

# A Three-Tiered Approach to Wetland Condition Assessment in New York State

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All figures and photographs by L. Shappell  
or NYNHP staff unless noted.



New York  
Natural Heritage  
Program

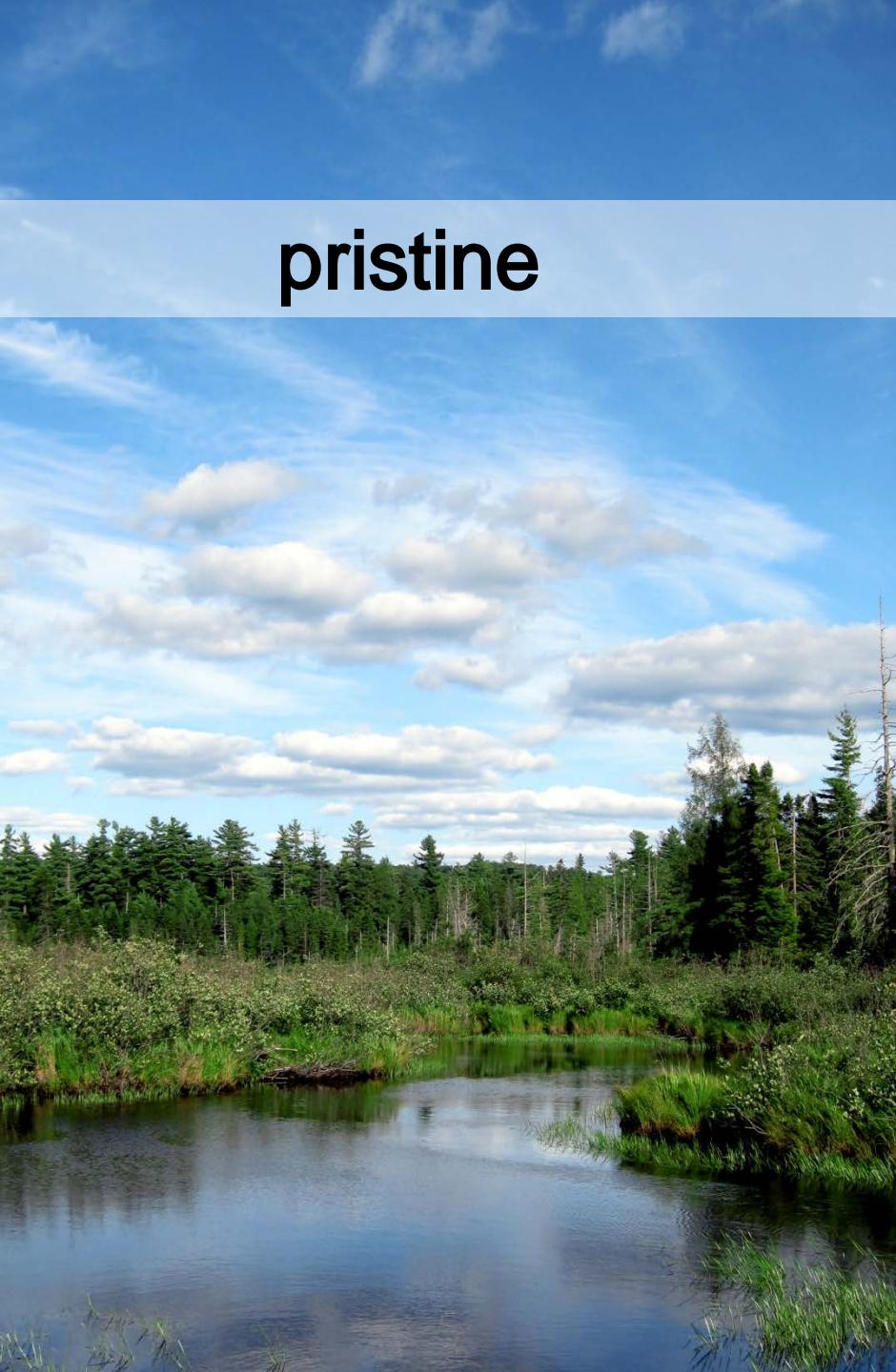


Department of  
Environmental  
Conservation

**pristine**



**pristine**



**trashed + invaded**



# Hierarchical 3-level approach

**Level 1:** Landscape-scale GIS model (LCA)

**Level 2:** rapid assessment (NYRAM)

**Level 3:** intensive veg plots

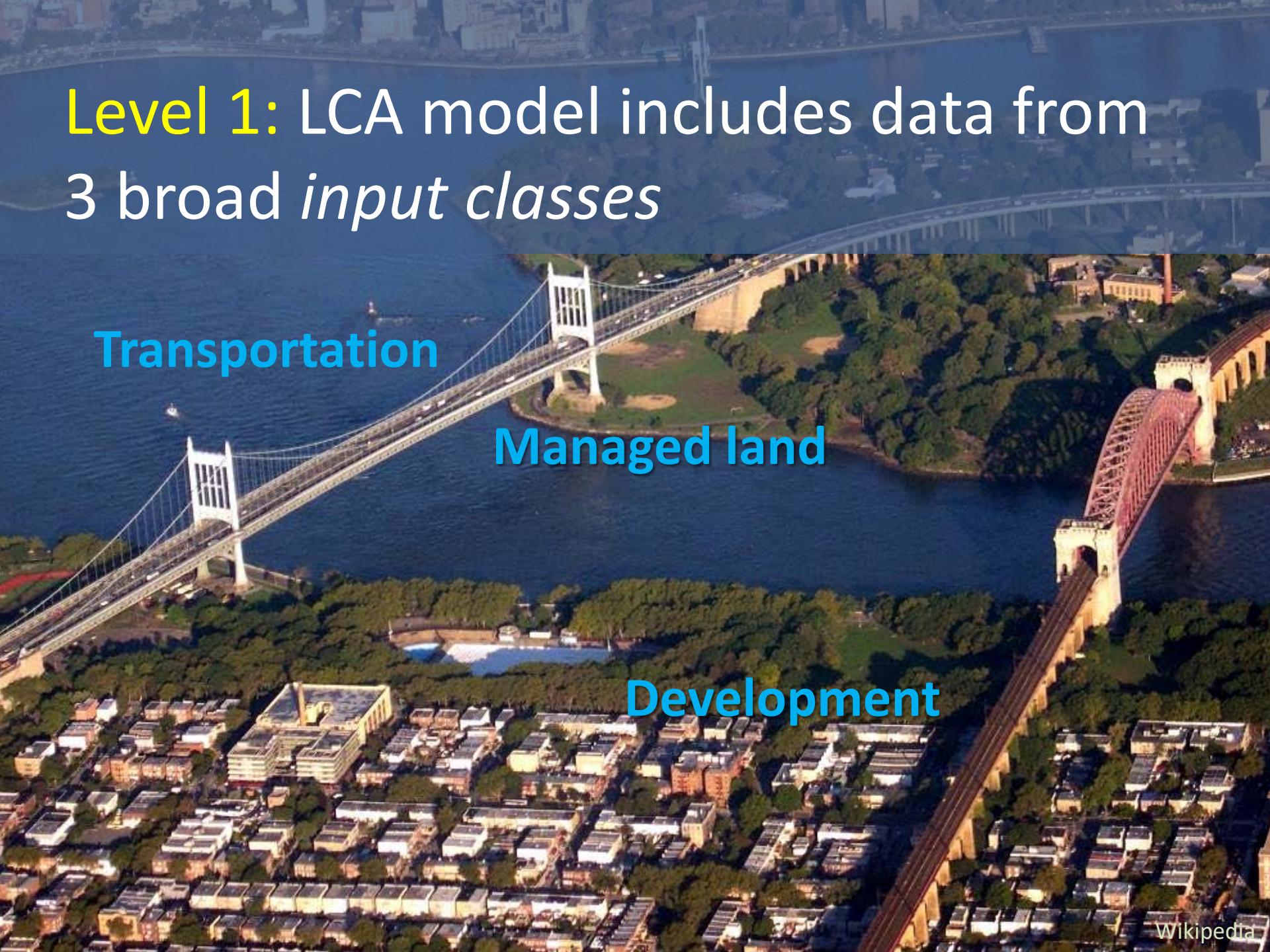
# Hierarchical 3-level approach

**Level 1:** Landscape-scale GIS model (LCA)

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**Level 3:** intensive veg plots

Level 1: LCA model includes data from  
3 broad *input classes*

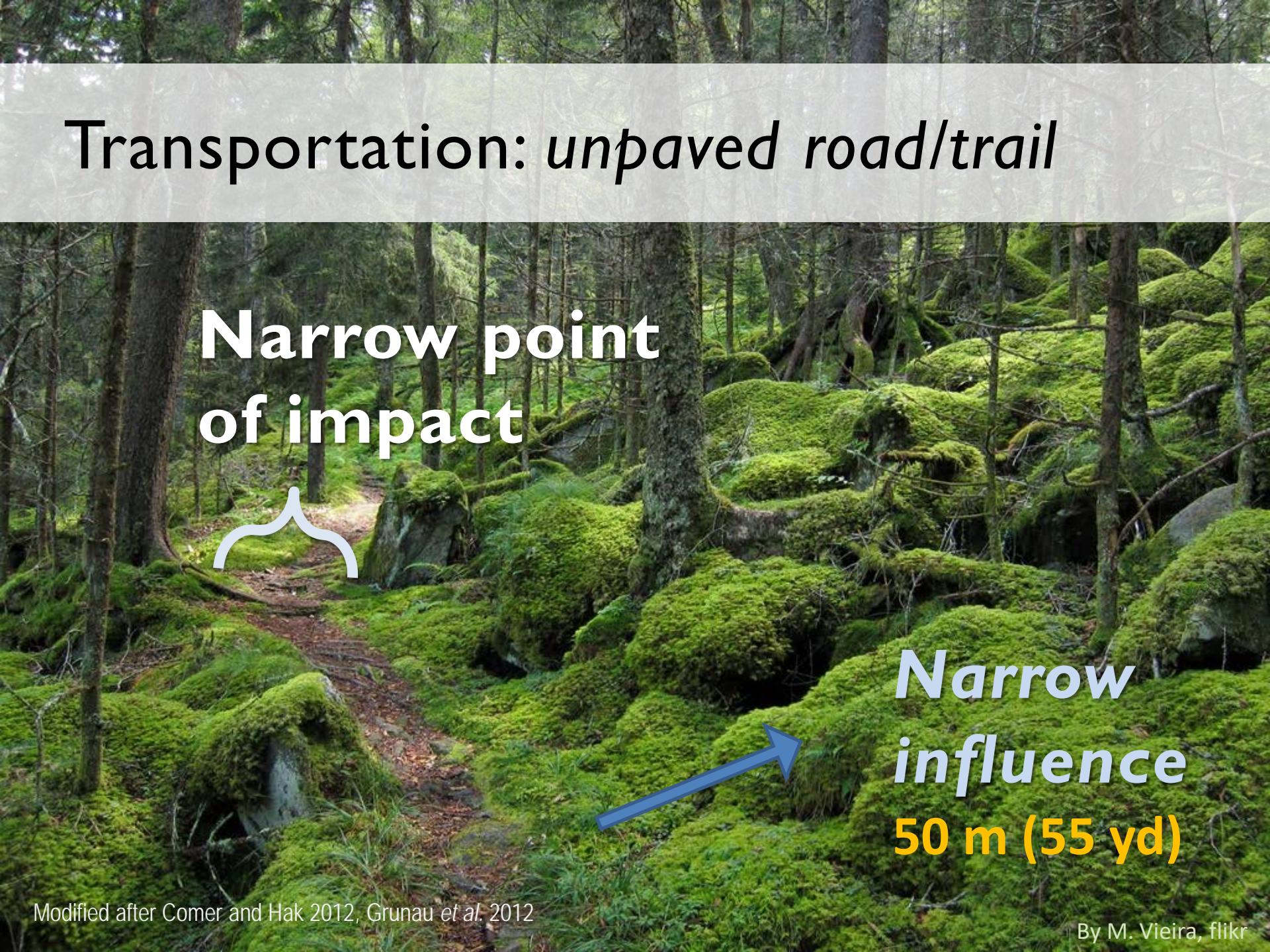
An aerial photograph of a bridge spanning a wide river. The bridge has two distinct sections: a suspension bridge on the left with white towers and cables, and a red steel arch bridge on the right. The river is dark blue and reflects the surrounding environment. On the banks of the river, there is a mix of green managed land with some buildings and dense urban development with numerous houses and apartment complexes. The overall scene represents the three broad input classes mentioned in the text.

