Tulelake, CA

National Wetland Inventory(NWI) Overview

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USFWS National Wetlands Inventory Program

You Can’t Protect What You Do Not Know Exists

Suisun Marsh, Solano County, CA

Overview

1. NWI Overview
2. NWI Standards and Methods
3. Regional Updates
4. Discussion

Seal Beach NWR, Seal Beach, CA

NWI Overview

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Impact of NWI

Clean Drinking Water

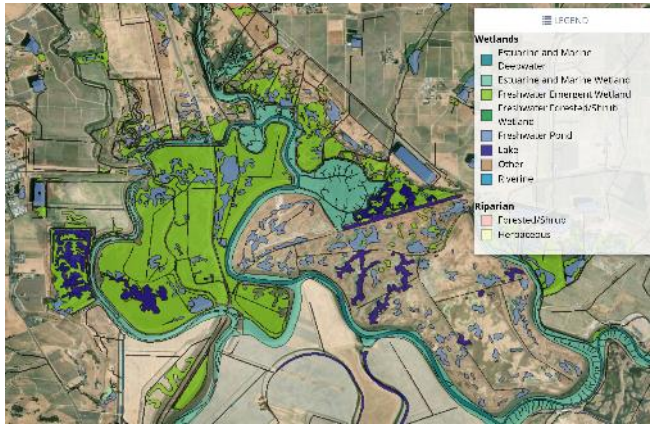
Abundant Fisheries

Flood Protection

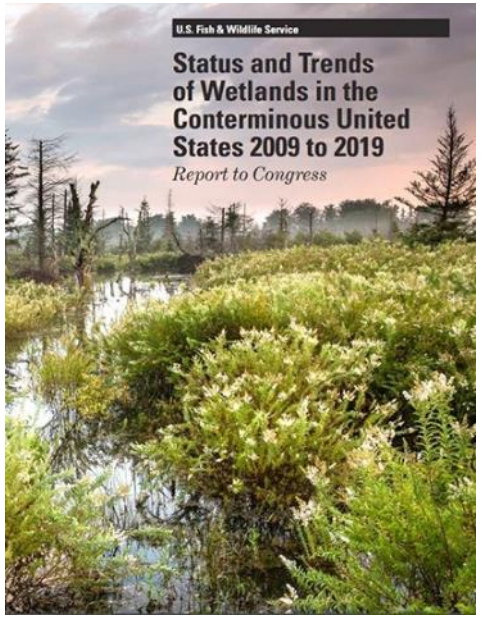
What is NWI

Principal U.S. federal agency tasked with providing information to the American public on the extent and trends of U.S. wetlands

Wetland Mapper:
Map US Wetlands



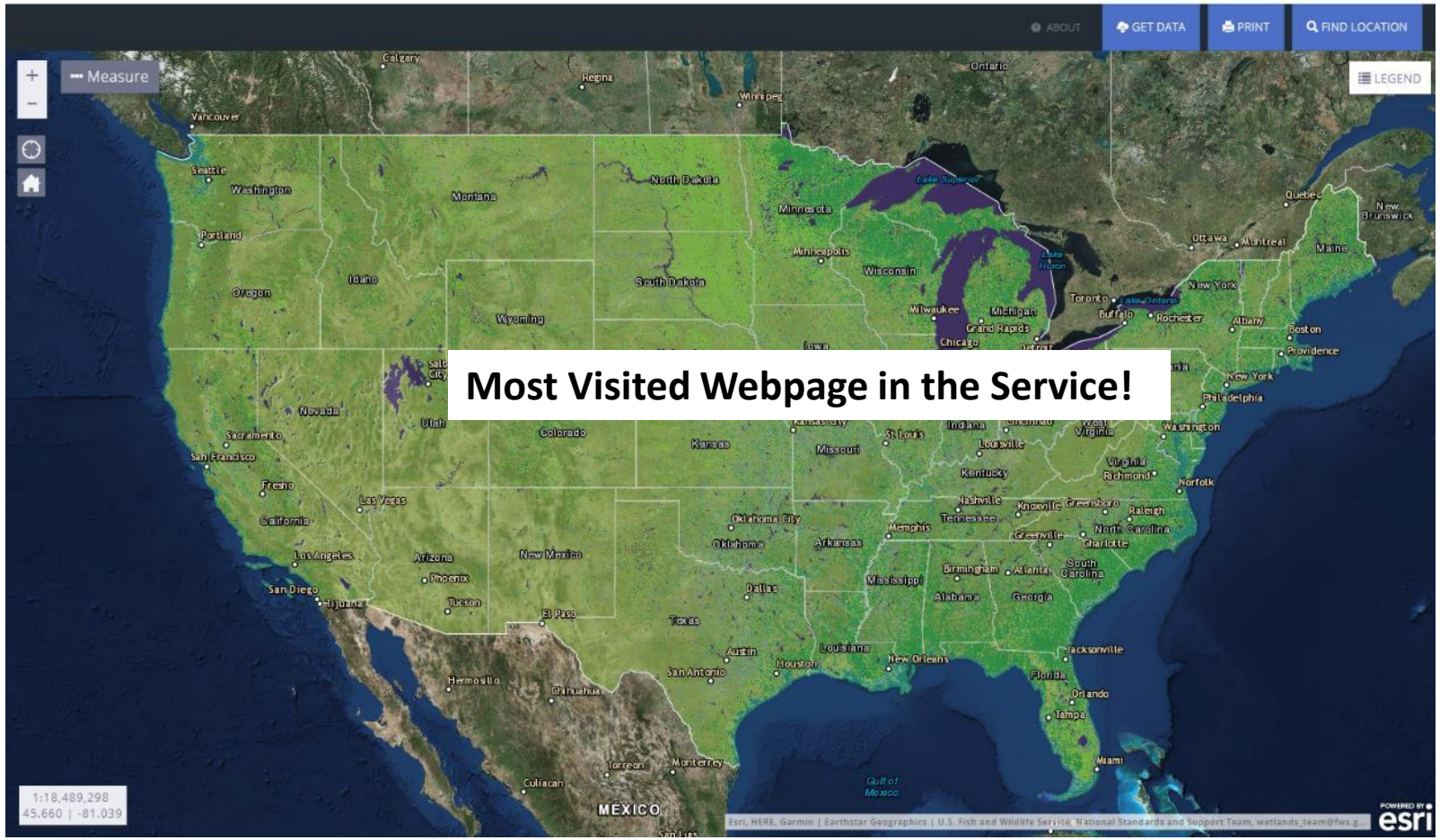
Status and Trends:
Provide decadal reports to Congress on wetland change



Wetland Mapper

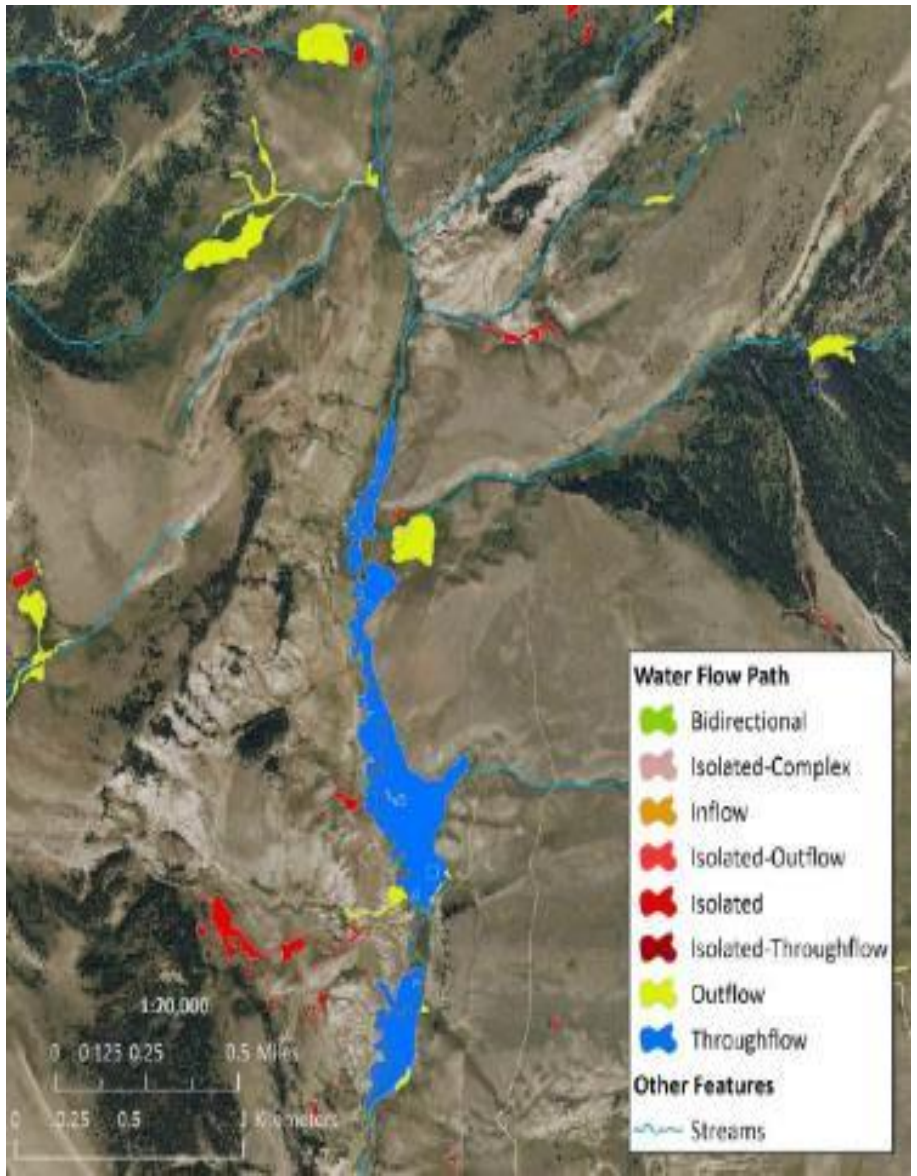
In 2024 the Wetland Mapper had:

- 5 million requests for information
- 550,000 Mapper views
- 306,000 users
- 286,000 downloads
- 290,000 maps printed



https://www.fws.gov/wetlands/Data/Mapper

Landscape, Landform, Waterbody, Water Flow Path Data for Functional Assessments



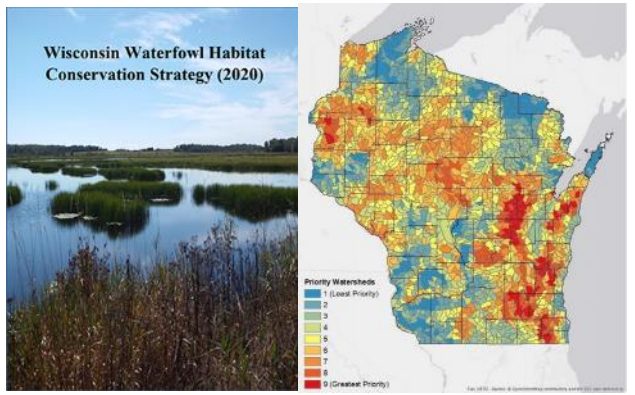
NWI+ LLWW assesses 11 potential functions:

- Carbon sequestration
- Bank and shoreline stabilization
- Coastal storm surge detention
- Fish and aquatic invertebrate habitat
- Waterfowl and waterbird habitat
- Other wildlife habitat
- Unique, uncommon, regionally significant or highly diverse plant communities
- Nutrient cycling & transformation
- Streamflow maintenance
- Sediment and other particulate retention
- Surface water detention

Data Uses and Supporting Applications

Infrastructure and Development: roads, pipelines, renewable energy. 70% of calls

Habitat and Species Assessments



Watershed and Restoration Plans

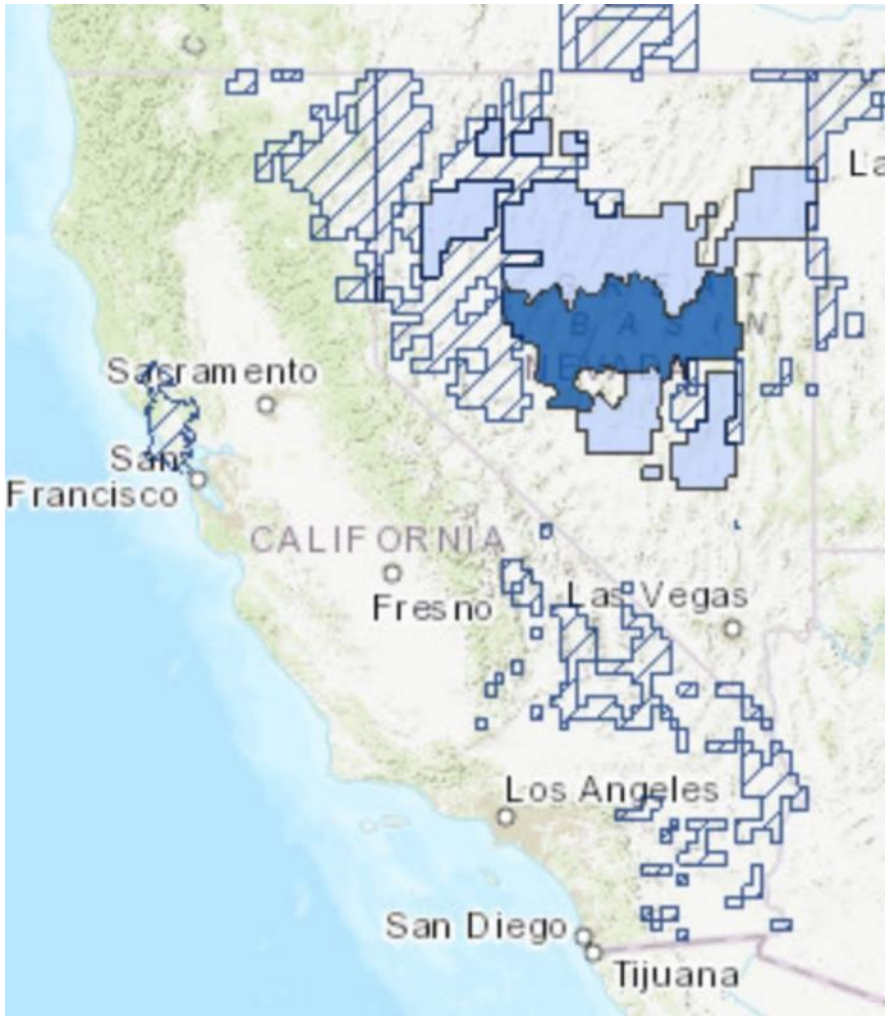
Natural Disaster Resiliency

Improving Water Quality and Supply

Recreation

NWI data saves states, NGOs, and private entities tens of millions of dollars each year through supporting efficient, stream-lined decision making

NWI Use Example- CA & NV BLM Sage Grouse



2018 status map

Goal:

- Decision making for the **Greater Sage Grouse**

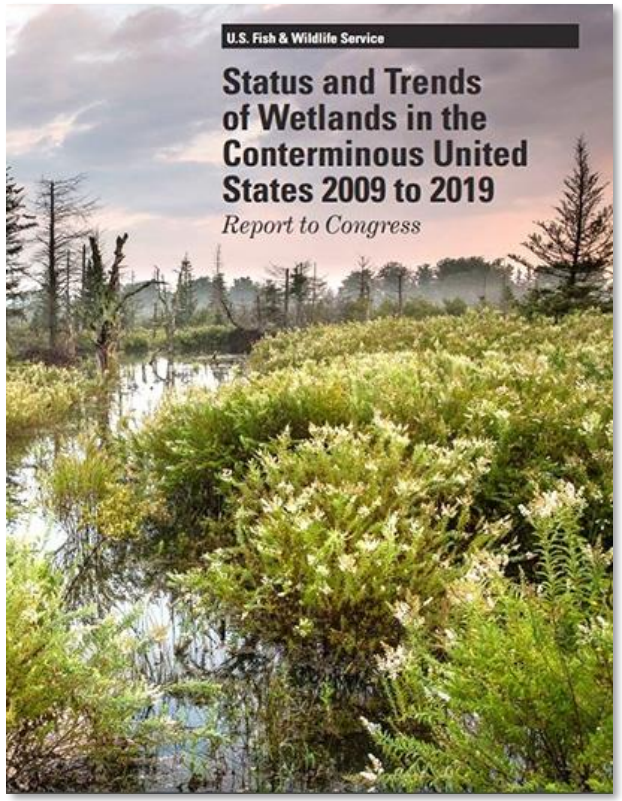
As of 2018:

- 32 million ac BLM funded mapping in NV
- 26 million ac BLM funded mapping in CA
- Southern planned CA mapping completed in 2019
- NE CA mapping completed in 2023 and 2024

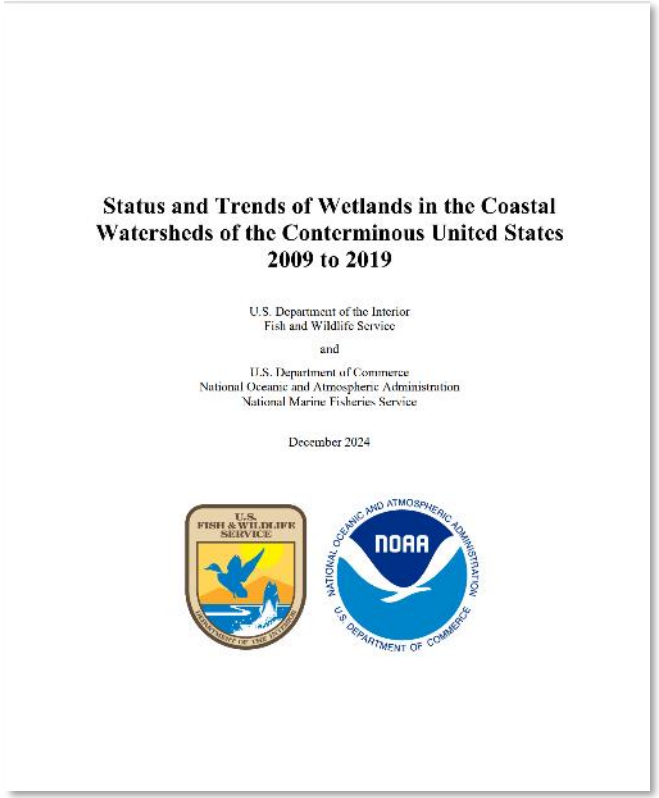
Current Projects

- 2024 CA-NV BLM Mapping-> 3.7 million acres
- 2022 NV BLM Mapping-> 7.5 million acres

