

# A Lake and Pond Classification System for the Northeast and Mid-Atlantic States

**November 2014**

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The Nature Conservancy Eastern Regional Office*



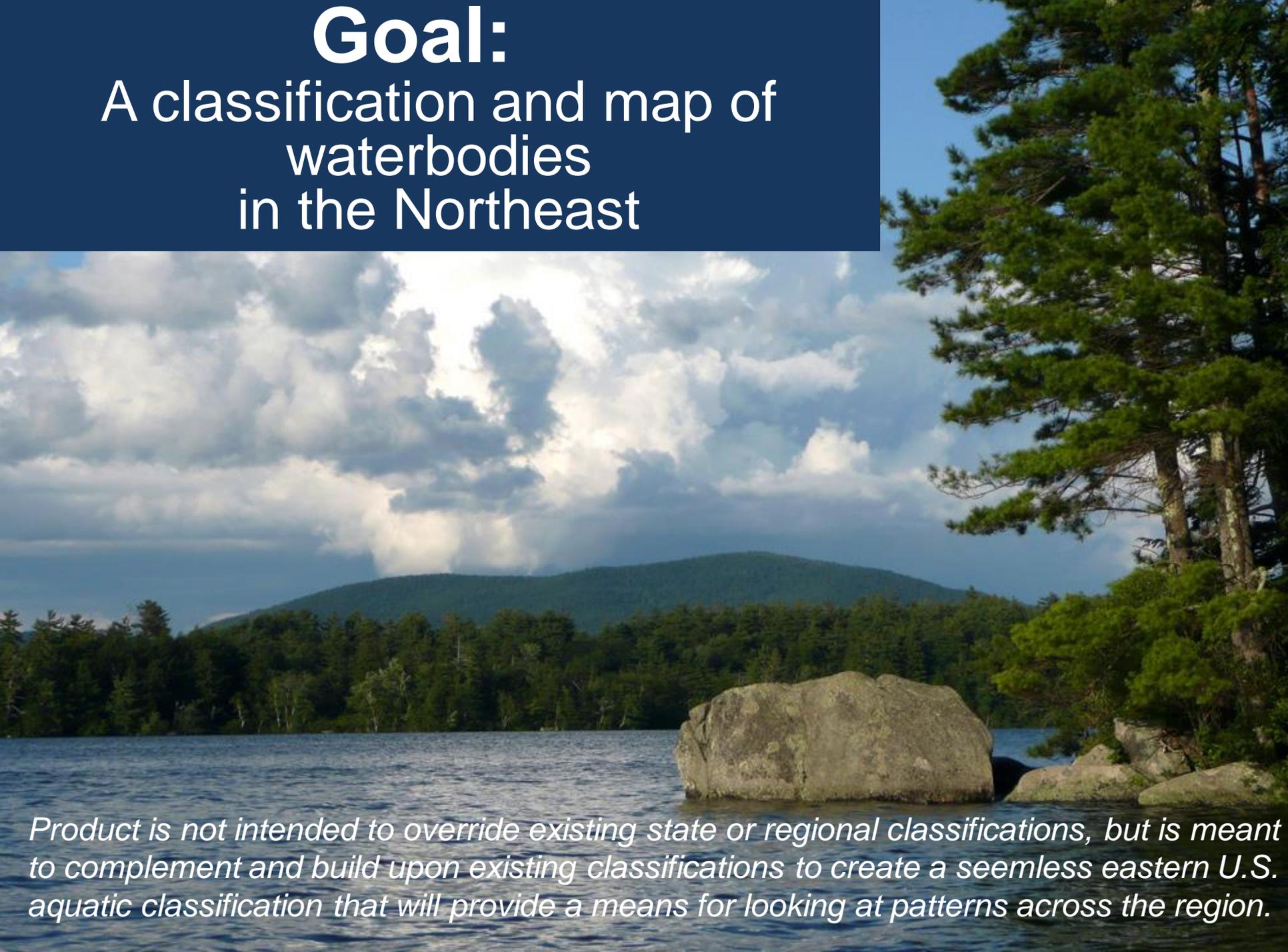
# Call Outline

- Goal
- Process
- Key Variables
  - Trophic Level
  - Alkalinity
  - Temperature
  - Depth
- Integration of Variables into Types
- Distributable Information
- Web Mapping Service



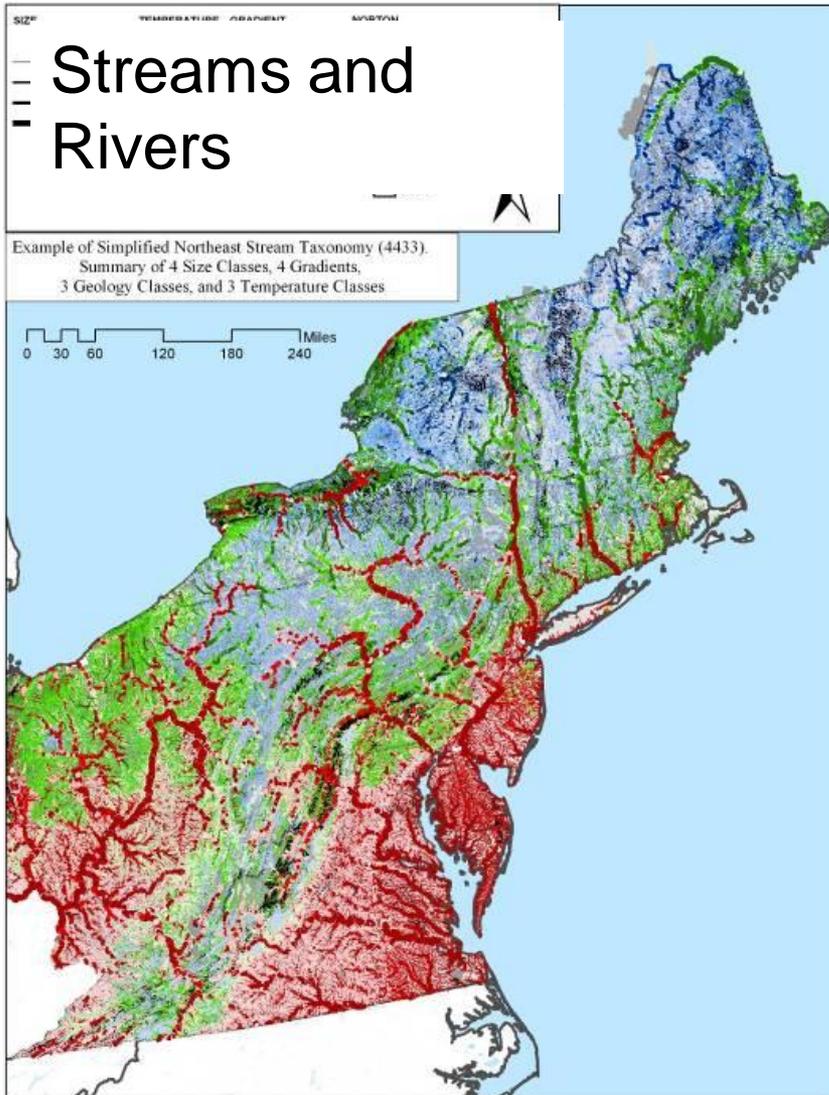
# Goal:

A classification and map of  
waterbodies  
in the Northeast



*Product is not intended to override existing state or regional classifications, but is meant to complement and build upon existing classifications to create a seamless eastern U.S. aquatic classification that will provide a means for looking at patterns across the region.*

# Counterpart to the NE Aquatic Habitat Classification



- Lakes and Ponds



Olivero, A, and M.G. Anderson. 2008. The Northeast Aquatic Habitat Classification. The Nature Conservancy, Eastern Conservation Science. 90 pp.

<http://www.rcngrants.org/spatialData>

# Steering Committee

State/Federal	Name	Agency
EPA	Jeff Hollister	Environmental Protection Agency
ME	Dave Halliwell	Department of Environmental Protection
	Douglas Sutor	Department of Environmental Protection
	Linda Bacon	Department of Environmental Protection
	Dave Coutemanch	The Nature Conservancy
NH	Matt Carpenter	Division of Fish and Game
VT	Kellie Merrell	Department of Environmental Conservation
MA	Richard Hartley	Department of Fish and Game
	Mark Mattson	Department of Environmental Protection
CT	Brian Eltz	DEEP Inland Fisheries Division
NY	Greg Edinger	Natural Heritage Program
	*David Newman	Department of Environmental Conservation
PA	Dave Arnold	Fish and Boat Commission
	Barbara Lathrop	Department of Environmental Protection
MD	*Sherm Garrison	Department of Natural Resources
NJ	Christopher Smith	Department of Environmental Protection
RI	*Elizabeth Herron	URI Watershed Watch
DE	*Kevin Kalasz	Department of Natural Resources and Conservation
WV	Brett Preston	Department of Natural Resources
VA	*Brad Fink	Department of Game and Inland Fisheries
	* unable to be on steering committee but advised and provided data as possible	

Develop  
frame-  
work

Share  
data

Review  
results

# Reviewed Existing Classifications and Variables

	Sum Count	Sum Dominant	NAHCS	ME GIS	NH GIS/ Biotic	MA Living Waters	MA Heritage	VT Heritage	NY Heritage	CT Heritage	CT Fisheries	PA Heritage	VA Heritage	NJ Heritage	NJ Cold Water	MA Cold Water	NLA
•Water Chemistry	11	ph/ANC	ANC/pH	ANC/pH , shoreline wetlands	ANC	pH	pH	pH	pH/ANC, salinity	pH/ANC		pH/ANC	Sinkhole	pH/ANC			
•Physiography	6	Elevation (temperature proxy?)	Elevation	Elevation		Elevation		Elevation					Elevation				Ecoregion
•Stratification	5	Stratified in summer (temperature proxy?)	Depth	Depth	Depth	Depth			Stratification								
•Temperature	2	Cold Water Habitat/Trout Production									<19C >4mg/l DO				<21C > 4mg/l DO	<70F >5mg/l DO	
•Groundwater Linkage	5	Coastal Plain				Coastal Plain	Coastal Plain		Coastal Plain				Coastal Plain	Coastal Plain			
•Morphometry	5	Size	Size, Shoreline sinuosity	Size, Shoreline sinuosity	Size	Size			Size								
•Genesis	4	Man-made				Kettle			Oxbow, Impounded lake			Glacial					Man-made
•Trophic State	3	Trophic						Trophic	Trophic		Trophic						
•Lake Hydrology	2	Stream Connected	Connection to streams	Connection to streams													
•Retention time																	
•Color and Clarity																	

The goal was to agree on a few key variables that apply to the whole region and could be mapped.

# Final Variables

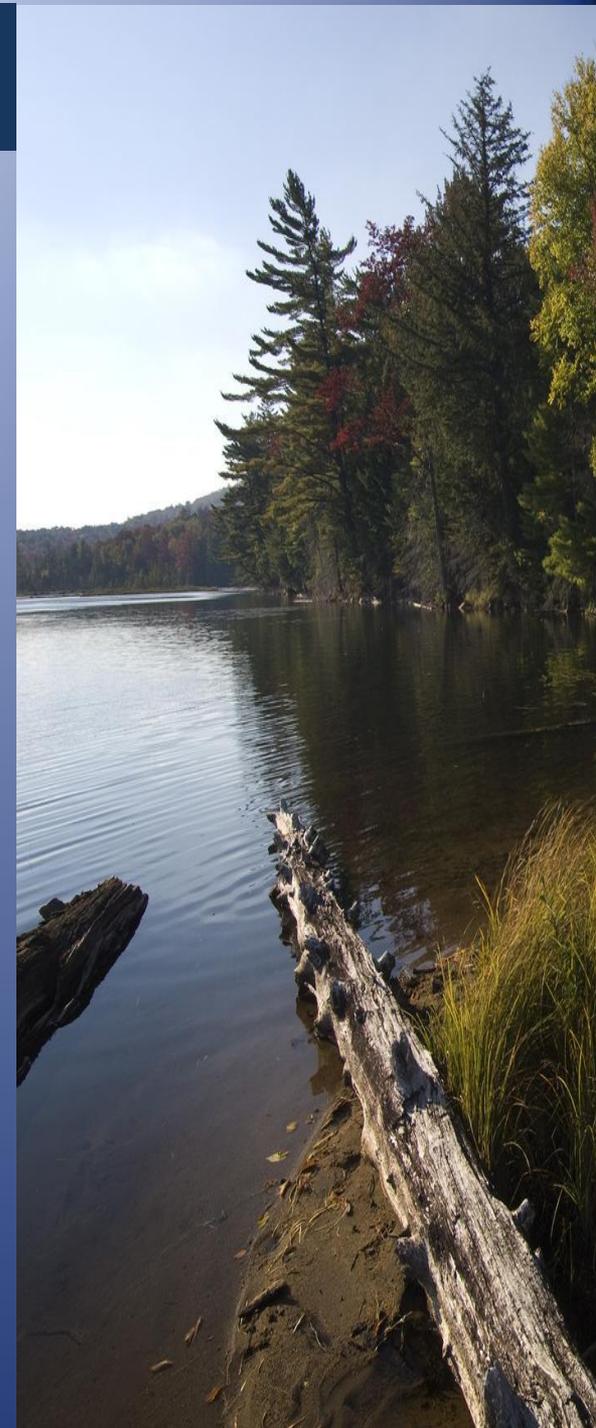
- Temperature
- Trophic Level
- Alkalinity
- Depth

