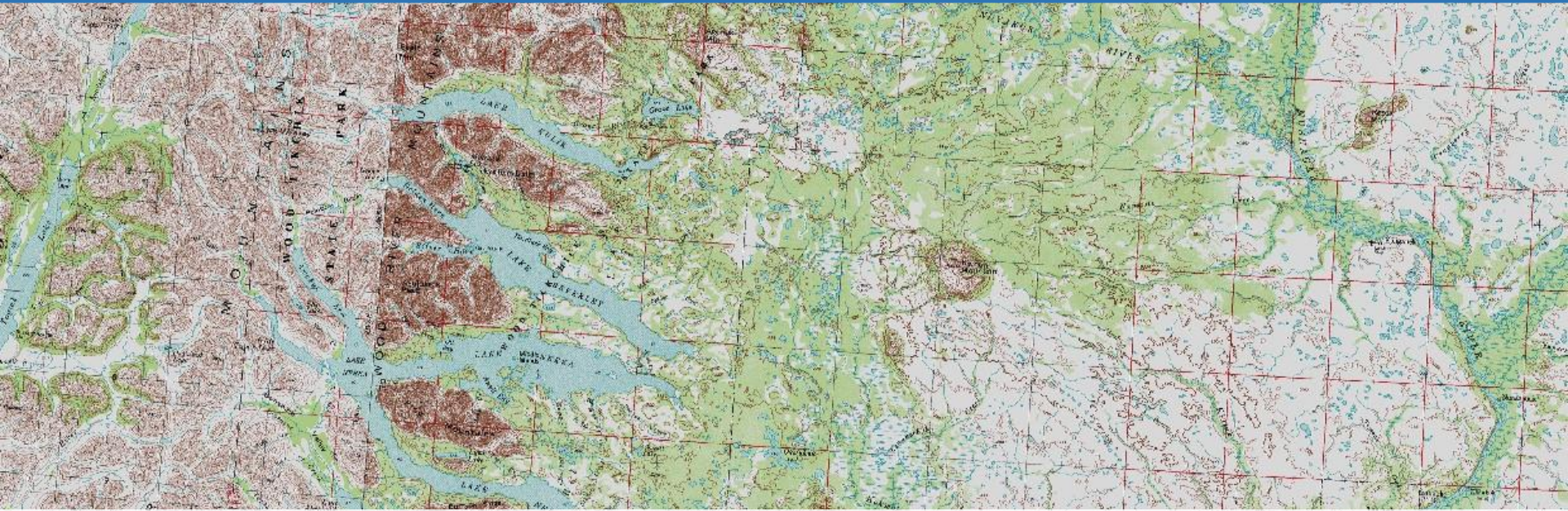


# MAPPING ALASKA'S WATER

## THE ALASKA HYDROGRAPHY DATABASE



April 28, 2016

**Interagency Hydrology Committee for Alaska**  
Anchorage, AK

**Kacy Krieger**  
[kekrieger2@uaa.alaska.edu](mailto:kekrieger2@uaa.alaska.edu)  
AK Hydrography Coordinator  
AHTWG Co-Chair





# ALASKA'S WATER

---

> 3,000,000  
Mapped Lakes and Ponds

---

> 892,000  
Length of Mapped Streams and Rivers in miles

---

44,000  
Length of Mapped Coastline in miles

---

1,980  
Length of the longest river, the Yukon, in miles

---

616  
Named Glaciers

---

40%  
Share of the Nation's Surface Water

# Background

## Why we need to update Alaska's Hydrography

- The National Hydrography Dataset (NHD) represents the surface waters of the United States
- Out of date for Alaska- source data from 1940's era aerial photographs
- In Alaska, the NHD contains a variety of errors and misrepresentations
- Separate agencies also hold a variety of hydrography datasets

# ALASKA HYDROGRAPHY TECHNICAL WORKING GROUP

---

**Mission:** Supports the maintenance, stewardship, and use of common hydrography datasets for the benefit of all users.

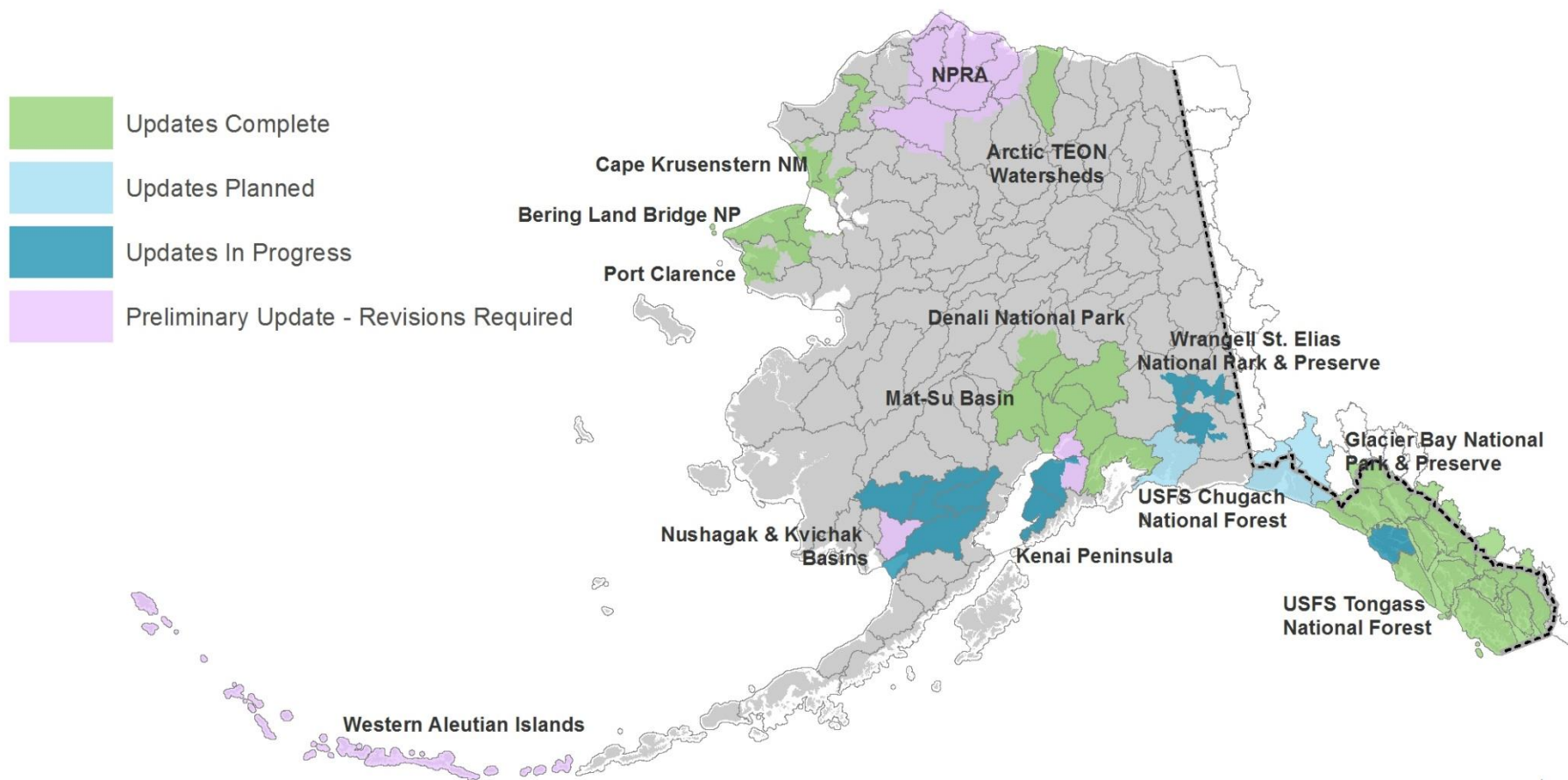
Coordinate on editing and data standards, funding, training, coordination of updates, strategic planning, etc.

Oversees the Alaska Hydrography Database (AK Hydro), a collaborative data editing and updating system.



# Current Hydrography Status

complete • ongoing • planned



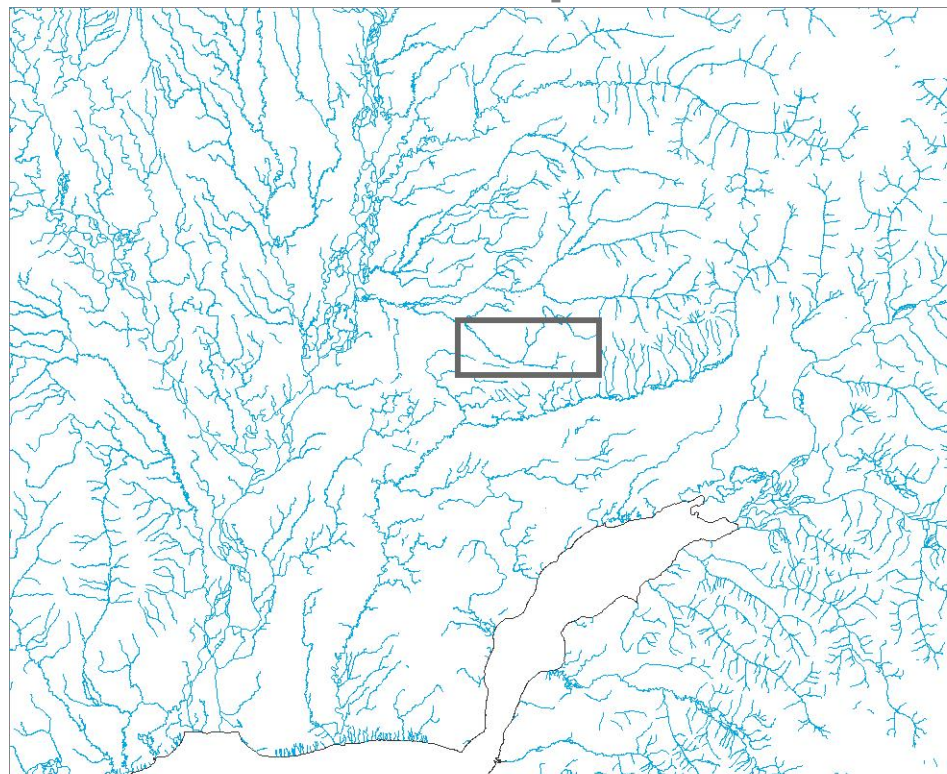
\* Update status current as of April 1, 2016. Does not include ongoing maintenance by USGS NHD Program.  
For more information, contact Kacy Krieger, Alaska Hydrography Coordinator, (907) 786-7749, [kekrieger2@uaa.alaska.edu](mailto:kekrieger2@uaa.alaska.edu)

