

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

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All figures and photographs by L. Shappell
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New York
Natural Heritage
Program



Department of
Environmental
Conservation

pristine



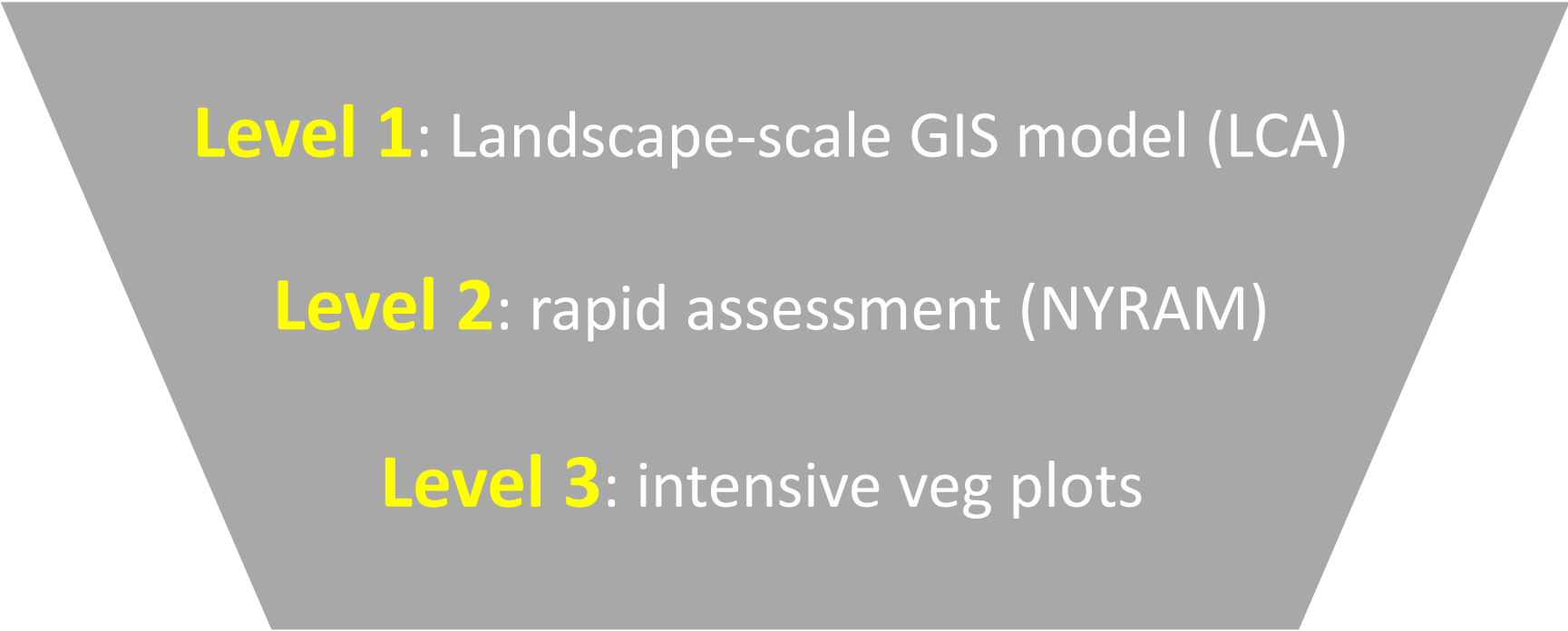
pristine



trashed + invaded



Hierarchical 3-level approach

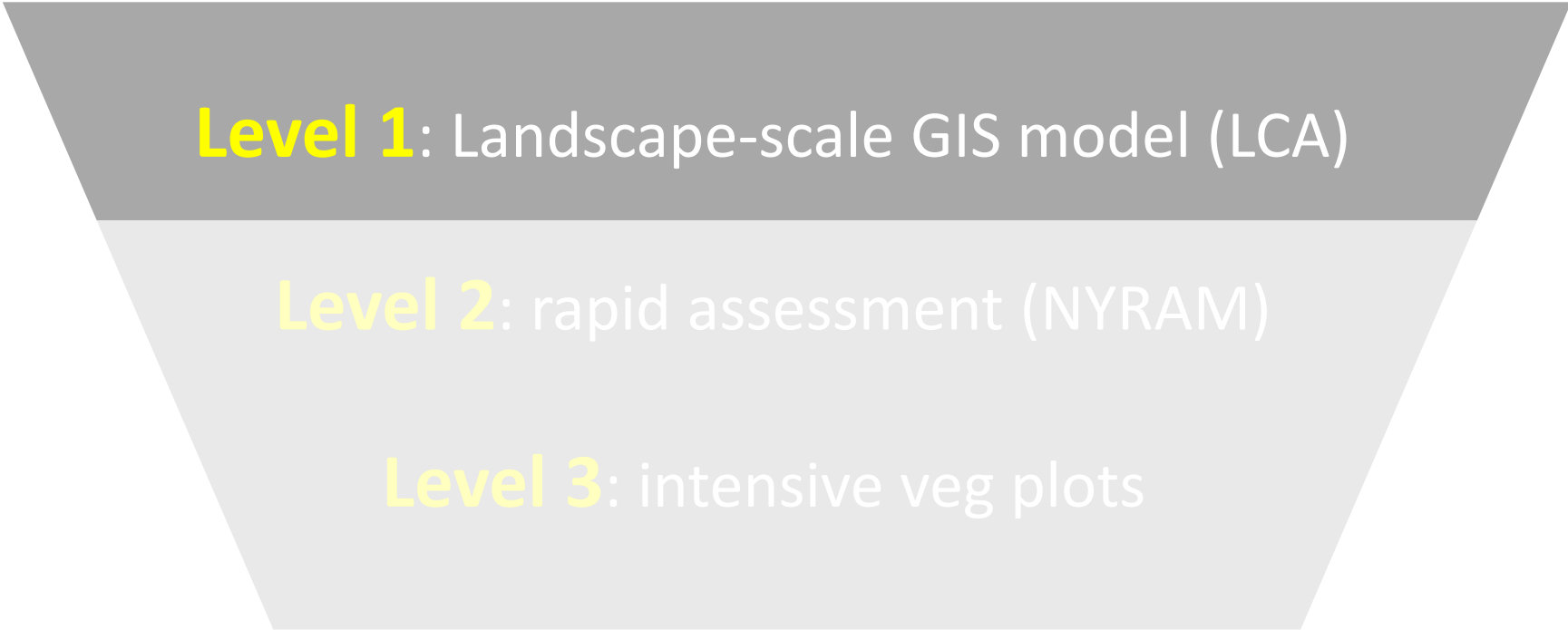


Level 1: Landscape-scale GIS model (LCA)

