Alaska Wetland Technical Working Group

Statewide Wetland Inventory

Ten Year Strategic Plan

2019-2029

Prepared by the Alaska Wetlands Technical Working Group
Version 1
November 15, 2019

I. Strategic Plan Scope and Purpose

The acquisition and scientific accuracy of publicly accessible base map products, particularly targeted wetlands and hydrography, is a mapping goal of the Alaska Mapping Executive Committee (AMEC) and the Alaska Geospatial Council (AGC). The AGC formed working groups to advance action to update Alaska's wetland and hydrography maps. The Alaska Wetland Technical Work Group (AWTWG) developed this strategic plan (plan) to complete a statewide wetland dataset according to the Alaska's National Wetland Inventory (NWI) standard. The plan provides a proposed implementation schedule to complete the inventory within ten (10) years.

Background

Approximately 65% of the nation's wetlands are located in Alaska covering 174 million acres, or 43%, of the State's surface area (Hall, Frayer, & Wilen, 1994). Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Alaska's wetlands include moist and wet tundra types, permafrost areas, marshes, bogs, fens, swamps, and salt marshes. The state's many intertidal, riparian and shallow water ponds and associated wetlands are recognized as important breeding habitat for numerous migratory bird species. The value of wetlands to wildlife in Alaska is not limited to migratory birds; many mammals, fish and other species utilize the habitat year round. Wetlands located within key watersheds also provide rearing habitat for juvenile salmon. Intertidal wetlands serve as a transition zone for anadromous fish moving to and from freshwater to the marine environment.

Wetlands provide many other valuable ecological functions, such as insulation for permafrost (temperature regulation) and maintenance of water quality by slowly filtering excess nutrients, sediments, and pollutants before water seeps into rivers, streams, and underground aquifers. Wetlands provide valuable flood attenuation in some flood prone areas due to the ability to intercept, retain and slowly release large amounts of surface water. Wetlands are also valued for their many recreational uses from hiking, photography/wildlife watching, hunting/fishing, and paddling (canoe and kayak). In Alaska, many of the areas that are economically important to the state are located in areas with high concentrations of wetlands.

