How Delaware Benefits from National Wetland Inventory Data

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DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

Delaware Wetlands
Purify Provide Protect
http://de.gov/delawarewetlands

NAWM Webinar - Celebrating 50 years of NWI 6.24.2025

The National Wetlands Inventory Proves Valuable in Assessing Wetland Protection, Health, and Function in Delaware.

Three Examples of Use:

1. Periodic mapping and inventory including status and trends.

2. Comparing wetland health with functional prediction

3. Evaluating regulatory protection with changing federal jurisdiction.

Spotted Water Hemlock
(*Cicuta maculata*)
B.Haywood

Imagery: Only a snapshot in time – degree of wetness varies

2007

2012

2017

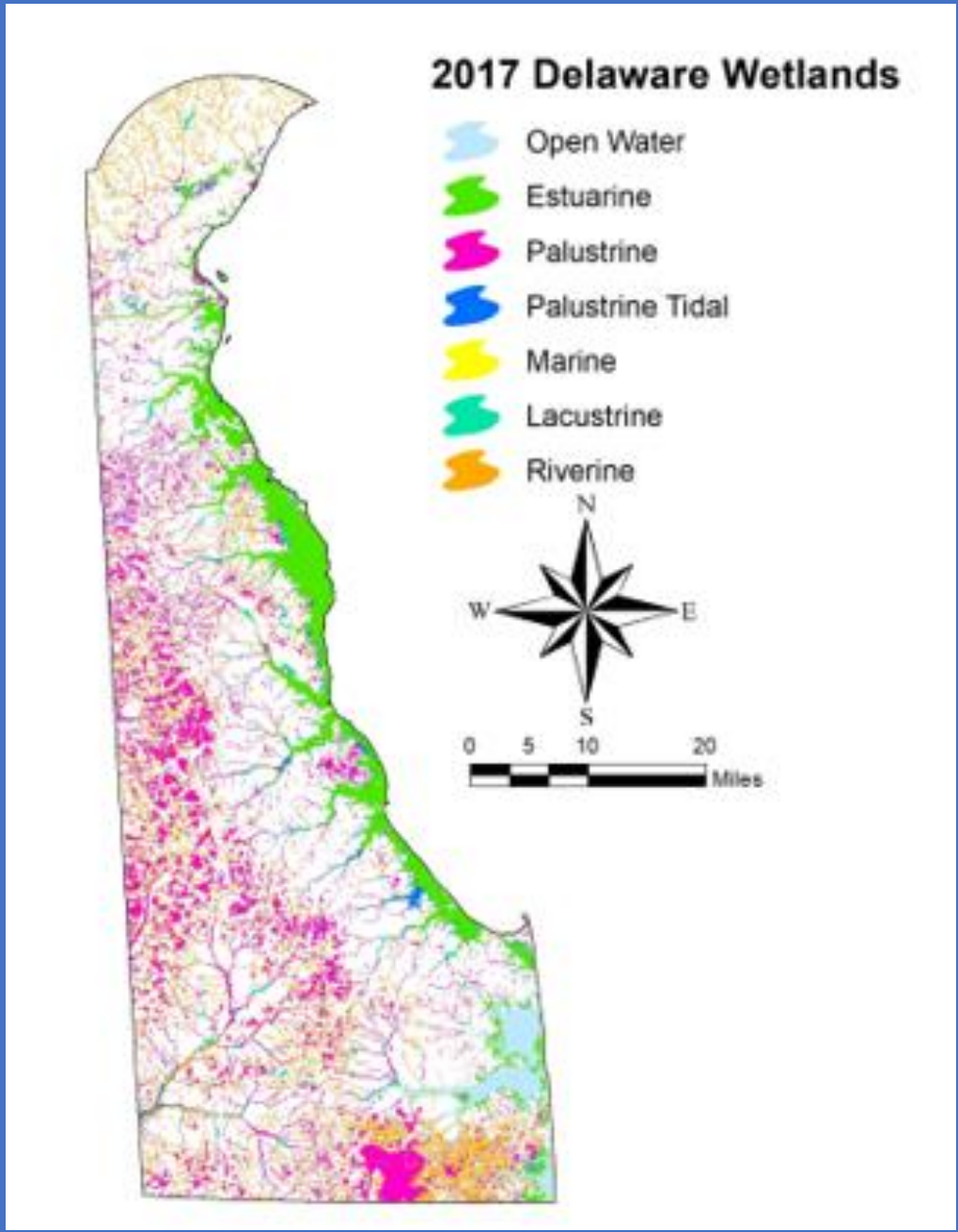
NWI Version 2 methodology

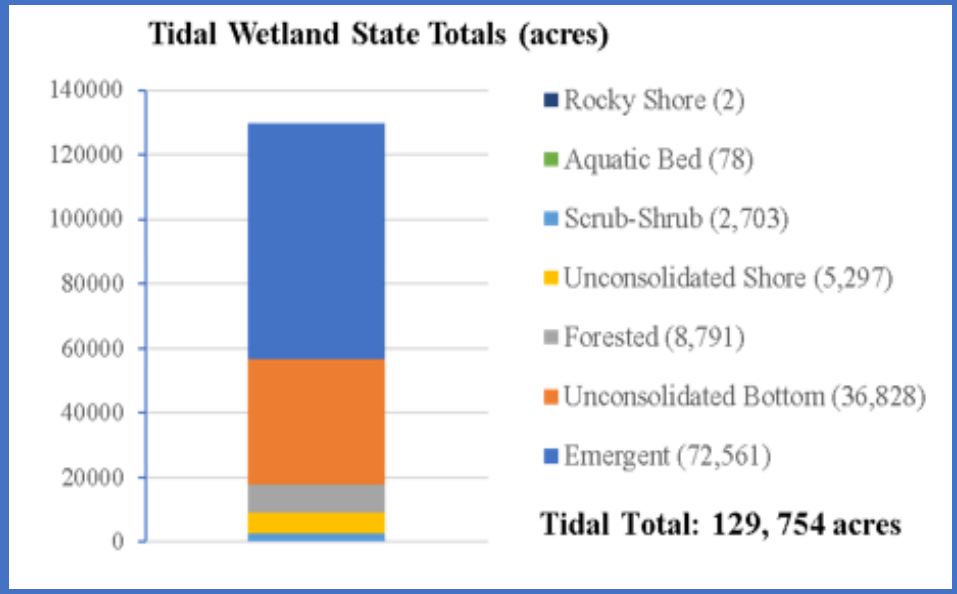
Mapped wetland and deepwater habitats as in past and applied Cowardin et al. (1979) to all polygonal features

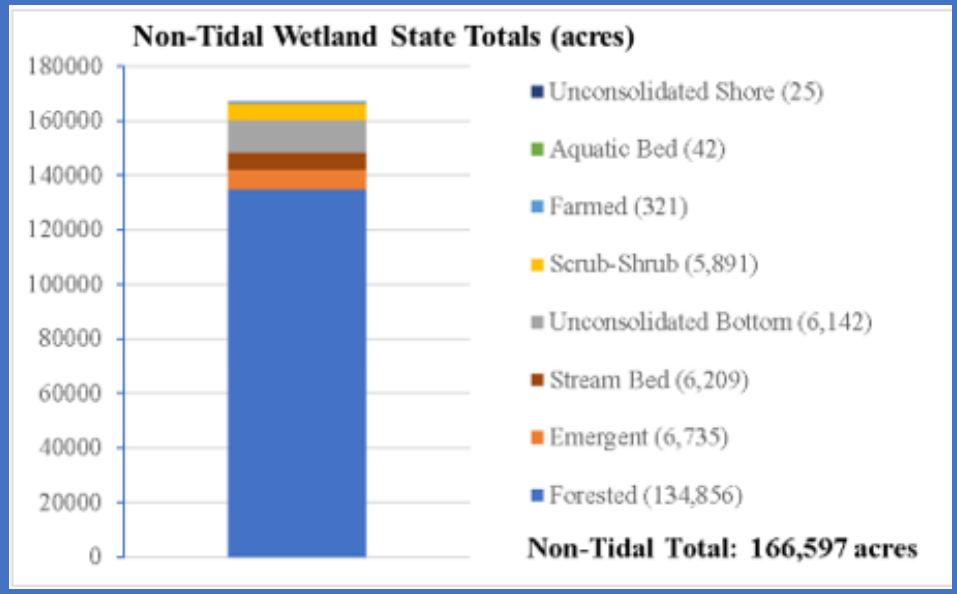
Incorporated hydrography data (NHD) into the mapping for a comprehensive data set of all wetlands and surface waters