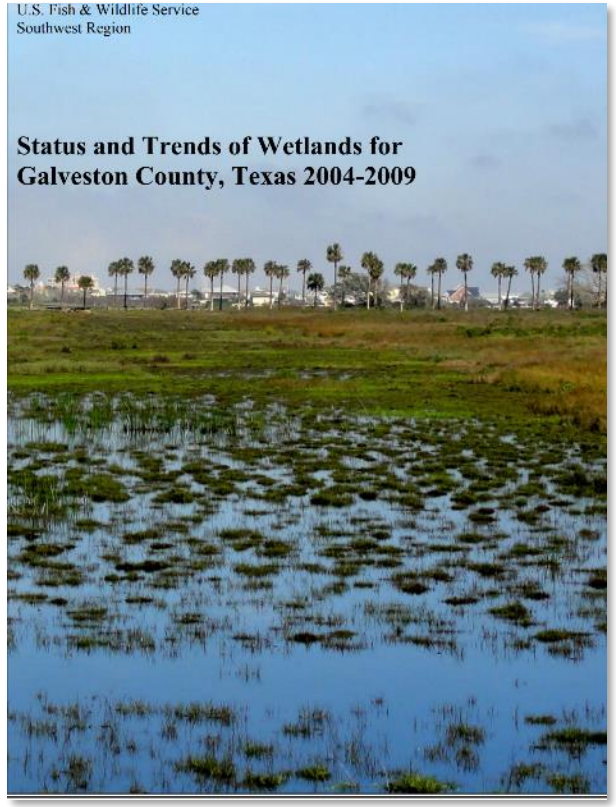
Status and Trends-Overview



National



Regional



State

Wetlands Status and Trends reports provide science-based information on the status of nations wetlands through time.

Standards and Methods

1. NWI Overview
2. **NWI Standards and Methods**
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NWI Wetland Definition

Hydrology
Or
Hydrology and Soils
Or
Hydrology and Plants
Or
Hydrology, Soils and Plants

- The FGDC Wetlands Classification Standard (WCS) defines "wetlands" according to Cowardin et al. (1979):
  - WETLANDS *are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following three attributes:*
    - *(1) at least periodically, the land supports predominantly hydrophytes;*
    - *(2) the substrate is predominantly undrained hydric soil; and*
    - *(3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.*

Biological, Non-Regulatory Definition

Classification-Cowardin

Riverine -Rivers and Streams
San Joaquin River, CA

Lacustrine- Lakes
Lake Mead, NV/AZ

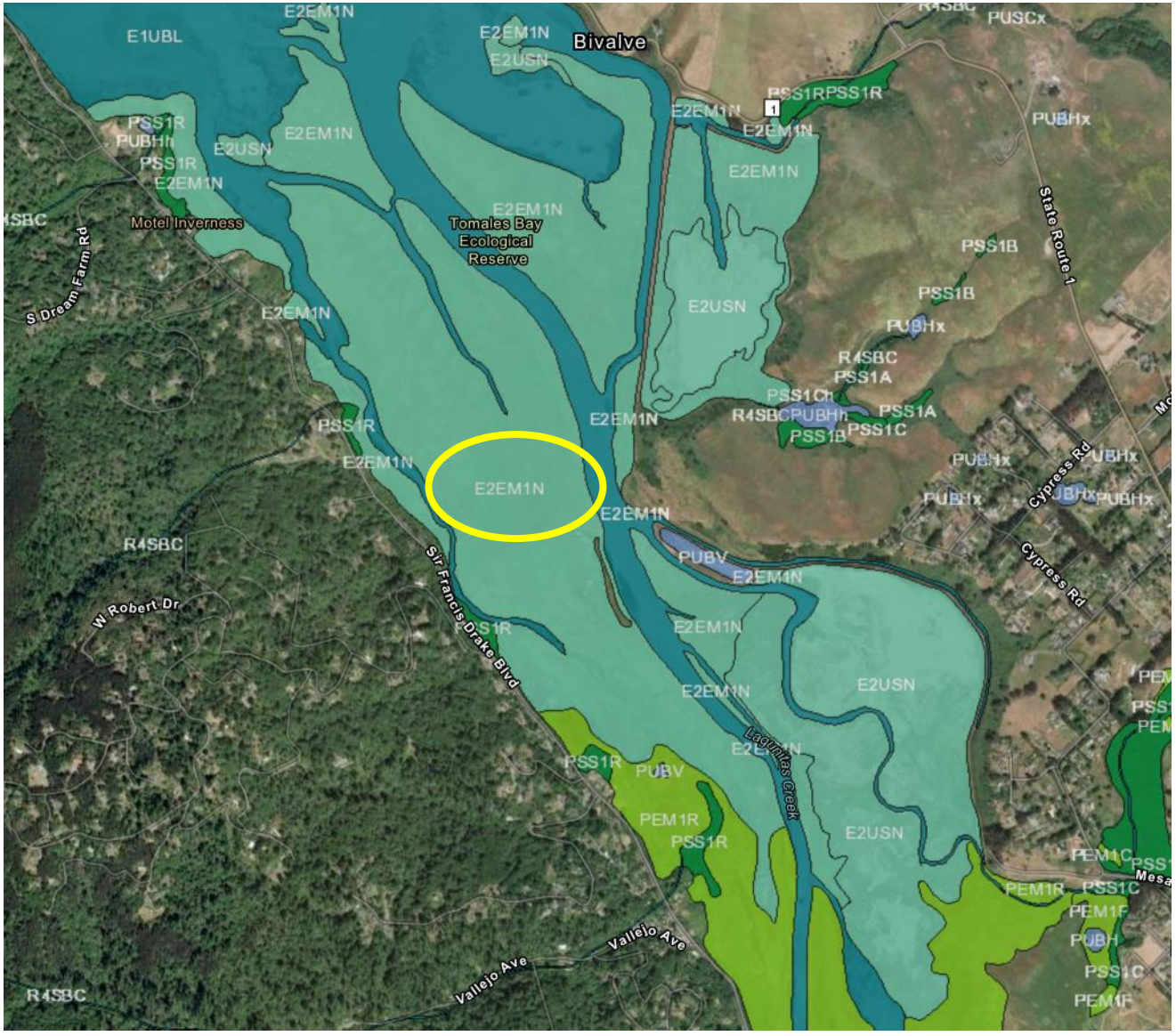
Marine and Estuarine-Marshes, Beaches
Seal Beach NWR, Seal Beach, CA

Palustrine-Vernal Pools, Playas, Forested
Virginia Range, NV

Palustrine-Ponds, Bogs, Fens, Farmed
Ginny Lake Fen, Tahoe Basin, NV

Palustrine-Floodplains, Meadows
Wet Meadow, Klamath Range, CA

Feature Attribution Example



E2=Estuary Intertidal (System & Subsystem)
EM1= Emergent Persistent Vegetation (Class & Subclass)
N=Regularly Flooded Tidal Salt (Water Regime)

FGDC Wetland Mapping Standard-Overview

CONSISTENCY

ACCURACY –

MUST MAP **98%** OF ALL WETLANDS VISIBLE ON THE IMAGERY AT THE APPROPRIATE SCALE. **85%** ACCURACY OF WETLAND CLASSIFICATION

TARGET MAPPING UNIT (TMU)-

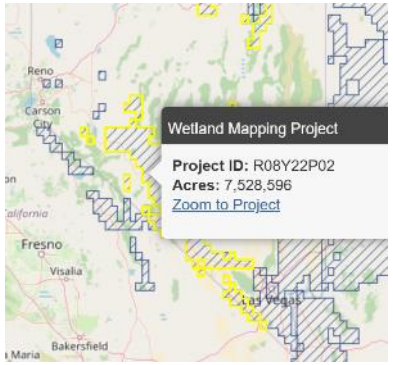
0.5 ACRES IS THE SMALLEST WETLAND SIZE THAT IS MAPPED

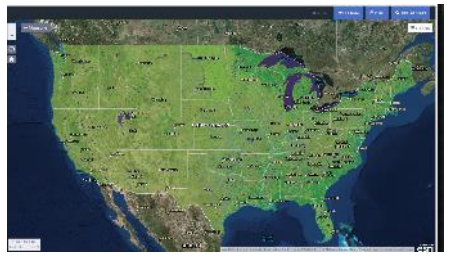
IMAGERY-

1 M RESOLUTION SUCH AS NAIP

Established in 2009, the standard set minimums for accuracy, projection, metadata, imagery, etc.