Level 2: rapid assessment (NYRAM)

Level 3: intensive veg plots

Hierarchical 3-level approach



Level 1: Landscape-scale GIS model (LCA)

Level 2: rapid assessment (NYRAM)

Level 3: intensive veg plots

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

Transportation

Managed land

Development

Transportation: *unpaved road/trail*

**Narrow point
of impact**



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

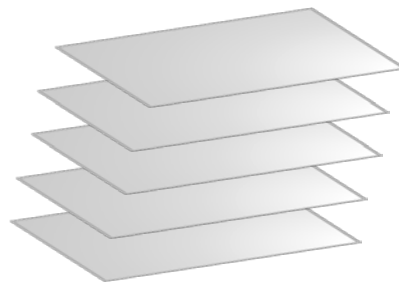
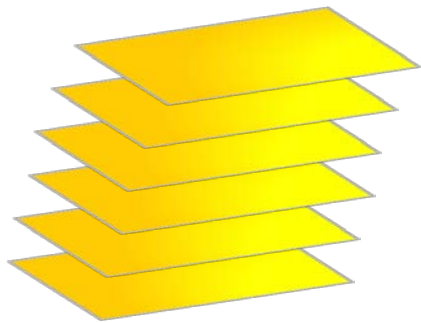


Level I: LCA models cumulative impact of 13 human-mediated stressor subclasses

Transportation

Development

Managed land

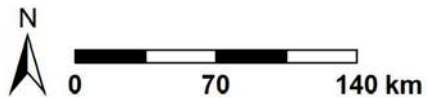
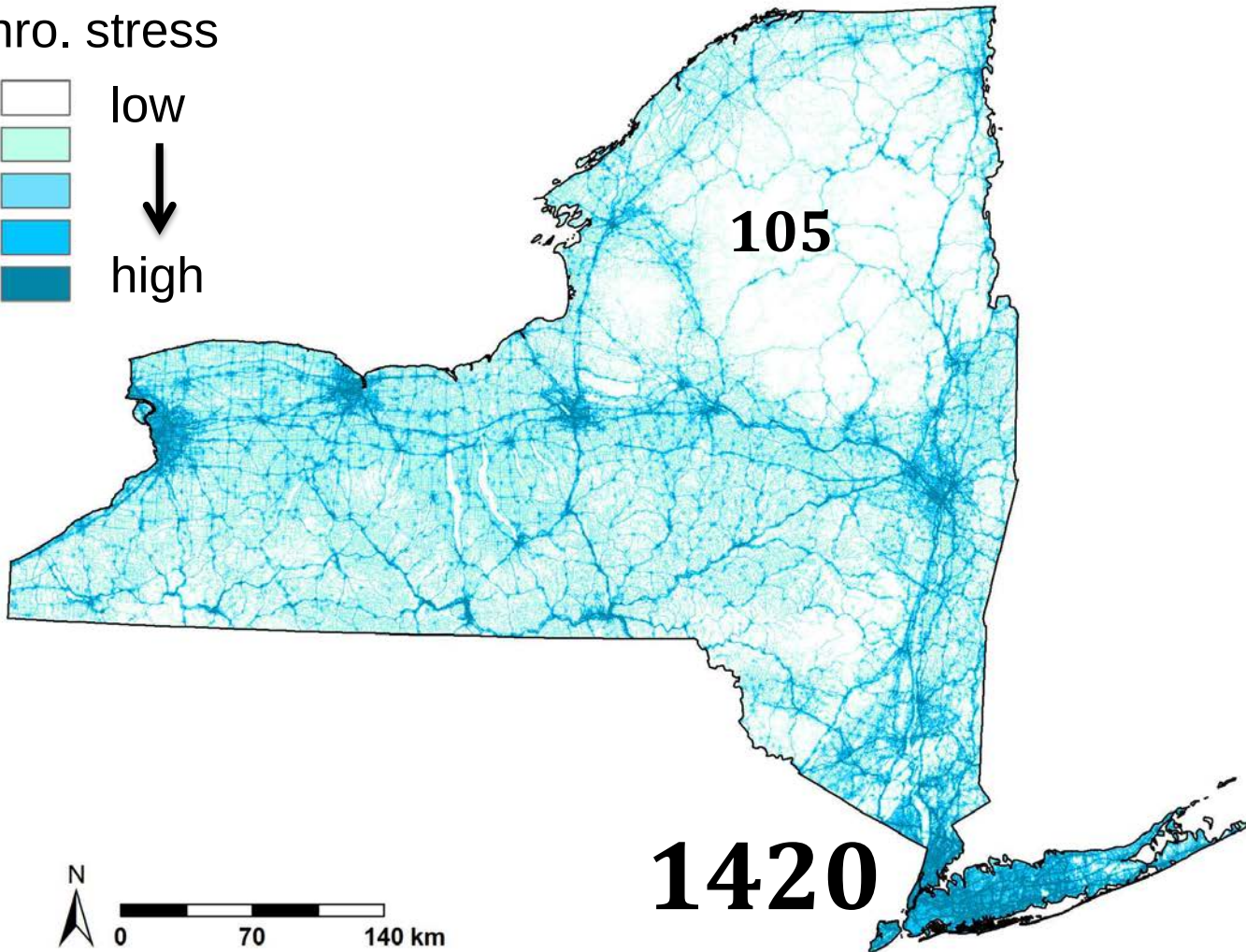
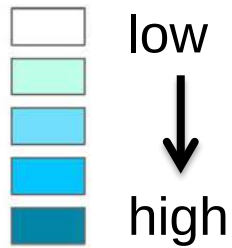