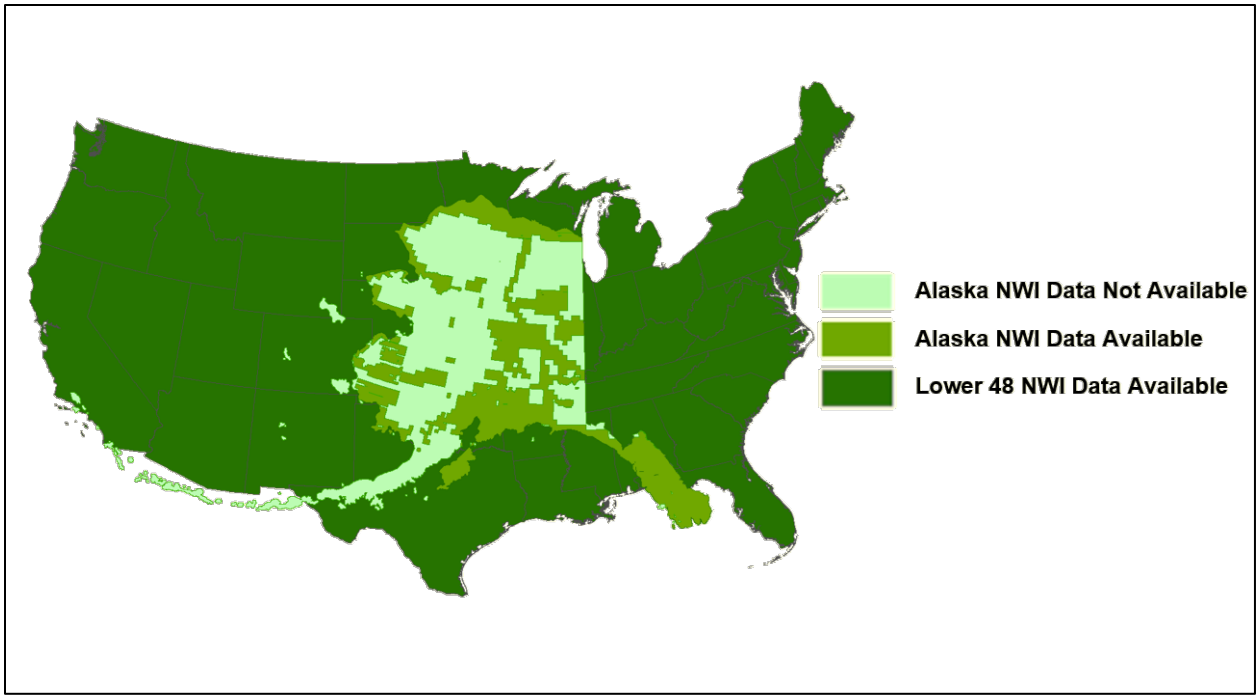

Figure 1 Current National Wetland Inventory Status for Alaska and Lower 48

Alaska is one-fifth the size of the entire United States and is the only state with land area north of the Arctic Circle. Despite its resource potential and global position, Alaska has the most limited wetland geospatial data coverage of all states in the nation (figure 1); less than half of Alaska's wetlands have been mapped (USFWS 2019). Accurate, detailed geospatial information that meets national standards is lacking for much of the state, adding costs to responsible development, permitting and resource conservation decisions, delaying or preventing adequate response to natural disasters and emergencies, and preventing effective measurement and monitoring of ecological processes. Today, given the leadership of AMEC and the AGC there is opportunity to address Alaska's geospatial shortfalls through collaboration and coordination between state and federal agencies.

II. Alaska Mapping Initiative – An Overview

It has taken over a decade for agencies in Alaska to position themselves for widespread production of statewide geospatial datasets. The interagency effort for statewide mapping gained momentum when state and federal agencies sought to identify statewide user needs for elevation and imagery data. After multiple workshops, two white papers were released detailing user needs and making recommendations on appropriate data solutions (Dewberry, 2008) (i-cubed, 2009). Overwhelmingly state and federal land managers indicated the need for consistent elevation and imagery products in order to complete subsequent inventory and monitoring efforts related to hydrology, wetlands, vegetation, soils and land use. What followed was a multiyear effort to collect a 2.5 meter base imagery product and 5 meter base elevation product across the entire state. In general, the imagery acquisition was coordinated through the State-led Alaska Geospatial Council (AGC) and the elevation acquisition was coordinated through the USGS led Alaska Mapping Executive Committee (AMEC). The total investments were over $70 million dollars and came primarily from the USGS, State of Alaska, NRCS, BLM, NPS, USFS and USFWS.

During the same timeframe that imagery and elevation projects were collected the AGC established a number of technical working groups (TWG) to support other statewide mapping efforts. The intent of the working groups was to bring interested parties together to represent their needs related to a single theme. The TWGs included hydrography, wetlands, vegetation, and many others. Most of the working groups recognized the need for the base imagery and elevation data to be completed in an area prior to initiating their respective inventories for a region.

As the imagery and elevation projects reached completion there was a surge of interest in the next phases of statewide data collection. In 2018 the AMEC engaged participating agencies in an effort to identify future data needs. The identified needs aligned with the rationale for establishing the baseline imagery and elevation datasets from the prior decade, and include a statewide wetland inventory (AMEC 2019). With the recognized importance of both the AGC and the AMEC, the Wetlands Technical Work Group (WTWG) is engaging state and federal land managers, and interested parties, in pursuing a comprehensive and collaborative approach to completing the statewide wetland inventory.

The WTWG charter (Appendix A) established a need to provide an “opportunity for Federal, State, and local agencies, non-profits and industry across Alaska to come together, in a collaborative and cooperative environment, to address wetland inventory and mapping needs for the state” (WTWG, 2016). This strategic plan adopts the National Wetland Inventory as the statewide wetland dataset. Furthermore, it establishes the path for completing the inventory, and associated ancillary wetland products, over the next ten years (2019-2029). While this strategy focuses on completing a statewide dataset, the WTWG may also simultaneously work on other projects consistent with its charter.

III. Need for a Complete Wetland Inventory

Multiple Sectors Rely on Accurate Geospatial Information

Fish and wildlife management, aviation and maritime safety, energy development, resource assessments, flood plain management, and recreational activities all depend on access to accurate, up-to-date wetlands and hydrographic data. The geospatial data to support modern wetland and hydrography maps do not exist for much of Alaska, where significant natural resource management and community use and development interests intersect. Geospatial information and datasets provide federal agencies, the State of Alaska and local communities with scientific tools and information to ensure balanced use and stewardship of public lands

Importance of the National Wetland Inventory

The National Wetland Inventory is widely used throughout the country, including Alaska, to support planning, development and conservation decisions. It provides consistent classification of wetland systems and its utility is widely documented in technical and academic literature. Additionally, over 4,406 NWI downloads occurred from the National Mapper during Federal fiscal years 2016-2018. Where NWI was available it was has been used to inform mapping of Alaska's rare wetland ecosystems (Flagstad et al. 2018) which provided the basis for a gap analysis to understand the systems' current level of land management protection relative to their conservation need (Flagstad et al. 2019).

