



Bristol Bay

National Wetlands Inventory

Daniel Cheyette, SVP Lands and Resources, BBNC

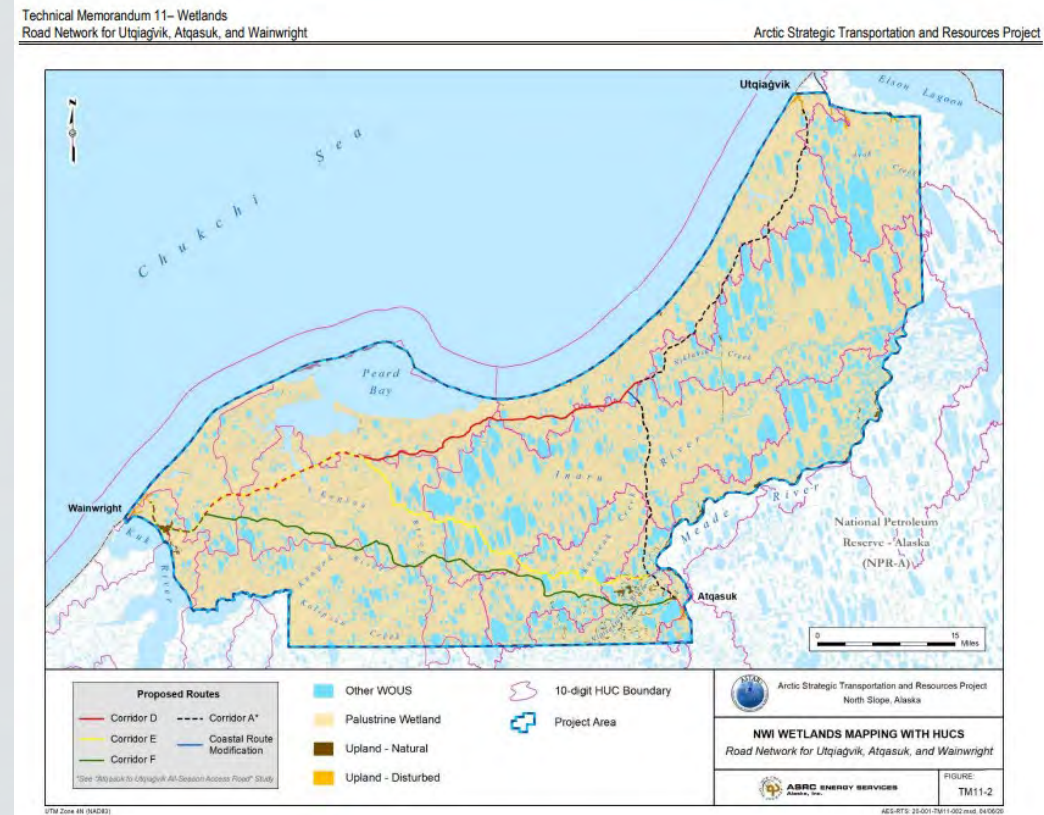
Sydney Thielke, Wetlands Coordinator, USFWS

Mapping wetlands across the Bristol Bay watershed

- Use satellite imagery and field data to **map the location and type of wetlands** across the Bristol Bay watershed
- NWI data helps us understand how wetlands contribute to the health of the ecosystem
- NWI data is often the foundation of scoping, planning and permit applications necessary for community infrastructure projects

Example

Road Network for Utqiagvik, Atqasuk, and Wainwright Arctic Strategic Transportation and Resources Project



Wetland Habitats and Functions



- Areas with saturated soil for at least part of the year
- Filter sediment
- Buffer water temperature
- Complex ecosystems
- Can contain salt or freshwater
- Estimates indicate approximately 43% of Alaska is wetland, but mapping across the state is limited

Wetlands and Salmon

Many wetlands in the Bristol Bay region are hydrologically connected, and vitally important, to salmon bearing streams



Field observations have indicated the presence of salmon in stream sites disconnected from surface-water flows (Woody and O'Neal 2010). Annual floods during spring and fall likely reconnect these habitats through a network of ephemeral wetlands and streams.

BABY SALMON LIVE IN OUR STREAMS!
HOME IS WHERE THE HABITAT IS

OUR SALMON LANDSCAPE
Kenai Peninsula salmon spawn in our rivers, grow up in the connected lakes and streams, and swim in the marine waters of Cook Inlet. In each of these places, salmon need healthy habitat.

COLD WATER
Salmon prefer water temperatures below 55 degrees F. Warm water stresses salmon out, making them vulnerable to pollution, predation and disease.