Hydrography data became separate polygons

Allows for more accurate adaptive management, geospatial summaries, and modeling


2017 Delaware Wetlands
Open Water
Estuarine
Palustrine
Palustrine Tidal
Marine
Lacustrine
Riverine
N
W
E
S
0 5 10 20
Miles


Tidal Wetland State Totals (acres)
140000
120000
100000
80000
60000
40000
20000
0
Rocky Shore (2)
Aquatic Bed (78)
Scrub-Shrub (2,703)
Unconsolidated Shore (5,297)
Forested (8,791)
Unconsolidated Bottom (36,828)
Emergent (72,561)
Tidal Total: 129, 754 acres


Non-Tidal Wetland State Totals (acres)
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
Unconsolidated Shore (25)
Aquatic Bed (42)
Farmed (321)
Scrub-Shrub (5,891)
Unconsolidated Bottom (6,142)
Stream Bed (6,209)
Emergent (6,735)
Forested (134,856)
Non-Tidal Total: 166,597 acres

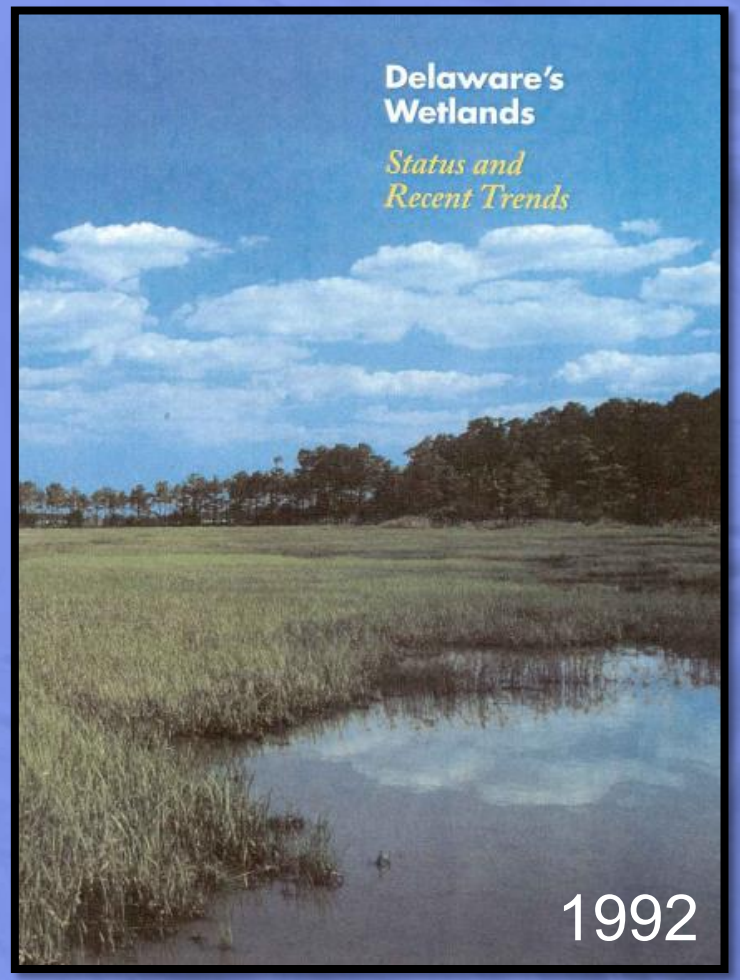
Assessing Wetland Loss, Gain, and Change 2007-2017 (acreage and function)

