wetland Inventory
- Provides more inclusive geospatial data of all wetlands and surface water features.
- An interrelated dataset that depicts all surface water and wetland features in a single feature class
  - Retains the wetland and deepwater polygons from NWI
  - Reintroduces linear wetlands as narrow polygonal features
  - Completes segmented connections
  - Provides consistency by applying Cowardin classification to all features

# Combined NWI and NHD Update

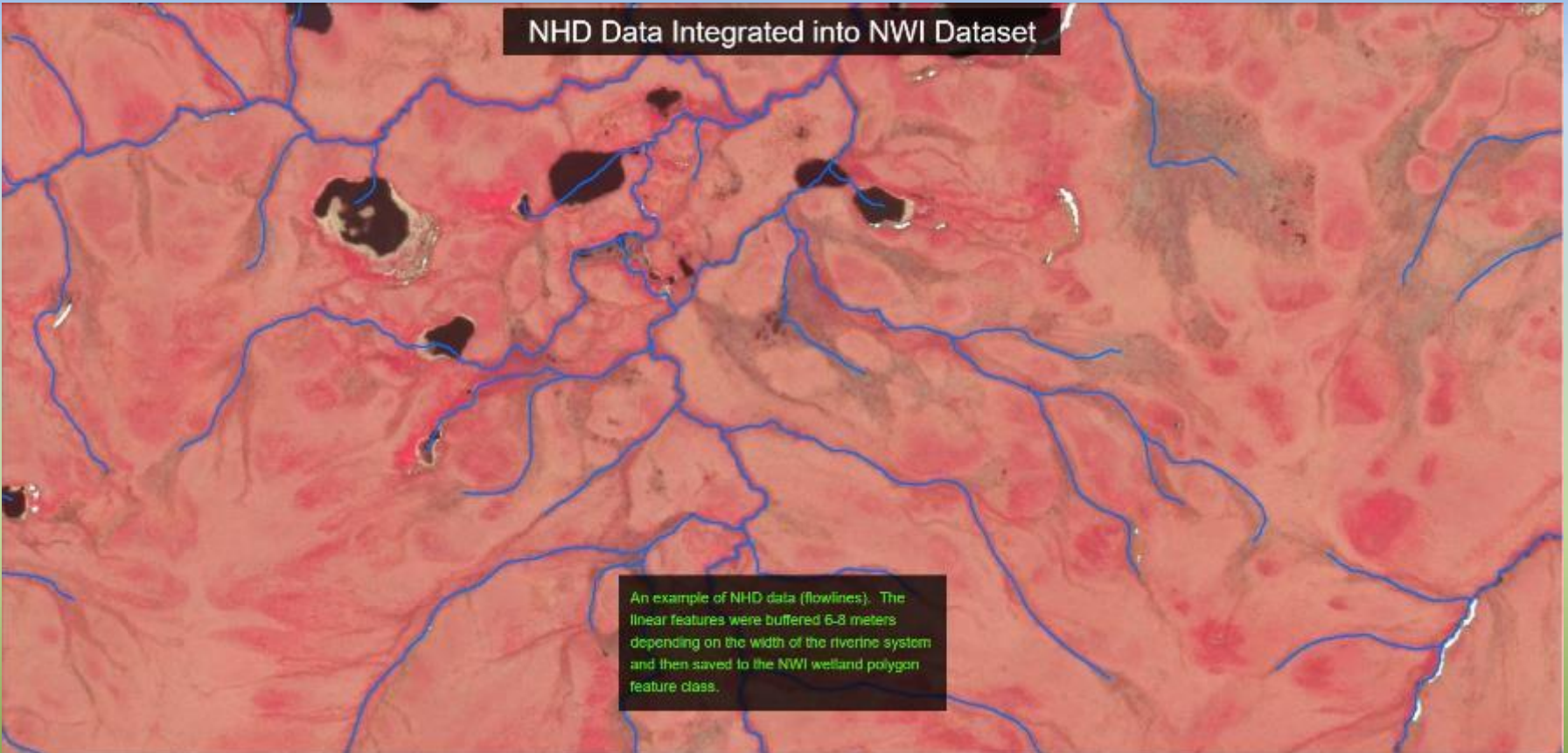
## Methods for NHD Mapping

It was agreed by the partners that the base imagery for the Selawik National Refuge Wetland and Hydrography Mapping project would be Alaska's SPOT 5 imagery acquired by Alaska Statewide Data Mapping Initiative (SDMI).