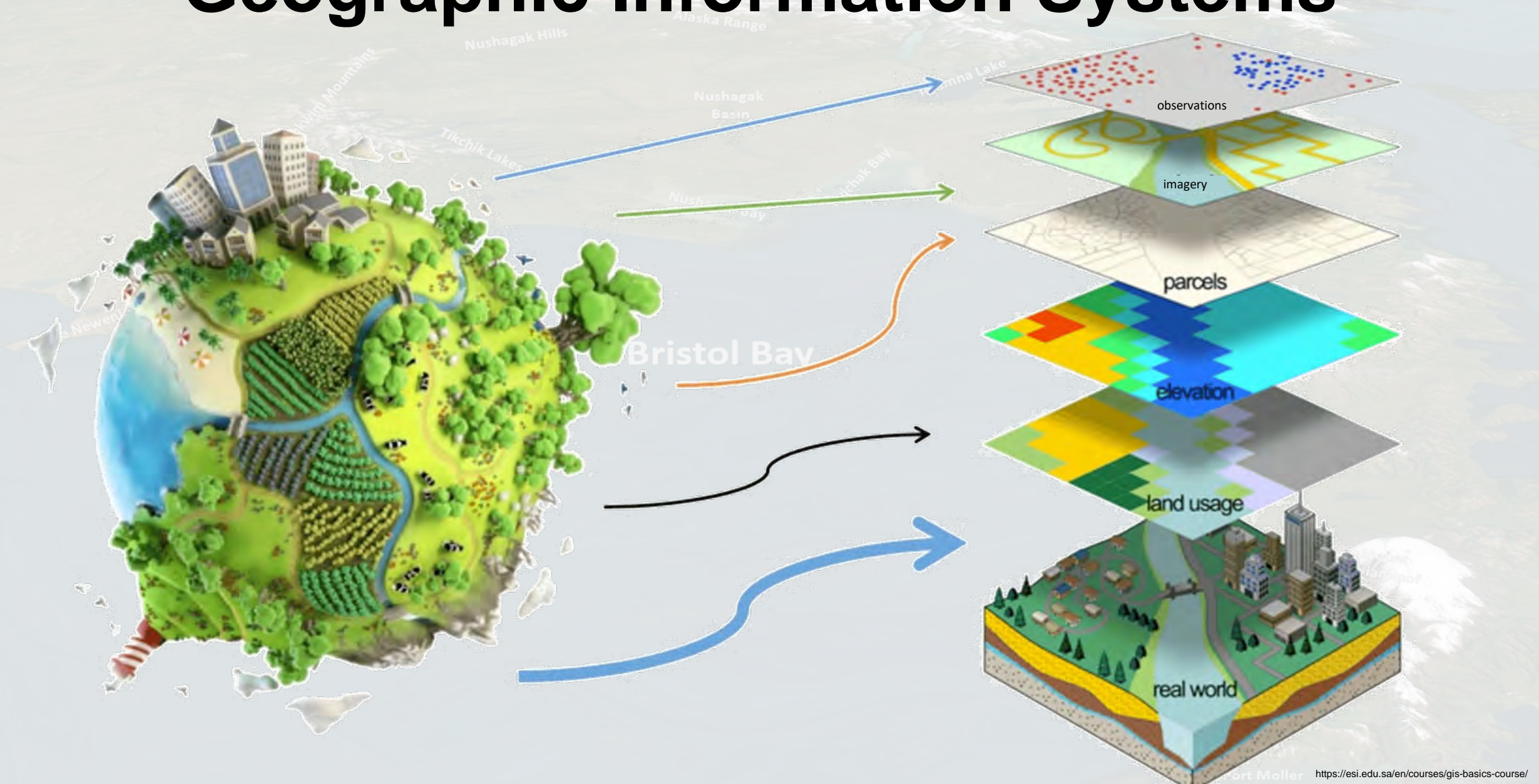
STREAM-SIDE VEGETATION
Trees, shrubs, and grasses on our stream banks are important for creating shade which helps keep our streams cold. Vegetated stream banks also hold back fine sediment from entering the stream channel where it clogs up baby salmon gills.

KEEP OUR SALMON HABITAT HEALTHY!
Walk on gravel bars or in the water to protect our stream-side vegetation and keep small side channels intact.

GROUNDWATER CONNECTIONS
Small side channels, tributaries, and springs bring cold groundwater into stream channels in the summer. These small habitats provide juvenile salmon a place to avoid predators and high stream flows. Also, they are important open-water areas in the winter.