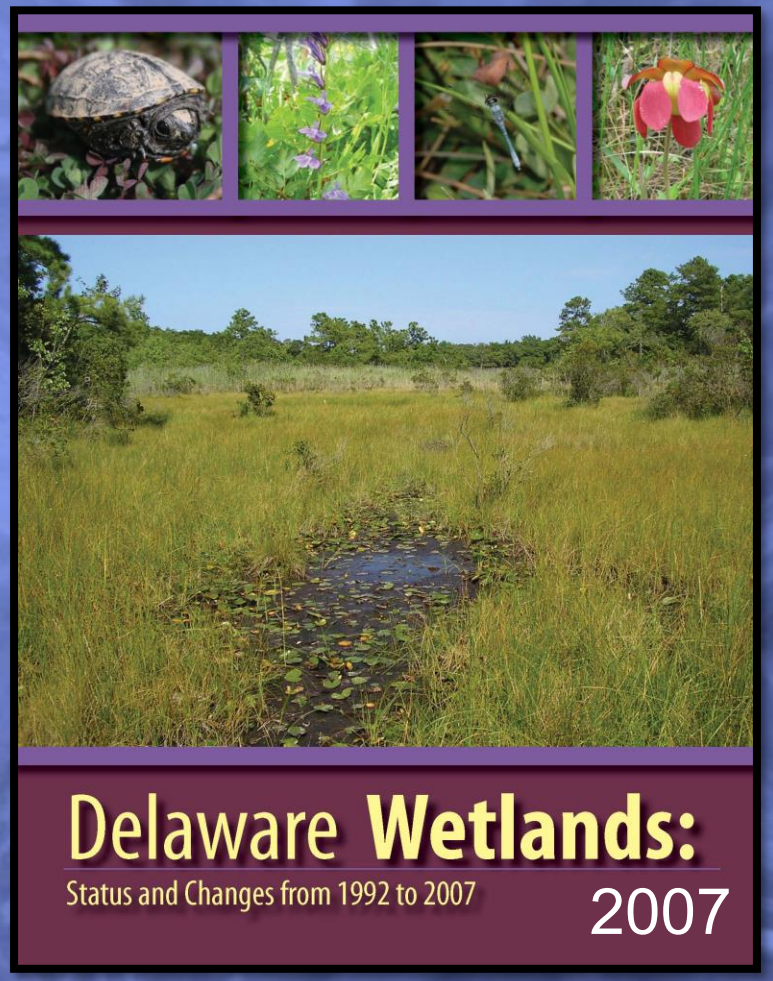
Mapping provides opportunity to track loss/gain/change over time for spatial extent and functional prediction

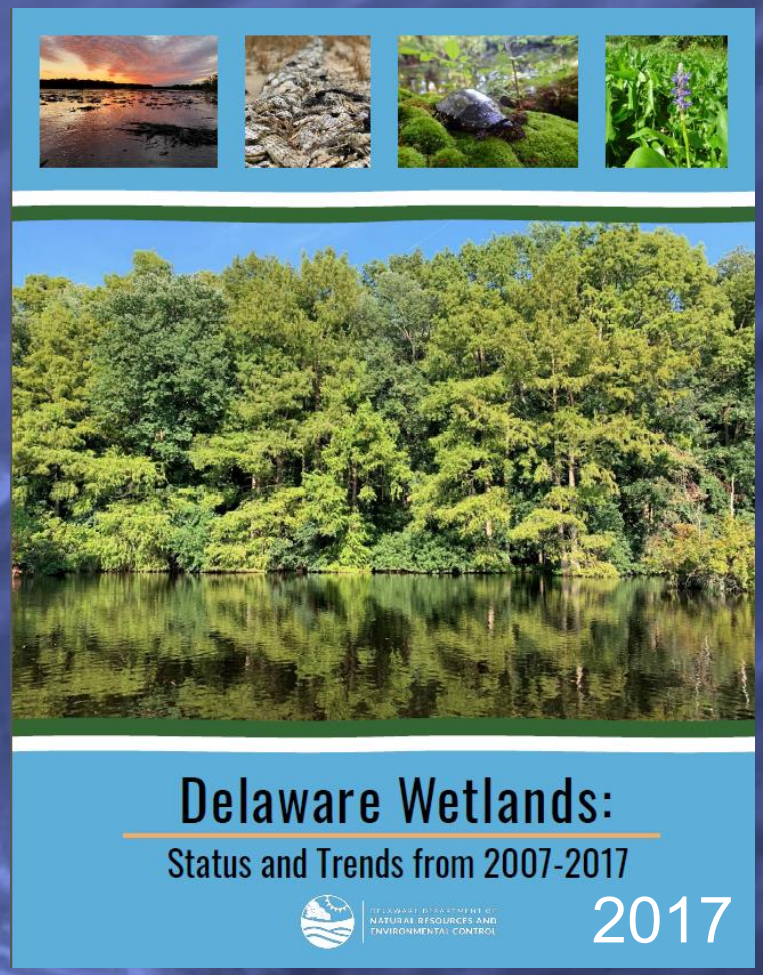
Delaware has three Status and Changes reports

- 1982-1992 (10 years) – 1,905 acres net vegetated loss
- 1992-2007 (15 years) -- 3,126 acres net vegetated loss
- 2007-2017 (10 years) – 3,011 acres net vegetated loss