Rasterized LCA model
30 x 30 m resolution

Level I - State-wide LCA GIS model

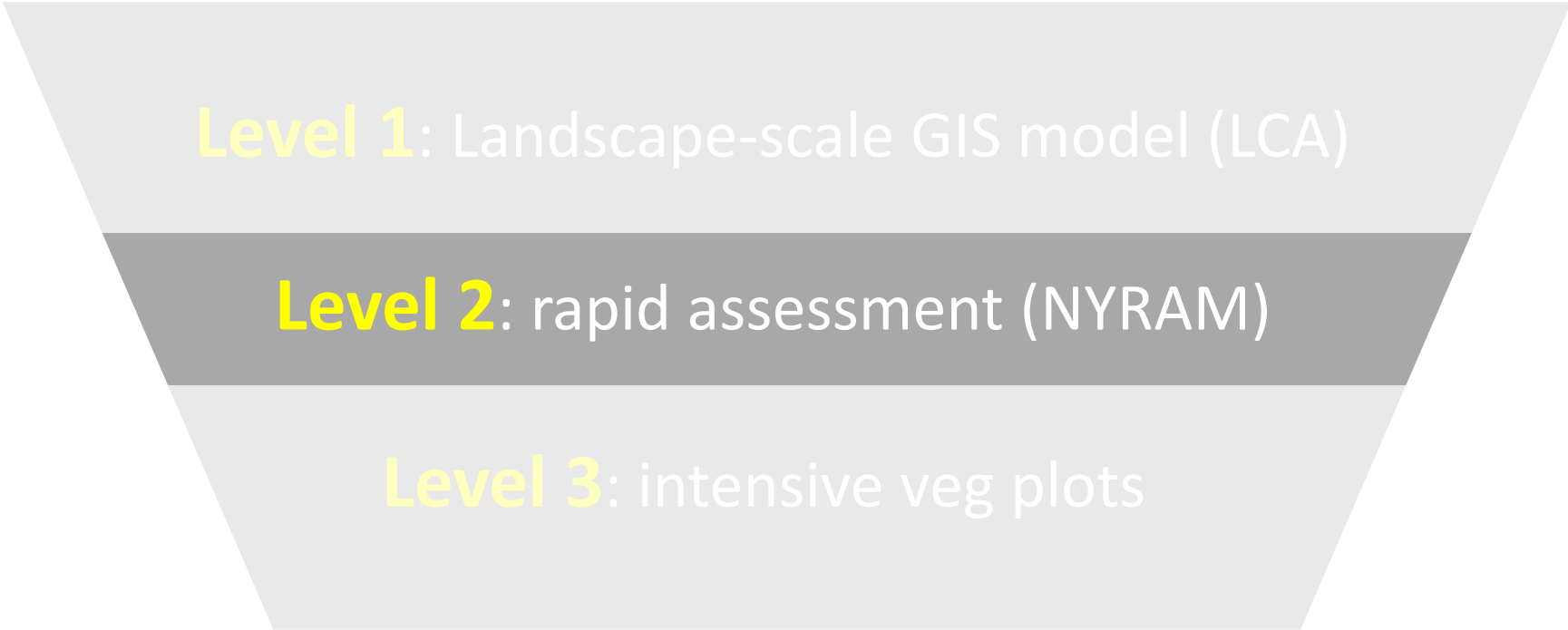
Raster layer available at nynhp.org/data

Anthro. stress



30 x 30 m resolution

Hierarchical 3-level approach



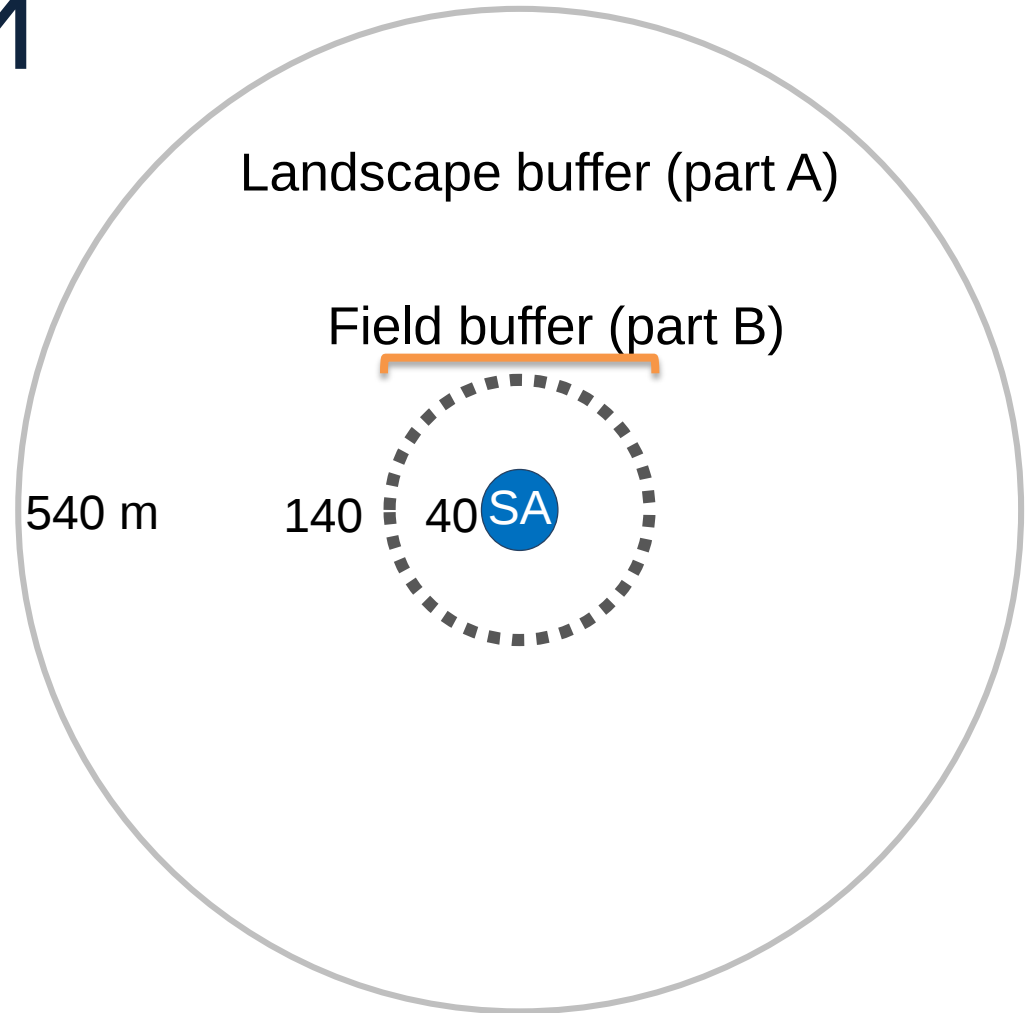
Level 1: Landscape-scale GIS model (LCA)

Level 2: rapid assessment (NYRAM)

