

# **Wetland Mapping Consortium: National SURRGO Wetland Soils Project**

**Wetland Mapping Consortium Webinar**

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# Wetland Restoration

- ▶ Problem 1: Regulatory agencies, and people who are regulated to restore or replace wetlands do not have a simple database to find suitable sites.
- ▶ Problem 2: Agency planners must compile the soils information from an area by hand before they can conduct regional planning.
- ▶ Problem 3: Restoration can be an expensive, unsuccessful effort.

# [http://www.weogeo.com/blog/Top10\\_Datasets\\_on\\_WeoGeo.html](http://www.weogeo.com/blog/Top10_Datasets_on_WeoGeo.html) - 3rd most useful data set

The screenshot shows the homepage of the National Wetlands Inventory (NWI) website. The browser address bar displays [www.fws.gov/wetlands/index.html](http://www.fws.gov/wetlands/index.html). The page features the U.S. Fish & Wildlife Service logo and the title "National Wetlands Inventory". A search bar is located below the header. A navigation menu includes links for Home, Wetlands Data, Status and Trends, Wetlands Layer, Other Topics, NWI Program, and Contact Information. On the left sidebar, the "Wetlands Mapper" link is circled in red. The main content area includes a descriptive paragraph about wetlands, a "Latest News and Reports" section with several news items, and a "Contact Us" link at the bottom.

**U.S. Fish & Wildlife Service**  
**National Wetlands Inventory**  
Fisheries and Habitat Conservation

Search NWI Website

Menu: Home | Wetlands Data | Status and Trends | Wetlands Layer | Other Topics | NWI Program | Contact Information

**Wetlands Mapper**

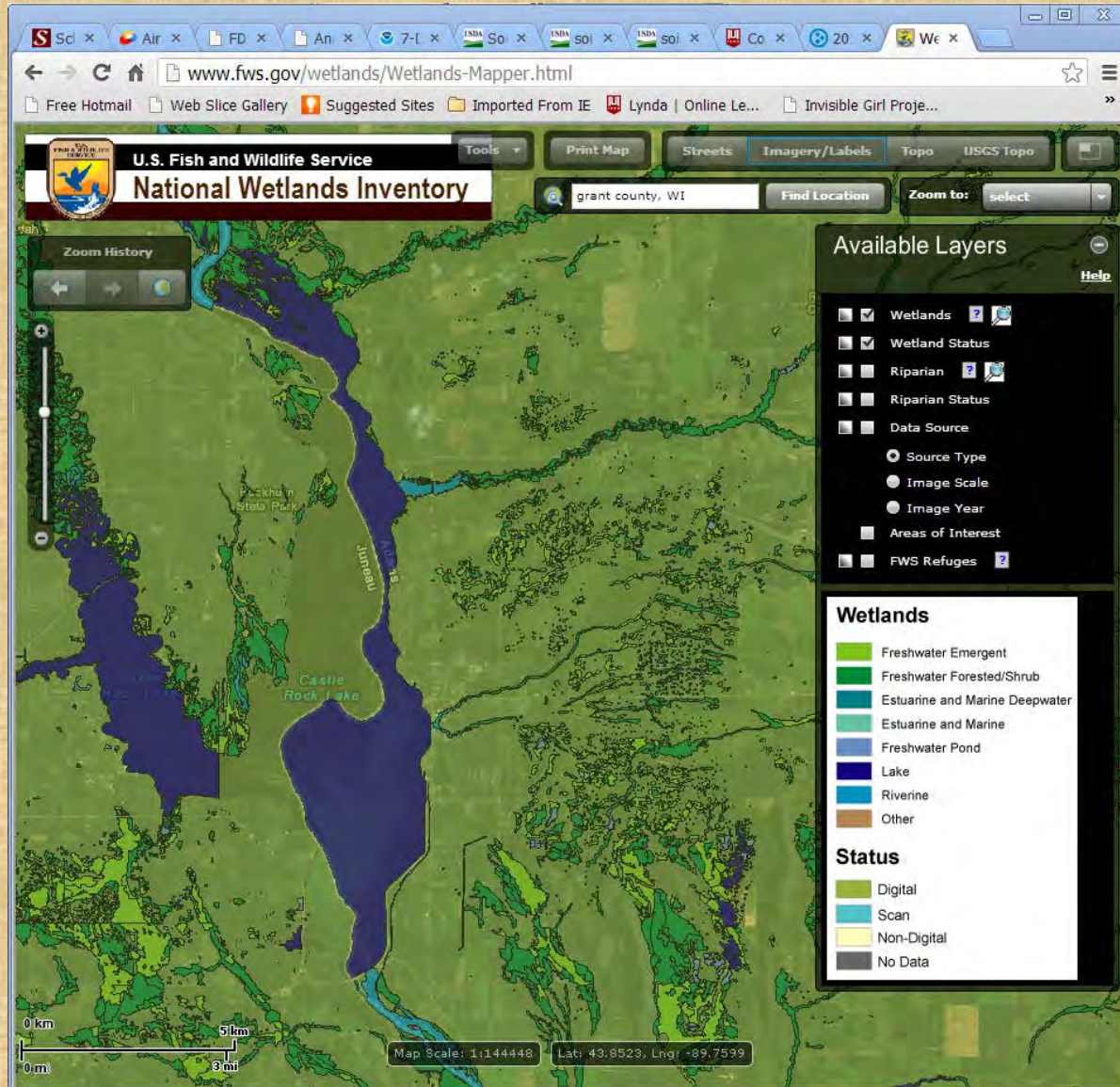
Wetlands provide a multitude of ecological, economic and social benefits. They provide habitat for fish, wildlife and a variety of plants. Wetlands are nurseries for many saltwater and freshwater fishes and shellfish of commercial and recreational importance. Wetlands are also important landscape features because they hold and slowly release flood water and snow melt, recharge groundwater, recycle nutrients, and provide recreation and wildlife viewing opportunities for millions of people.