Transportation

Managed land

Development

# Transportation: unpaved road/trail



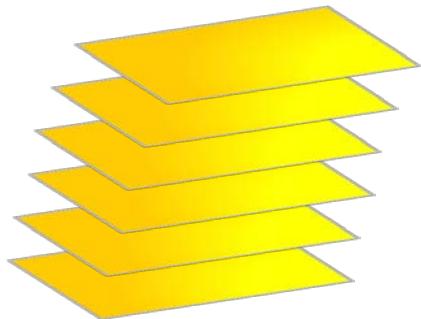
Narrow point  
of impact



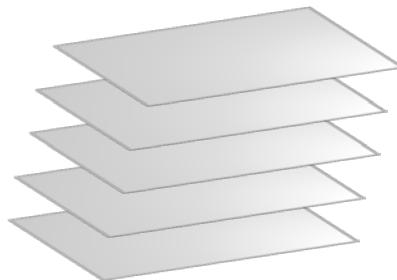
Narrow  
influence  
**50 m (55 yd)**

# Level I: LCA models cumulative impact of 13 human-mediated stressor subclasses

*Transportation*



*Development*



*Managed land*

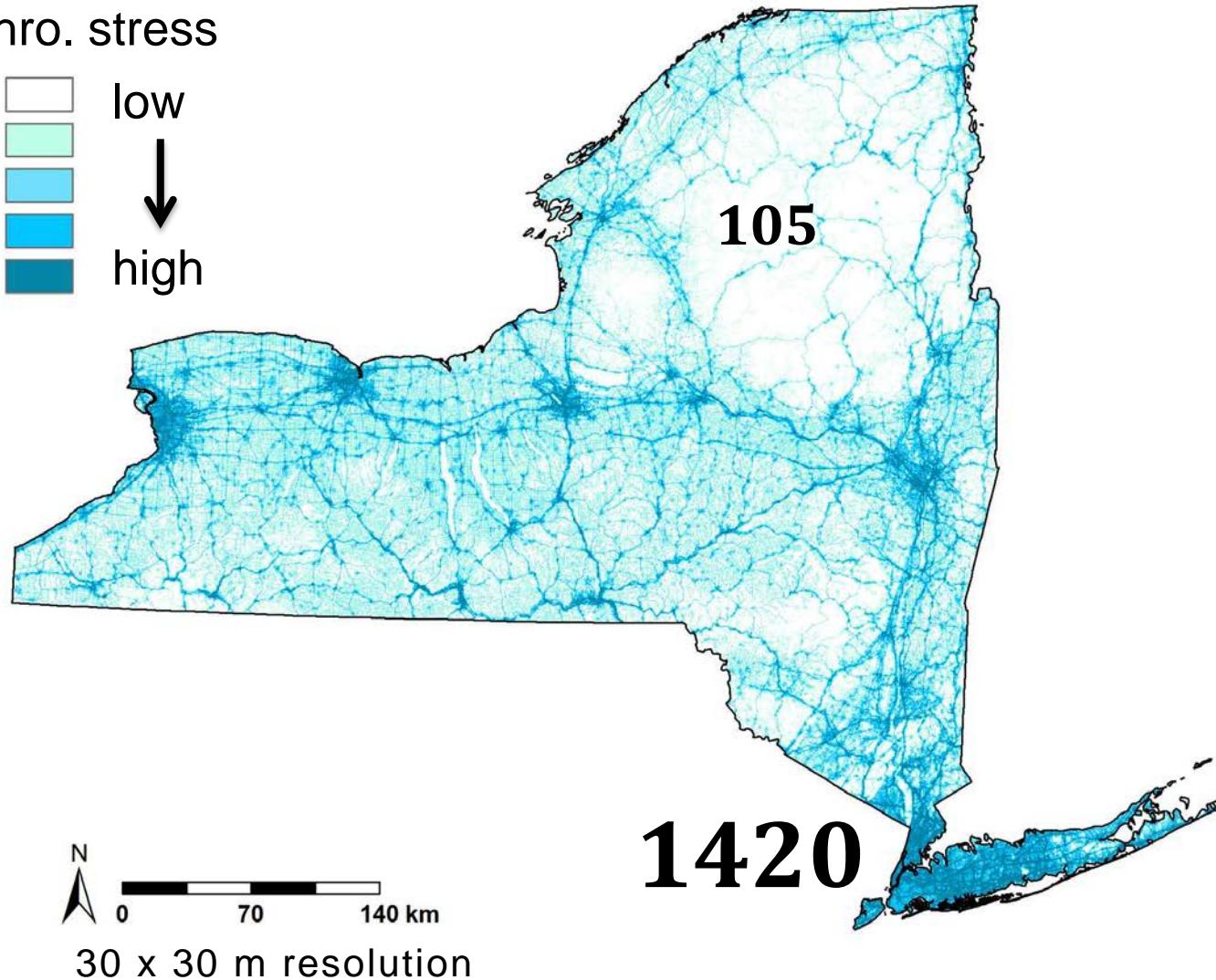
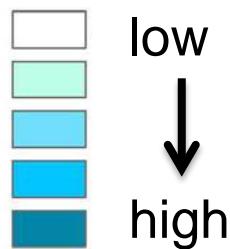


Rasterized LCA model  
 $30 \times 30 \text{ m}$  resolution

# Level I - State-wide LCA GIS model

*Raster layer available at [nynhp.org/data](http://nynhp.org/data)*

Anthro. stress



# Hierarchical 3-level approach

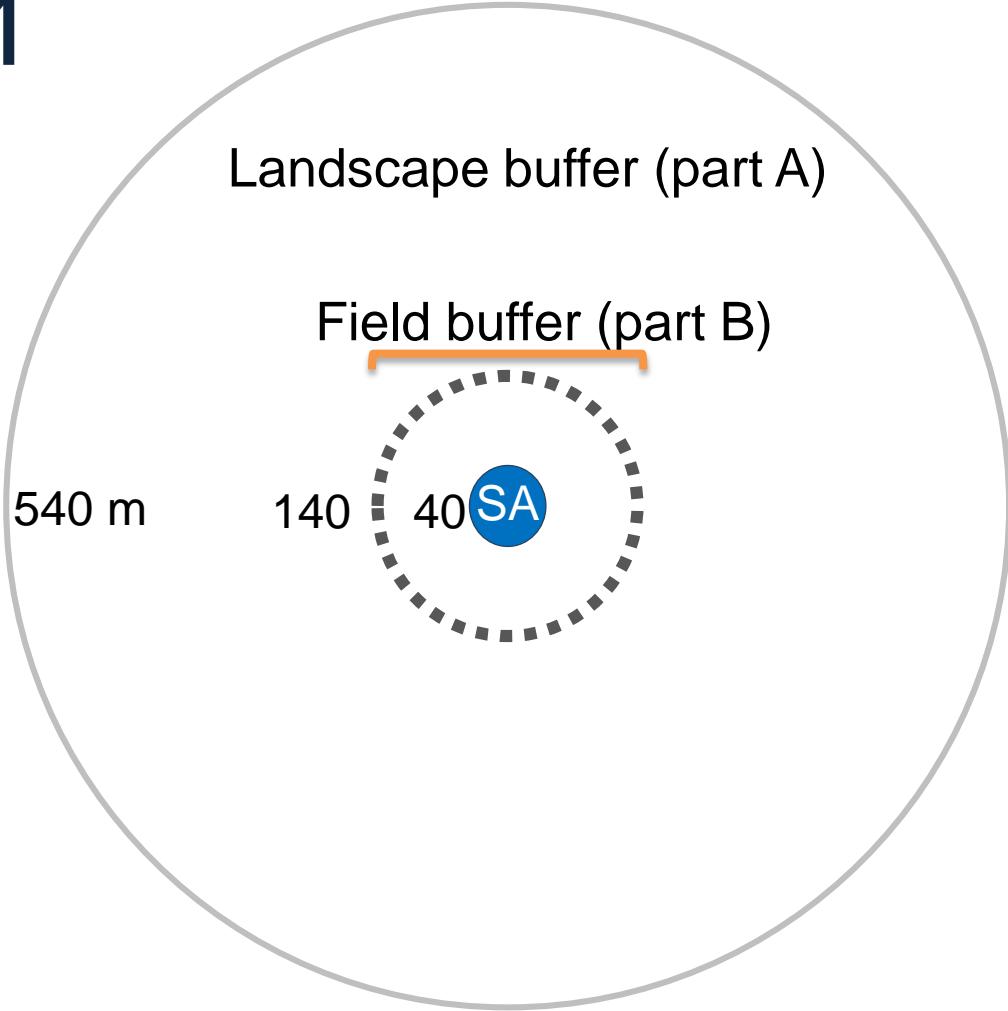
**Level 1:** Landscape-scale GIS model (LCA)

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**Level 3:** intensive veg plots