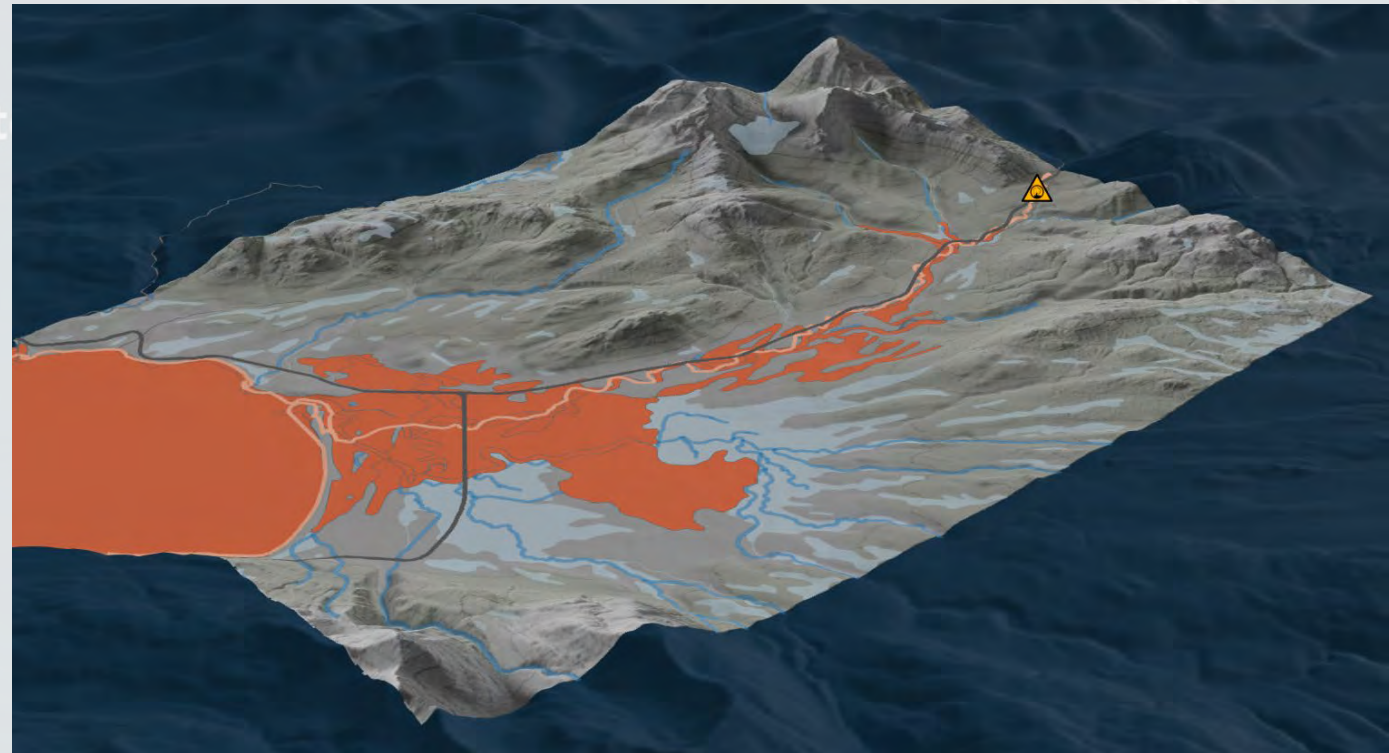
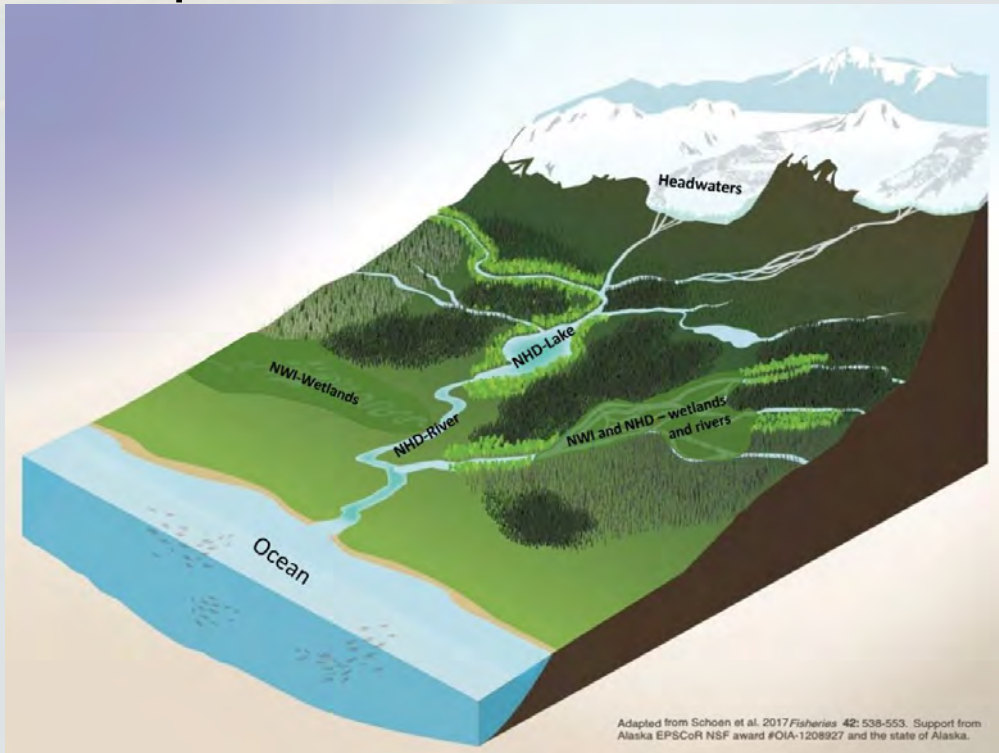
Logos: Kenai Peninsula Borough, Kenai State Park, Kachemak Heritage Land Trust

Geographic Information Systems



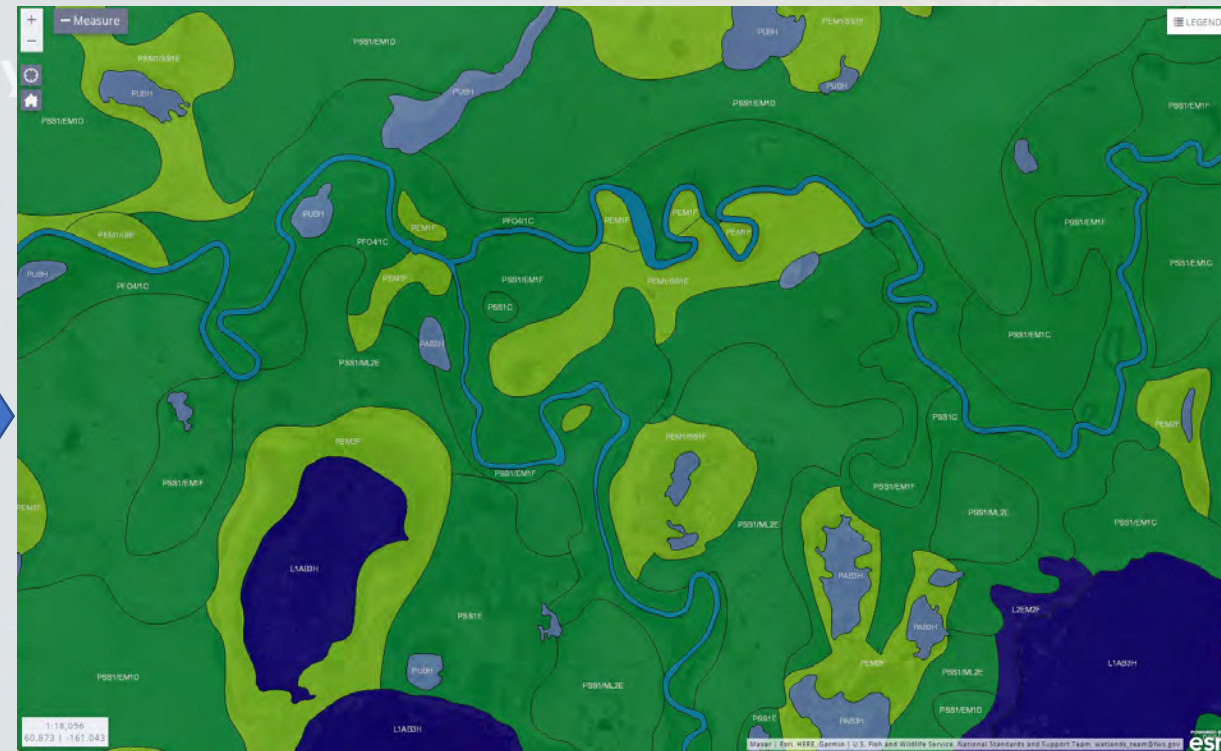
Wetlands, GIS and Connectivity

- Data helps us identify pathways for plants, animals or contaminants to move across the landscape including beneficial movements for fish or detrimental impacts like a fuel spill