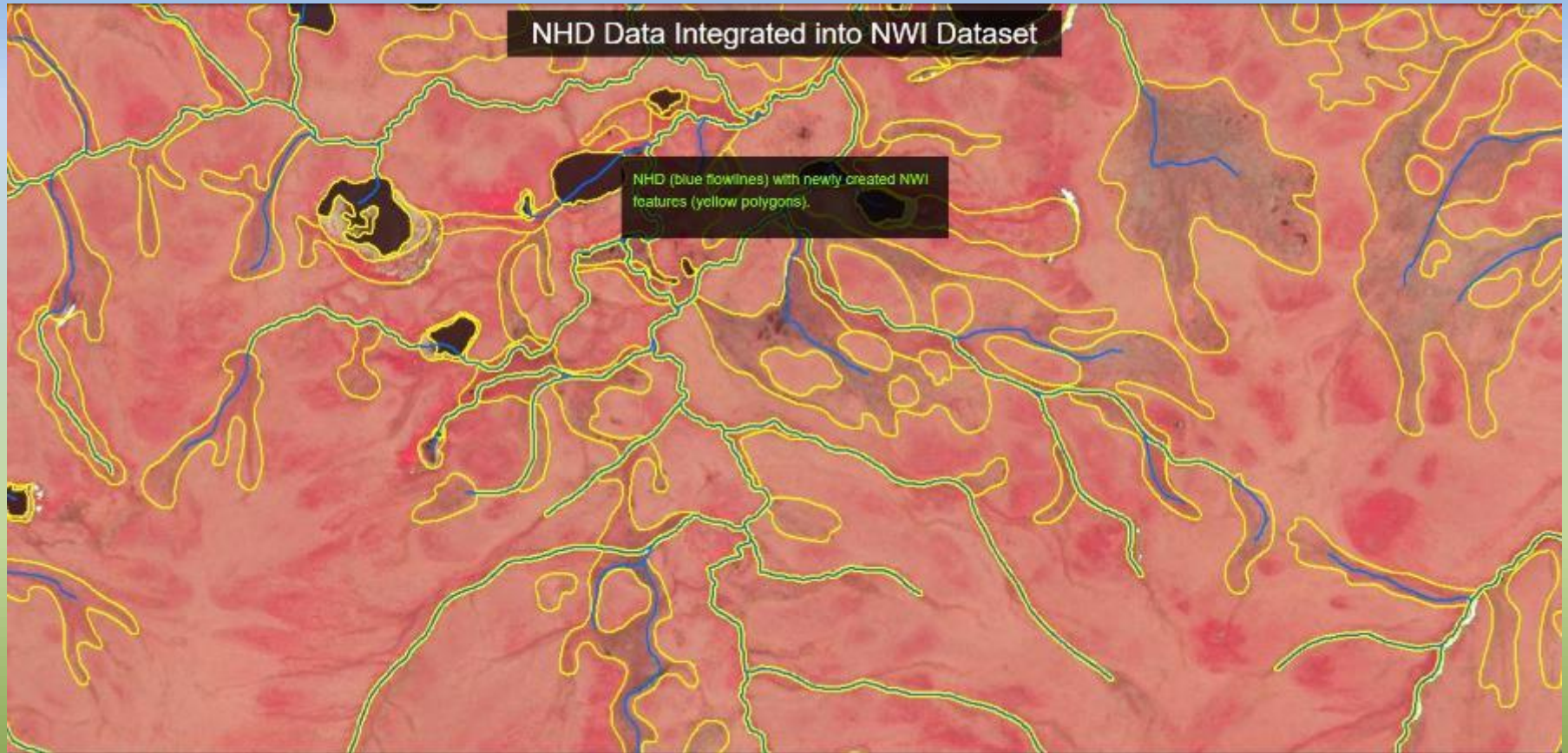




# Integrating NHD and NWI

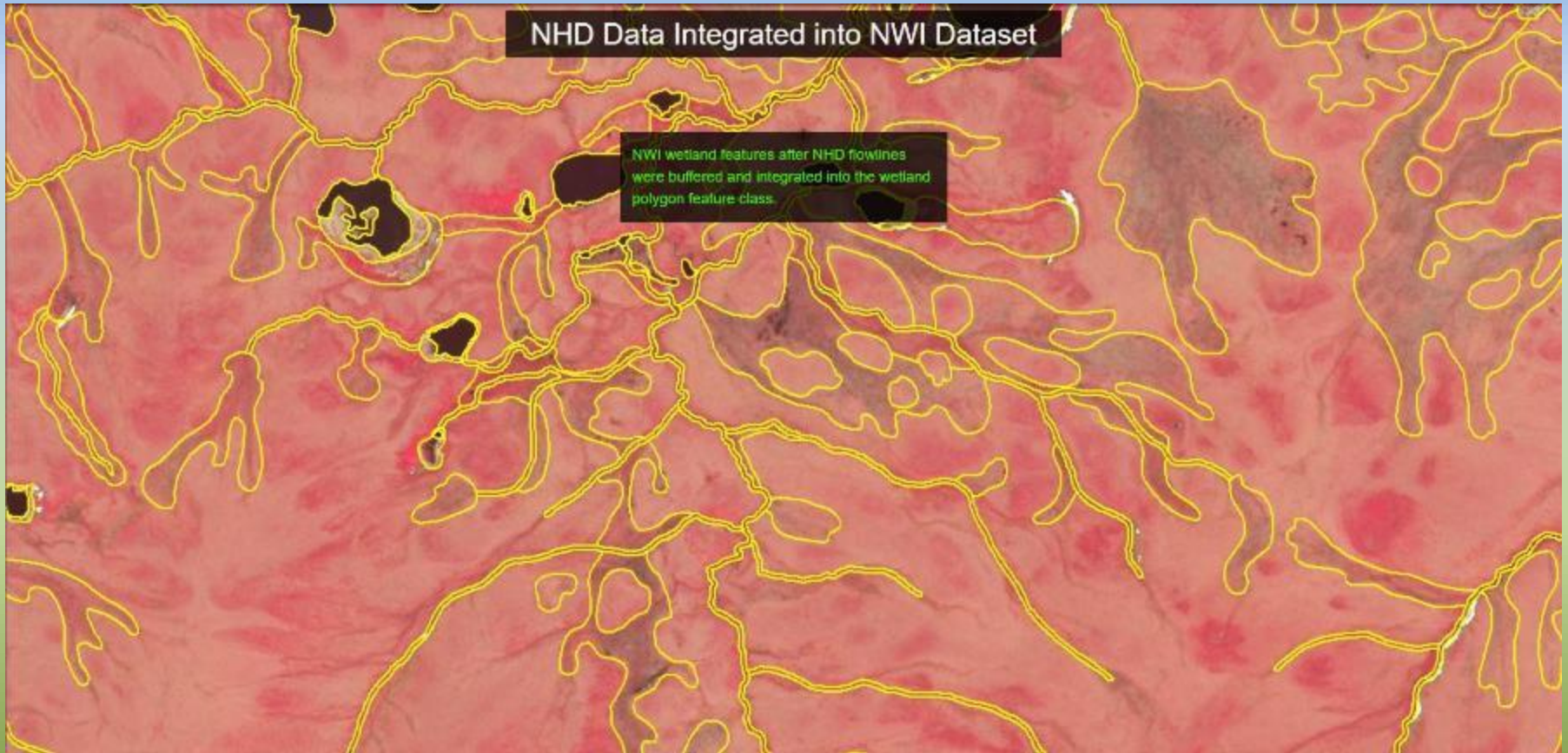


# Integrating NHD and NWI



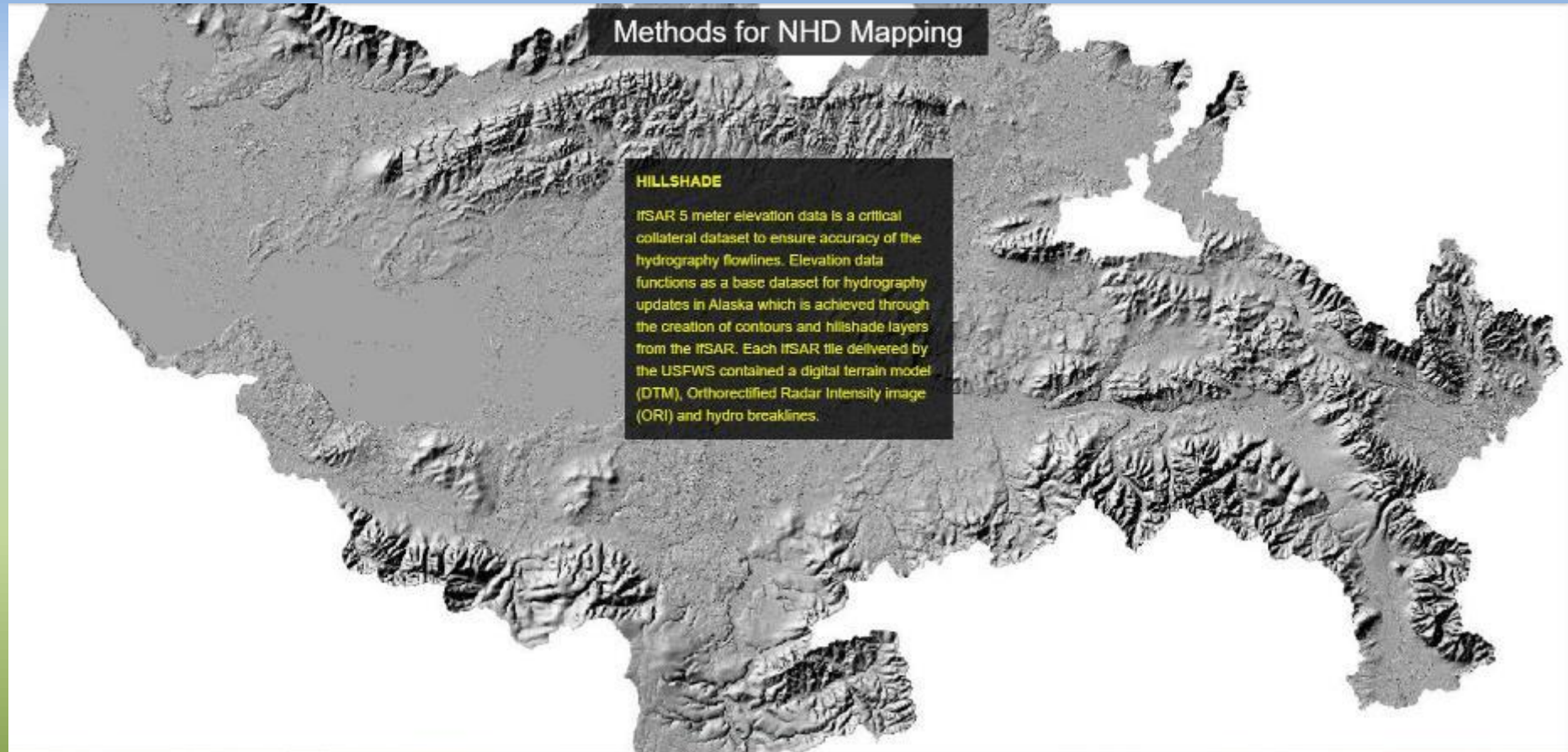


# Integrating NHD and NWI





# Hillshade and Derived Hydro



# Additional Collateral Data

## Methods for NWI Wetland Mapping

The imagery and collateral datasets used for mapping, classification and validation of both hydrography and wetland features include the following:

1. SDMI Système Pour l'Observation de la Terre Satellite (SPOT) 5 Imagery
2. Alaska Hydrography Dataset
3. Alaska Anadromous Waters Catalog
4. IfSAR Digital Terrain Model (DTM)
5. IfSAR Orthorectified Image (ORI)
6. IfSAR Hillshade
7. Digital Raster Graphics (DRG's)
8. Contours
9. Synthetic Flowline Networks