Ability to attribute cause of loss/gain/change







- Have four statewide wetland mapping efforts (1982, 1992, 2007, 2017)
- Status and Changes reports
- Ability to track wetland acreage and change in type, gains and losses
- LLWW can assess at the landscape level the potential of wetlands to perform certain functions

Wetland Functional Analysis

Use of abiotic features to predict wetland functions

LLWW (Tiner, 2003)
Landscape Position, Landform, Water Flow Path, Waterbody Type (derived from HGM classification)

First applied in Delaware as part of the 2007 statewide wetland mapping

Ability to predict at landscape level the potential for wetland types to perform 11 functions at a high or moderate level

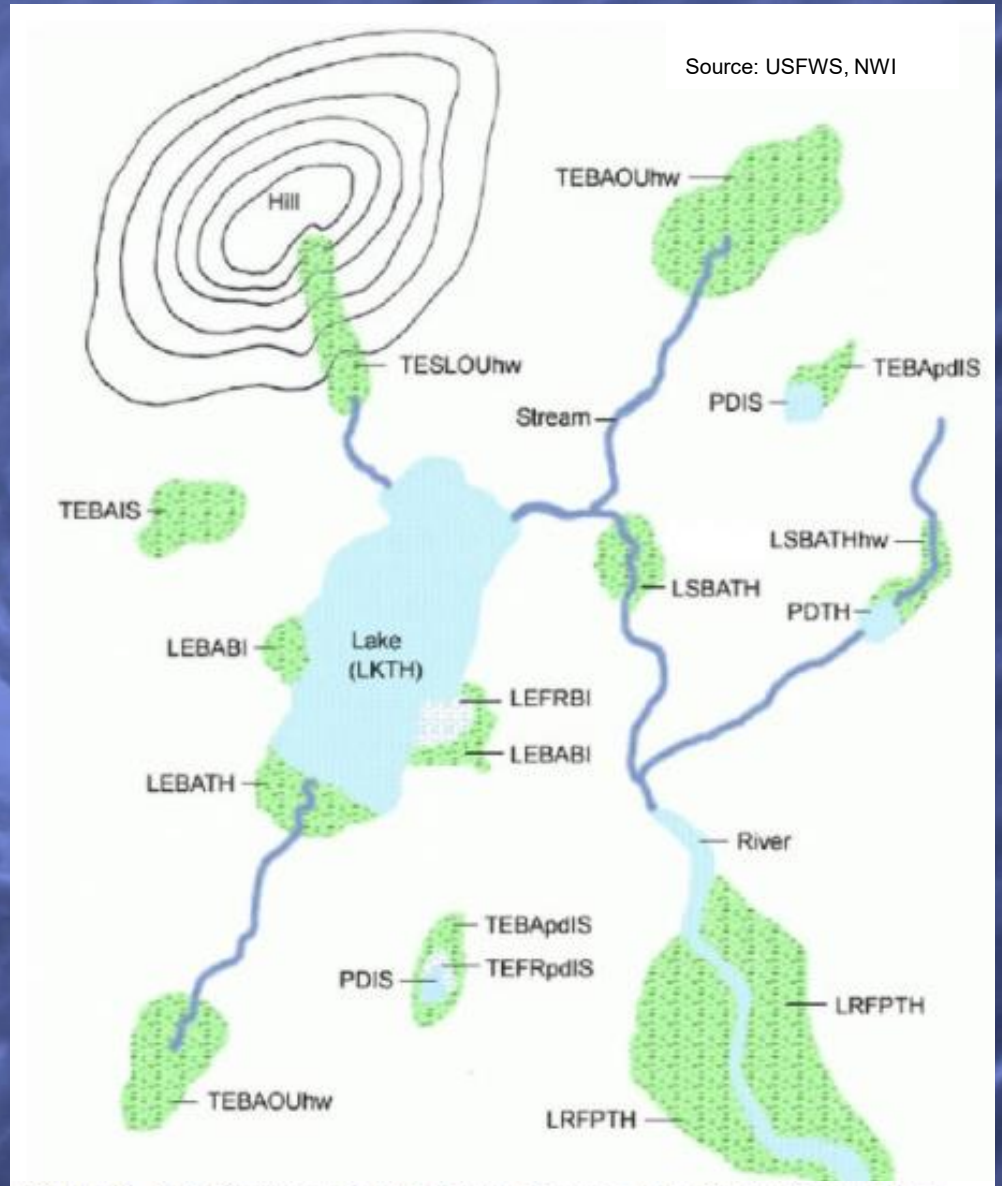


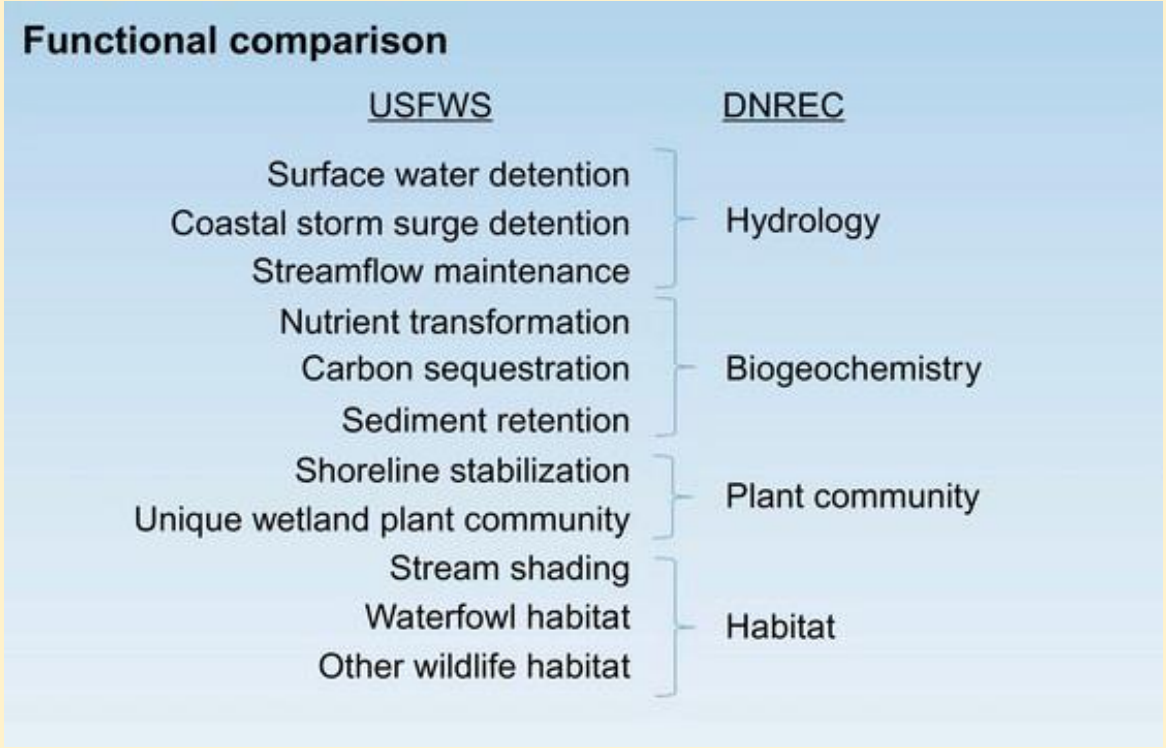
Figure 1. Application of LLWW descriptors to a region with nontidal wetlands. Landscape positions: LR – lotic river, LS – lotic stream, LE – lentic, and TE – terrene; Landforms: BA – basin, FR – fringe, FP – floodplain, SL – Slope; Water flow paths: OU – outflow, IS – isolated, TH – throughflow, BI – bidirectional-nontidal; other descriptors: pd – pond (association), hw – headwater; Waterbodies: PD – pond, LK – lake. Note: Landscape position can be added to lakes and ponds if desirable.

- **What if we compared site-level functional condition to the landscape level prediction of functional condition?**

- Delaware has completed site-level wetland condition assessments (by HGM type) for all watersheds statewide using HGM based methods (DECAP, DERAP).

- Wetland condition assessments evaluate levels of stressors and disturbance compared to a set of reference wetlands.

- Uses 5 functional categories to determine the Index of Wetland Condition (IWC) that shows how far removed a wetland is from the ability to perform certain functions.