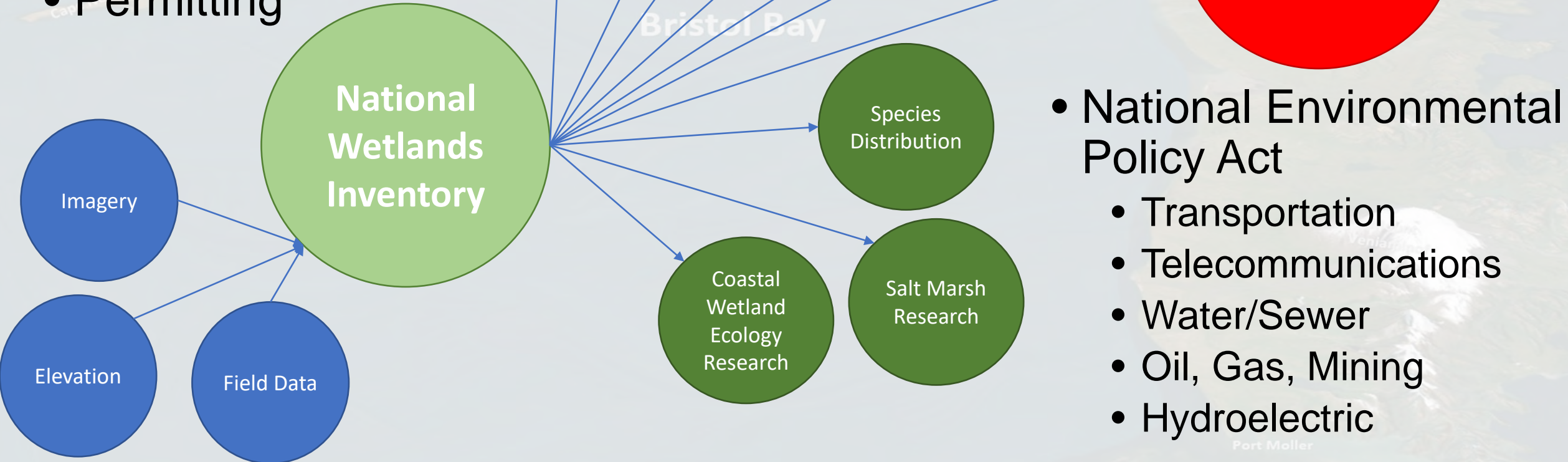
The National Wetlands Inventory

- The NWI uses satellite imagery supported by field data to map the location and type of wetlands across the landscape
- Data is created, and can be used, in a GIS
- Information can also be displayed as hard-copy maps



NWI Uses

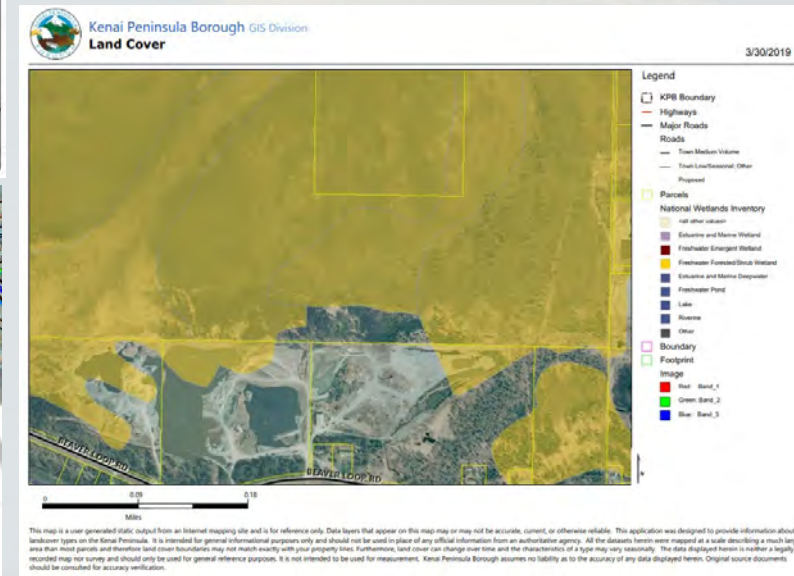
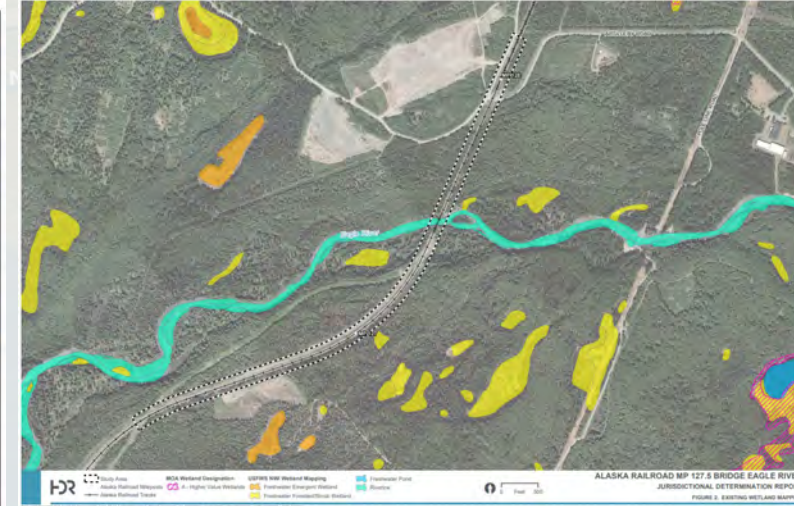
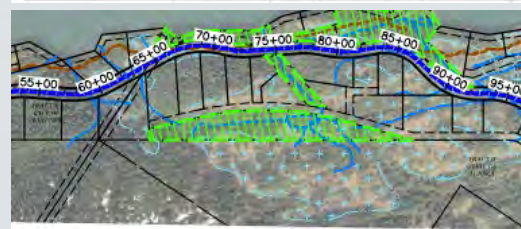
- Habitat analysis
- Climate change
- Land use planning
- Permitting