**Fieldsite photo:** Selawik Lake

# Surface Water Fraction

Researchers from the University of Maryland - Dr. Chengquan (Cheng) Huang and collaborators:

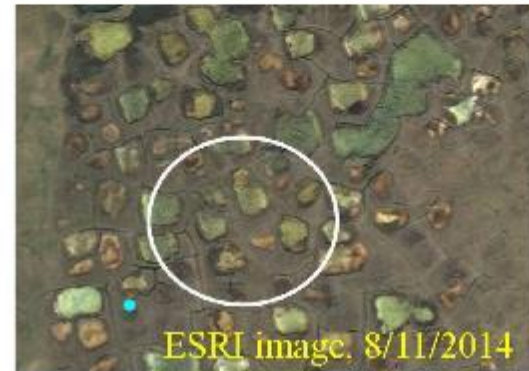
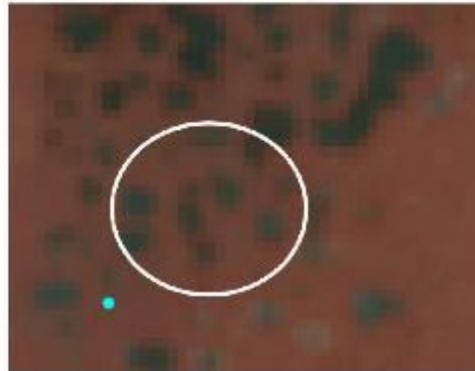
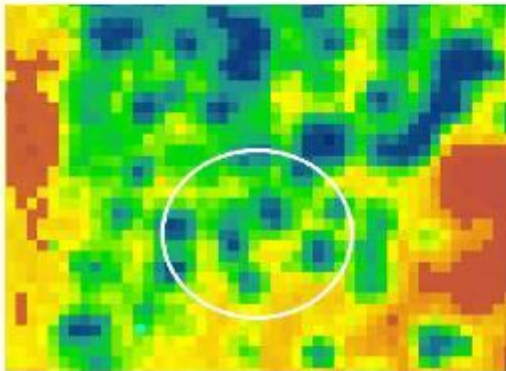
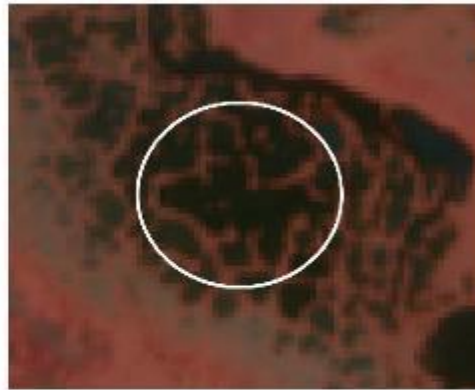
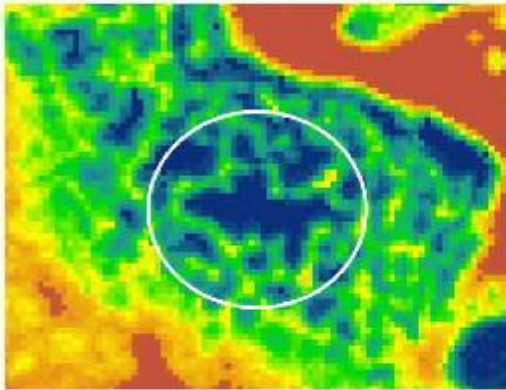
- Temporal analysis of Sentinel 1 and Sentinel 2 radar and sensors to map surface inundation change over time
- Multiple return periods in the same year and over multiple years
- Better characterize annual hydro period and inform water regime decisions
- Combine with high resolution optical imagery to inform vegetation classes
- Perhaps provide wetland delineation and classification for 5 acre TMU