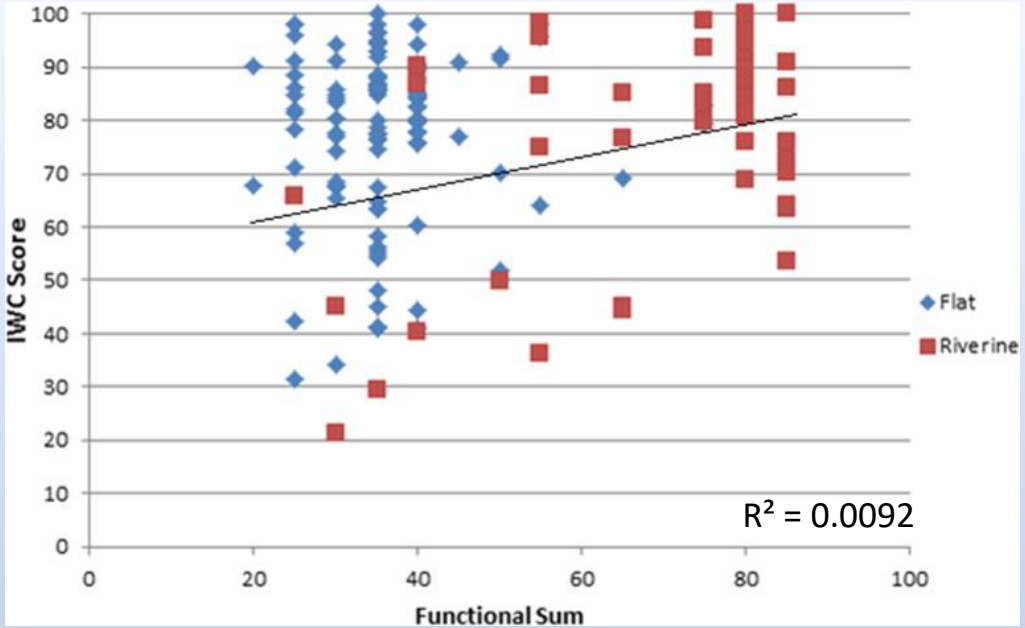
Landscape-level predicts function based on abiotic factors (LLWW) assigning a high or moderate category

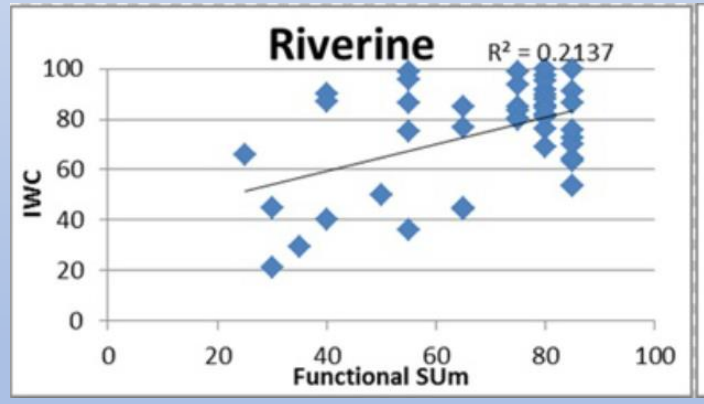
Site-level uses stressors and disturbance to determine function using wetland condition scoring

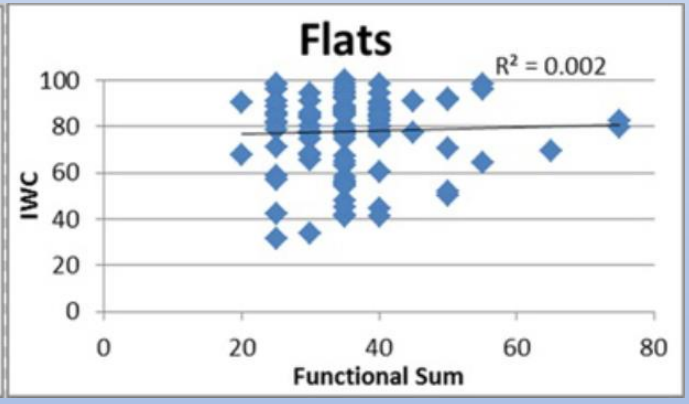
Comparing categorical rankings (landscape-level) to numeric rankings (site-level) is challenging

For numerical comparison purposes, landscape-level high were given a score of 10, and moderate 5

Allowed for summation of all predicted functions (functional sum) for comparison to site-level scores