- National Environmental Policy Act
 - Transportation
 - Telecommunications
 - Water/Sewer
 - Oil, Gas, Mining
 - Hydroelectric

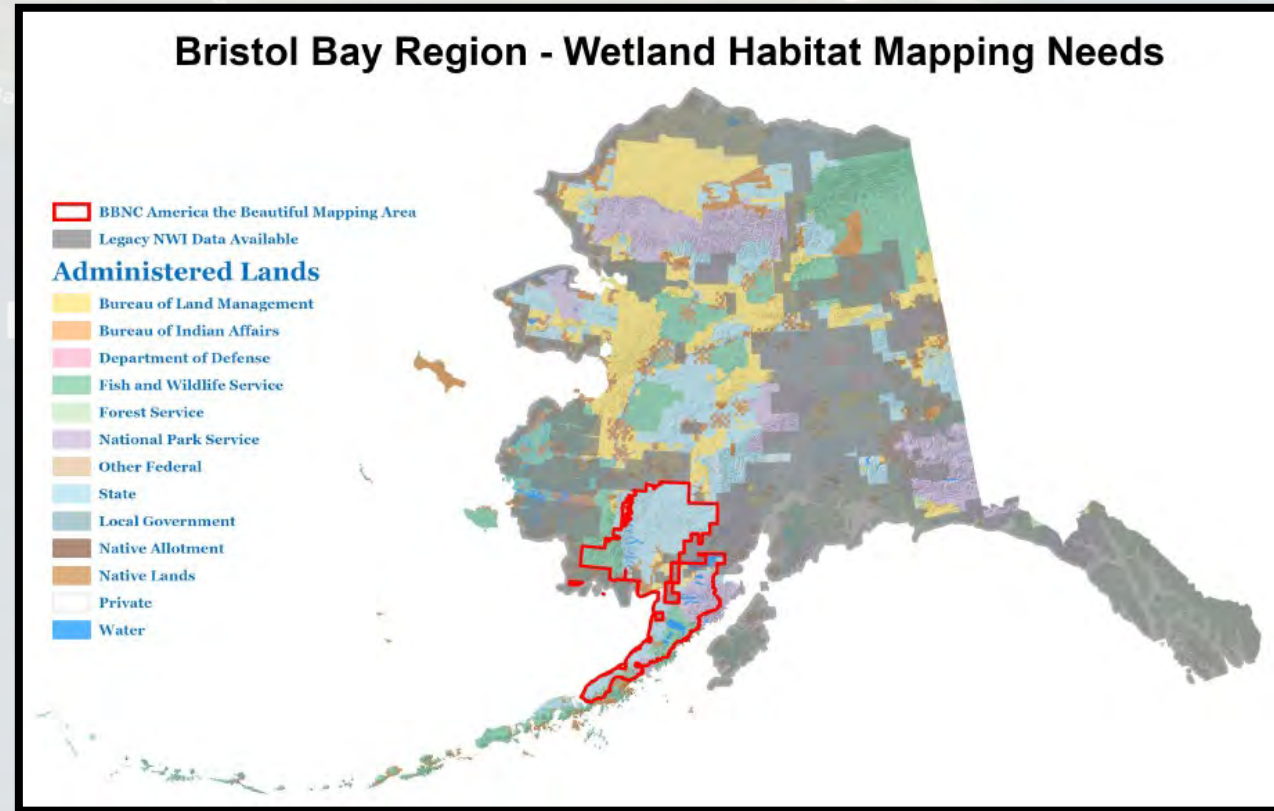
NWI NEPA/Planning Examples

- Mining
- Oil and Gas
- Alaska Railroad
- Airport expansion/realignment
- Wastewater treatment plans
- Road/Highway construction
- HUD Housing Developments
- Communication site leases

