NWI Standards and Dataset: A Cornerstone for Decision Support

Uses of NWI Data

GeoSpatialServices

Saint Mary's University OF MINNESOTA

Association of State Wetland Managers

Wetland Mapping Consortium

December 09, 2015

U.S. FISH & WILDLIFE SERVICE

The Laundry List…

Habitat Inventory and Modelling

NHD and NHDPlus Updates

Watershed Planning

SLAMM (Sea Level Affecting Marshes Model) – Coastal resilience

Wetland Functional Assessment – stakeholder engagement, preservation, restoration and enhancement

National Status and Trends

Initial Permit Screening (EPA, USACE, States, developers) – EA, screening, etc.

Mitigation and Restoration

Potentially Restorable Wetlands

Climate Change research

RTE Species Recovery Plans

Transportation and Facility location planning

Invasive Species Control

Carbon sequestration modelling

Energy project planning

NWI Ver. 2 – surface waters inventory

Primary Application Areas

1. Use as base mapping – “Where are the wetlands”
   - permit/applicant screening
   - status and trends
   - restoration

2. Use as input for developing other map products
   - wetland functional assessment
   - SLAMM modelling
   - potentially restorable wetlands

3. Use for decision support
   - watershed planning
   - climate change research
   - RTE species recover planning

The Laundry List… Refined

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Habitat Inventory and Modeling

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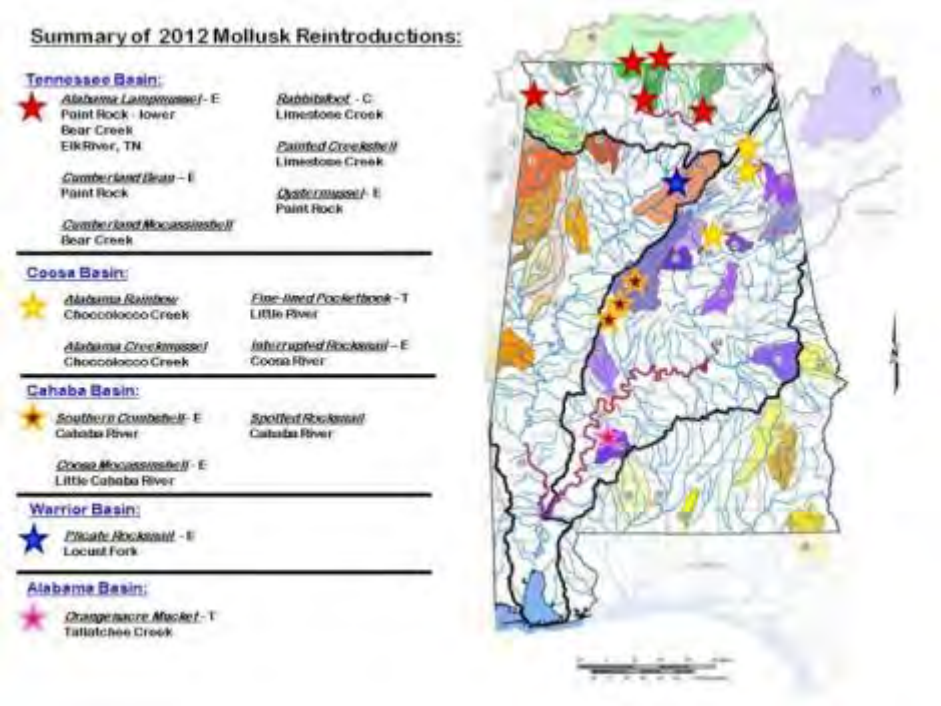

