

A New Wetland Map for Tompkins County

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Cayuga Lake Watershed Network

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Wetlands

Wetlands exist... “at the interface between truly terrestrial ecosystems and aquatic systems, making them inherently different from each other, yet highly dependent on both.”

- Mitsch and Gosselink, 2007



Credit: [CT Dept of Energy & Environmental Protection](#)



Credit: [NH Division of Forests and Lands](#)



Credit: [Maine Natural Areas Program](#)

Wetlands

Wetlands exist... *“at the interface between truly terrestrial ecosystems and aquatic systems, making them inherently different from each other, yet highly dependent on both.”*

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“...areas inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.”

- U.S. Army Corps of Engineers (Corps) and the U.S. EPA accepted definition for regulatory purposes

Jurisdictional Wetland Criteria

1. Flooding or saturation
2. Hydric Soils
3. Hydrophytic vegetation

Wetlands

Ecological Values

- Support unique plant and animal communities
- High biological diversity
- Critical habitat for many rare and endangered species

Ecosystems goods and services

- Flood abatement
- Groundwater replenishment
- Erosion and sedimentation control
- Water purification
- Nutrient cycling
- Recreation and tourism
- Open spaces

Wetlands

Federal Law

- [Clean Water Act \(1972\) Section 404](#) established a program to regulate the discharge of dredge and fill material into waters of the United States including wetlands
- [National Environmental Policy Act of 1969](#) (NEPA) is the basic national charter for protection of the environment. It establishes policy, sets goals, and provides means for carrying out the policy.
- [Rivers & Harbors Act of 1899](#) established a program to regulate activities affecting navigation in United States waters, including wetlands.

State Law

- The [Freshwater Wetlands Act, Article 24](#) of the Environmental Conservation Law, provides DEC and the Adirondack Park Agency with the authority to regulate freshwater wetlands in the state.

Need for a new wetland map

Wetland Protections in Tompkins County: Existing Status, Gaps, and Future Needs (2008)

- Field Survey
 - 19% of wetlands in Tompkins have no protection under state or federal law
 - 70-80% of wetlands not on existing wetland maps
 - 20% of wetland area in survey not included in USFWS NWI wetlands database

WRC Wetlands Committee drafted sample local wetland law

“identify and map all wetlands that are not currently regulated by DEC or the federal government and are therefore vulnerable to disturbance and destruction from development.”

- Tompkins County WRC Work Plan

Need for a new wetland map

Existing wetland maps

National Wetlands Inventory (NWI)

US Fish and Wildlife Service

- Map all wetlands in United States

NYS Article 24 Freshwater Wetland Maps

NYS Department of Environmental Conservation

- Map all NYS jurisdictional wetlands (>12.4 acres) and smaller wetlands of unusual local significance

Need for a new wetland map

Existing wetland maps



USGS NHAP 1980s – Tompkins County

Need for a new wetland map

New data resources

NYS Digital Orthoimagery Program

- 2002 - color-infrared (0.5ft and 1ft pixel resolution)
- 2007 - natural color (0.5ft and 2ft pixel resolution)
- 2012 - 4-band (0.5ft and 2ft pixel resolution)