**Latest News and Reports**

- NWI Overview**  
The National Wetlands Inventory (NWI) Program Overview page has been updated with new information. <http://www.fws.gov/wetlands/NWI/Overview.html>
- Publication of the Final National Wetland Plant List**  
The US Army Corps of Engineers, as part of an interagency effort with the US Environmental Protection Agency, the US Fish and Wildlife Service and the US Department of Agriculture Natural Resources Conservation Service, is announcing the availability of the final 2012 National Wetland Plant List (NWPL). The NWPL is used to determine whether the hydrophytic vegetation parameter is met when conducting wetland determinations under the Clean Water Act and the Wetland Conservation Provisions of the Food Security Act. The list will become effective on 6/1/12. [Click here to download the list](#), or [click here to for the Federal Register notice](#).
- National Coastal Condition Report IV**  
The latest version of the National Coastal Condition Report has been released by EPA. The reports describe the ecological and environmental conditions in U.S. coastal waters. They summarize the condition of ecological resources in the coastal waters of the US and highlight several exemplary federal, state, tribal, and local programs that assess coastal ecological and water quality conditions. [Click here to download the report](#).
- Status and Trends of Wetlands in the Conterminous United States 2004 to 2009: Report to Congress on the status and trends of our Nation's wetlands resources**  
This report is the latest in a continuous series spanning 50 years of wetlands data. It represents the most comprehensive and contemporary effort to track wetlands resources at a national scale. [Click here to download the report and related documents](#).

Visit our [News](#) page for a complete list of News and Reports. [Follow us on Facebook for the latest announcements!](#)

# Wetlands Mapper



# Potential Wetland Soil Landscapes Data

## - Goal

- ▶ The goal of the project is to produce a soil/hydrology/site data set that can be used as a base data set to find landscapes that have or once supported wetlands. Those landscapes should have dominantly hydric soils.
- ▶ The purpose is to inform the wetland community, planners, developers, and private citizens of the location of sites that have the potential to be easily, inexpensively, and reliably converted into wetlands for mitigation and restoration purpose.

# Potential Wetland Soil Landscapes Data Set - Background

- ▶ The PWSL data set uses SSURGO soil survey data for identifying soil map units that have a “hydic” soil as dominant component.
- ▶ Areas with dominantly hydic soils that are not mapped as wetlands, but are in cropland or pasture, adjacent to mapped wetlands, or have some indication of hydrologic presence or alteration are worthy sites for a field visit.
- ▶ Areas identified with dominantly hydic soils that have some remotely- sensed indicator of hydrologic presence or alteration are worth a field visit as well.

# Potential Wetland Soil Landscapes Data Set

## - Premise

- ▶ Hydric soils do not occur outside of wetlands unless:
  - ▶ The vegetation or hydrology has been altered
  - ▶ There was a mistake in soil or NWI mapping
- ▶ Wetlands or potential wetland sites may occur outside of NWI wetland boundaries because:
  - ▶ The vegetation or hydrology had been altered
  - ▶ There was a mistake in soil or NWI mapping

# Restoration of Vegetation or Hydrology

- ▶ Solution 1: Areas that were once wetlands and have had the vegetation altered may be simply restored; in fact, the seed bank may still be present or nurse plants may surround the site.
- ▶ Solution 2: Areas that were once wetlands and have had the hydrology altered may be simply restored by plugging drainage ditches.



# gSSURGO - Background

- ▶ In 2012, USDA-NRCS produced a seamless gridded (10-m raster) version of their most detailed vector soil survey maps. The data set is currently out for testing.
- ▶ The data is joined across survey areas, edge-matched, converted to raster cells, and clipped by state boundary.
- ▶ The gSSURGO product will be available after testing at the [NRCS Geodata Data Gateway](#).

# gSSURGO User's Guide

This will be offered  
to the public  
bundled with data  
when downloaded  
as well as on the  
new gSSURGO  
web page.