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- Water storage and release, maintenance of base flow
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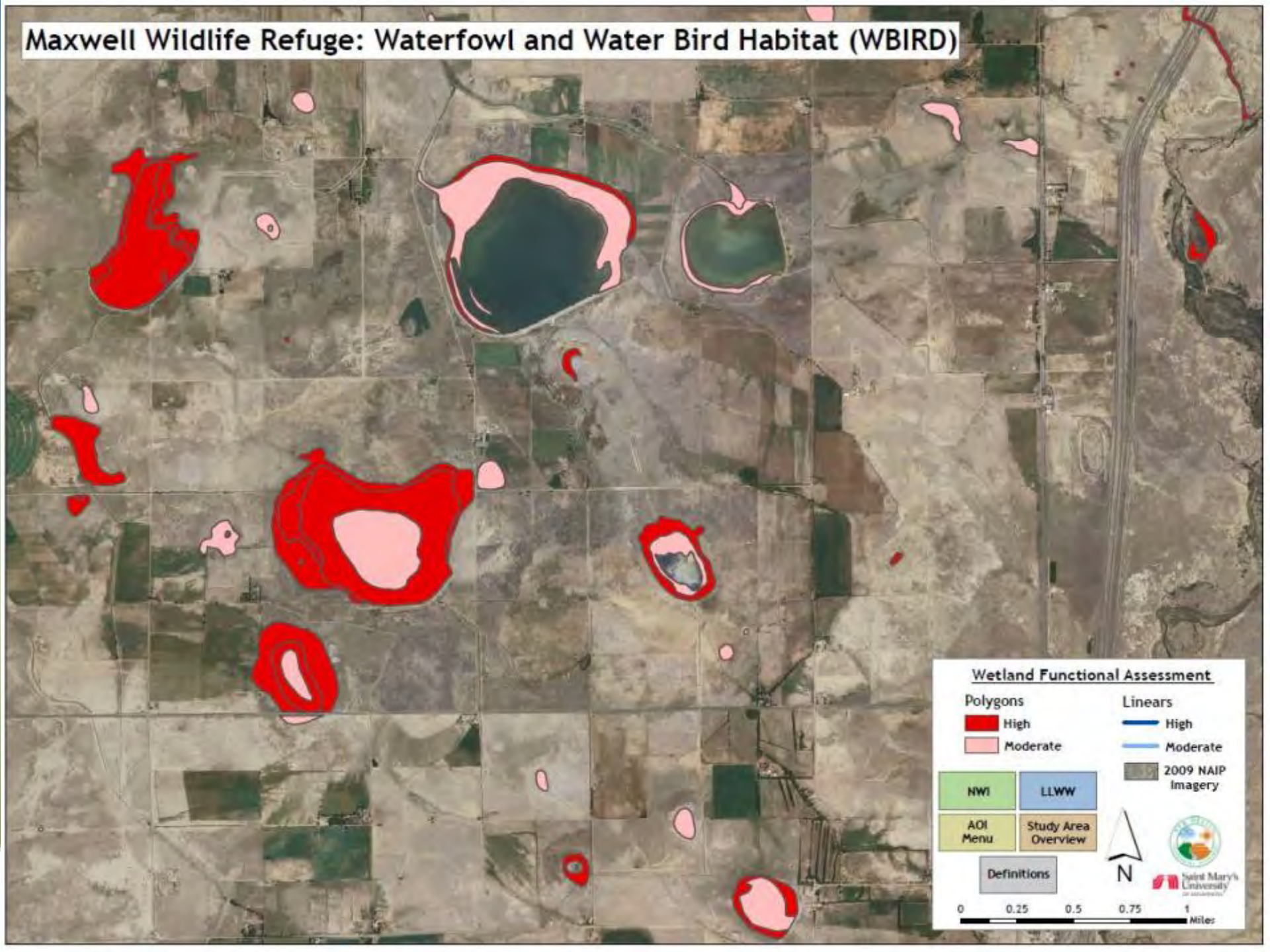
Maxwell Wildlife Refuge: Waterfowl and Water Bird Habitat (WBIRD)



Watershed Planning

So, Why Include Wetlands in Watershed Plans?

Wetlands play critical roles:

- Ecosystem function
  - Influence water quality
  - Recycle nutrients
  - Filter pollutants
  - Contribute to climatic processes
  - Provide habitat for fish and wildlife
- Watershed dynamics
  - Surface water management (interception, storage, release)
  - Groundwater management (release, recharge, storage)
  - Provide for stream/river base flow
- Societal health (values)
  - Reduce peak flows and flood damage
  - Food production
  - Water filtration
  - Shoreline protection
  - Recreation and education

So, Why Create Watershed Plans?

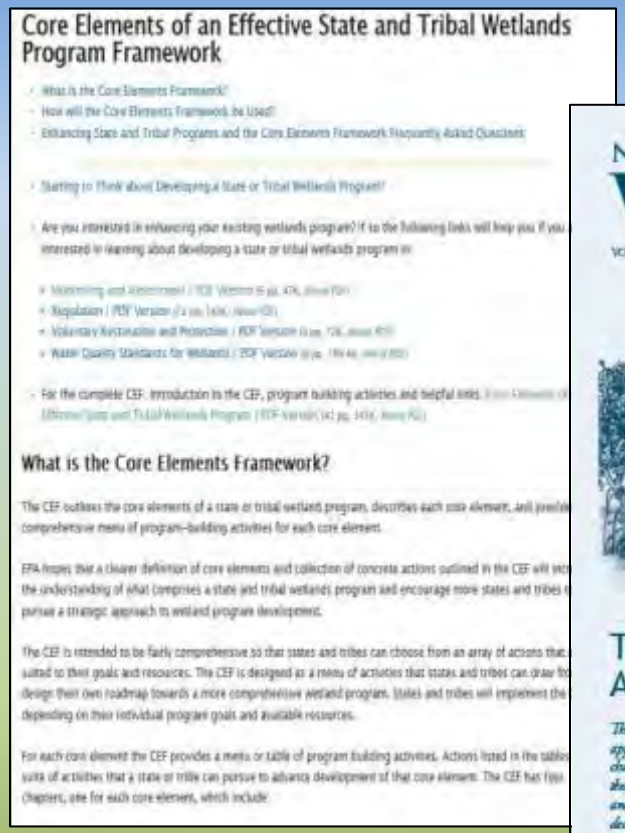
Regulatory Context

- CWA Section 404 federal legislation to minimize the physical alteration of wetlands through dredging and filling
- Where wetland damages are unavoidable applicants must provide compensatory mitigation of wetland damage
- Restoration/creation , preservation and enhancement