Level 3: intensive veg plots

Level 2: NYRAM

Part A: on-screen

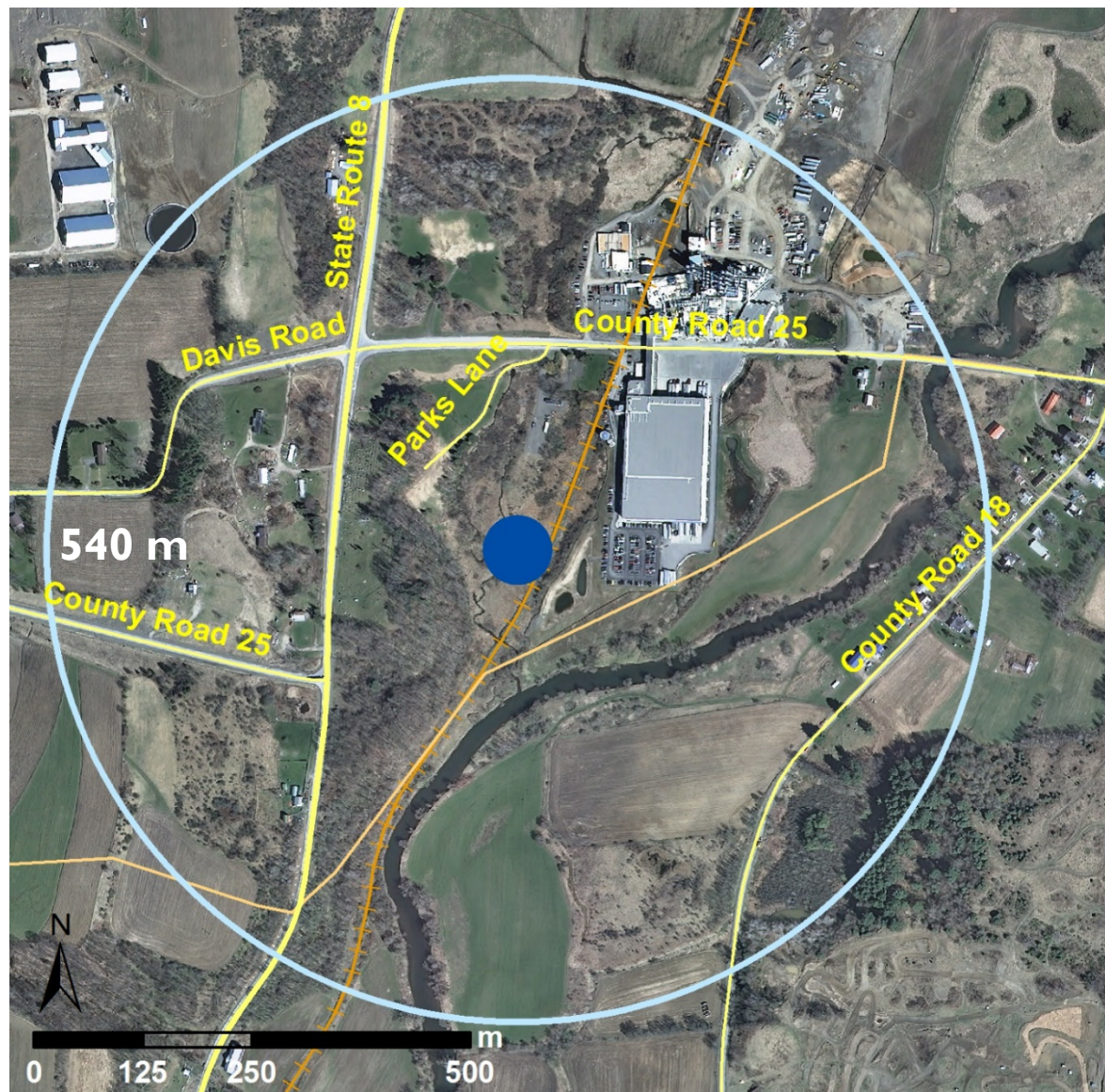


NYRAM

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)