Data Production





Project Creation
- Partnership Building
- Funding
- Goal Setting

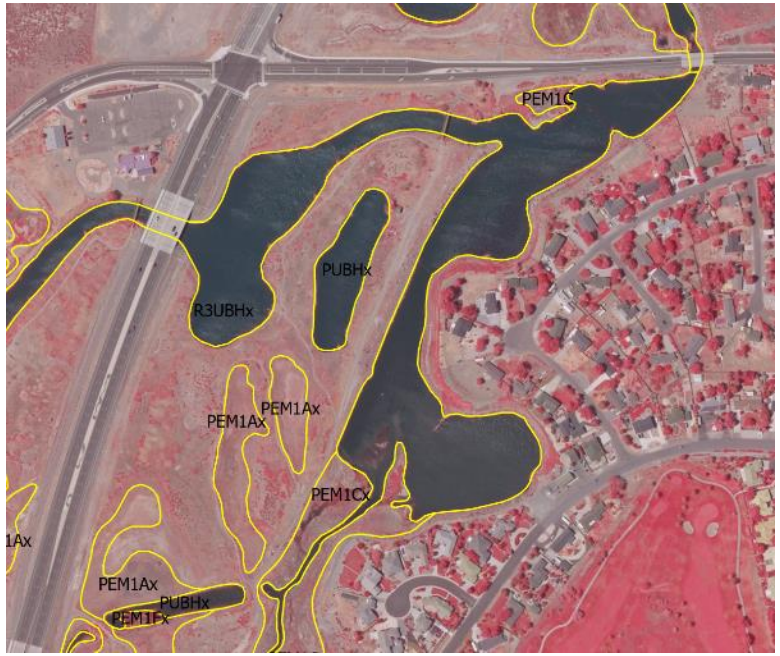
Mapper Checkout

Mapping (Contractor/Cooperator)
- Fieldwork
- Ancillary Data
- Heads up Digitization

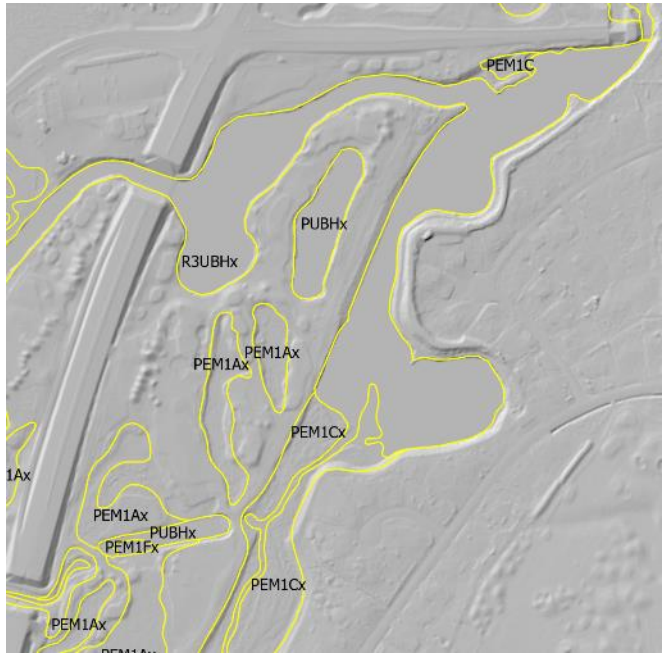
Quality Control (NWI)
- Quality Control
- Quality Assurance

Mapper Update

Data Production



Heads-Up Digitization
Photo interpretation of base imagery (**snapshot in time)** using ArcPro. Often starts with automated process



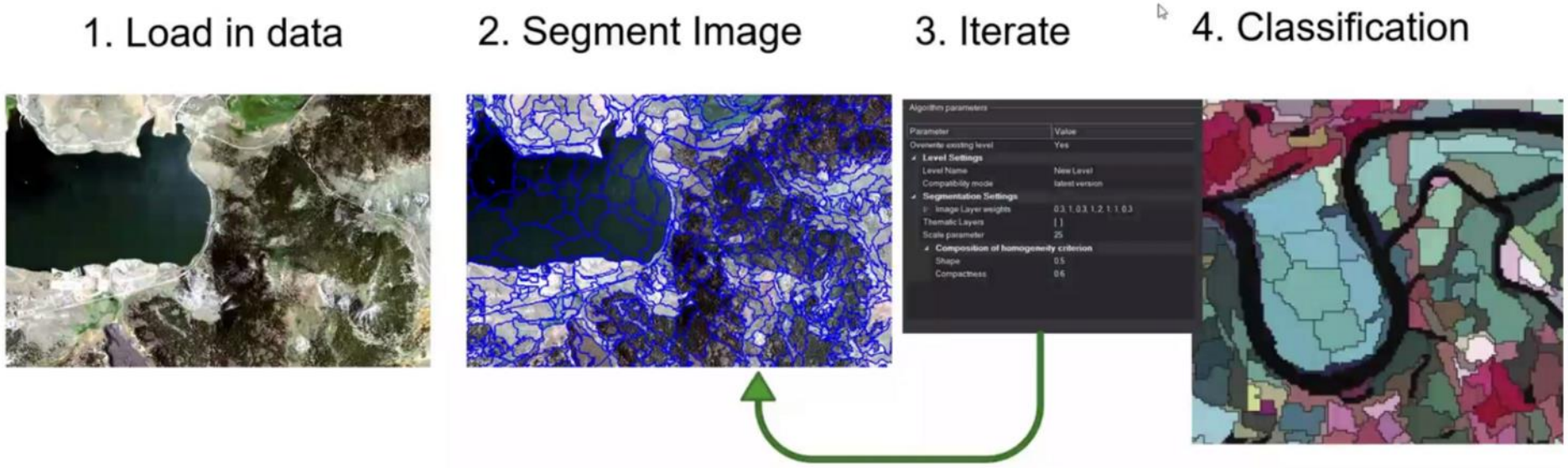
Ancillary Data
Examples includes Lidar (shown), SSURGO soils, NHD

Fieldwork
Limited scope. Match aerial imagery signatures to the ground

New Mapping Technologies-Automation

- Most data producers use semi-automated workflows for wetland recognition and classification

- Examples includes: eCognition, Object Based Learning and Rulesets



Goal: Better, Cheaper, Faster NWI Data

Regional Update

1. NWI Overview
2. NWI Standards and Methods
3. **Regional Updates**
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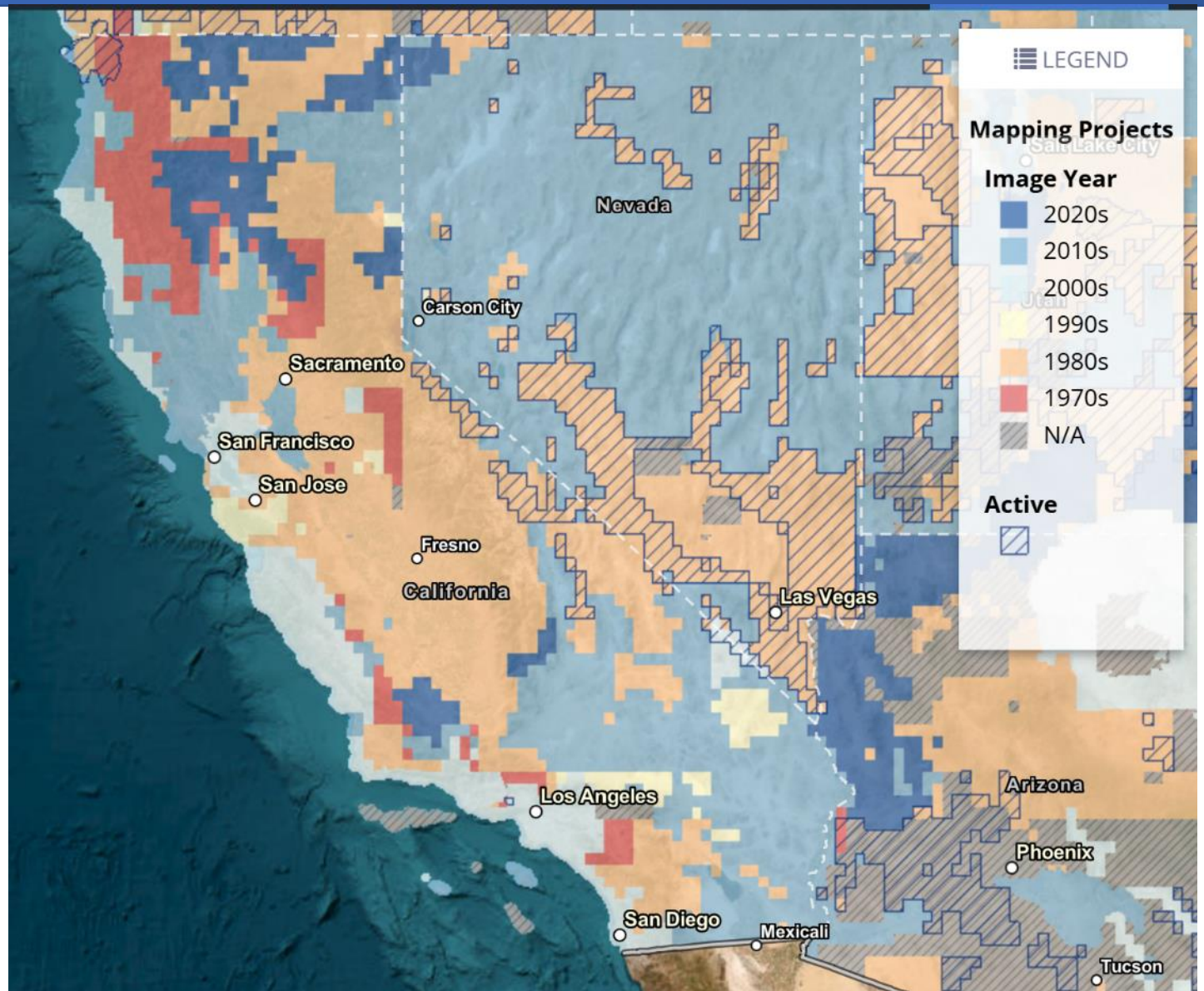
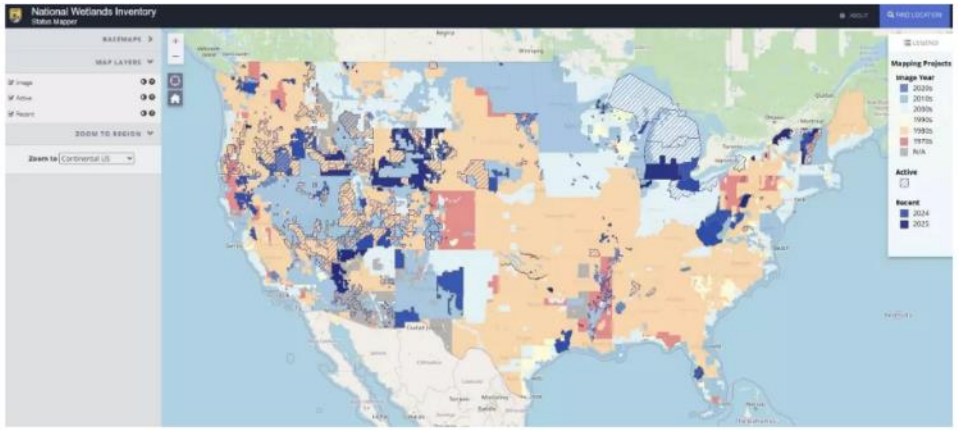
California and Nevada Update