Watershed Plans:

- Complimentary documents to regulatory framework:
  - Guide compensatory mitigation location and collaboration
  - Address wetlands not covered by CWA 404 (e.g. geographically isolated wetlands)
  - Address indirect impacts (e.g. adjacent land use, zoning, development, runoff, atmospheric deposition)
  - Incentivize voluntary actions focused on preservation, enhancement or restoration (e.g. land acquisition, easements, landowner activities)

Some Key Guidance


Core Elements of an Effective State and Tribal Wetlands Program Framework

- What is the Core Elements Framework?
- How will the Core Elements Framework be Used?
- Enhancing State and Tribal Programs and the Core Elements Framework Frequently Asked Questions

- Starting to Think about Developing a State or Tribal Wetlands Program?

- Are you interested in enhancing your existing wetlands program? If so the following links will help you. If you are interested in learning about developing a state or tribal wetlands program in:

- Monitoring and Assessment
- Regulation
- Voluntary Restoration and Protection
- Water Quality Standards for Wetlands

- For the complete CEF, Introduction to the CEF, program building activities and helpful links.

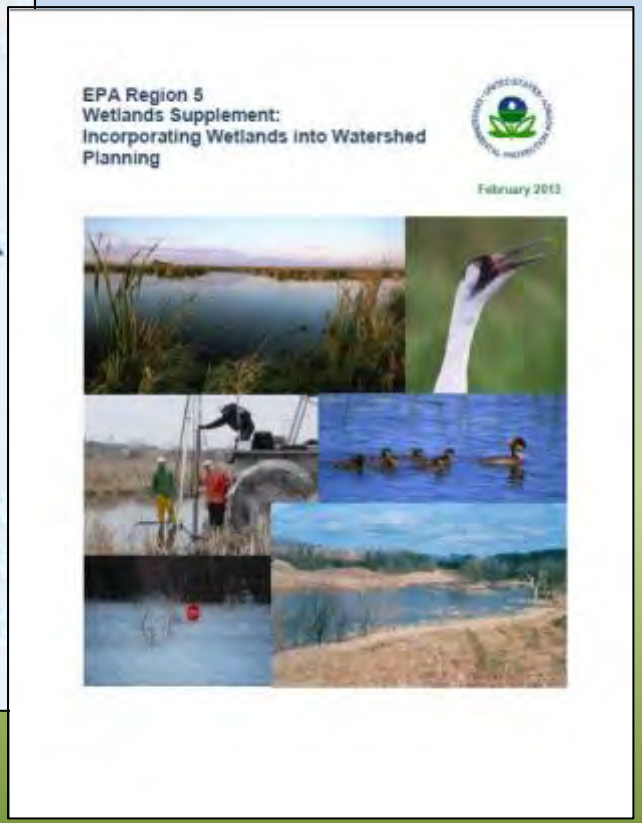
What is the Core Elements Framework?

The CEF outlines the core elements of a state or tribal wetland program, describes each core element, and provides a comprehensive menu of program-building activities for each core element.

EPA hopes that a clearer definition of core elements and collection of concrete actions outlined in the CEF will increase the understanding of what comprises a state and tribal wetlands program and encourage more states and tribes to pursue a strategic approach to wetland program development.

The CEF is intended to be fairly comprehensive so that states and tribes can choose from an array of actions that are suited to their goals and resources. The CEF is designed as a menu of activities that states and tribes can draw from to design their own roadmap towards a more comprehensive wetland program. States and tribes will implement the CEF depending on their individual program goals and available resources.

For each core element the CEF provides a menu or table of program building activities. Actions listed in the tables are suite of activities that a state or tribe can pursue to advance development of that core element. The CEF has four chapters, one for each core element, which include:



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Wetland Functional Assessment

So, What Is Landscape Level Wetland Functional Assessment?