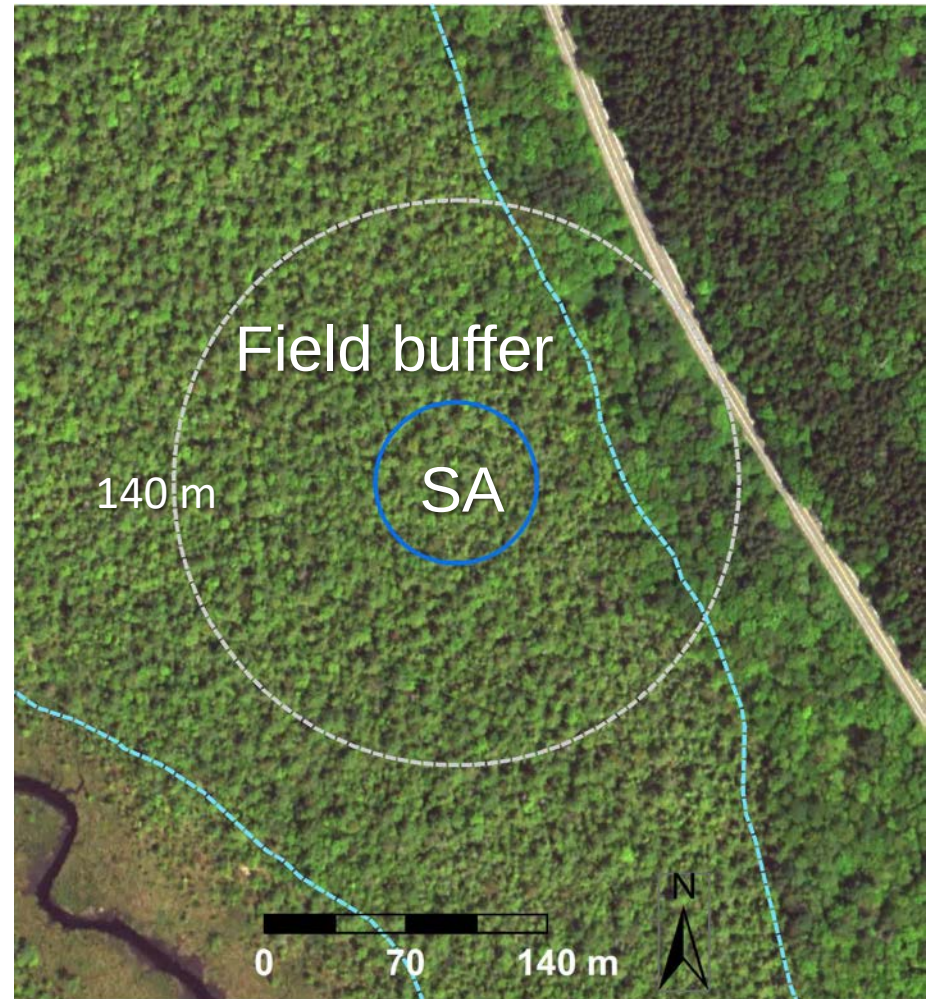
Vegetation

Hydroperiod & topography

Sediment transport

Eutrophication

Invasive plant richness

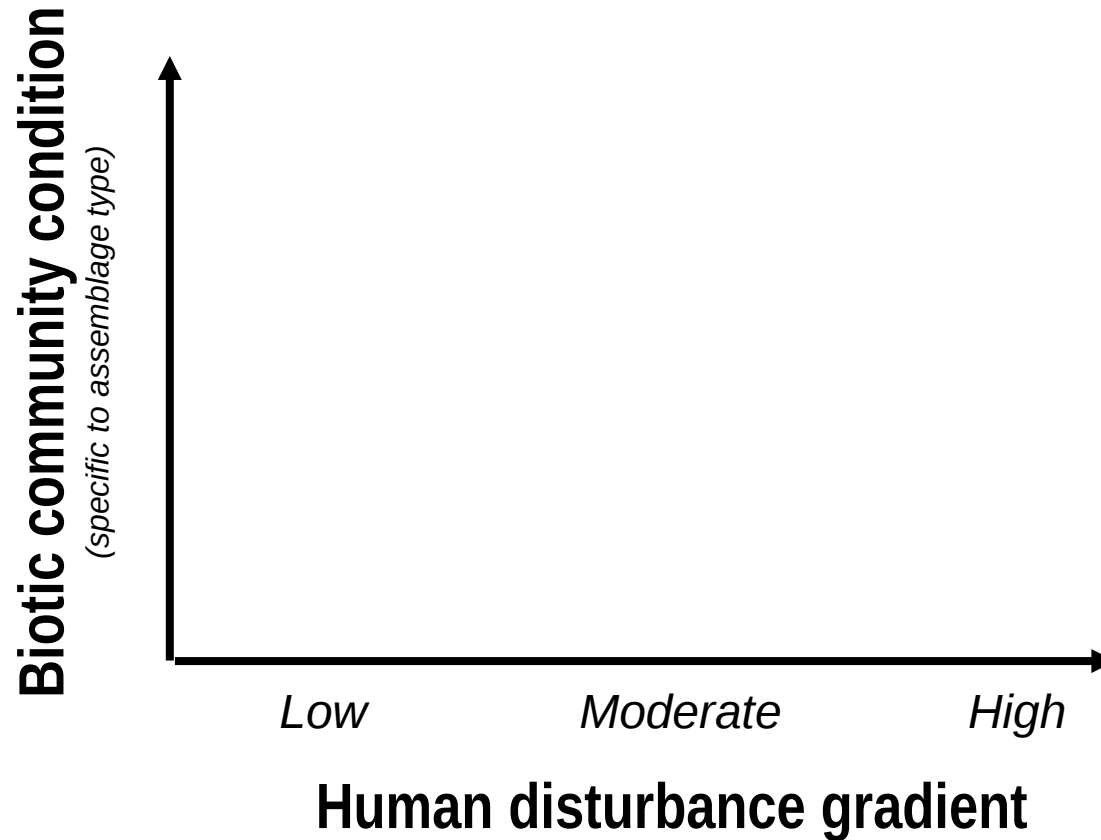


Site ID: NYW14-432
Cortland County, NY
2015 NAIP Imagery
Scale: 1:3000

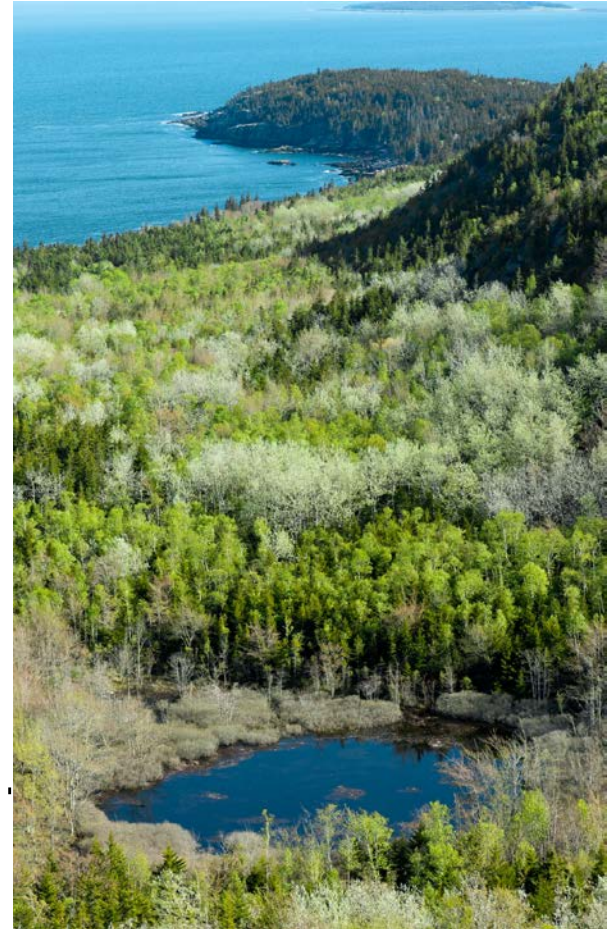
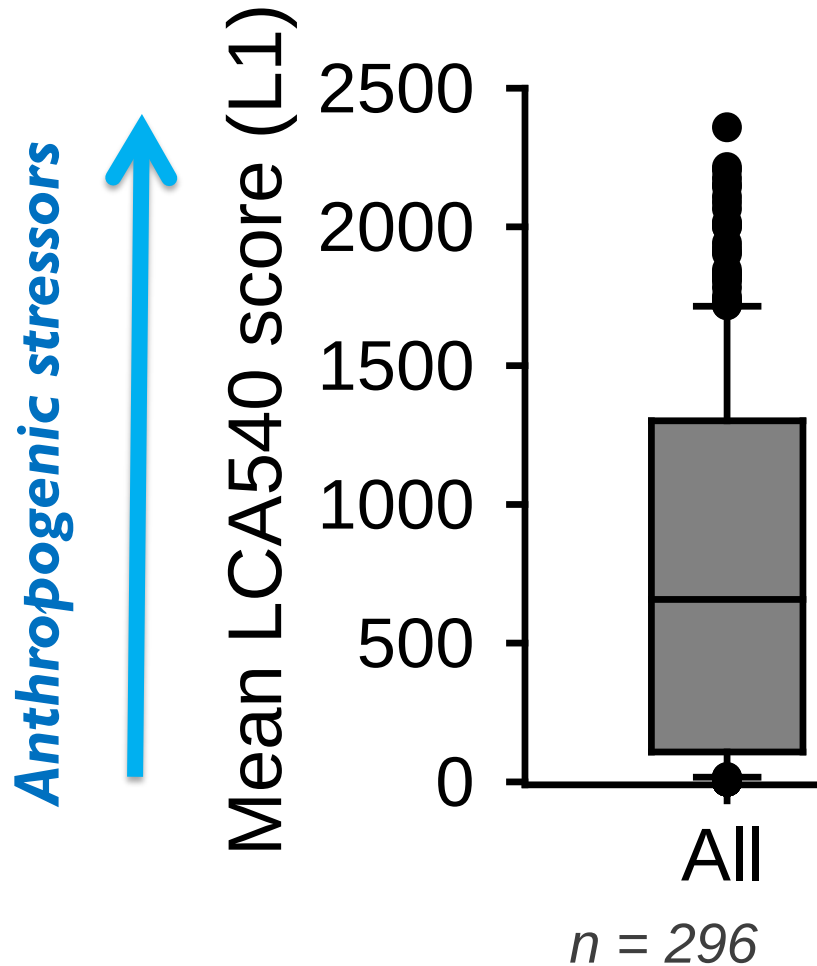
 Target wetland polygon
 Sample Area (SA)
 140 m Field Buffer (FB)

