



# **USING NATIONAL WETLAND INVENTORY DATA TO ASSIST STATE/TRIBE WETLAND MONITORING AND ASSESSMENT EFFORTS**

**Association of State Wetland Managers**

**Presented by: Yvonne Vallette, EPA Region 10**

**December 1, 2020**

# WETLAND MONITORING & ASSESSMENT PROGRAMS

Consistent, thorough and timely wetland monitoring and assessment programs are a critical tool for states and tribes to better manage and protect their wetland resources. These programs allow states and tribes to:

- ▶ establish a baseline in wetlands extent, condition and function;
- ▶ detect change;
- ▶ prioritize wetland restoration/protection,
- ▶ evaluate success of wetland restoration, and
- ▶ characterize wetland trends over time.



# BENEFITS OF WETLAND MONITORING & ASSESSMENT (M&A) PROGRAMS

- ▶ Well-designed & executed wetland M&A programs are a critical tool for states and tribes to better manage and protect their wetland resources.
- ▶ Allows states/tribes to establish a baseline in wetlands extent, condition and function, detect change, assess value, and characterize trends over time.
- ▶ M&A can inform planning and prioritization at both the individual wetland and watershed scales and is a tool to guide state/tribal decision-making.

# BENEFITS OF WETLAND MONITORING & ASSESSMENT (M&A) PROGRAMS

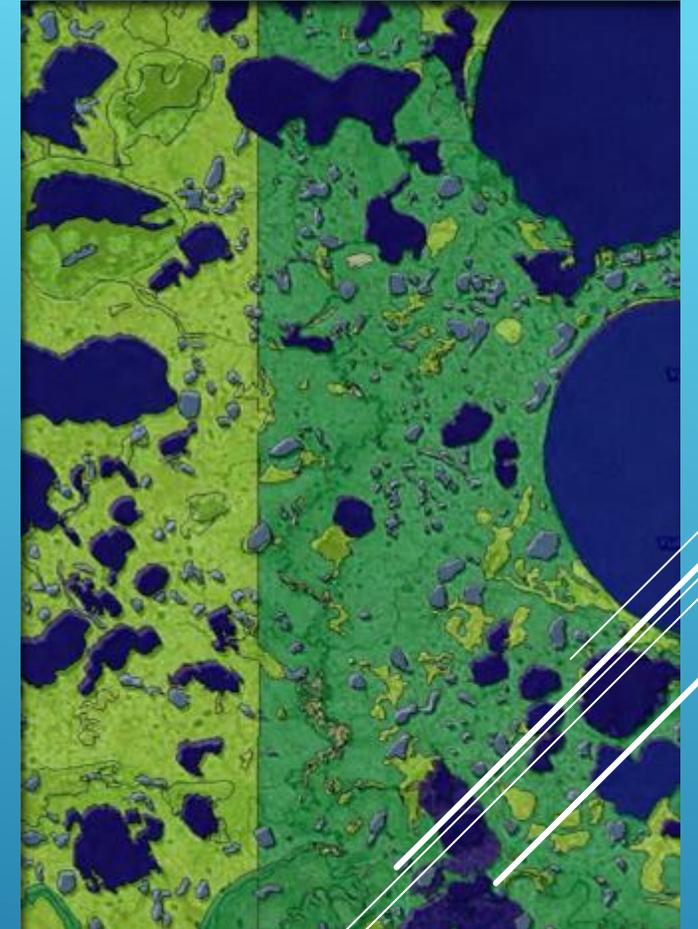
- ▶ States/tribes can use M&A data to determine if water quality standards are being met or to develop wetland-specific water quality standards. They can also help determine if permits are maintaining WQs standards.
- ▶ Help evaluate the success of wetland restoration.
- ▶ By integrating wetland monitoring data with information on other aquatic resources, M&A strategies become an important bridge between wetlands and other water programs within a state or tribe.



# EPA'S 3 TIER APPROACH FOR M&A

- ▶ **Level 1 – Landscape Assessment** - relies primarily on mapping (NWI), remote sensing, and modeling to evaluate wetlands on a regional, statewide, or watershed scale.
- ▶ **Level 2 – Rapid Wetland Assessment** – On-the-ground site specific work that can be done quickly via rapid assessment methods that rely on readily visible indicators of wetland condition, local stressors (e.g. land use, wetland alteration) which impact condition, and best professional judgment to fill in gaps.
- ▶ **Level 3 – Intensive Site Assessment** – includes traditional, long-term scientific investigations. Detailed chemical, physical, and biological information is gathered over time.

