

National Wetlands Inventory

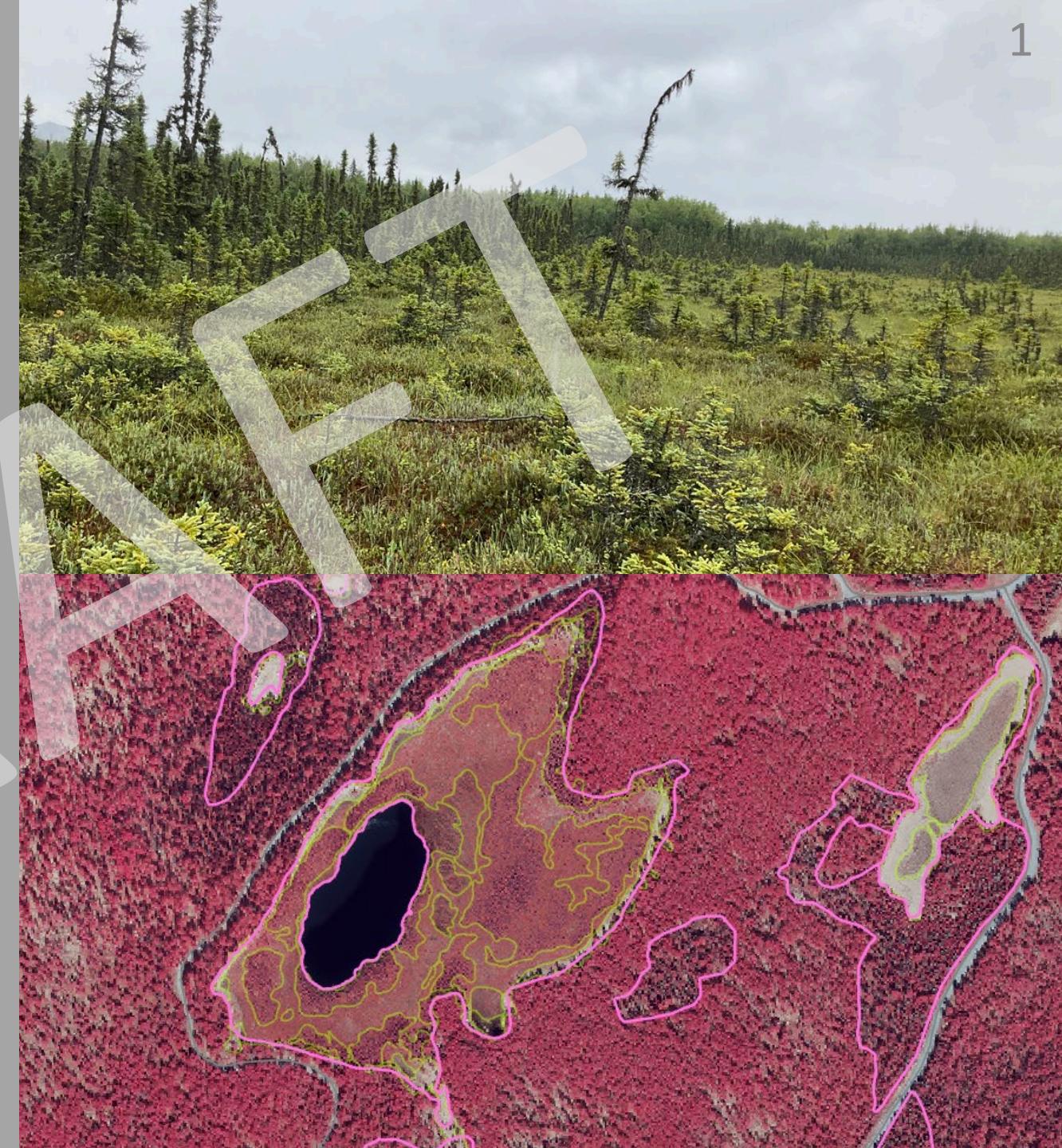
JBER 2023

Prepared by: Charlie Weiss

Team:

USFWS: Sydney Thielke, Charlie Weiss, Kendra Holman

JBER: Cassandra Schoofs, Charlene Johnson



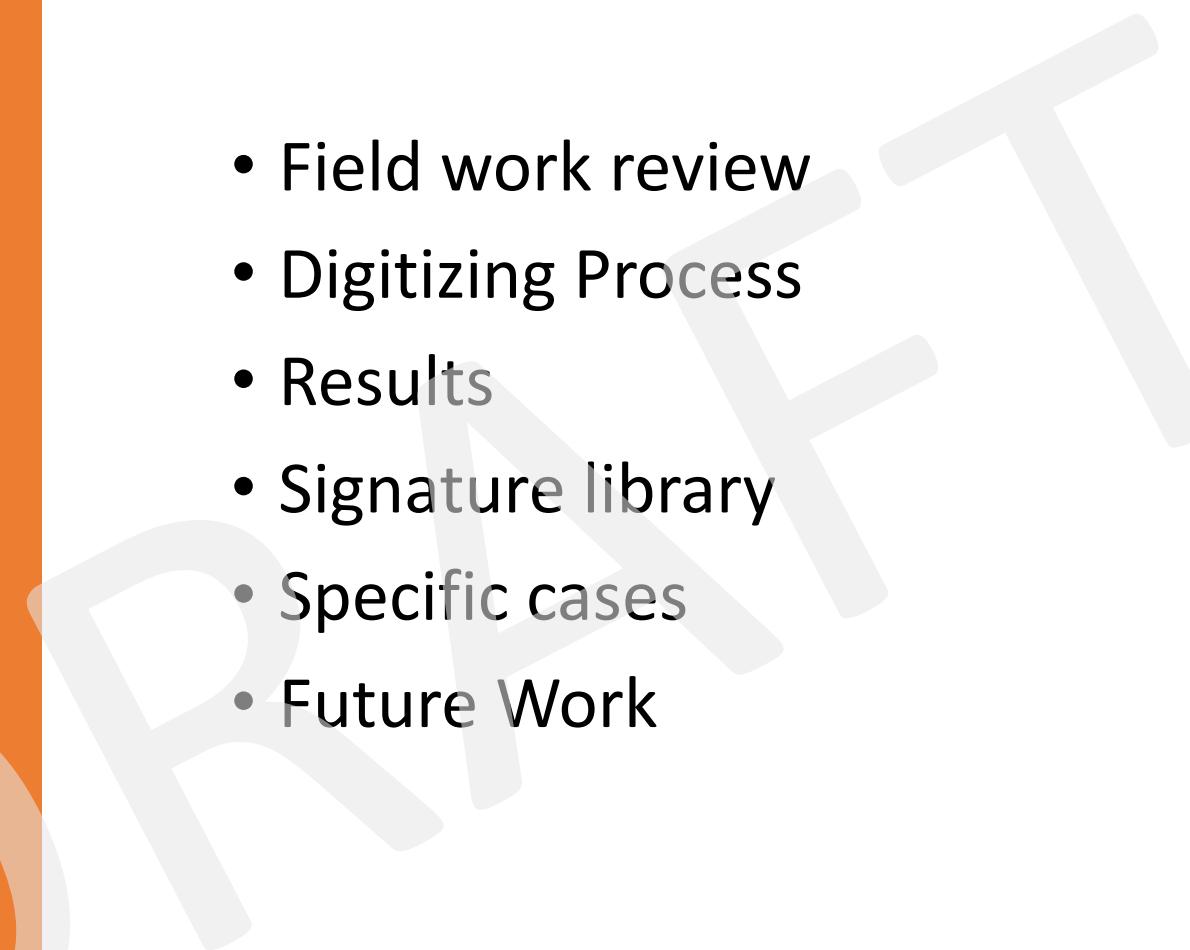


Introduction

- Visited 78 field sites and took 383 data points in the cantonment area, most training areas, and alpine
 - Representative examples compiled into Signature Library
- Mapping done at a .25 acre TMU across JBER with various data references
- NWI and JBER wetland databases made consistent

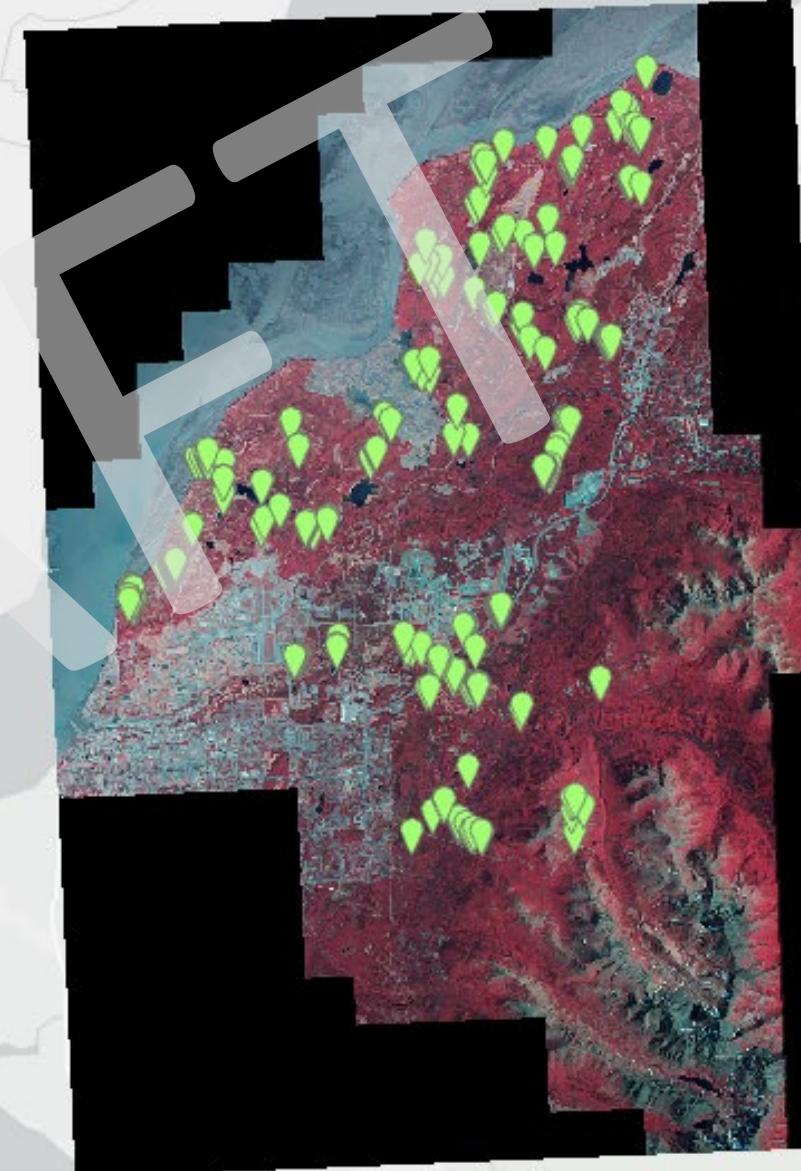


Today's topics

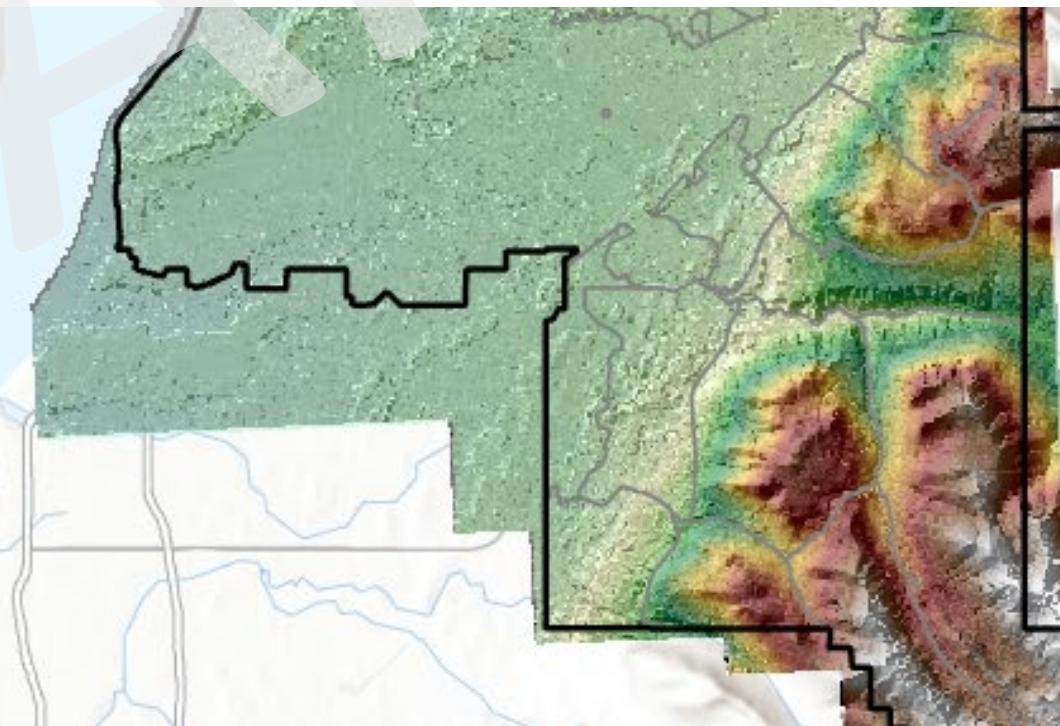
- 
- Field work review
 - Digitizing Process
 - Results
 - Signature library
 - Specific cases
 - Future Work

Field Work Review

- We visited 78 field sites and took 383 data points in the cantonment area, most training areas, and alpine
- There were sometimes challenges in making a call for wetland or upland based on soils and hydrology
 - Glacial landscape
 - Weather conditions
 - Seasonal frost layer
- Some Alaskan wetlands are difficult to delineate
 - Some spruce forests and alpine areas
 - Timing can have big effects

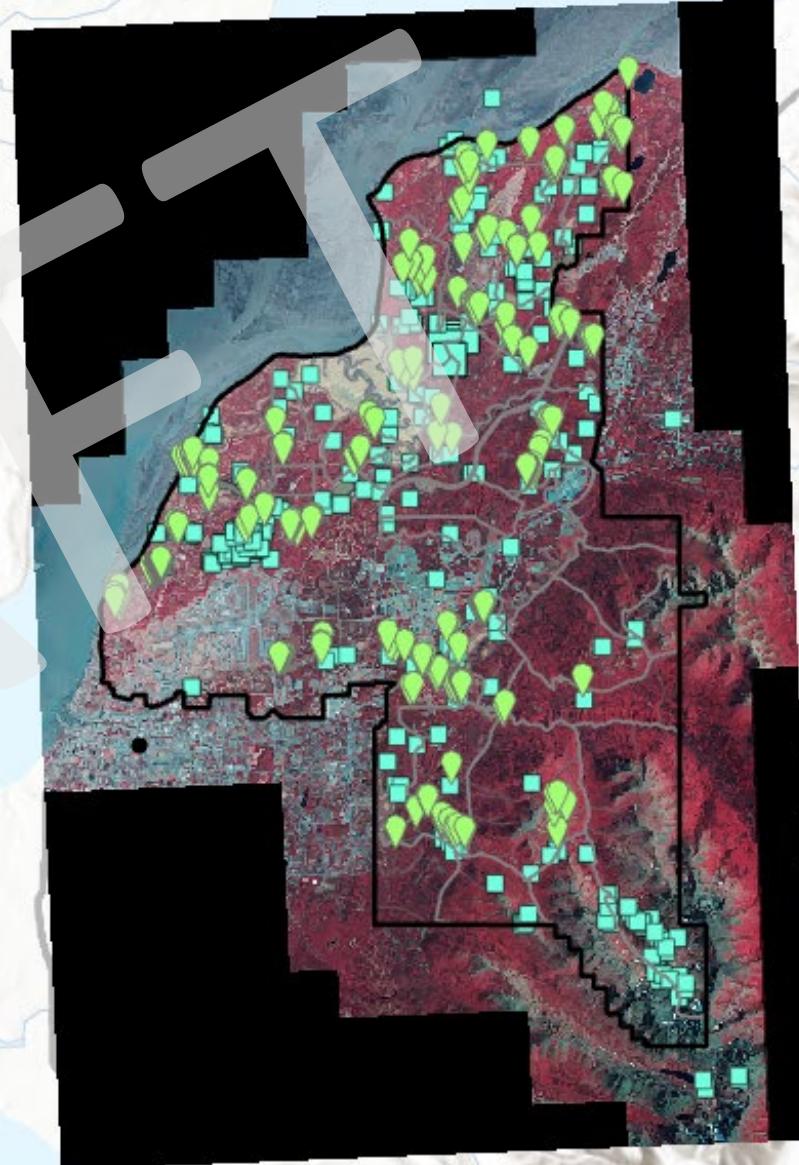


Digitizing Process



Data Used

- New field data collected in summer 2022
- 15 cm resolution multi-spectral imagery collected in 2021 and 2019
 - Imagery signatures vary between the years
- .15 m resolution LiDAR imagery collected in 2021
- Existing JBER Wetlands Inventory
- 448 field points collected with USACE methods spanning 1995-2019
- Legacy NWI data
- Google Earth Pro (All years, May 2021 especially)