0 250 500 750 Miles

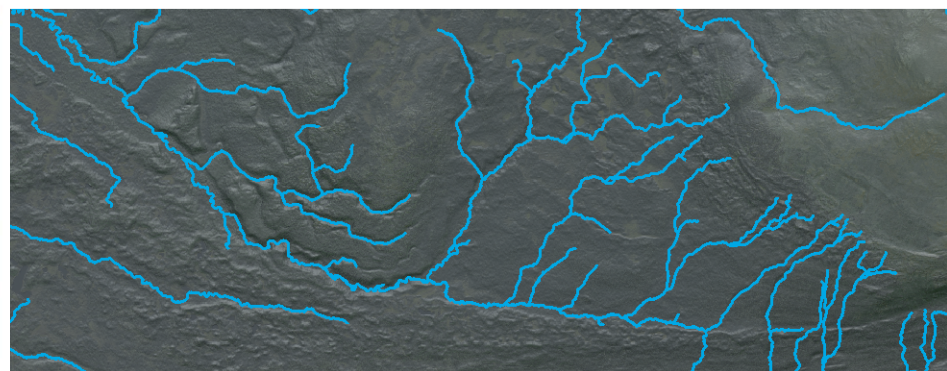
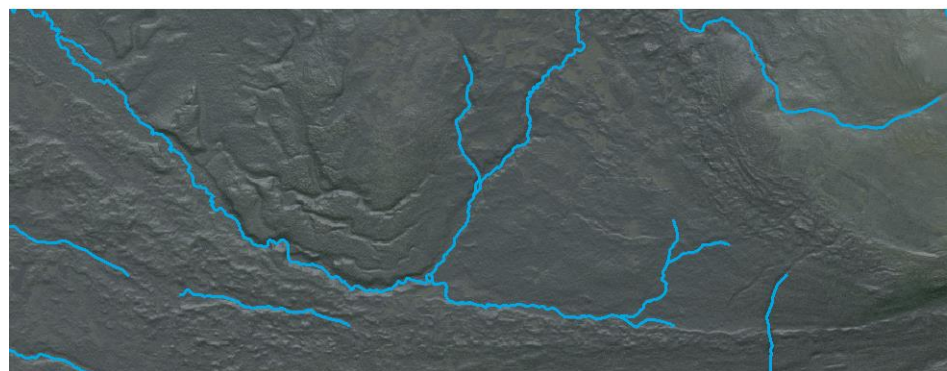
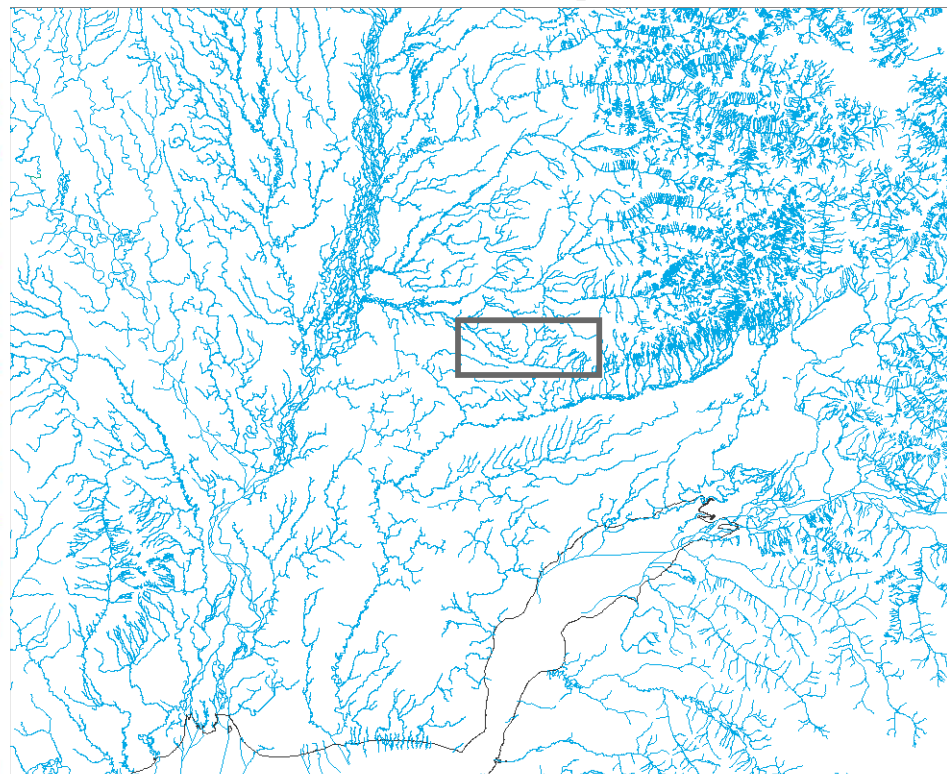


# MAT-SU HYDROGRAPHY UPDATES

**2009: Pre-Updates**



**2015: Post-Updates**





# MAT-SU CULVERT ANALYSIS

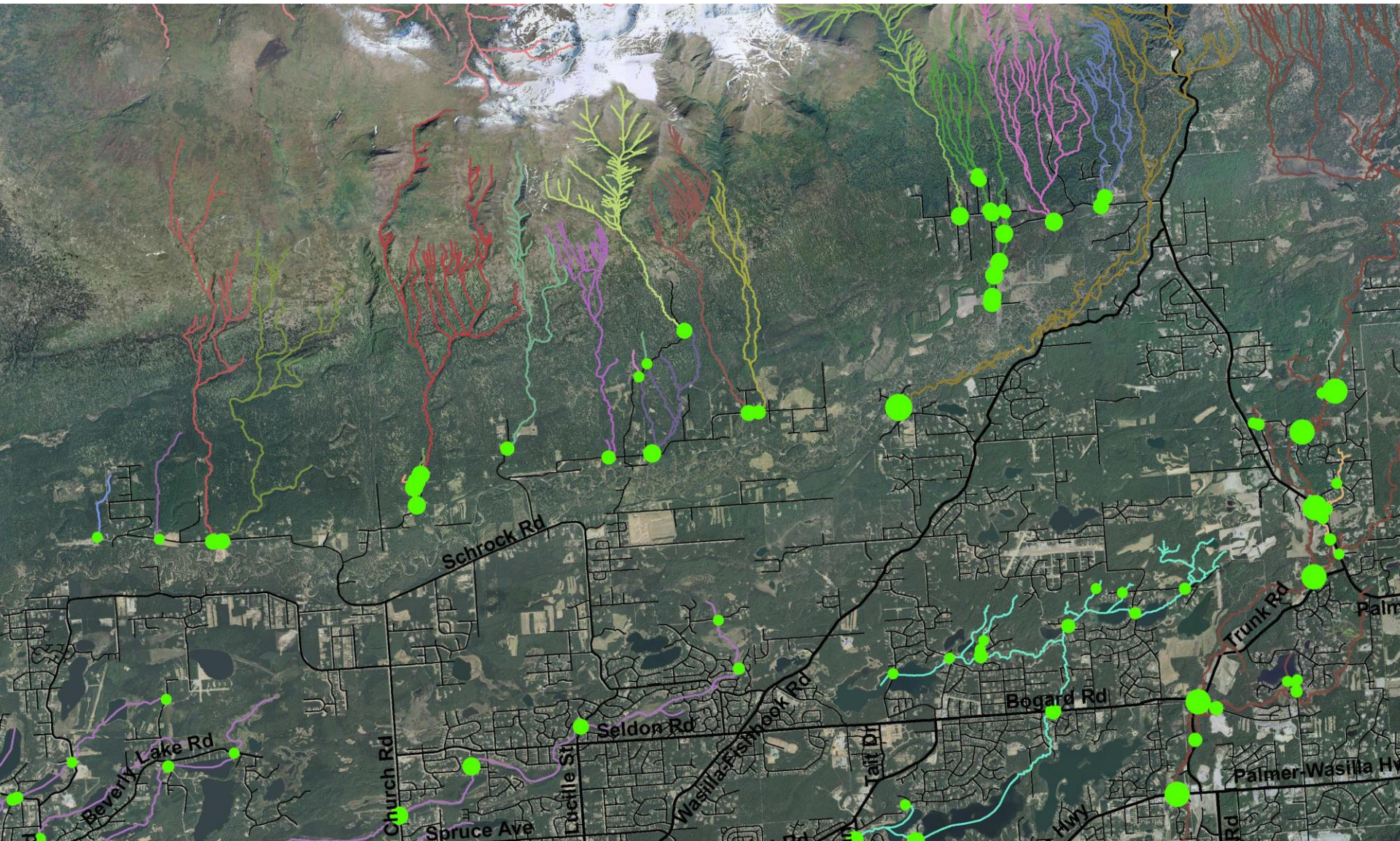


Figure: Jim DePasquale (TNC)



New NHD (light blue lines)

Old NHD

Culvert Site ID 6744. Cumulative upstream length = 15.9 km

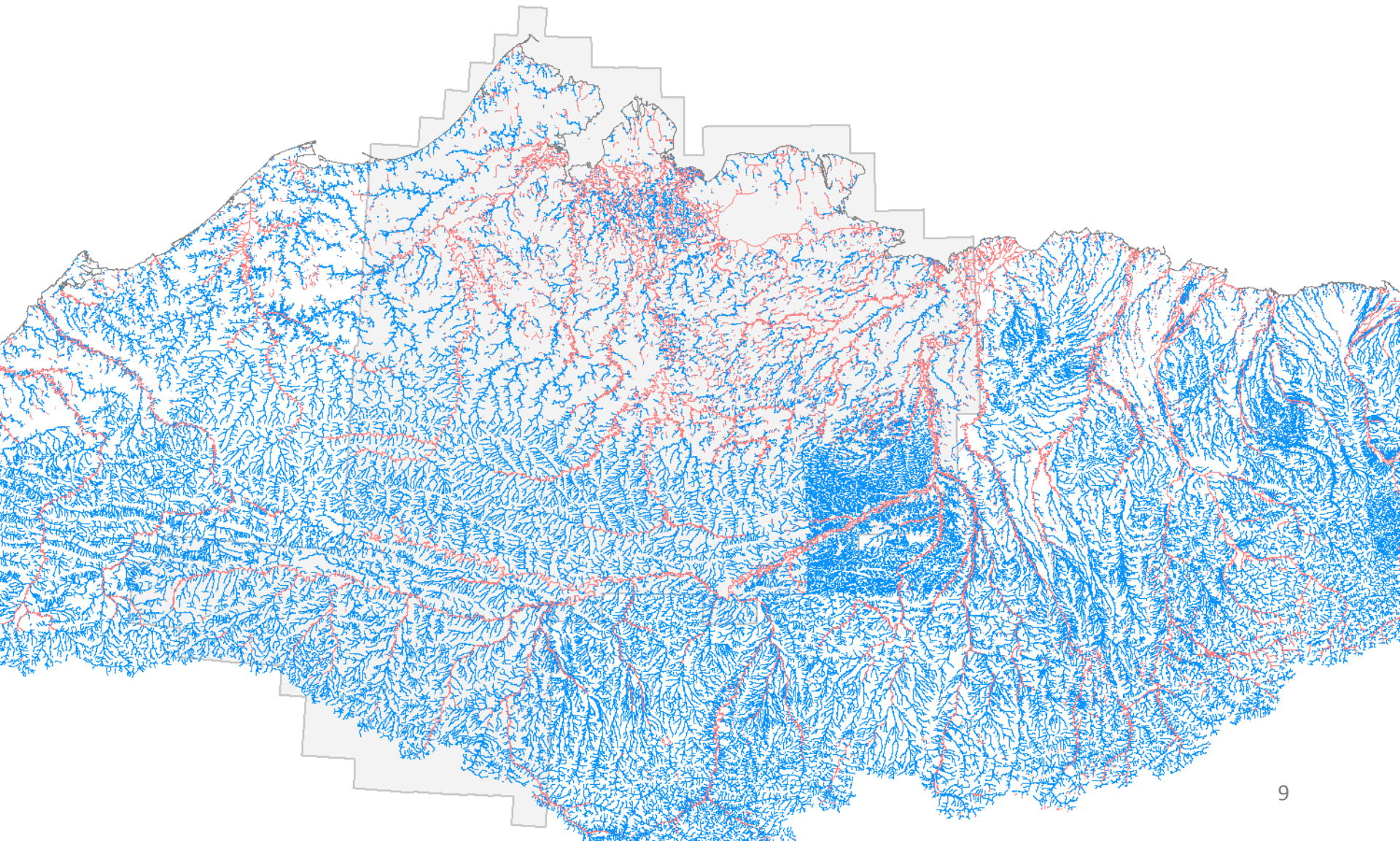
Culvert Site ID 6744. Cumulative upstream length = 264.9 km

Figure: Jim DePasquale (TNC)