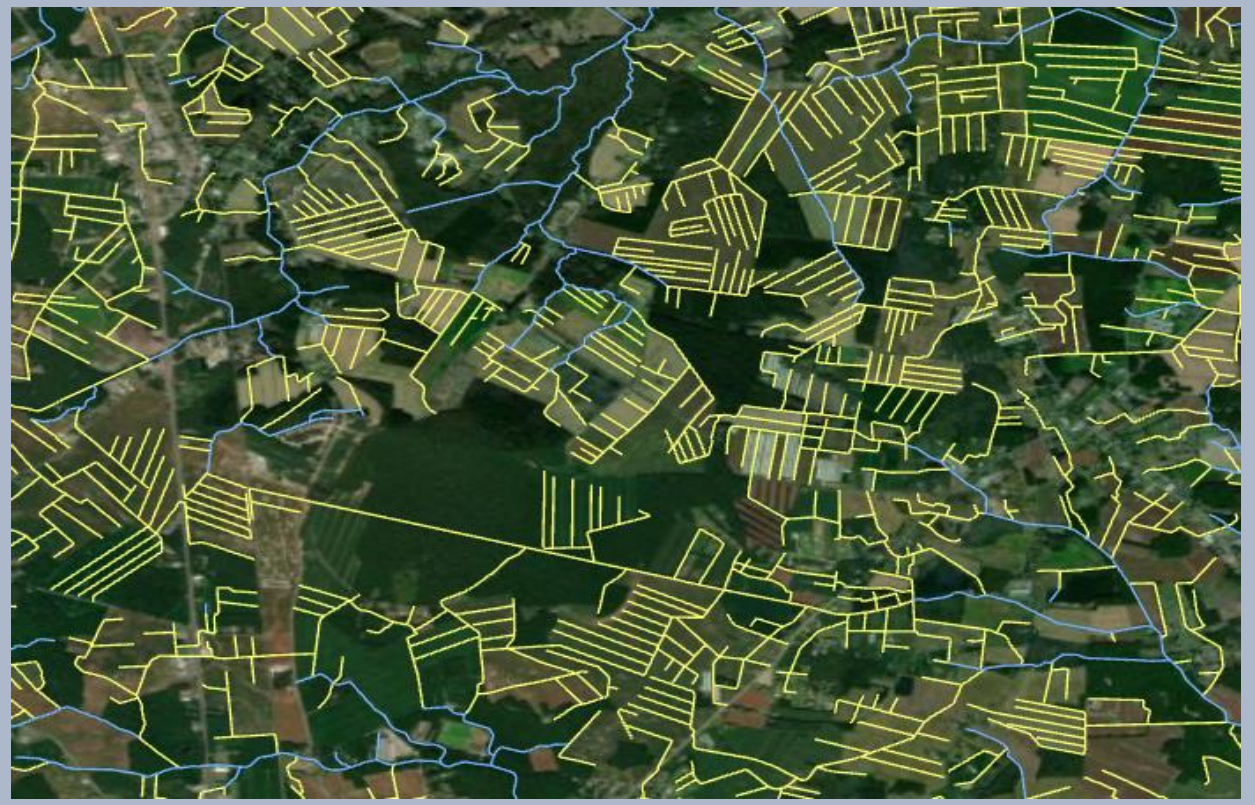


** Lack of strong correlation reveals improvement needed In landscape level prediction, however, both methods can Inform the other going forward to improve accuracy.

Post-Sacket Analysis:

- Used NWI and NHD
- Removed any Estuarine or Marine, and all freshwater tidal from NWI data
- Buffered NHD at 1m for a conservative approach
- Established break points for NHD segments
- Further classified categories
  - Isolated NWI polygons
  - Connected NWI polygons
  - Perennial NHD segments (includes artificial and connector)
  - Intermittent polygons
  - Intermittent NHD segments (includes canal/ditch)

Example of grid ditches for drainage



Delaware's Landscape

Lowest lying state in the U.S.
90% Coastal Plain (remainder Piedmont)
Large areas poorly and very poorly drained soils
Extensive ditching primarily for agricultural drainage

Non-tidal Features

NWI polygons

- Isolated
- Perennial connected (incl. NHD artificial and connector)
- Intermittent not connected (incl. NHD canal/ditch)

NHD segments

- Perennial (incl. artificial and connector)
- Intermittent (incl. canal/ditch)

** Post Sackett assessment predicted more than 70% of Delaware's nontidal wetlands are left without protection.

Provides efficient and cost-friendly data to monitor and assess wetland extent and condition.

Allows for comparing wetland status and trends over time and plan for conservation or restoration efforts.

Supplies data and information enabling more accurate prediction of wetland function across the landscape.

Assists in determining potential changes to regulatory jurisdiction due to changing jurisdictional scope.

Thank you for the opportunity to present and celebrate NWI!

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