- ▶ Level 1 (landscape) assessments rely entirely on existing GIS and mapping data, utilizing landscape disturbance indices to assess wetland condition.
- ▶ This approach involves characterizing the lands that surround wetlands through the use of landscape metrics (e.g., percent forest cover and land use category).
- ▶ Assessment results can provide a coarse gauge of wetland condition within a watershed.



## TIER 1- LANDSCAPE ASSESSMENT

- ▶ Level 2 (rapid) assessments use relatively simple metrics (like buffer size, etc) to assess wetland condition.
- ▶ They are customarily based on the readily observable hydrogeomorphic and plant community attributes of wetlands. They also can employ the use of a “stressor checklist.”
- ▶ Rapid assessment methods typically produce a single score that describes where a wetland generally falls along a gradient of human disturbance and with respect to ecological integrity.



## TIER 2- RAPID ASSESSMENT

- ▶ Level 3 (intensive site) assessments provide a more thorough and rigorous measure of wetland condition by gathering direct and detailed measurements of biological taxa and/or hydrogeomorphic functions.
- ▶ Examples of the type of indicators used in a Level 3 assessment are plant composition/structure (e.g., Index of Biological Integrity, Floristic Quality, etc) and soil organic matter content.
- ▶ Level 3 assessment provide more robust results that can be evaluated to develop more rapid indicators or indices.



## TIER 3- INTENSIVE ASSESSMENT

- ▶ Wetlands assessment activities at all three levels can be effectively integrated with other surface water monitoring efforts such as stream or habitat assessments.
- ▶ Doing so can provide a more integrated understanding of watershed health and a foundation for developing more effective management approaches.



## WETLAND ASSESSMENTS

# NWI & NWCA- A MARRIAGE OF INTERESTS

- ▶ The U.S. Fish and Wildlife Service (USFWS) Status and Trends studies are based on a statistical sampling of the National Wetland Inventory (NWI) maps that focus on wetland acreage. Over the past decade, studies in wetland health and trends in wetland health have gained importance in understanding the quantity and quality of the nation's wetlands.
- ▶ The Environmental Protection Agency (EPA), in partnership with states and tribes, conducted the first national wetlands condition assessments (NWCA) in 2011, 2016 and soon in 2021.
- ▶ NWCA provides the baseline for wetland quality in the United States. Builds on the success of the US FWS Wetland Status and Trends (S&T) Report. Just as the S&T Report characterizes wetland acreage by category across the country, NWCA characterizes wetland condition nationwide for many of the same wetland classes.
- ▶ The two efforts provide the public and government agencies with national information on wetland quantity and quality. The data provides an integrated evaluation of the cumulative effects of actions that either degrade wetlands or protect and restore their ecological condition.

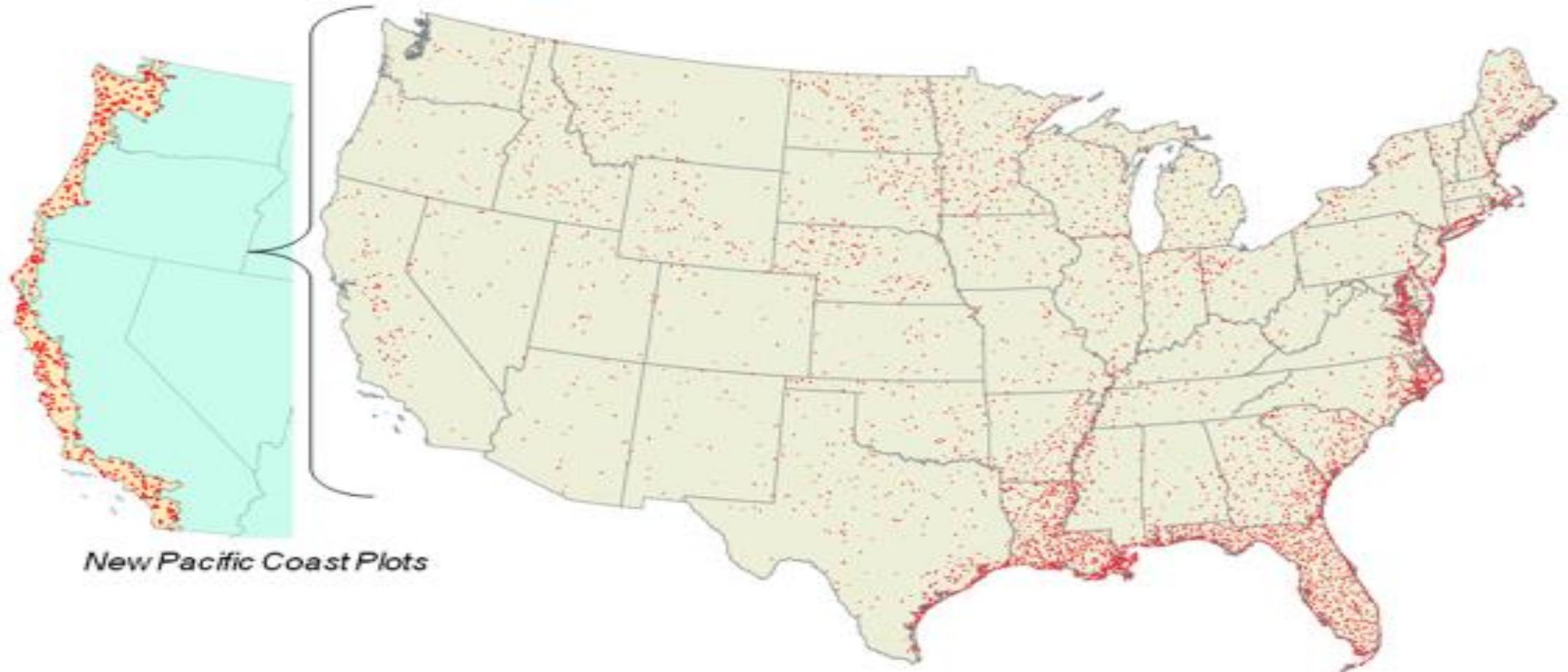
# EPA'S NATIONAL WETLAND CONDITION ASSESSMENT (NWCA)