Public and Community Uses

The USGS National Map draws on the National Wetland Inventory to display wetlands on their topographic maps. Those topographic maps are considered the gold standard for outdoor enthusiasts traveling in the backcountry. Accurate wetland information can assist an outdoor enthusiast in everything from route planning that avoids wetlands for backpackers to route planning that accesses wetlands for hunters and anglers. When wetland data are combined with hydrography, topography and infrastructure, the USGS is able to provide a more comprehensive landscape map and safer outdoor experience.

Support Land Use Planning Processes with Sound Science

The National Wetland Inventory is used to evaluate the effects of an undertaking on wetlands when conducting environmental analysis on proposed actions and management decisions. Project proponents also use NWI to conduct initial development planning (Colorado Department of Transportation, 2011) (US Federal Highway Administration and Mississippi Department of Transportation, 2009) (ASRC Energy Services, 2015). The first step of the process involves using a Geographic Information System (GIS) with the NWI polygons and project footprints to determine whether inventory information is available. If NWI data is available the reviewer identifies the types of wetlands that will be affected and then identifies how those wetlands interact with the watershed, how common are they and, if information is available, assess the extent to which a project will impact wetland habitat and actions to avoid and minimize impacts. This process is similar for small projects like subdivision development and large projects like major infrastructure (Kravitz & Blair,

2019). NWI is also used to support landcover mapping where more fine-scale datasets are unavailable or incomplete (Boggs et al. 2019).

Support Practical Science and Research Needs

National Wetland Inventory is used to expand research related to how wetlands can influence habitat and stream characteristics. Within Alaska, Fellman et. Al. 2013 conducted a study on nine salmon-spawning watersheds in southeast Alaska. Their study found that wetlands may be an important factor for determining stream temperature vulnerability to air temperature change. Research has shown that wetland cover, geomorphic class, topography, and mean elevation are important predictors of stream habitat types and processes such as aquatic communities, water chemistry, and summer temperature regimes (King et al. 2012, Walker et al. 2012, Mauger et al. 2012). Additional work occurs in the lower 48 using NWI data to support research for salmon habitat (Bartu & Andonaegui, 2001) (McGee, 2008) (Snohomish Basin Salmonid Recovery Technical Committee, 2005).

Expand Modeling Applications

Alaska wetlands support some of the largest migratory bird populations in the world. Yet, literature review and professional discussions suggest it is not easy to incorporate NWI data into migratory bird management and research due to lack of consistent coverage. The USFWS and Manomet Center for Conservation Sciences found that wetland fringe habitats are extremely important for nesting habitat, however, wetland information was limited to coarse scale land cover analysis, and the importance of high resolution data is needed for documenting current habitat extents (Saalfeld, Fischer, Stehn, Platte, & Brown, 2017). A study on the Alaska Peninsula relied on 50 meter pixel Landsat classifications from 1982 and USGS 1:63,360 map symbols to make initial inferences on wetland types for their study design (Savage, Tibbitts, Sesser, & Kaler, 2018). In the absence of NWI, land managers and researchers must take extra steps to categorize wetland types.

Summary

The National Wetland Inventory data are used, where available, across the state of Alaska to inform management decisions and research. The availability of the data is limited to coverage across 42% of the state. Based on research into NWI use in other parts of the country, it is anticipated that as NWI coverage becomes more comprehensive across the state, its use and utility to help inform proactive resources management decisions will also increase.

Figure 2 Resources with ties to wetland management-salmon, estuaries and oil and gas

IV. Alaska National Wetland Inventory Recommended Approach and Standards

As of Fall 2019, less than 42% of the state has NWI data available or is undergoing inventory (figure 3). The WTWG recommends mapping approximately 25 million acres each year. At that rate, it should take ten years to complete the statewide NWI base map for Alaska.