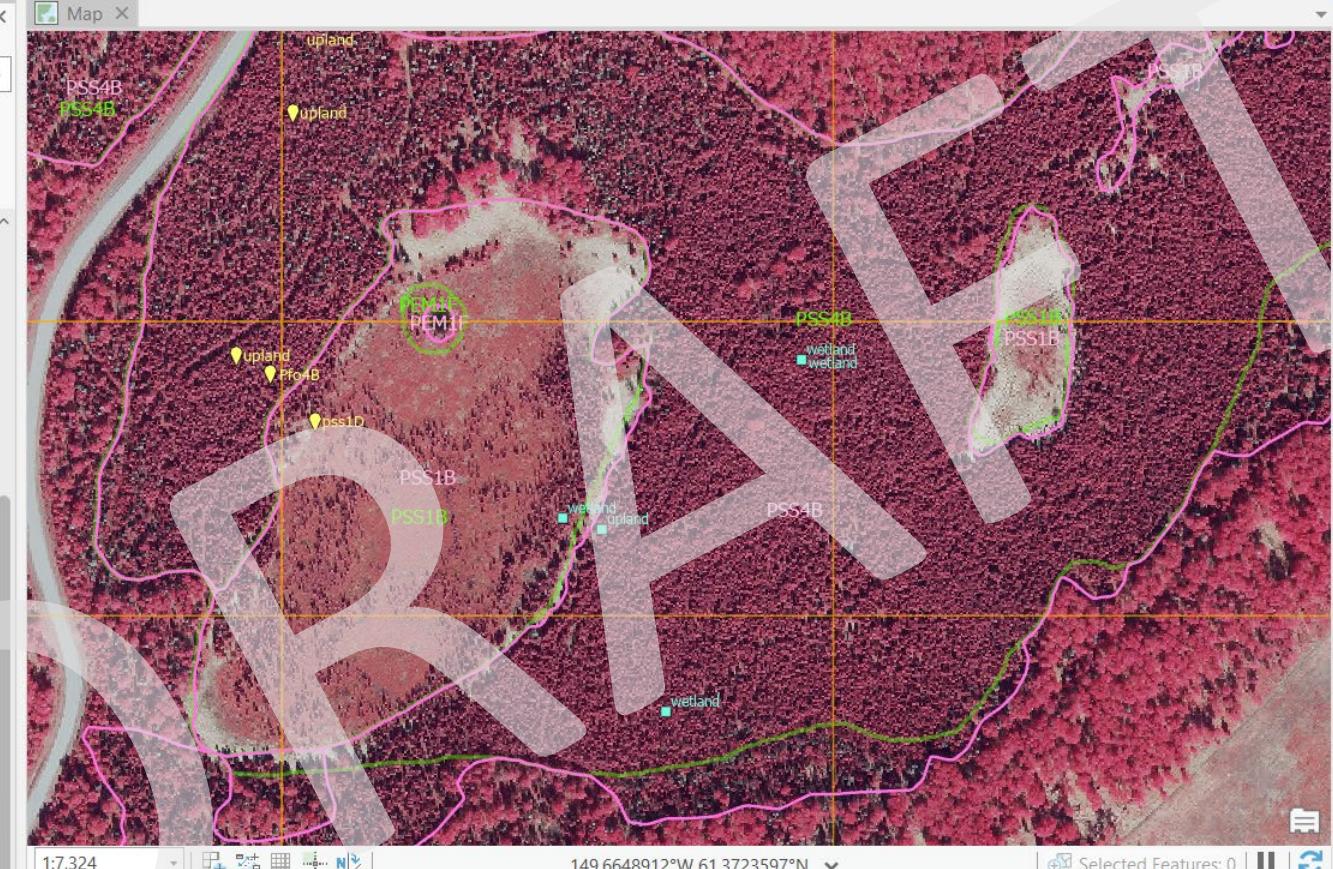


Contents

A toolbar with a search bar labeled 'Search' and various icons for file operations: a funnel, a trash can, a blue folder, a pencil, a grid with a plus sign, and a yellow paintbrush.

Drawing Order

- ▶ Project Boundary
 - ▶ AK_wet_poly
 - ▶ New NWI (5m_smooth_paek)
 - ◀ CreateFishnet
 -
 - ▶ New Charlie Line Notes
 - ▶ New Charlie Notes
 - ▶ Data First 2 Weeks
 - ▶ Training Areas
 - ▶ Data Prior Field Data
 - ▶ Data Clunie Creek
 - ▶ Wetlands JBER
 - ▶ Wetland_A (JBER local)
 - ▶ Wetlands NWI
 - ▶ JBER_Boundaries
 - ▶ Other Depression Points
 - ▶ JBER_05sep2019_wgs84_utm
 - ▶ Imagery 2021
 - ▶ 5780026637448.tif
 - ▶ Imagery Base 1950
 - ▶ Imagery Anchorage 1939
 - ▶ Imagery 2009
 - ▶ LiDAR 2021
 - ▶ Hillshade2021
 - World Terrain Base
 - World Hillshade
 - ◀ **Standalone Tables**



Wetland A (IBER local)

Field:		Add	Calculate	Selection:	Select By Attributes	Zoom To	Switch	Clear	Delete	Copy	More
	OBJECTID *	SHAPE *	ATTRIBUTE	QAQC_CODE	WETLAND_TYPE	ACRES	GLOBALID *				
1	708	Polygon	E2ABM	NNNNNN	Estuarine and Marine...	3.862535	{E81C0F60-CF2D-4CDE-8AAA-37943E56EE3A}				
2	3964	Polygon	E2ABM	NNNNNN	Estuarine and Marine...	40.945027	{1128AC69-B336-42EE-BBA5-A47E1FAE67A}				
3	3993	Polygon	E2ABM	NNNNNN	Estuarine and Marine...	4.110801	{CBA593CE-4DA6-44B4-B2AC-FC0A5252D87D}				

Create Features

 Search

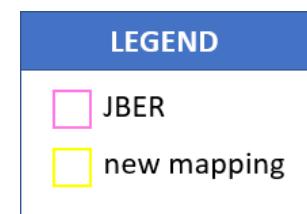
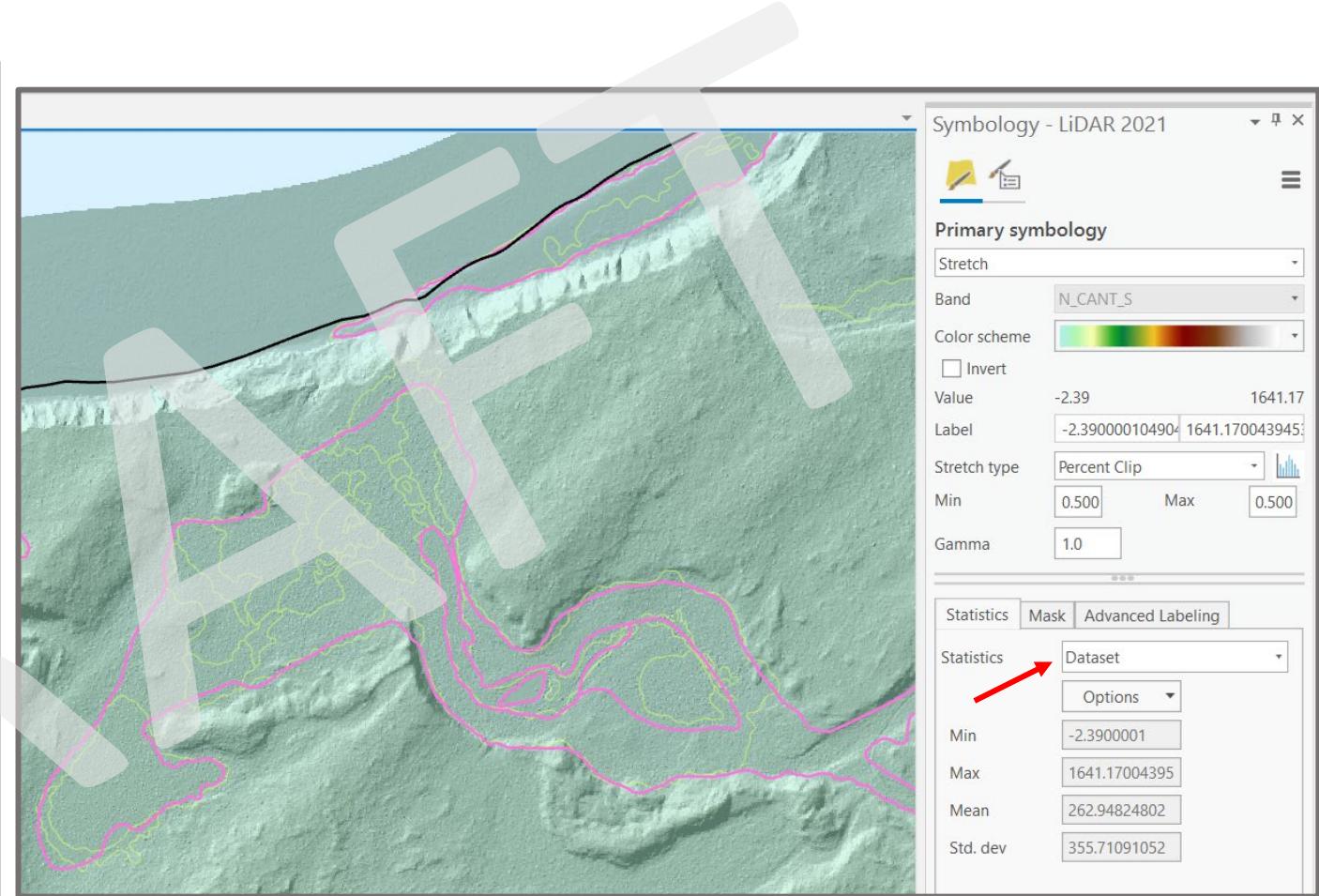
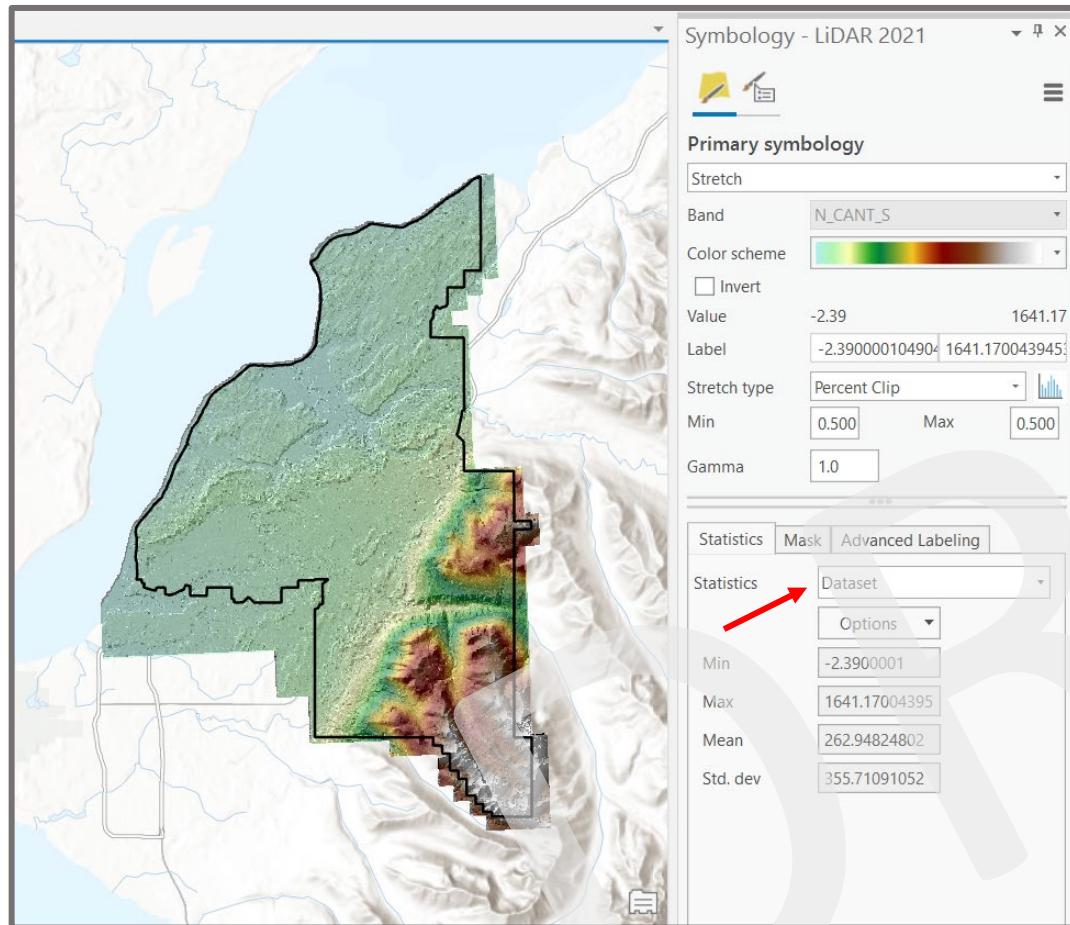
Templates Favorites