# National Hydrography Dataset

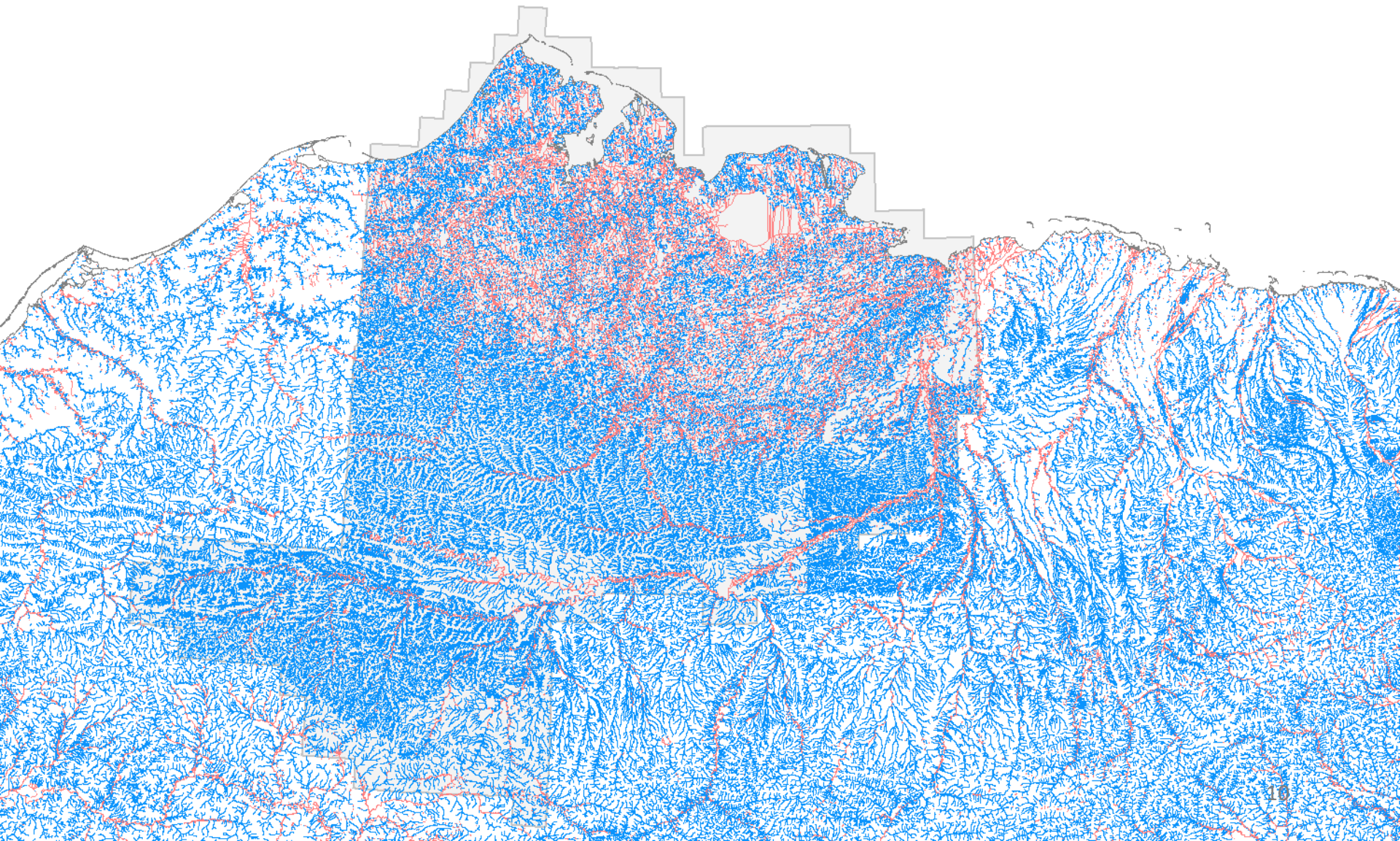
## **NPRA, 2009**





# National Hydrography Dataset

## **NPRA, 2015**



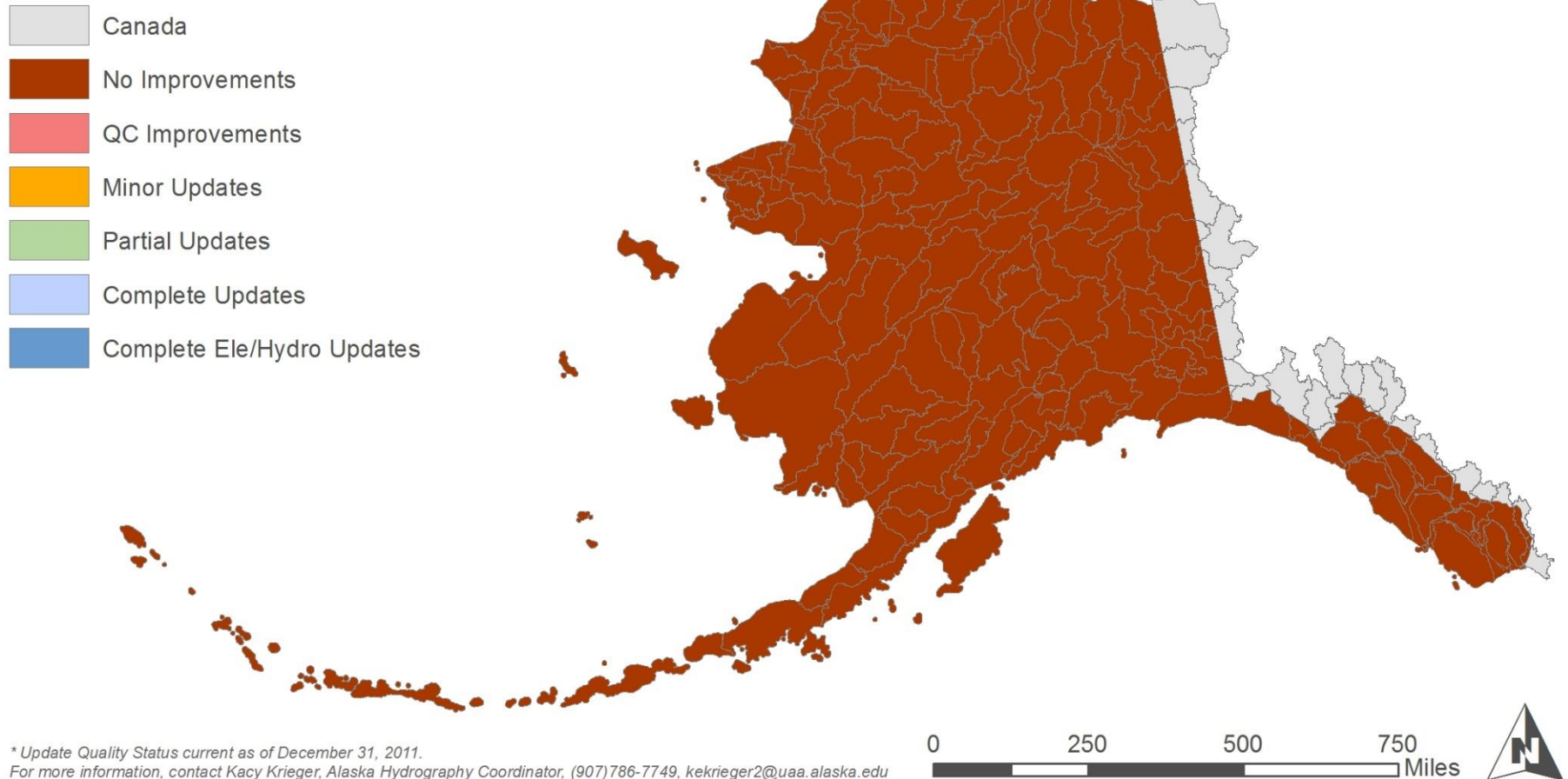


# Alaska NHD Quality Status

Category		Data Status
Incomplete	Canada	No updates to Canadian hydrography
	No Improvements	NHD is in the original 1:63,360 (or pre-AK Hydro) state. Contains numerous errors.
	QA/QC Improvements	Initial updates addressing network issues. Data should pass NHD QA checks.
Complete	Minor Updates	Initial updates addressing geometry updates. Data should pass NHD QA checks.
	Partial Updates	More extensive updates to geometries. Updates to 1D or 2D features, may or may not be densified. Data should pass NHD QA checks.
	Complete Updates	Complete updates to 1D and 2D features, data is densified, complete attributes. Data must pass all NHD QA checks.
	Complete Ele/Hydro Updates	Complete updates to 1D and 2D features, data is densified, complete attributes. Data is integrated/derived from elevation data. Data must pass all NHD QA checks.

# Update Status Prior to AK Hydro

## 2011 AK Hydrography Update Quality

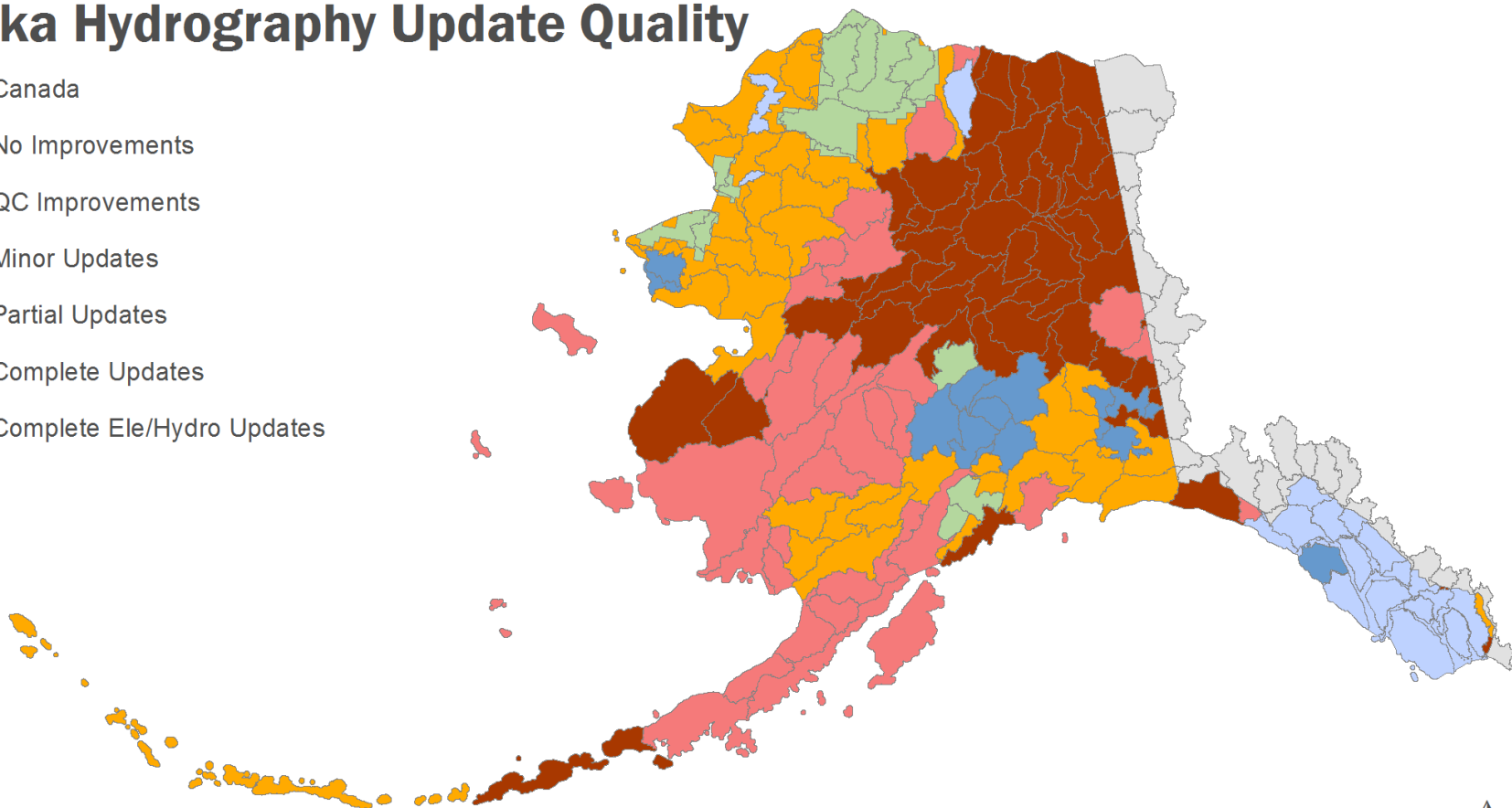
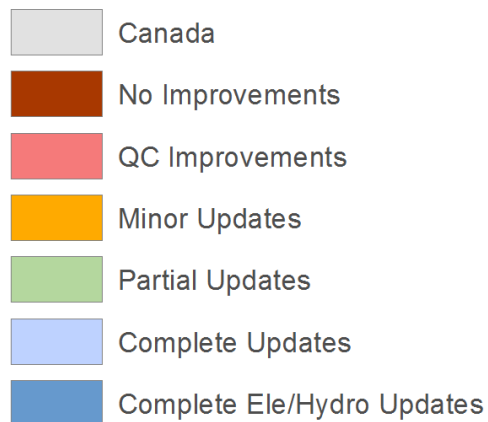