# Level 2: NYRAM

Part A: on-screen

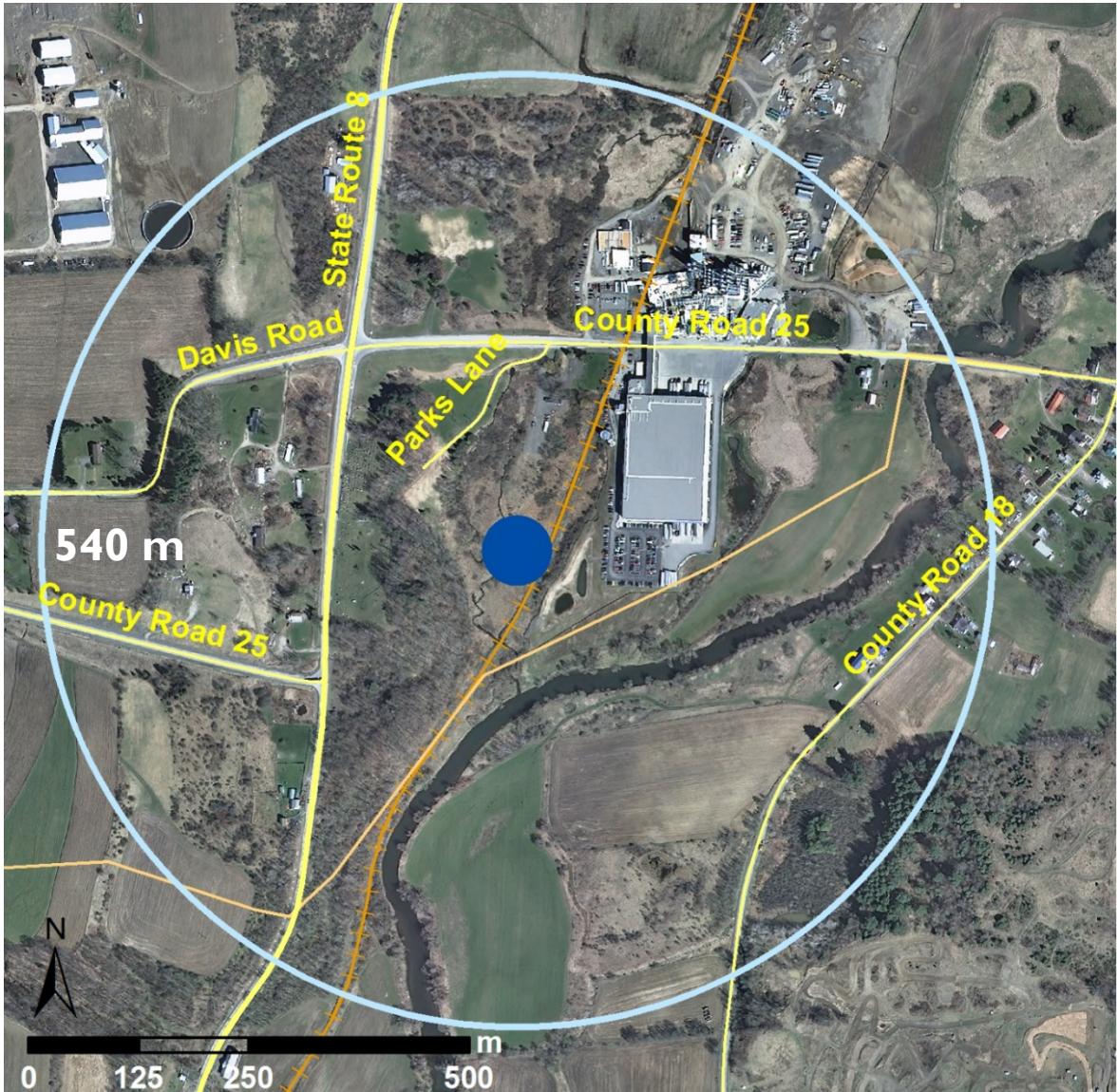


# NYRAM

## Part A on-screen

Fragmenting  
feature tally

Land use land  
cover (% LULC)



Site ID: NYW14-029  
Chenango County, NY

Target wetland class:  
Emergent (EM)

Trans & Rec

- Road
- Snowmobile Trail
- NYS Rail Lines

540 m Landscape Buffer  
Sample Area (SA)

2012 Orthoimagery  
Map scale 1:10,000

# NYRAM

## Part B: Field survey

Stressor checklist (pres/abs)

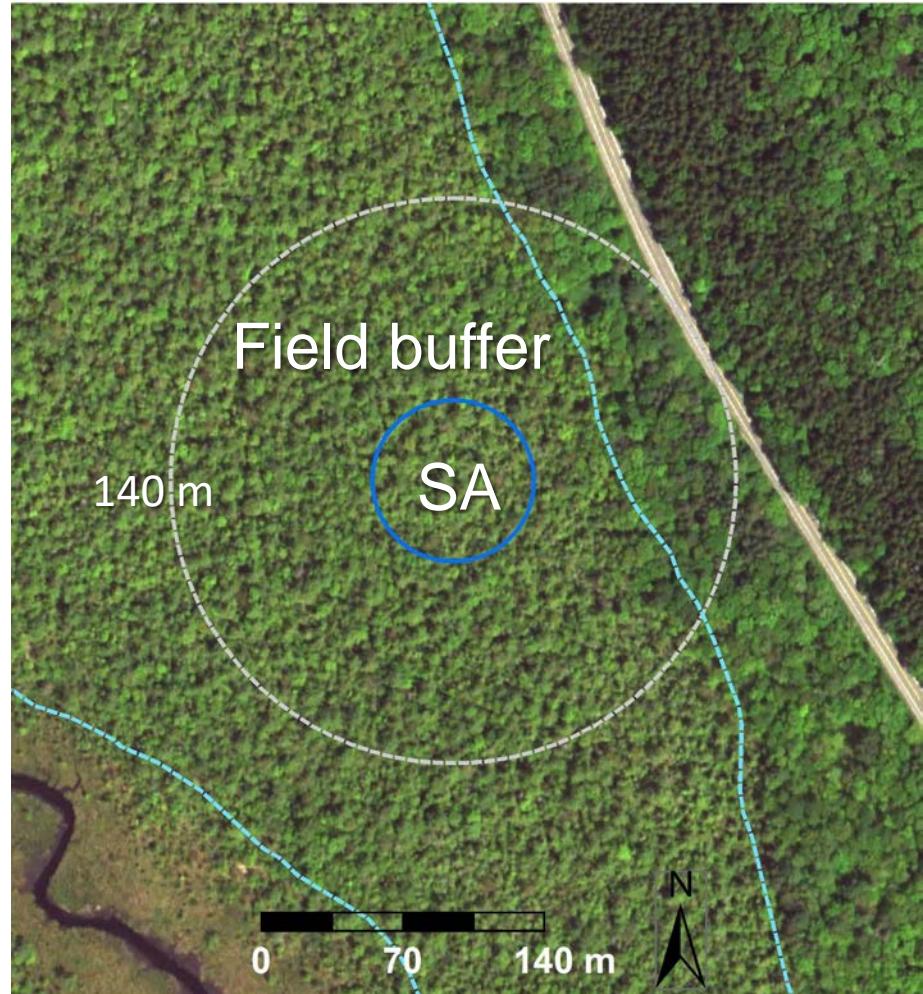
Vegetation

Hydroperiod & topography

Sediment transport

Eutrophication

Invasive plant richness

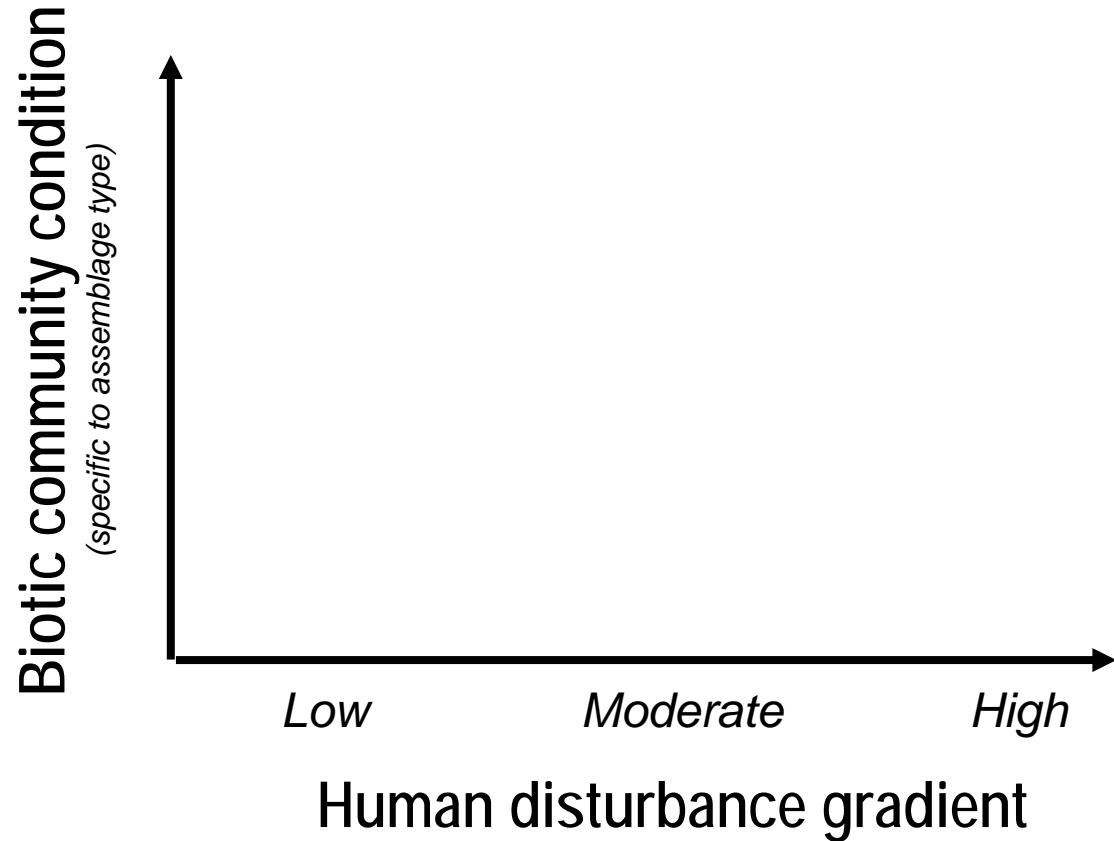


Site ID: NYW14-432  
Cortland County, NY  
2015 NAIP Imagery  
Scale: 1:3000

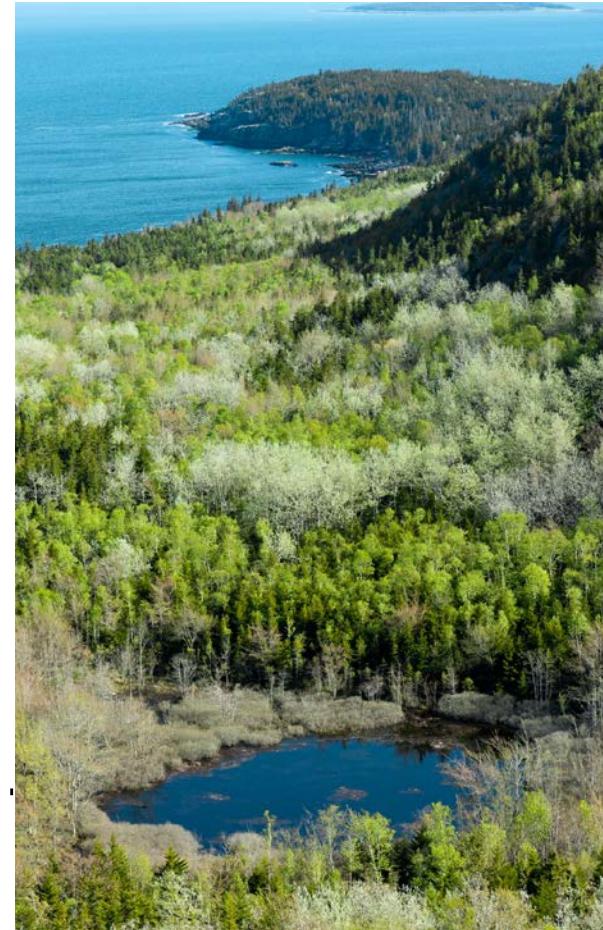
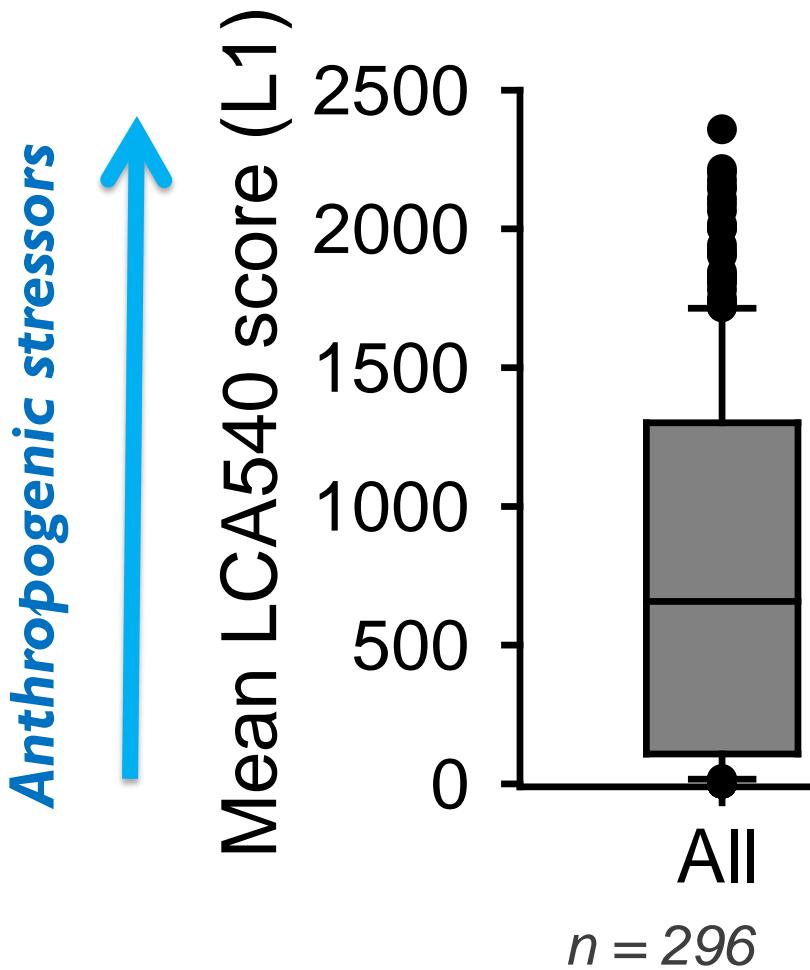
[Legend:  
Light Blue Box: Target wetland polygon  
Dark Blue Box: Sample Area (SA)  
Dashed Blue Line: 140 m Field Buffer (FB)]