- ▼ CreateFishnet
 -  CreateFishnet
 - ▼ New Charlie Notes
 -  1/4 acre square

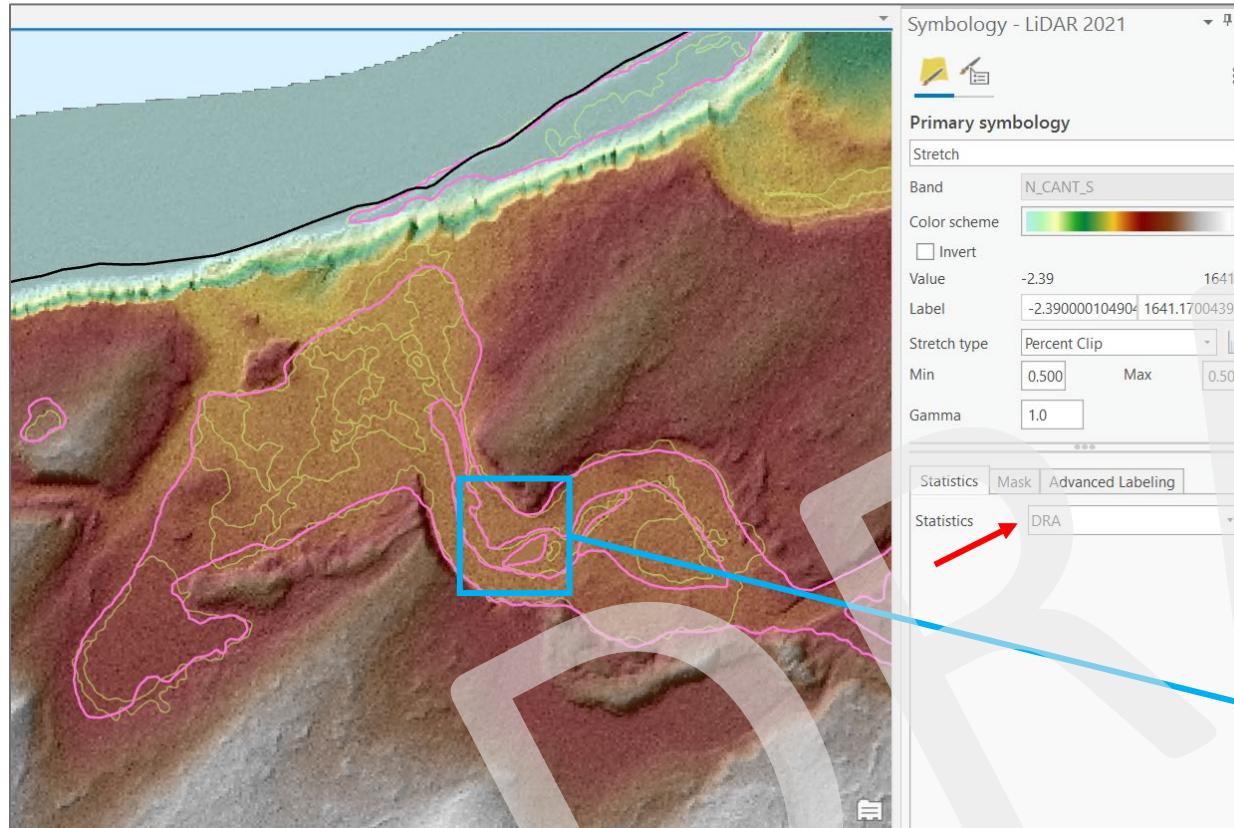
charlie notes

C I E E H G S C M C

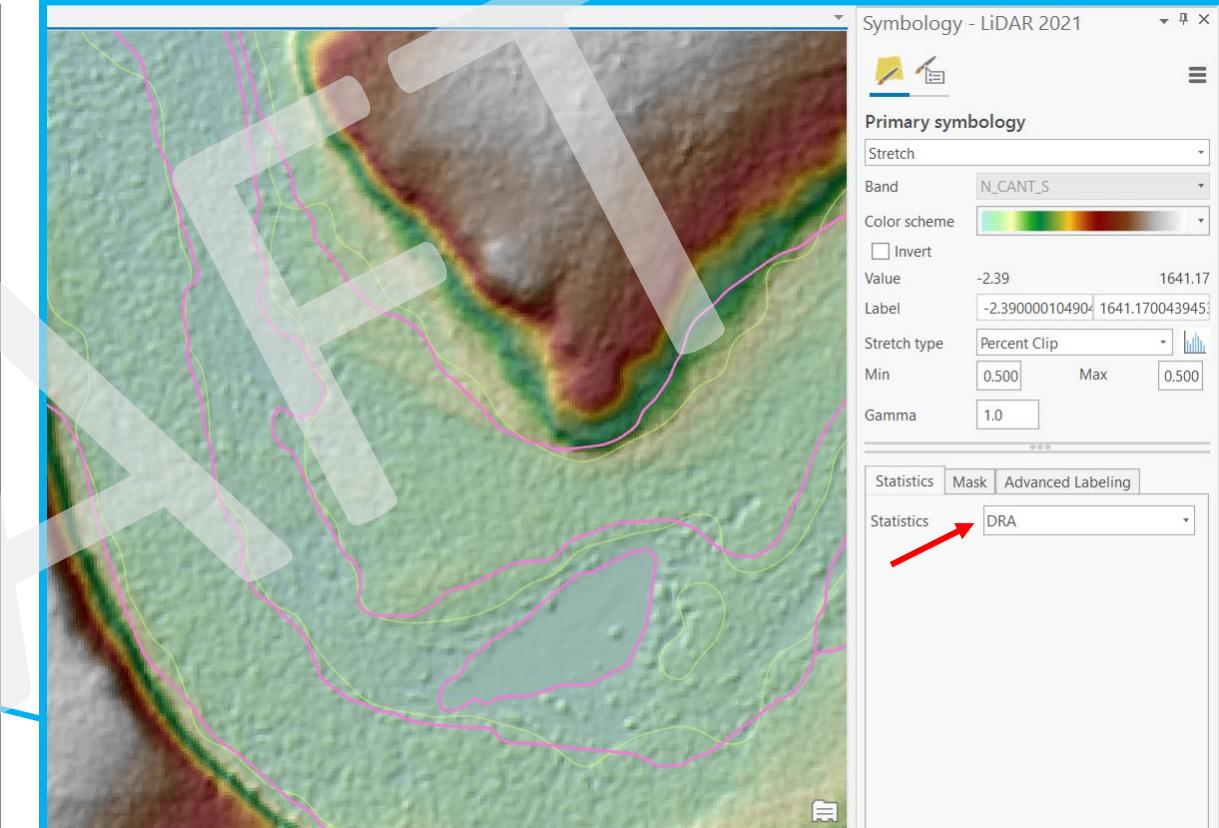
Static LiDAR



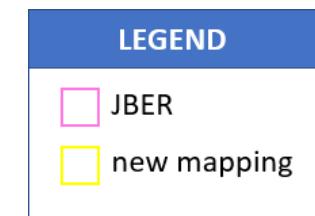
Dynamic LiDAR



1:15,000



1:3,000



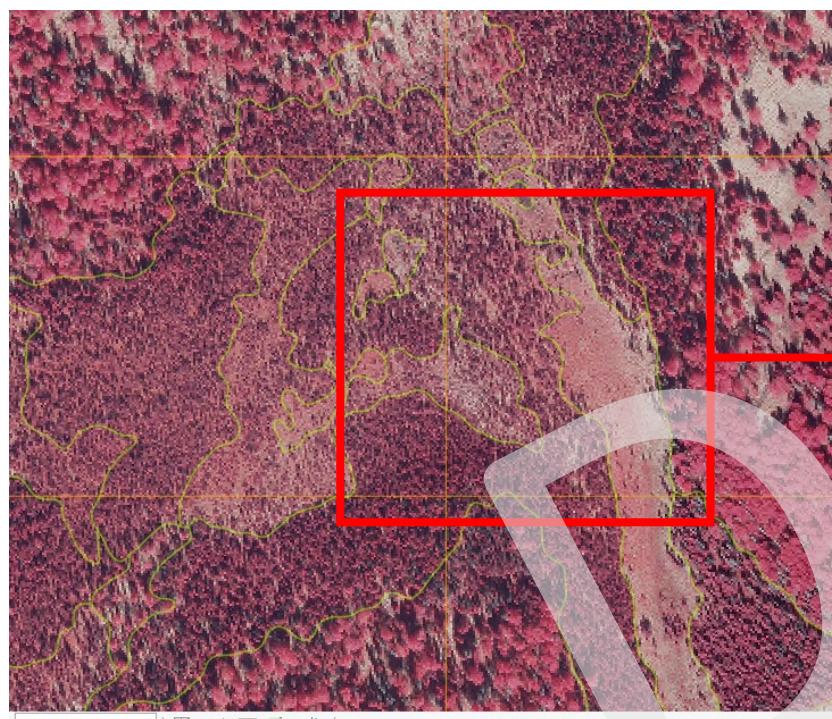


LEGEND

new mapping

Mapping to Scale

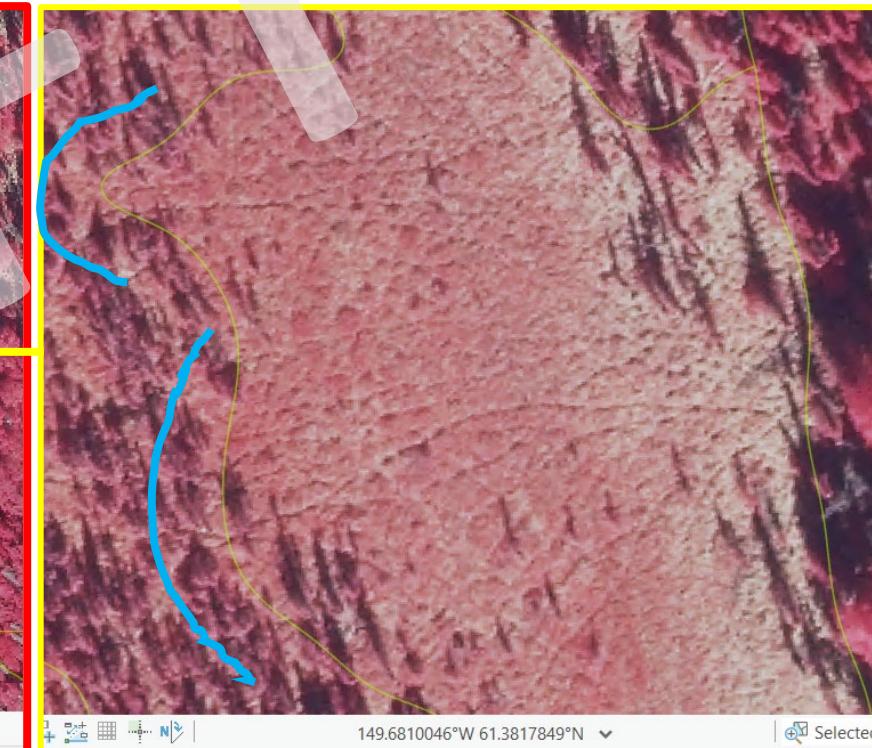
Use scale (1:6000)



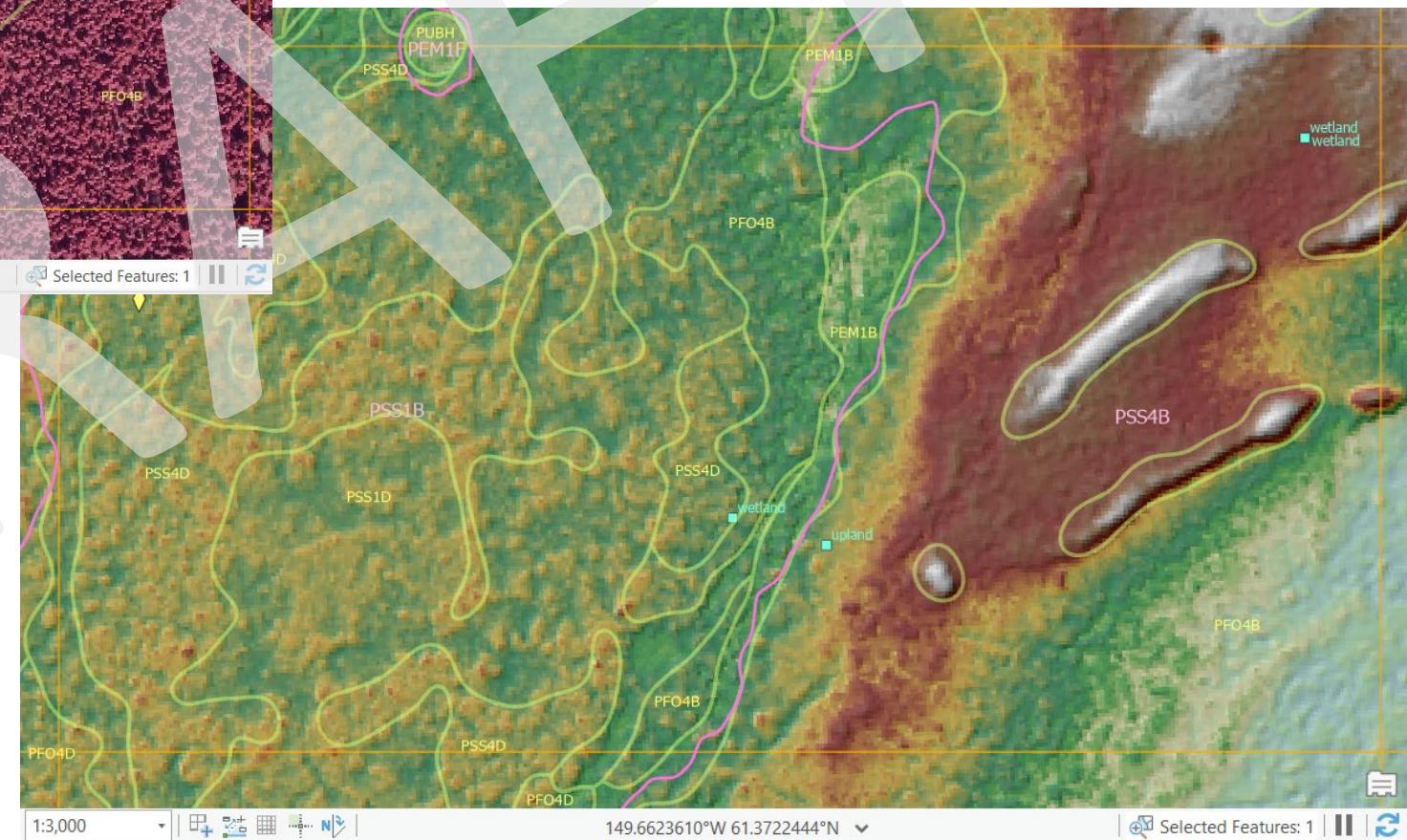
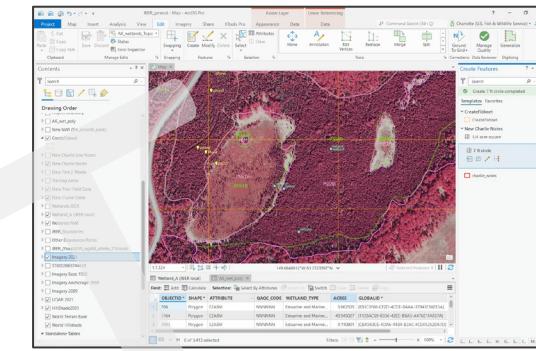
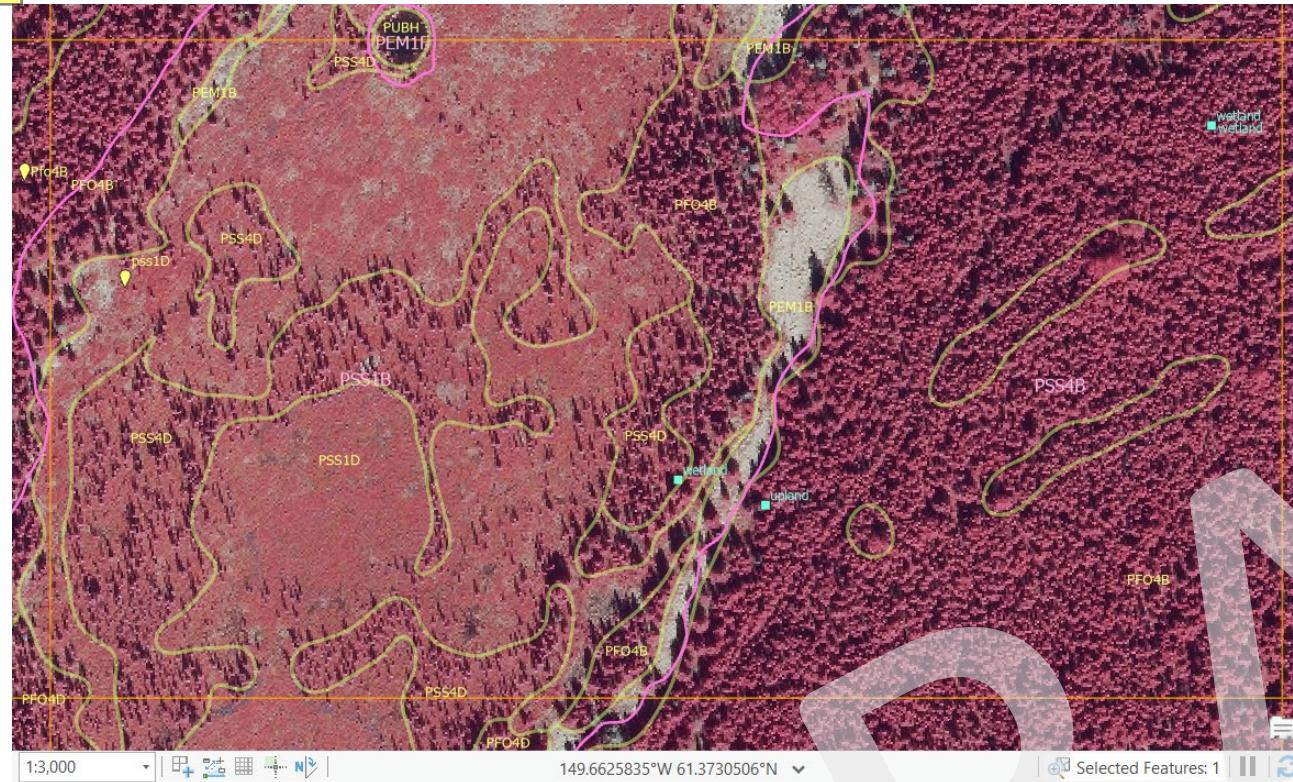
Digitizing scale (1:3000)



Too close (1:1000)