# Update Status

goal of full statewide hydro update

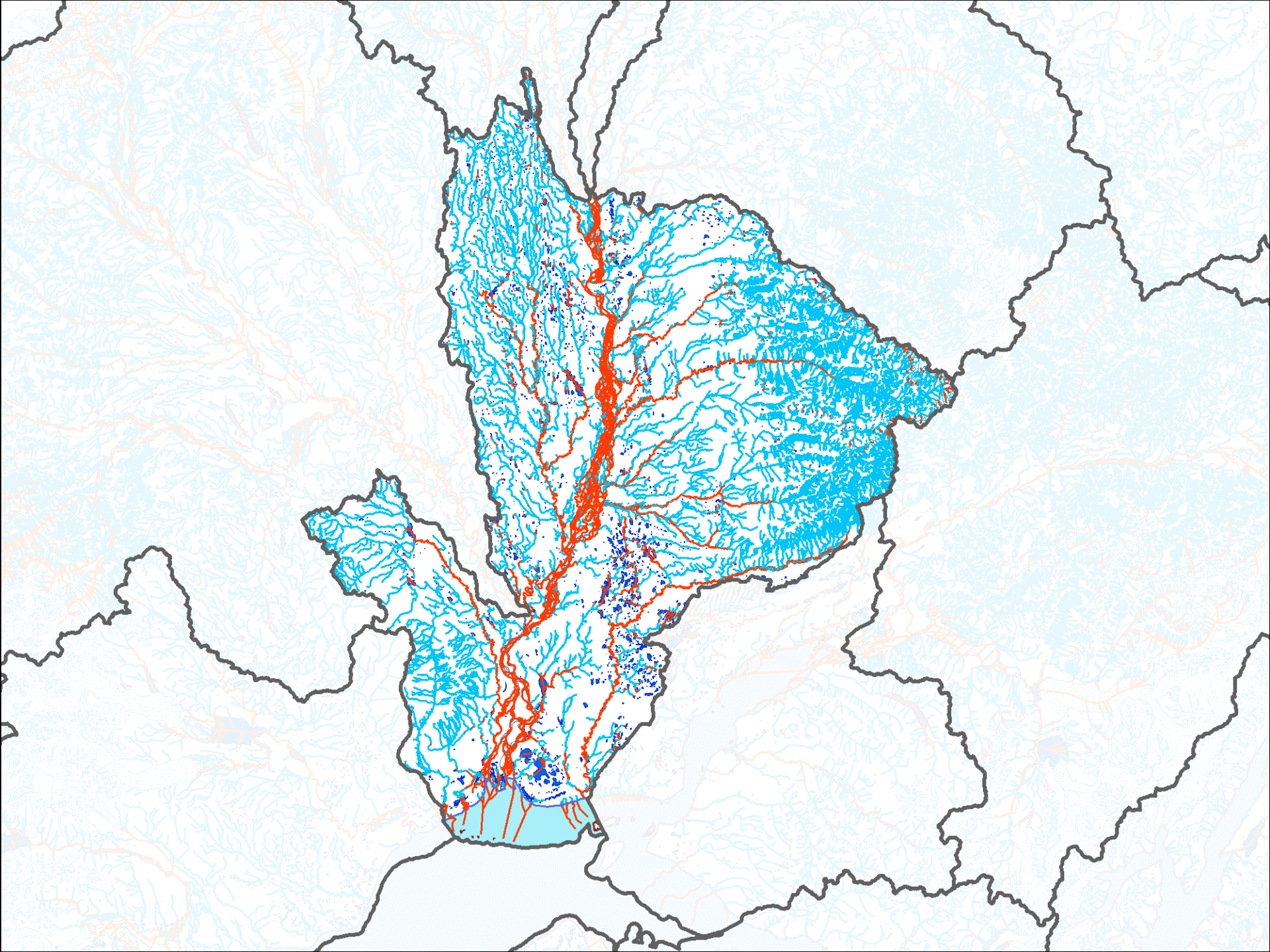
## Alaska Hydrography Update Quality



\* Update Quality Status current as of April 1, 2016.

For more information, contact Kacy Krieger, Alaska Hydrography Coordinator, (907)786-7749, [kekrieger2@uaa.alaska.edu](mailto:kekrieger2@uaa.alaska.edu)