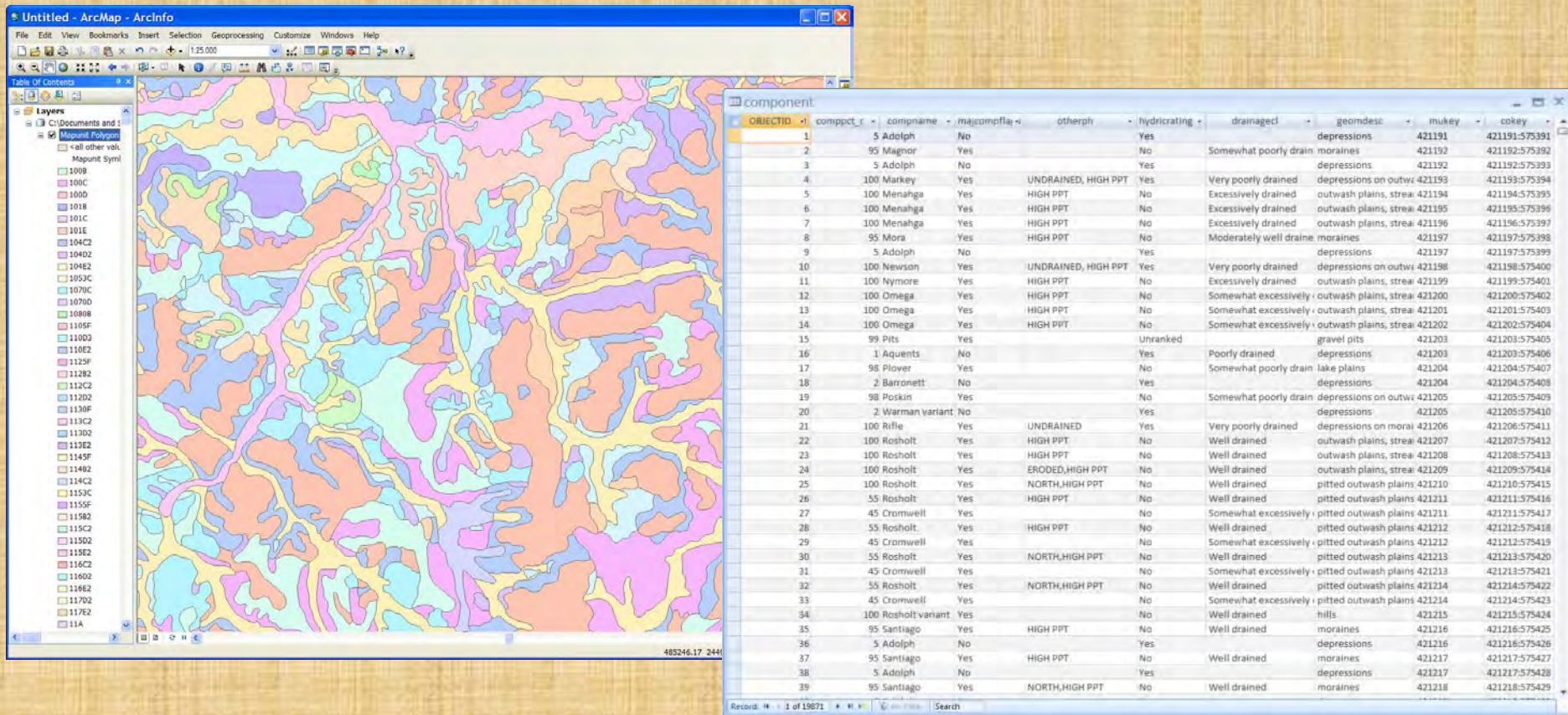
## **Gridded Soil Survey Geographic (gSSURGO) Database**

### **User Guide**

Version 1.0  
February 12, 2013  
National Soil Survey Center

# gSSURGO – Gridded SSURGO Data

- ▶ The PWSL data set includes the gridded (raster) SSURGO spatial layer plus eight relevant tables, rather than the entire set of over 50 SSURGO tables.



# Potential Wetland Soil Landscapes Data Set

- ▶ The PWSL gSSURGO data is meant to be used as a base layer, in combination with other data sets.
- ▶ Not all tables are included because that requires a high level of user expertise, increases the size of the geodatabase, and many of the tables are not involved in wetland projects.
- ▶ There are exceptions, and the entire data set can be obtained if needed at the [NRCS Geodata Data Gateway](#).