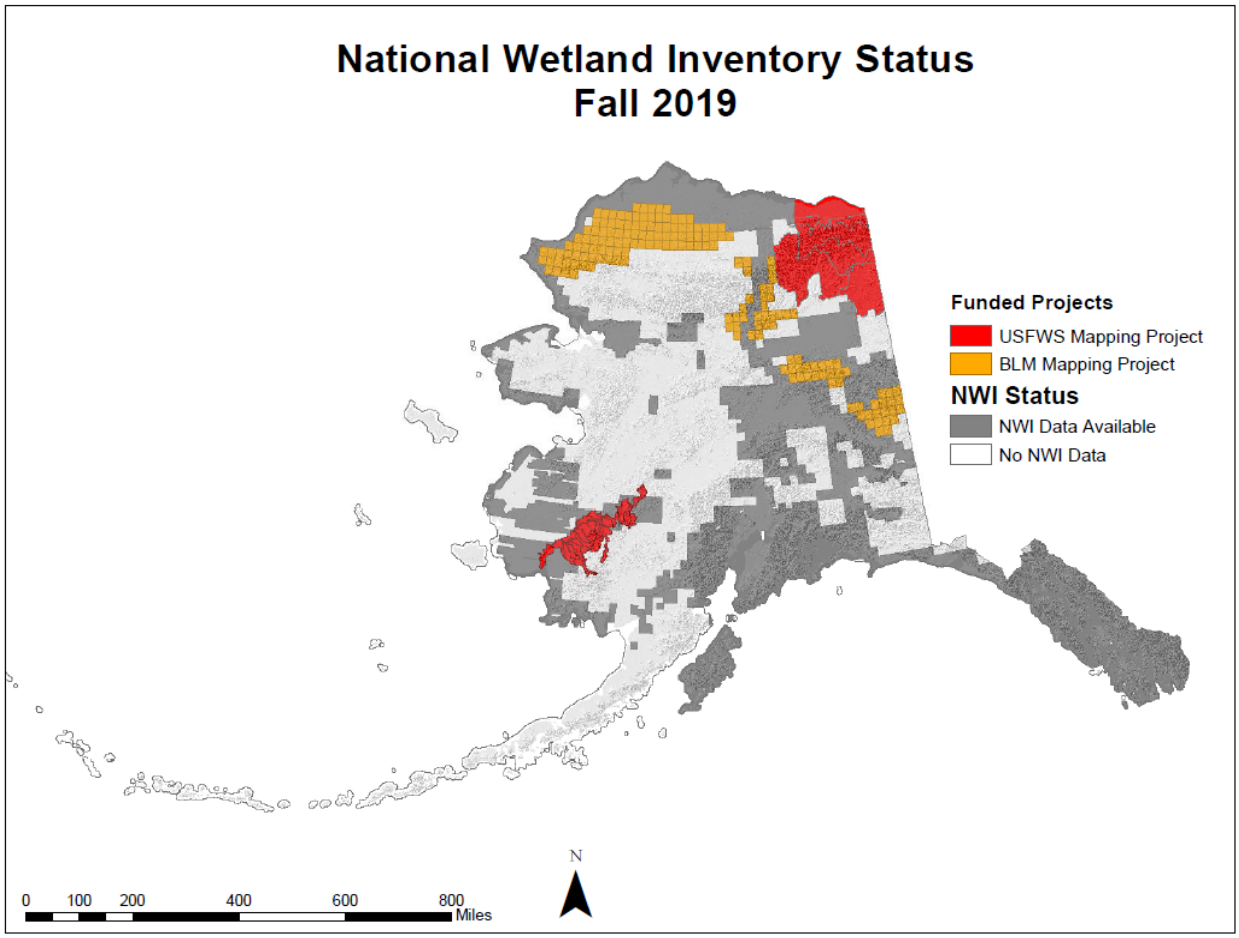

Figure 3 Current NWI status and funded projects.

The Office of Budget and Management Circular A-16 requires federally funded wetland mapping efforts to be conducted according to the Federal Geographic Data Committee (FGDC) National Wetland Inventory (NWI) Standard (Federal Geographic Data Committee, 2009). The USFWS is responsible for compiling and maintaining the National Wetlands Inventory database. Based on the Circular A-16 requirements and need for federal funding to support a statewide mapping effort, the Wetlands Technical Working Group recommends using the NWI as the framework as the official thematic layer that will be developed for mapping statewide wetlands.

The FGDC and USFWS establish the requirements for NWI mapping (FGDC, 2009) (Dahl, Dick, Swords and Wilen, 2015). The standard uses a five-acre Target Mapping Unit (TMU) as the level of detail for Alaska mapping, however the WTWG is

recommending an additional requirement of a one acre TMU for open water bodies be applied to all new mapping. The rationale for the WTWG recommendation is that recent investments in IfSAR and National Hydrography Dataset (NHD) products have created existing open water datasets at a one-acre TMU. To make the most return on investment, the open water bodies from those data sources should be incorporated in future wetland mapping efforts.