**RIVERS & STREAMS**



**LAKES & PONDS**



**COASTLINE**



**IMPEDIMENTS**

# HYDROGRAPHY

**GLACIERS**



**DIVERSIONS**



**WETLANDS**

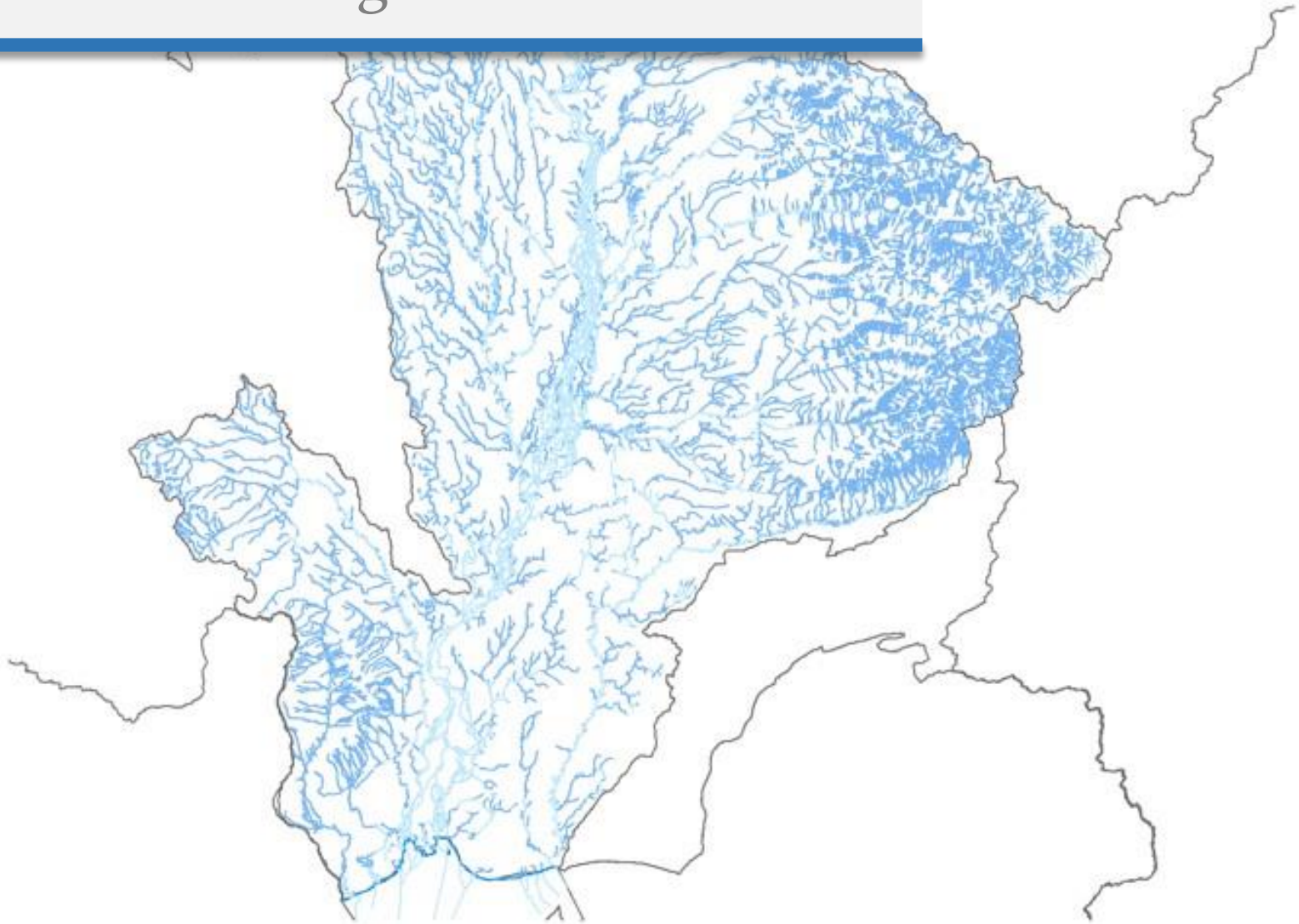


**FLOW NETWORKS**



# MODEL STREAM NETWORK

from high resolution digital elevation data





# COMPARISON

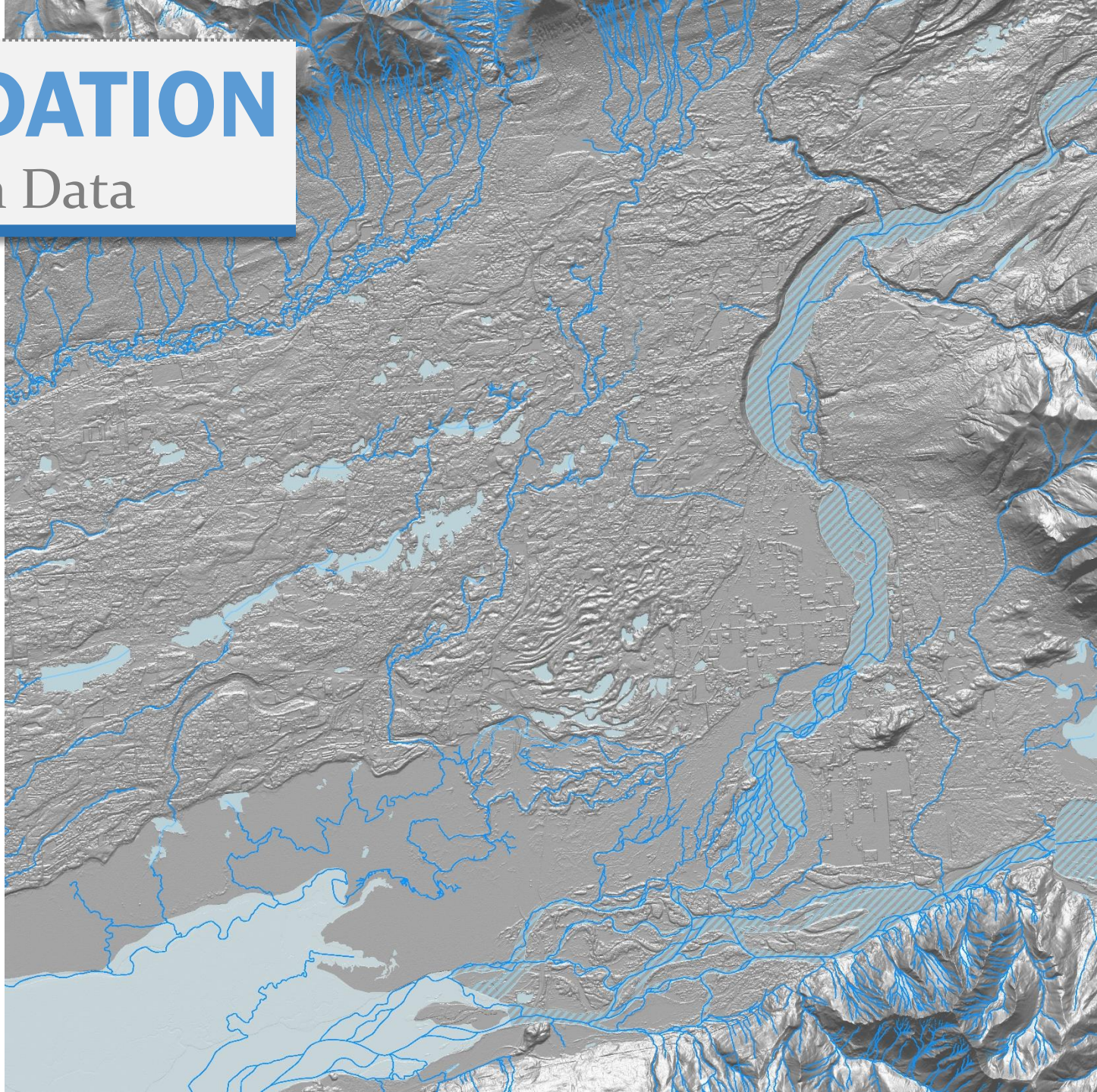
## Historic Data





# VALIDATION

Elevation Data





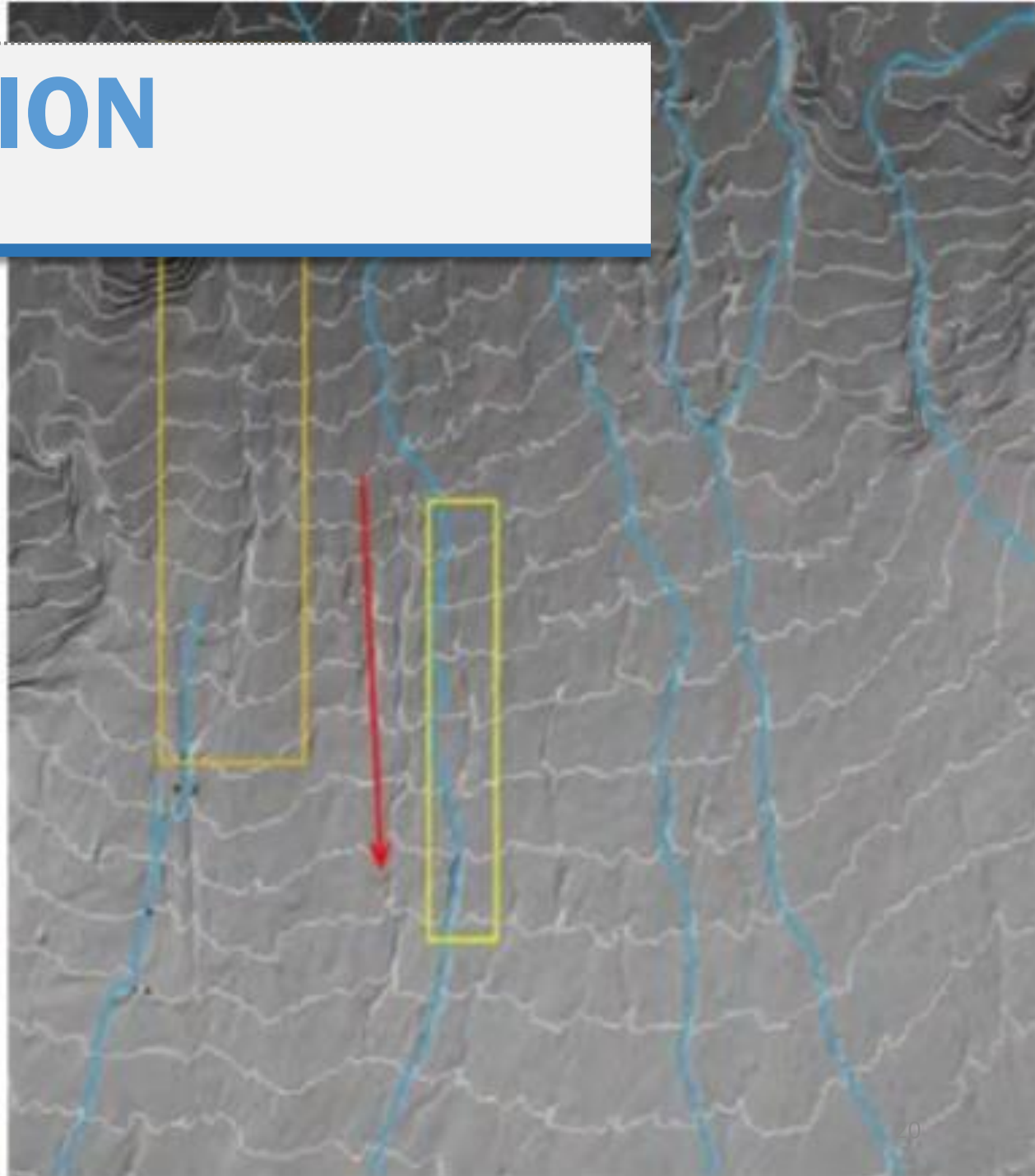
# VALIDATION

## Imagery



# VALIDATION

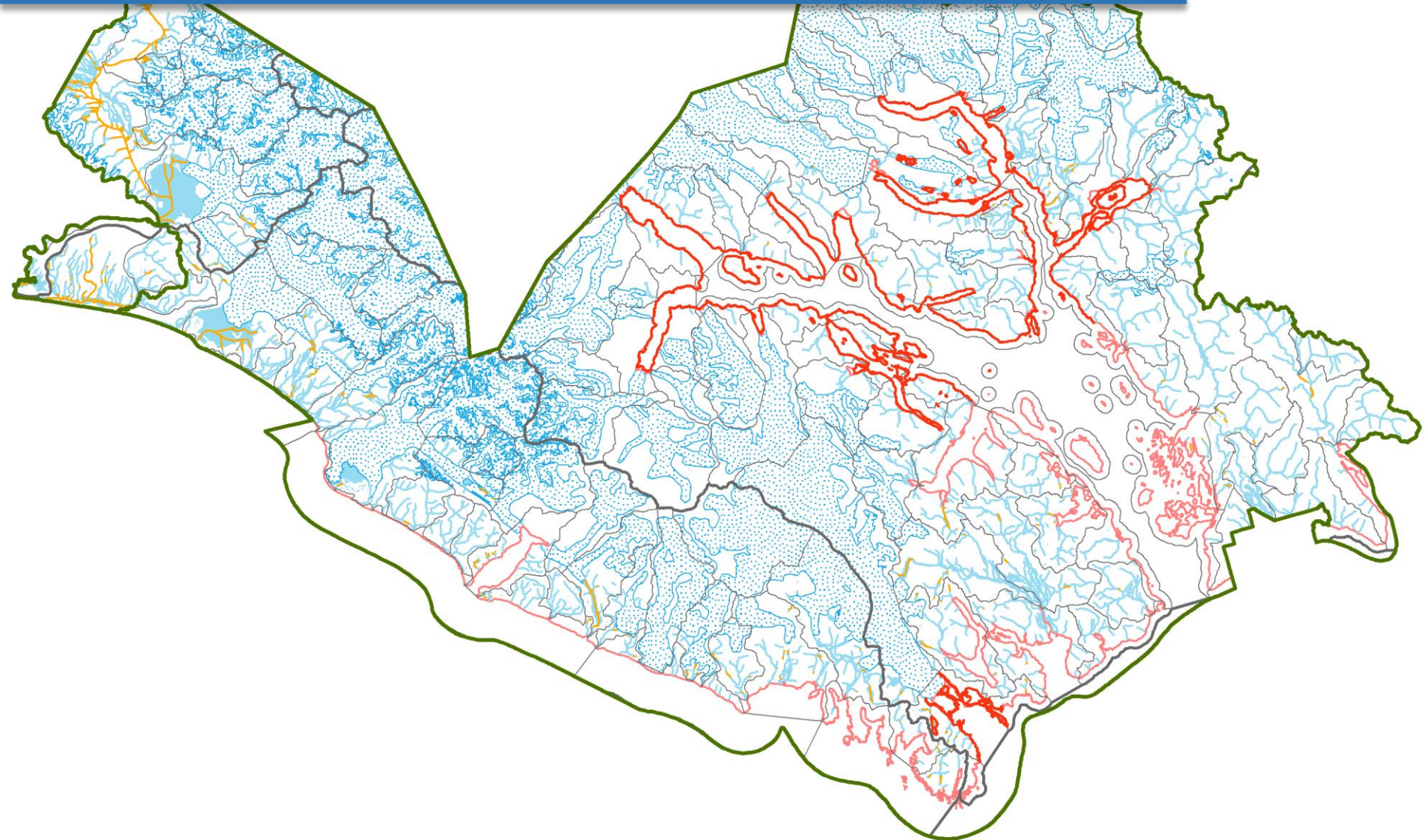
identify errors





# ADDITIONAL FEATURES

Lakes, shoreline, glaciers, etc.



# FIELD VERIFICATION

targeted field site visits





# NETWORK INTEGRITY

identify and correct errors



# ATTRIBUTES

populate with required and additional attributes

Table								
Stream_LN								
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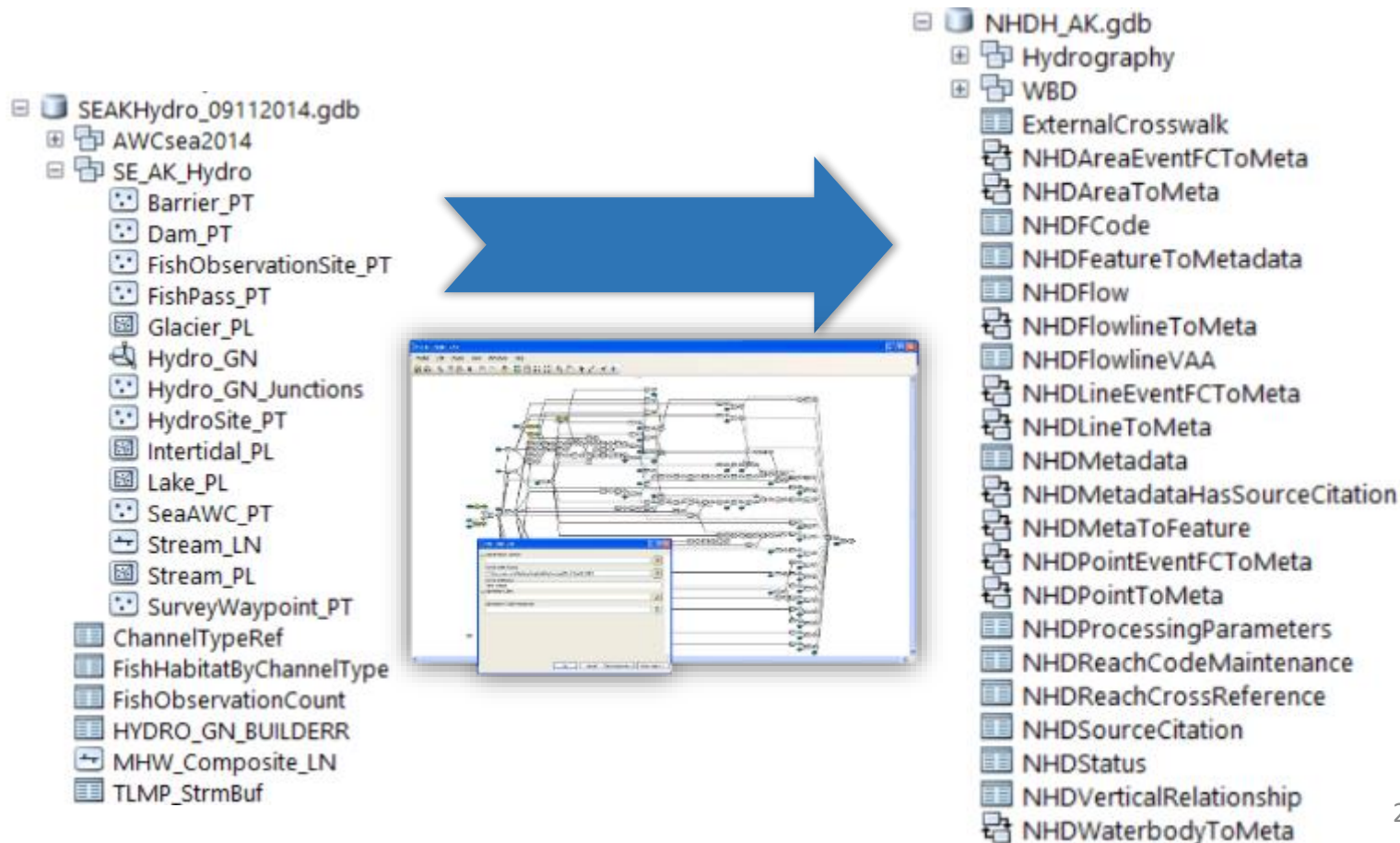
1 (5053 out of 134626 Selected)