A wetland mapping approach that allows us to:

- Inventory current and historic wetland resources within a watershed using traditional and evolving technologies
- Characterize those wetlands with a suite of descriptive metrics
- Correlate wetland characteristics to ecological functions they provide
- Support informed decisions about wetland preservation, enhancement and restoration opportunities
- Incorporate watershed planning objectives, partnerships and stakeholder engagement

Wetland Inventory to Wetland Functional Assessment

- work with existing landscape level wetland inventory techniques
- extend mapping to include additional descriptive metrics (e.g. soils, elevation surfaces, hydrogeomorphic, adjacent landcover/landuse, water quality, and others)
- incorporate applied science, best professional judgment, local input, stakeholder concerns

Main Steps in the WFA Process

WFA is an "adaptive environmental management process":

1. Inventory Present-Day Wetlands (WWI)
2. Convert and refine to NWI FGDC standard
3. Interpret additional hydrogeomorphic metrics
4. Correlate wetland functions to wetland data
5. Identify Historic and Potential Restorable Wetlands (PRWs)
6. Prioritize wetland preservation, enhancement and restoration

> *"Adaptive management is a decision process that promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood"* Williams, et al. 2009

Wetland Functional Correlation

Potential Wetland Functions for Assessment

Physical and Biogeochemical Functions

- Surface Water Detention
- Streamflow Maintenance
- Energy Dissipation
- Groundwater Recharge
- Shoreline Stabilization
- Nutrient Transformation
- Carbon Sequestration
- Sediment or Particulate Retention

Habitat Functions

- Fish Habitat
- Aquatic Invertebrate Habitat
- Waterfowl Habitat
- Water Bird Habitat
- Amphibian Habitat
- Other Wildlife Habitat
- Conservation of Biodiversity

Surface Water Detention (SWD)

Wetlands that provide high levels of surface water detention include those found along stream and river floodplains, in lakebasins and fringes and islands. Terrene wetlands with throughflow are also included. Moderate SWD is found in vegetated wetlands and ponds with isolated or outflow water path.

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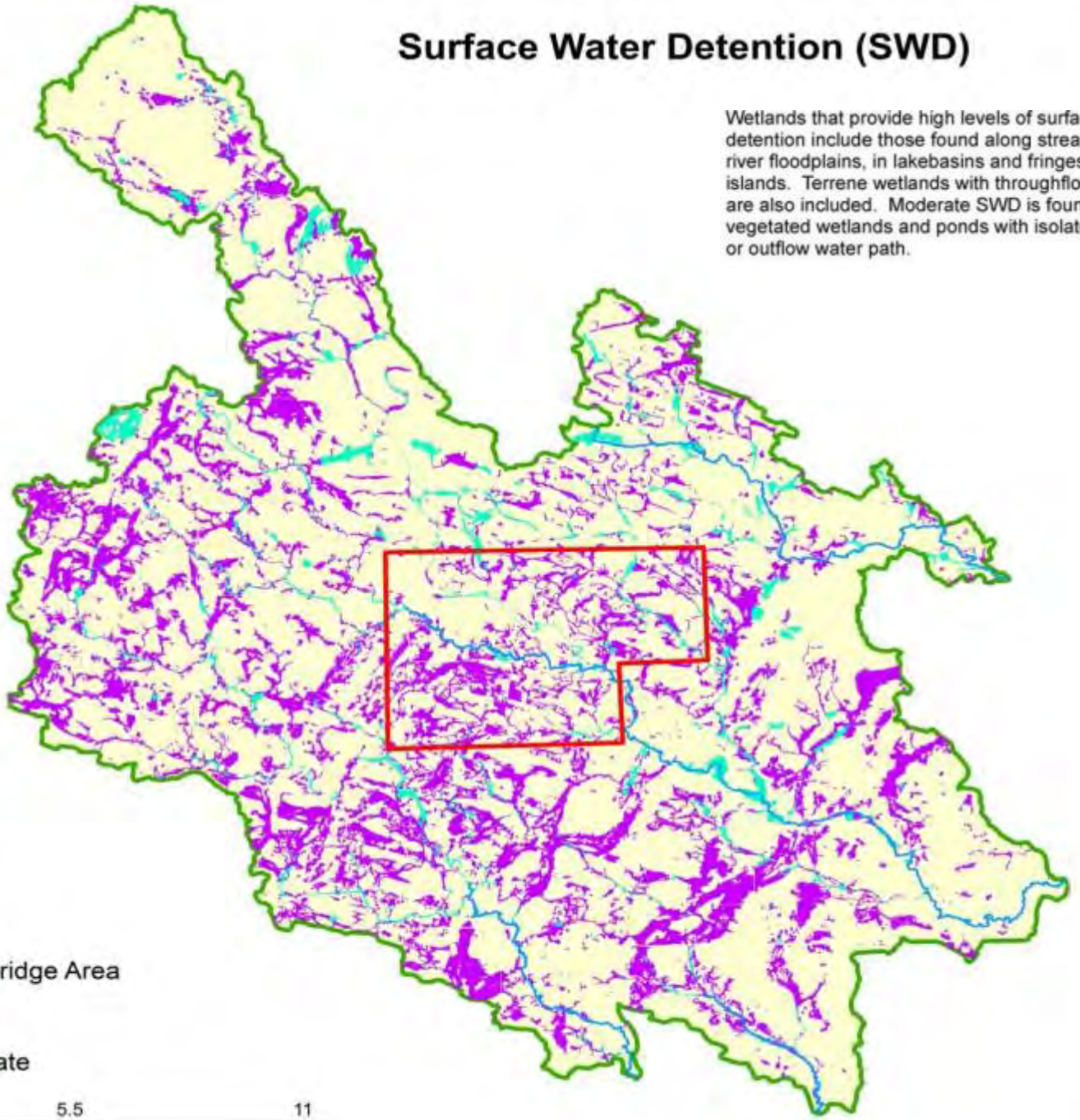
US Army Corps of Engineers