These were unanimously agreed on by the steering committee



# Approach for each Variable

- Clarified ecological relevance
- Defined classes that correspond to observable biological changes
- Compiled known samples for Eastern waterbodies
- Developed predictive model based on waterbody and landscape attributes for unsampled waterbodies



# Accuracy and Confidence

- Required all models to have error rates less than .30 (the standard)
- Calculated a confidence score for each variable in each waterbody

## Waterbody X

Probability Very Cold = 60%  
Probability Cold-Cool = 30%  
Probability Warm = 10%

} Difference = 30% = High

## Waterbody Y

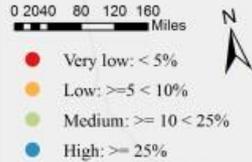
Probability Very Cold = 40%  
Probability Cold-Cool = 38%  
Probability Warm = 22%

} Difference = 2% = Very Low

# Confidence Classes

## Northeast Lake and Pond Classification

Confidence of prediction values for alkalinity



**1. Very Low  $< 5\%$**

**2. Low  $\geq 5 < 10\%$**

**3. Medium  $\geq 10 < 25\%$**

**4. High  $\geq 25\%$**

**5. Known**

Information on predictions and confidence are in the attribute table

lakes\_all\_attributes.xlsx

	A	B	C	D	E	F	G	H	I	J
1	COMID	GNIS_NAME	STAT	IN_ALK	PROB_HALK	PROB_MALK	PROB_LALK	CLASS_ALK	ALK_DIFP	ALK_CONF
911	1031497		ME	0	0.193750	0.536250	0.270000	Medium Alk	0.266250	4. High $\geq 25\%$
912	1031499	Parker Bog Ponds	ME	0	0.176250	0.516250	0.307500	Medium Alk	0.208750	3. Medium $\geq 10 < 25\%$
913	1031503	Little King Lake	ME	0	0.011250	0.420000	0.568750	Low Alk	0.148750	3. Medium $\geq 10 < 25\%$
914	1031505	Call Pond	ME	0	0.018750	0.498750	0.482500	Medium Alk	0.016250	1. Very Low $< 5\%$
915	1031511	Felker Pond	ME	0	0.012500	0.402500	0.585000	Low Alk	0.182500	3. Medium $\geq 10 < 25\%$
916	1031513		ME	0	0.018750	0.537500	0.443750	Medium Alk	0.093750	2. Low $\geq 5 < 10\%$

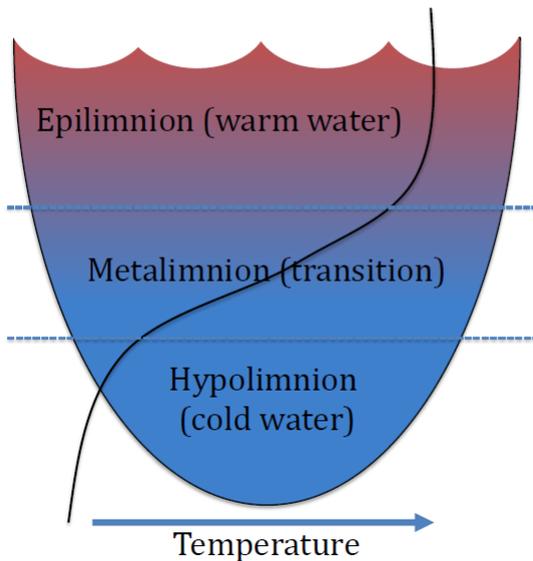
# For Each Variable....

- Ecological Importance
- Classes Used
- Starting Data Map
- Final Results Map
- Driving Variables
- Model Error and Confidence

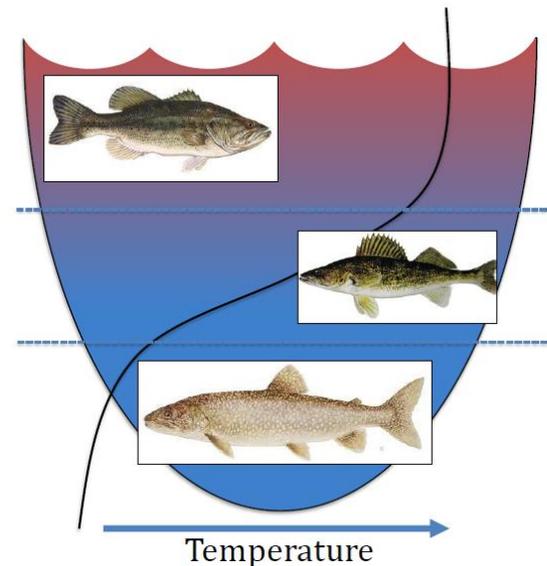
# Temperature Class

Water temperature is critical in the life of aquatic organisms (fishes, amphibians, reptiles, invertebrates). It sets the physiological limits where these lake organisms can persist. Seasonal changes in water temperature often also cue reproduction, migration, influence growth rates of eggs and juveniles, and can affect the body size and therefore the fecundity of adults.

## Water temperature in lakes



## Water temperature in lakes



# Temperature Class

Coldest water present in the summer



Presence of greater than 1 meter of following habitat throughout the summer (use July/August profile if available).

1. VERY COLD:  $<12.8\text{C}$  and  $\geq 5$  mg/l DO or indicator fish = lake trout reproduction

2a. COLD:  $12.8\text{C} \leq 18\text{C}$   $\geq 5$  mg/l DO or indicator fish = wild brook trout reproduction

2b. COLD-COOL:  $>18 \leq 21\text{C}$ ,  $\geq 4$  mg/l DO or indicator fish = non-reproducing brook trout, holdover or reproduction of brown trout, kokanee, smelt

3. WARM  $>21\text{C}$

Combined  
into  
Cold-Cool

# Results

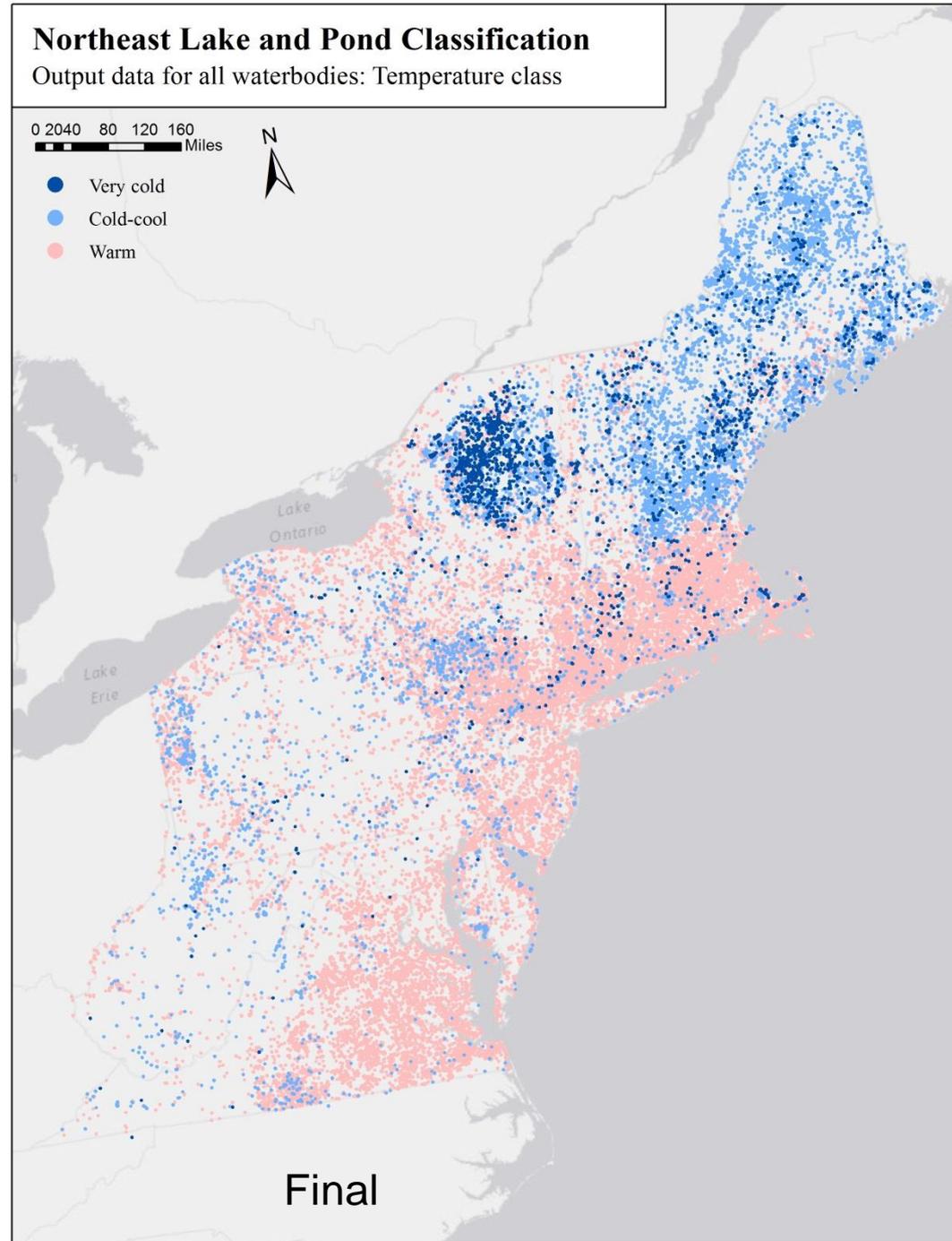
## Northeast Lake and Pond Classification

Output data for all waterbodies: Temperature class

0 20 40 80 120 160 Miles



- Very cold
- Cold-cool
- Warm



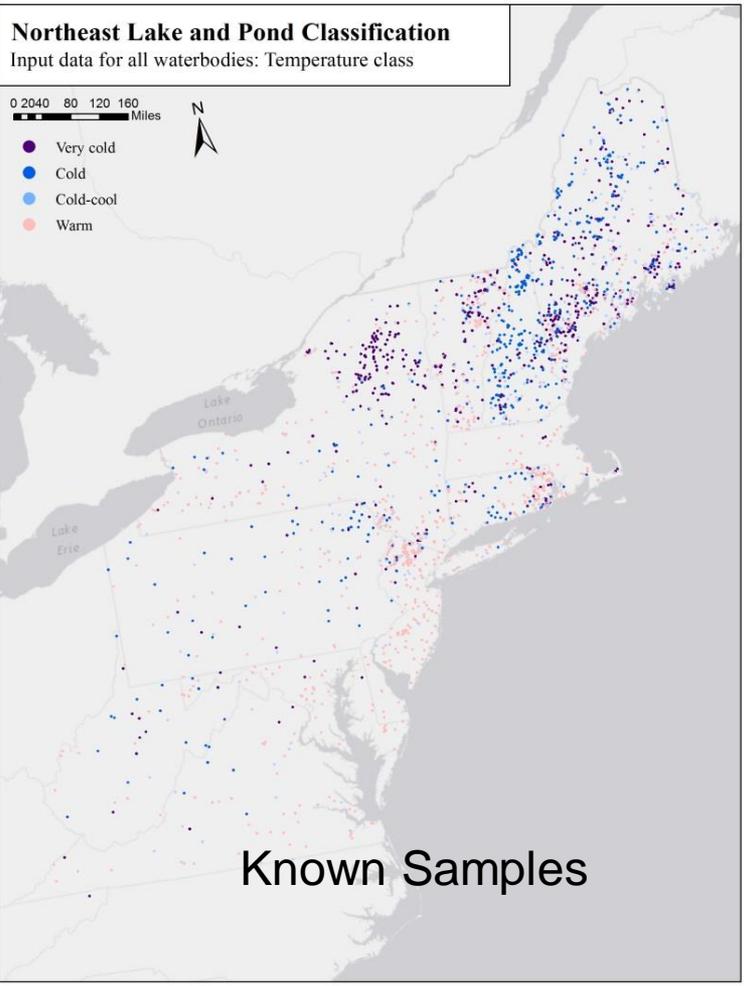
## Northeast Lake and Pond Classification

Input data for all waterbodies: Temperature class

0 20 40 80 120 160 Miles



- Very cold
- Cold
- Cold-cool
- Warm



Class	# output	# input	Total	Percent
Very cold	1,262	529	1,791	6
Cool to cold	7,502	811	8,313	26
Warm	21,643	790	22,433	69
Grand Total	30,407	2,130	32,537	100

Final

Known Samples

# Temperature: Best Predictors

- Latitude
- Maximum and mean depth
- Longitude
- Elevation
- Fetch
- Emergent wetlands in the 100m buffer

These variables make ecological sense given the strong influence of depth and fetch on lake stratification. Cooler climates in the more northern and higher elevation parts of the region also have cooler seasonal air temperatures.