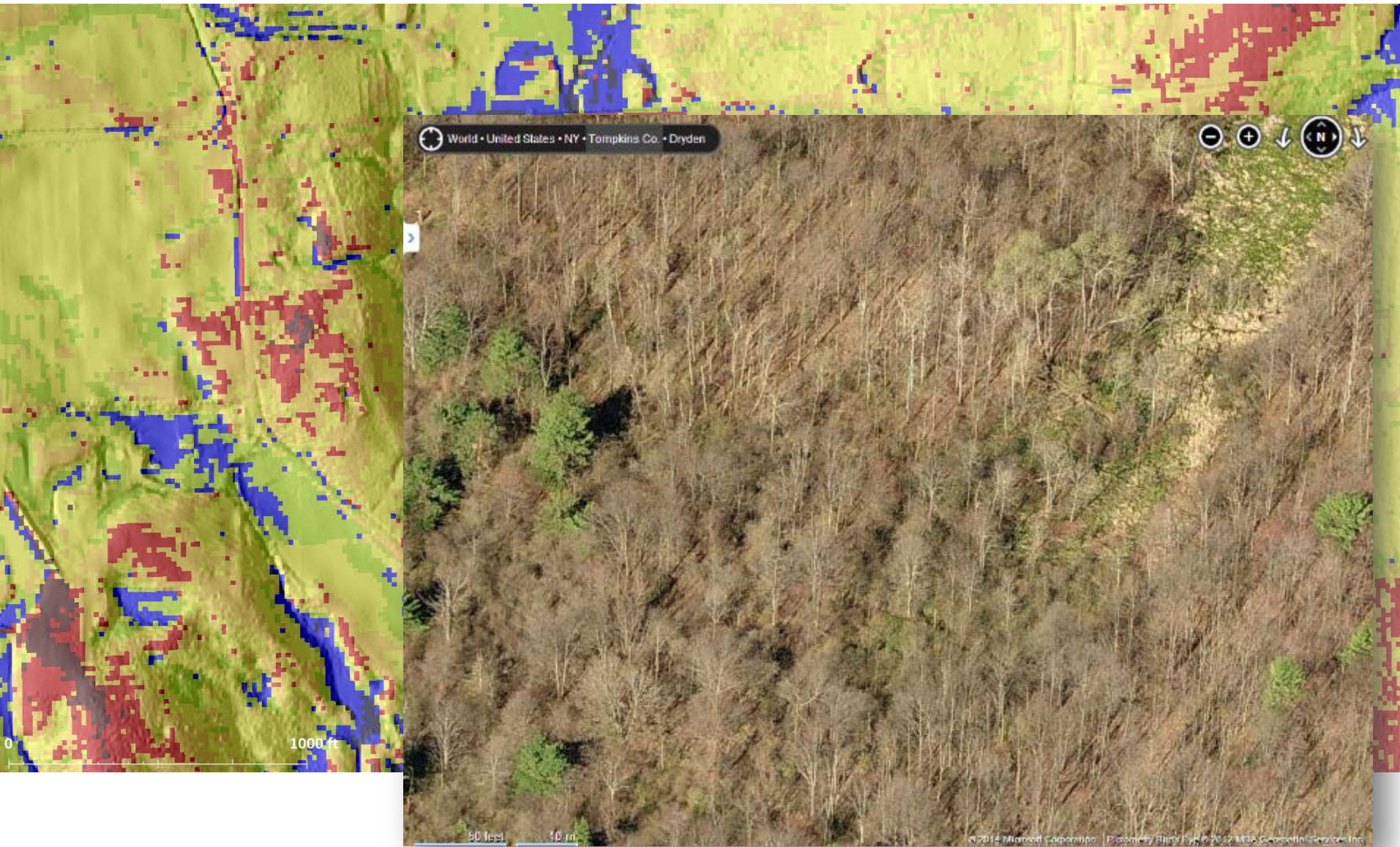
LiDAR Elevation Data for Tompkins County