Stream\_LN



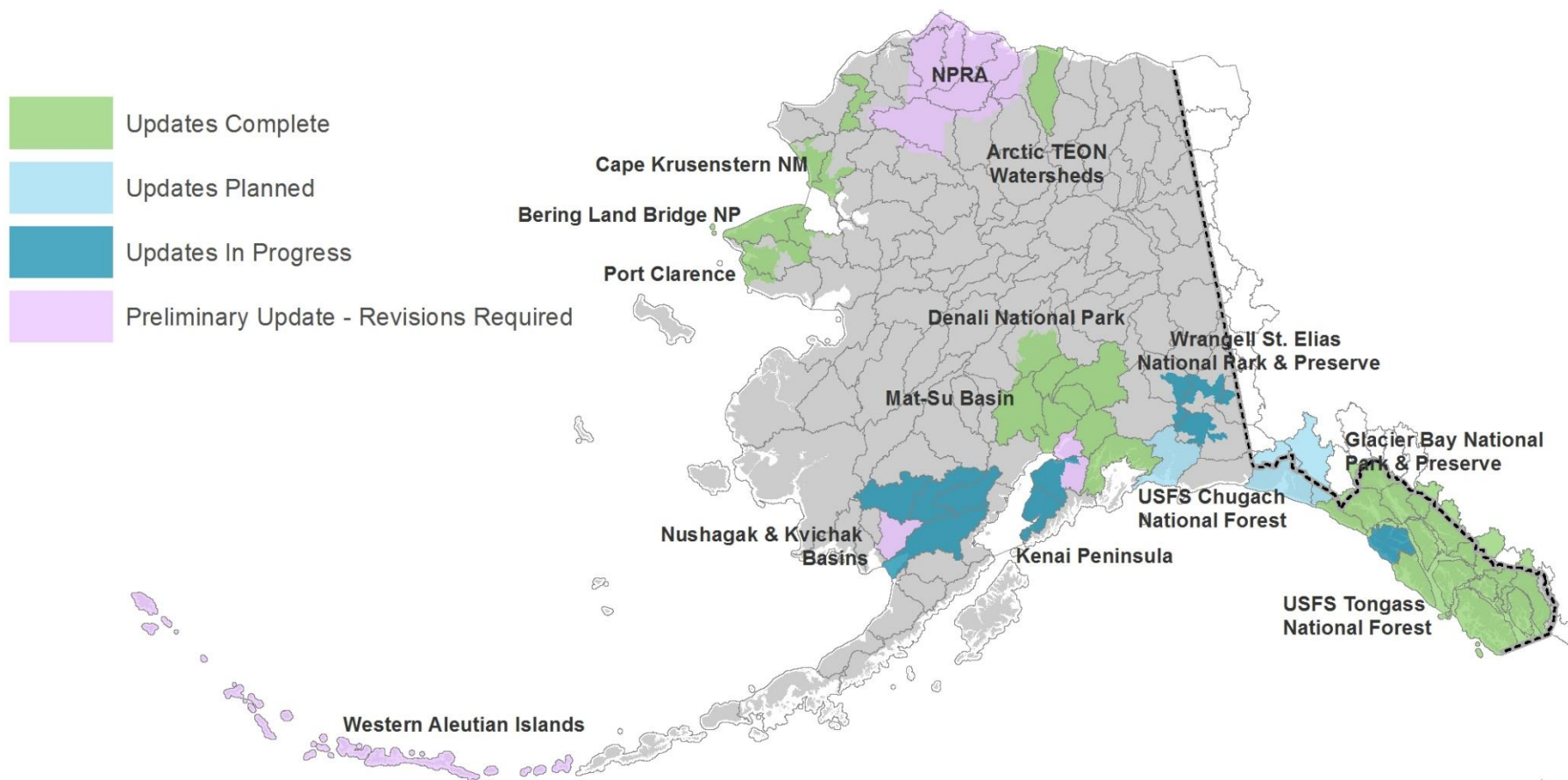
# GEOCONFLATION

use AK Hydro to format and upload to NHD



# Current Hydrography Status

complete • ongoing • planned



\* Update status current as of April 1, 2016. Does not include ongoing maintenance by USGS NHD Program.  
For more information, contact Kacy Krieger, Alaska Hydrography Coordinator, (907) 786-7749, [kekrieger2@uaa.alaska.edu](mailto:kekrieger2@uaa.alaska.edu)

0 250 500 750 Miles





# IFSAR ELEVATION STATUS

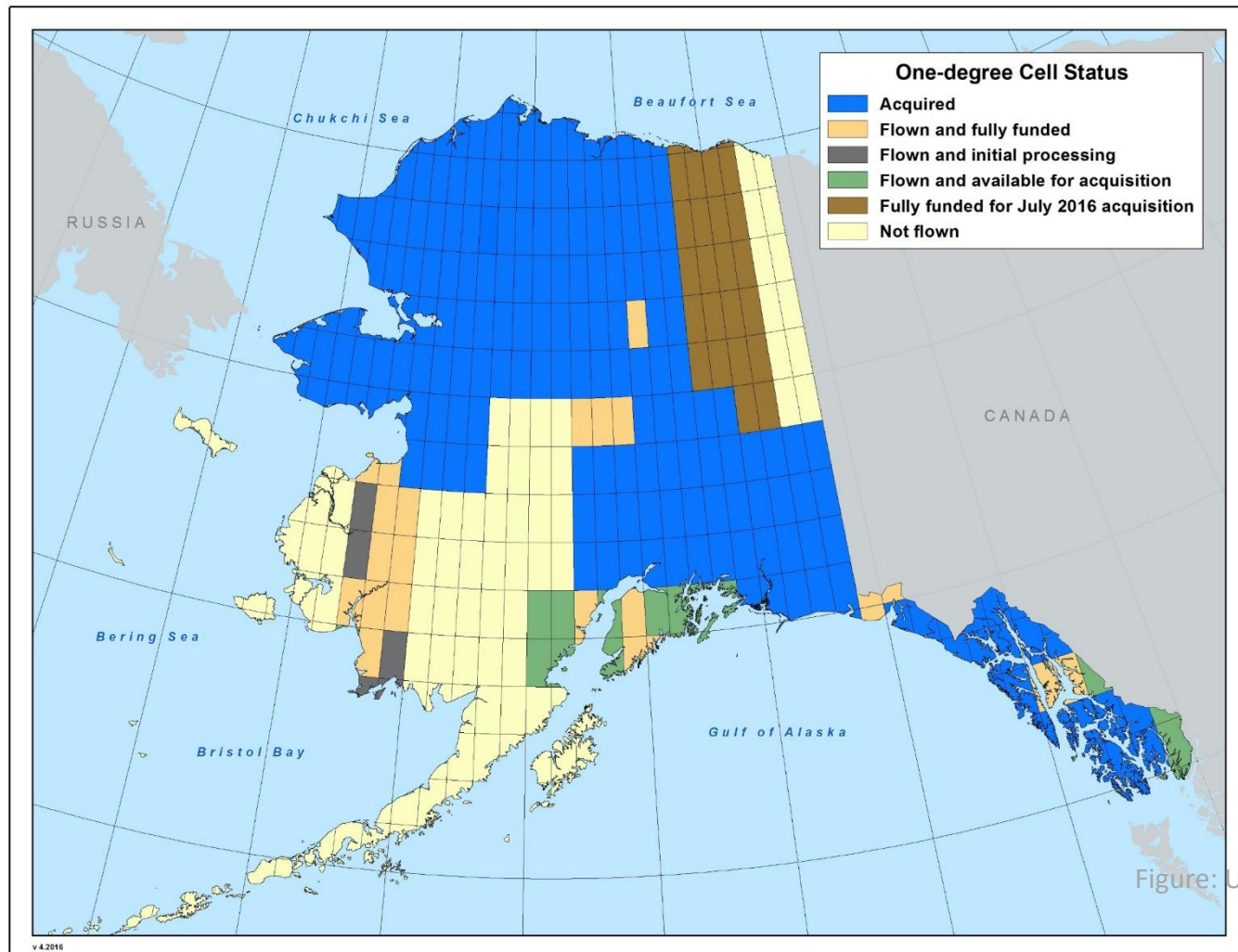
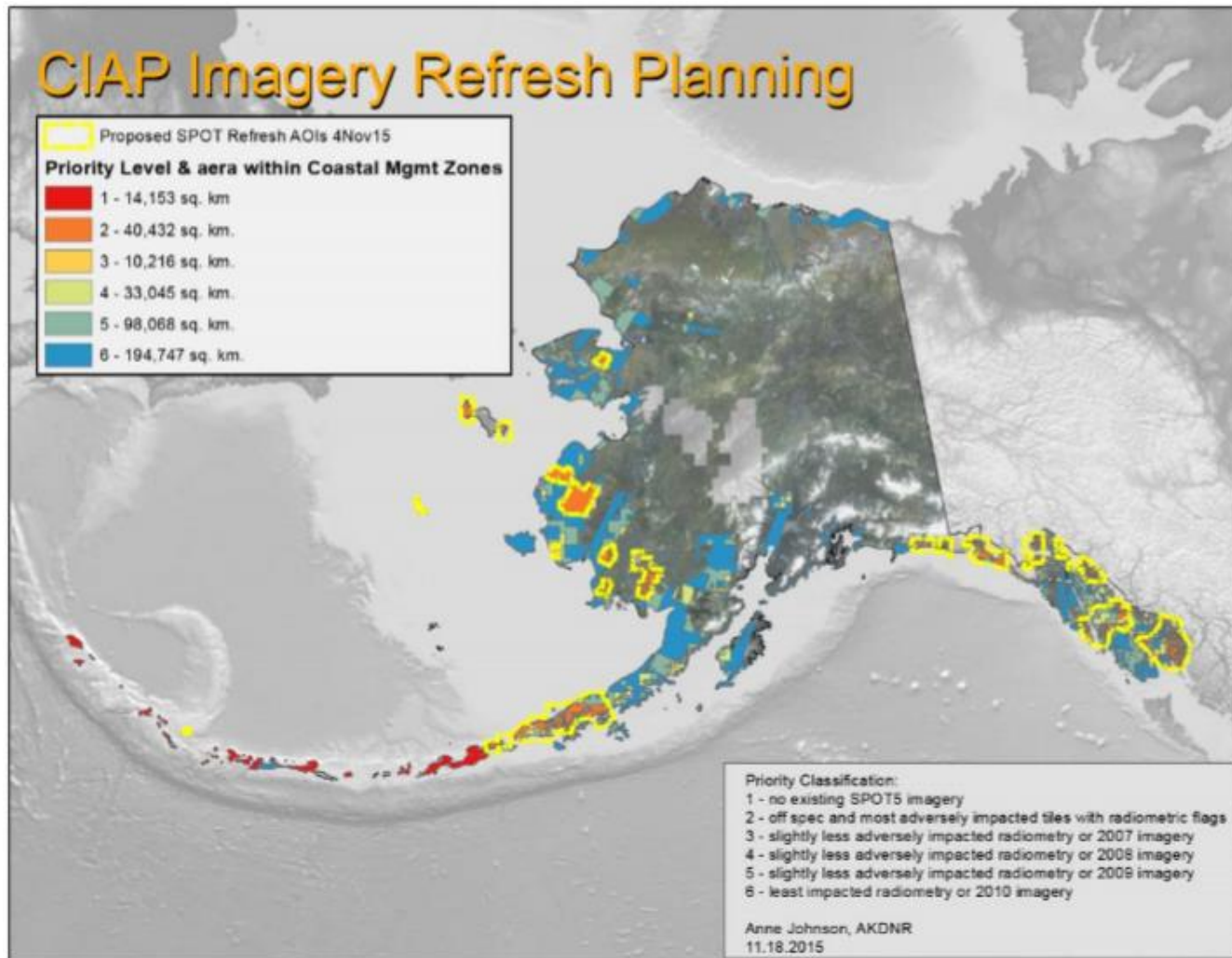