# Confidence

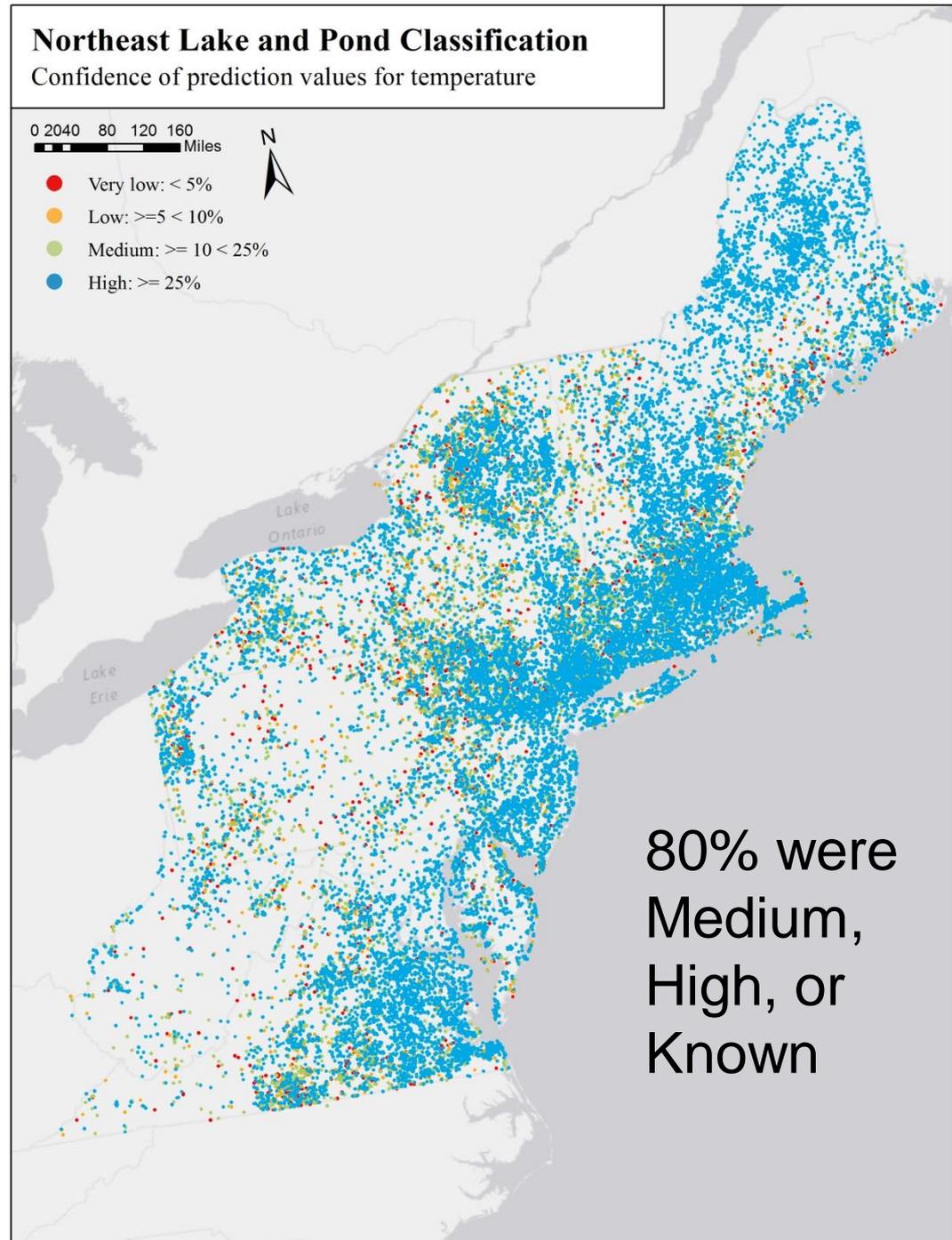
## Northeast Lake and Pond Classification

Confidence of prediction values for temperature

0 20 40 80 120 160  
Miles



- Very low: < 5%
- Low:  $\geq 5 < 10\%$
- Medium:  $\geq 10 < 25\%$
- High:  $\geq 25\%$



80% were  
Medium,  
High, or  
Known

Temperature Model	% Waterbodies
-------------------	---------------

1. Very Low <5%	10%
-----------------	-----

2. Low $\geq 5 < 10\%$	10%
------------------------	-----

3. Medium $\geq 10 < 25\%$	24%
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4. High $\geq 25\%$	50%
---------------------	-----

5. Known	7%
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Grand Total	100%
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# Trophic Level

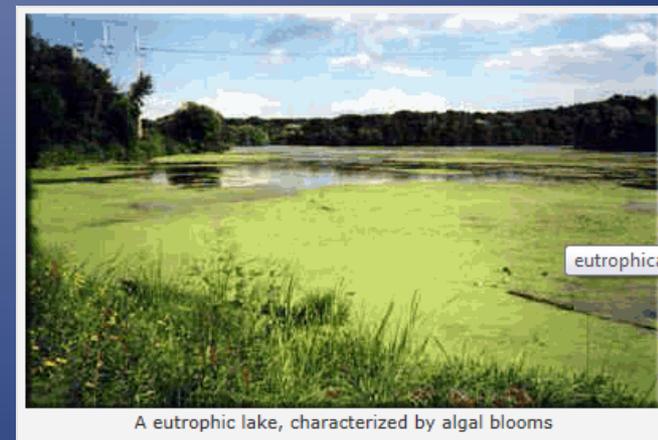
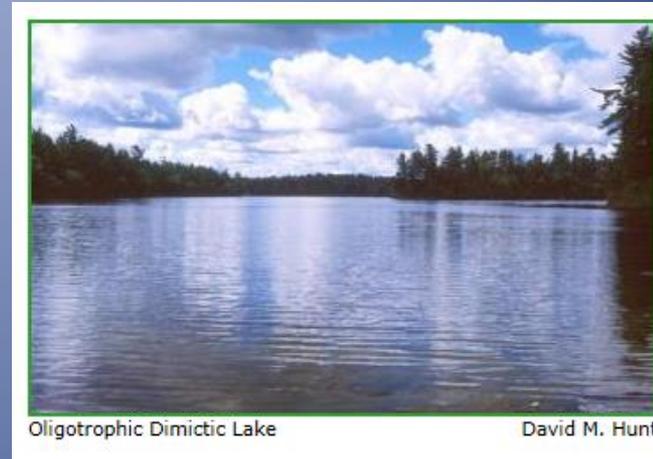
***Trophic level:*** Meaning “nourishment.” Used to describe the level of productivity of a lake.

*Oligotrophic:* ( $\leq 2$  ug/L Chlorophyll-a) A nutrient poor lake. Low biological productivity, High transparency

*Mesotrophic* ( $>2 - 7$ ug/L Chlorophyll-a) : A lake that is moderately productive.

*Eutrophic* ( $>7-30$  Chlorophyll-a) : A well-nourished lake, very productive, A balanced and diverse array of organisms. Low transparency due to high algae and chlorophyll-a content.

*Hypereutrophic:* ( $>30$  ug/L Chlorophyll-a)  
Characterized by an excess of nutrients. Algal blooms, vegetative overgrowth, low biodiversity.