# Tables in the PWSL Data

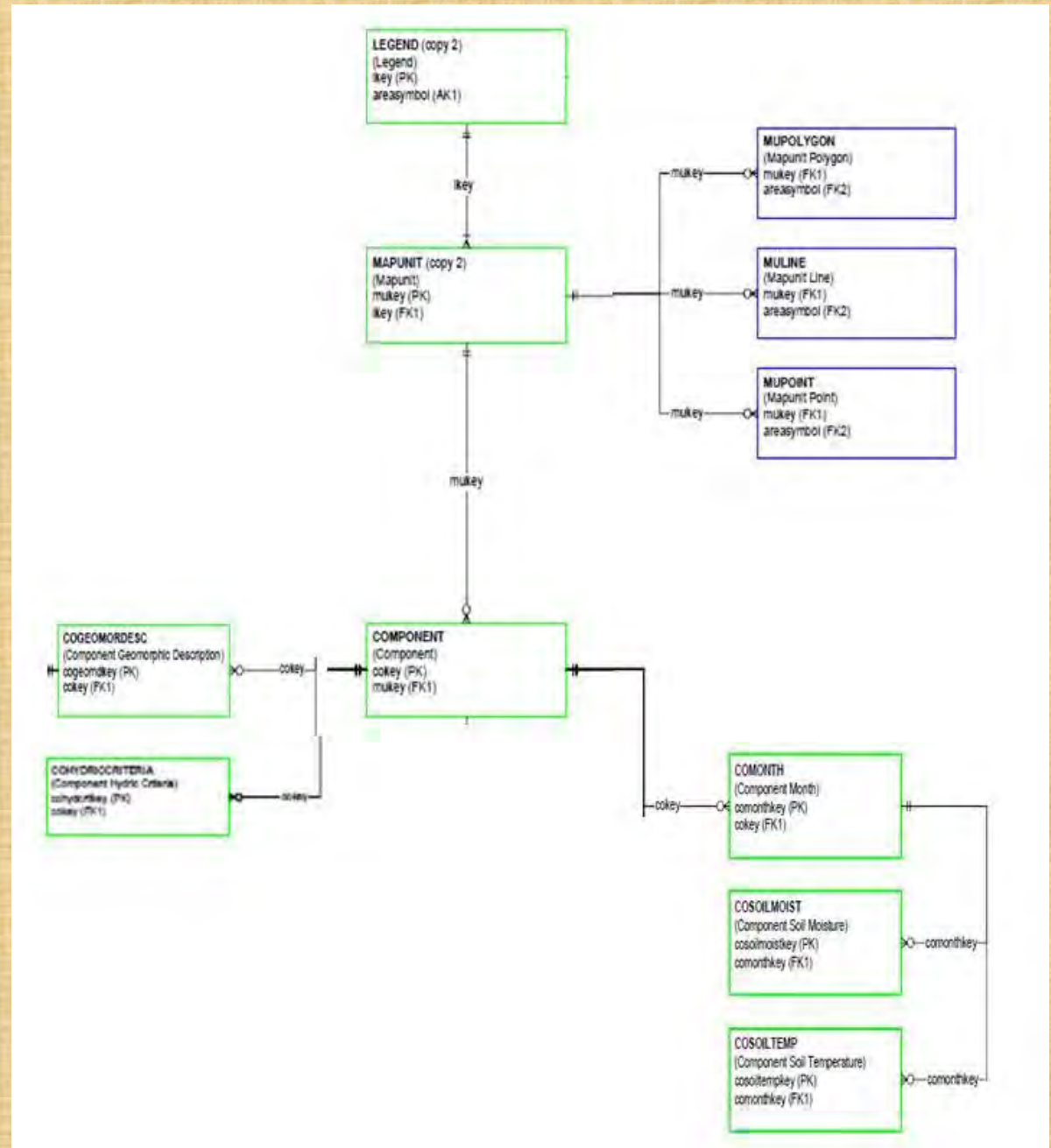
- ▶ Data tables include:
  - ▶ *Legend table* – (relationship between mapunits and spatial data)
  - ▶ *Mapunit table* – (mapunit symbol, mapunit name)
  - ▶ *Component table* – (component name and pct. composition, phase, hydric rating (yes/no), drainage class, hydrologic soil group, geomorphic setting)

# Tables in the PWSL Data

- ▶ *Cohydriccriteria table* – (hydraulic criterion)
- ▶ *Comonth table* – (flood and ponding freq. and duration)
- ▶ *Cosoilmoist table* – (soil moisture depth and status)
- ▶ *Cosoiltemp table* – (soil temperature depth and status)
- ▶ *Cogeomordesc* – (geomorphic features)

# gSSURGO Table Relationships

- Link these tables in a database manager such as Microsoft Access<sup>®</sup> using the indicated linking fields, without the need for a template.
- These are all 1:1 joins.
- Link to the spatial data afterwards.



# gSSURGO Table Relationships and Linking Keys

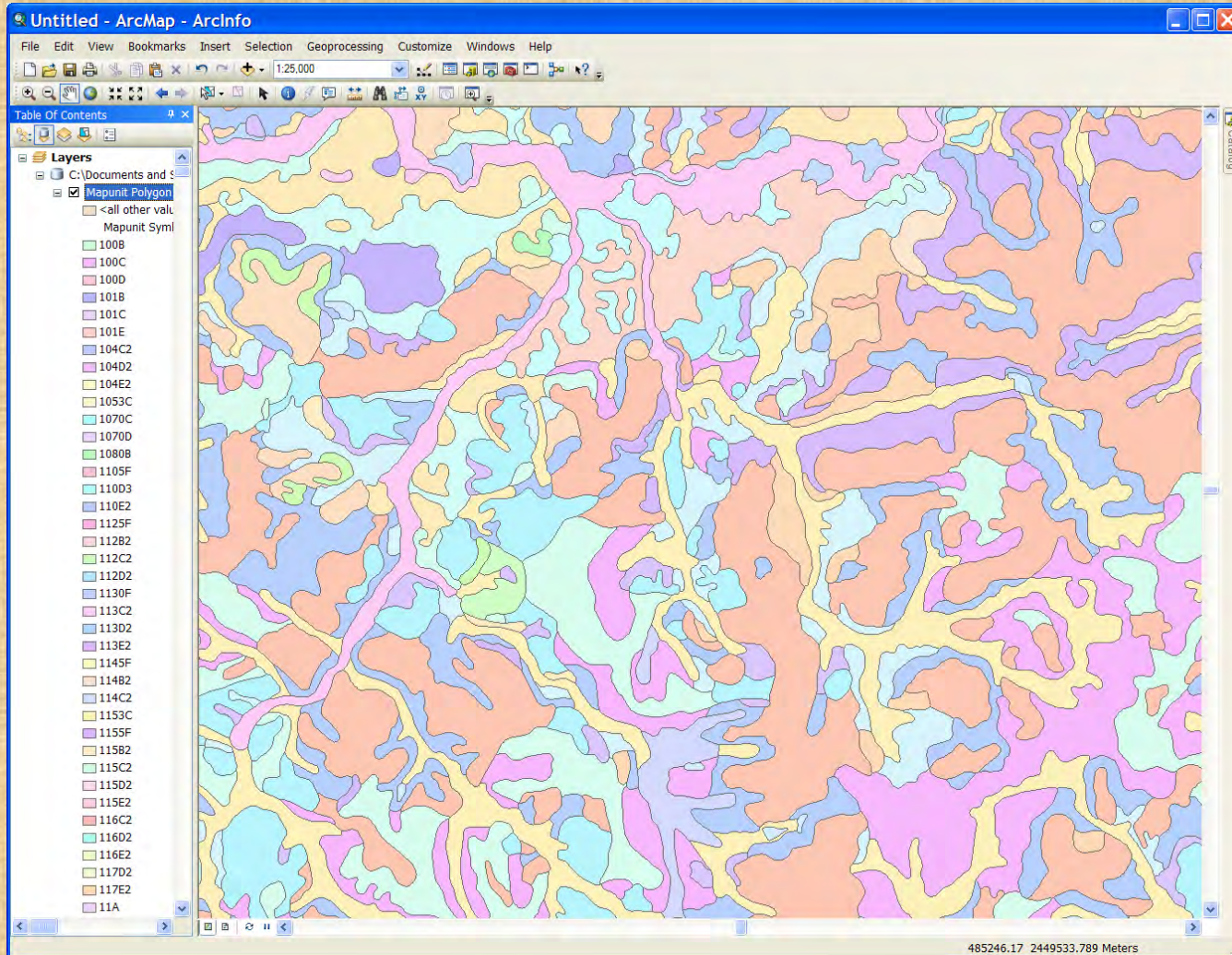
- ▶ Legend Table - links to Mapunit table with lkey
- ▶ Mapunit Table – links to spatial data (vector) with mukey and areasymbol
- ▶ Component Table – links to Mapunit Table with mukey
- ▶ Cogeomordesc Table – links to Component Table with cokey
- ▶ Cohydriccriteria Table – links to Component Table with cokey
- ▶ Comonth - links to Component Table with cokey
- ▶ Cosoilmoist - links to Comonth Table with comonthkey
- ▶ Cosoiltemp - links to Comonth Table with comonthkey