NYRAM

Part B: Field survey qualitative condition rating



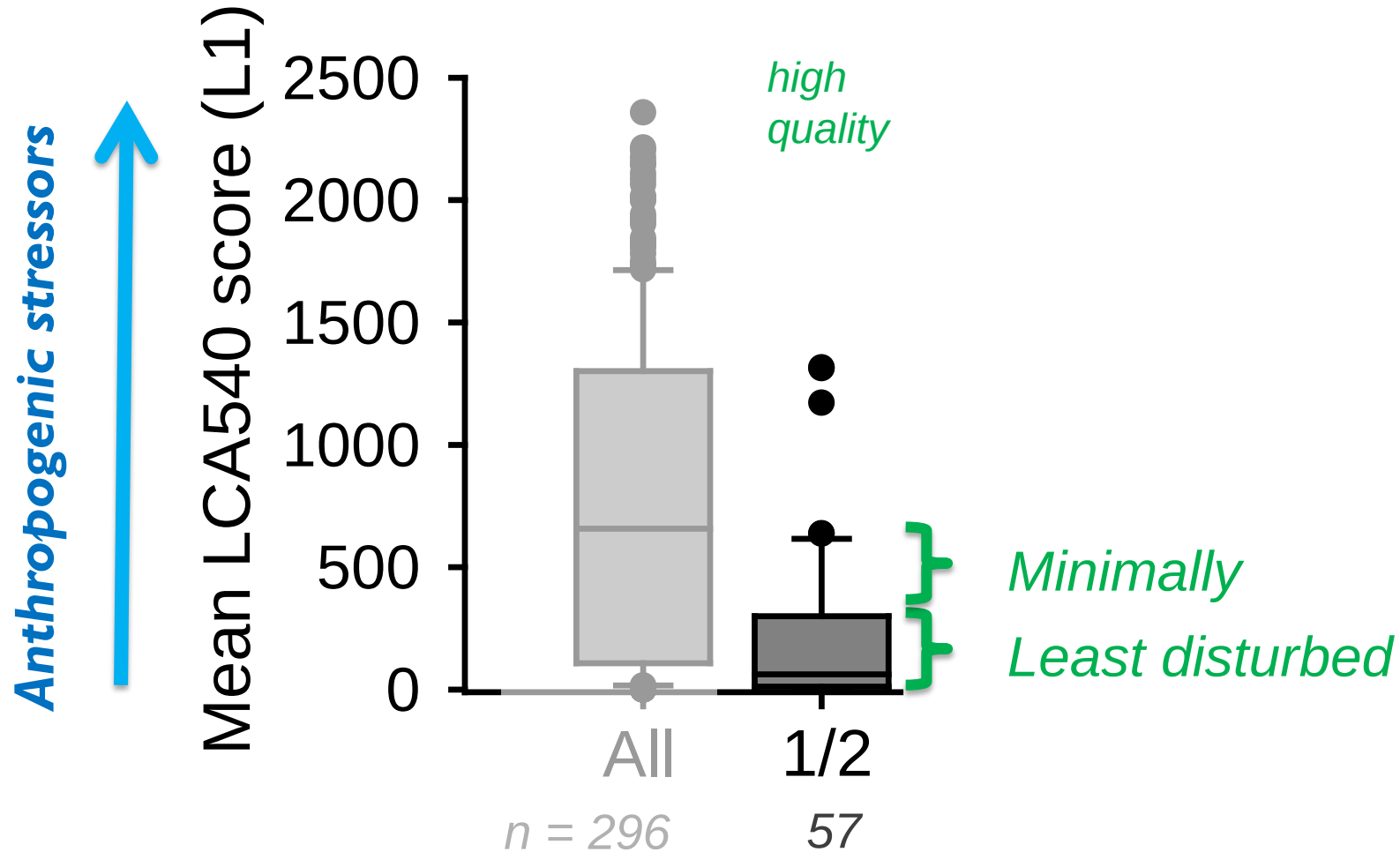
Level I: Landscape Condition Assessment (LCA) scores