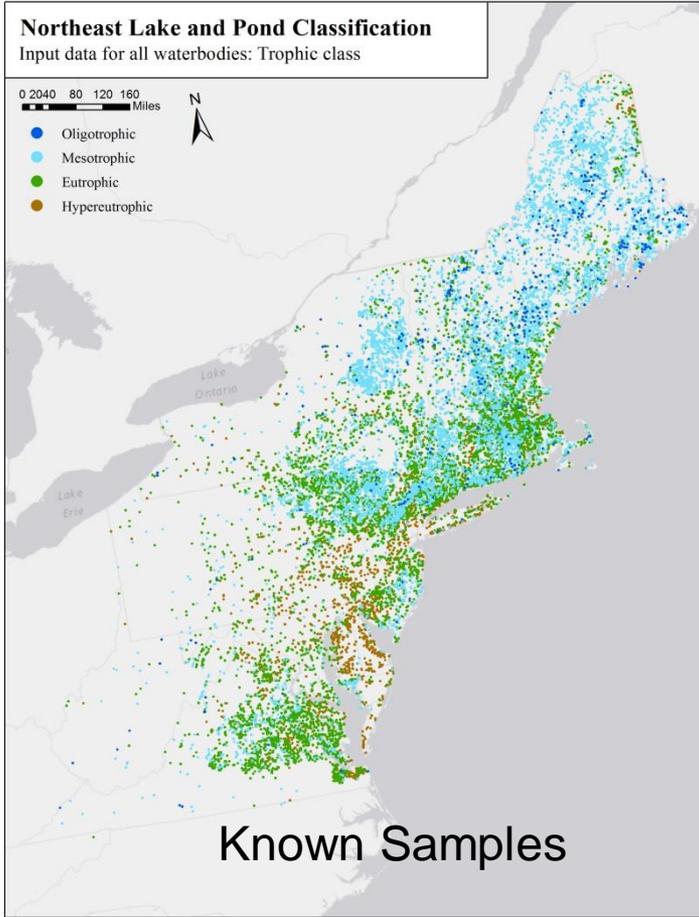
# Results

## Northeast Lake and Pond Classification

Input data for all waterbodies: Trophic class

0 20 40 80 120 160 Miles

- Oligotrophic
- Mesotrophic
- Eutrophic
- Hypereutrophic



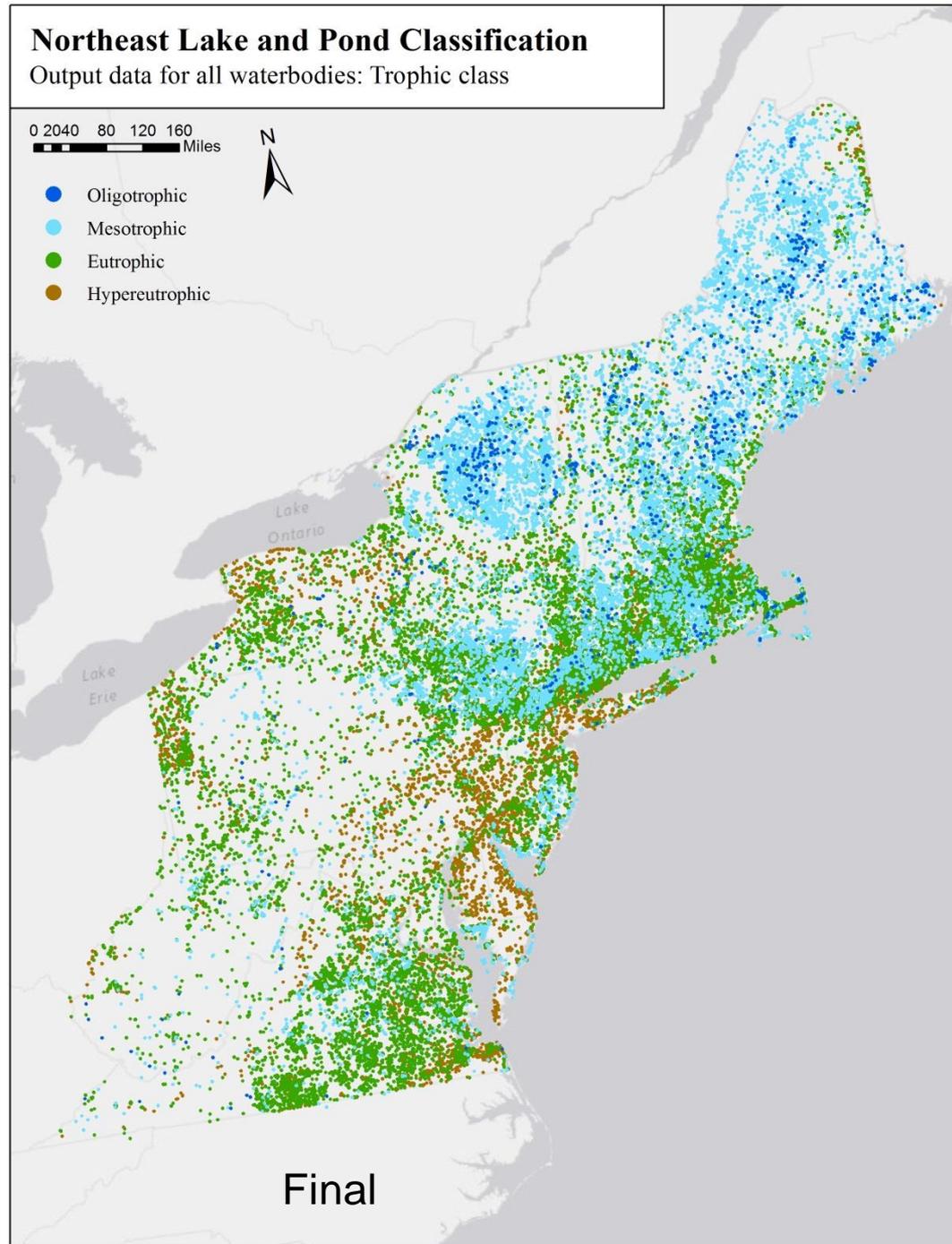
Known Samples

## Northeast Lake and Pond Classification

Output data for all waterbodies: Trophic class

0 20 40 80 120 160 Miles

- Oligotrophic
- Mesotrophic
- Eutrophic
- Hypereutrophic



Final

Class	# output	# input	Total	Percent
Hypereutrophic	3,464	1,996	5,460	17
Eutrophic	7,167	7,534	14,701	45
mesotrophic	3,958	7,575	11,533	35
Oligotrophic	368	511	879	3
Grand Total	14,957	17,616	32,573	100

# Trophic Level: Best Predictors

- % Natural cover
- Longitude
- Maximum depth
- Latitude
- Elevation
- % Deciduous forest
- % Agriculture

These variables make ecological sense given the geographic patterns, the strong influence of depth, and the strong influence of nutrient inputs from local development and agriculture.

# Confidence

**Trophic Model:**                      **% Waterbodies**  
**Confidence Class**

<b>1. Very Low &lt;5%</b>	4%
<b>2. Low <math>\geq 5 &lt; 10\%</math></b>	4%
<b>3. Medium <math>\geq 10 &lt; 25\%</math></b>	10%
<b>4. High <math>\geq 25\%</math></b>	29%
<b>Known</b>	54%
<b>Grand Total</b>	100%

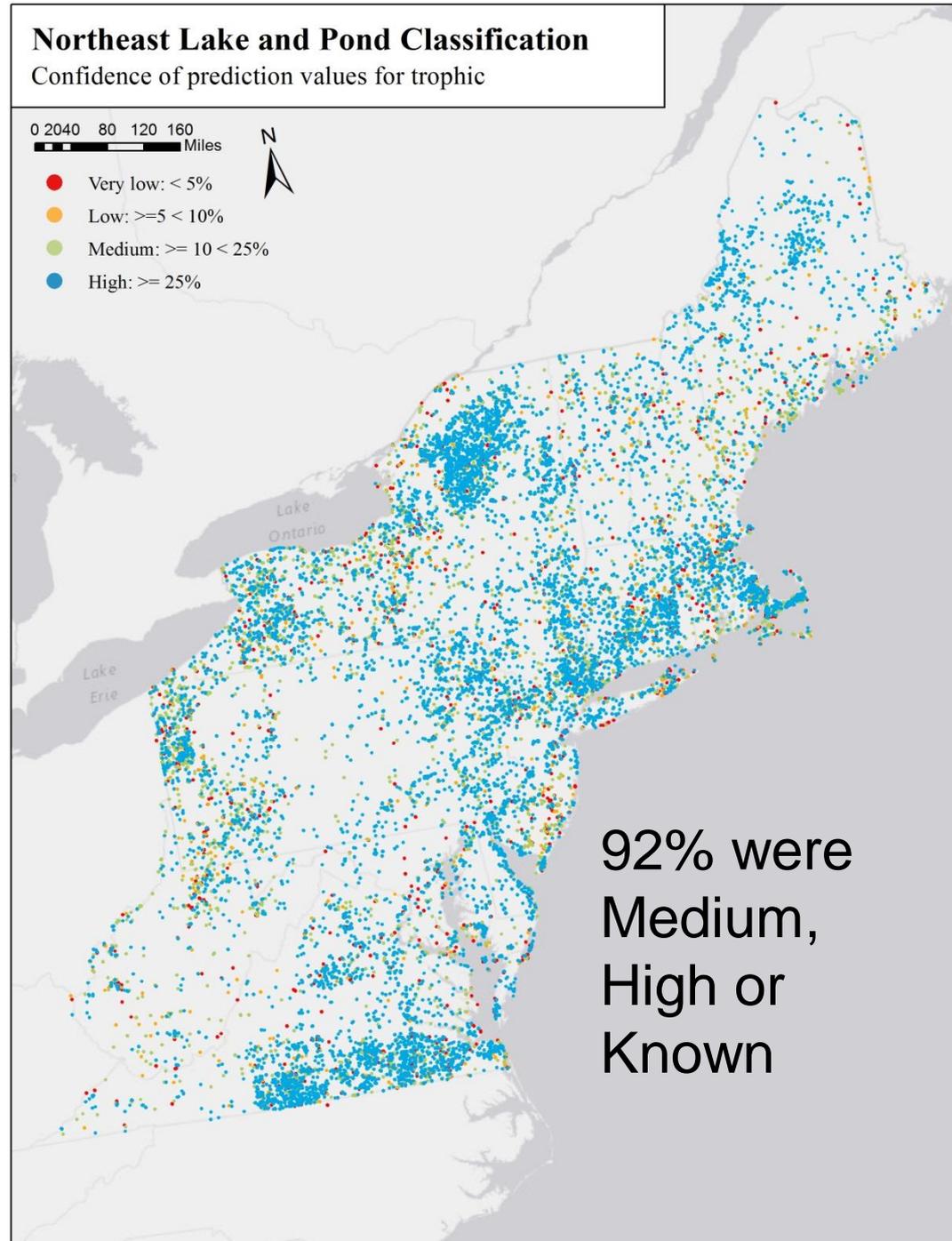
## Northeast Lake and Pond Classification

Confidence of prediction values for trophic

0 20 40 80 120 160  
Miles



- Very low: < 5%
- Low:  $\geq 5 < 10\%$
- Medium:  $\geq 10 < 25\%$
- High:  $\geq 25\%$



92% were  
Medium,  
High or  
Known

# Alkalinity

## Acid Neutralizing Capacity

**ANC** indicates sensitivity to changes in pH. ANC is primarily determined by the soil and underlying geology of the surrounding watershed. Waterbodies in limestone watersheds have higher pH and higher ANC



Inland Calcareous Lake Shore

Timothy Howard

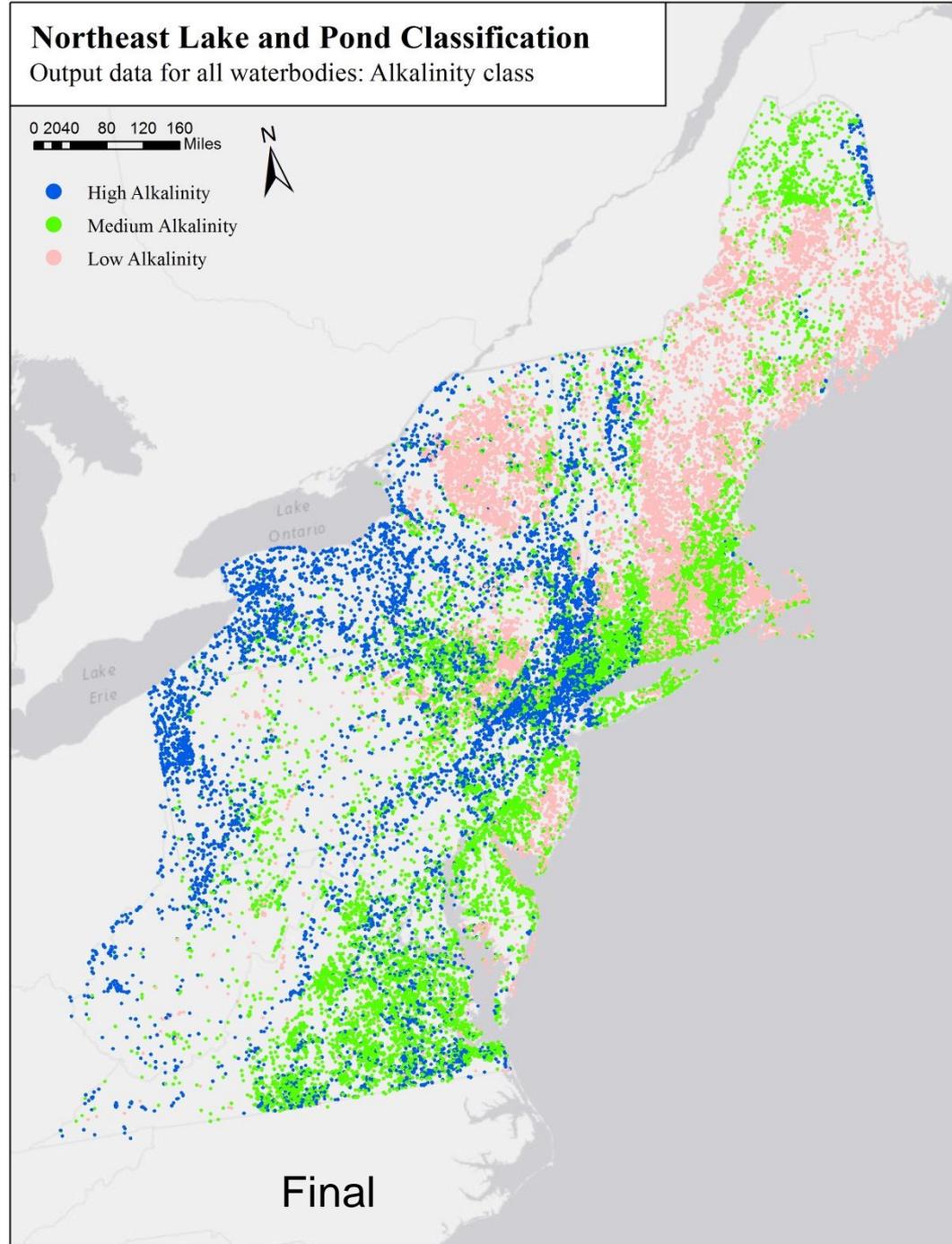
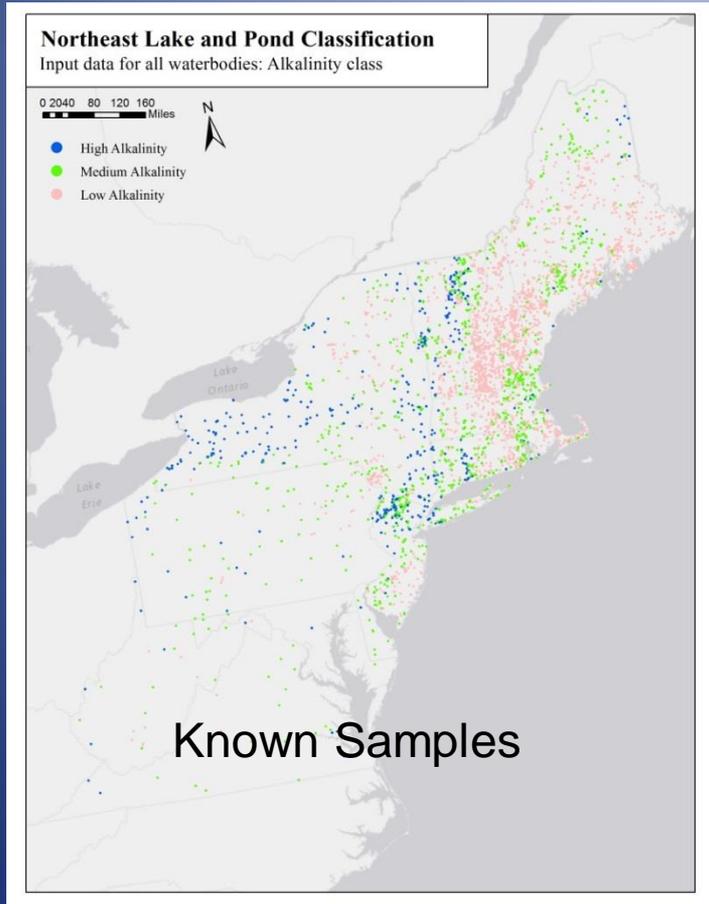
## Alkalinity Classes

**High Alkalinity  $\geq 50$  mg/L**

**Medium Alkalinity  $\geq 12.5$  &  $< 50$  mg/L**

**Low Alkalinity  $< 12.5$  mg/L**

# Results



Class	# output	# input	Total	Percent
Low Alk	9,504	1,903	11,407	35
Medium Alk	11,824	973	12,797	39
High Alk	7,902	431	8,333	26
Grand Total	29,230	3,307	32,537	100

# Alkalinity: Best Predictors

- Latitude
- Longitude
- % calcareous bedrock
- % natural cover
- Elevation
- % evergreen forest
- % acidic granitic bedrock
- % agriculture

These variables make ecological sense given the geographic patterns and the particularly strong influence of calcareous bedrock (limestone, dolomite, dolostone, marble) on buffering capacity.