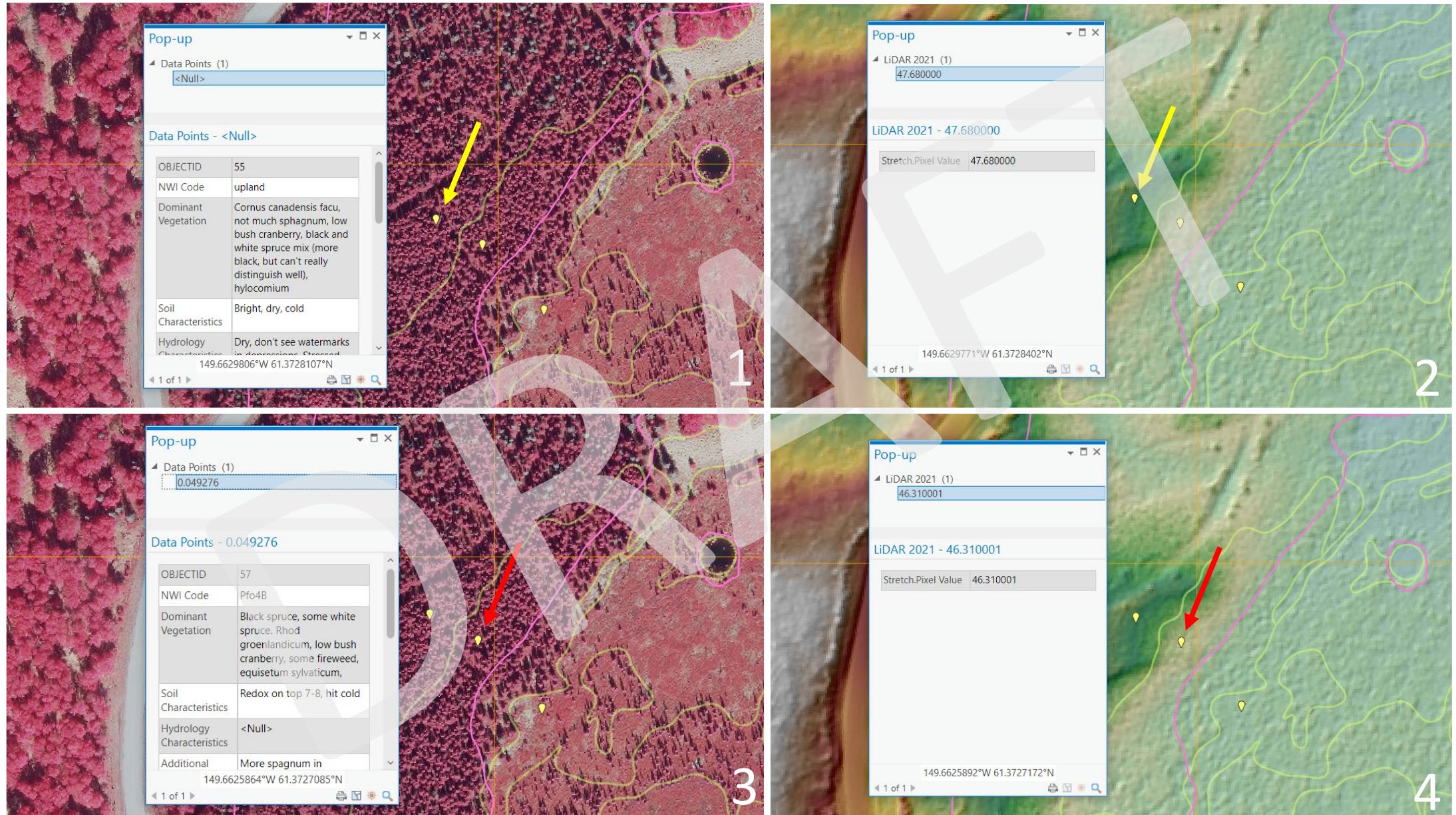


Mapping with data





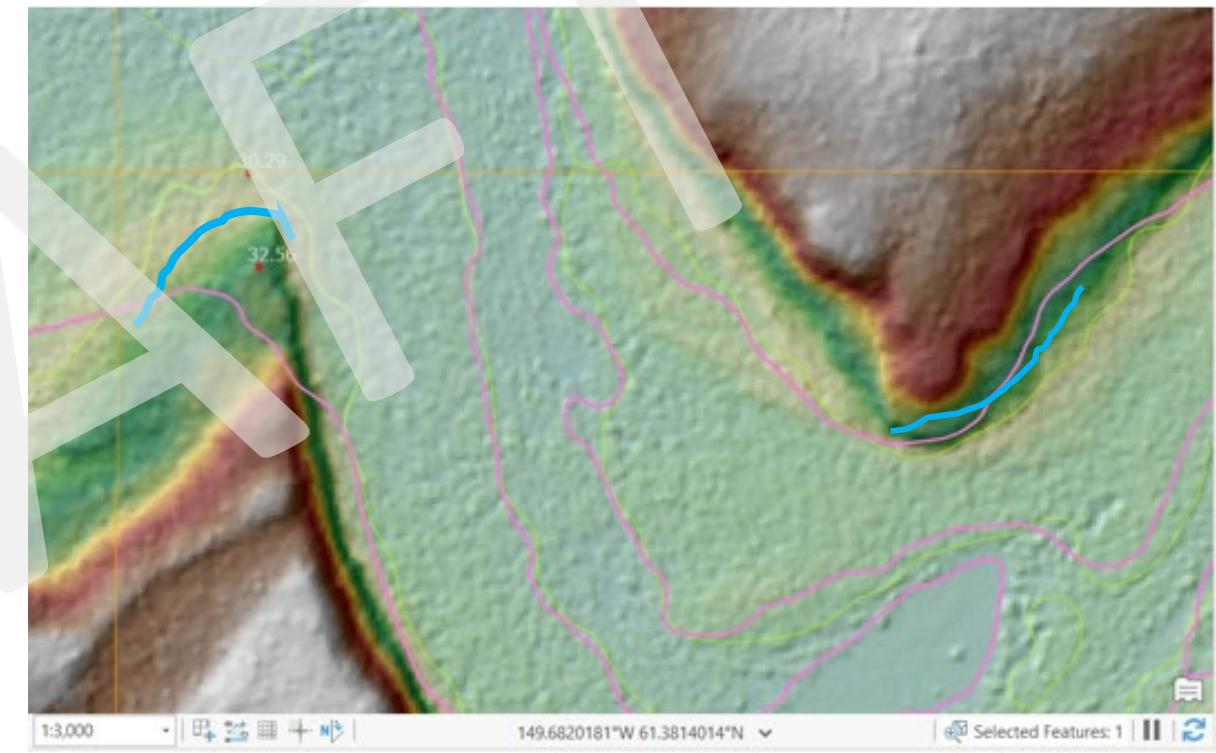
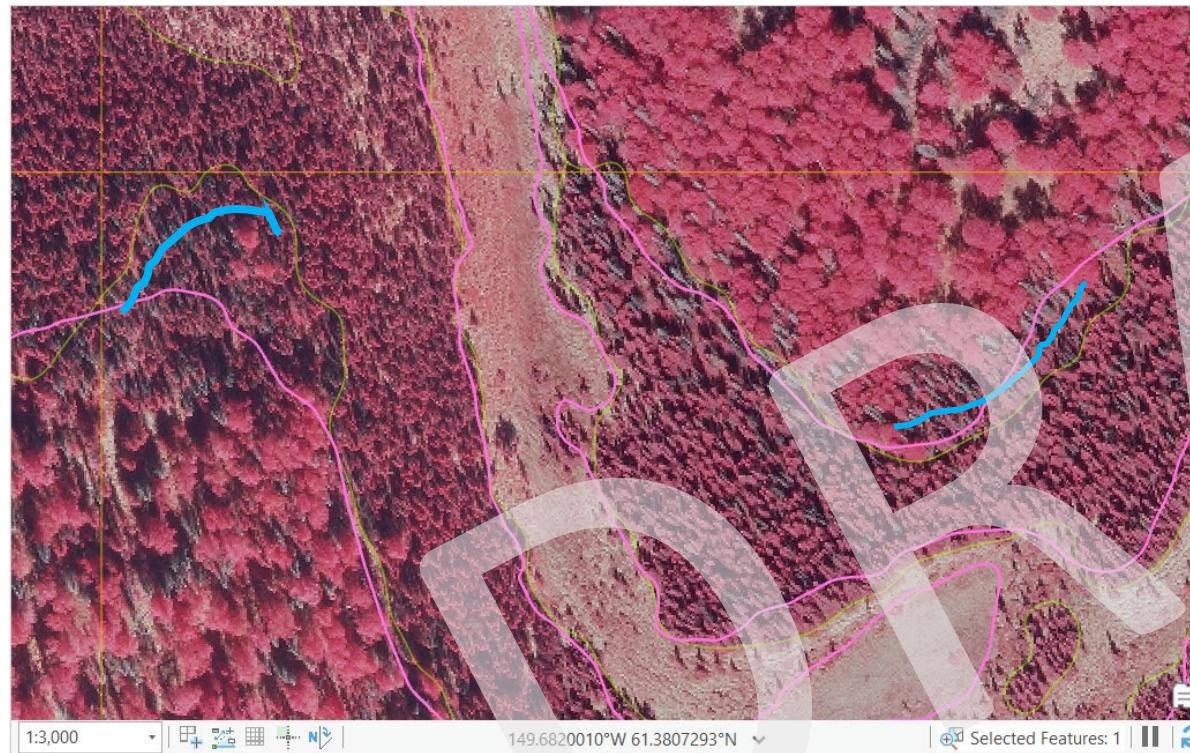
Extrapolating from data



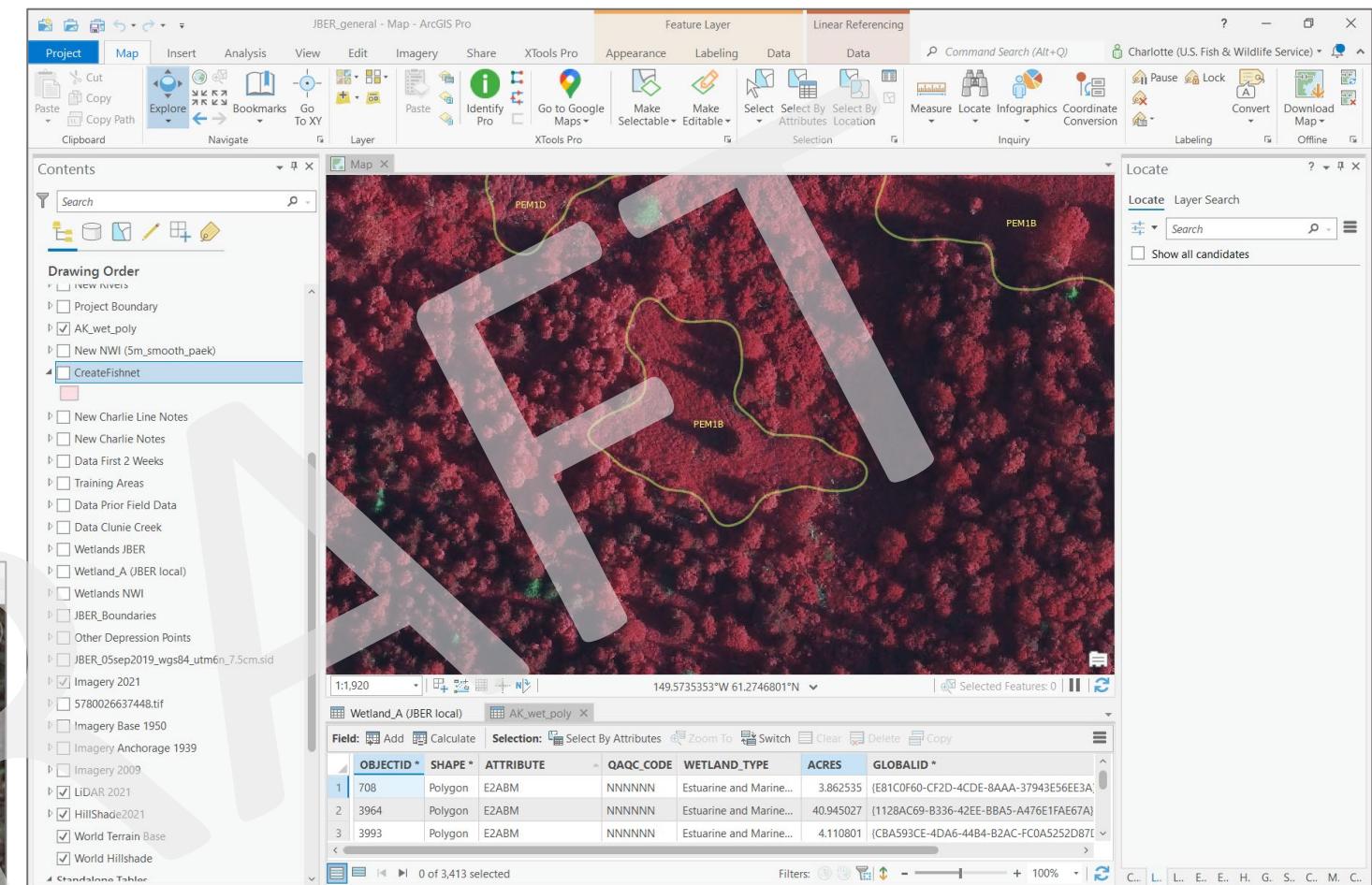
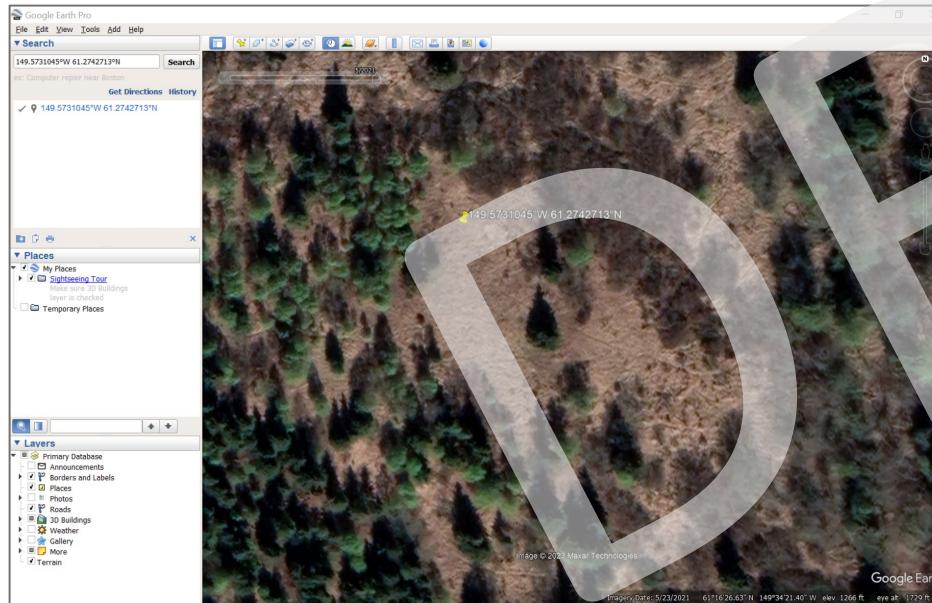


CIR First, LiDAR for cleanup

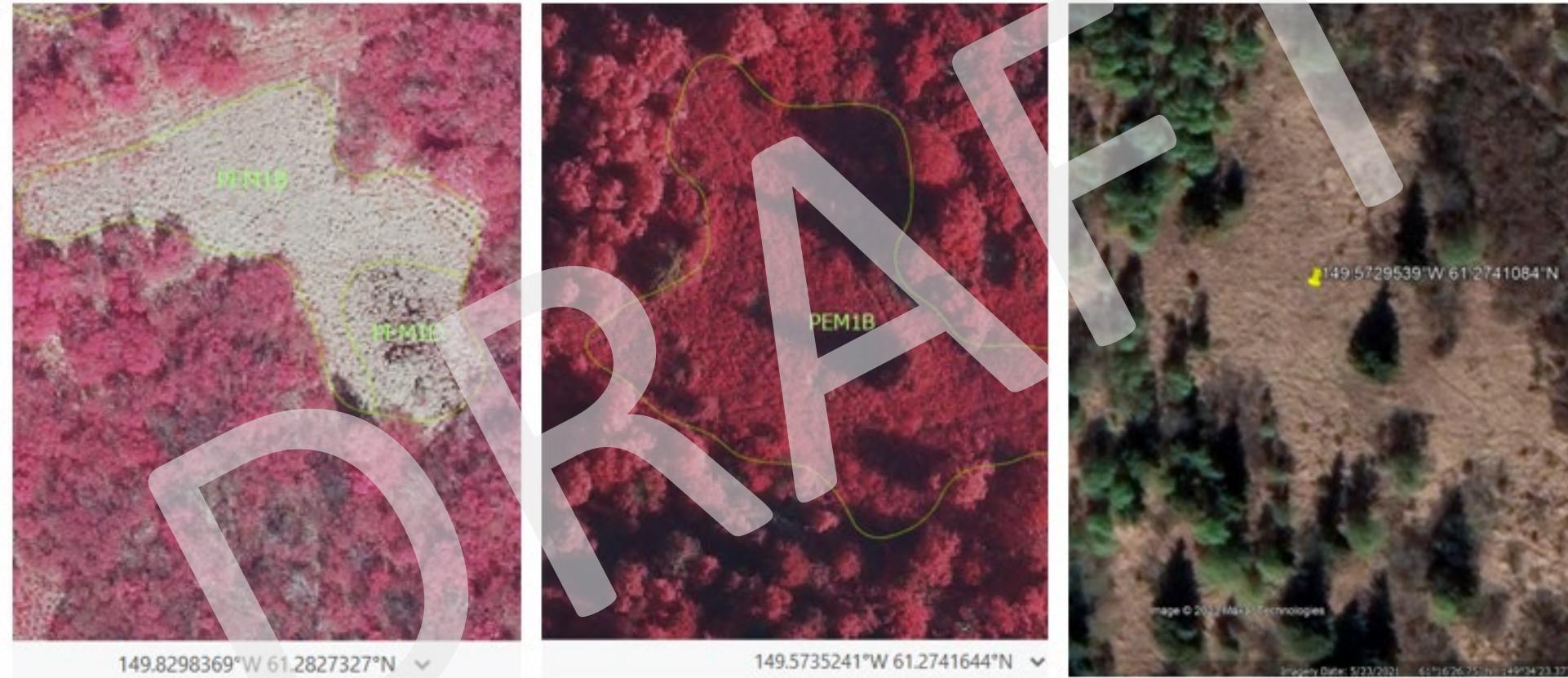
LEGEND	
	JBER
	new mapping



Google Earth Reference

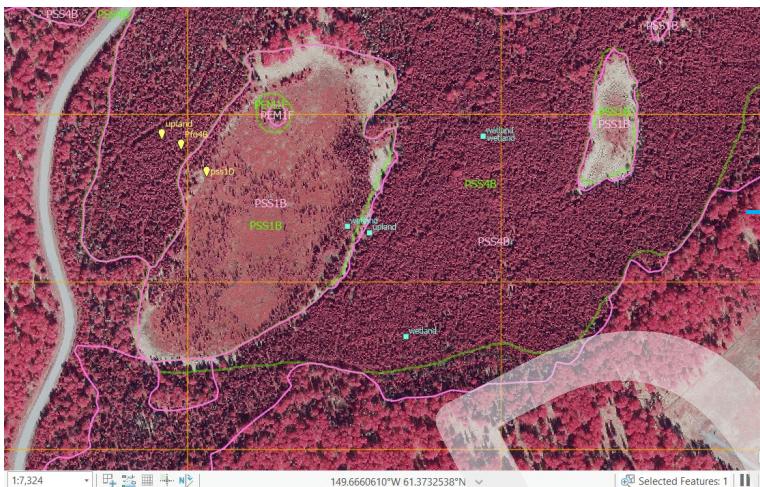


Differences in CIR imagery



From left to right: PEM1B wetlands in 2021 imagery (149.8298369W 61.2827327N), 2019 imagery (149.5735241W 61.2741644N), and Google Earth May 2021 (149.5735241W 61.2741644N)