St. Paul District



Climate Change Research

Climate Change Research

- Wetland status and trends incl. change detection
- Invasive species distribution and extent
- Adaptation of flora and fauna
- Wetland response to changes in precipitation and evaporation
- Change in wetland functions such as carbon sequestration

Alaska is the Frontline of Climate Change

Updated wetland mapping is critical:

- habitat inventory e.g. migratory birds
- coastal change: erosion, flooding, storm intensification etc.
- shallow lake draining and drying
- permafrost degradation and thermokarst
- vegetation encroachment and rapid succession

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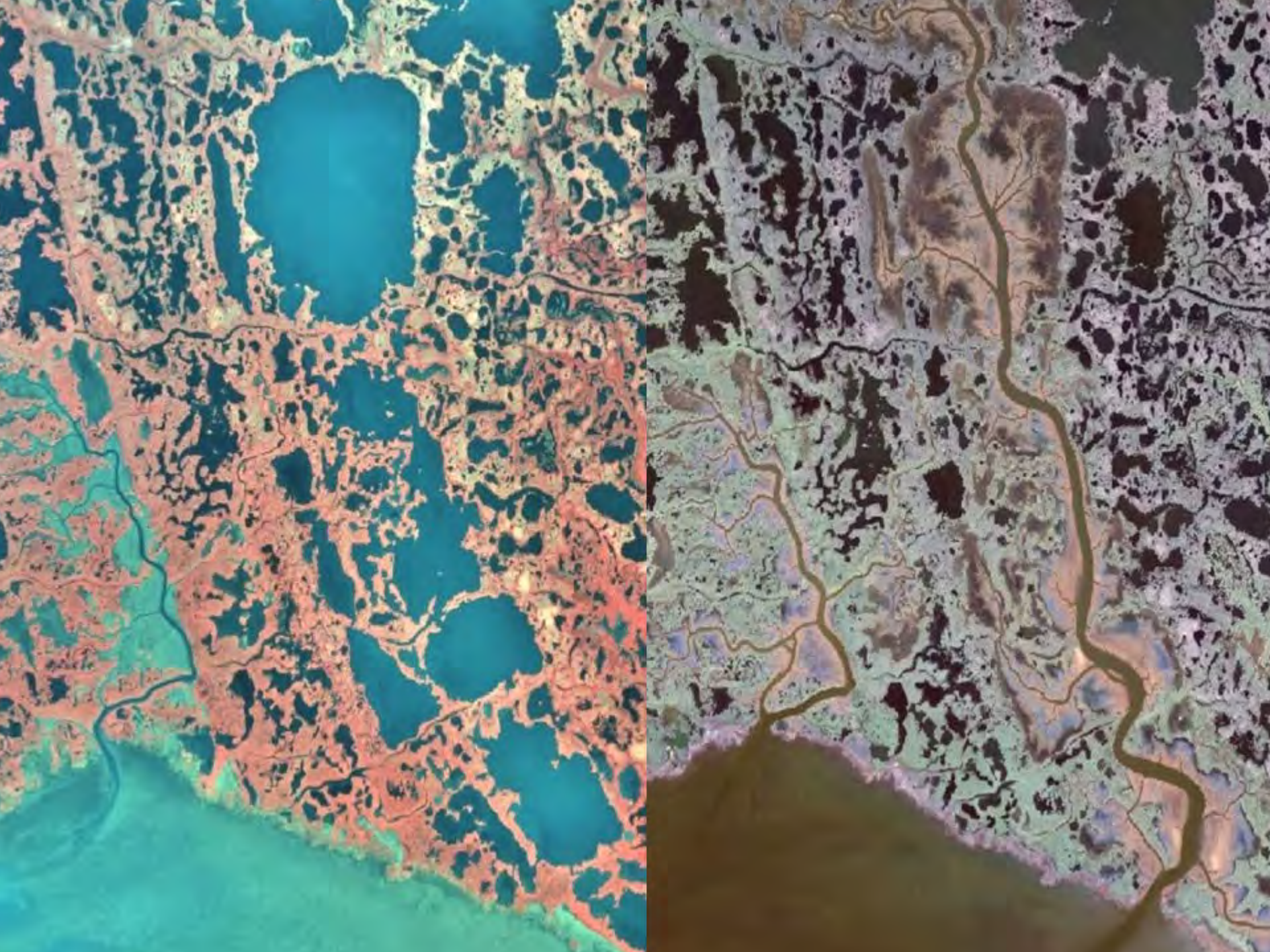