# Confidence

Alkalinity Model: Confidence Class	% Waterbodies
1. Very Low <5%	14%
2. Low $\geq 5 < 10\%$	13%
3. Medium $\geq 10 < 25\%$	27%
4. High $\geq 25\%$	36%
Known	10%
Grand Total	100%

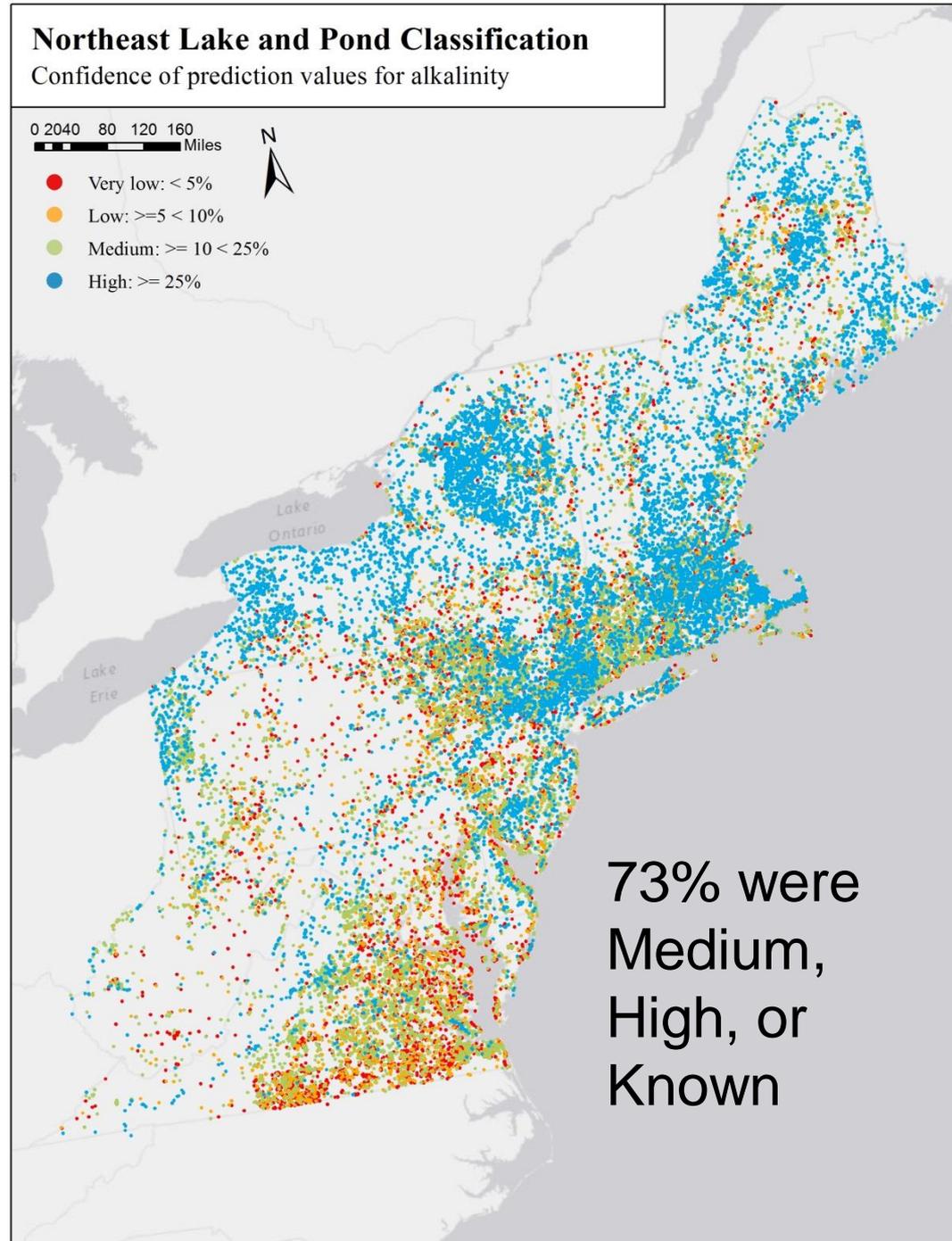
## Northeast Lake and Pond Classification

Confidence of prediction values for alkalinity

0 20 40 80 120 160  
Miles



- Very low: < 5%
- Low:  $\geq 5 < 10\%$
- Medium:  $\geq 10 < 25\%$
- High:  $\geq 25\%$



# Depth: Lake vs Pond

Ponds = light penetration to the bottom, photosynthesis throughout.

Lakes = areas where light does not penetrate, profundal zone with no photosynthesis.

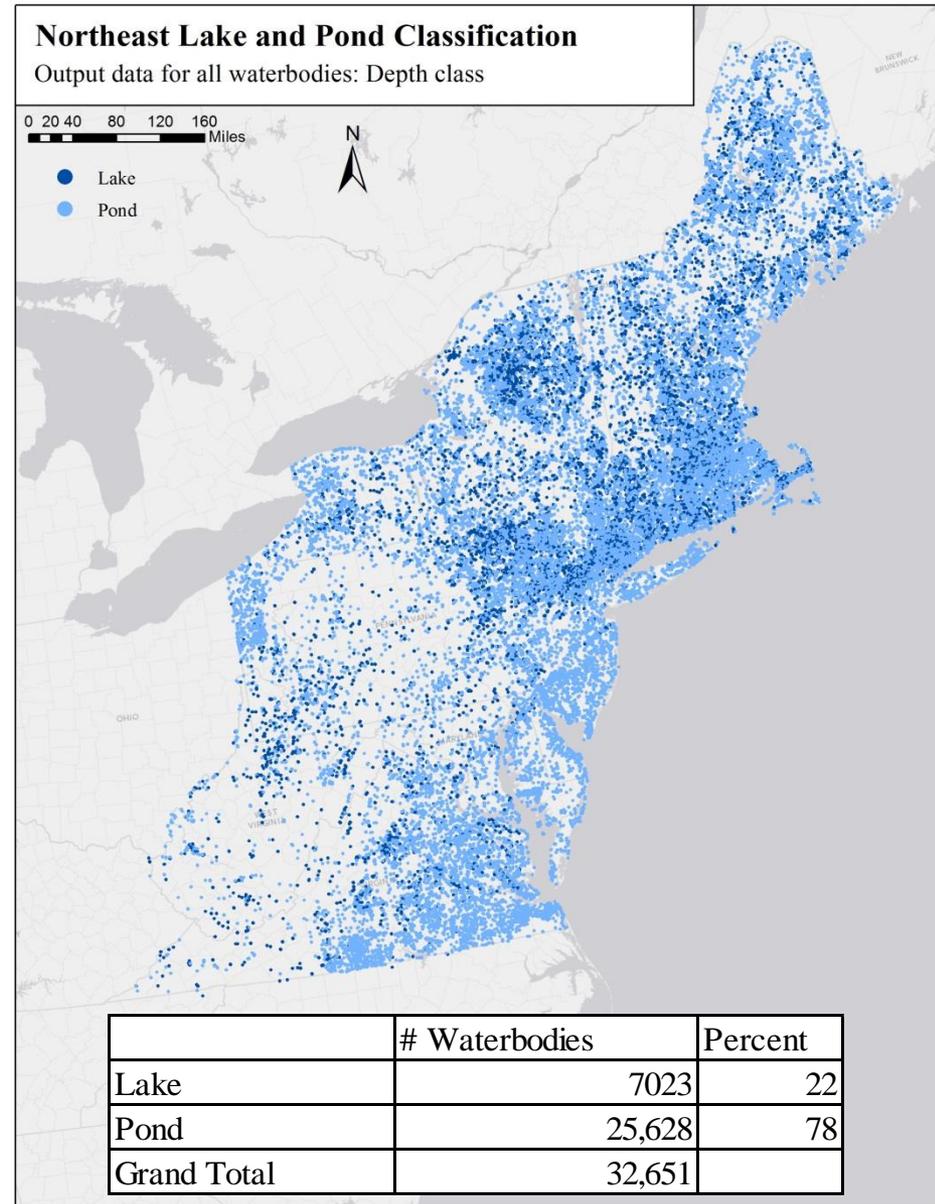
## Depth Threshold

- depends on water clarity:

Oligotrophic <30ft

Mesotrophic <20ft

Eutrophic <10ft



# Waterbody Types: 3 Variables

**First:** Split by depth into lakes and ponds.

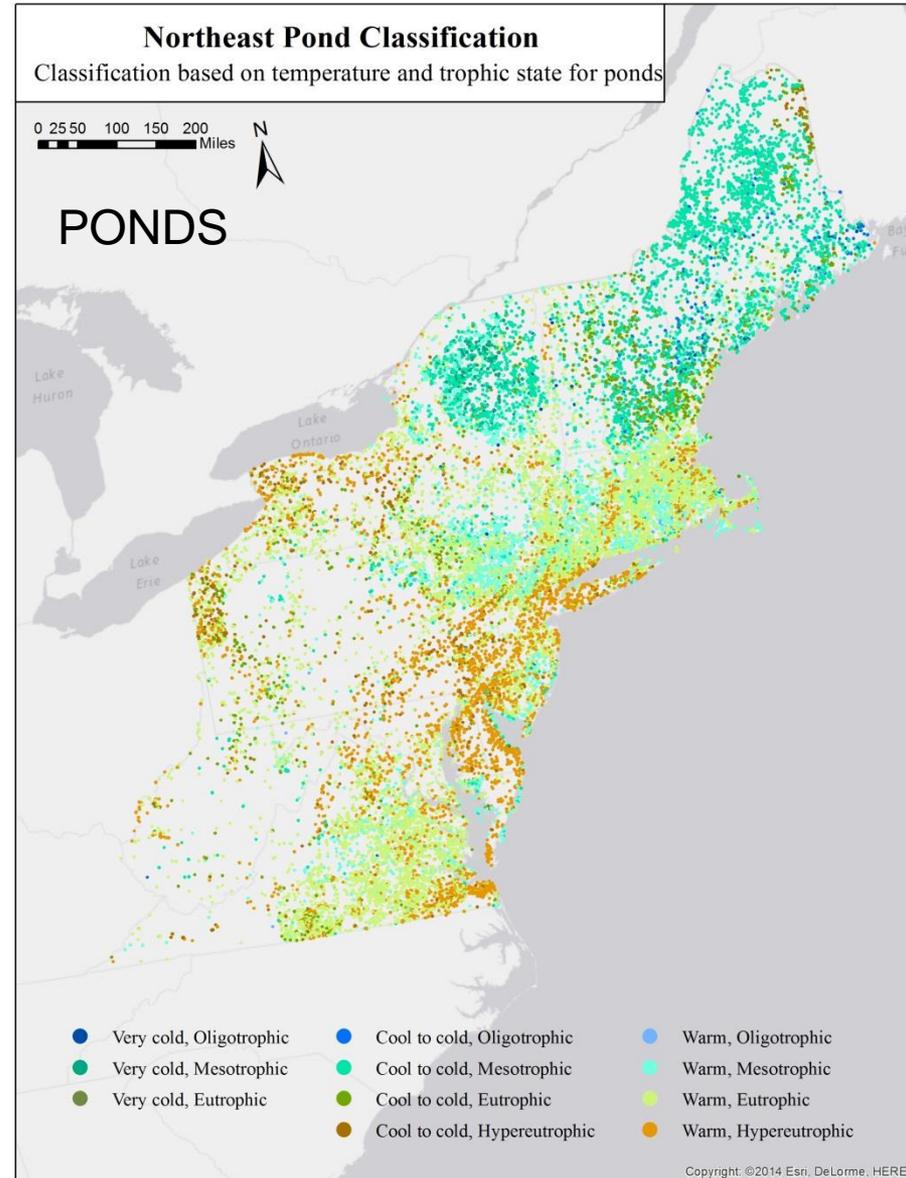
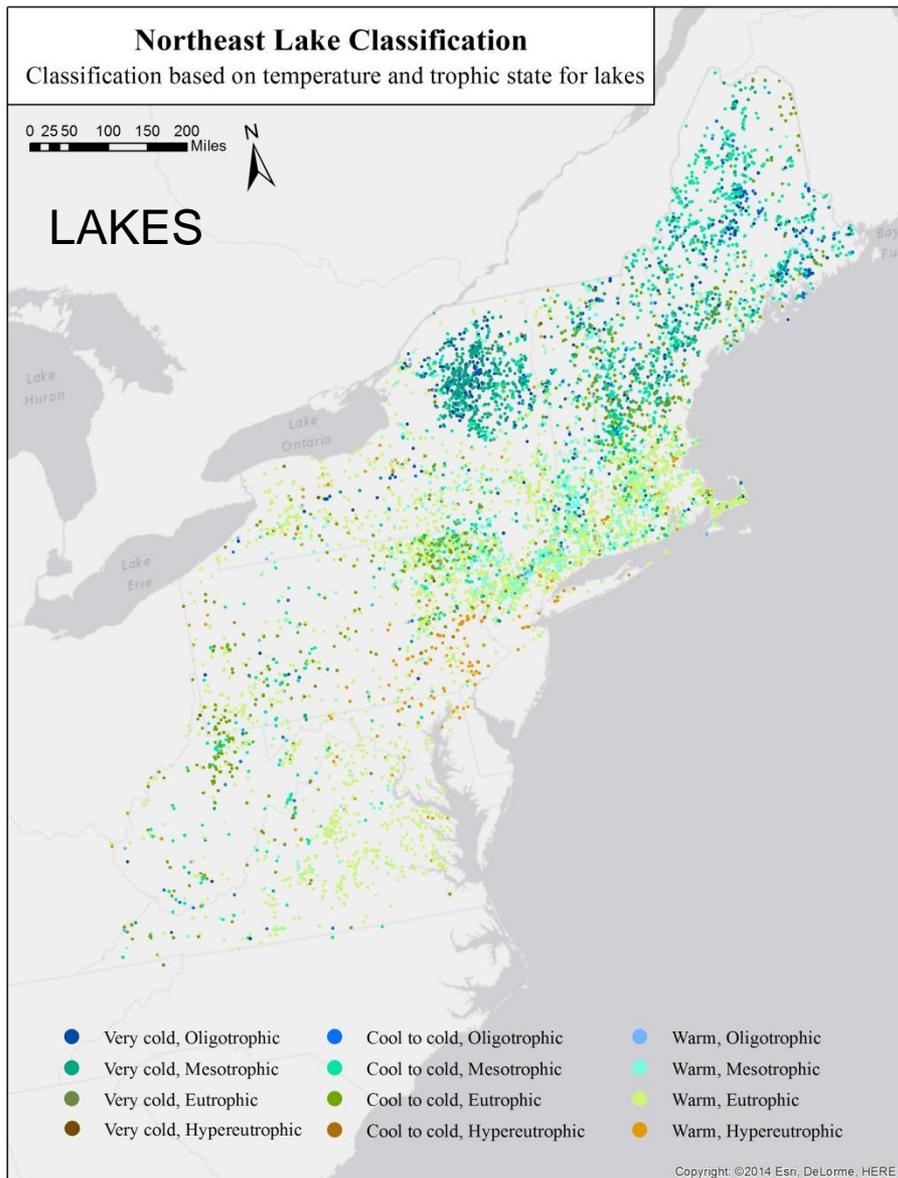
**Second:** Further classified by 2 variable combinations

- Temperature + Trophic:  
12 types
- Temperature + Alkalinity:  
9 types
- Trophic + Alkalinity:  
12 types



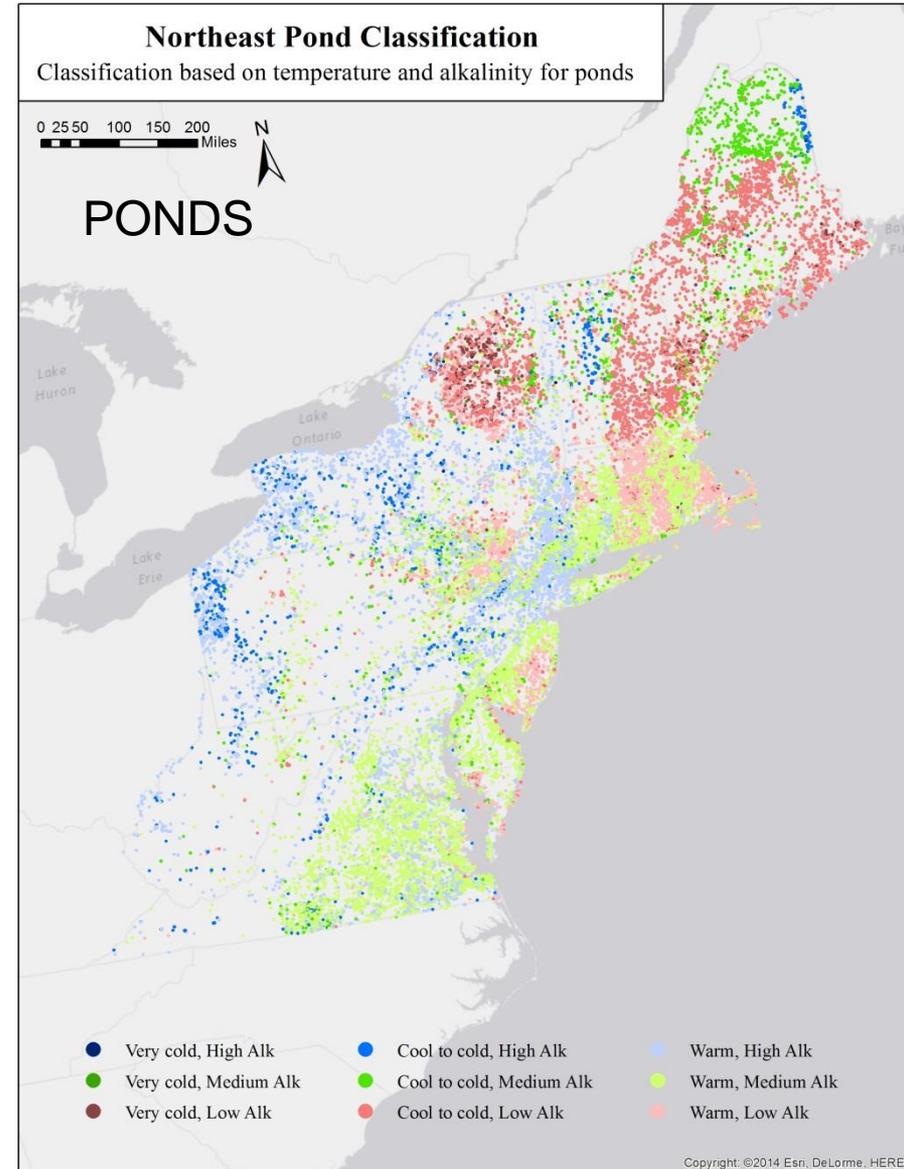
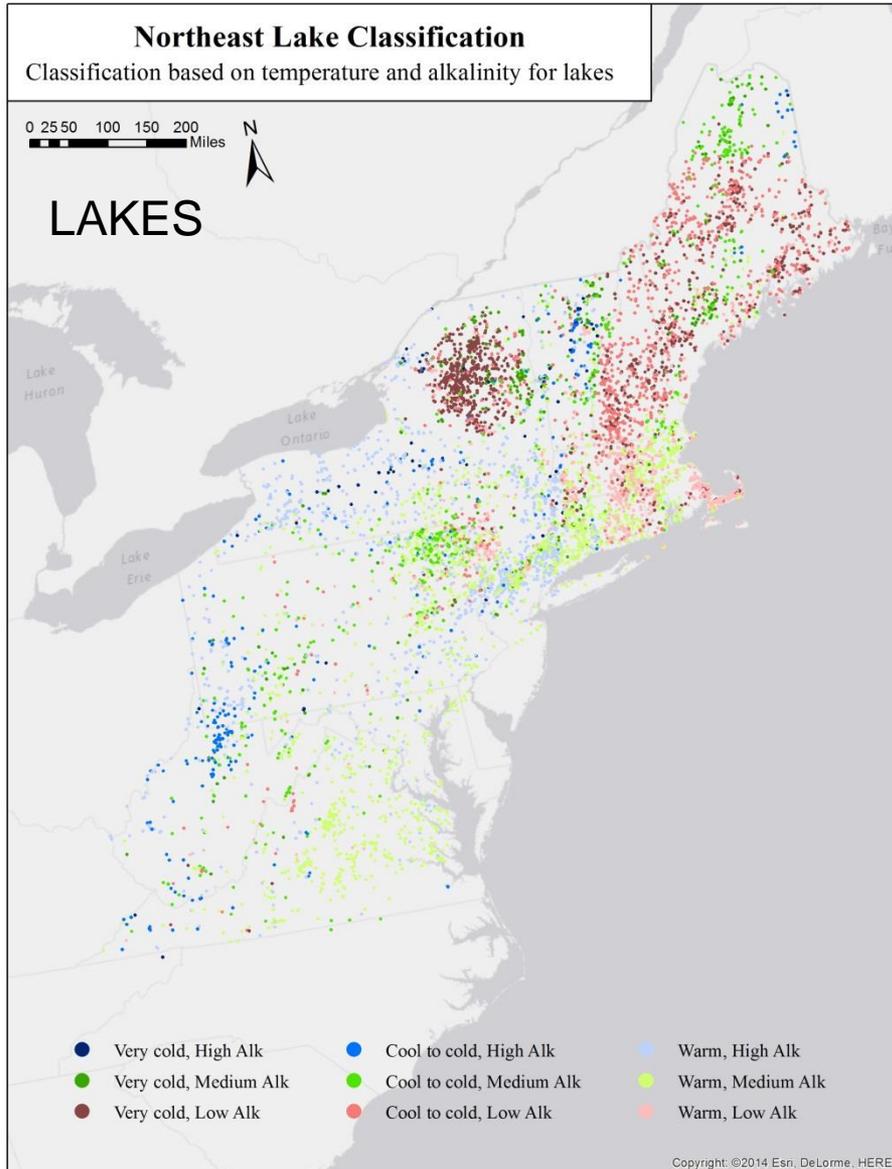
# Temperature plus Trophic