Tracking work with a fishnet of polygons



The screenshot shows the ArcGIS Pro interface with the following details:

- Project Bar:** JBER_general - CreateFishnet - ArcGIS Pro, with tabs for Table, Feature Layer, and Linear...
- Labeling Tools:** Class (Class 1), Label Features In This Class (checked), Field (note), In Beyond, Out Beyond, Clear Limits, AA (Boundary), AA (Landform/P...), Aa (Landmark/P...), Tahoma (Font), 10 pt (Size), Text Symbol (Font Style), Rounded Percent, truncated, Basic Polygon, Pause, Lock, View Unplaced, More, Map.
- Contents Panel:** Shows layers: Project Boundary, AK_wet_poly, New NWI (5m_smooth_paek), CreateFishnet (selected), note (with sub-values 1, 2, 3, <Null>, E, GE, L, QC1, QC2, QC3, QC4, QC5, RL, TBD, U, U1, U2, <all other values>), New Charlie Line Notes, New Charlie Notes, Data First 2 Weeks, Training Areas, Data Prior Field Data, Data Clunie Creek, Wetlands JBER.
- Map View:** Displays a satellite image of a wetland area with a fishnet overlay. The fishnet consists of a grid of polygons. The 'note' layer is applied to these polygons, showing various colors (green, yellow, red, blue) corresponding to the values in the 'note' field. A legend in the bottom right corner of the map view shows the color scheme for the 'note' field.
- Symbology - CreateFishnet Panel:** Shows the symbology for the 'note' field. It includes:
 - Primary symbology:** Unique Values, Field 1: note, Add field.
 - Color scheme:** A palette with 17 symbol classes, corresponding to the values in the 'note' field.
 - Classes:** A table showing the mapping between 'note' values and their corresponding symbols and labels.
- Table View:** Shows a table with columns: OBJECTID *, Shape *, Shape_Length, Shape_Area, note, cw_note. The data includes:

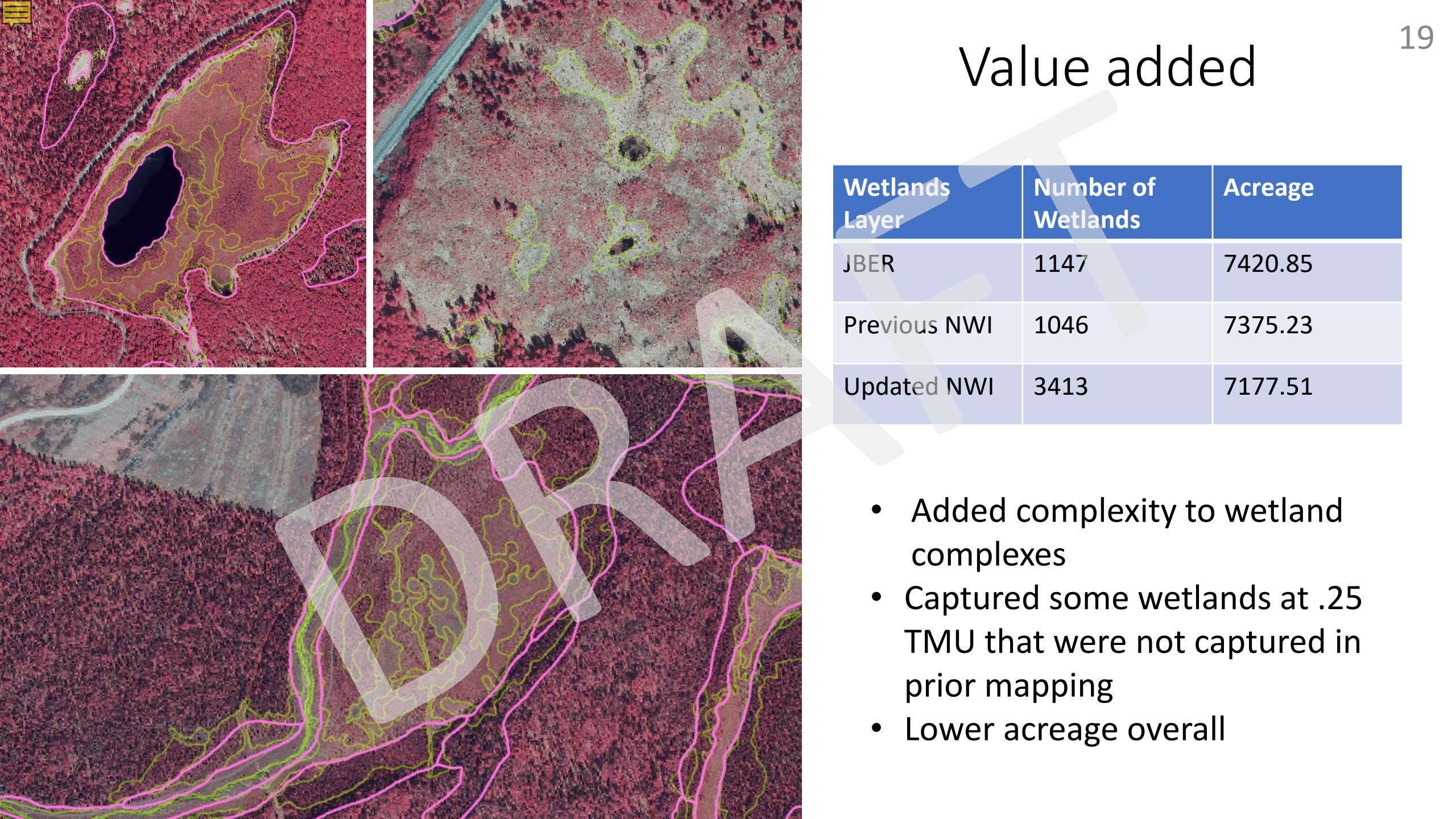
OBJECTID *	Shape *	Shape_Length	Shape_Area	note	cw_note
1	Polygon	2184.4208	270639.952	<Null>	<Null>
2	Polygon	2184.4206	270639.914	<Null>	<Null>
3	Polygon	2184.4206	270639.914	<Null>	<Null>
4	Polygon	2184.4206	270639.914	<Null>	<Null>

The screenshot shows the ArcGIS Pro interface with the following components:

- Top Bar:** JBER_general - Map - ArcGIS Pro, Feature Layer, Linear Referencing, Command Search (Alt+Q), Charlotte (U.S. Fish & Wildlife Service).
- Toolbar:** Cut, Copy, Paste, Copy Path, Clipboard, Explore, Bookmarks, Go To XY, Layer, XTools Pro, Identify Pro, Go to Google Maps, Make Selectable, Make Editable, Selection, Measure, Locate, Infographics, Coordinate Conversion, Labeling, Inquiry.
- Contents Panel:** Shows a list of layers including World Terrain Reference, AK_wetlands_Topo, AK_wet_poly (selected), and various QC and Data layers. A blue arrow points from the 'AK_wet_poly' entry in the list to the 'AK_wet_poly' entry in the table below.
- Map View:** Displays a satellite map of a coastal area with wetland polygons. A large red 'X' is overlaid on the map. A blue arrow points from the 'AK_wet_poly' entry in the table below to the 'AK_wet_poly' entry in the Contents panel.
- Catalog:** Shows the project structure with toolboxes, combined tools, individual linear and polygonal tools, and databases.
- Table:** Shows a table of selected features for 'Wetland_A (JBER local)'. The table includes columns: Field, Add, Calculate, Selection: Select By Attributes, OBJECTID, SHAPE, ATTRIBUTE, QAQC_CODE, WETLAND_TYPE, ACRES, and GLOBALID. The 'QAQC_CODE' column is highlighted with a blue arrow.
- Bottom Bar:** Filters, 100%, Offline, and various status indicators.

Field	Add	Calculate	Selection:	OBJECTID *	SHAPE *	ATTRIBUTE	QAQC_CODE	WETLAND_TYPE	ACRES	GLOBALID *
1	708	Polygon	E2ABM	NNNNNN	Estuarine and Marine...	3.862535	(E81C0F60-CF2D-4CDE-8A			
2	3964	Polygon	E2ABM	NNNNNN	Estuarine and Marine...	40.945027	(1128AC69-B336-42EE-BE			
3	3993	Polygon	E2ABM	NNNNNN	Estuarine and Marine...	4.110801	(CBA593CE-4DA6-44B4-B			





Value added

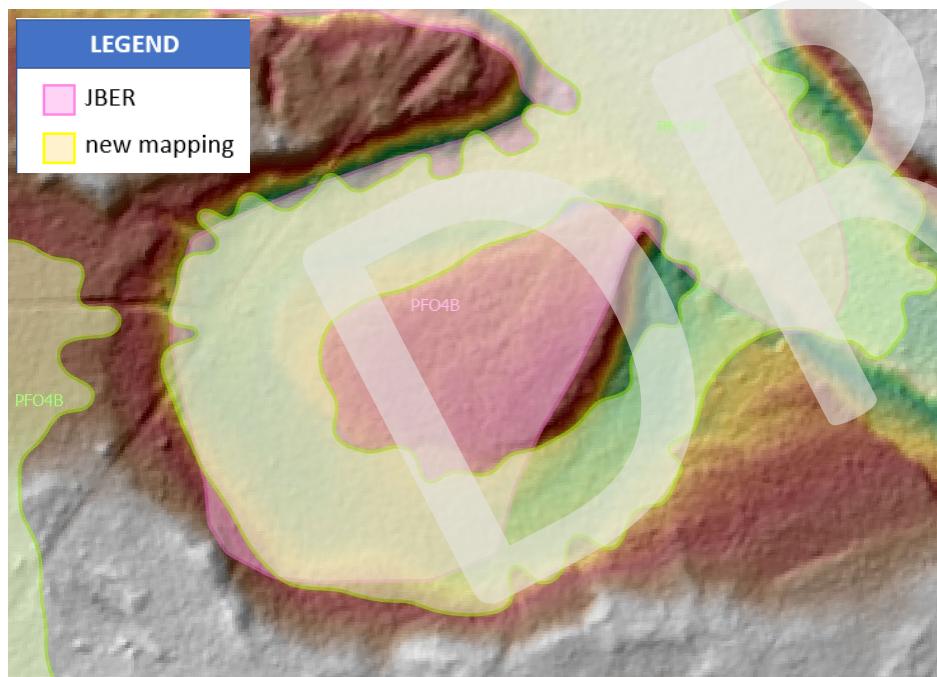
Wetlands Layer	Number of Wetlands	Acreage
JBER	1147	7420.85
Previous NWI	1046	7375.23
Updated NWI	3413	7177.51

- Added complexity to wetland complexes
- Captured some wetlands at .25 TMU that were not captured in prior mapping
- Lower acreage overall

Removing PFO4B

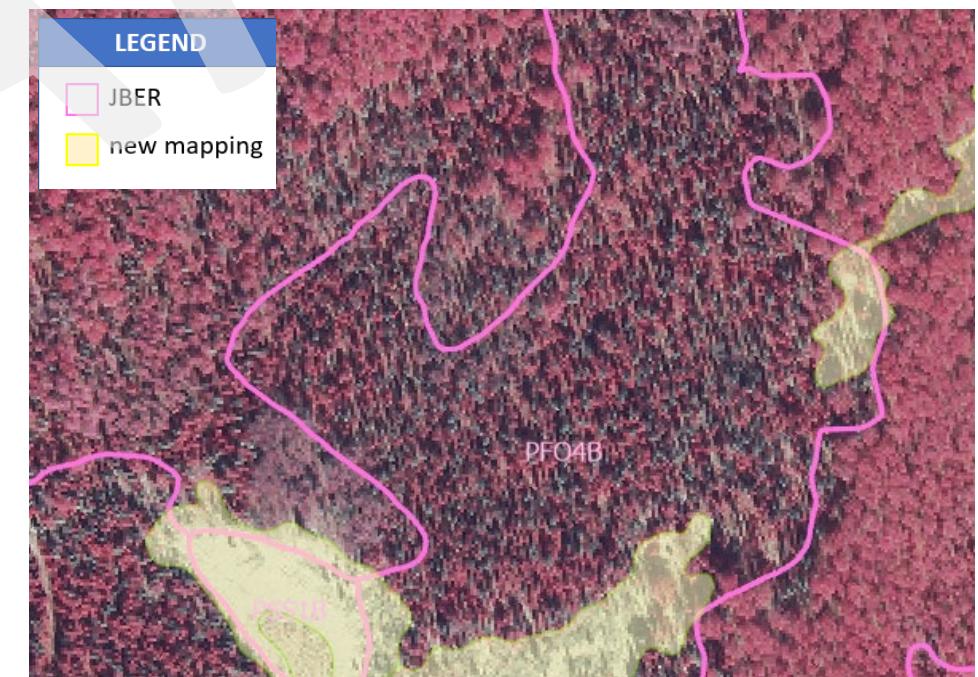
Wetlands Layer	PFO4B Acreage
JBER	1738.12
Previous NWI	1352.72
Updated NWI	1132.11

Inaccurate with elevation



Coordinates: 149.5903068W 61.3937222N

Dead white spruce signature

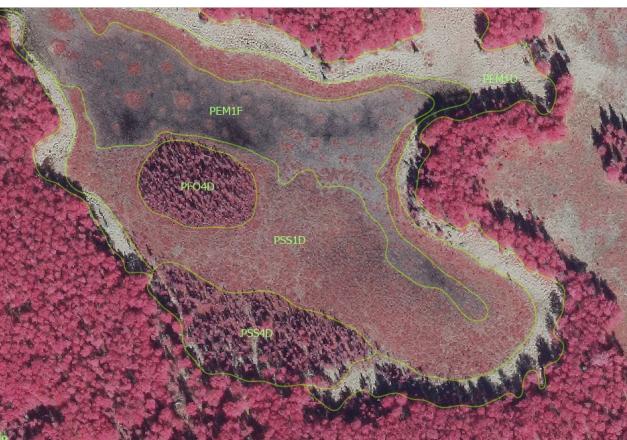
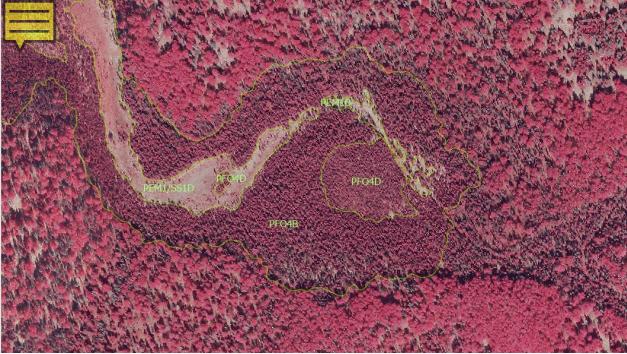


Coordinates: 149.7019037°W 61.3473587°N

Signature Library Examples

PEM1F

PUBH



10 Most Common Codes

By occurrence:

1. PEM1D (422)
 2. PFO4B (384)
 3. PSS1D (372)
 4. PEM1B (360)
 5. PSS4D (292)
 6. PEM1F (284)
 7. PFO4D (182)
 8. PUBH (114)
 9. PSS1B (110)
 10. PEM1C (98)

By acreage:

1. E2EM1N (1178)
 2. PFO4B (1132)
 3. PSS1D (628)
 4. E2USN (486)
 5. PSS4D (479)
 6. PEM1D (313)
 7. PFO4D (293)
 8. L1UBH (248)
 9. E2USM (217)
 10. PEM1B (213)



PEM1D

422 occurrences
313.04 acres

23

Signature #1: Bluejoint grass

Description

- Emergent vegetation
- Water trails, intense saturation, or small pockets of open water.