# NYRAM

## Part B: Field survey qualitative condition rating



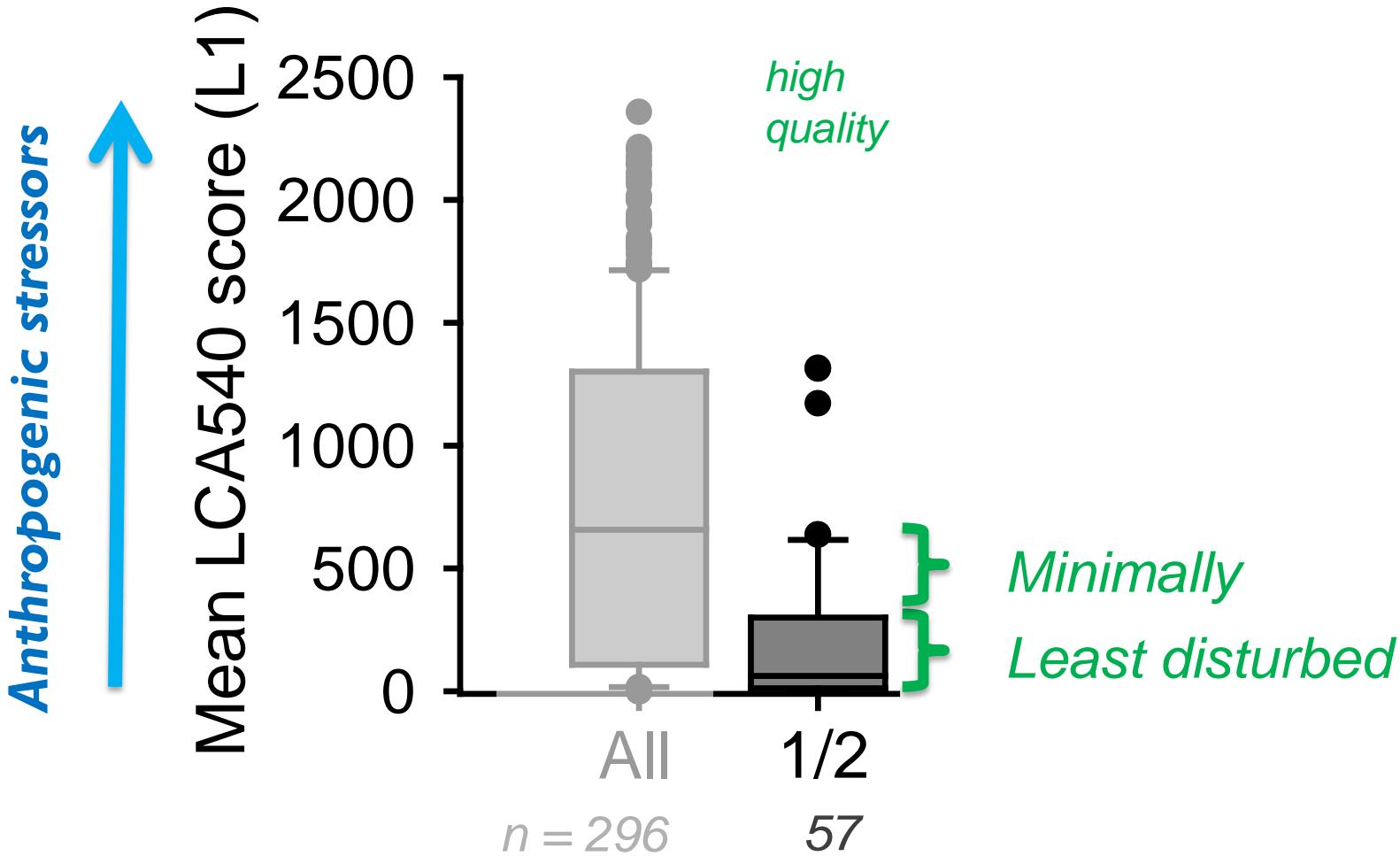
# Level I: Landscape Condition Assessment (LCA) scores



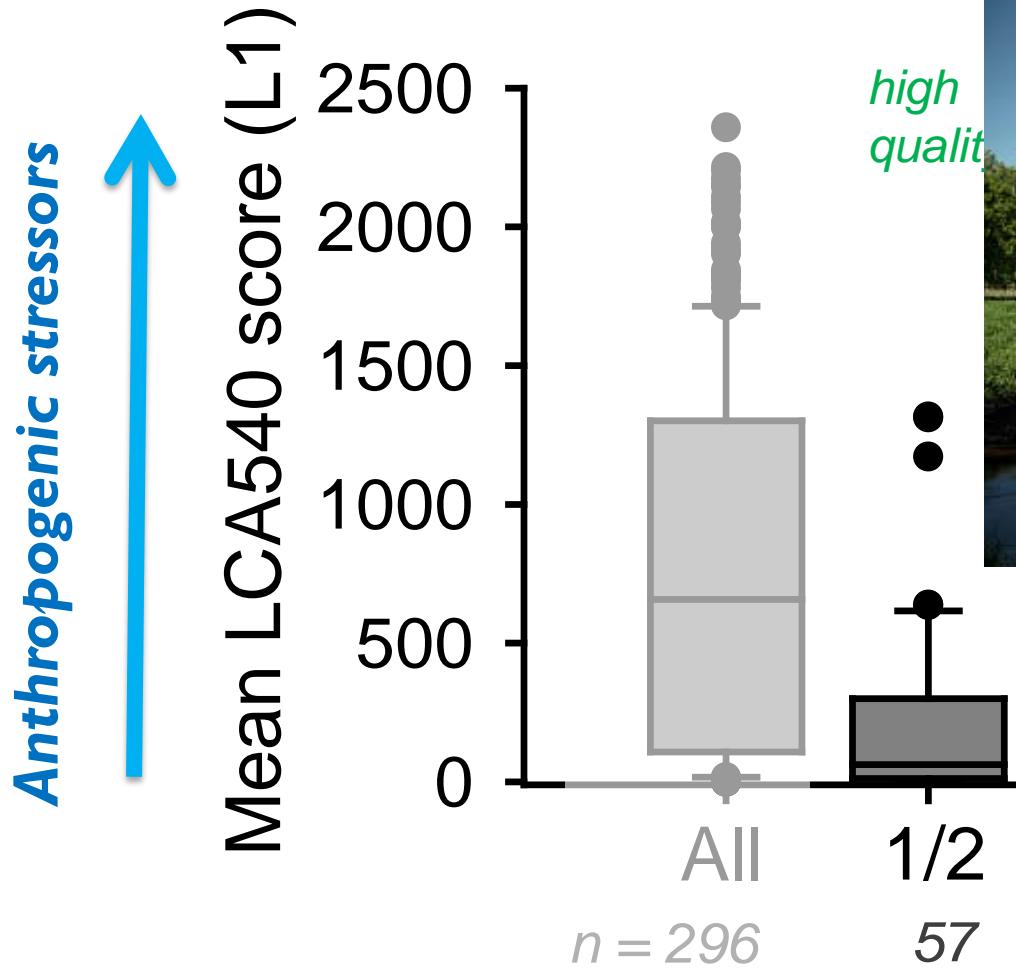
# Putting a number on “good”



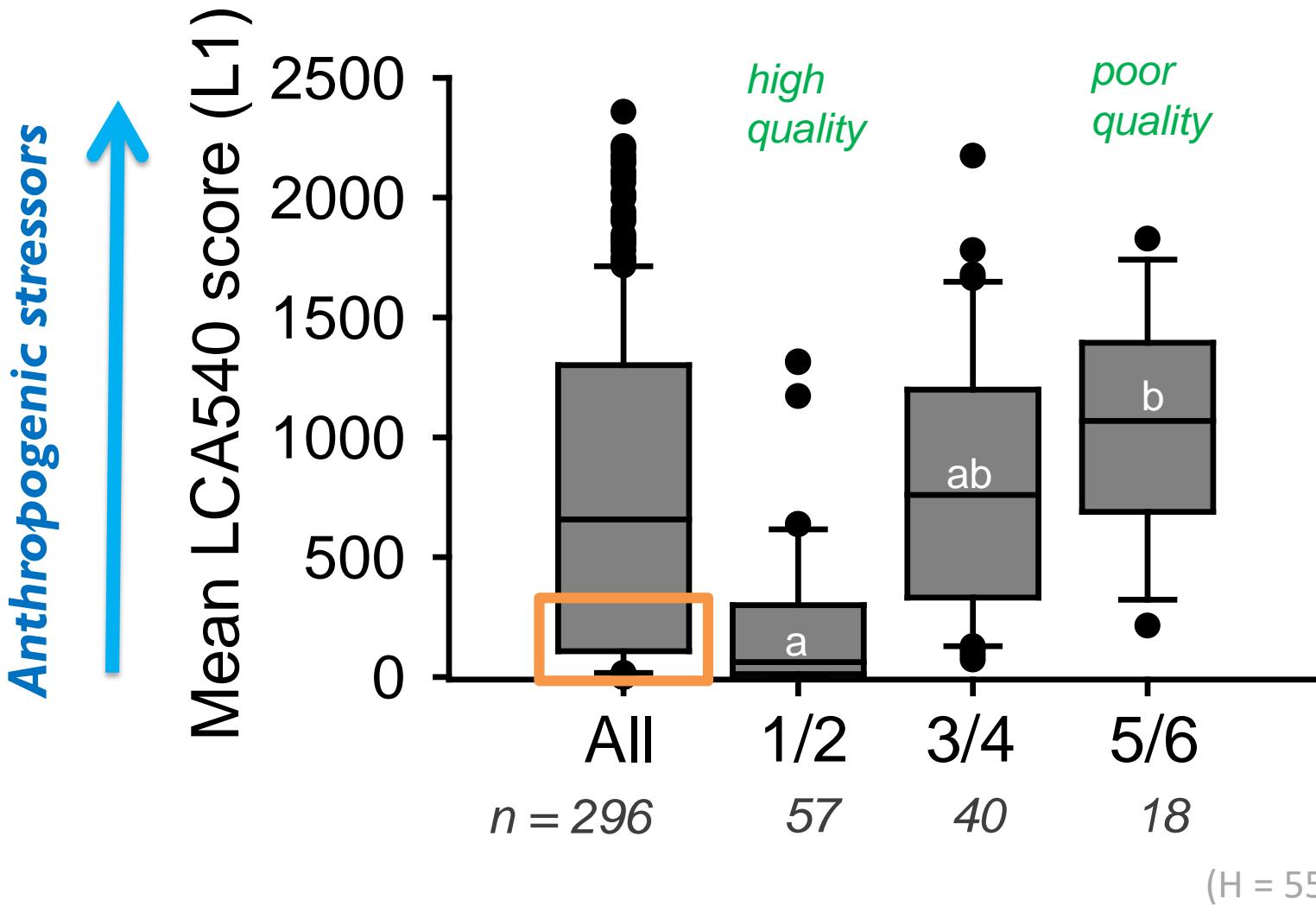
# High quality sites used for benchmarks