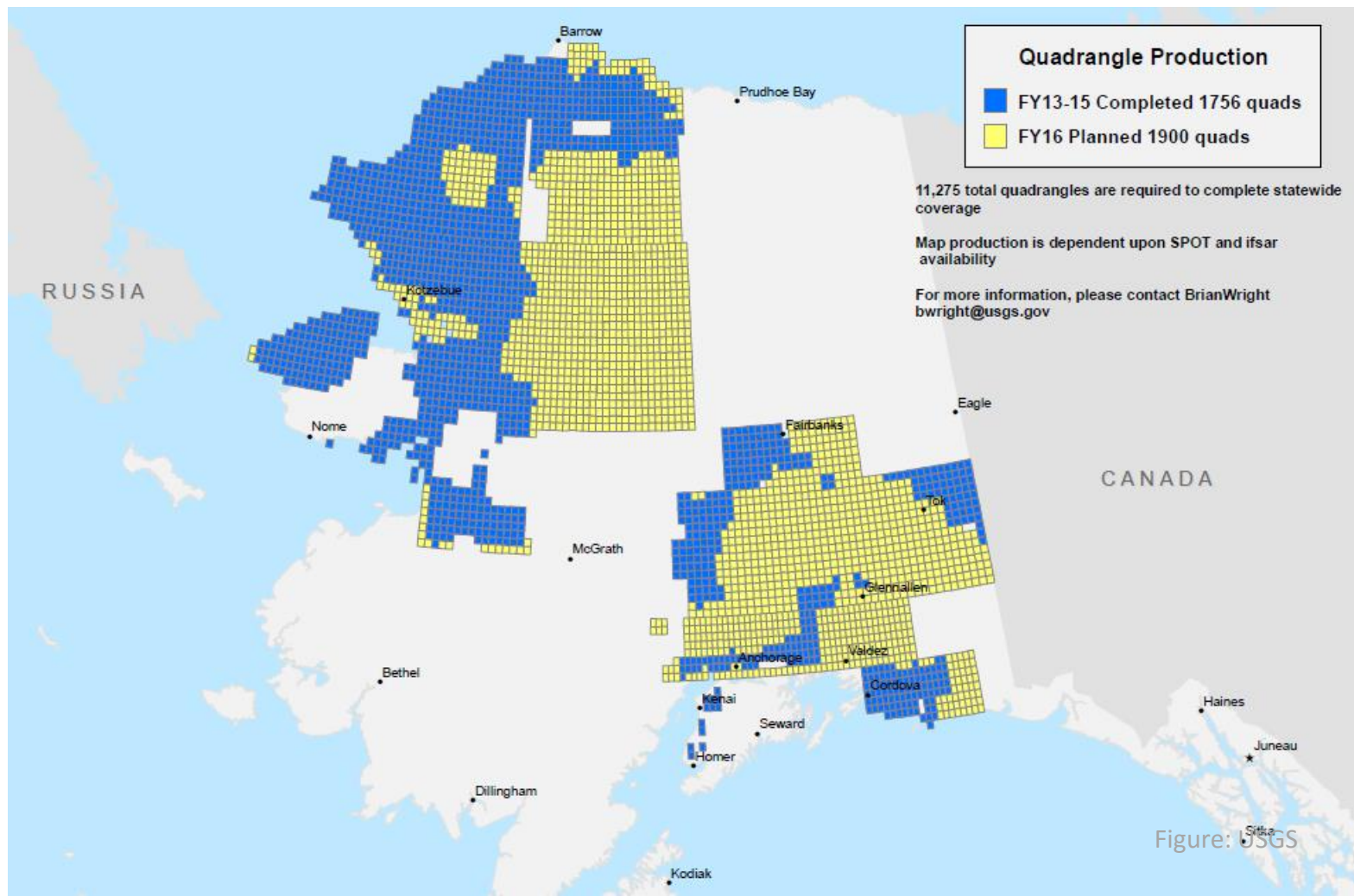
Figure: USGS

# Statewide Orthoimagery



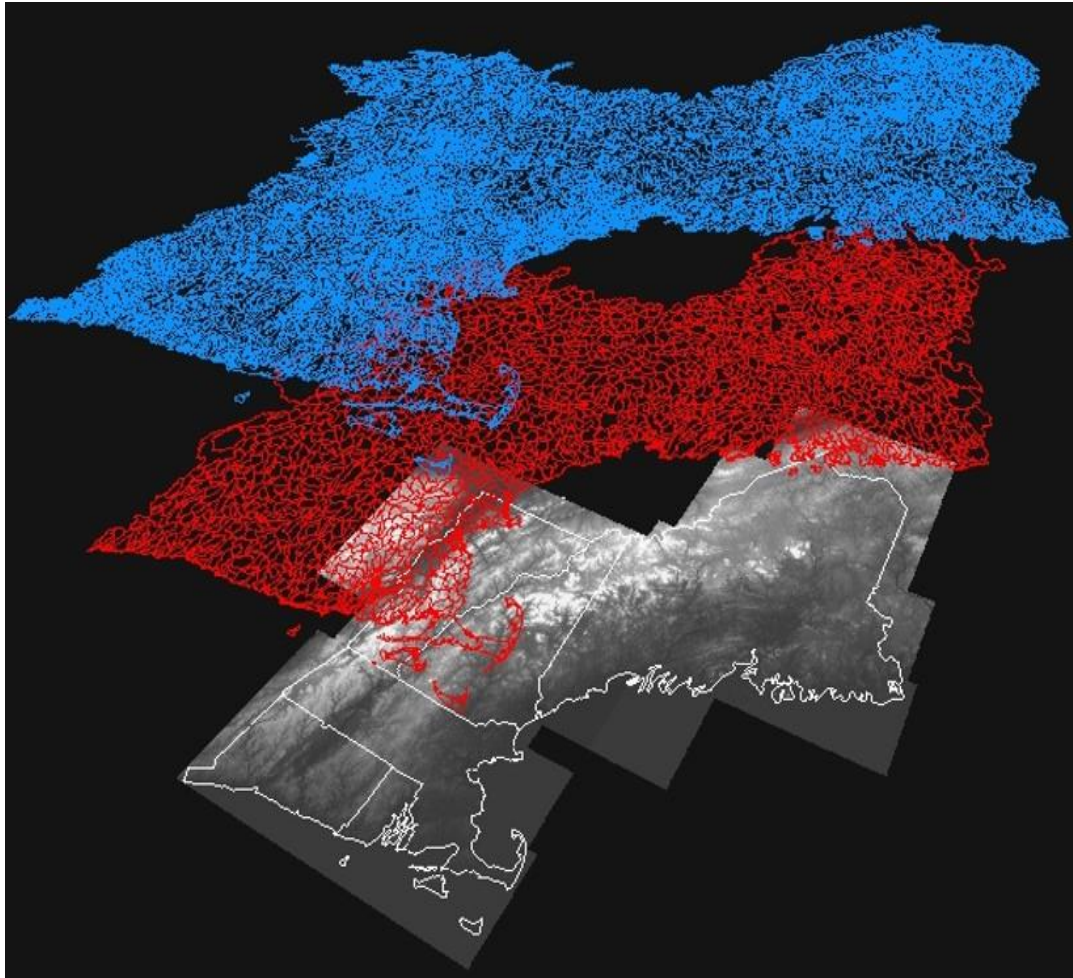


# US TOPO Map Production



# NHDPlus

Integration of NHD, WBD, NED



- Hi-Resolution NHDPlus in Production in L48.
- Alaska Hi-Resolution NHDPlus in 3+ years.
- Pilot projects possible/likely sooner.



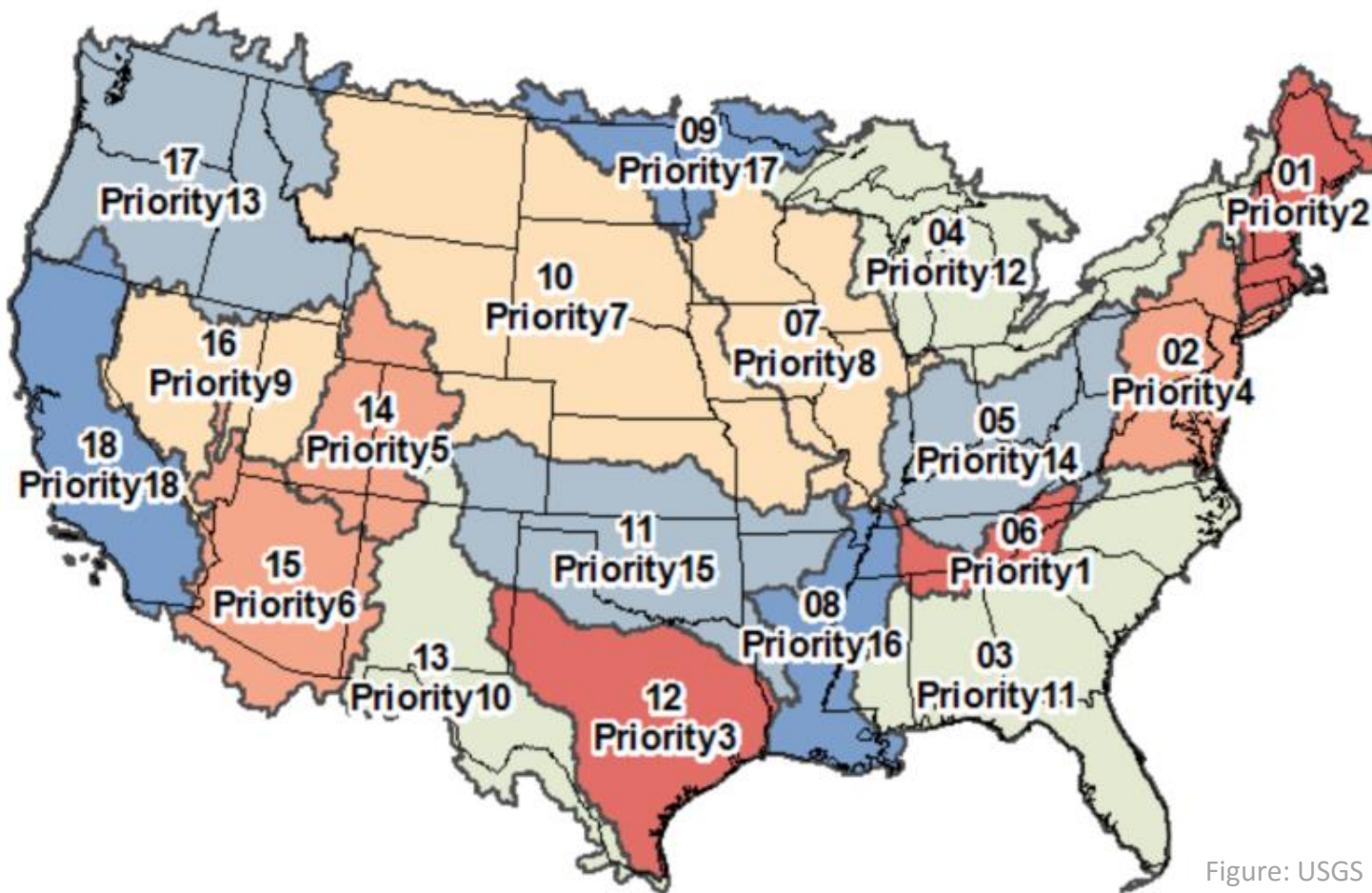
# High Resolution NHDPlus

What will it look like?

- Snapshots of ingredient data
  - High Resolution NHD (1:24,000)
  - Updated Watershed Boundary Dataset
  - 10m DEM (possibly 5m in AK)
- Value Added Attributes
- Catchments
- Flow Direction and Accumulation Grids

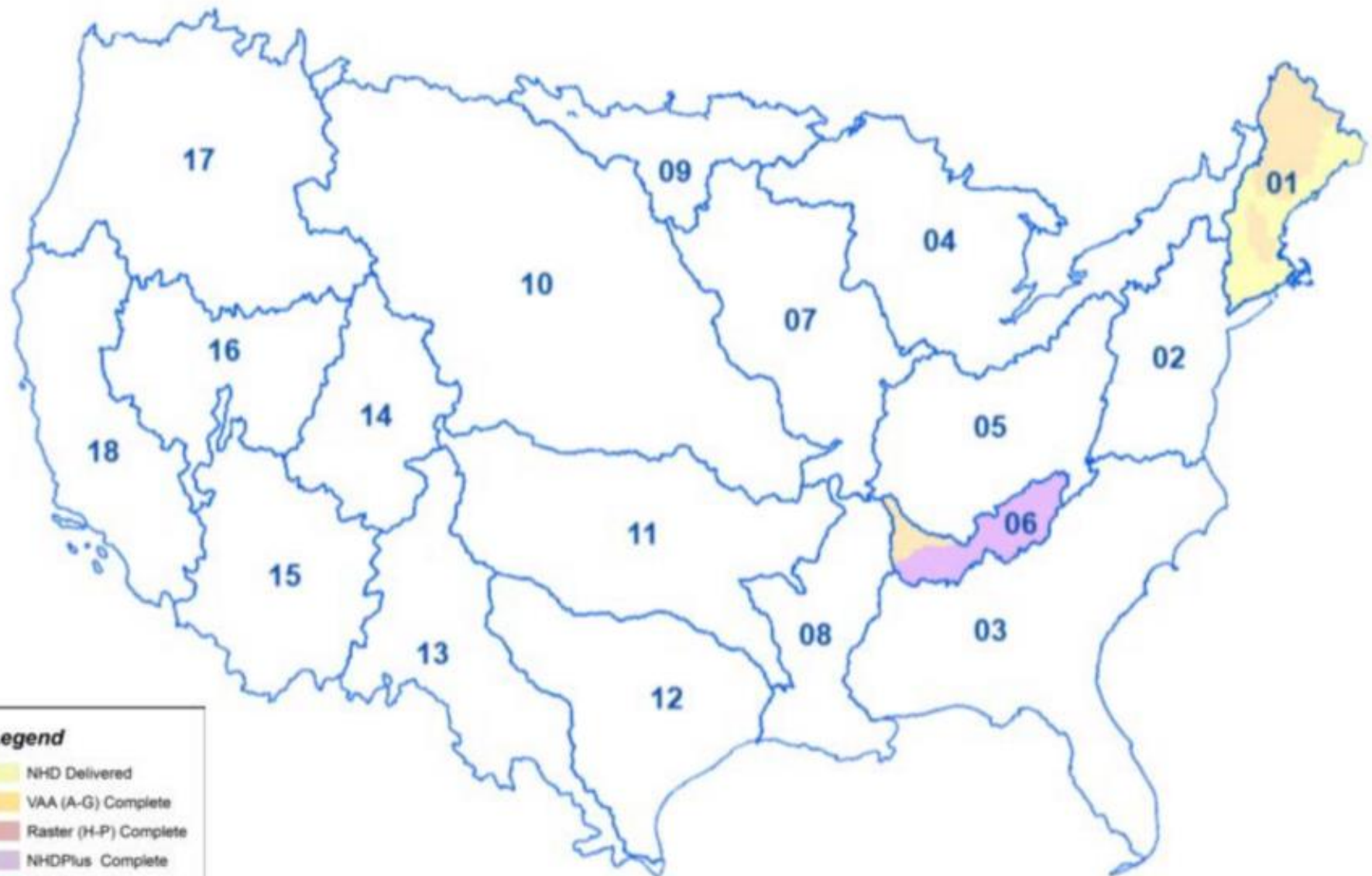
# NHDPlus High Resolution

## Priorities





## NHDPlus - Status 1/7/16



### Legend

- NHD Delivered
- VAA (A-G) Complete
- Raster (H-P) Complete
- NHDPlus Complete
- NHDPlus QC
- NHDPlus Refreshed