Common Species

Bluejoint grass (*Calamagrostis canadensis*), marsh five finger (*Comarum palustre*)

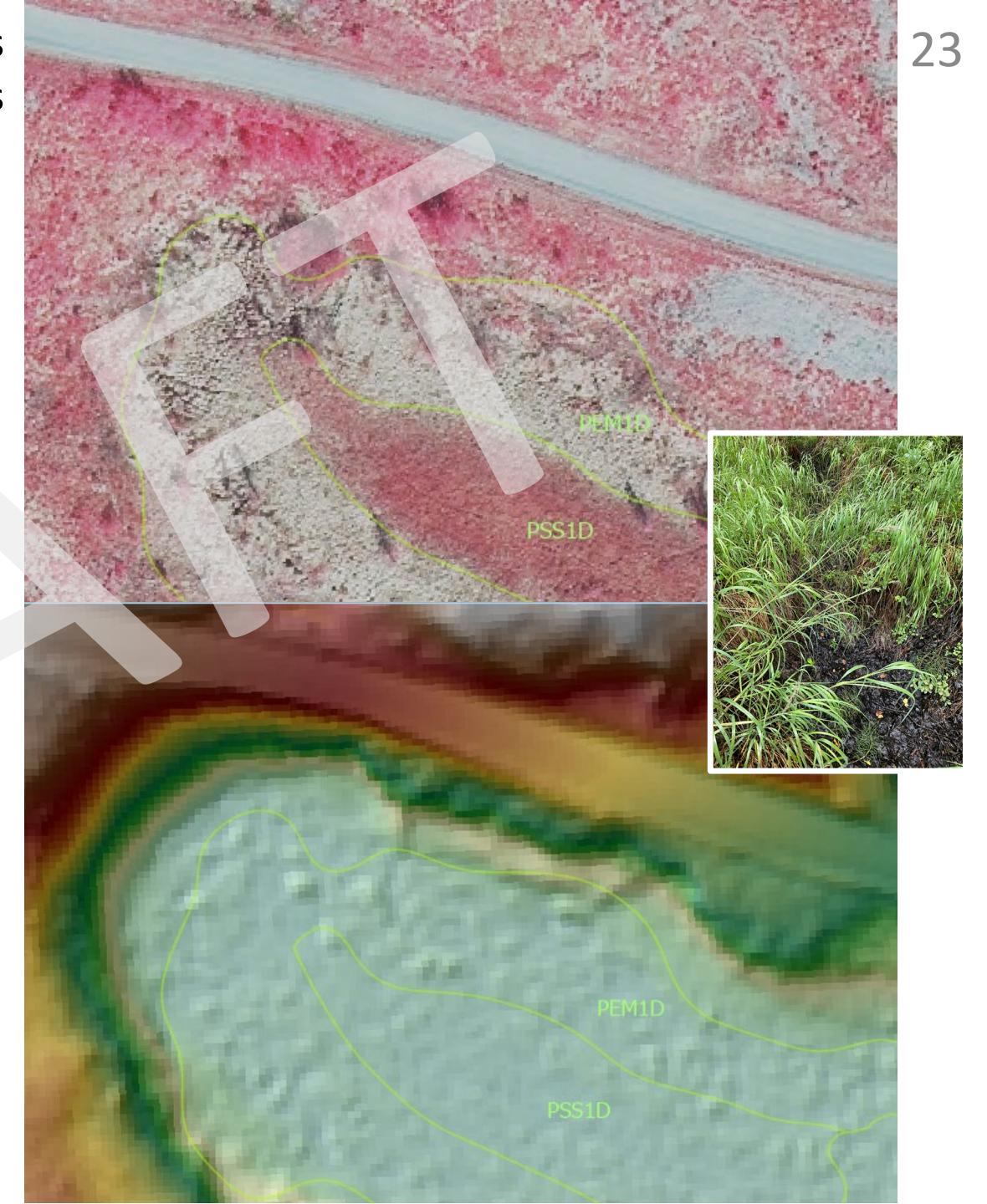
Signature

- Tan color with dark patches
- Smooth texture

Coordinates

149.7973014°W 61.2748889°N

Field photo: 149.6263011°W 61.3608833°N





PEM1D

422 occurrences
313.04 acres

Signature #2: Wetland Complexes

Description

- Areas in wetland complexes with smoother (not scrubby) texture that fell short of appearing flooded
- Shrubs likely present, but stunted and lower stature than emergent plants

Common Species

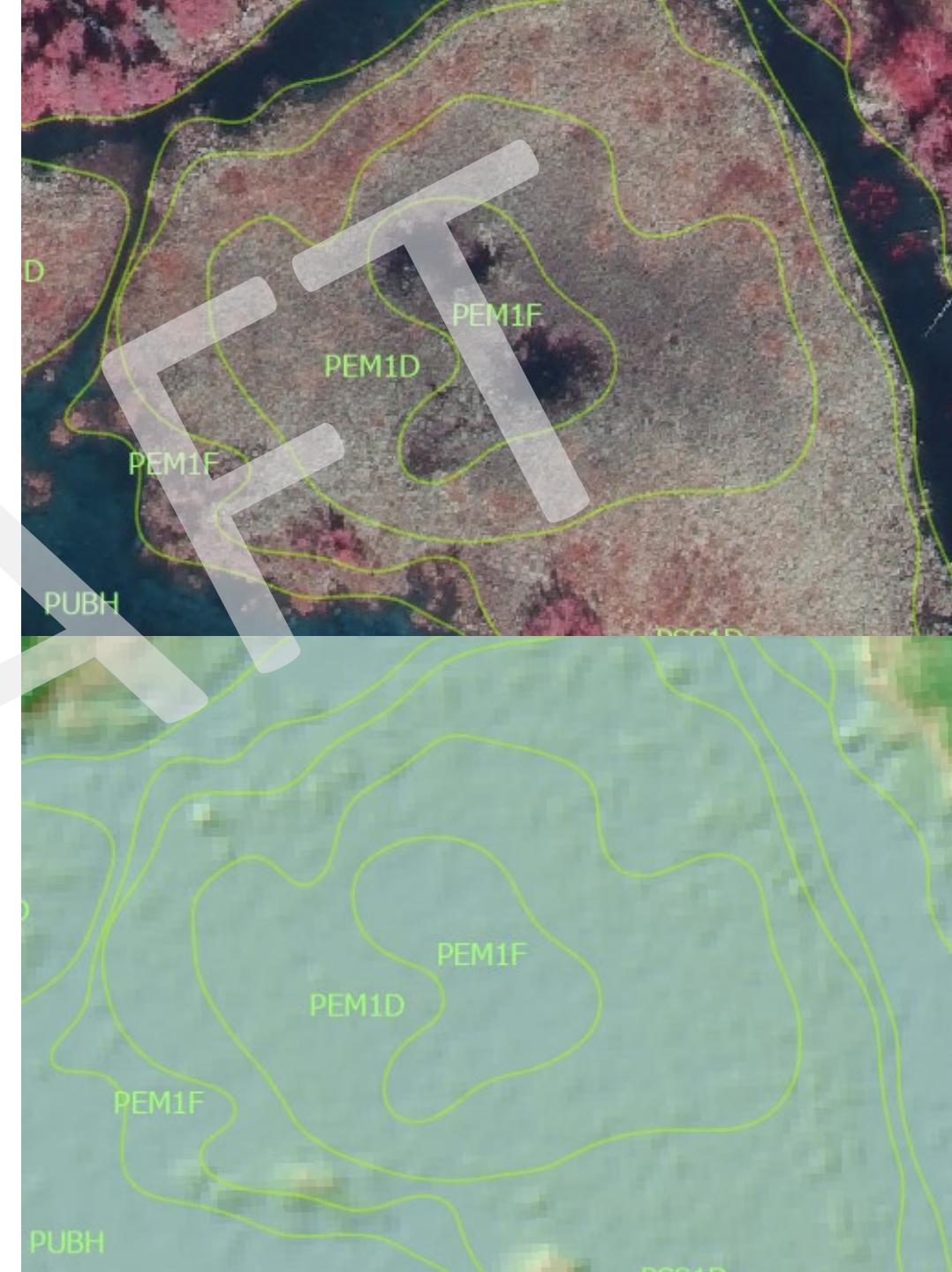
Bluejoint grass, marsh five finger, sedges (*Carex spp.*), sphagnum moss (*Sphagnum spp.*), *Equisetum spp.*, birch shrubs or saplings (*Betula spp.*), blueberry shrubs (*Vaccinium spp.*)

Signature

- Grey color
- smooth texture

Coordinates

149.7248568°W 61.2918668°N



PFO4B

384 occurrences
1132.11 acres

25

Description

- Densely forested with live spruce
- Often border PFO4D as an outer edge to a wetland complex, but also occur in large, isolated swaths.

Common Species

Black spruce (*Picea mariana*), white spruce (*Picea glauca*), bunchberry (*Cornus spp.*), sedges, currant/gooseberry (*Ribes spp.*), *Equisetum spp.*

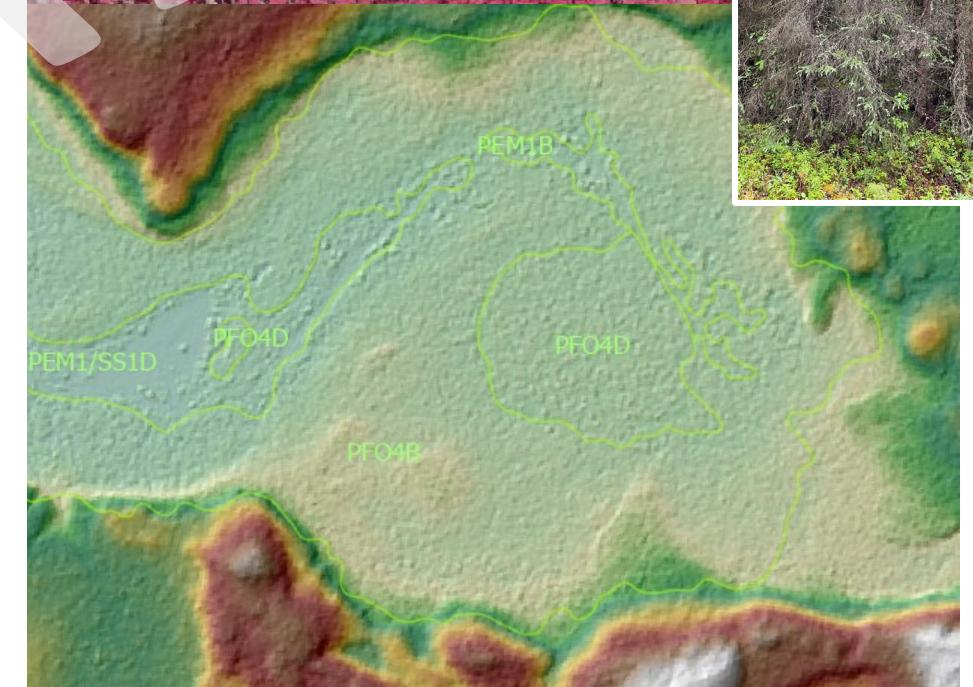
Signature

- Spruce trees are densely packed circles of dark magenta and appear larger than the spruce trees in the PFO4D area
- Understory not visible between the trees
- PFO4B is slightly higher than PFO4D

Coordinates

149.6751829°W 61.3795051°N

Field Photo: 149.6121026°W 61.3771587°N





PSS1D

372 occurrences
627.67 acres

26

Description

- Areas with wetland shrubs and obvious saturation or pockets of standing water
- Often associated with larger wetland complexes which contain multiple wetland types, particularly bogs and fens.

Common Species

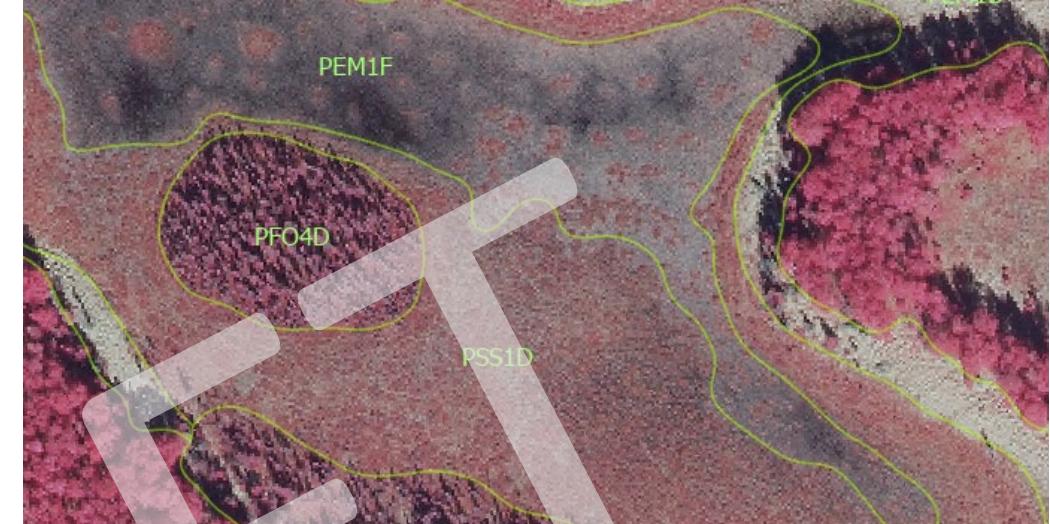
Labrador tea (*Rhododendron spp.*), sweet gale (*Myrica gale*), leatherleaf (*Chamaedaphne calyculata*), bog-rosemary (*Andromeda polifolia*), dwarf birch (*Betula nana*)

Signature

- Lighter speckled with tan and dark patches
- Texture rough overall
- Lowest part of the depression with the PEM1F area

Coordinates

149.7689739°W 61.2745514°N





PEM1B

360 occurrences
213.45 acres

27

Description

- Dominated by bluejoint grass
- Hydrology moist with organic soils, without standing water during the growing season
- Generally along edges of wetland complexes as transition zones to upland areas, in isolated areas in depressions or on mild slopes, or as connective areas between other wetland types

Common Species

Bluejoint grass

Signature

- Tan in color and smooth texture
- Area is situated in a depression.

Coordinates

149.7918661°W 61.2760635°N





PSS4D

292 occurrences
478.78 acres

28

Description

- Inundated areas that cause black spruce to grow short and stunted
- Complete saturation and/or standing water common along with sphagnum mats and organic soils
- Often occur in bog/fen wetland complexes

Common Species

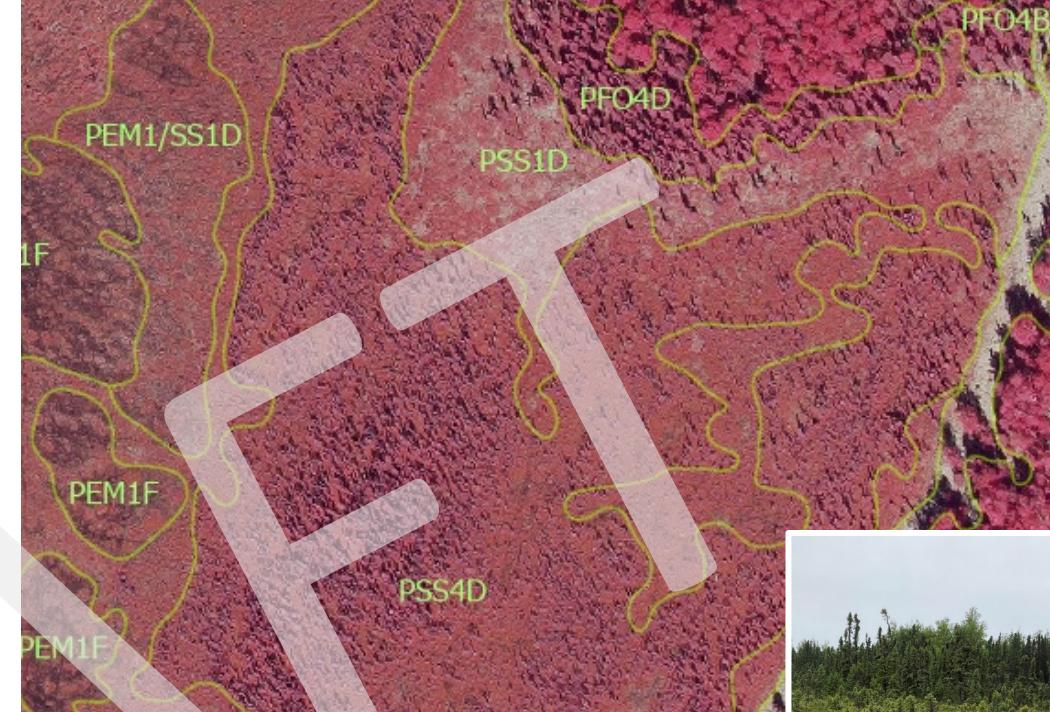
Black spruce, sedges, dwarf birch, labrador tea, sweet gale

Signature

- Very rough textured with dark magenta “triangles” above smoother lighter-colored understory
- Mildly elevated compared to adjacent wetlands with microtopography
- Overall area is in a large depression

Coordinates

149.6125148°W 61.3745309°N





PEM1F

284 occurrences
173.26 acres

29

Description

- Obvious surface water or complete saturation
- Often found near permanently flooded or saturated areas, generally in the middle of wetland complexes