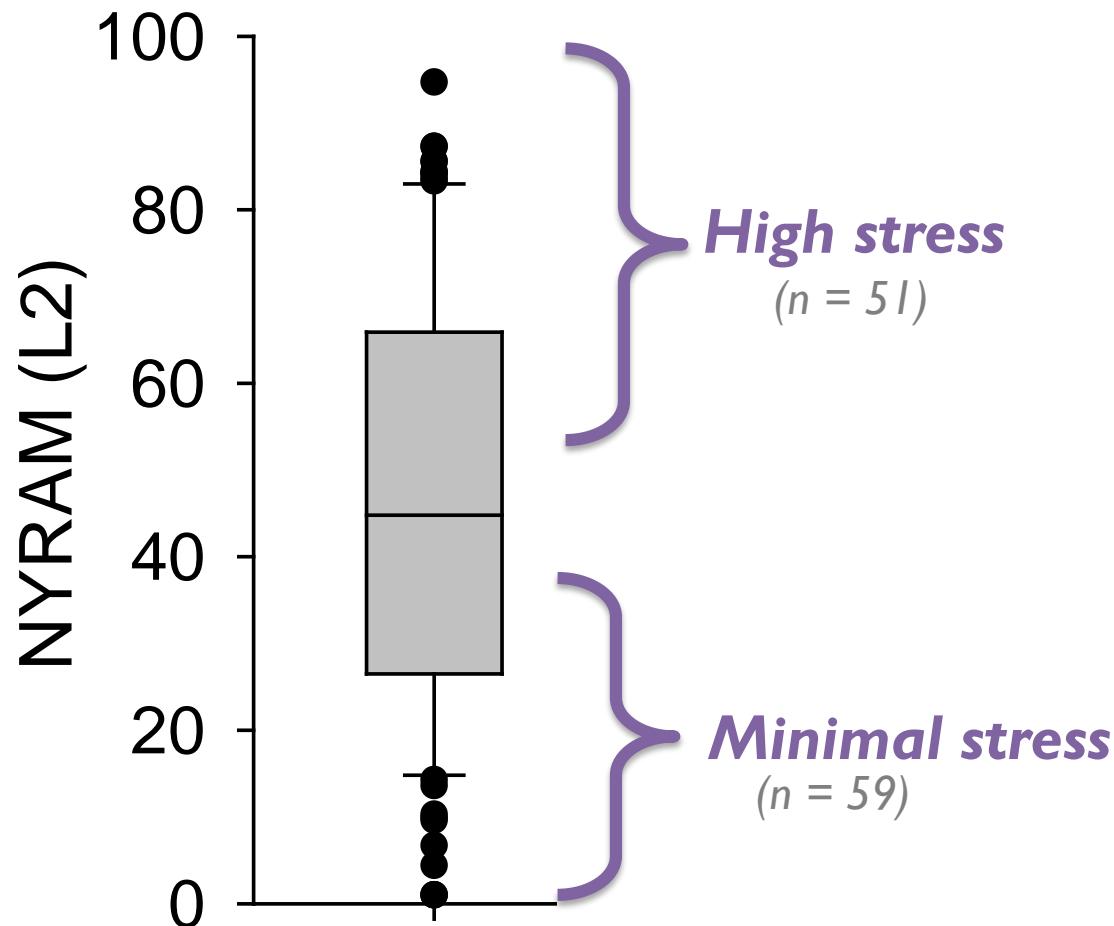
# Do good and poor scores overlap?



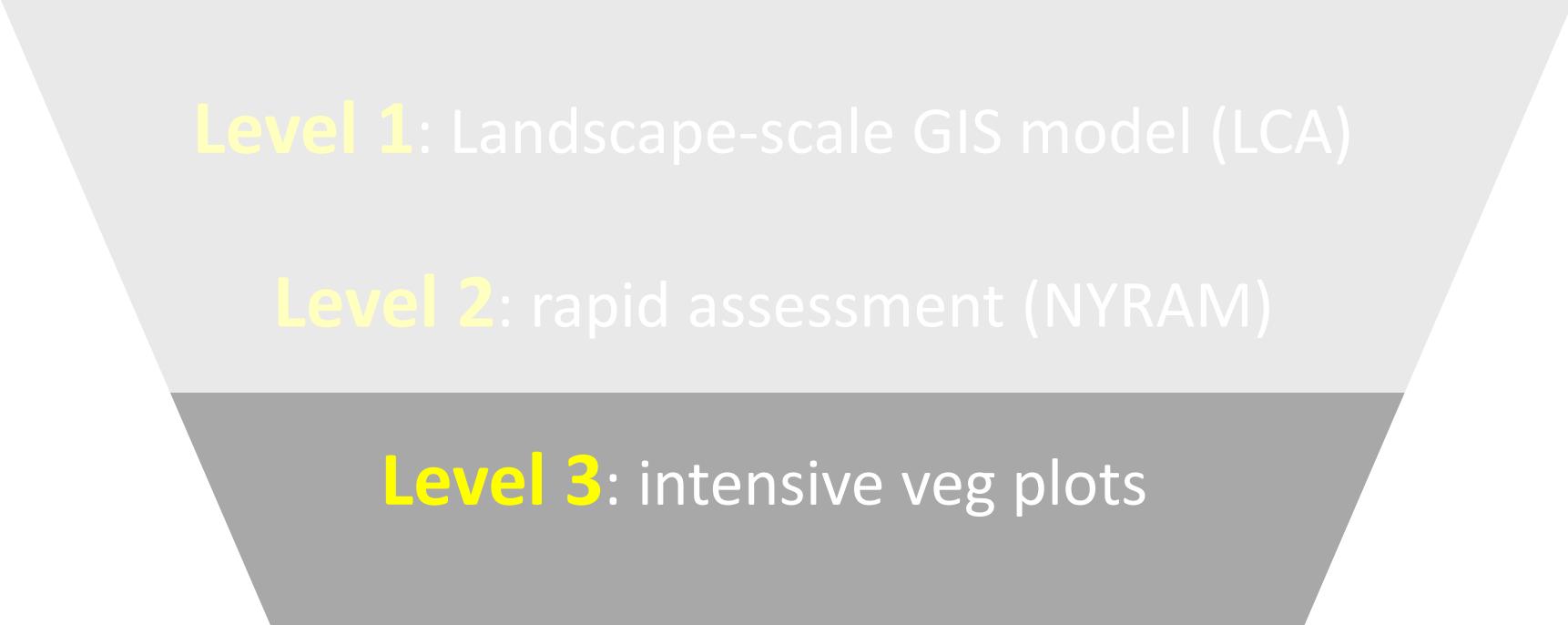
# Level I reference standards: high vs. poor



# Level 2: NY Rapid Assessment



# Hierarchical 3-level approach

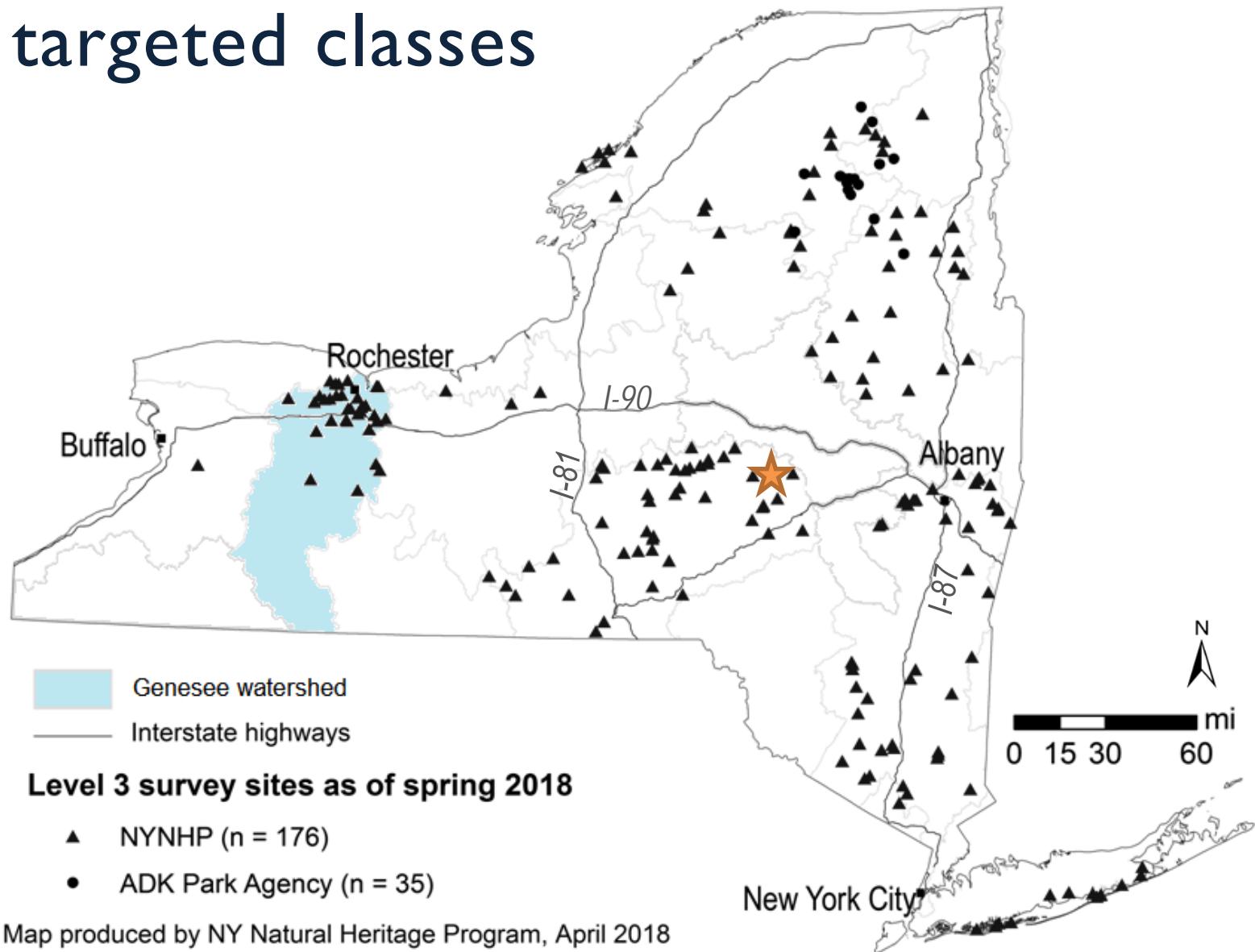


**Level 1:** Landscape-scale GIS model (LCA)

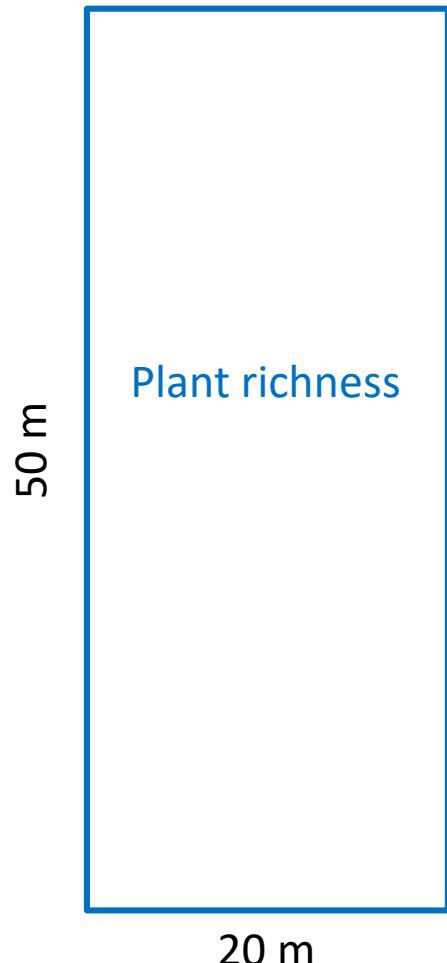
**Level 2:** rapid assessment (NYRAM)