## Example: Very Cold Oligotrophic Lake



# Temperature and Alkalinity

Example: Very cold, acidic pond



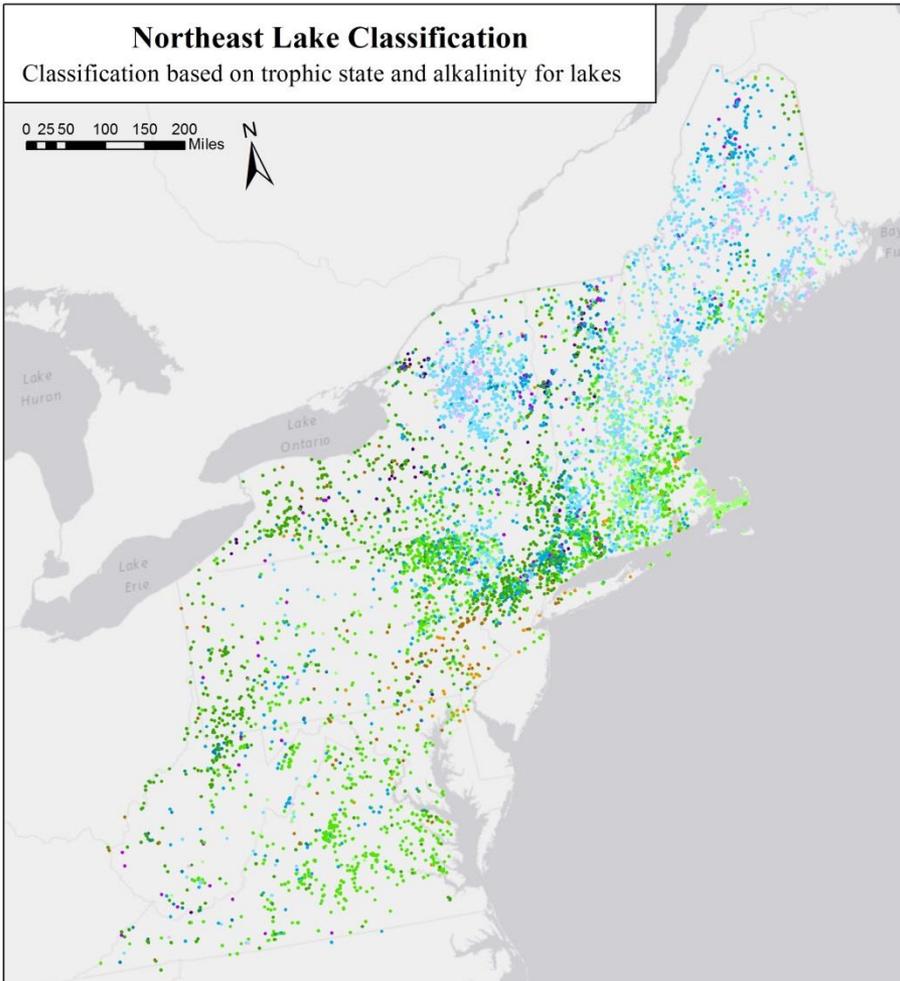
# Trophic and Alkalinity

## Example: Eutrophic, Highly Alkaline Lake

### Northeast Lake Classification

Classification based on trophic state and alkalinity for lakes

0 25 50 100 150 200 Miles



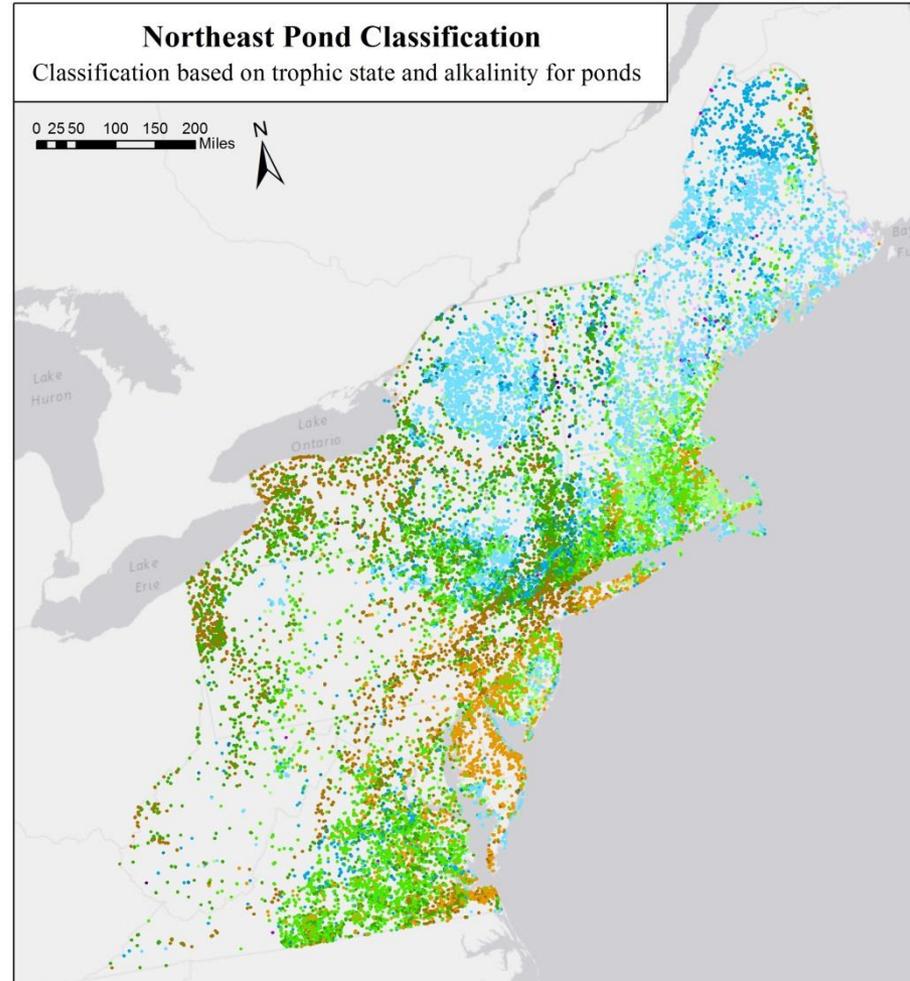
- |                                   |                                     |
|-----------------------------------|-------------------------------------|
| ● Oligotrophic, High Alkalinity   | ● Eutrophic, High Alkalinity        |
| ● Oligotrophic, Medium Alkalinity | ● Eutrophic, Medium Alkalinity      |
| ● Oligotrophic, Low Alkalinity    | ● Eutrophic, Low Alkalinity         |
| ● Mesotrophic, High Alkalinity    | ● Hypereutrophic, High Alkalinity   |
| ● Mesotrophic, Medium Alkalinity  | ● Hypereutrophic, Medium Alkalinity |
| ● Mesotrophic, Low Alkalinity     | ● Hypereutrophic, Low Alkalinity    |

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### Northeast Pond Classification

Classification based on trophic state and alkalinity for ponds

0 25 50 100 150 200 Miles



- |                                   |                                     |
|-----------------------------------|-------------------------------------|
| ● Oligotrophic, High Alkalinity   | ● Eutrophic, High Alkalinity        |
| ● Oligotrophic, Medium Alkalinity | ● Eutrophic, Medium Alkalinity      |
| ● Oligotrophic, Low Alkalinity    | ● Eutrophic, Low Alkalinity         |
| ● Mesotrophic, High Alkalinity    | ● Hypereutrophic, High Alkalinity   |
| ● Mesotrophic, Medium Alkalinity  | ● Hypereutrophic, Medium Alkalinity |
| ● Mesotrophic, Low Alkalinity     | ● Hypereutrophic, Low Alkalinity    |

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# Four Variable Classification

**Example: Warm, hypereutrophic, highly alkaline, pond**

- Waterbodies were assigned a four-variable code that combined their class for temperature, trophic state, alkalinity, and depth.
- Four variable integration results in 68 waterbody types: 35 lake types and 33 pond types.
- Waterbodies were called “unclassifiable” if three or more of their variables had very low confidence scores (2% of all waterbodies)

# Most Common Lake and Pond Types

## LAKES

## | PONDS

Warm, Eutrophic, Medium Alk	1305	Warm, Eutrophic, Medium Alk	4950
Warm, Eutrophic, High Alk	880	Warm, Eutrophic, High Alk	3424
Cool to cold, Mesotrophic, Low Alk	748	Cool to cold, Mesotrophic, Low Alk	3360
Very cold, Mesotrophic, Low Alk	670	Warm, Hypereutrophic, Medium Alk	2334
Warm, Eutrophic, Low Alk	446	Warm, Mesotrophic, Low Alk	2334
Warm, Mesotrophic, Low Alk	383	Warm, Hypereutrophic, High Alk	1999
Warm, Mesotrophic, Medium Alk	366	Warm, Eutrophic, Low Alk	1517
Cool to cold, Mesotrophic, Medium Alk	288	Warm, Mesotrophic, Medium Alk	1201
Very cold, Oligotrophic, Low Alk	281	Cool to cold, Mesotrophic, Medium Alk	843
Cool to cold, Eutrophic, Medium Alk	220	Alk	468
		Cool to cold, Eutrophic, Low Alk	468

# CONSERVATION GATEWAY

The screenshot shows a web browser window with the URL <https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/fresh>. The browser's address bar also shows a tab for "Northeast Lakes and Pond ...". The website's navigation menu includes "Home", "Library", "TNC's Priorities", "Science Chronicles", and "Subscribe". The main header features the "Conservation Gateway" logo with the tagline "The Nature Conservancy Protecting nature. Preserving life." and a search bar with a "Go" button. Below the header, there are dropdown menus for "Conservation Planning", "Conservation Practices", and "Conservation By Geography". The left sidebar lists "Conservation By Geography" with icons for Africa, Asia Pacific, North America, and South America. The main content area displays the breadcrumb trail: "Conservation Gateway » Conservation By Geography » North America » United States » Eastern Division » Science and Data » Freshwater Projects". The title of the page is "Northeast Lakes and Pond Classification System". Below the title is a large photograph of a loon on a lake with snow-capped mountains in the background, labeled "MOUNT WASHINGTON OBSERVATORY". To the right of the photo are social media sharing icons for Facebook, Twitter, Google+, and Email. Below these icons is a "Data & Reports" section with three links: "Northeast Lake and Pond Classification" (Get the report), "Northeast Lakes and Ponds Webmap" (Explore the lakes and ponds classification), and "Northeast Lake and Pond Data" (Download the data file). At the bottom of the page, there is a "NATURE'S VALUES" banner and a paragraph stating: "This project was supported by a grant from the U.S. Department of the Interior, Fish and Wildlife Service."

Shared methods. Smarter conservation.

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Conservation Gateway  
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## Northeast Lakes and Pond Classification System

MOUNT WASHINGTON OBSERVATORY

Data & Reports

- Northeast Lake and Pond Classification  
Get the report
- Northeast Lakes and Ponds Webmap  
Explore the lakes and ponds classification
- Northeast Lake and Pond Data  
Download the data file

### Nature's Values

This project was supported by a grant from the U.S. Department of the Interior, Fish and Wildlife Service.

# Download: Report and Data

- Report
- Spatial Data:
  - waterbodies with simple attribute table, .lyr files for ArcGIS display
- Tabular Excel Data:
  - waterbodies with 140+ attributes used the modeling

# Database of Attributes

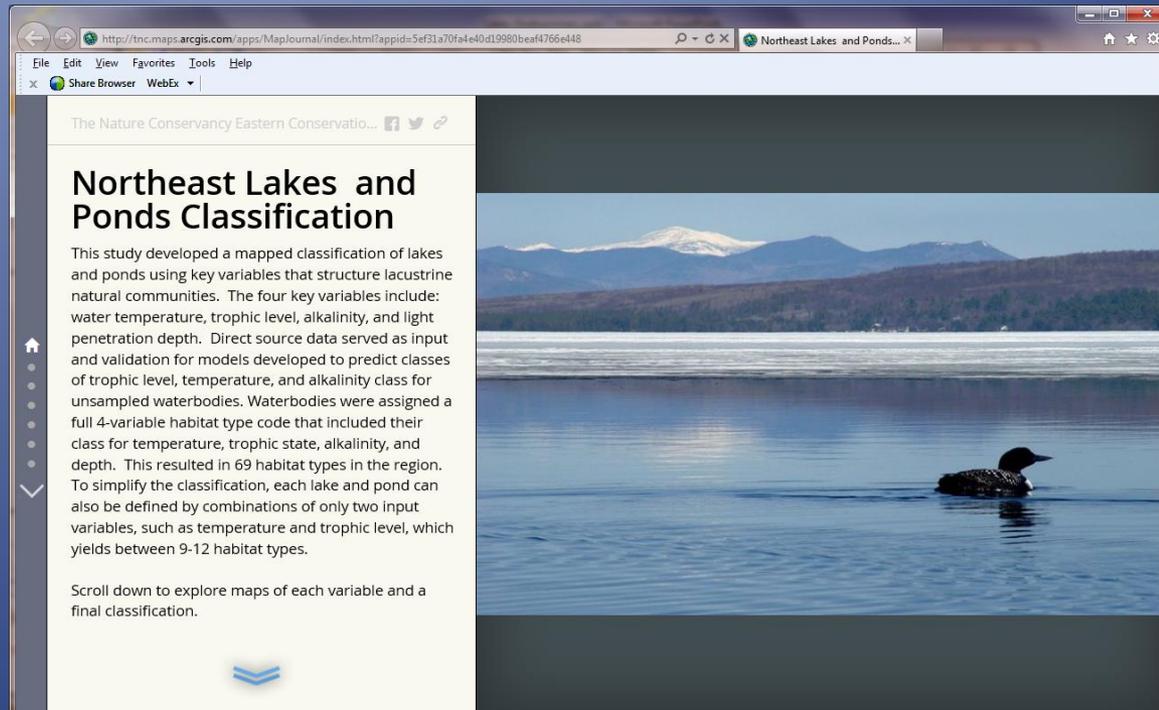
## Waterbodies codes with 140+ attributes

- **Lake Morphometry:** surface area, max depth, mean depth, fetch, shoreline complexity...
- **Buffer Characteristics:** 100m, 500m and 1000m buffer land cover, geology, impervious surface, baseflow index
- **Presence and type of dam**
- 
- **Chlorophyll a, Alkalinity, Temperature :** State/federal sample data and values averaged for each waterbody
- **Confidence and probabilities** for every waterbody

# Web Map

<http://bit.ly/1sVYyOQ>

- Short text about each classification variable
- View and zoom in on a map of each attribute
- Click on polygon to get simple attribute table displayed
- View one simplified 2 Variable classification:  
Temperature and Trophic



# Web Map: Temperature

The Nature Conservancy Eastern Conservatio... [f](#) [t](#) [l](#)

## Northeast Lakes and Ponds Classification

### Temperature

Water temperature is critical in the life of aquatic ecoterms (fishes, amphibians, reptiles, invertebrates) as it sets the physiological limits where lake organisms can persist. Seasonal changes in water temperature often also cue migration, influence growth rates of eggs and juveniles, and can affect the body size and therefore the fecundity of adults.