Alaska has extensive variability in terms of climate, land cover and access. In recent years, agencies such as USFWS and BLM have identified a one to two acre TMU as the appropriate level of detail for areas with sensitive resources, or with high probability for infrastructure development. Therefore, the WTWG recommends varying the resolution of the TMU from one to five acres on project by project basis in Alaska. The strategic plan identifies a TMU of five acres (with one acre for open water bodies) as the base data collection for Alaska and agencies will be encouraged to identify areas where a higher resolution is needed and make investments to acquire the level of detail to meet their needs.

The WTWG will work with the USFWS NWI program to coordinate NWI efforts across the state. This includes contacting potential partners and interested landowners regarding upcoming projects in order to pool expertise, coordinate data collection and leverage resources. Federal land managers are also encouraged to pursue internal funding for additional or enhanced data collection. State and Local Governments as well as Tribal Entities may also consider opportunities such as the EPA Wetland Program Development Grants for the same reasons. The WTWG will form an outreach subcommittee be to connect with non-traditional funders like NGOs and local governments.

NWI is one of many different wetland data products available. The WTWG recommends Landscape Position, Landform, Water Flow Path and Waterbody (LLWW) classification in its most current and appropriate version to Alaska, as an additional product to be included in all wetland inventories. The LLWW classification has been recognized as supplemental classifications that incorporate functions into the wetland classification (Federal Geographic Data Committee, 2009) (Tiner, 2011).

The priority of this strategy is to complete statewide wetland mapping, according to the NWI mapping conventions and supplemental LLWW attribution. This strategy does not address mapping updates or projects outside of the scope of statewide level mapping. The Alaska WTWG will address updates, or non-contributing projects through other means as defined in their charter (Appendix A).

Data Collection Process

The required base datasets for NWI collection will be the Statewide IfSAR elevation and, at a minimum, optical imagery should be the statewide SPOT. Ancillary datasets including radar images, higher resolution or more temporally relevant imagery products, vegetation inventories, and LIDAR data should be incorporated when available. The WTWG and the FWS NWI program will strive to incorporate New Mapping Technologies to increase the efficiency and accuracy of standard compliant data.

The WTWG encourages the use of one-meter resolution imagery into projects with a target mapping unit less than 5 acres. The WTWG and/or FWS NWI Program will provide project boundaries to the Alaska Mapping Executive Committee and Imagery Technical Working Group in order to request options for higher resolution data. Efforts should be made to acquire multi spectral imagery across the project area that is <5 years old with limited seasonal variability.

All data collection projects should be coordinated to maximize cost savings for field data collection. Coordination on hydrography, vegetation and soil survey projects should be considered and pursued, as feasible. Cooperation should not only occur for mobilization and equipment costs, but standard terminology for vegetation, soils and water regimes is also encouraged.

Quality Control/Quality Assessment Requirements for Mapping Updates

Quality Assurance and Quality Control are an established part of the NWI process. QAQC for NWI data is the sole responsibility of the USFWS. This process cannot be contracted out which ensures this step is not ignored and consistently applied using national standards. The WTWG recommends the USFWS develop a strategy, to be included in this document as an appendix that ensures timely QA/QC and integration of updated wetland data to the national mapper. This could include, identification of opportunities for temporary assignments and details to help address QA/QC needs.

Field validation will be an integral part of inventory update at all scales. A USFWS regional wetland coordinator or other qualified NWI staff person should be present, whenever practical, on all NWI mapping fieldwork to ensure NWI protocols are followed and to address issues that may arise during the QAQC process. All NWI mapping contracts/agreements should include a reference to the USFWS QAQC plan. The iterative QAQC process was developed to ensure questions or inconsistencies are addressed early in the mapping process.

V. Estimated Cost for Statewide NWI

The cost estimates for NWI updates in Alaska vary by project area but the average cost estimate for a 5-acre TMU project, with 1-acre open water TMU, is approximately $0.01/acre. Therefore, the remaining wetland mapping of Alaska at a 5 acre TMU, with one-acre open water bodies, is estimated to cost $2.5 million. The funding will be approached as an interagency effort, where all benefactors are encouraged to contribute to the statewide effort; however, the USFWS NWI Program is encouraged to take the lead on securing funding for the base map update.

Increased investments will be needed in areas where higher resolution data are identified and this strategic plan looks to project area land managers or benefactors as the primary source of funding for these investments. Field costs will vary based on landscape accessibility, fuel costs and target mapping unit. The total costs of a variable scale approach to mapping will be dependent on identified needs. This strategy will be amended as estimates are completed (see project schedule discussion). Total cost for a statewide one acre target mapping unit estimates exceeded 11 million dollars and therefore was not pursued. If investments indicate a statewide one-acre target map unit product is viable, the WTWG encourages pursuing that opportunity.