# Surface Water Fraction

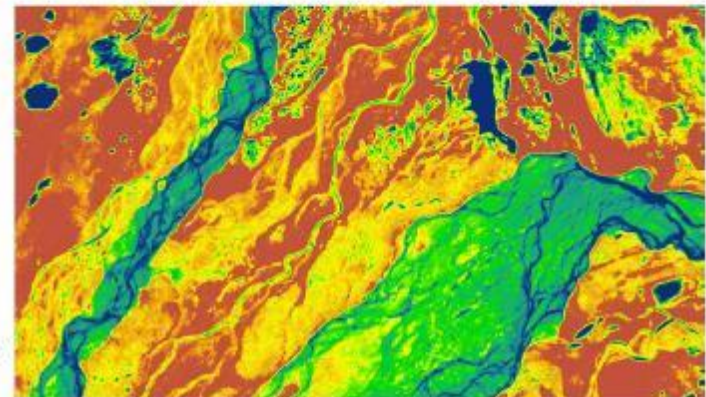
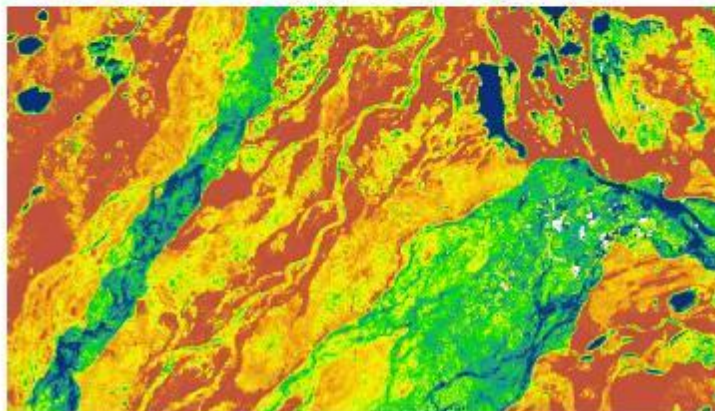
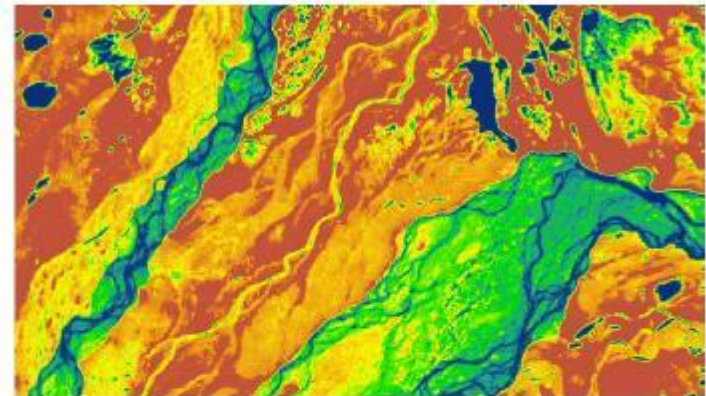
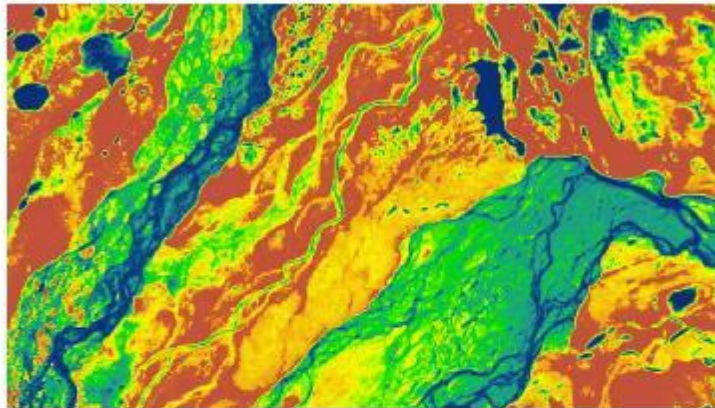
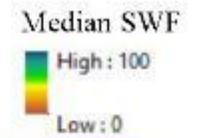
## Details for Individual Wetlands