National Wetland Inventory Opportunities

- Extent of land area to be mapped
- Diversity of the Alaska landscape
- Up to date imagery - 2012- 2015 vintage
- Evolving collateral data layers and research
- New high resolution digital elevation models
- Availability of multi-agency project funding

NWI Version 2.0 – Surface Waters Inventory

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What is SWI?

- Often referred to as version 2.0 of the National Wetlands Inventory
- Provides more inclusive geospatial data of all wetlands and surface water features.
- SWI is a derived dataset that depicts all surface water and wetland features in a single feature class
  - Retains the wetland and deepwater polygons from NWI
  - Reintroduces linear wetland features orphaned from original NWI hardcopy maps by converting them to narrow polygonal features
  - Supplements the dataset with buffered hydrographic linear data that were missed by NWI mapping or to delineate and classify segmented connections

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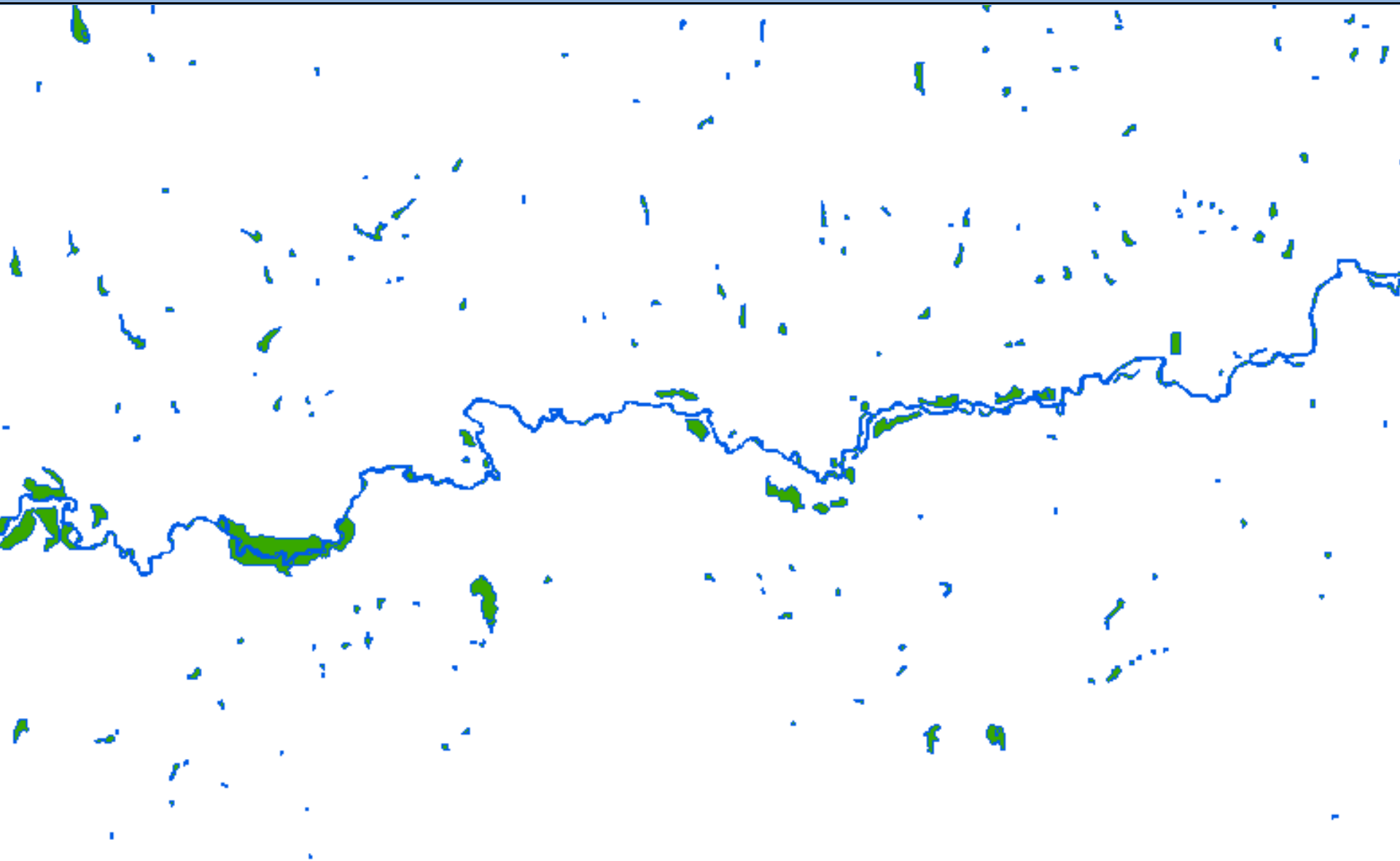