VI. Example Project Schedule and Implementation Plan

The project schedule will be based on available funding and goals of interested parties. Provided is an example schedule of a ten year statewide map inventory effort using watersheds as a project boundaries (figure 4).

2019/2020—Currently Funded Projects--50 million acres (not by watershed boundaries)

- Northern ANWR, 7.4 million acres (1 acre TMU CP, 3 acre TMU area C)
- 40 mile 7.3 million acres (1 acre TMU)
- Lower Kuskokwim, 5.5 million acres (1 acre TMU)
- BLM Projects, 16 million acres (1 acre TMU)
- Remaining ANWR, 12 million acres (5 acre TMU)

2021—total acres 31.2 million acres

- Lower Kuskokwim, 16 million acres
- Kobuk, 7.5 million acres
- Noatak, 7.7 million acres

2022—total acres 25.8 million acres

- North Seward Peninsula, 6.2 million acres
- Norton Sound, 12.9 million acres
- Chandalar River, 3.2 million acres
- Porcupine River, 3.5 million acres

2023—total acres 31.7 million acres

- Koyukuk, 15.8 million acres
- Melozitna-Yukon River, 12.2 million acres
- Beaver Creek-Yukon Flats, 3 million acres
- 40 mile, 670,000 acres

2024—total acres 25.2 million acres

- Lower Yukon (remap), 25.2 million acres

2025—total acres 24.8 million acres

- Nushagak, 9.3 million acres
- Kvichak-Port Heiden, 11.5 million acres
- St Lawrence Island, 2 million acres
- Nunivak Island, 2 million acres

2026—total acres 12.34+ million acres

- Kodiak-Shelikof (complete remap) 10.8 million acres
- Western Cook Inlet, 890,000 acres
- Knik Arm 390,000 million acres
- Prince William Sound 260,000 acres
- Consider extensive remap of KPB and PWS hydro units

2027—total acres 26.1 million acres

- Copper River 8.2 million acres
- Western Aleutians 17.9 million acres

2028—total acres 2.5+ million acres

- Gulf of Alaska (Yakutat) 2.5 million acres
- Remaining unmapped lands or high priority remap