- Collected in 2008
- Funded by TCSWCD

Oblique Aerial Imagery

Need for a new wetland map

New data resources



Tompkins County 2012 Wetlands Map

Wetland mapping process

Mapping Method

Visual interpretation of imagery

LiDAR topographic analysis

Oblique aerial imagery

Wetland Characterization

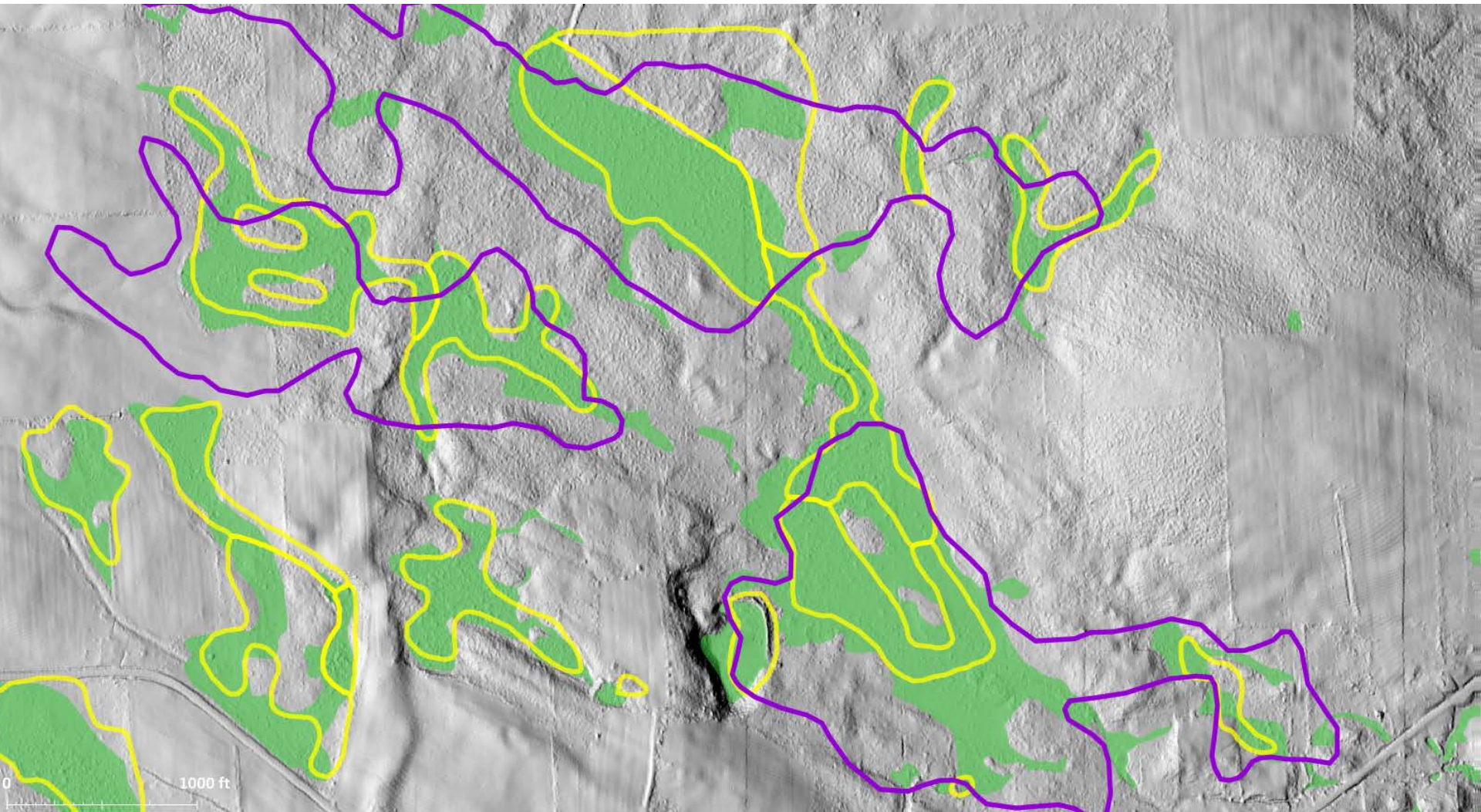
Cowardin Classification System

Additional attributes

- Artificial vs Natural
- Mapping indicators
- Likelihood of wetland
- Wetland Complex Identification

Tompkins County 2012 Wetlands Map

Wetland mapping process



Tompkins County 2012 Wetlands Map

Result: Wetland acreage by category

	DEC	NWI	Tompkins 2012
Freshwater Emergent		2,196.4	4,002.9
Freshwater Forested/Shrub		7,329.9	9,359.7
Freshwater Pond		890.1	1,618.0
Unconsolidated shoreline		11.6	8.2
Lake		213.4	207.9
Riverine		117.6	115.8
Total	5,631.9	10,747.5	15,312.5

Tompkins County 2012 Wetlands Map

Result: Wetland acreage by municipality

	Natural Wetlands Only			Municipal Area
	DEC	NWI	Tompkins 2012	
Caroline	555	963	1,185	35,244
Danby	936	1,028	1,175	34,510
Dryden	2,192	3,414	5,119	60,328
Enfield	162	599	809	23,622
Lansing	608	1,014	1,310	38,734
Newfield	230	457	581	37,836
Village of Cayuga Heights	103	409	487	22,321
Village of Groton	768	1,474	1,994	31,635
Village of Trumansburg	75	507	684	21,145

Tompkins County 2012 Wetlands Map

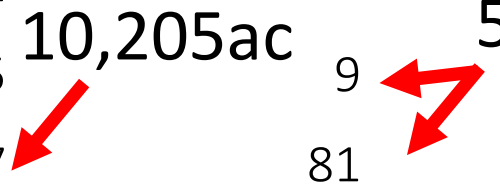
Results: Comparison to existing wetland map

Natural Wetlands Only

Size Class	Tompkins 2012	DEC
< 0.5 ac	1,667	
0.5 - 1.0 ac	434	
1.0 - 2.0 ac	342	
2.0 - 12.4 ac	525	9
> 12.4 ac	197	81
Totals	3,164	90

10,205ac

5,632ac



Tompkins County 2012 Wetlands Map

Accuracy Assessment

Measures

1. Omission errors
2. Commission errors
3. Spatial accuracy of wetland boundary

Field Survey: August – October 2015

- Training by Kerry Thurston (InFocus Environmental Consulting)
- 26 Sites: 22 Cornell Plantations' Natural Area; 4 CLWN Member Landholdings

Tompkins County 2012 Wetlands Map

Accuracy Assessment


Results

65 Wetlands found in the field

48 mapped in GIS  74% captured

- Missed wetland median size: 0.2 acres
- 97.5% of wetlands over 0.5 acres successfully mapped