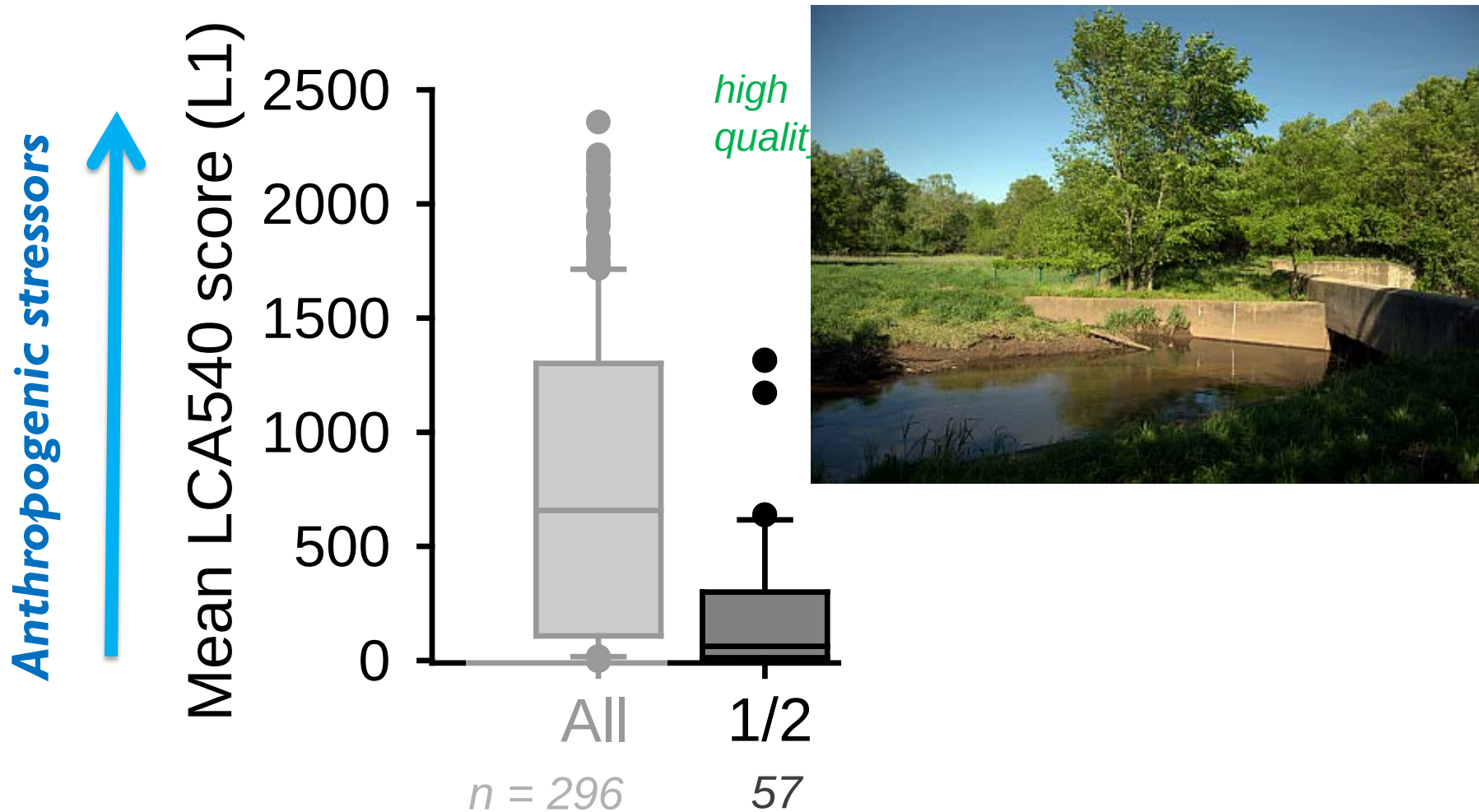
Putting a number on “good”



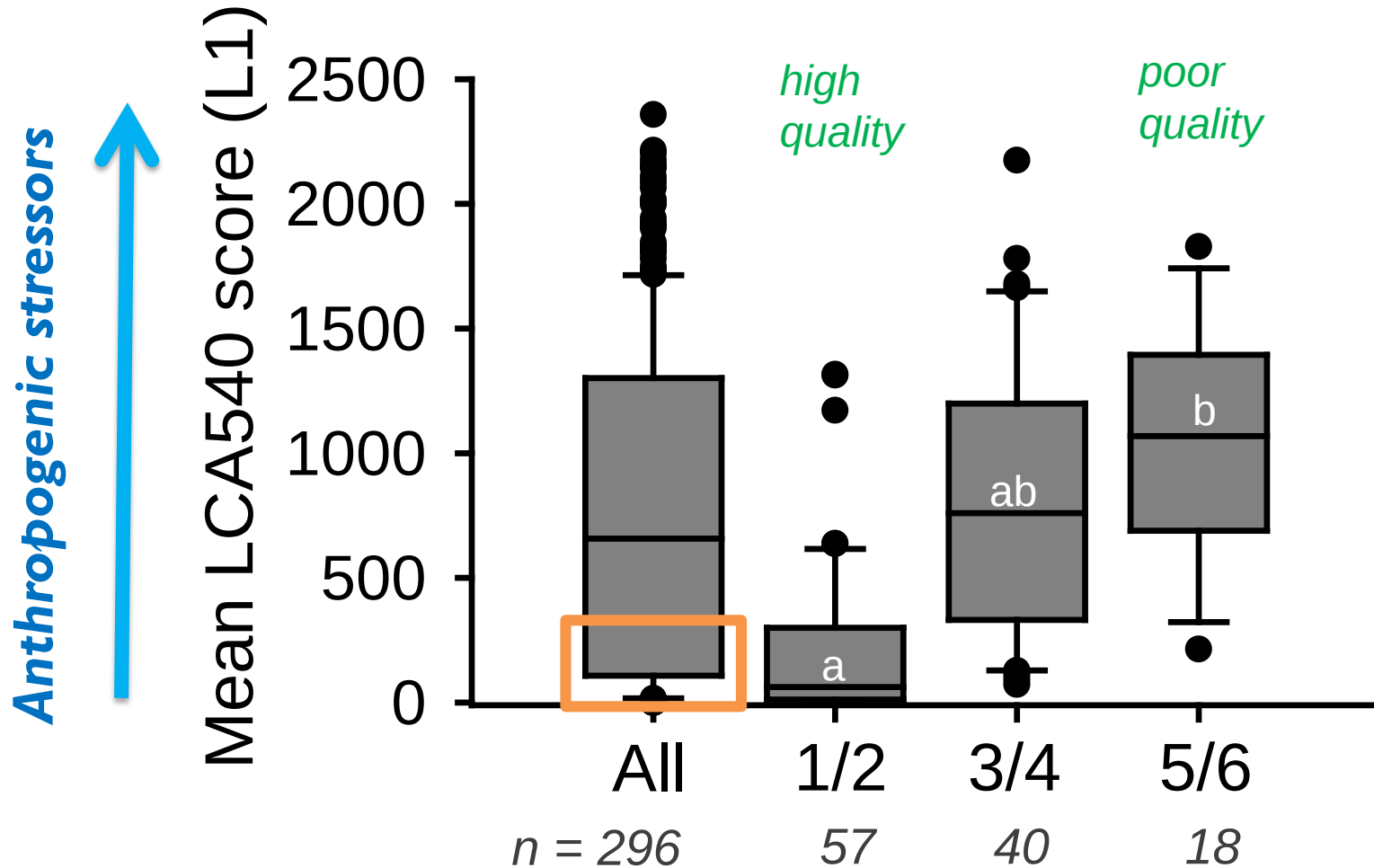
High quality sites used for benchmarks



Do good and poor scores overlap?