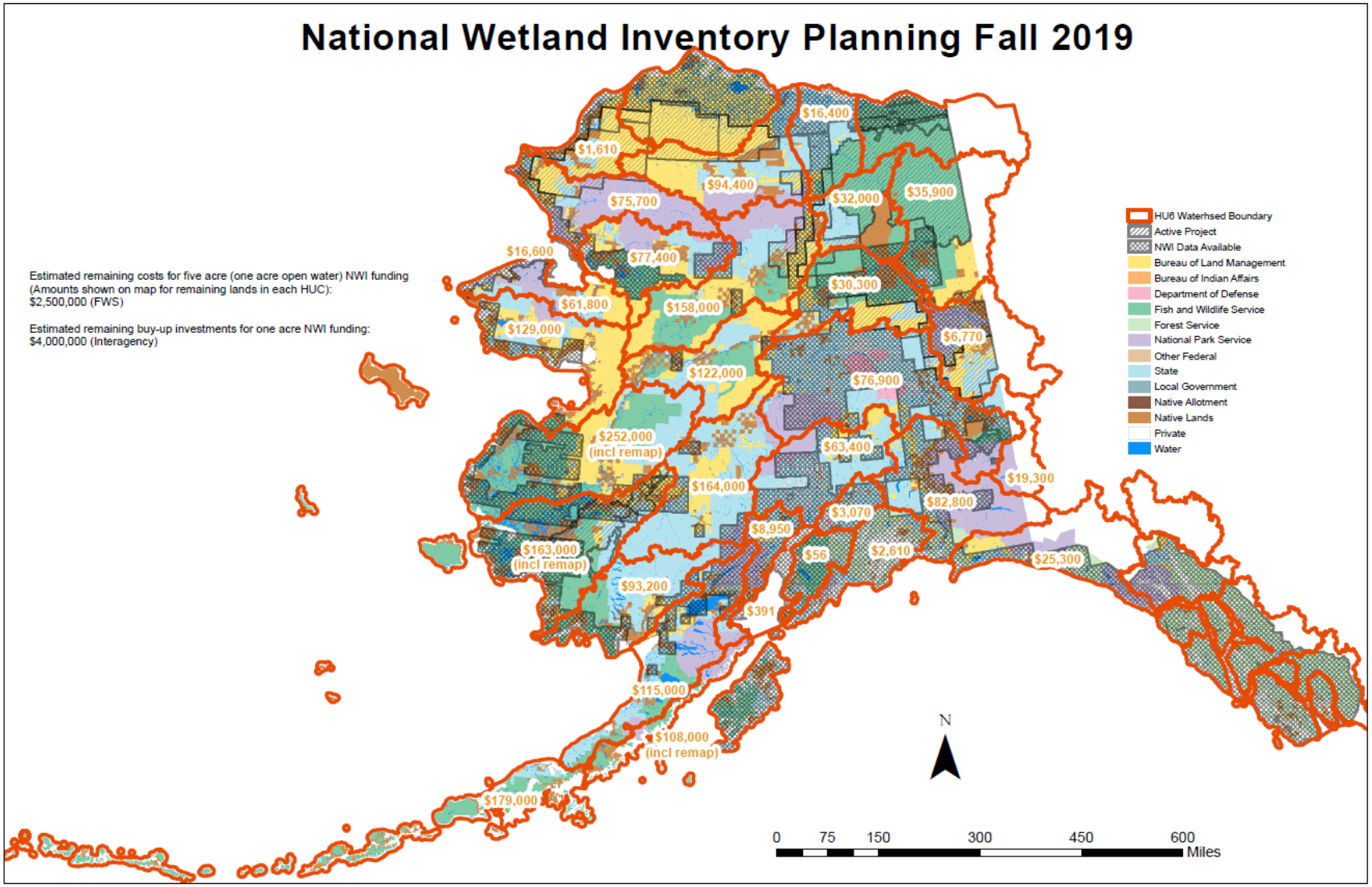

Figure 4 Example watershed based planning for NWI completion.

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VIII. Thank You

The AWTWG would like to extend our sincere thanks to all individuals who participated in the development of this strategic plan. Wetland inventory across the state of Alaska is dependent on collaboration and cooperation amongst all interested parties and this has been a true collaboration amongst stakeholders from state and federal agencies, local governments, universities and private industry. The time is now to tackle the unfinished business of inventorying Alaska's wetlands.

Appendix A

Alaska Wetlands Technical Working Group Charter

Alaska Geospatial Council
Wetlands Working Group Charter

1 Background

Approximately 65% of the nation's wetlands are located in Alaska covering approximately 174 million acres, or about 43% of the State's surface area (Hall et al, 1994). Wetlands are areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Alaska's wetlands include moist and wet tundra types, permafrost areas, marshes, bogs, fens, marshes, swamps, and salt marshes. The state's many intertidal, riparian and shallow water ponds and associated wetlands are recognized as important breeding habitats for numerous migratory bird species. The value of wetlands to wildlife in Alaska is not limited to migratory birds; many mammals, fish and other species utilize the habitat year round. Wetlands located within key watersheds also provide rearing habitat to juvenile salmon. Intertidal wetlands serve as a transition zone for anadromous fish moving to and from freshwater to the marine environment.

Wetlands provide many other valuable ecological functions, such as insulation for permafrost (temperature regulation) and maintenance of water quality by slowly filtering excess nutrients, sediments, and pollutants before water seeps into rivers, streams, and underground aquifers. Wetlands provide valuable flood attenuation in some flood prone areas due to the ability to intercept, retain and slowly release large amounts of surface water. Wetlands are also valued for their many recreational uses from hiking, photography/wildlife watching, hunting/fishing, and paddling (canoe and kayak). In Alaska, many of the areas that are economically important to the state are located in areas with high concentrations of wetlands.

Alaska is one fifth the size of the entire United States and is the only state with land area north of the Arctic Circle. Despite its resource potential and global impact, however, Alaska has the most limited geospatial data coverage of all states in the nation. Accurate, detailed geospatial information that meets national standards is lacking for much of the state, inhibiting responsible development, permitting and resource conservation, delaying or preventing adequate response to natural disasters and emergencies, and preventing effective measurement and monitoring of ecological processes.

2 Purpose

The Wetland Technical Working Group (WTWG) provides the opportunity for Federal, State, and local agencies, Non-Profits, and Industry across Alaska to come together in a collaborative and cooperative environment to address wetland inventory and mapping needs for the state. The Federal Geographic Data Committee (FGDC) Wetland Mapping Standard (2009) provides guidance and standards for the mapping of wetlands in Alaska. In addition, recently acquired imagery (SPOT 5) and elevation data (IfSAR) for the state provide unprecedented base spatial datasets to support landscape level wetland inventory. The initial purpose of the WTWG will be to evaluate existing standards, classification systems, inventory methods, and management needs in order to provide guidance to public agencies and private industry on recommended approaches for wetland inventory.