S2 10-m Image



# Surface Water Fraction

## SWF Dynamics Along River Beds



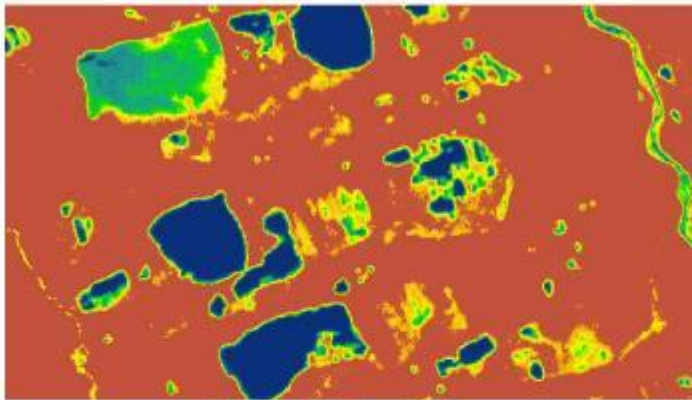


# Surface Water Fraction

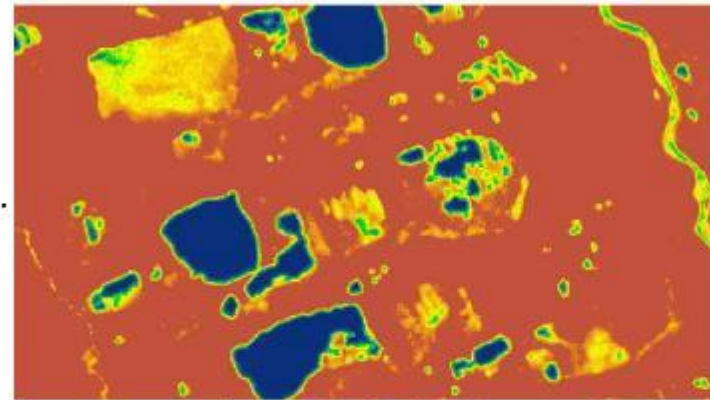
## SWF Dynamics of Individual Wetlands/Waterbodies

Median SWF  
High : 100  
Low : 0

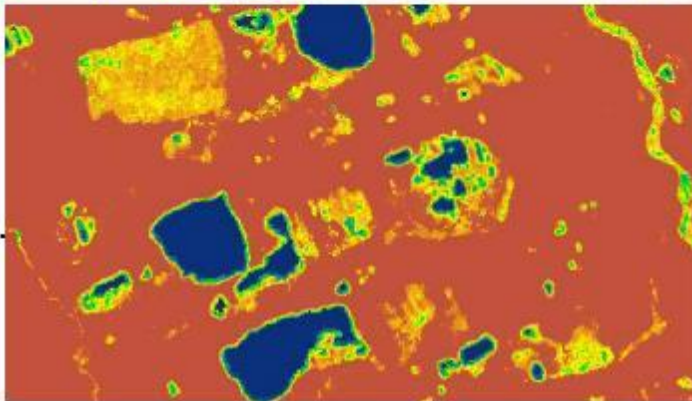
Jun.



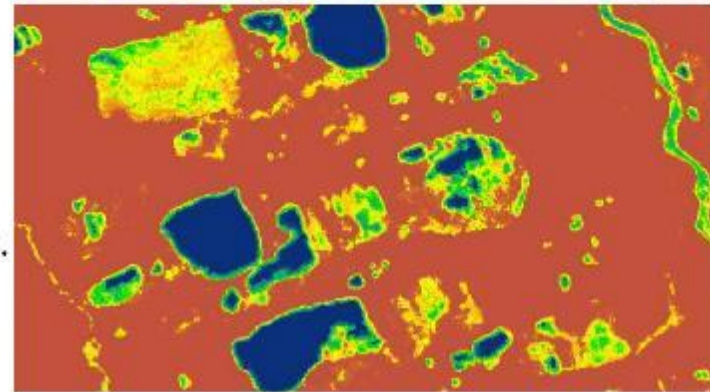
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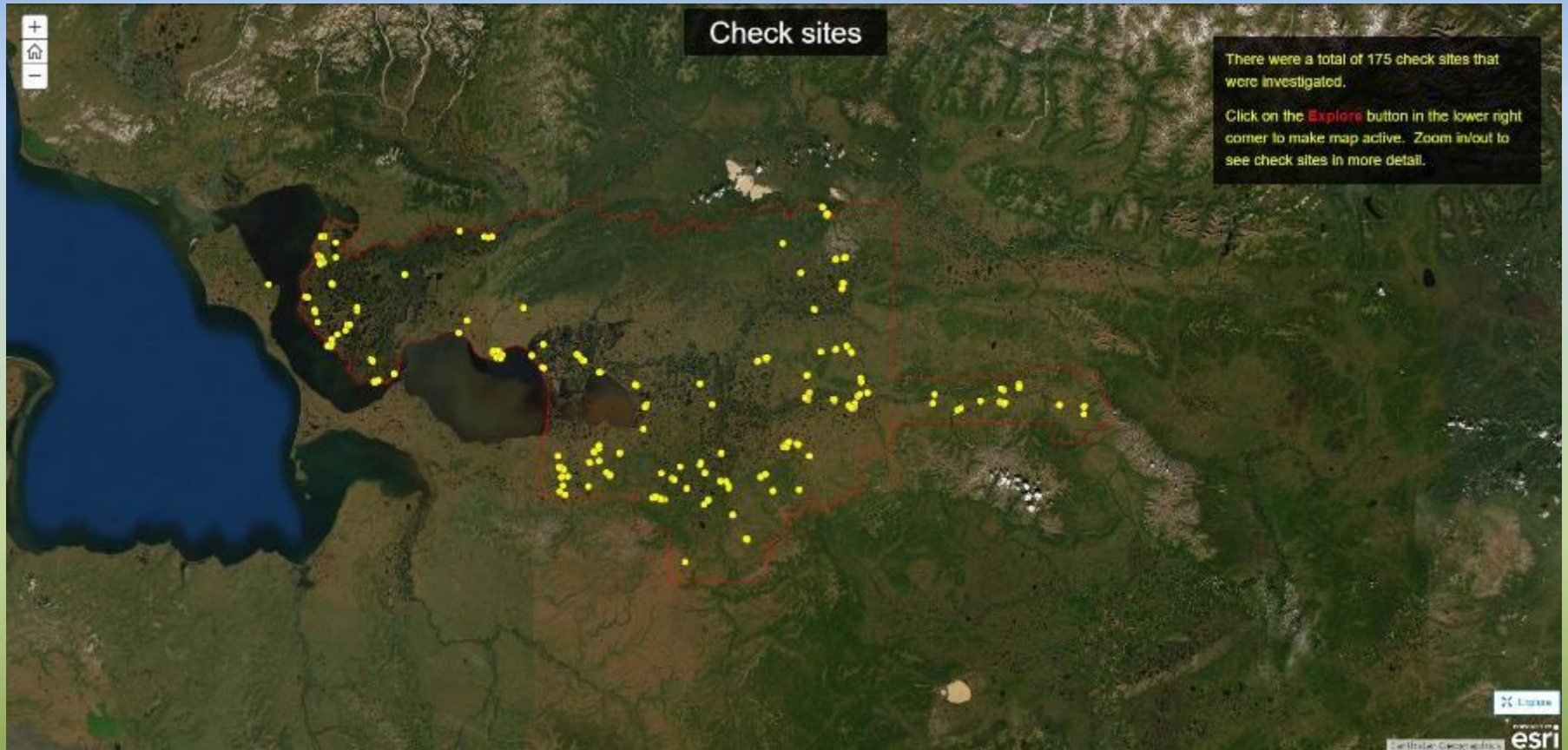
Aug.