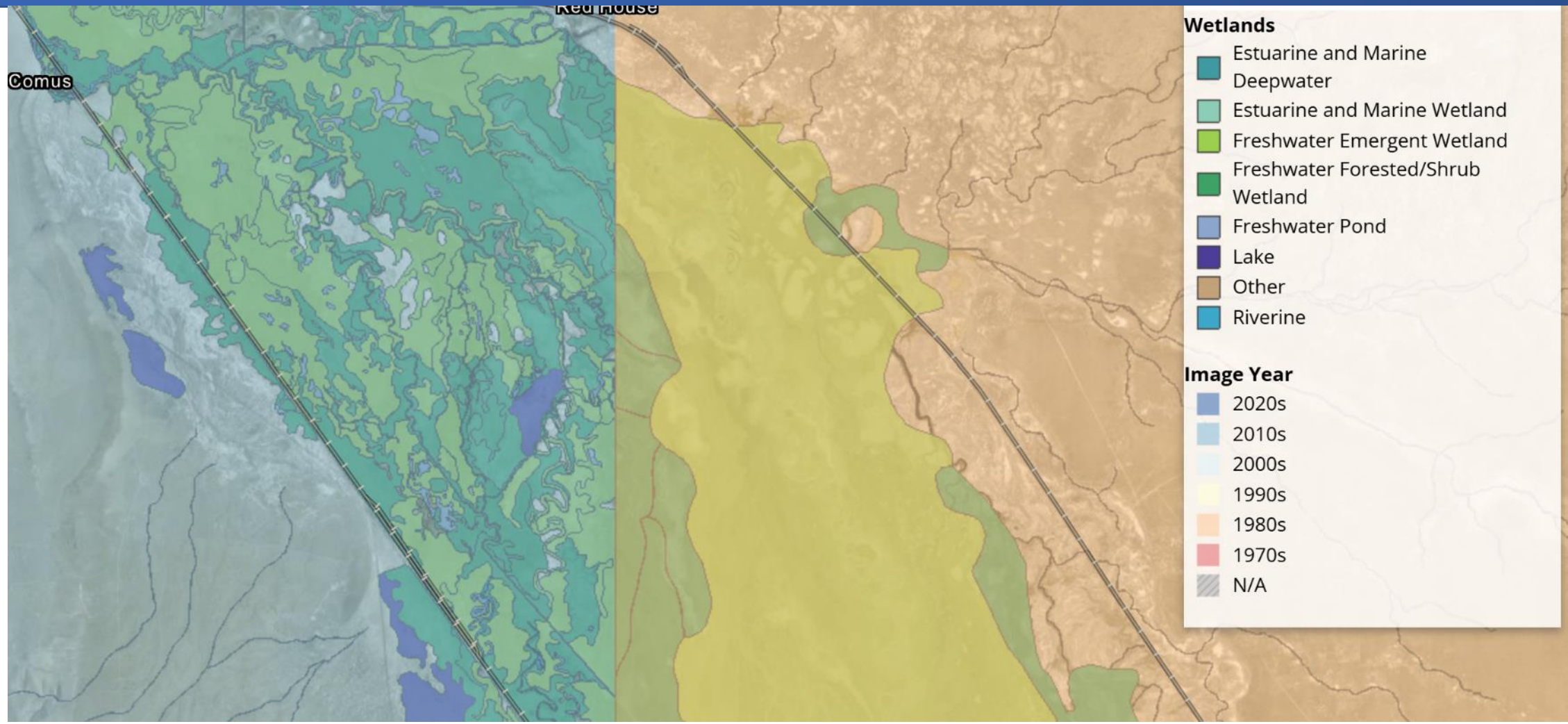


CA and NV are 100% mapped with NWI data. Now the focus is on updating!