- ▶ The NWCA survey was designed to provide regional and national estimates of wetland ecological integrity and rank the stressors most commonly associated with poor conditions. The process of designing and conducting the survey also helps to build state/tribal capacity to monitor and analyze wetland condition while promoting collaboration across jurisdictional boundaries.
- ▶ Uses a probability-based sampling design that provides a statistically-valid estimates of condition for a population of wetlands. A consistent field assessment procedure ensures that the results can be compared across the country. The assessment examines ecological, biological and water quality indicators and assess the extent of key stressors across the country.
- ▶ In concert with similar surveys on the Nation's coastal waters, wadeable streams, rivers, and lakes, NWCA can inform decision-makers on how to better protect, maintain, and restore water-quality to the Nation's aquatic resources.

## 2011 NWCA SAMPLE FRAME



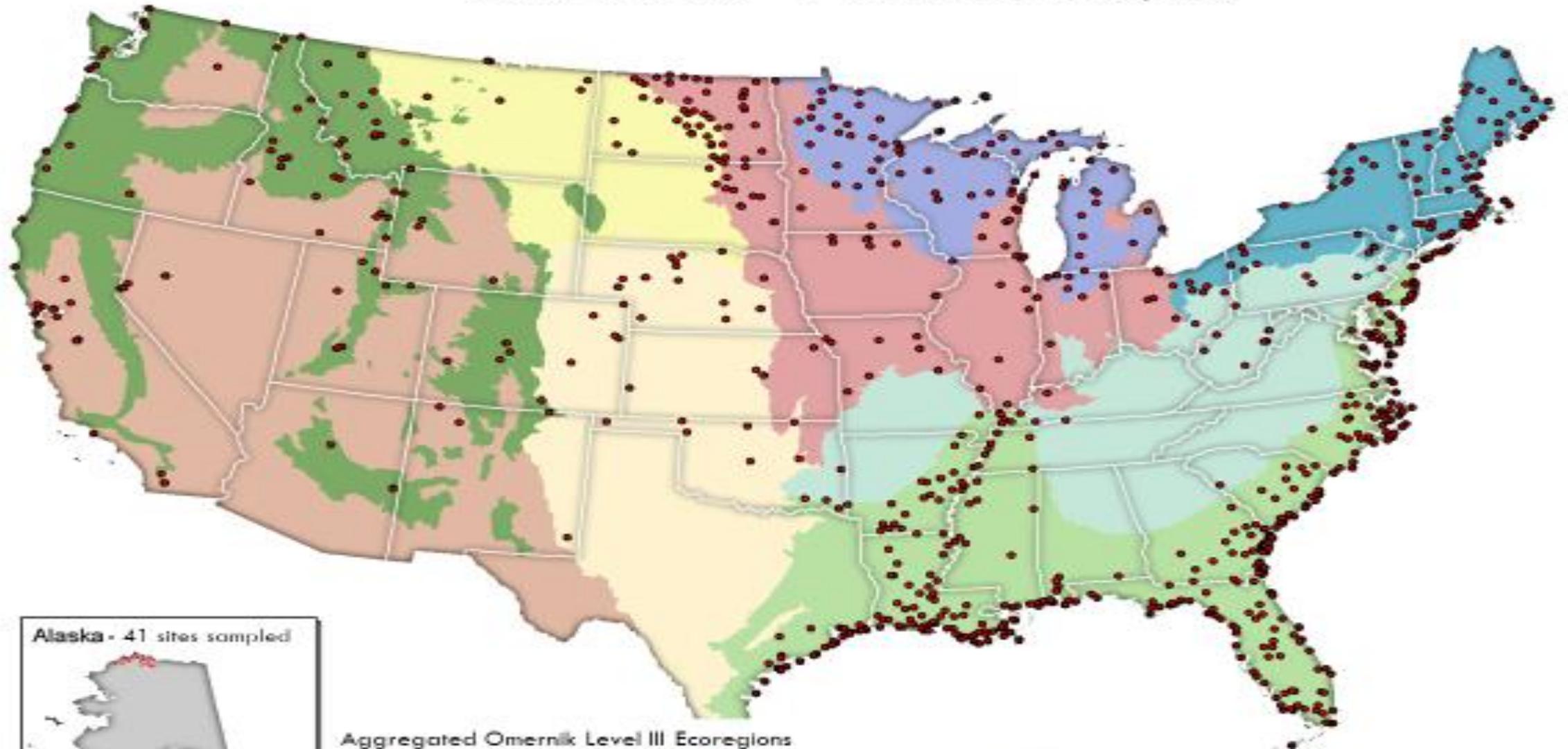
### Status and Trends 2005 Plot Locations