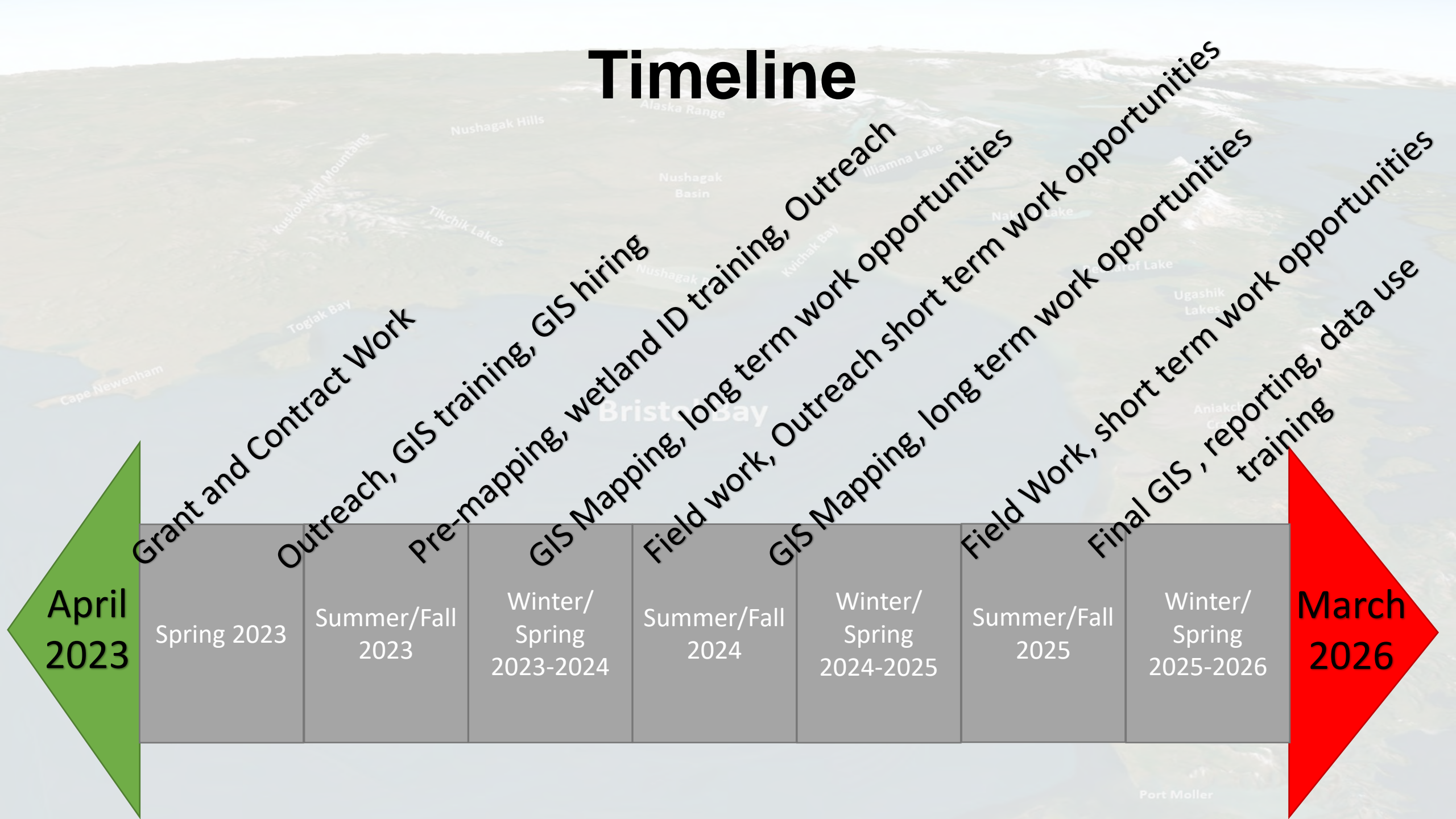


The NFWF Grant Application

- Bristol Bay Native Corporation
 - USFWS, SMUMN, BLM, USGS
- **\$1 million award**
- **Map 7 million acres of NWI**
- **Outreach** to communities
- **Employ** community members
- **Educate** on use of final products



Timeline



April
2023

Grant and Contract Work

Spring 2023

Outreach, GIS training, GIS hiring

Summer/Fall
2023

Pre-mapping, wetland ID training, Outreach

Winter/
Spring
2023-2024

GIS Mapping, long term work opportunities

Summer/Fall
2024

Field work, Outreach short term work opportunities

Winter/
Spring
2024-2025

GIS Mapping, long term work opportunities

Summer/Fall
2025

Field Work, short term work opportunities

Winter/
Spring
2025-2026

Final GIS , reporting, data use training

March
2026

Outreach

Share information on the wetland mapping process

Incorporate local wetland names, and traditional uses

Creating a Statewide Wetlands Inventory

Sydney Thielke, Regional Wetlands Coordinator, U.S. Fish and Wildlife Service Alaska Region Sydney.Thielke@fws.gov Leslie Jones, PhD, Geospatial Information Officer, Alaska Geospatial Office Leslie.Jones2@alaska.gov

Alaska's National Wetlands Inventory (NWI)

The National Wetlands Inventory (NWI) is a nationwide dataset, stewarded by U.S. Fish and Wildlife Service, that contains the location and type of wetlands across the landscape. While the Lower 48 has complete NWI coverage, Alaska only has data available for 42% of the state. Where available, the NWI is used to support activities from planning for infrastructure like roads or fiber optic, to understanding the diverse habitats that support our subsistence resources like Pacific Salmon. The NWI is developed by interpreting imagery and other data to map the wetland locations and their attributes. For more information about the NWI in Alaska contact Sydney Thielke, Regional Wetlands Coordinator at Sydney_thielke@fws.gov.

The Need for NWI in Alaska

The NWI has been used extensively across Alaska, where it exists, to support a broader understanding and sustainable management of wetlands in Alaska. Although the NWI is non-regulatory, it is often the best available information for project proponents and managers to refer to regarding wetlands impacts, and so it is often used in planning processes. The current availability of NWI centers around Alaska's areas of high development including travel corridors and urban centers. The lack of NWI data in rural communities often increases costs, both time and money, for critical infrastructure implementation like water and wastewater facilities and road development because wetlands information is not readily available and must be generated on a project-by-project basis. The lack of statewide coverage limits analytical capabilities for climate change and habitat work because large data gaps lead to inconsistent outputs or prevent comprehensive results. Over the past four years, significant investments by a wide variety of stakeholders have resulted in NWI projects across over 200 million acres in Alaska, with most of this data expected to be complete and available in the next five years.

NWI Data Development, Access and Products

In order to produce a statewide dataset, remotely sensed data is essential; it is not possible to put people on the ground over every square foot of the state. The NWI is most reliant on satellite imagery, digital elevation, and hydrography flowlines. Trained photo interpreters use these datasets in a Geographic Information System (GIS) to interpret wetland locations and their attributes. Field work is also an important component of wetland mapping. Data producers spend time in the field, often using helicopters, looking at the landscape, vegetation and soils. They capture photos and notes to inform the entire project team about wetland systems on the ground.

The NWI data is available to the public via an online web mapper (QR Code below) where it can be interacted with online or downloaded for offline use. Online interaction includes the option to generate professional quality map products. The mapper simplifies data into a display that shows basic wetland and deep water habitats: Marine, Estuarine, Freshwater (Palustrine), Riverine and Lakes. The data can also be downloaded or integrated into a GIS using web map services for more complex or project specific analysis. There are hundreds of different wetland types in Alaska and in a GIS it is possible to break out the data display by the NWI code including life form, substrate, flooding frequency and even if beaver activity is present. E.g. Palustrine, Emergent, Persistent (1), Semi-permanently flooded(F) with beaver activity (SEM1Fb).