Status Mapper

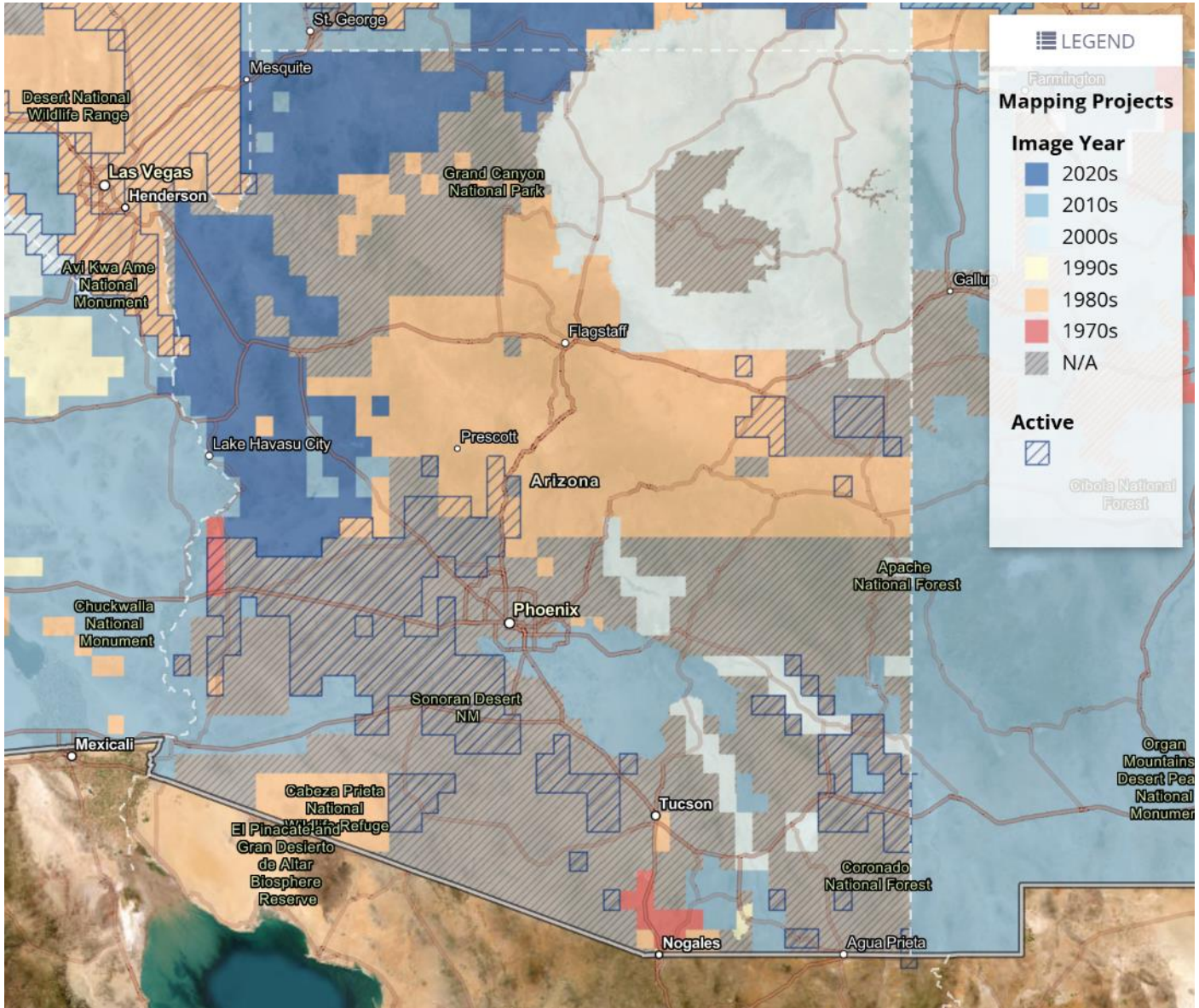
NV Data is Updated



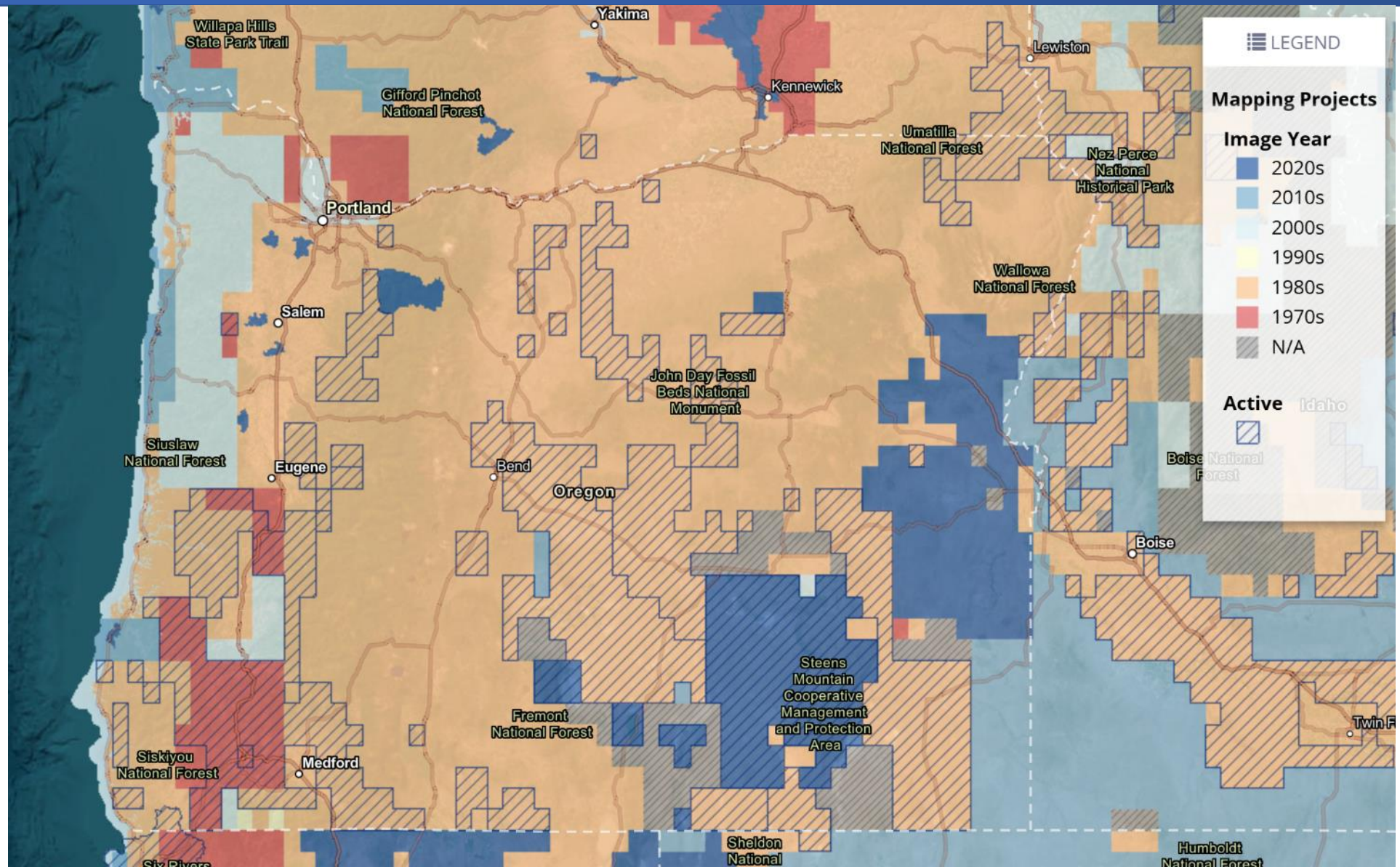
NEW

OLD

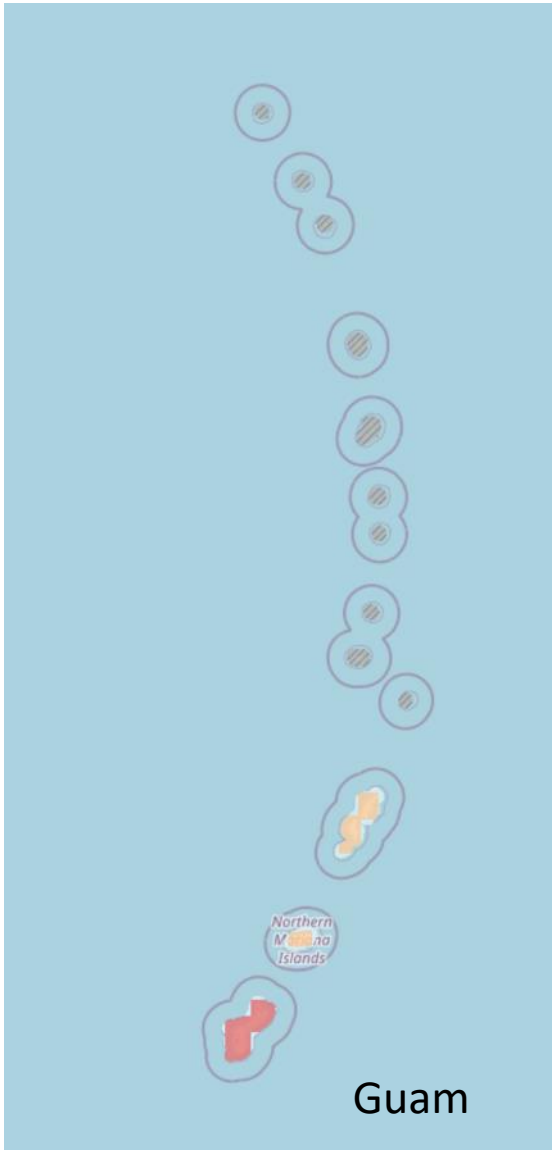
Arizona Data Status Update

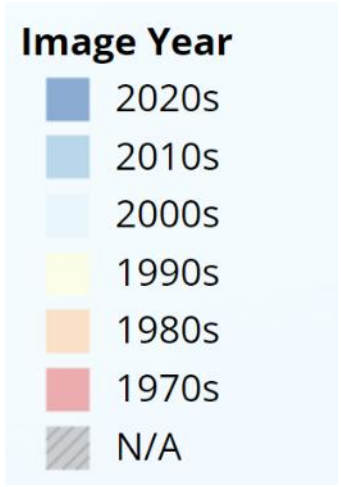


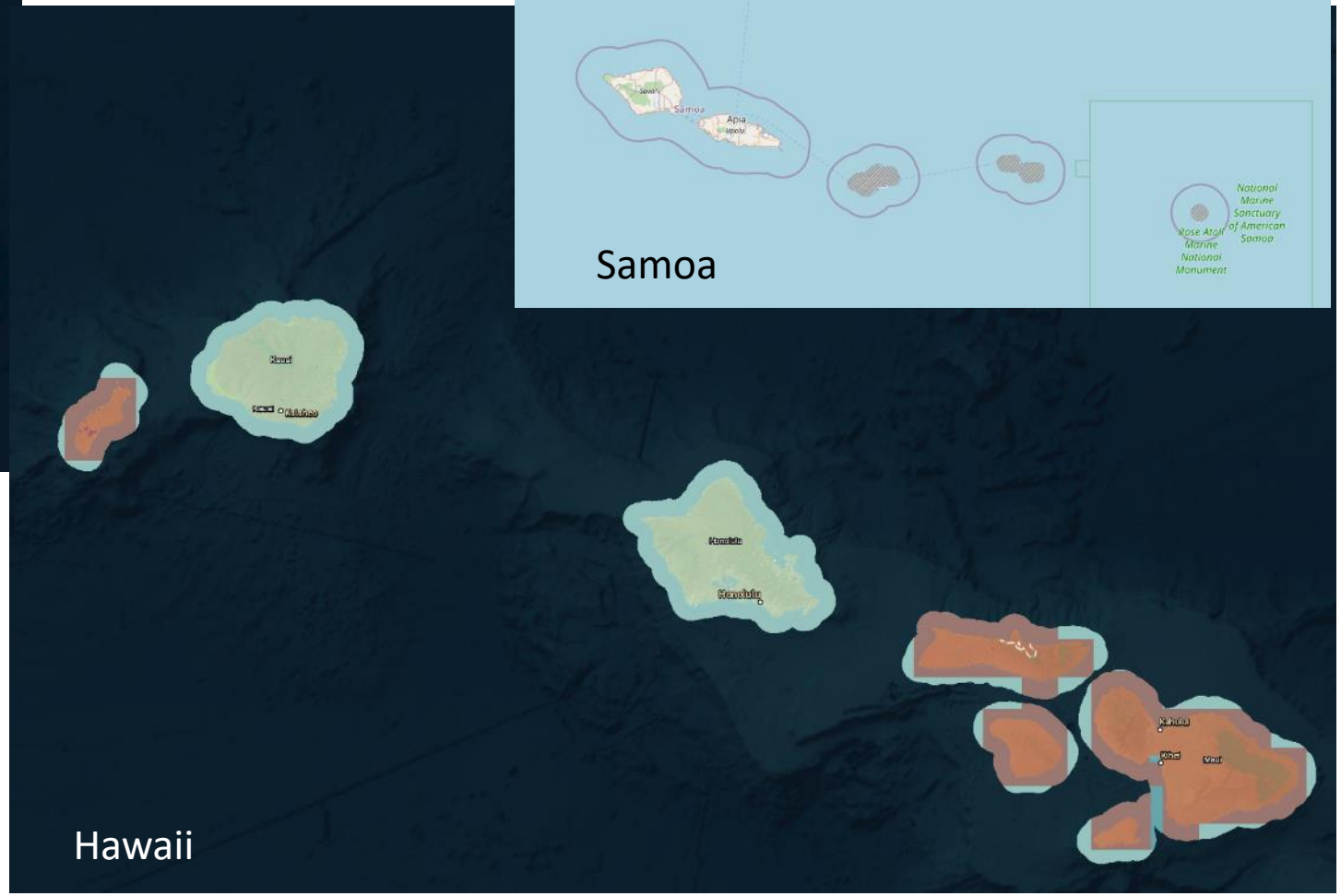
Oregon Data Status Update



HI and Pac Trust Data Status Update

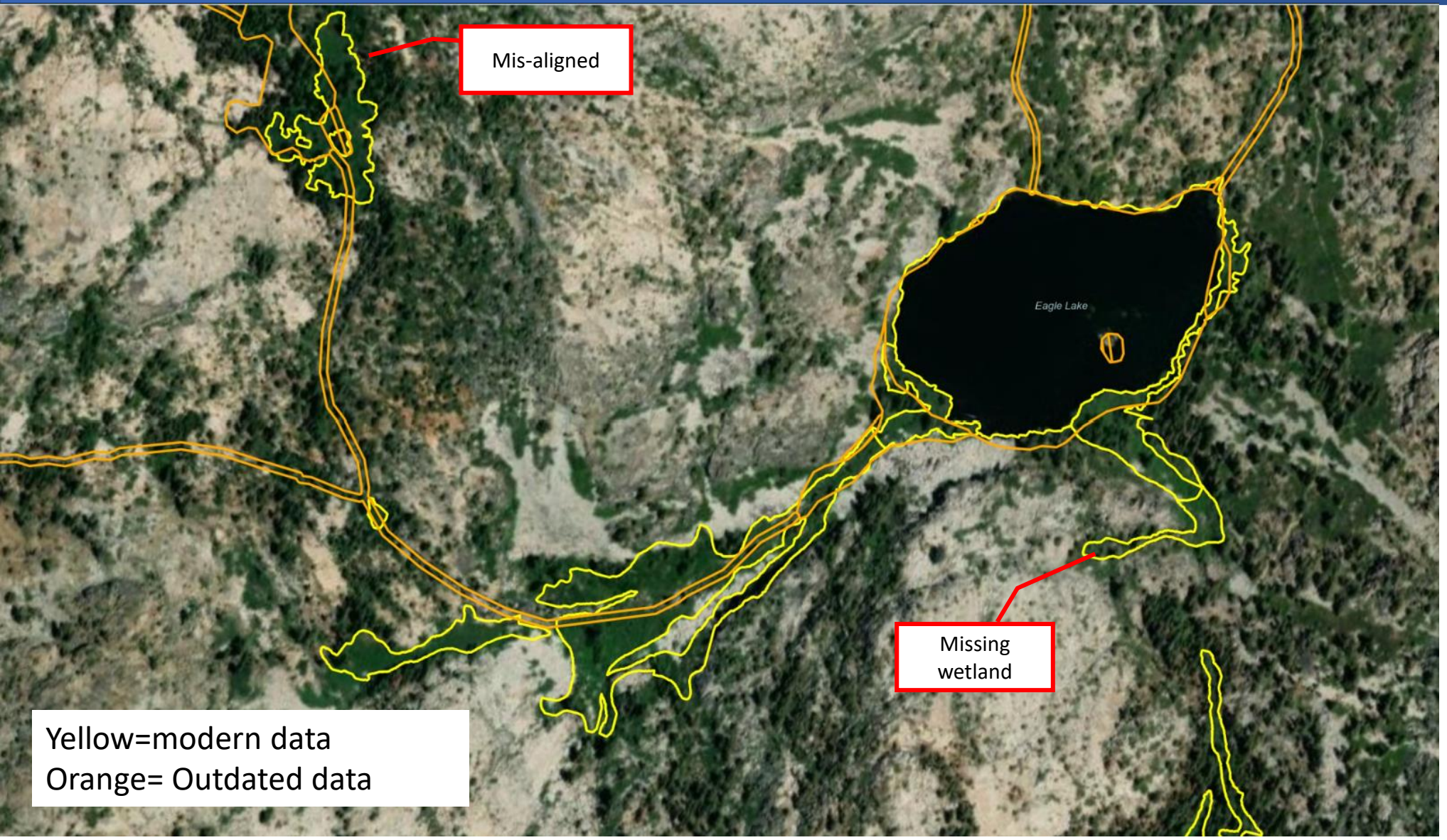






https://fwsprimary.wim.usgs.gov/wetland-projects-v2/

Advantages of Updated Data



- More wetlands are captured
- Better wetland alignment
- Standardized
- More complete classification
- Field verified
- Enhanced quality control

* Remember lots of Nevada data WAS from 1980 from digitized hand-drawn maps!

Funding for Wetland Mapping

Current data production is mostly funded by external cooperators, such as state agencies, Tribes, and municipalities:

- Wetland Program Development Grants (EPA)
- BLM interagency agreements
- U.S. Army Corps of Engineers