# Alaska hydrography

# UPDATE OPTIONS

## Option 1

### Statewide Contract

- Full hydrography update
- **Based on elevation data**
- 2D features updated from existing datasets and IfSAR hydro masks.
- Work performed by contracted vendor.
- Partner support through AK Hydro
- Updates at \$55.00/mi<sup>2</sup>

Total Est. Cost **\$36,800,000 ±**

## Option 2

### Collaborative Updates

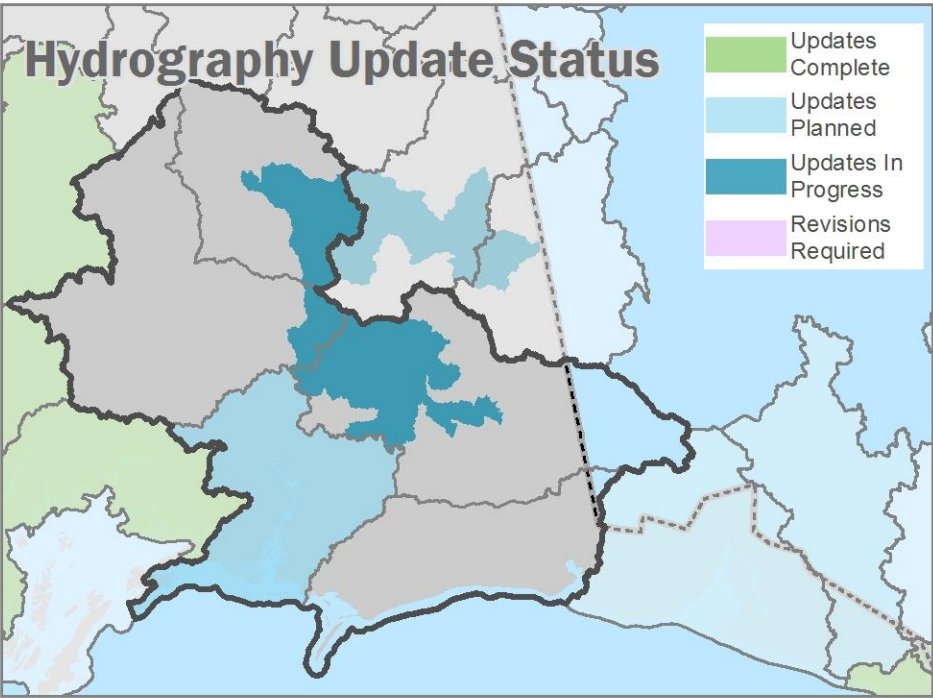
- Full hydrography update
- **Based on elevation data**
- 2D features updated from existing datasets and IfSAR hydro masks.
- Attributes from models, partners, and editors.
- edits, updates and validation performed by Universities and partners through AK Hydro with support from USGS.
- Costs cover AK Hydro Staffing and updates (bonus of AK Hydrography Coordinator covered)
- Updates at \$13.00/mi<sup>2</sup>

Total Est. Cost **\$10,000,000 ±**



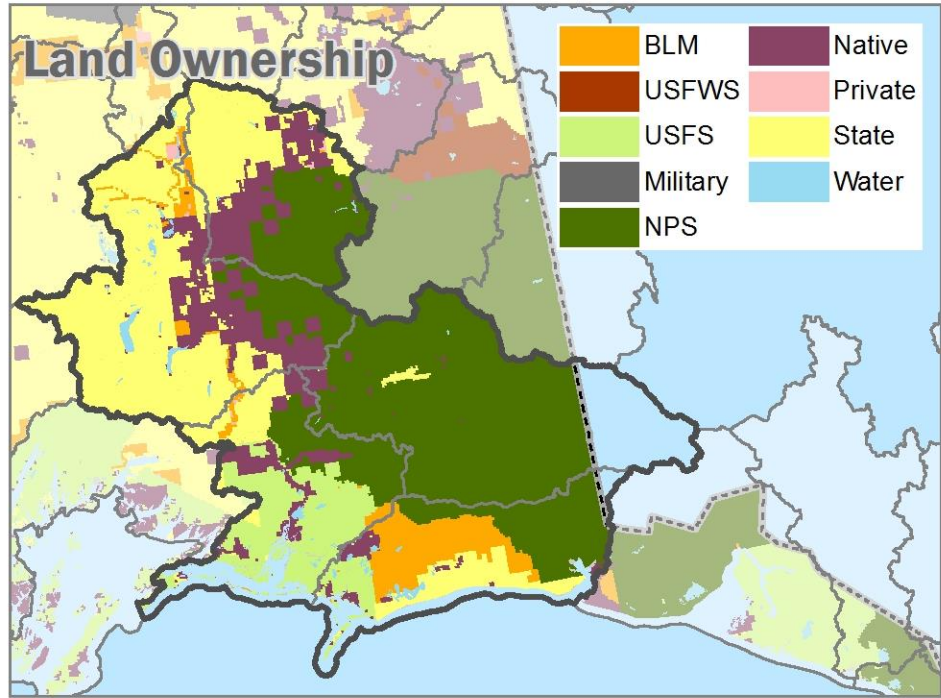
## Hydrography Update Status

- Updates Complete
- Updates Planned
- Updates In Progress
- Revisions Required



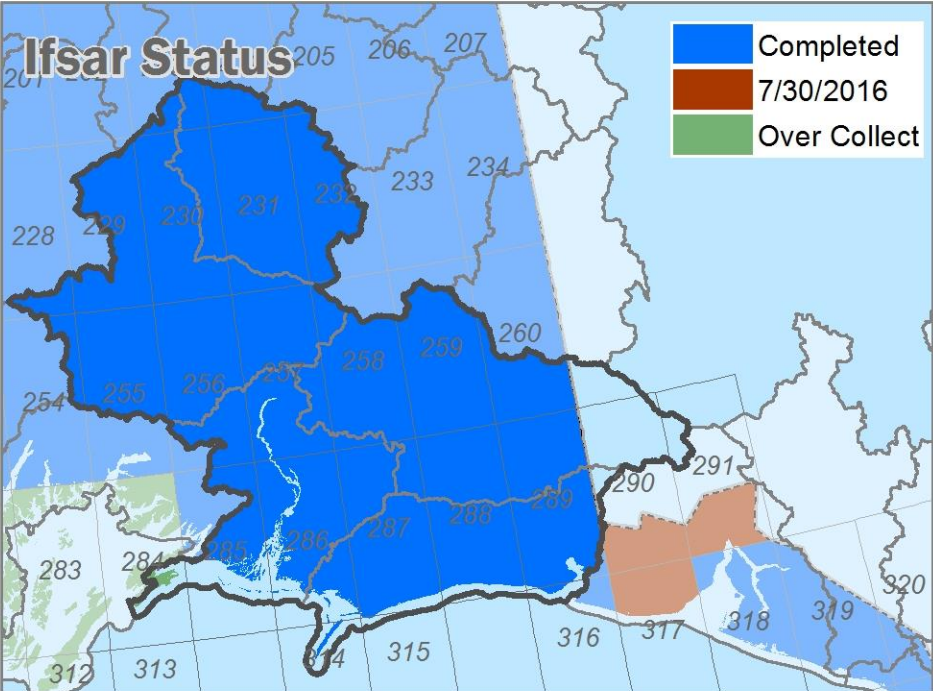
## Land Ownership

- BLM
- USFWS
- USFS
- Military
- NPS
- Native
- Private
- State
- Water

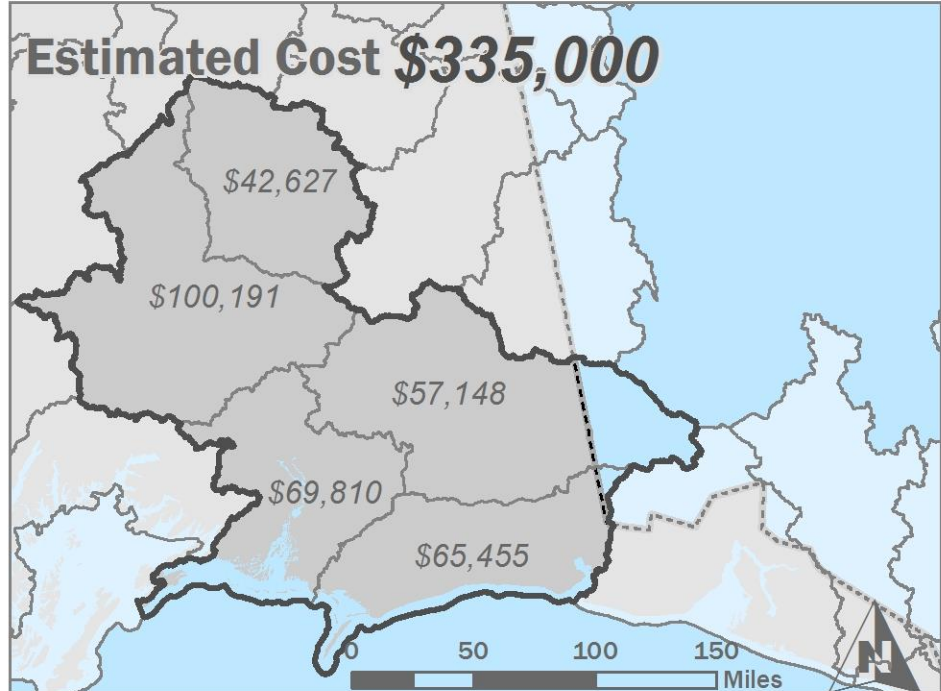


## Ifsar Status

- Completed
- 7/30/2016
- Over Collect



## Estimated Cost \$335,000



# Questions

Agency	Primary Member	Primary Email
U.S. Geological Survey	Brian Wright*	<a href="mailto:bwright@usgs.gov">bwright@usgs.gov</a>
University of Alaska	Kacy Krieger*	<a href="mailto:kekrieger2@uaa.alaska.edu">kekrieger2@uaa.alaska.edu</a>
Alaska Department of Environmental Conservation	Kim Homan	<a href="mailto:kim.homan@alaska.gov">kim.homan@alaska.gov</a>
Alaska Department of Fish and Game	J Johnson	<a href="mailto:j.johnson@alaska.gov">j.johnson@alaska.gov</a>
Alaska Department of Natural Resources	Anne Johnson	<a href="mailto:anne.johnson@alaska.gov">anne.johnson@alaska.gov</a>
Bureau of Land Management	Matt Varner	<a href="mailto:mvarner@blm.gov">mvarner@blm.gov</a>
National Oceanic and Atmospheric Administration	Tim Smith	<a href="mailto:timothy.m.smith@noaa.gov">timothy.m.smith@noaa.gov</a>
National Park Service	Joni Piercy	<a href="mailto:joni_piercy@nps.gov">joni_piercy@nps.gov</a>
U.S. Fish and Wildlife Service	Bret Christensen	<a href="mailto:Bret_christensen@fws.gov">Bret_christensen@fws.gov</a>
U.S. Forest Service	Erik Johnson	<a href="mailto:ejohnson02@fs.fed.us">ejohnson02@fs.fed.us</a>

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**Kacy Krieger**

Alaska Hydrography Coordinator

AHTWG Co-Chair

[kekrieger2@uaa.alaska.edu](mailto:kekrieger2@uaa.alaska.edu)

907-786-7749

\* AHTWG Co-Chairs



# AK Hydro Database Administrator

- Research Technician – AK Hydro
- Position is now open until 5/6/2015:

<http://careers.alaska.edu/cw/en-us/job/496714/research-technician-ak-hydro>

- Necessary Skills:
  - ArcGIS Server and Desktop
  - Spatial Databases