Foundational Geospatial Data

The Alaska Mapping Executive Committee (AMEC) and the Alaska Geospatial Office (AGC) are the two foremost groups in Alaska coordinating to complete foundational geospatial data products across Alaska. Geospatial data is used to create maps, perform analysis, and better understand the natural world around us using computers. Until recently, Alaska did not have consistent statewide satellite imagery or accurate digital elevation data to support many geospatial data development or analytic activities. Investments by both state and federal agencies through AMEC and AGC into these products are now being leveraged to produce more data, including NWI.

For information about the AMEC, contact Tracy Fuller, Alaska Mapping Program Manager, tfuller@uses.gov. For information about the AGC, contact Executive Director Leslie Jones, PhD, State Geospatial Information Officer, Leslie.Jones2@alaska.gov.

Imagery

Satellite imagery is the foundation for NWI to determine the location and type of wetlands on the ground. The AMEC coordinated acquisition of a high resolution (one-half meter) imagery (MAXAR @ 2022) product to support partner's needs. The statewide imagery is distributed by the Alaska Geospatial Office on the State Geospatial (gis.data.alaska.gov) through an online web mapping service. The imagery serves as the base for all new NWI projects.

Elevation

Digital elevation data is another foundational dataset used for the NWI. Elevation data is used to supplement the imagery when it is not conclusive for where wetlands start and end. Additionally, elevation data can be used to automate processes like determining where water flows and concentrates on the landscape. Alaska is covered by a five meter elevation product produced using Interferometric Synthetic Aperture Radar (ISAR) that was completed in 2020.

Hydrography

The National Hydrography Dataset (NHD) is rebranding to the 3D Hydrography Program (3DHP). While Alaska has statewide coverage of the NHD, it is very coarse scale and does not capture the full network of streams and rivers across Alaska. The new production of the 3DHP will more closely represent the diverse network of perennial streams we have in Alaska. The NHD is used extensively to represent the riverine features in the NWI and the USGS and U.S. FWS are working together to develop better interoperability between the products.

Map products created on the Wetlands Mapper

NWI data with all the data labels containing imagery in a GIS

QR Code Link: Wetlands Mapper

QR Code Link: NWI Data with all the data labels containing imagery in a GIS

WETLANDS OF THE YUKON-KUSKOKWIM DELTA

Wetland Type

- Freshwater Emergent Wetland
- Freshwater Forested & Shrub Wetland
- Freshwater Pond
- Lake
- Riverine
- Other

PERMANENTLY FLOODED WETLANDS

- Croakeries (Rural (domestic))
- White-tailed Goose (Rural (wild))
- Wetland Eggs

FRESHWATER FORESTED AND SHRUB WETLANDS

- Bushes (Rural (domestic))
- Blue Spruce (Rural (wild))
- Engelmann Spruce (Rural (wild))

FRESHWATER POND

- Freshwater Pond (Rural)
- Moose (Rural (wild))

LAKES

- Shallow Shallow Habitat
- Shallow Basin

RIVERINE

- Wetland Habitat
- Substrate Features

Other

- City of Bethel, Alaska

Mamterilleq | Bethel

YUPIK TRANSLATION OF SUMMARY PASSAGE

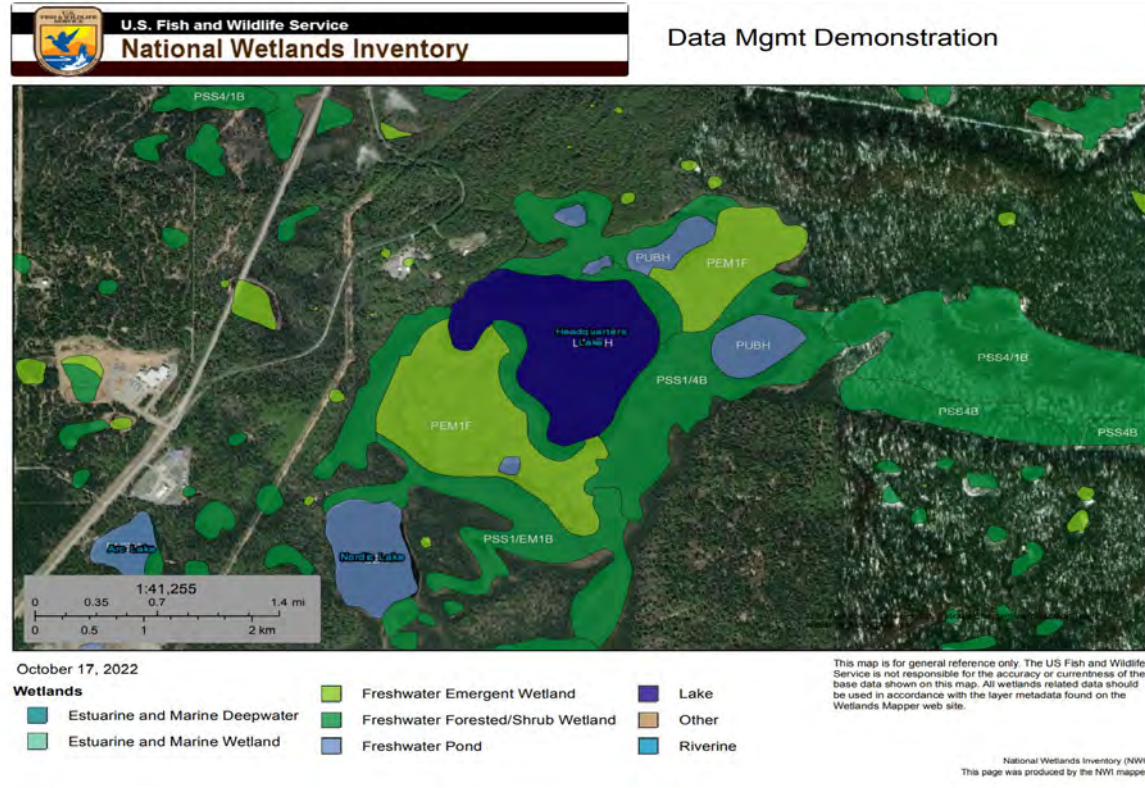
In western Alaska, the Yukon-Kuskokwim Delta is a vast area where the Yukon and Kuskokwim Rivers empty into the Bering Sea. The Yukon-Kuskokwim Delta is comprised of many rivers, streams, lakes, and ponds. Much of the landscape across the Yukon-Kuskokwim Delta are wetlands. Wetlands such as bogs, and meadows, and riparian corridors, provide important habitat for many species of fish, wildlife, and plants. Traditional subsistence-based activities, such as hunting, fishing, and gathering, are also supported by wetland habitats in Alaska.