Sep.

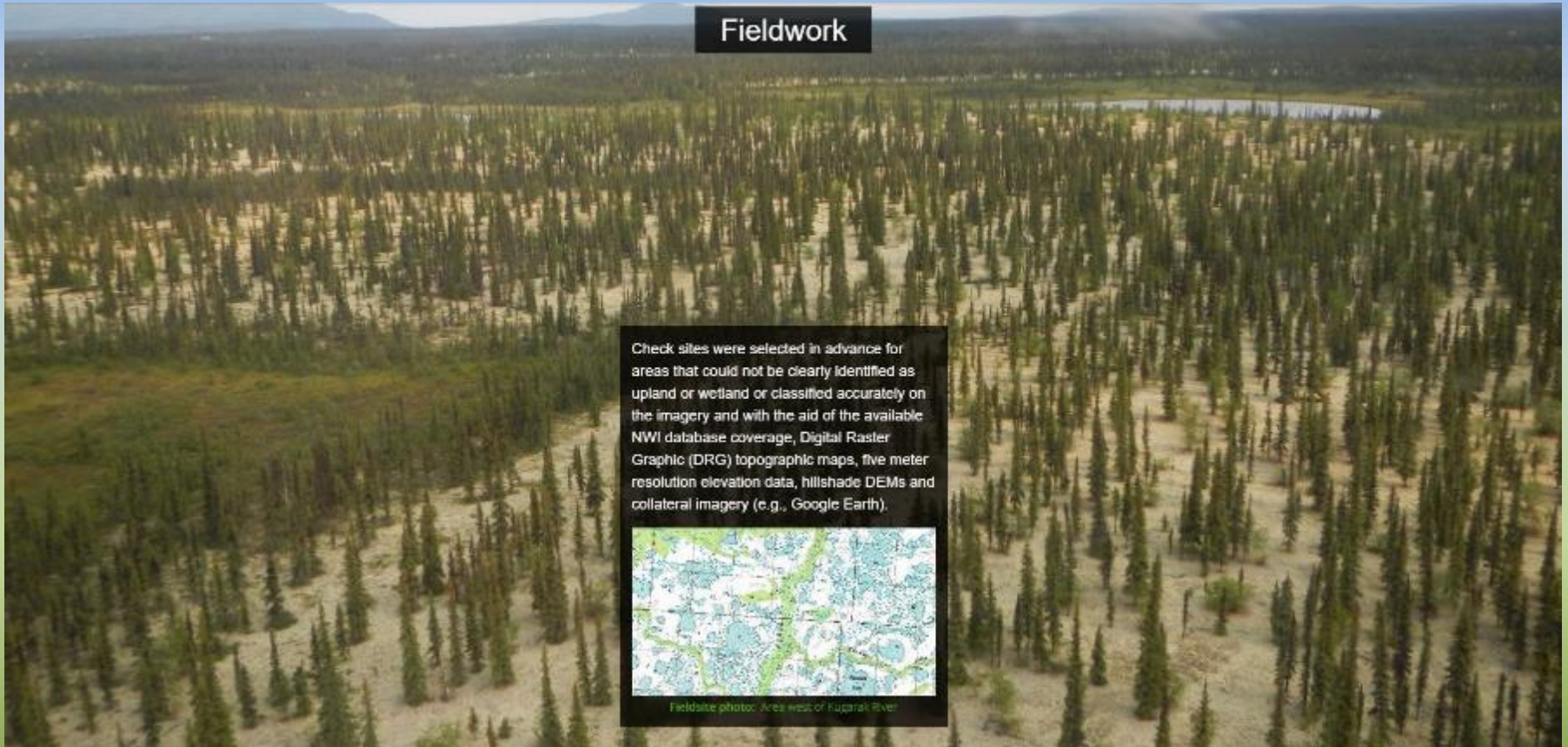


# Fieldwork Checksites





# Fieldwork Documentation



# Fieldwork Documentation

**Check sites**

Check site photos on map:  
These are a few examples of the check sites visited.