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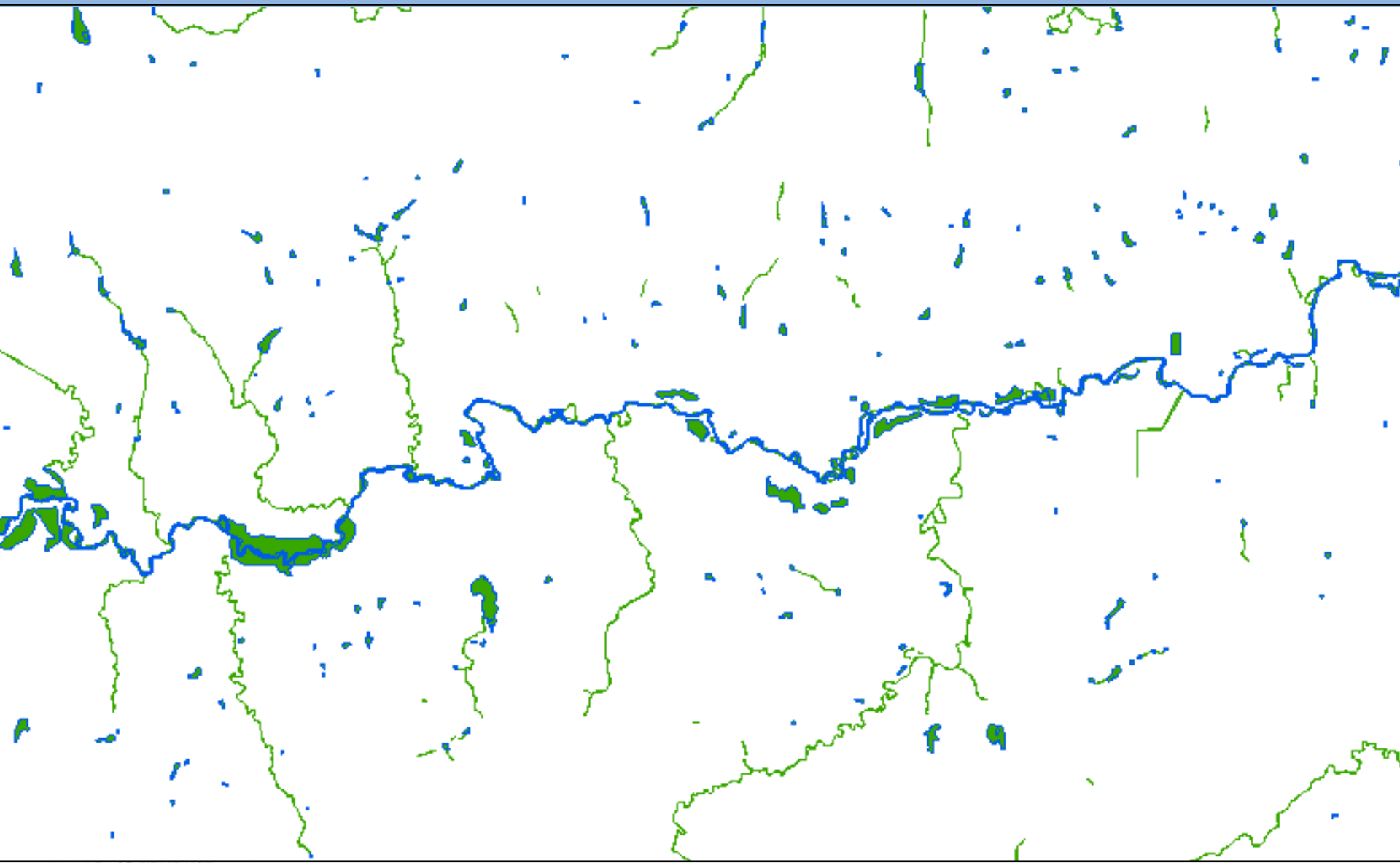