Common Species

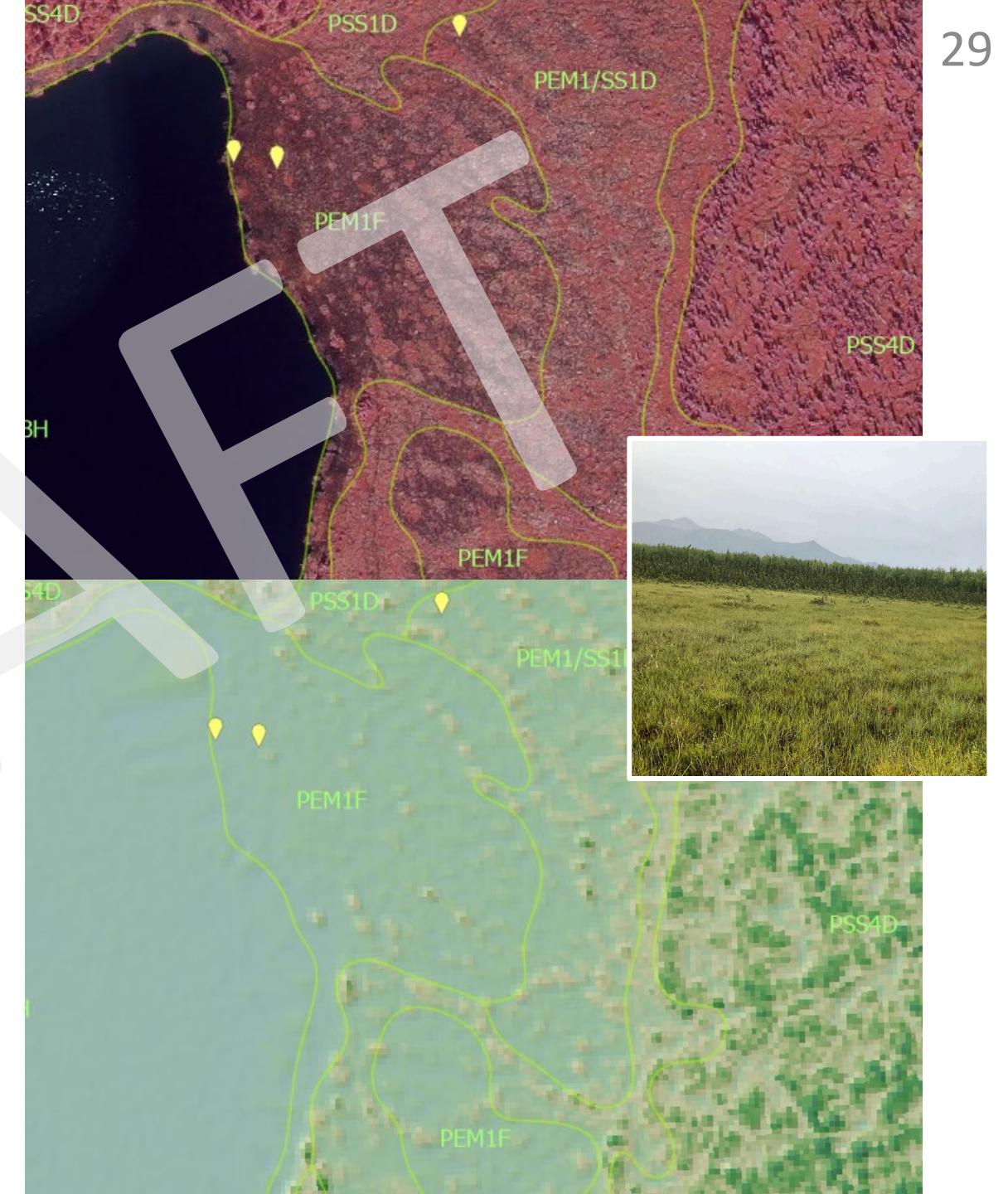
Cotton-grass (*Eriophorum spp.*), sedges, marsh five finger, sphagnum moss, buck-bean (*Menyanthes trifoliata*), sweet gale, leatherleaf

Signature

- Dark area with smooth texture and pink mottles, adjacent to various other wetland types/textures
- Occurs in patches with lowest elevation.

Coordinates

149.6144798°W 61.3750751°N



PFO4D

182 occurrences
293.13 acres

Description

- Black spruce forests with thinner and shorter trees, suggesting growth limits from wetter hydrology
- Occur in smaller swaths than PFO4B, generally bordering wetland complexes at low elevation
- Sphagnum moss grows in the valleys of microtopography, soils are organic, and there is little white spruce

Common Species

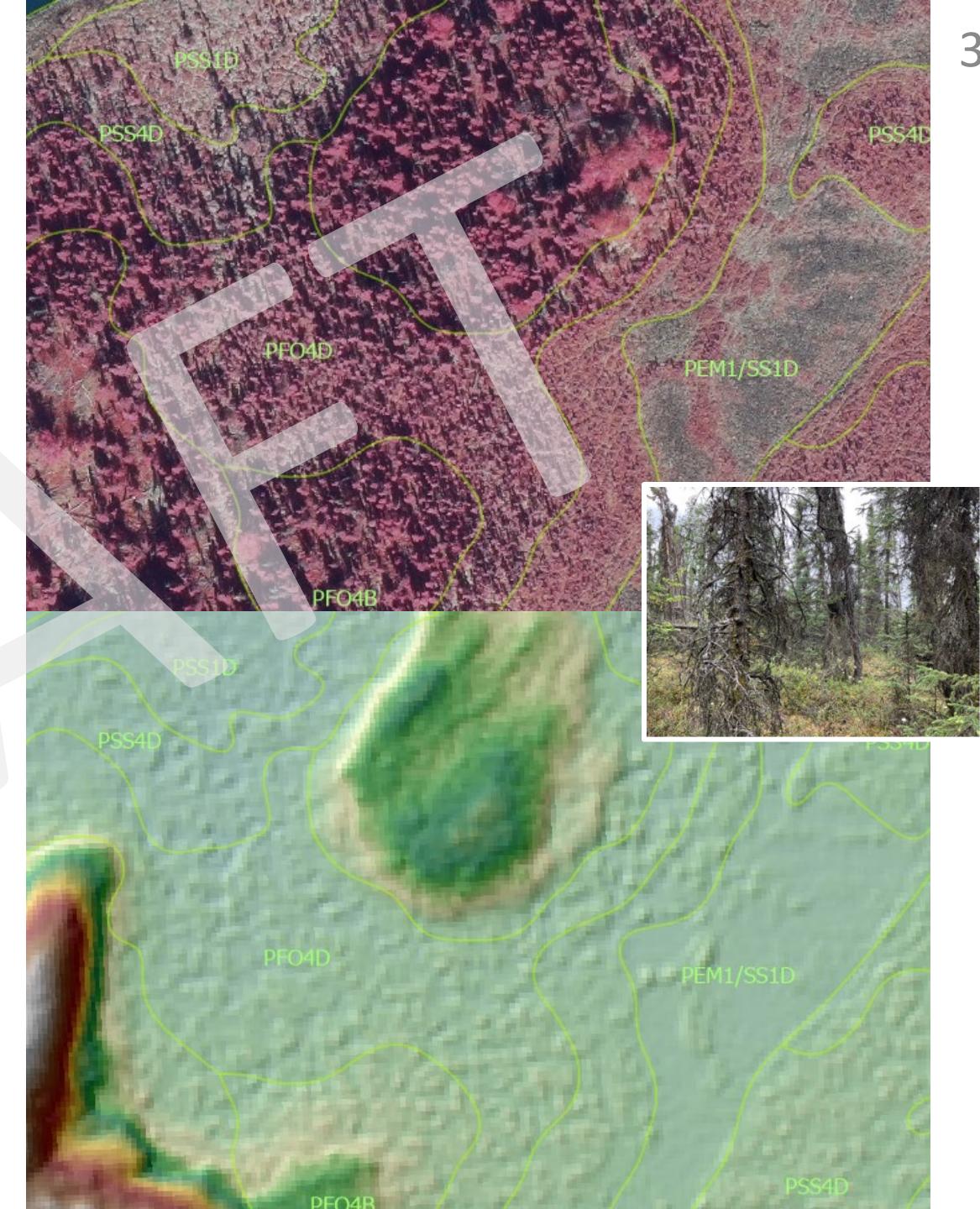
Black spruce, Labrador tea, bunchberry, sedges, currant/gooseberry, *Equisetum spp.*

Signature

- Smaller black spruce trees with light magenta understory similar to PSS1D signature
- PFO4D connects other wetland types with “D” water regime
- Trees appear taller than those in PSS4D signature.

Coordinates

149.8169190°W 61.2823616°N



114 occurrences
162.88 acres

Description

- Non-vegetated wetlands smaller than 20 acres (ponds)
- May have small pockets of vegetation or aquatic beds that are either not visible in the imagery or do not reach 30% cover across the mapping unit

Common Species

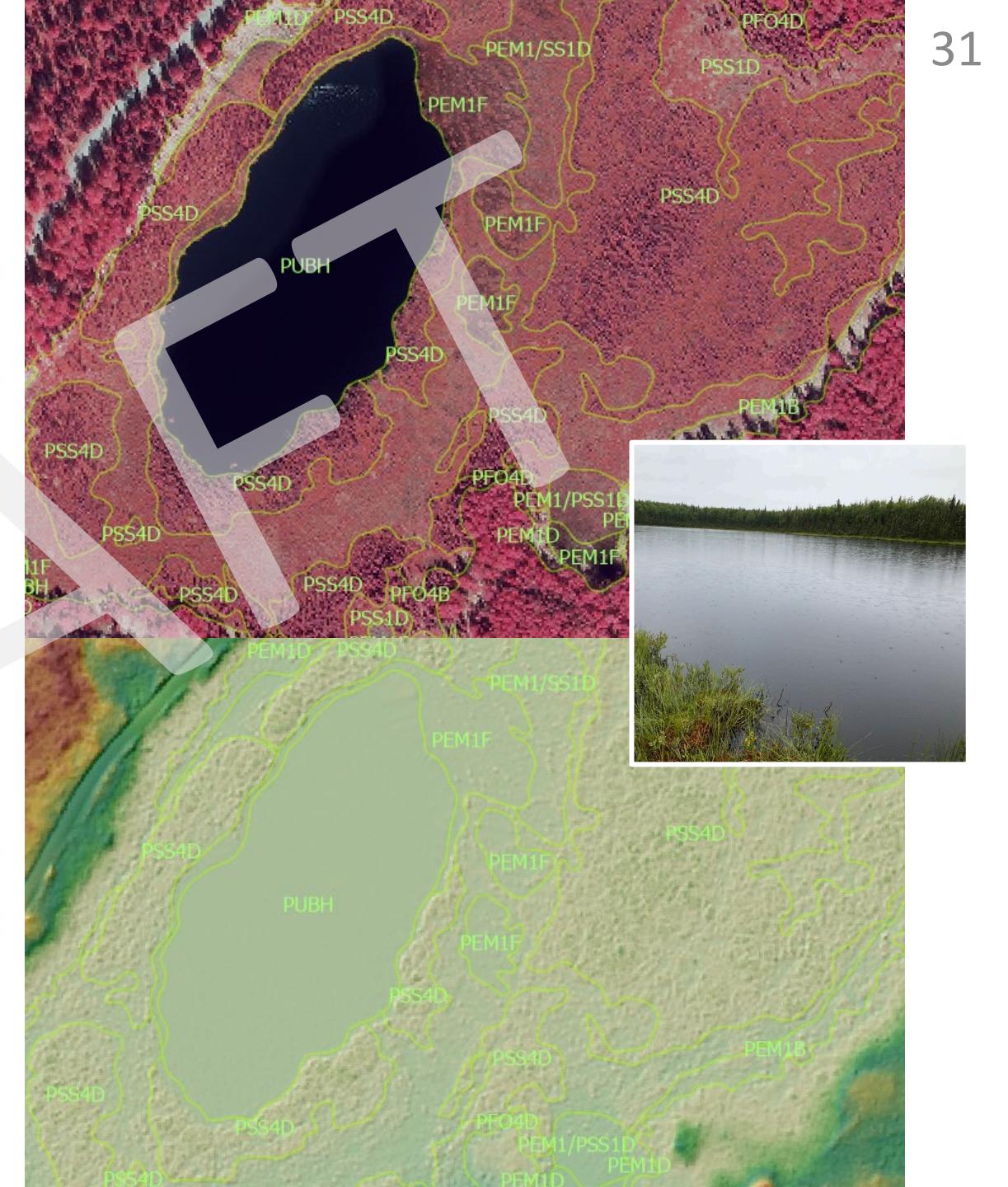
Predominately unvegetated, but sporadic obligate species may be present.

Signature

- PUBH area is a large dark oval area
- Imagery matches the smooth, lowest elevation area in LiDAR

Coordinates

149.6159323°W 61.3742543°N



PSS1B

110 occurrences
193.68 acres

32

Description

- Scrubby and often border uplands
- Inclusion informed by prior mapping, elevation data, and association with other wetlands

Common Species

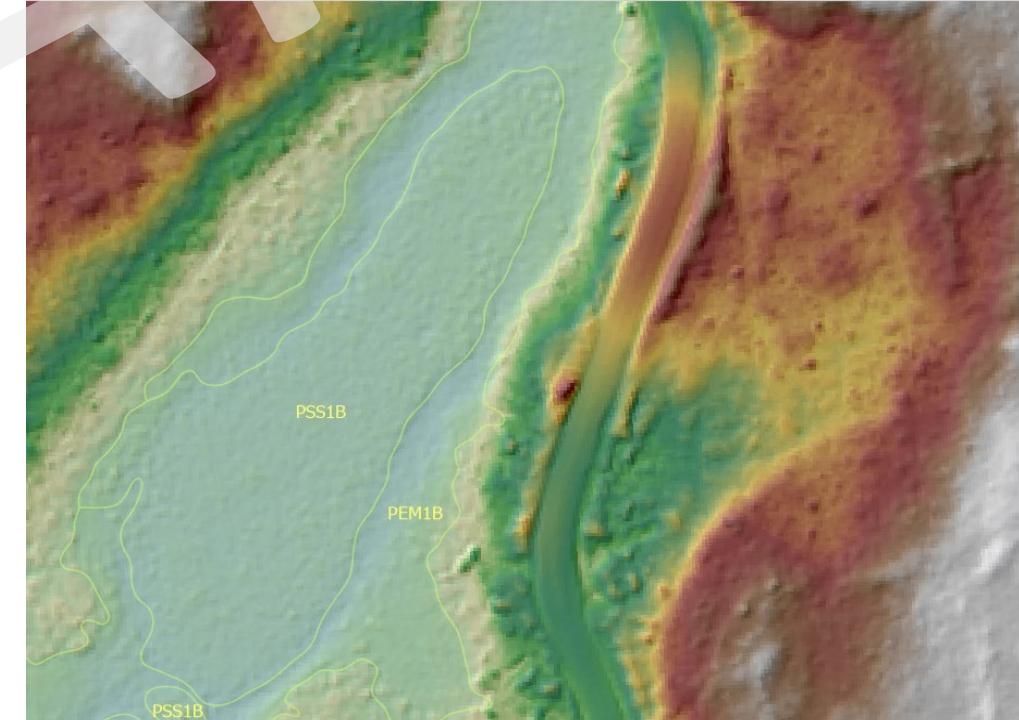
Dwarf birch, Alaska paper birch (*Betula neoalaskana*, stunted),
Labrador tea, blueberry shrubs, sedges, bluejoint grass

Signature

- Rough textured from scrubby vegetation
- light pink and tan in color
- Slightly elevated in the middle of a depression which contains other wetlands.

Coordinates

149.6016671°W 61.3758199°N





PEM1C

98 occurrences
23.73 acres

33

Description

- Show signs of flooding in current imagery, but historical imagery showed varying flood state, revealing underlying vegetation
- Generally associated with small depressions along the edges of bluejoint grass fields.

Common Species

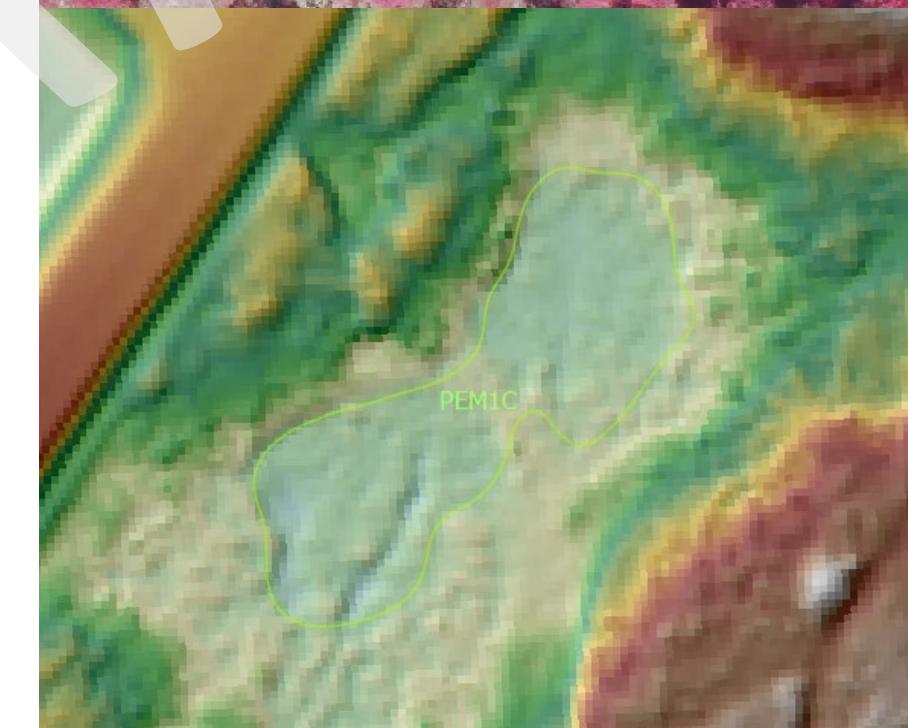
Bluejoint grass

Signature

- Very dark smooth texture from standing water, with speckles of tan grass.