**Level 3:** intensive veg plots

# Spatially balanced within basin, stratified by targeted classes

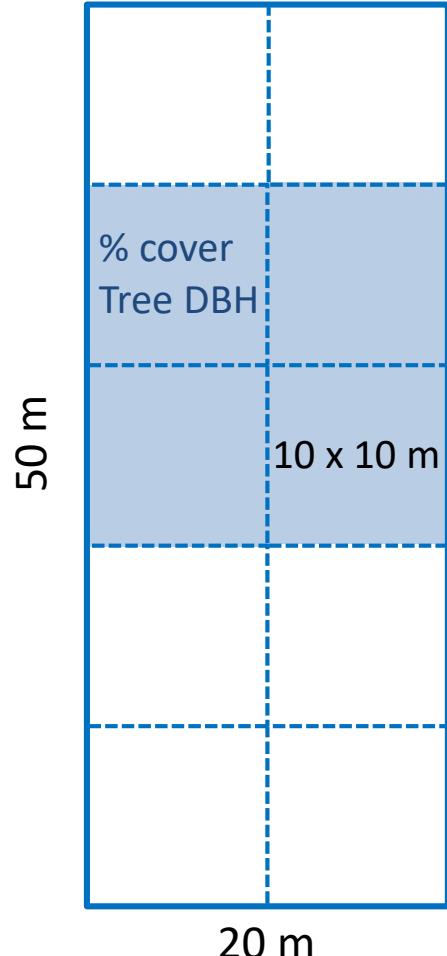


# Level 3 – intensive veg plots ( $n = 204$ )



(Methods follow Peet et al. 1998)

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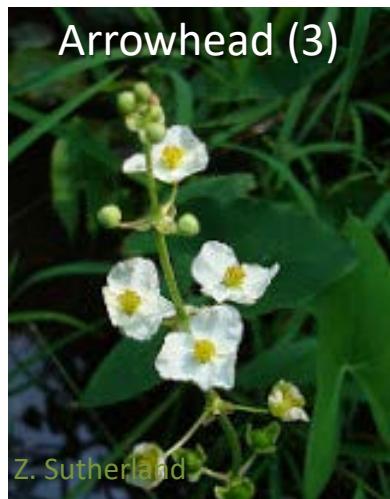


# Level 3 – floristic integrity

*Coefficient of Conservatism, “C”*

Scores vary among NY assemblages, ecological tolerance

Wide: 0-3



Arrowhead (3)

Limited: 7-8



Cardinal flower (7)

Moderate: 4-6



Cinnamon fern (6)

Narrow: 9-10

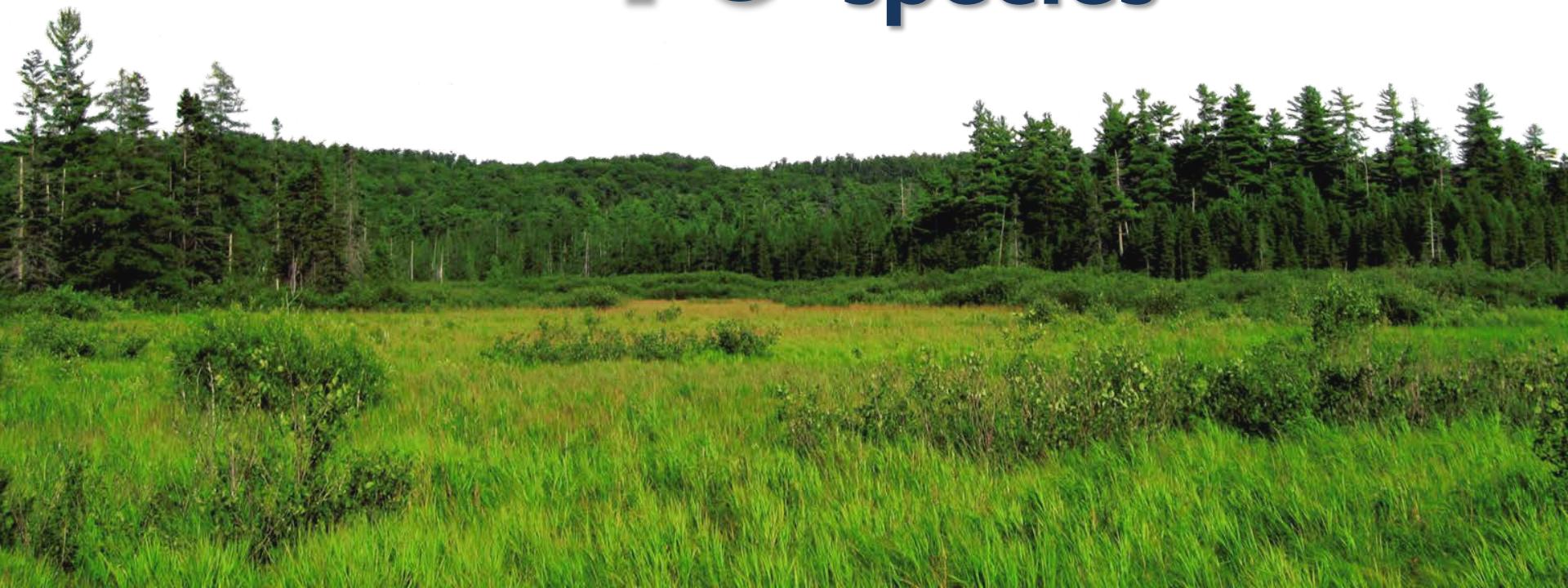


Bog laurel (10)

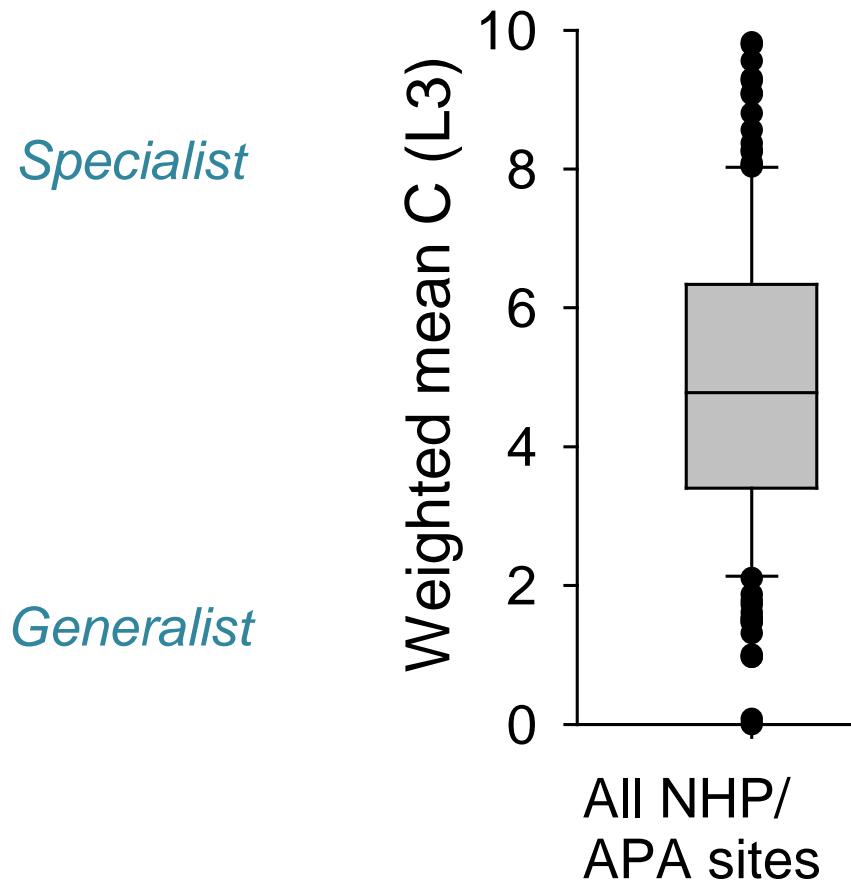
(Swink & Wilhelm 1994; Wilhelm & Masters 1995; NYS C-values: Ring et al. 2015, NYNHP)