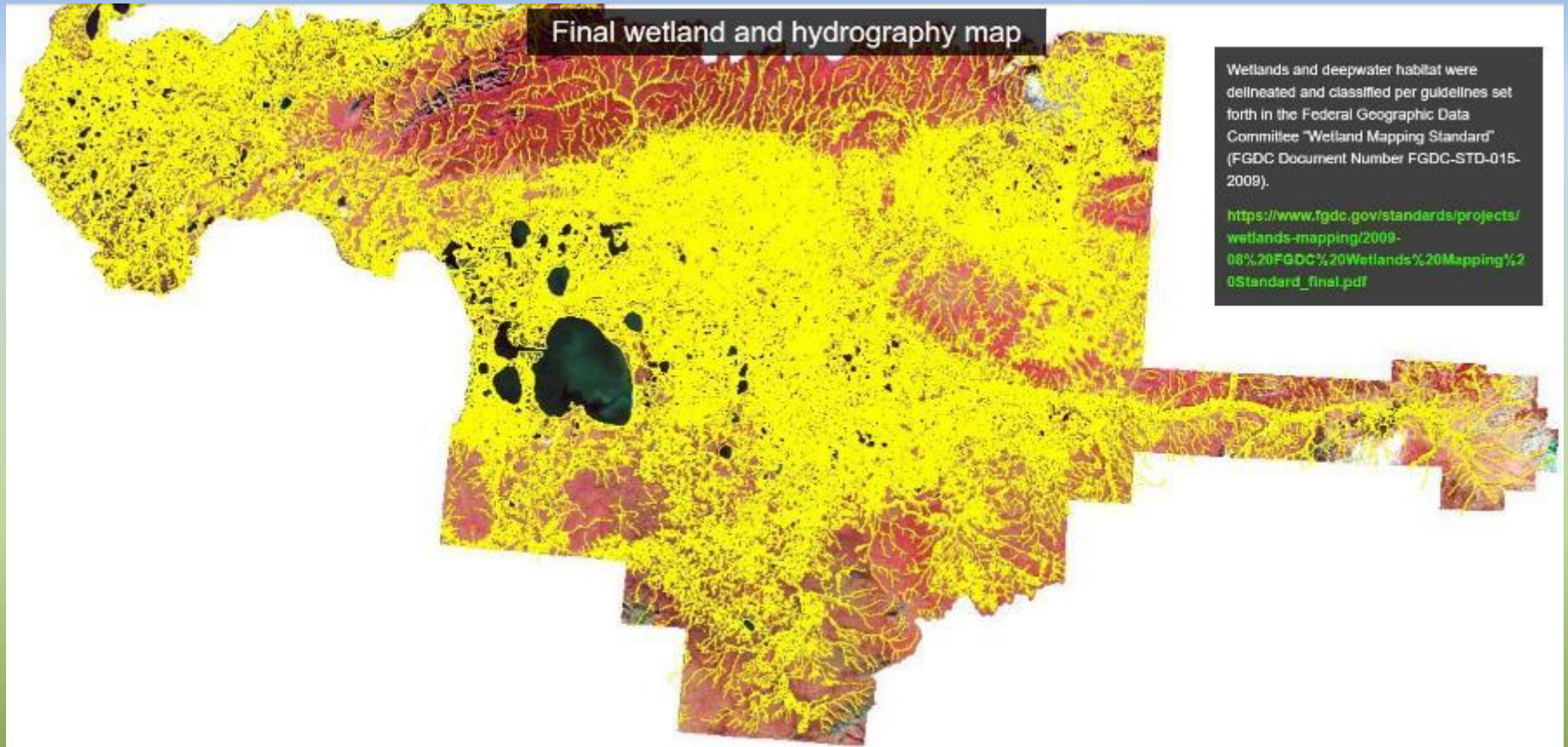
Click on the **Explore** button in lower right to make map active.  
Click on green tabs to view fieldsite photos.

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geogra...

esri



# Final NWI and NHD GeoDatabase





# Final NWI and NHD GeoDatabase

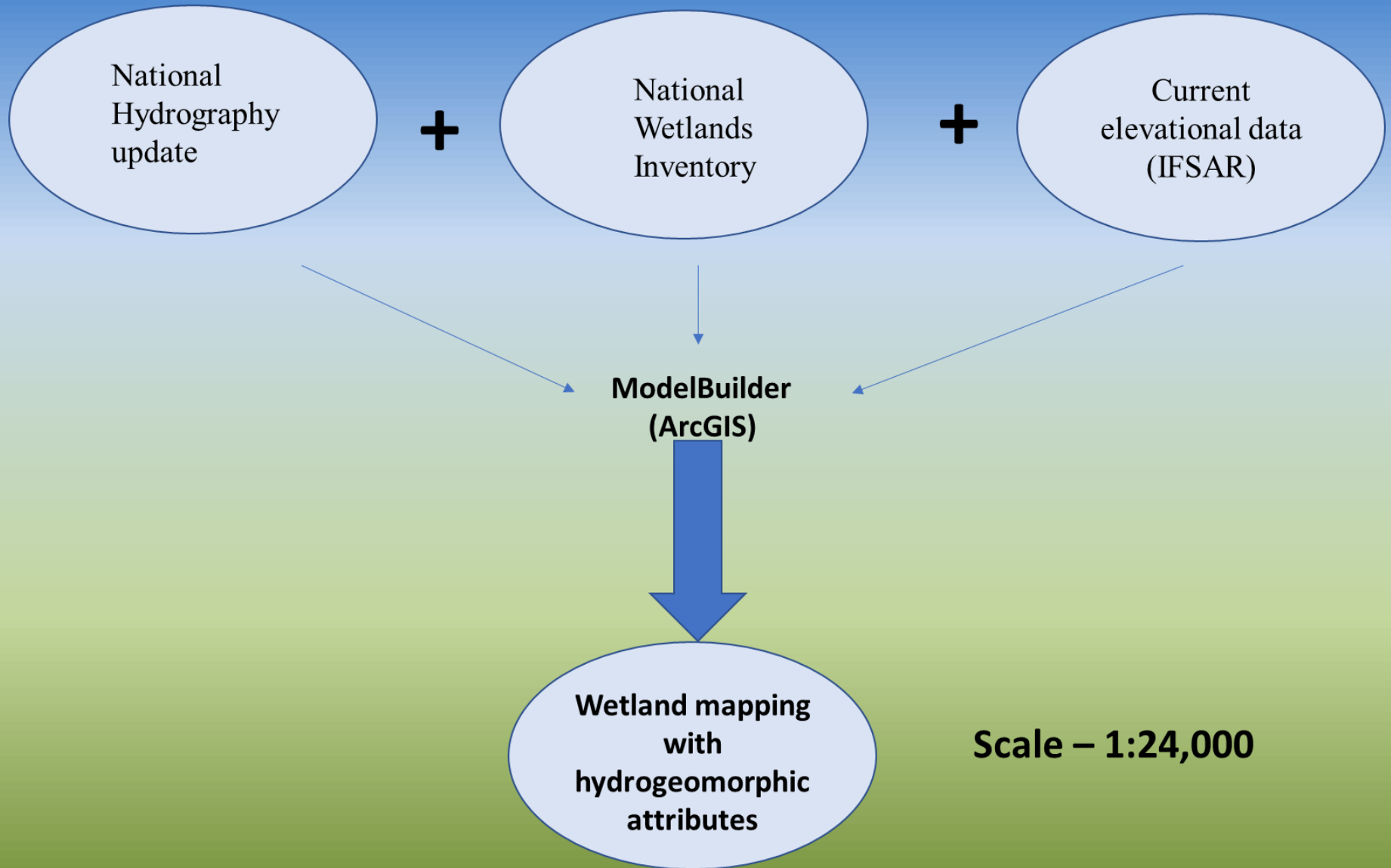
12,095 miles of streams, 19,571 waterbodies, 110,000 wetlands



GeoSpatialServices



# Further attribution of National Wetlands Inventory data



# Outcomes of LLWW classification

**Landscape** position – marine, estuarine, lotic (along rivers and streams), lentic (in basins and lakes and reservoirs)

**Landform** – description of the physical shape of the wetland – basin, flat, floodplain, fringe, island, slope and peatland.