# SSURGO Component Table

OBJECTID	compct_r	compname	majcompfla	otherph	hydrating	drainagecl	geomdesc	mukey	cokey
1	5	Adolph	No		Yes		depressions	421191	421191:575391
2	95	Magnor	Yes		No	Somewhat poorly drain	moraines	421192	421192:575392
3	5	Adolph	No		Yes		depressions	421192	421192:575393
4	100	Markey	Yes	UNDRAINED, HIGH PPT	Yes	Very poorly drained	depressions on outwa	421193	421193:575394
5	100	Menahga	Yes	HIGH PPT	No	Excessively drained	outwash plains, strea	421194	421194:575395
6	100	Menahga	Yes	HIGH PPT	No	Excessively drained	outwash plains, strea	421195	421195:575396
7	100	Menahga	Yes	HIGH PPT	No	Excessively drained	outwash plains, strea	421196	421196:575397
8	95	Mora	Yes	HIGH PPT	No	Moderately well draine	moraines	421197	421197:575398
9	5	Adolph	No		Yes		depressions	421197	421197:575399
10	100	Newson	Yes	UNDRAINED, HIGH PPT	Yes	Very poorly drained	depressions on outwa	421198	421198:575400
11	100	Nymore	Yes	HIGH PPT	No	Excessively drained	outwash plains, strea	421199	421199:575401
12	100	Omega	Yes	HIGH PPT	No	Somewhat excessively	outwash plains, strea	421200	421200:575402
13	100	Omega	Yes	HIGH PPT	No	Somewhat excessively	outwash plains, strea	421201	421201:575403
14	100	Omega	Yes	HIGH PPT	No	Somewhat excessively	outwash plains, strea	421202	421202:575404
15	99	Pits	Yes		Unranked		gravel pits	421203	421203:575405
16	1	Aquents	No		Yes	Poorly drained	depressions	421203	421203:575406
17	98	Plover	Yes		No	Somewhat poorly drain	lake plains	421204	421204:575407
18	2	Barronett	No		Yes		depressions	421204	421204:575408
19	98	Poskin	Yes		No	Somewhat poorly drain	depressions on outwa	421205	421205:575409
20	2	Warman variant	No		Yes		depressions	421205	421205:575410
21	100	Rifle	Yes	UNDRAINED	Yes	Very poorly drained	depressions on morai	421206	421206:575411
22	100	Rosholt	Yes	HIGH PPT	No	Well drained	outwash plains, strea	421207	421207:575412
23	100	Rosholt	Yes	HIGH PPT	No	Well drained	outwash plains, strea	421208	421208:575413
24	100	Rosholt	Yes	ERODED,HIGH PPT	No	Well drained	outwash plains, strea	421209	421209:575414
25	100	Rosholt	Yes	NORTH,HIGH PPT	No	Well drained	pitted outwash plains	421210	421210:575415
26	55	Rosholt	Yes	HIGH PPT	No	Well drained	pitted outwash plains	421211	421211:575416
27	45	Cromwell	Yes		No	Somewhat excessively	pitted outwash plains	421211	421211:575417
28	55	Rosholt	Yes	HIGH PPT	No	Well drained	pitted outwash plains	421212	421212:575418
29	45	Cromwell	Yes		No	Somewhat excessively	pitted outwash plains	421212	421212:575419
30	55	Rosholt	Yes	NORTH,HIGH PPT	No	Well drained	pitted outwash plains	421213	421213:575420
31	45	Cromwell	Yes		No	Somewhat excessively	pitted outwash plains	421213	421213:575421
32	55	Rosholt	Yes	NORTH,HIGH PPT	No	Well drained	pitted outwash plains	421214	421214:575422
33	45	Cromwell	Yes		No	Somewhat excessively	pitted outwash plains	421214	421214:575423
34	100	Rosholt variant	Yes		No	Well drained	hills	421215	421215:575424
35	95	Santiago	Yes	HIGH PPT	No	Well drained	moraines	421216	421216:575425
36	5	Adolph	No		Yes		depressions	421216	421216:575426
37	95	Santiago	Yes	HIGH PPT	No	Well drained	moraines	421217	421217:575427
38	5	Adolph	No		Yes		depressions	421217	421217:575428
39	95	Santiago	Yes	NORTH,HIGH PPT	No	Well drained	moraines	421218	421218:575429