**820** Plant  
species

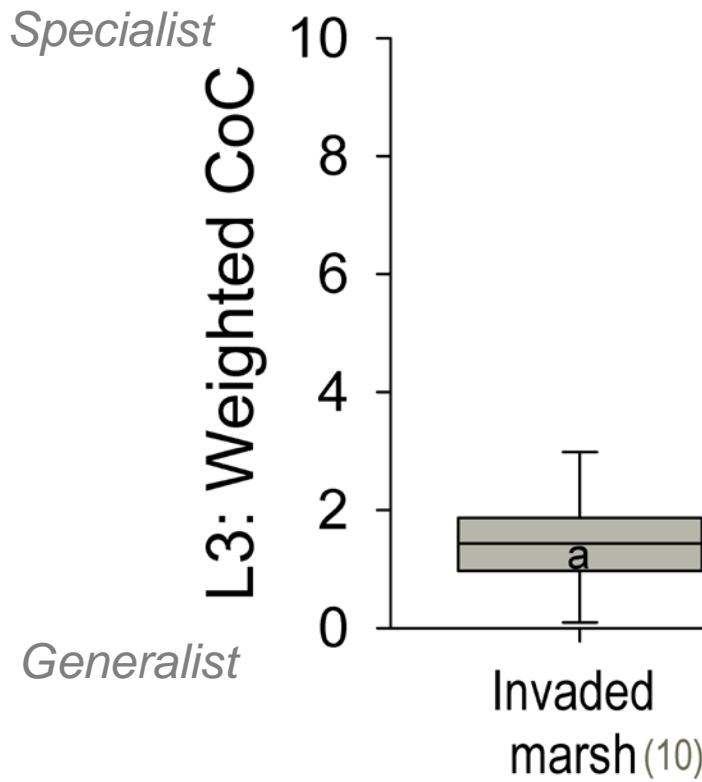
**16** T & E  
species



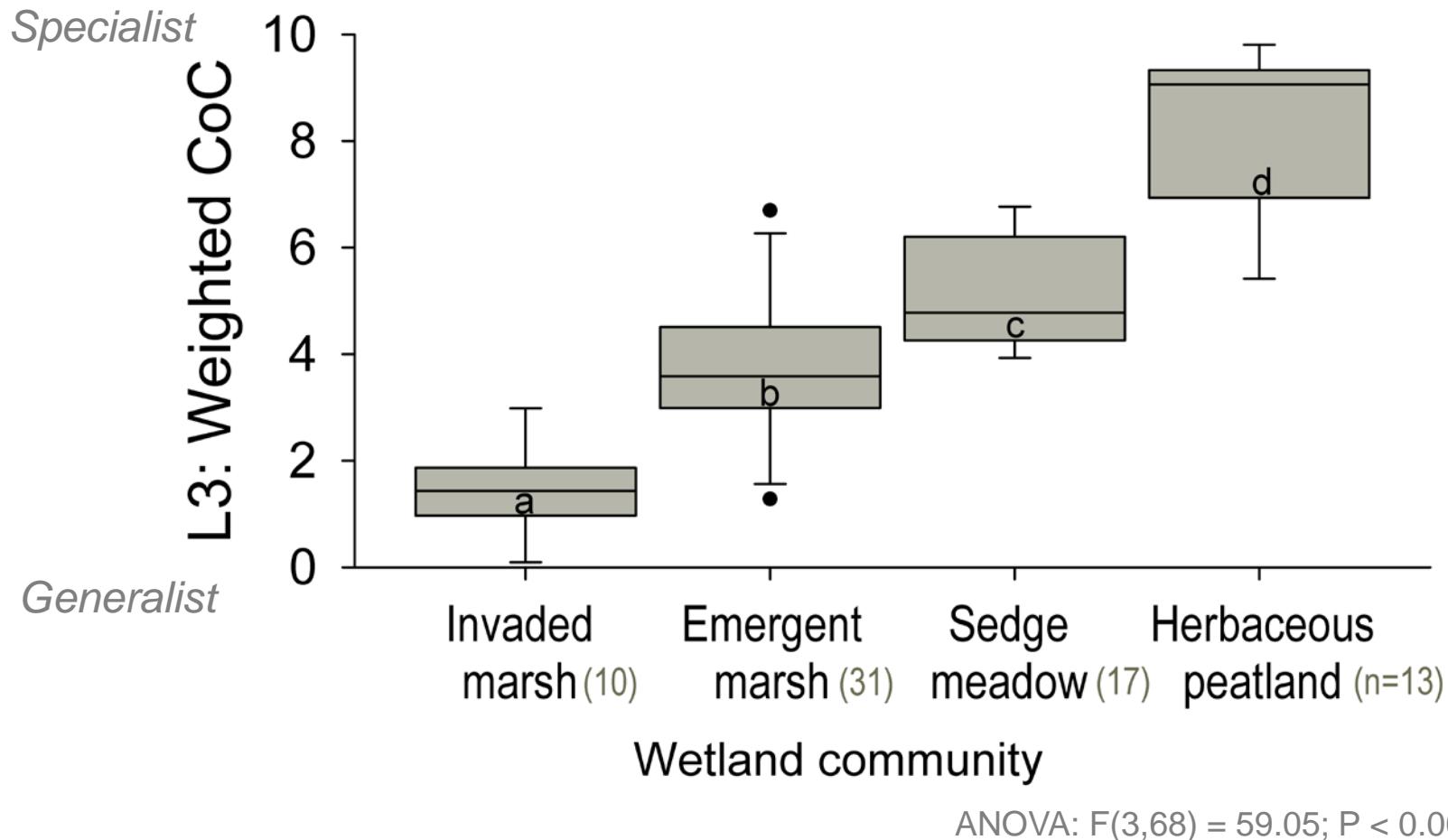
# L3 basic floristic quality benchmarks



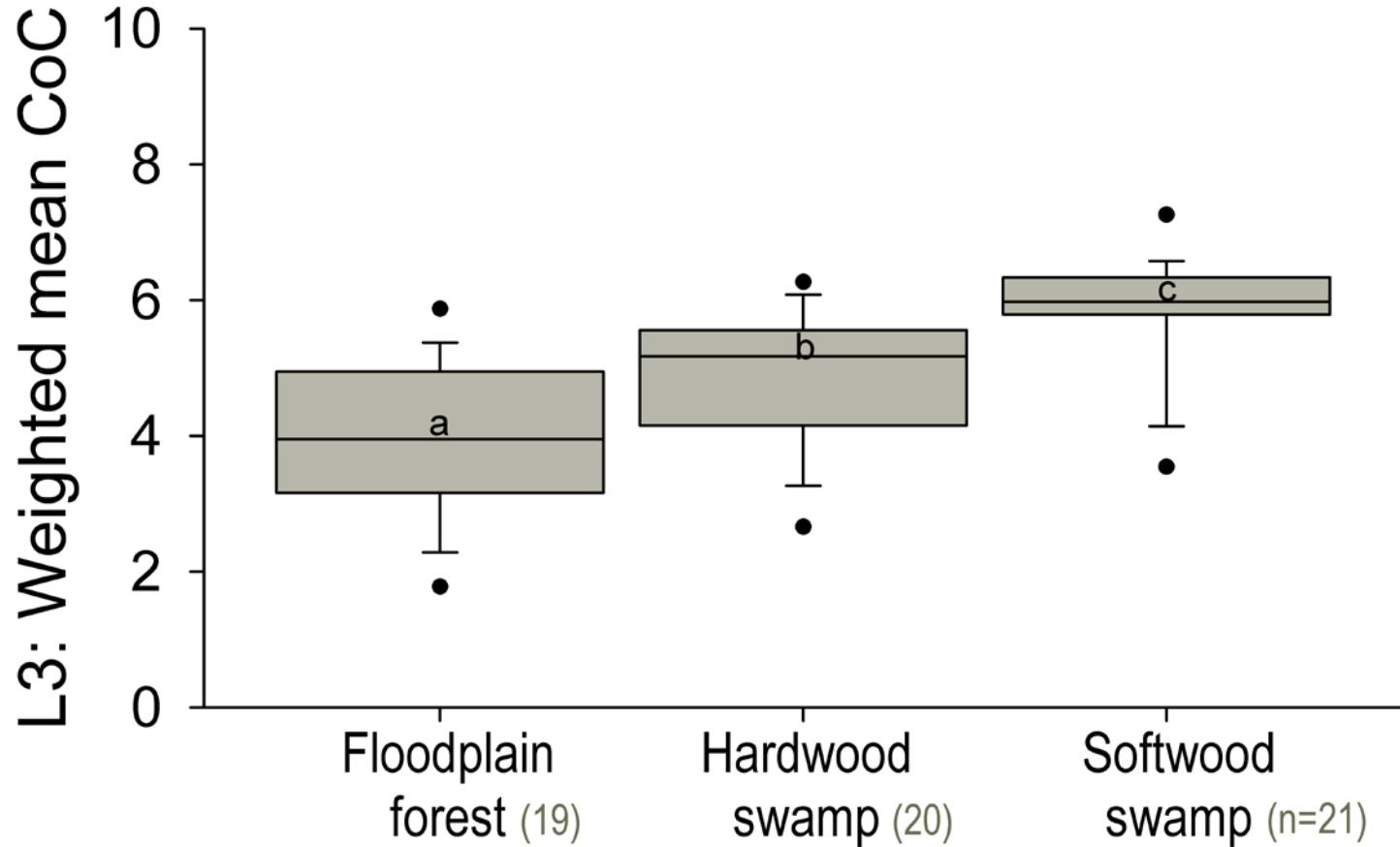
# Significant differences among herbaceous wetland types



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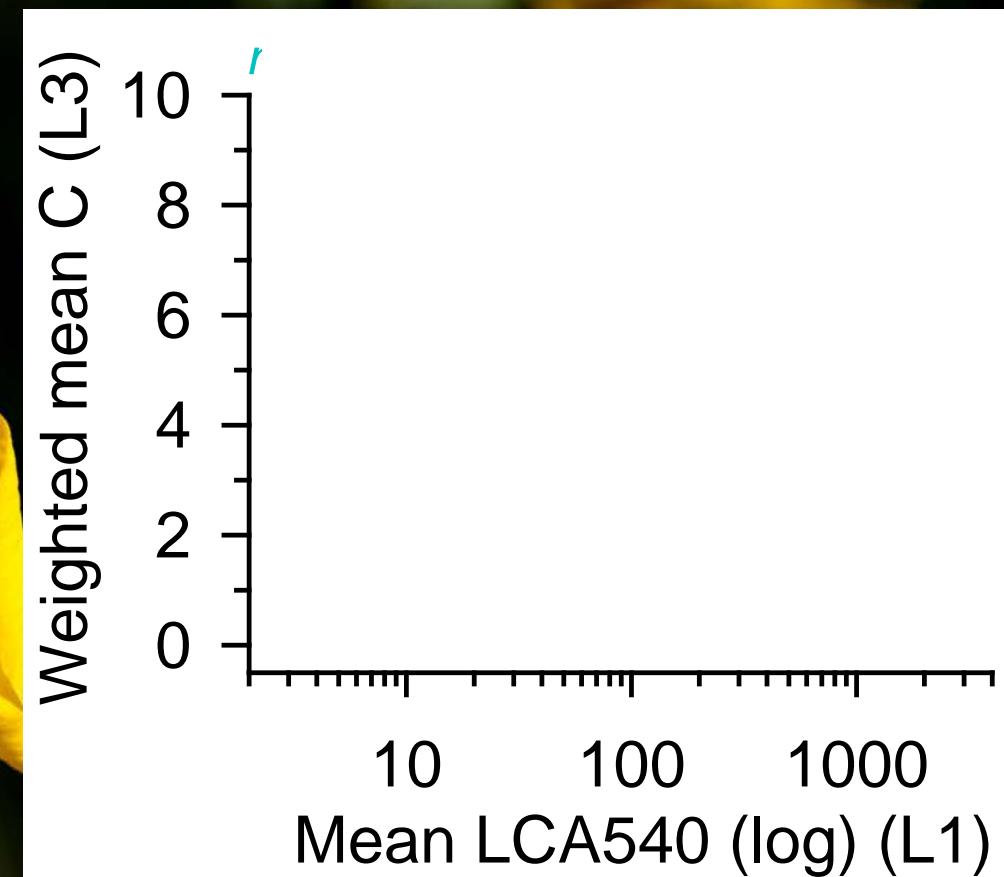