NWI's primary challenge is to support a contemporary dataset with a historically flat budget.

- After accounting for inflation, NWI's current budget is 1/6th of its 1986 budget (the year NWI mapping was mandated).

All federally funded wetland inventory mapping projects must comply with the FGDC Wetland Mapping Standard and Classification of Wetlands and Deepwater Habitats of the United States!

Creating Easy to Ingest Data

Key Tips

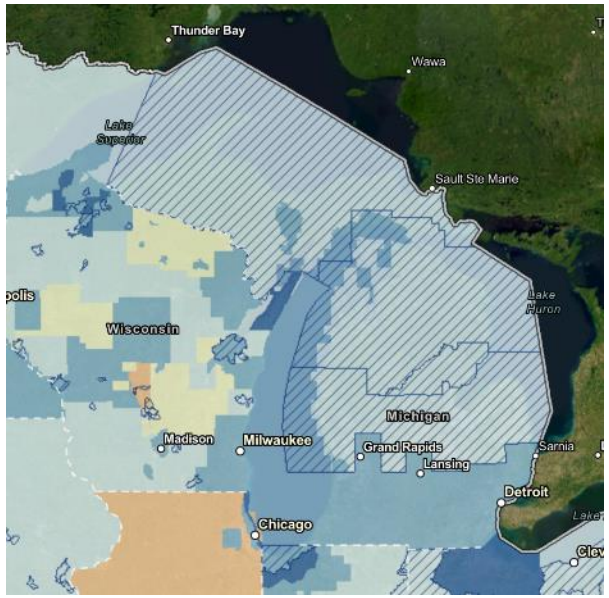
1. Communicate early and often with NWI
    a. We are not always aware of projects, reach out!
    b. Use iterative Qc process
2. Account for extra budget to edit for NWI standard
    a. In most areas full automated NWI mapping has yet to be achieved, account for manual editing
3. Read the standard (or work with a contractor or cooperator who is familiar with NWI mapping)
    a. Common problems: not aligned to image, differing definitions of wetlands, accuracy does not meet 98%, incorrect schema or projection, different classification system