# gSSURGO Soil Map



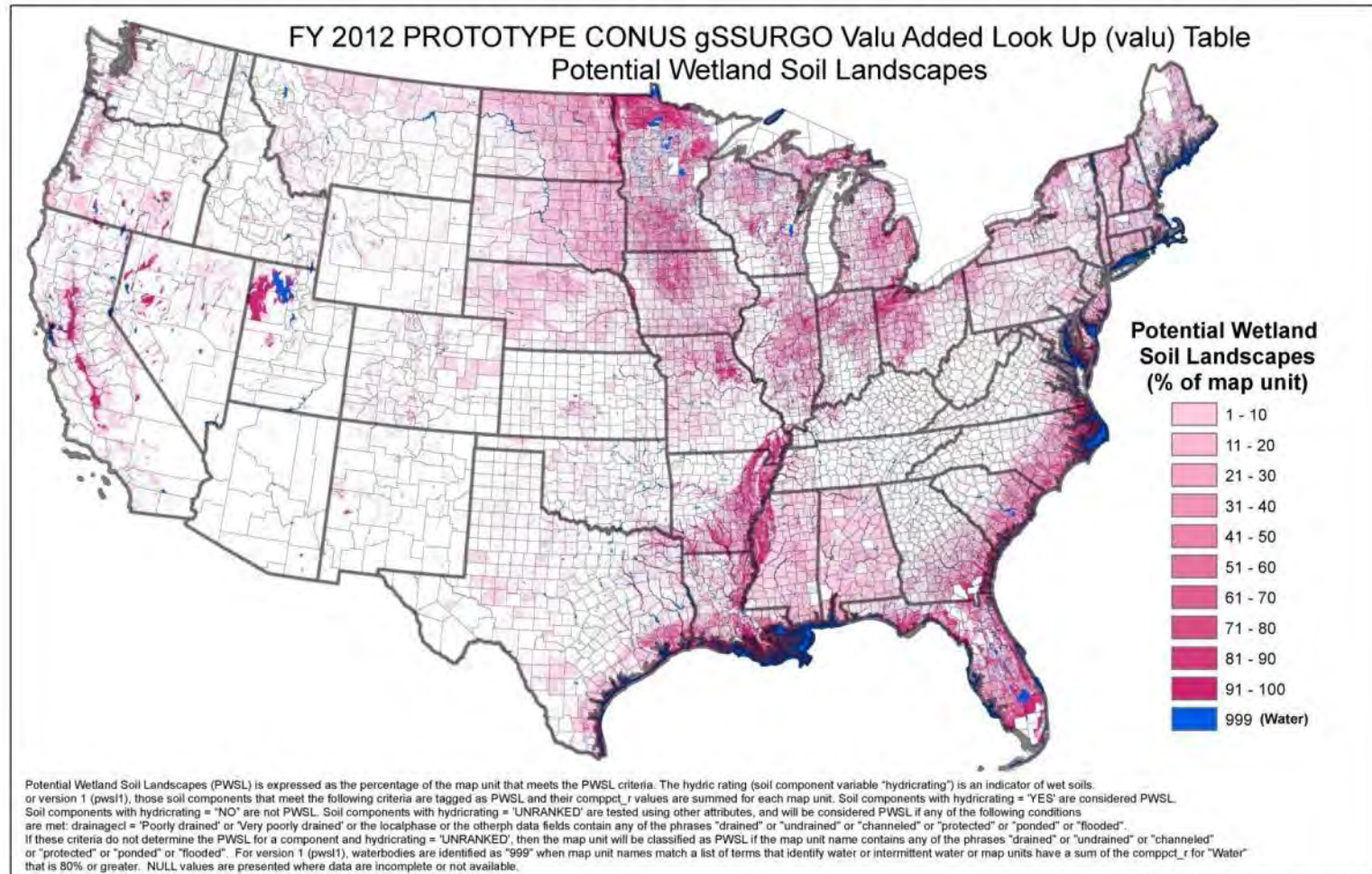
485246.17 2449533.789 Meters

# VALU Table

- ▶ In order to sum the percent composition of hydric soils in any map unit, a query was developed by Sharon Waltman of USDA-NRCS. The results are stored in a table that should be available at the same site where the PWSL data resides.
- ▶ There is a column ~called pwslpomu in the VALU table database table used to map the potential wetlands soil landscapes.
- ▶ The VALU table database is national, so you can use it with any or all States. Need to join the field to the 10m raster gSSURGO using Mukey.

<http://sdmdataaccess.nrcs.usda.gov/QueryHelp.aspx>

# Prototype Valu Table for sum PWSL %



# The Query to Produce a State Value Table

Find the soil map unit pixels that have the dominant soil with hydricrating = y.  
To do this, use the following query from the full data set.