52 wetlands mapped in GIS

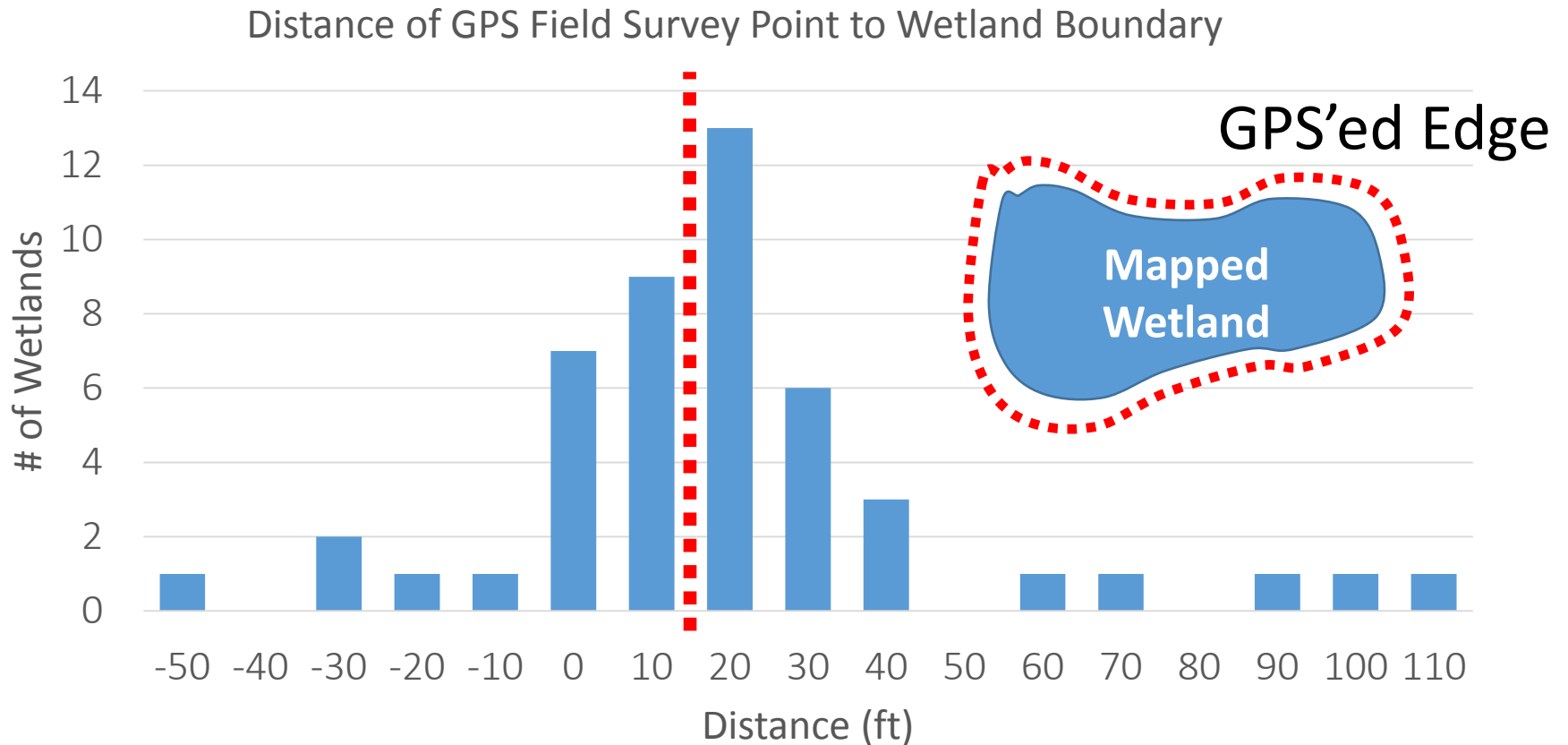
4 NOT found in field  92% of mapped wetlands real

- Falsely mapped wetlands were all floodplain wetlands

Tompkins County 2012 Wetlands Map

Accuracy Assessment

Result



Tompkins County 2012 Wetlands Map

Conclusions

1. New map is not perfect
 - Misses smallest wetlands (<0.5ac)
 - Underestimates wetland size on average
2. New map is more complete and spatially accurate
3. Field delineations will always be necessary
4. Immediately useful for planning purposes
5. Better resource for supporting possible local wetland protection law

Tompkins County 2012 Wetlands Map

Data Availability

Dropbox Folder

- Geospatial data
- Metadata
- Final Report
- PDF Maps

CUGIR (Cornell)

- Geospatial data
- Metadata

Online Map

- Tompkins County Map App
- Cornell Hosted
- [CartoDB](#)