Coordinates

149.8300017°W 61.2783189°N

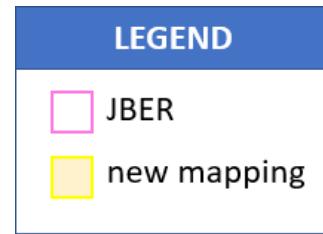


Specific Cases



Copying in below TMU

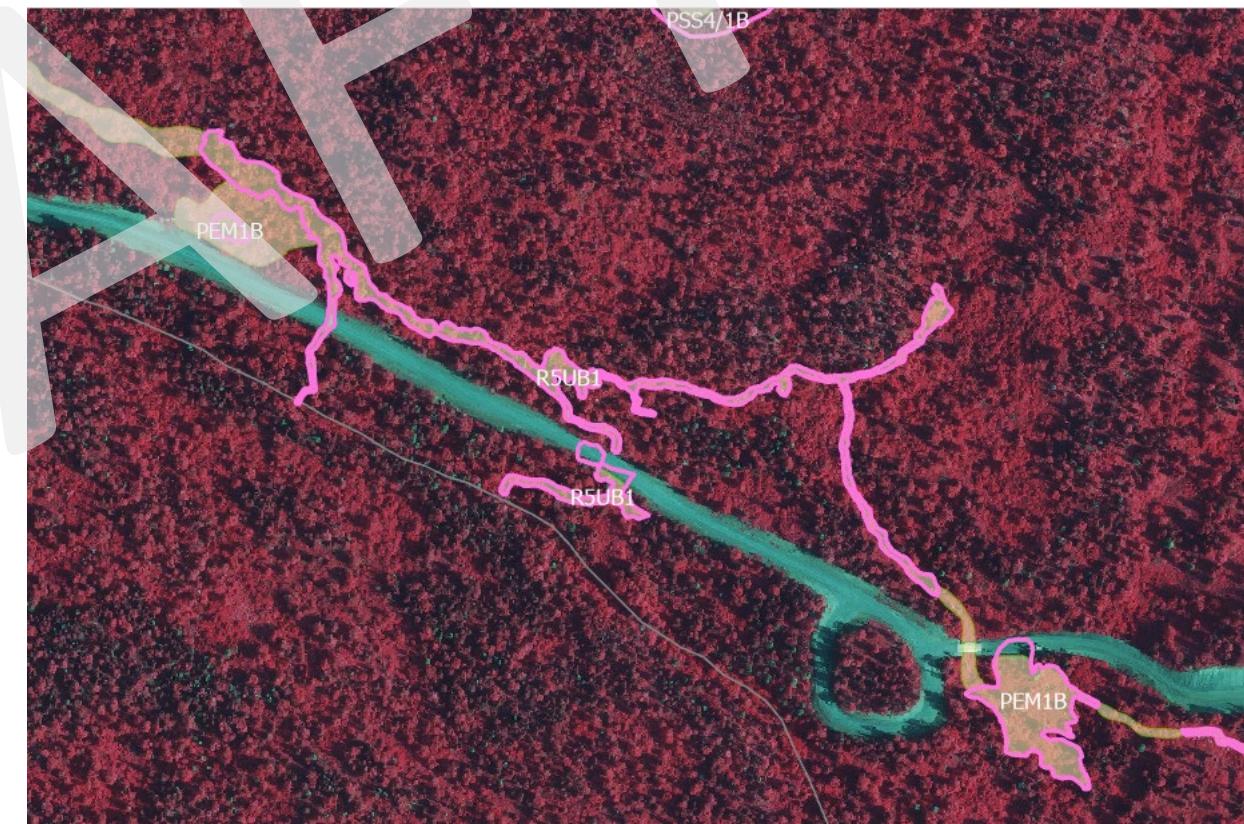
Some areas were directly copied in because prior mapping was done below the TMU for this project



Alpine wetlands

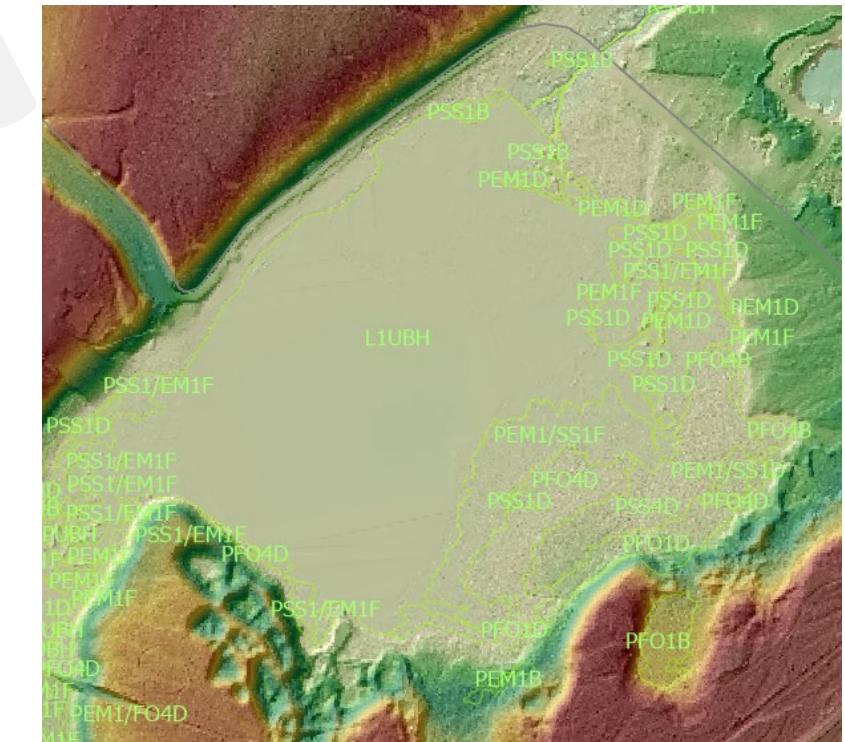
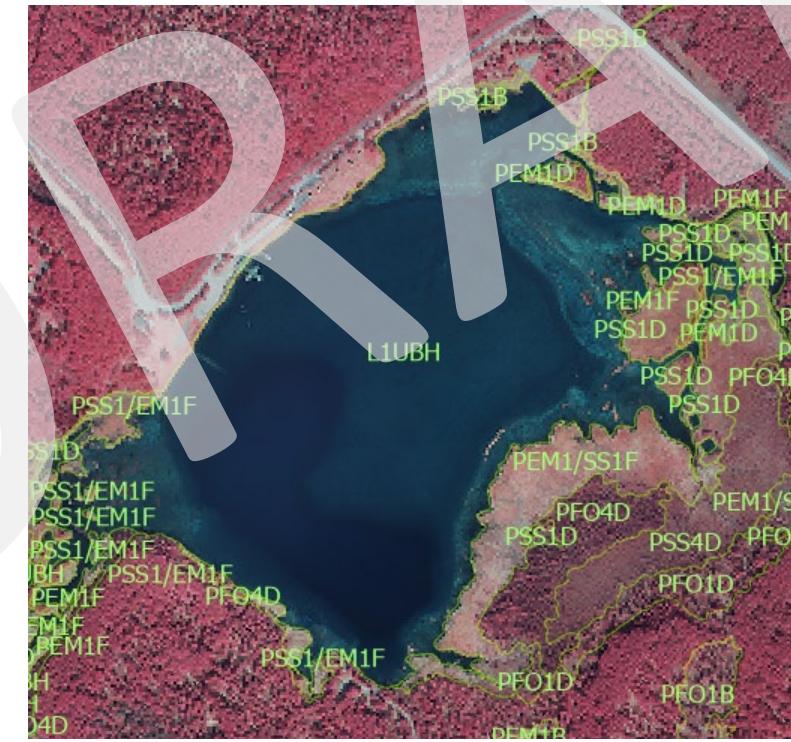
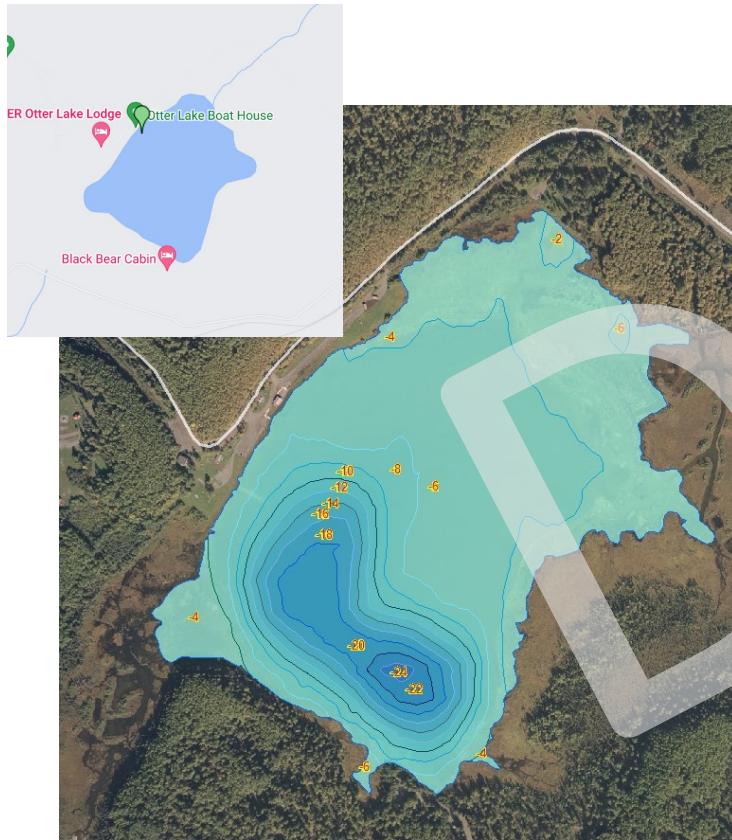


Prior JD

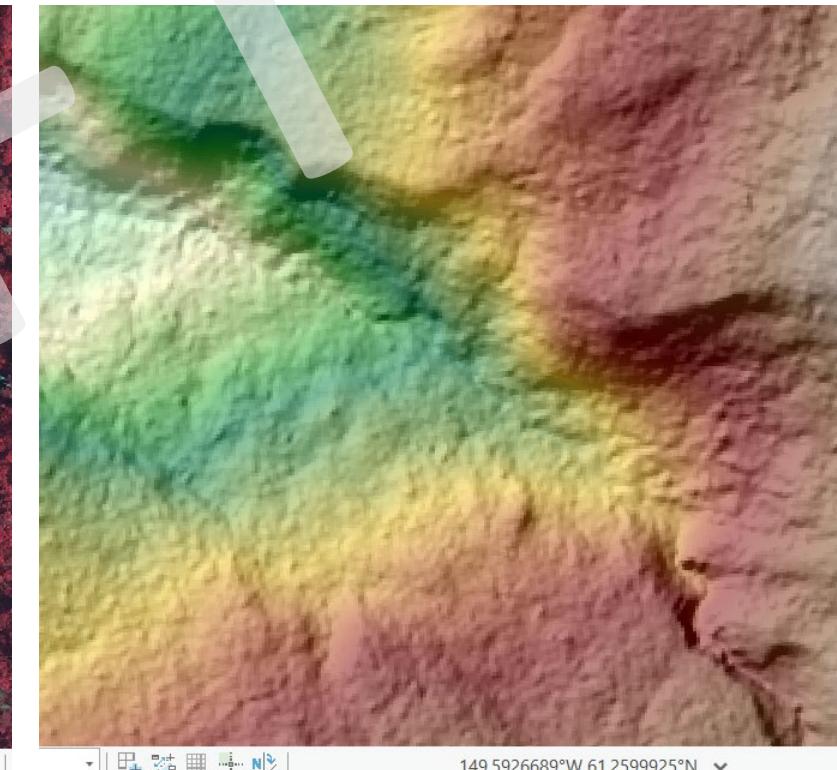


Lacustrine Areas - Limnetic or Littoral?

Data from the Alaska Lake Database (http://www.adfg.alaska.gov/SF_Lakes/) informed whether lacustrine areas were above or below the 2.5 meter cutoff for limnetic (above) vs. littoral (below) classification.



Wetlands not visible in imagery

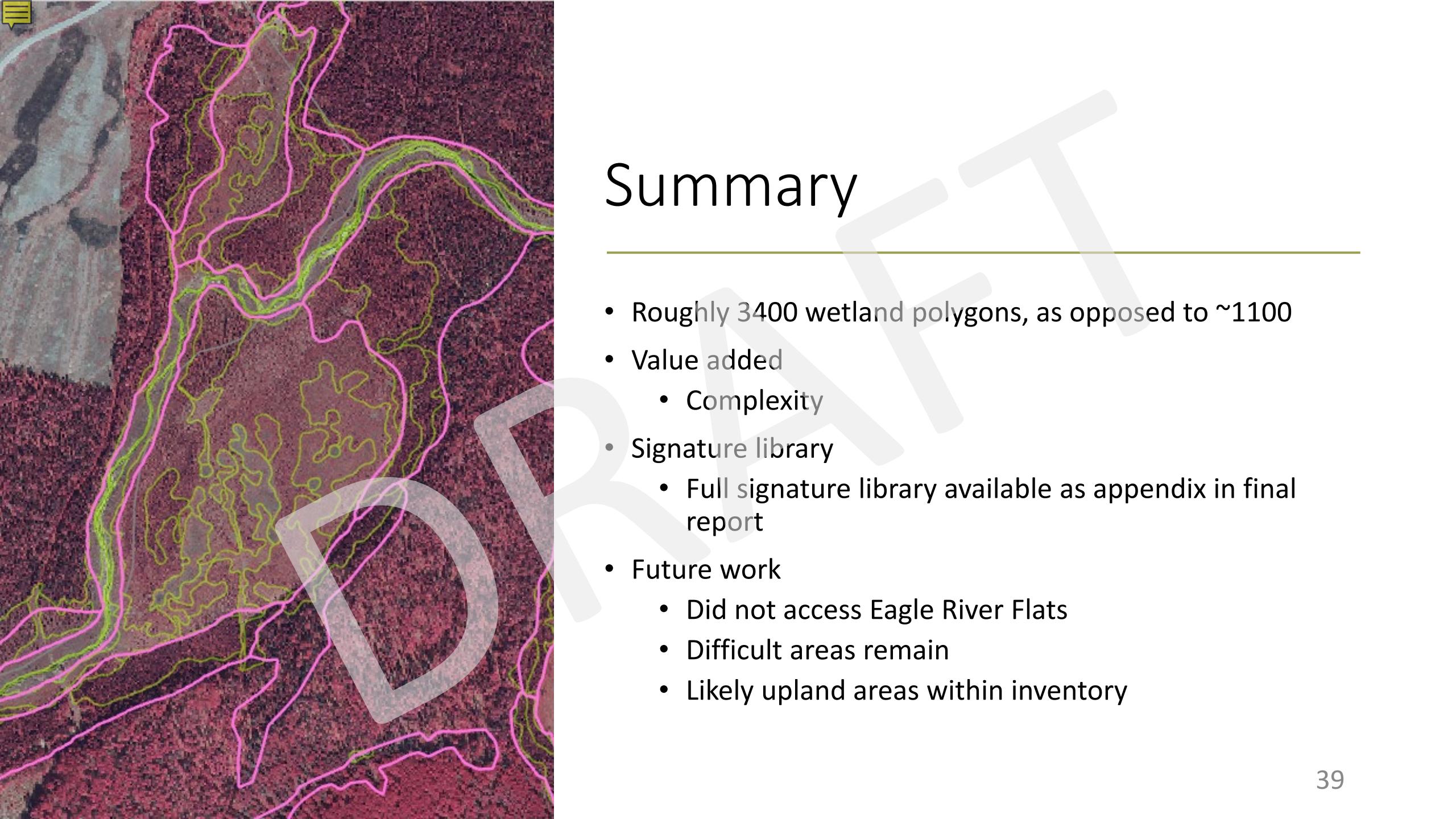


Future Work

- Eagle River Flats
- Alpine
- Difficult PFO4B areas

This inventory defaulted to assigning areas that met certain photo interpretive characteristics as wetlands— it is likely on the ground determinations will find upland areas, especially in the B water regimes, or wetlands that were not captured





Summary

- Roughly 3400 wetland polygons, as opposed to ~1100
- Value added
 - Complexity
- Signature library
 - Full signature library available as appendix in final report
- Future work
 - Did not access Eagle River Flats
 - Difficult areas remain
 - Likely upland areas within inventory