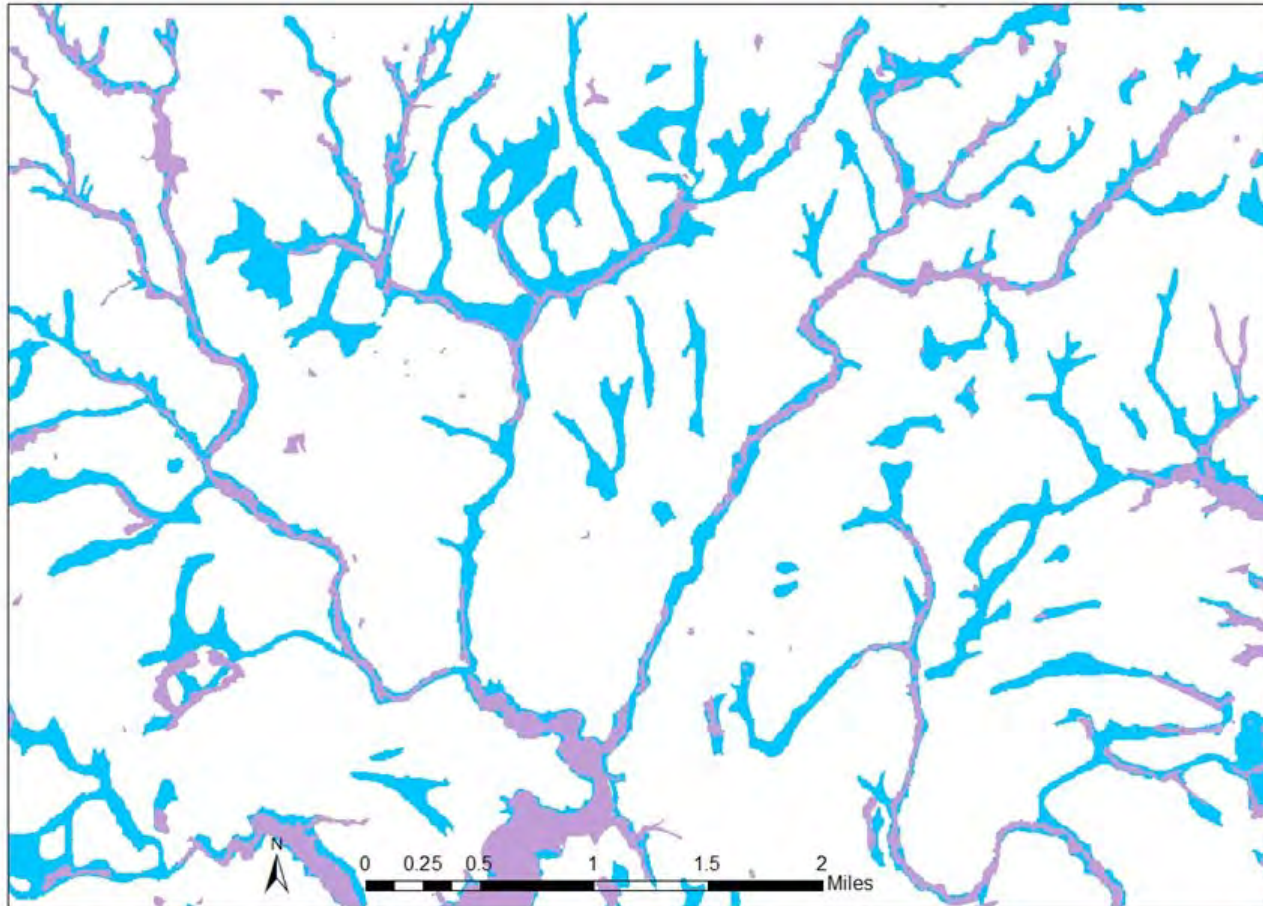
- ▶ select areasymbol, musym, compname, mapunit.mukey, compct\_r, from legend
- ▶ join mapunit on legend.lkey=mapunit.lkey
- ▶ join component on component.mukey = mapunit.mukey
- ▶ join cohydriccriteria on component.mukey = mapunit.mukey  
where areasymbol like '\_\_%' and [insert two letter state abbreviation]  
areasymbol <> 'US' and  
hydricrating = 'y' and  
majcompflag = 'yes' and  
component.cokey in
- ▶ (select top 1 c.cokey from component c where c.mukey=mapunit.mukey  
order by compct\_r desc)

Developed by: Sharon W. Waltman, USDA-NRCS

# Discussion – Location and Hydrology

- ▶ PWSL are those “hydic” clusters that are:
  - 1) adjacent to an NWI unit, or along the same stream system, or
  - 2) occur upland of a levee or near a canal, or
  - 3) on geomorphic positions where having wetland hydrology makes sense, or
  - 4) National Hydrography Data (NHD) or SSURGO point or line features indicate ditches, drains, springs, seeps, or
  - 5) NHD swamp or marsh symbols or water presence, or
  - 6) the map unit phase name includes, for example: “*high water table, poorly drained, strongly saline, slightly wet, ditched, protected, or drained*”, or
  - 7) TWI indicated a depression to be filled, or a high wetness index, or
  - 8) the geomorphic position is, for example: “*depressional*” or “*salt flats*”

View of the major component hydric soils (blue) and the NWI wetlands (purple) for one section of Charles City County, VA