Our classification is based on the presence of the coldest water habitat throughout the summer found in each waterbody and highlights three classes.

- **VERY COLD:** <12.8 C and  $\geq$  5 mg/l DO or indicator fish = lake trout reproduction
- **COLD - COOL:** 12.8 C to 21 C or indicator fish = brook trout, kokanee, smelt
- **WARM:** > 21 C

*Click on a lake or pond polygon to get a pop-up displaying all attributes of the lake.*

### Trophic State

Level of productivity or "nourishment" in a lake.

**LEGEND**  
**Water Temperature**  
Final output variable

- Very cold
- Cool to cold
- Warm

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# Web Map: Trophic

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## Northeast Lakes and Ponds Classification

### Trophic State

Level of productivity or "nourishment" in a lake.

This classification recognizes 4 levels:

**Oligotrophic**: (<=2 ug/L Chlorophyll-a) A nutrient poor lake. Describes a lake of low biological productivity and high transparency or clarity.

**Mesotrophic** (>2 -7ug/L Chlorophyll-a) : A lake that is moderately productive.

**Eutrophic** (>7-30 Chlorophyll-a) : A well-nourished lake, very productive and supports a balanced and diverse array of organisms. Usually low transparency due to high algae and chlorophyll-a content.

**Hypereutrophic**: (>30 ug/L Chlorophyll-a) Characterized by an excess of nutrients. These lakes usually support algal blooms, vegetative overgrowth, and low biodiversity.

*Click on a lake or pond polygon to get a pop-up displaying all attributes of the lake.*

### Alkalinity

Alkalinity and acid neutralizing capability (ANC) are

**LEGEND**

Lake\_Classification\_1118201  
- Lake Classification

**Lake Classification:**  
**Trophic Class**

Final output variable

- Oligotrophic
- Mesotrophic
- Eutrophic
- Hypereutrophic

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# Web Map: Lakes vs. Ponds

Northeast Lakes and Pond... x +

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## Northeast Lakes and Ponds Classification

### Light Penetration

Ponds have light penetration to the bottom of the waterbody allowing photosynthesis throughout. Lakes have some depths where light does not penetrate to the bottom, creating a profundal zone with no photosynthesis.

Because thresholds in light penetration are not independent of trophic state, we classified the pond depth threshold as follows: oligotrophic <30ft (9.14m), mesotrophic <20ft (6.10m), and eutrophic <10ft (3.05m)

*Click on a lake or pond polygon to get a pop-up displaying all attributes of the lake.*

### Final Classification: Temperature and Trophic Class

This project integrated the four classification variables into a flexible classification scheme that can be used in its full or simplified formats. Here we are looking at a simplified map of Temperature and Trophic level.

*Click on a lake or pond polygon to get a pop-up displaying all attributes of*

**LEGEND**

**Lake Classification:**  
Depth of Light Penetration

Final output variable

- Lake
- Pond

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# Web Map: Combining Variables

Northeast Lakes and Ponds... x +

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## Northeast Lakes and Ponds Classification

Click on a lake or pond polygon to get a pop-up displaying all attributes of the lake.

### Final Classification: Temperature and Trophic Class

This project integrated the four classification variables into a flexible classification scheme that can be used in its full or simplified formats. Here we are looking at a simplified map of Temperature and Trophic level.

Click on a lake or pond polygon to get a pop-up displaying all attributes of the lake.

### For More information

For more information on this project see the [Northeast Lakes and Ponds Report webpage](#).

You can download the report directly [here](#).

You can download the data directly [here](#).

Photo credit: "Wenham Lake - Wenham, Massachusetts" by Daderot

#### LEGEND

##### Temperature and Trophic

Classification Using Temperature and Trophic State

- Very cold, Oligotrophic
- Very cold, Mesotrophic
- Very cold, Eutrophic
- Cool to cold, Oligotrophic
- Cool to cold, Mesotrophic
- Cool to cold, Eutrophic
- Cool to cold, Hypereutrophic
- Warm,

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# Web Map: Pop Up

The screenshot shows a web browser window with a map application. The browser's address bar contains the URL `pid=5ef31a70fa4e40d19980beaf4766e448`. The browser's search bar shows `Ask.com`. The browser's tabs include `serveOnline - East...`, `https--connect.tnc.or...`, `SIFN Classification Exp...`, and `Web Slice Gallery`. The map application displays a map of the Glens Falls area, with labels for `Queensbury`, `Glens Falls`, and `Gansevoort`. A pop-up window titled `Lake Classification: Cossayuna Lake` is open, displaying the following data:

Lake Classification: Cossayuna Lake	
Lake Name	Cossayuna Lake
State	NY
Surface area (acres)	631.08
Maximum depth (meters)	12.31
Trophic class	Mesotrophic
Alkalinity class	Medium Alk
Temperature class	Very cold
Depth class (lake	Lake

The map also features a legend titled `LEGEND` with the heading `Temperature and Trophic`. The legend includes a green square for `Eutrophic` and an orange square for `Cool to cold,`. The map interface includes a navigation panel on the left with zoom in (+), home, and zoom out (-) buttons, and a social media sharing section with Facebook, Twitter, and LinkedIn icons.

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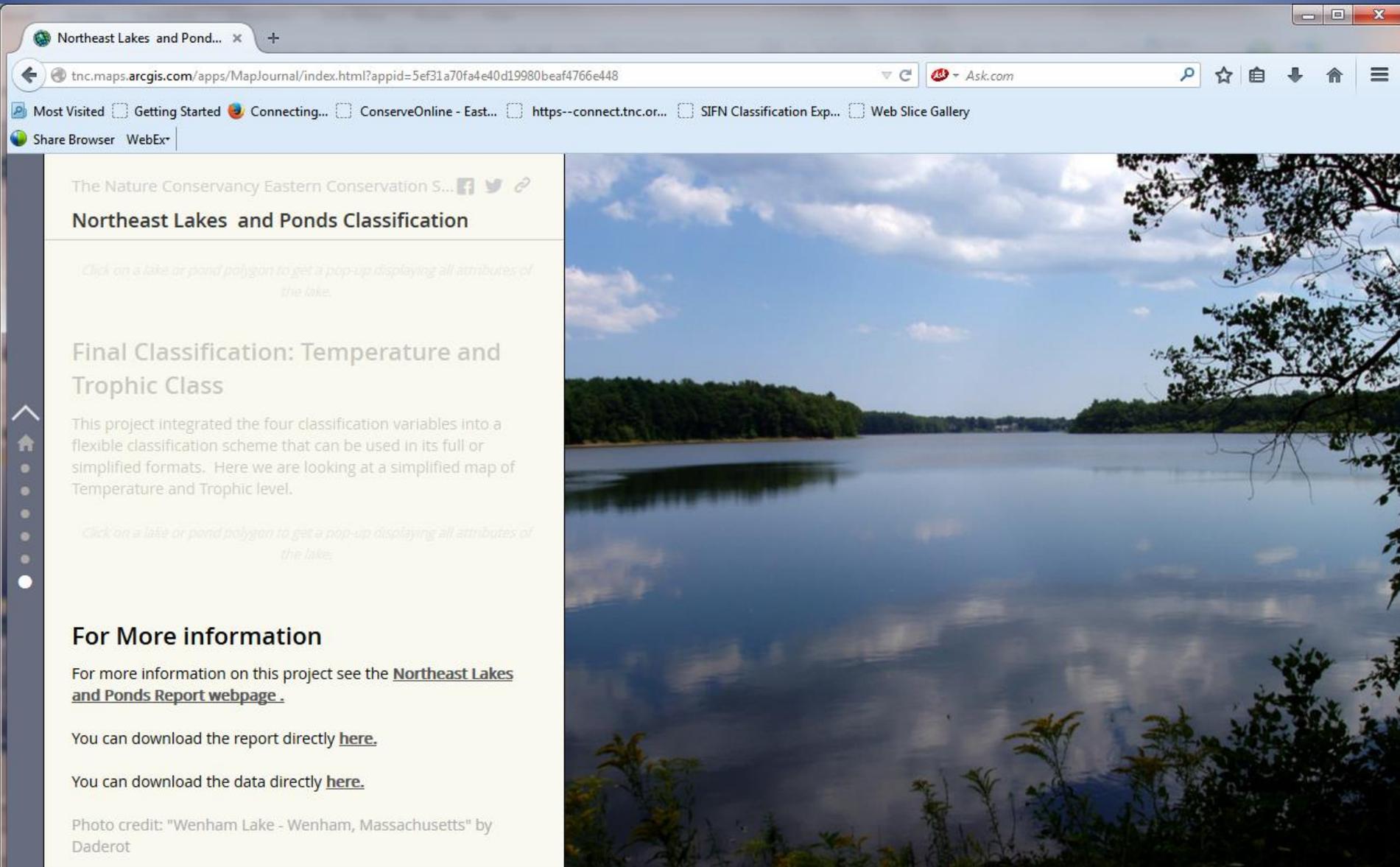


LEGEND  
Temperature and Trophic

4-way classification	Very cold, Mesotrophic, Medium Alk, Lake
3-way classification (trophic, temp, alk)	Very cold, Mesotrophic, Medium Alk
2-way classification (trophic and temp)	Very cold, Mesotrophic
2-way classification (trophic and alk)	Mesotrophic, Medium Alk
2-way classification	Very cold, Medium Alk

- Eutrophic
- Cool to cold,

# Webmap: Download Report and Data



The screenshot shows a web browser window with the following elements:

- Browser Tab:** Northeast Lakes and Pond...
- Address Bar:** tnc.maps.arcgis.com/apps/MapJournal/index.html?appid=5ef31a70fa4e40d19980beaf4766e448
- Navigation Bar:** Most Visited, Getting Started, Connecting..., ConserveOnline - East..., https--connect.tnc.or..., SIFN Classification Exp..., Web Slice Gallery
- Page Header:** The Nature Conservancy Eastern Conservation S... [Facebook icon] [Twitter icon] [Link icon]
- Section Header:** Northeast Lakes and Ponds Classification
- Text:** Click on a lake or pond polygon to get a pop-up displaying all attributes of the lake.
- Section Header:** Final Classification: Temperature and Trophic Class
- Text:** This project integrated the four classification variables into a flexible classification scheme that can be used in its full or simplified formats. Here we are looking at a simplified map of Temperature and Trophic level.
- Text:** Click on a lake or pond polygon to get a pop-up displaying all attributes of the lake.
- Section Header:** For More information
- Text:** For more information on this project see the [Northeast Lakes and Ponds Report webpage](#).
- Text:** You can download the report directly [here](#).
- Text:** You can download the data directly [here](#).
- Text:** Photo credit: "Wenham Lake - Wenham, Massachusetts" by Daderot

The right side of the browser window displays a large photograph of a lake, identified as Wenham Lake in Massachusetts, with a forested shoreline and a clear sky reflected in the water.

# Thank You!

Matt Carpenter and NEAFWA for envisioning and guiding this project

Andrew Milliken and Scott Schwenk of the North Atlantic LCC for support in making it a reality.

Jeff W. Hollister of EPA and all the individual State Departments of Fish and Wildlife, Environmental Management, and Natural Resources for sharing their data on the regions waterbodies  
Without their dedication and hard work to collect this data, our project would not have been possible.

The Lake Steering Committee for feedback, reports, coordinated data sharing, and review.