# Floodplain forests have lower FQ scores

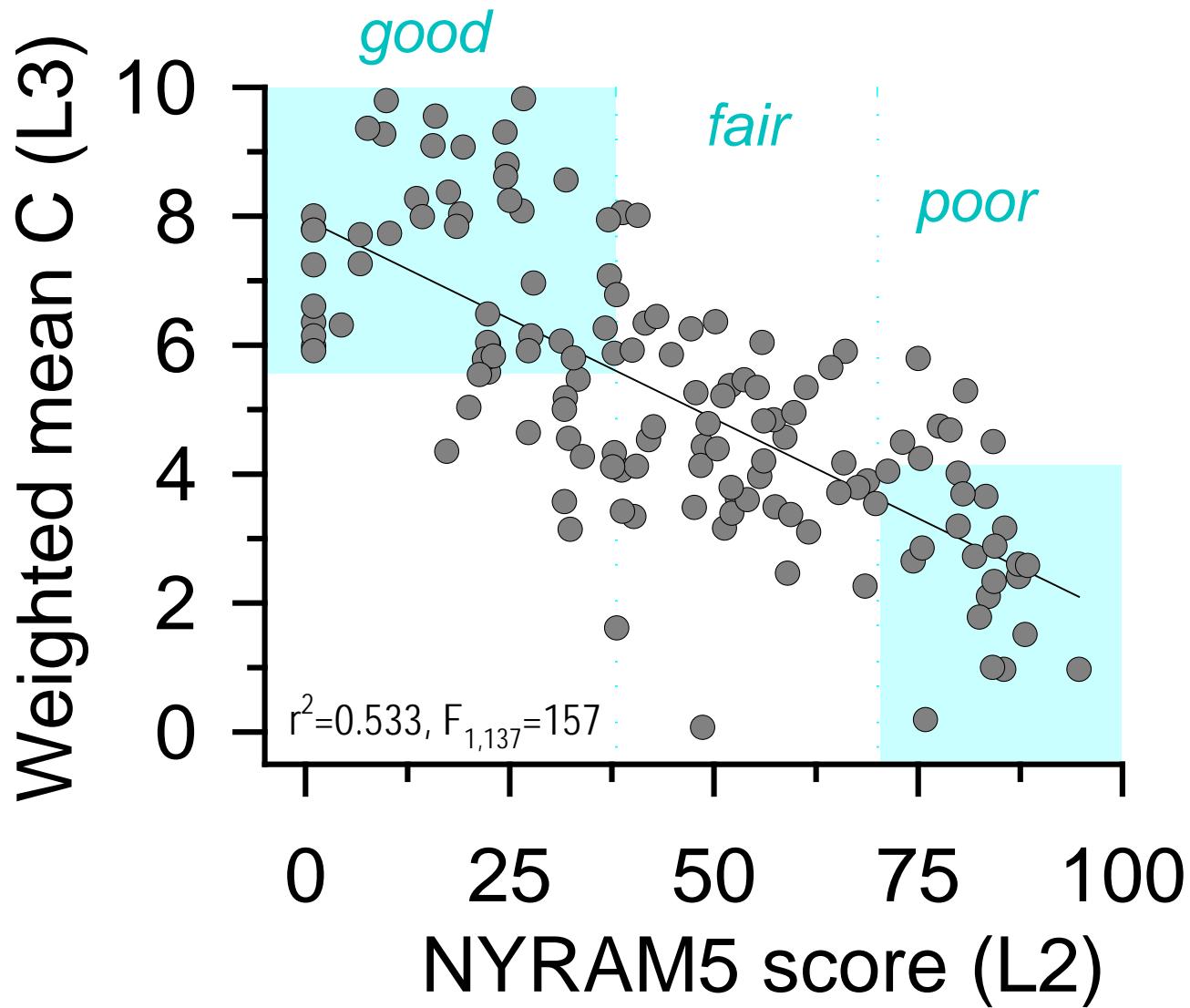


K-W: H = 33.792; P < 0.001

# Urban areas have more generalists



# L3 biotic integrity supports L2 RAM



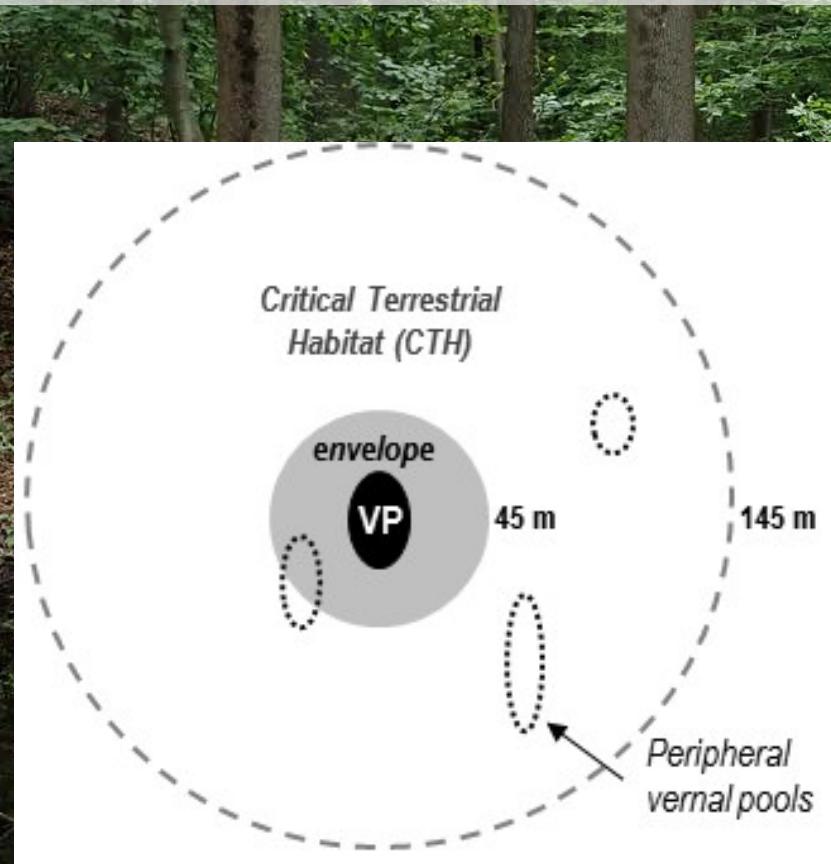
# Going forward

**Level 1:** Landscape-scale GIS model (LCA)

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**Level 3:** intensive veg plots

# Vernal pools



# Functional assessment



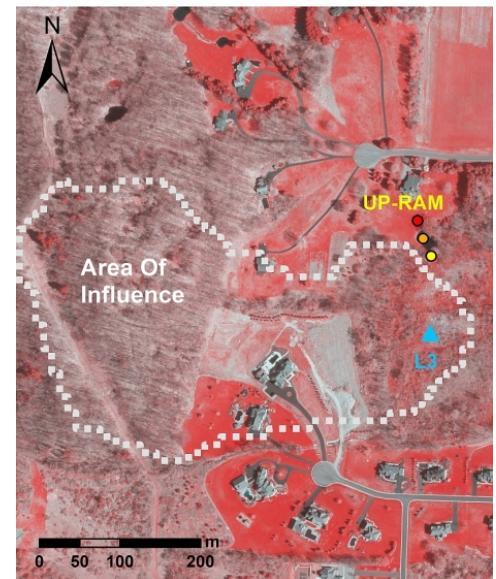
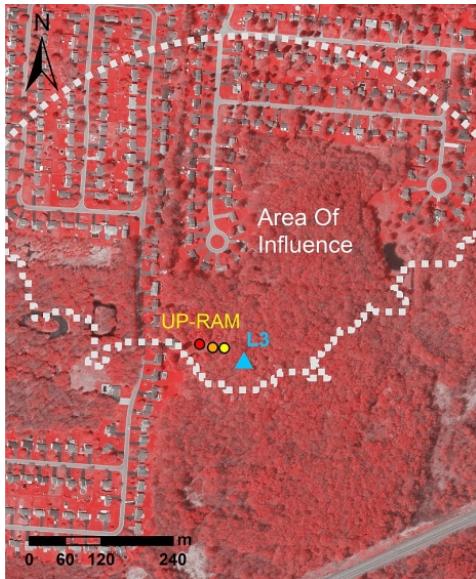
A photograph of a person standing in a large, mowed grassy field. The person is wearing a bright red short-sleeved shirt, grey cargo pants, black boots, and a red and orange cap. They are holding a small electronic device, possibly a GPS receiver or a tablet, in their hands. The field is divided into several parallel stripes by the mowing pattern. In the background, there is a dense line of trees and some low-lying bushes. The overall scene suggests a rural or park-like setting.

**Adjacent upland land use**

# Adjacent area condition



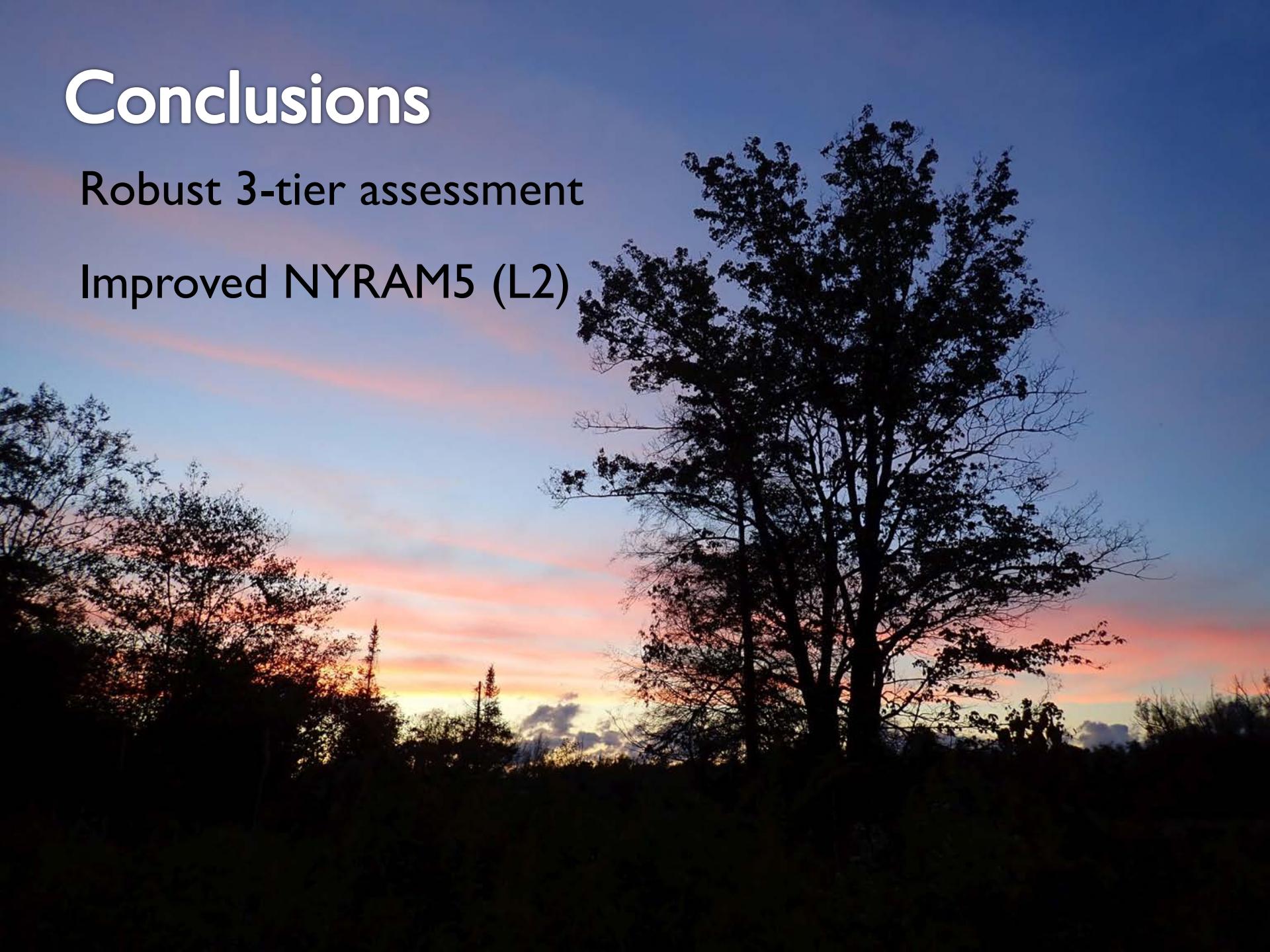
# Adjacent area of interest



# Conclusions

Robust 3-tier assessment

Improved NYRAM5 (L2)



# Acknowledgements

**Tim Howard**, Greg Edinger,  
DJ Evans, Elizabeth Spencer, Aissa  
Feldmann, NYNHP staffers/techs

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