As approaches to base level wetland inventory are adopted and implemented, the WTWG will move on to consider wetland data needs that address finer resolution decision support such as wetland rapid assessment methods, jurisdictional determination, and mitigation. The ultimate goal of the committee will be the

development of a comprehensive suite of wetland inventory and data development approaches that address data needs from the landscape to the site level using standardized methods that are consistent with national and state guidance. Additional considerations for future discussion may include: alternative classification systems; approaches to wetland functional assessment; the role of wetlands in watershed plan development; and, integration of wetlands data with other base inventory layers such as the National Hydrography Dataset.

3 Objectives/Actions

- Identify and advise AGC on issues related to wetland theme development and stewardship;
- Coordinate, develop and make recommendations for goals and/or strategies to improve Alaska's wetland data.
- Assess, evaluate and adapt current national and state standards for wetland data to create a value added product to meet Alaska's needs.
- Develop, implement and revise stewardship guidance and procedures for wetland data;
- Serve as a regional voice and advocate for wetland data in Alaska to the Alaska Geospatial Council and other key advisory groups (e.g., the federal Alaska Mapping Executive Committee).
- Develop collaborative funding strategies to further wetland inventory and assessment activities.
- Develop a communication, outreach and advocacy strategy to facilitate knowledge transfer related to wetland mapping processes and to track mapping status and opportunities for collaboration.

4 Membership

Membership is voluntary and is open to all, including all levels of government, utilities, academia and the private sector. The working group will be led by a chair and co-chair with at least one of these positions being occupied by a state agency representative at all times. The chair and co-chair positions will be revisited annually by the working group and changes in responsibility will be endorsed by group consensus. The chair will maintain membership lists and make these lists publicly available on the WTWG website at agc.dnr.alaska.gov.

Participation in the WTWG does not preclude involvement in AGC-related geospatial procurement, as the group does not vote on Council matters or have fiduciary responsibilities. Procurement matters are separate from this group and will be decided by State government representatives on the Alaska Geospatial Council and conducted through established state procurement procedures.

5 Leadership

The Wetland Technical Working Group is chaired by a designated member of the group as established by consensus annually. The Alaska Geospatial Council will ratify the selection of Chair and this Charter. The responsibilities of the Chair shall include:

- Manage the membership list.
- Preparation and distribution of quarterly meeting agenda, including location and time.
- Chair meetings (as defined below) and preside over decisions.
- Provide executive oversight and leadership for working group activities.
- Report recommendations and provide status updates to the Alaska Geospatial Council.
- Ensure that minutes are accurate and publicly available.

In the event the Chair fails to perform theses duties [over a period of 6 months], the Co-chair will assume lead responsibilities until a new Chair is selected be consensus of the working group at the next quarterly meeting or by email poll.

6 Meetings

A minimum of four (4) meetings shall be convened each calendar year. Additional meetings may be called at the discretion of the Chair and/or Co-chair.

7 Communication

Written communications will take place via e-mail. A working group page will be maintained on the http://agc.dnr.alaska.gov website by the Department of Natural Resources GIO. Website postings will include:

- Charter
- Membership
- Meeting minutes
- Data standards and stewardship documents
- Activities calendar
- Other information as determined by the Council.

The working group will review and update website information annually or more frequently as needed.

8 Decision Making

Meetings shall be guided by consensus rule of those attending the meeting. Decisions that do not have a consensus may be tabled until the next meeting. A call for consensus may be issued via email to membership; if no objections are raised within 10 working days consensus will be considered achieved.

The Chair is the final arbiter if consensus cannot be reached in an appropriate amount of time.

9 Amendments

Amendments to this charter can be made at any regular meeting if the amendments are listed in the meeting's agenda and the amendment has consensus.

10 Dissolution

The working group will continue to function as long as it is required by the Alaska Geospatial Council. The Council may dissolve the working group at any time if it is determined to be no longer necessary.

11 References

Hall, Jonathan V., W.E. Frayer, and Bill O. Wilen. 1994. Status of Alaska Wetlands. U.S. Fish and Wildl. Serv. 32pp.

Alaska Geospatial Council

Approval of the Alaska Geospatial Wetlands Technical Working Group Charter

ED FOGELS, Chair
Commissioner
Department of Natural Resources

Date: 12/22/16