In the Yukon-Kuskokwim Delta, these tundra wetlands are underlain by permafrost, which act as a carbon sink. Permafrost is a critical component for soil hydrology, carbon cycling, and biogeochemical processes. Climate change has negatively impacted wetland habitats in Alaska, and in turn have negatively affected rural communities. Fluctuations in the environment have led to permafrost degradation, leaving the land vulnerable to flooding and erosion. Since wetlands are sensitive to climate instability, understanding the characteristics and composition of a wetland is important for community planning. Identifying key characteristics within a landscape can help aid in future infrastructure site planning.

In Alaska, conducting geographical surveys can be limited given the vast areas of remote land. Using geospatial data and remote sensing is a cost-effective way to monitor changes in a remote geographical landscape over time. This project integrates both geospatial data and natural resource information to produce current information on the status, extent, characteristics, and functions of wetland habitats. Understanding the surrounding landscape, geography, hydrology, and natural resources can help rural communities in Alaska address and solve issues regarding community planning.

Port Moller

Education



- Different types of wetlands
- Geographic Information Systems (GIS)
- Using National Wetlands Inventory (NWI)

Economy and Employment

Short term and longer term opportunities to receive training and assist with logistics, data collection and map production

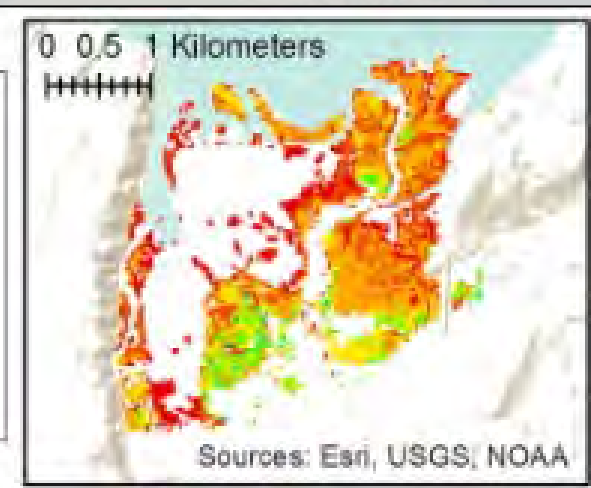
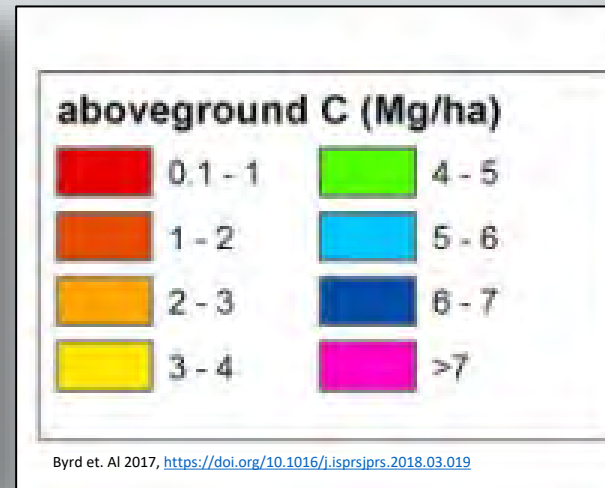
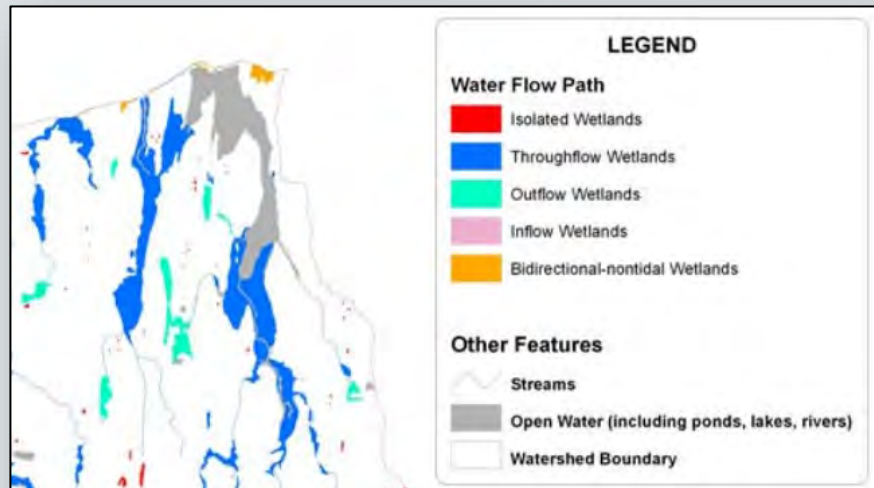
- Logistical supports – lodging, transportation, meeting space
- Geotagged photos of wetlands
- Plant community descriptions
- Digitizing wetlands in GIS



Putting NWI Data to Use

Once NWI data is produced, we will work with interested communities and organizations to ensure there is widespread knowledge on data use and future project opportunities.

- Electronic map production
- Value added attribution
- Hard copy map production
- Geospatial Analysis



Next Steps

- Complete grant award process
- Identify outreach and education opportunities
- Seek out short and long term employees



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We look forward to working with you!

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