*New Pacific Coast Plots*

Each red dot is a 4 square mile plot that includes mapped wetlands, deepwater, and uplands.

# 2011 NWCA - 1138 sites sampled



## Aggregated Omernik Level III Ecoregions

- |   |   |   |
|---|---|---|
|  Coastal Plain         |  Southern Appalachians |  Upper Midwest     |
|  Northern Appalachians |  Southern Plains       |  Western Mountains |
|  Northern Plains       |  Temperate Plains      |  Xeric             |



WHAT IS THE  
EXTENT OF  
WETLAND  
ACREAGE THAT  
SUPPORTS  
HEALTHY  
ECOSYSTEMS?



HOW  
WIDESPREAD  
ARE THE MOST  
SIGNIFICANT  
PROBLEMS  
AFFECTING  
WETLAND  
QUALITY?



HOW DO GAINS  
AND LOSSES IN  
WETLANDS  
ACREAGE AFFECT  
THE OVERALL  
CONDITION OF  
THE RESOURCE?



WHAT ARE THE  
CHARACTERISTICS  
OF WETLANDS  
SOILS IN  
GOOD/POOR  
CONDITION, AND  
WHAT SERVICES  
DO THEY PROVIDE  
ON THE  
LANDSCAPE?



TO WHAT EXTENT  
DO BUFFERS  
MITIGATE THE  
EFFECTS OF  
STRESSORS ON  
WETLAND  
CONDITION ?

KEY QUESTIONS NWCA CAN INFORM ON:

# USING NWI FOR MAPPING WETLANDS AND OTHER WATERS

- ▶ Can consider using NWI as starting point (some linear features are based on NHD modeling)
- ▶ Able to adjust wetland boundaries to match reference imagery (map to an image date\*)
- ▶ Helpful in conforming to project-specific and National mapping standards (Maintain consistency across project area)



- ▶ Scientific approach
- ▶ Biological definition
- ▶ Not regulatory
- ▶ Federal Standard (FGDC)
  
- ▶ Monitor all wetlands
- ▶ Measure gain and loss of wetland acreage by type
- ▶ remotely sensed imagery in combination with field verification work
  
- ▶ Statistical estimates
- ▶ Published standard error rates

## FWS NWI STUDY DESIGN

# IMAGERY CONSIDERATIONS

- ▶ Spatial resolution (pixel size)
- ▶ Spectral resolution (#bands)
- ▶ Temporal resolution
  - ▶ Wet/Dry
  - ▶ Publicly verifiable
- ▶ Consistency
  - ▶ Date, cloud cover, time of year, resolution
- ▶ \$\$\$