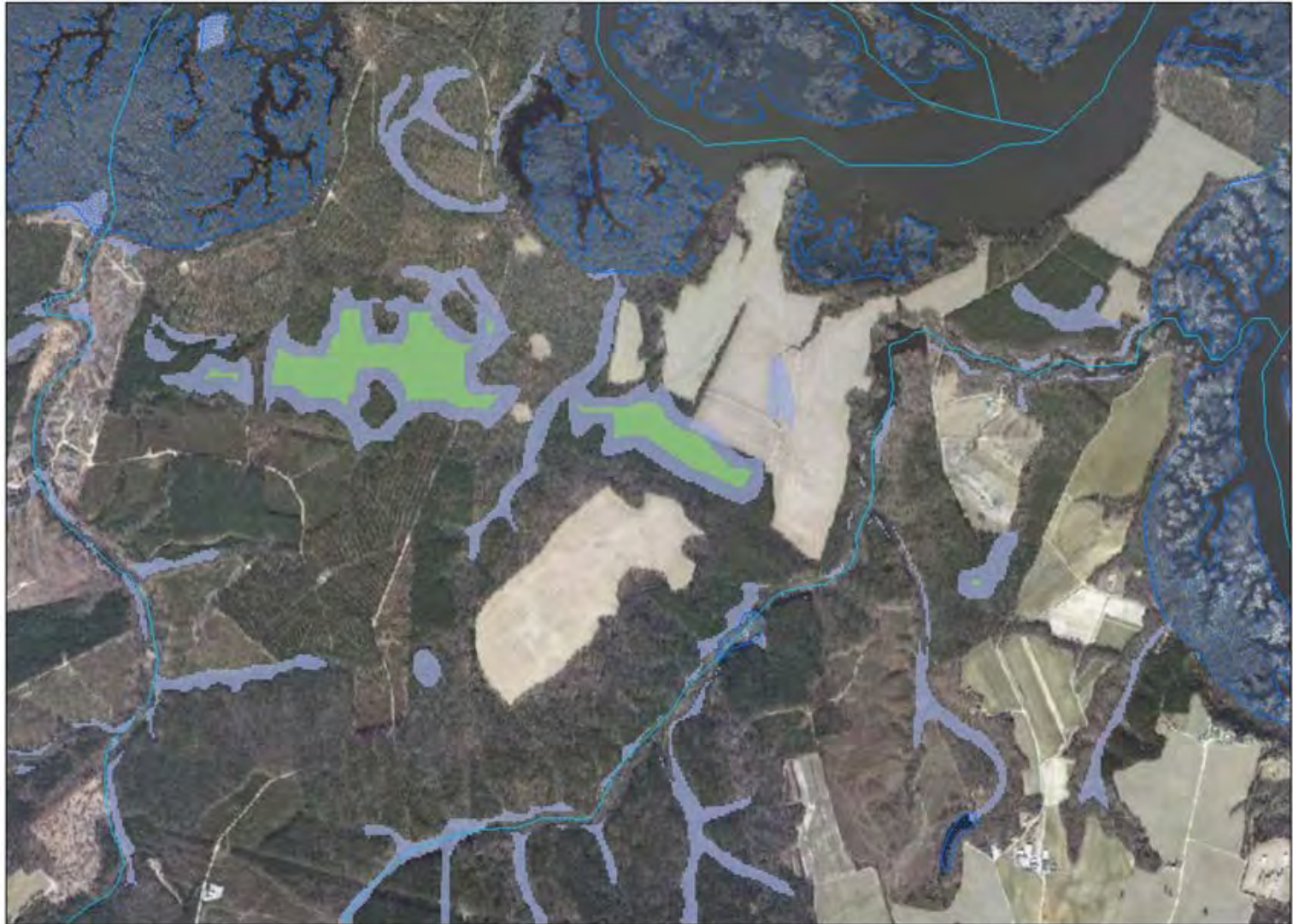


# Discussion - Vegetation

- ▶ Some cropland and pasture were not inspected as closely by NWI mappers.
- ▶ Find a PWSL “hydric” cluster using remote sensing or that extend away from an NWI polygon across a linear boundary.
- ▶ Find areas of cropland or pasture with a PWSL “hydric” cluster and some evidence of current or former wetland hydrology.
- ▶ Find areas of trees killed by drowning in a PWSL “hydric” cluster.
- ▶ Find areas of recently cleared vegetation in a PWSL “hydric” cluster adjacent to NWI polygons, using time-series Landsat imagery.



NHD streams, clear blue NWI, purple PWSL



0 1,000 2,000 4,000 Feet



# Ancillary Data Sets

- ▶ Landsat
- ▶ NAIP
- ▶ LiDAR
- ▶ National Land Cover Data
- ▶ Nat. Agr. Stat. Serv. (NASS) 2010 Cropland Data Layer
- ▶ National Hydrography Data set
- ▶ TIGER data
- ▶ Major Land Resource Area (MLRA)
- ▶ Ecoregion
- ▶ Drainage Districts and HUC Watershed maps

# Future Activities

- ▶ We will be developing a tutorial to step people through a simple GIS exercise. The tutorial will resemble a standard Windows<sup>®</sup> help guide that comes with most major software, and it will be posted on the ASWM web site. This is not intended to replace the USDA-NRCS User's Guide, but to supplement it for ease of use.
- ▶ The exercise will begin with linking the tables together using Microsoft Access, then linking the tabular with the spatial data.
- ▶ A grid map of the hydric soils will be made using the GIS.
- ▶ When available, we will add the Valu table that sums the percent composition of hydric soils for each map unit.

# Contact Information

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