**Waterflow** path- throughflow, inflow, vertical flow and tidal descriptors for those tidal wetlands

**Waterbody** – as informed by current NHD – lake, river, stream, pond



# Wetland Functions Informed by LLWW

- Surface water detention
- Coastal storm surge detention
- Streamflow maintenance
- Nutrient transformation
- Sediment/pollutant storage
- Carbon sequestration
- Bank and shoreline stabilization
- Fish and aquatic invertebrate habitat
- Waterfowl and waterbird habitat
- Provision of habitat for other wildlife
- Habitat for unique, uncommon or highly diverse wetland plant communities

# Customized Functional Assessment

## Salmon Habitat Support Function

- Develop a Quantitative Assessment
  - Better suited for decision support in wetland and watershed planning and management.
    - Triggers, modifiers, spatial context/position
  - Scoring based on an algorithm instead of spatial queries
    - More efficient, repeatable, transparent
    - Attribute based data inputs
    - Normalized
- Can the data inputs to the algorithm be derived from landscape-level data
  - LLWW
  - Typical collateral and derived datasets



# Salmon Habitat Support Function

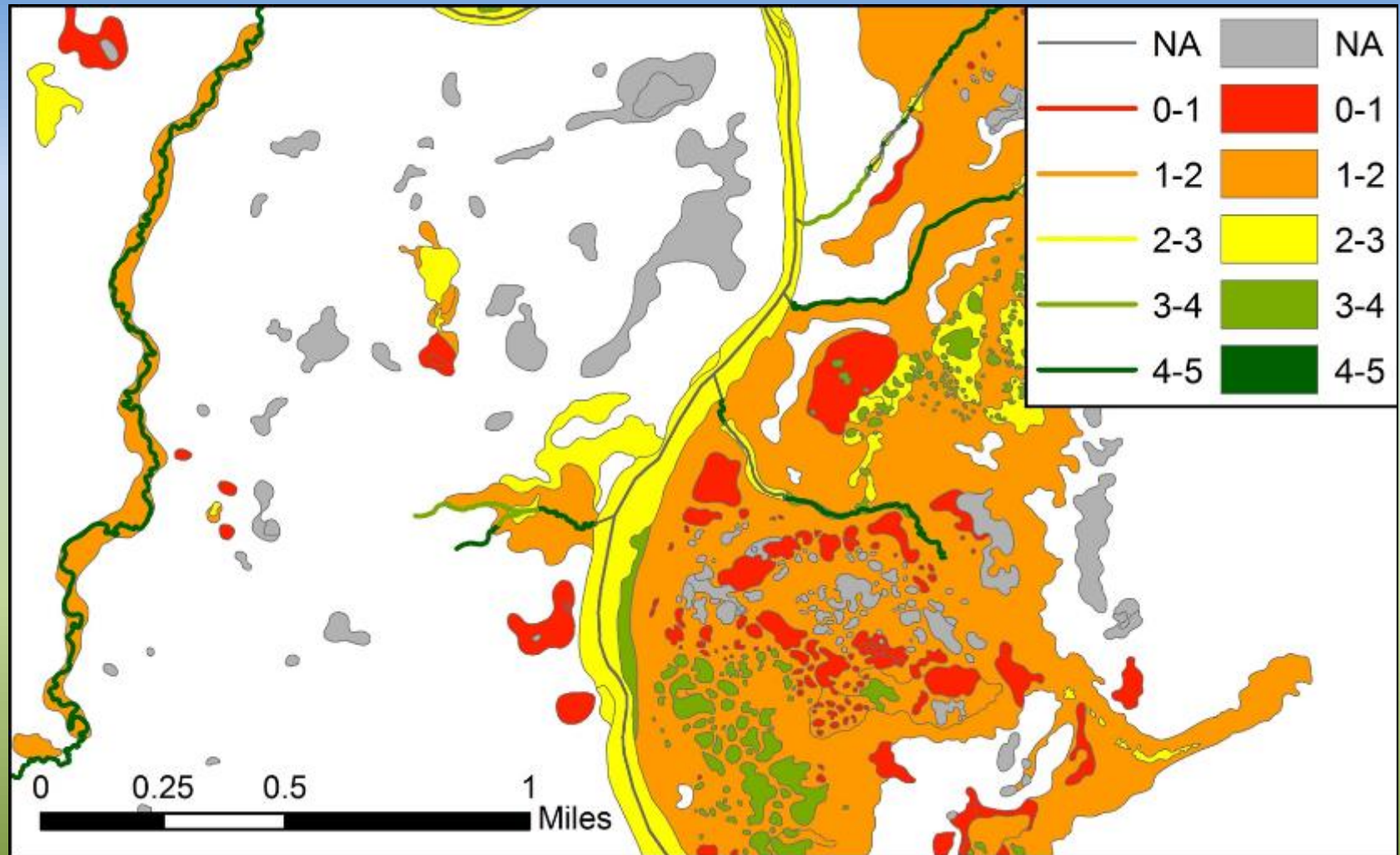
Algorithm for map units that satisfied Condition 1 (waterbody)

$$\left( \left( \frac{AV + Gr + WR}{3} \right) \times FP \right) \times FR$$

Where	
AV =	Aquatic vegetation (NWI Class)
FP =	Fish passage barrier
FR =	Flow regime
Gr =	Stream segment gradient
WR =	Water regime

Lookup Table for AV									
NWI Class									
AB	EM	FO	ML	RB	RS	SB	SS	UB	US
5	5	1	1	1	1	5	3	3	3

# Salmon Habitat Support Function





# Questions?

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