- ▶ Project area represents a “piece” of landscape (e.g. Refuge or Reservation Boundary)
- ▶ Project area is used to create a hole in national layer (your data is checked out)
- ▶ Wetland polygons then fill the hole created
- ▶ Project Area is vital to how wetlands mapped “interact” with the existing database
  - ▶ Vital that wetland data is mapped completely to the project boundary



## NEED TO DEFINE A PROJECT AREA

# USING GIS AND OTHER DATA

- Primary reference data
  - NWI data
- Ancillary datasets
  - Imagery (historic/multi-date)
  - Soils
  - NHD
  - LiDAR (DEM)
  - LWI or other wetland mapping
  - Land cover (GAP, NLCD....other)
  - Tabular data (Stream flow, precipitation, WETS, tidal, salinity)



EXAMPLES OF M&A PROGRAM  
EFFORTS  
USING NWI DATA

# REGIONAL EXAMPLE OF INTEGRATING NWI INTO WETLAND ASSESSMENTS

In the Northeast Atlantic Region, the FWS added several readily interpreted wetland attributes to the NWI classifications and has successfully used these attributes to assess wetland functional changes in the Nanticoke River watershed in Central Maryland/SW Delaware.

Additional attributes associated with the northeastern NWI updates include the following:

- ▶ landscape position, categorized by three aquatic landscapes: terrene, lentic or lotic
- ▶ landform descriptors, including slope, islands, fringe, basin, floodplain, flat or interfluvial form, and
- ▶ surface-water flow-path, nontidal bidirectional

# TRIBAL MAPPING & ASSESSMENT PROJECTS

- ▶ The Tulalip Tribe in Washington State has utilized recent aerial photography and improved methodology to update their NWI maps.
- ▶ This update more accurately identifying wetland locations, extent, types, and trends than the original version completed in the 1980s within their tribal reservation.
- ▶ This information is used to prioritize the Tribes decisions on future development and restoration projects.

# TRIBAL MAPPING & ASSESSMENT PROJECTS

- ▶ In California, the Yurok Tribe's Wetlands Program is dedicated to the inventory, monitoring, assessment and protection of wetlands within the Yurok Reservation.
- ▶ The Tribe's Wetland Program also works in coordination with and support of efforts to restore wetlands implemented by the Yurok Tribe Fisheries Program and Watershed Restoration Department.
- ▶ The Tribe's wetlands restoration efforts are driven by the desire to protect salmonids and other native fish that rely on Klamath River wetlands for critical habitat.

# TRIBAL MAPPING & ASSESSMENT PROJECTS

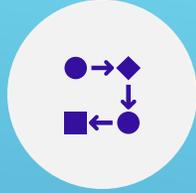
- ▶ In New York, the St. Regis Mohawk Tribe has instituted a wetland water-monitoring program that focused on collecting physical (location, size and informal boundaries) and chemical (pH, salinity, DO, turbidity, conductivity) data on the Tribe's wetlands.
- ▶ As a result of the collected information, the Program was able to develop a GPS-referenced map indicating the types and extent of wetlands that is now used in making initial site determinations for regulatory purposes.
- ▶ The collected water quality data provides a baseline from which the Tribal Program can track changes in wetland quality and assess future progress.



**SUCCESS DOESN'T HAPPEN OVERNIGHT- START SMALL & SMART.**



**DEVELOP SOME OVERALL PROJECT GOALS AND A STRATEGY TO HELP GUIDE THE COURSE.**



**IDENTIFY THE STEPS AND RESOURCES NEEDED. GET YOUR METHODS AND PROCESSES DOWN BEFORE EXPANDING YOUR EFFORTS**



**DON'T BE AFRAID TO USE EXISTING METHODS/PROCEDURES. MOST CAN BE RETOOLED TO ACCOMMODATE YOUR SPECIFIC NEEDS OR INTERESTS (CULTURAL VALUES, TRADITIONAL USES, ETC).**



**DON'T FORGET TO THINK ABOUT HOW TO MANAGE AND ORGANIZE YOUR DATA**



**CONSIDER PARTNERSHIPS WITH OTHER RELATED INTERESTS TO MAXIMIZE ACCESS TO SITES, THE COLLECTION OF DATA AND POTENTIAL USES OF THE DATA**

# TIPS FOR DEVELOPING A SUCCESSFUL MAPPING & ASSESSMENT PROJECT

A photograph of a wetland area with tall grasses and water lilies. The water is calm, reflecting the surrounding greenery. The text is overlaid on the image.

**Questions?**

**For more information:  
Yvonne Vallette, EPA, Region 10  
[vallette.yvonne@epa.gov](mailto:vallette.yvonne@epa.gov)  
503-326-2716**