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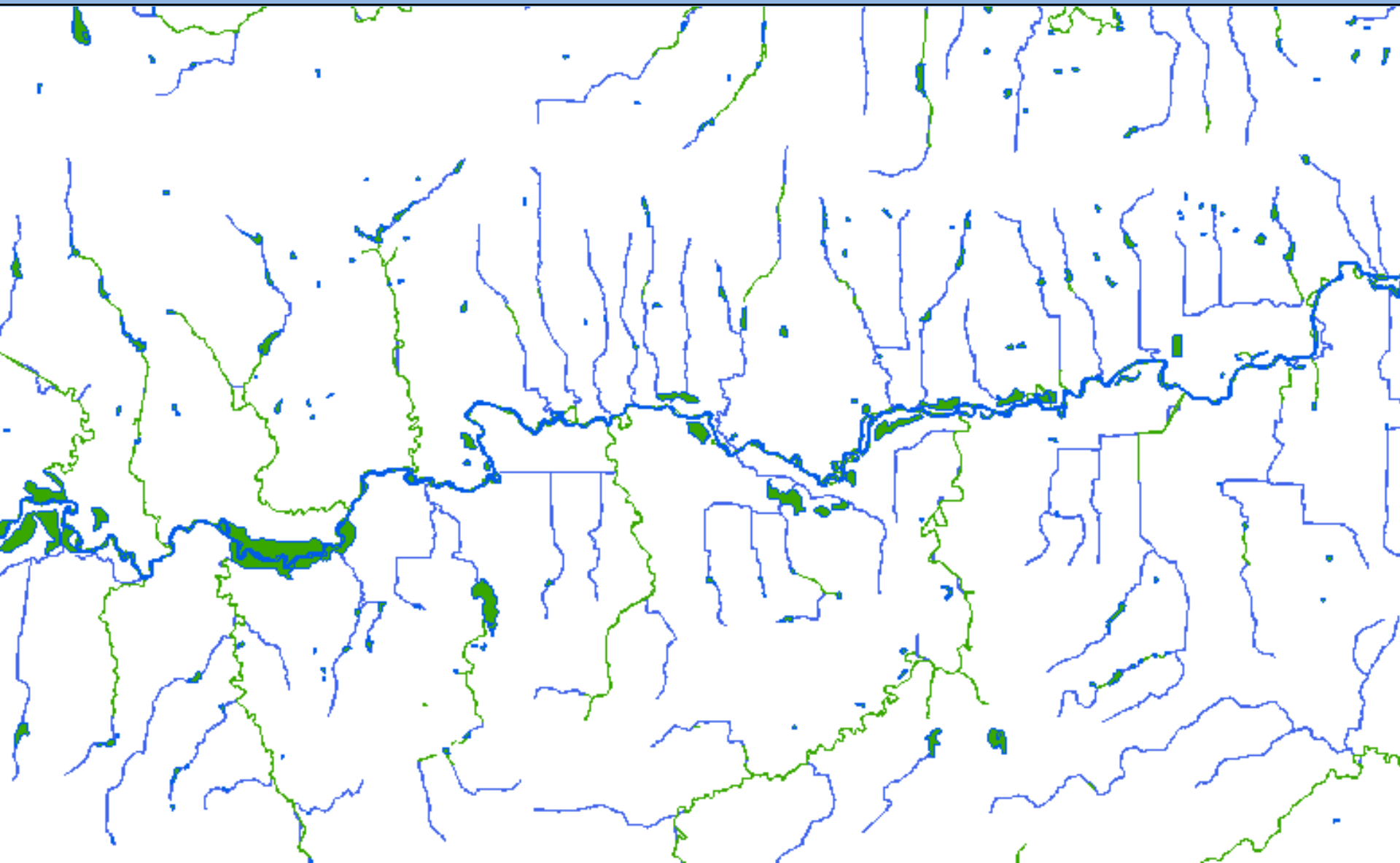

NWI Version 2.0 – Surface Waters Inventory

- Recognition of the importance of wetlands as part of all surface waters
- Isolation vs. connectivity
- Network data model = flow tracing
- Water storage and release, maintenance of base flow
- Nutrient cycling, sediment control, water quality
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NWI Version 2.0 – Surface Waters Inventory

Why SWI?

- It stems from the need to represent all surface waters and wetlands as polygons in a geospatial dataset to facilitate accurate area calculations and provide consistent, standardized ecological classification to allow for adaptive management, geospatial summaries, and modeling.
  - Tracing contaminant pathways through aquatic systems
  - Quantifying water retention capabilities upstream
  - Identifying and prioritizing habitat restoration opportunities
  - Examining continuity or dissection of habitat corridors
  - Quantifying aquatic and wetland resource types
  - Facilitating ecological modeling
- Environmental Protection Agency's Science Advisory Board (SAB) final report titled Connectivity of Streams and Wetlands to Downstream Waters: A Review and Synthesis of the Scientific Evidence
  - The report examines the effects that headwater and ephemeral streams and wetlands have on larger downstream waters.

Questions?

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