*All federally funded wetland mapping must comply with the FGDC standard

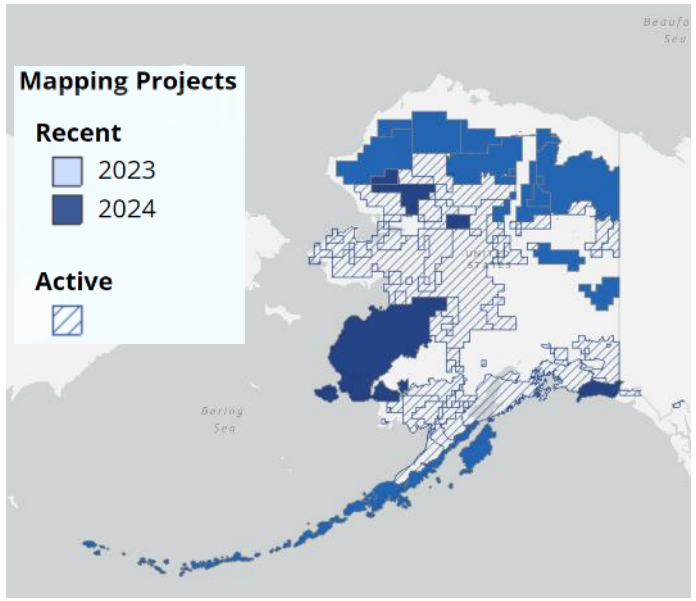
Discussion

1. NWI Overview
2. NWI Standards and Methods
3. Using the Wetland Mapper
4. Regional Updates
5. **Discussion**

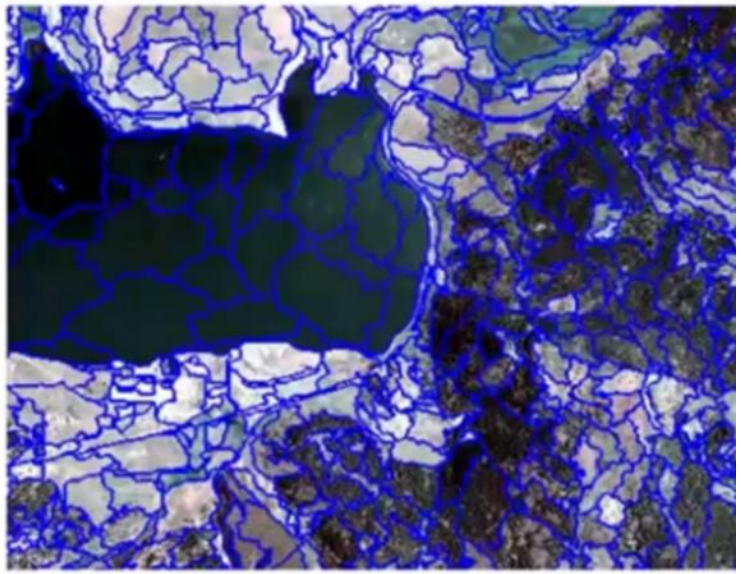
Where are we going?



Inter-operability between datasets
For example, concurrent NWI and 3DHP updates have created a fully modern hydrology map for Michigan



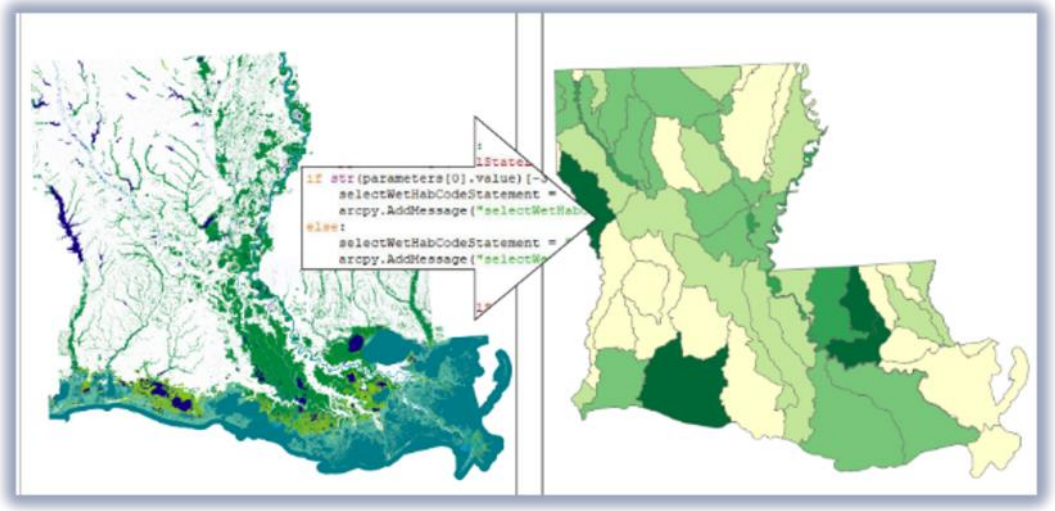
Mapping Alaska
63% mapped (2025), estimated completion of 2029



New Mapping Technology
We are continually striving for innovation and efficiency in our workflows. We work to leverage partnership to explore new mapping technologies

Other Updates

- New Resources
  - American Wetlands Month and Outreach (2025):
    - American Wetlands Month | U.S. Fish & Wildlife Service
  - NWI Use Highlights Page (2025):
    - National Wetlands Inventory Use Highlights | U.S. Fish & Wildlife Service
  - Coastal Status and Trends Report (2024):
    - 2019 Coastal Watersheds Wetlands Status and Trends | U.S. Fish & Wildlife Service
  - National Status and Trends Report (2024):
    - 2019 Wetlands Status and Trends Report | U.S. Fish & Wildlife Service
  - Stream Guidance (2024):
    - Mapping Standard Compliant Data - Supplement (version 2) | FWS.gov
  - GIS Analysis Tools (2019):
    - https://www.fws.gov/wetlands/data/GIS-Tools-and-Resources
- 2025 is our 50th anniversary!
  - Educators page: Wetland Educational Resources | U.S. Fish & Wildlife Service
  - 50th celebration story: Celebrating the 50th Anniversary of the National Wetlands Inventory | U.S. Fish & Wildlife Service
- Mapper Update
  - 155+ million acres of mapping in 2024, 90 million so far for 2025
- Staff Changes



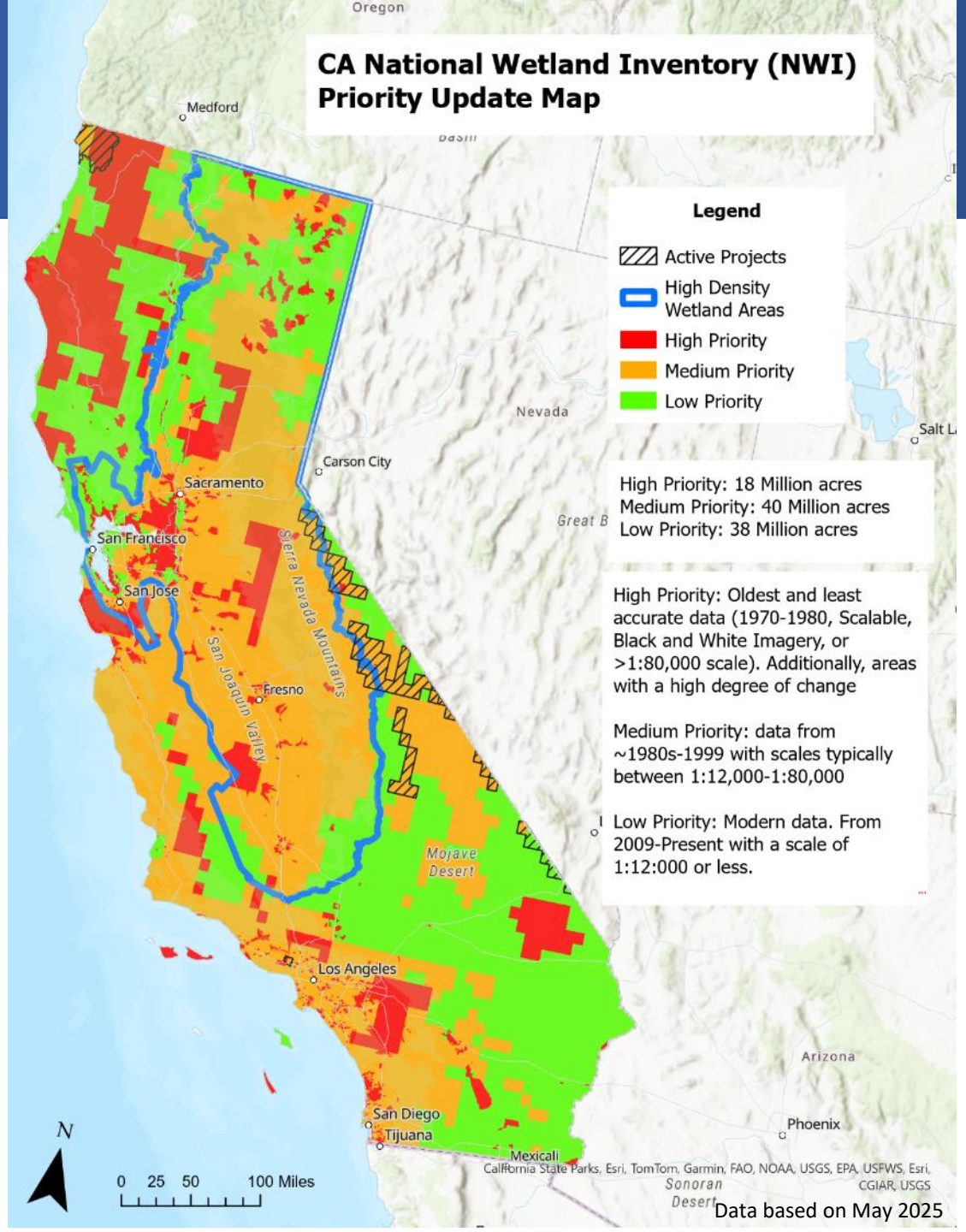
NWI Python Toolbox Download Package - Last updated: September 2019

Wetlands_Tools.zip (Arc GIS 10 and Pro Compatible)

CA Priority Map

Looking for help identifying:

- New partners
- Priority areas
- Survey: https://forms.office.com/g/mxjtY2xcXQ



Questions and Discussion

Thank You!