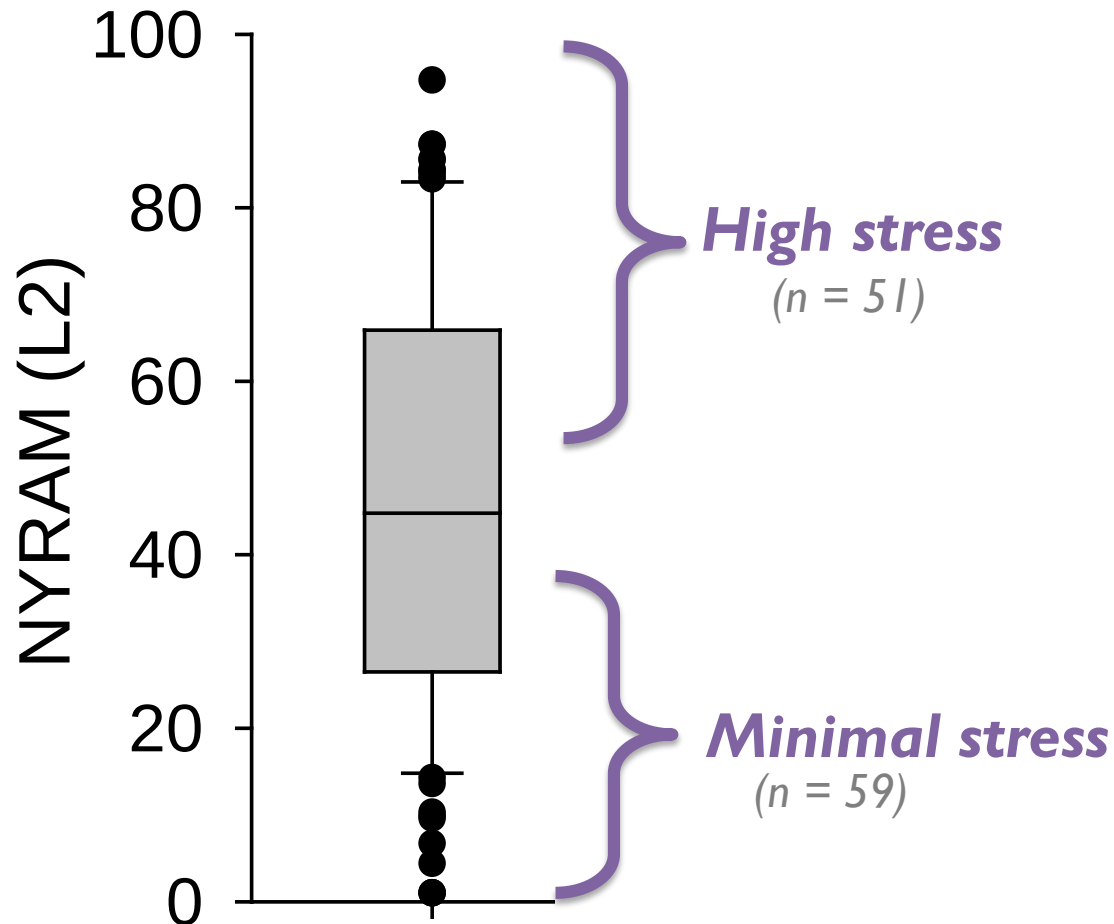


Level I reference standards: high vs. poor

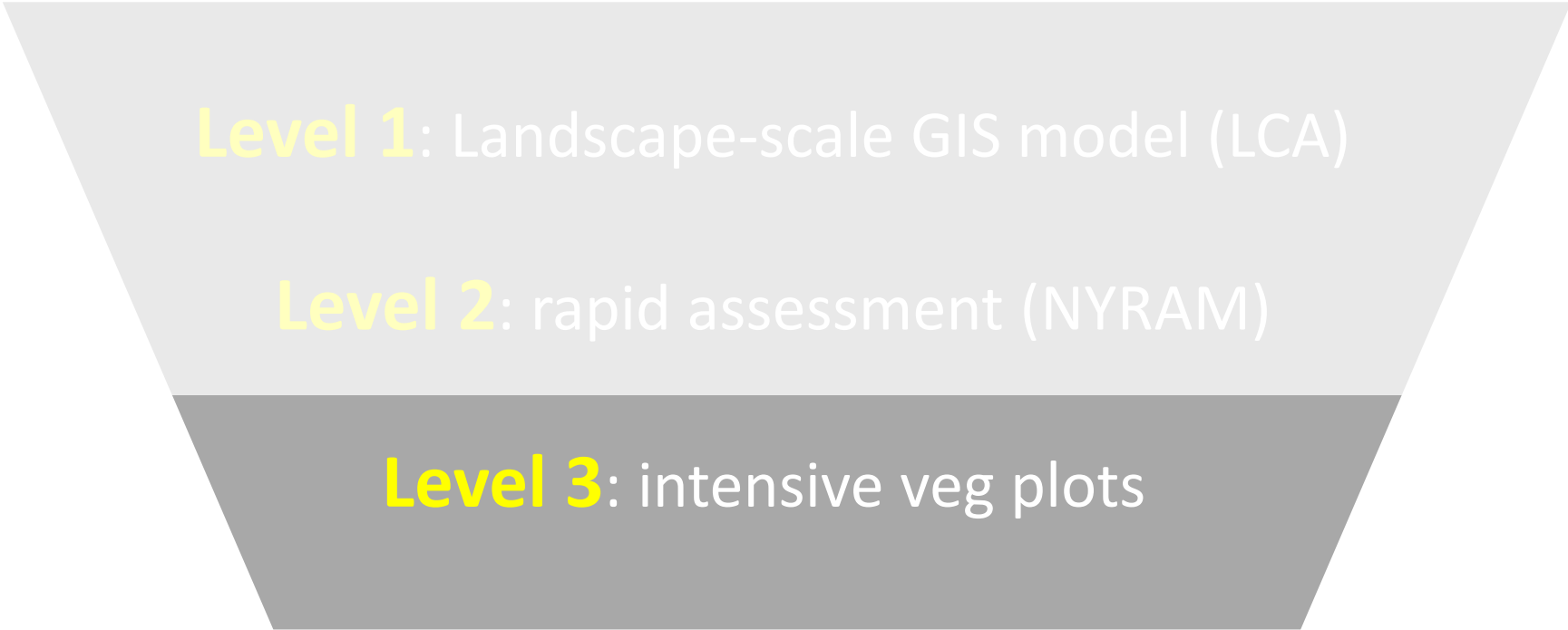


(H = 55.8, P < 0.001)

Level 2: NY Rapid Assessment



Hierarchical 3-level approach

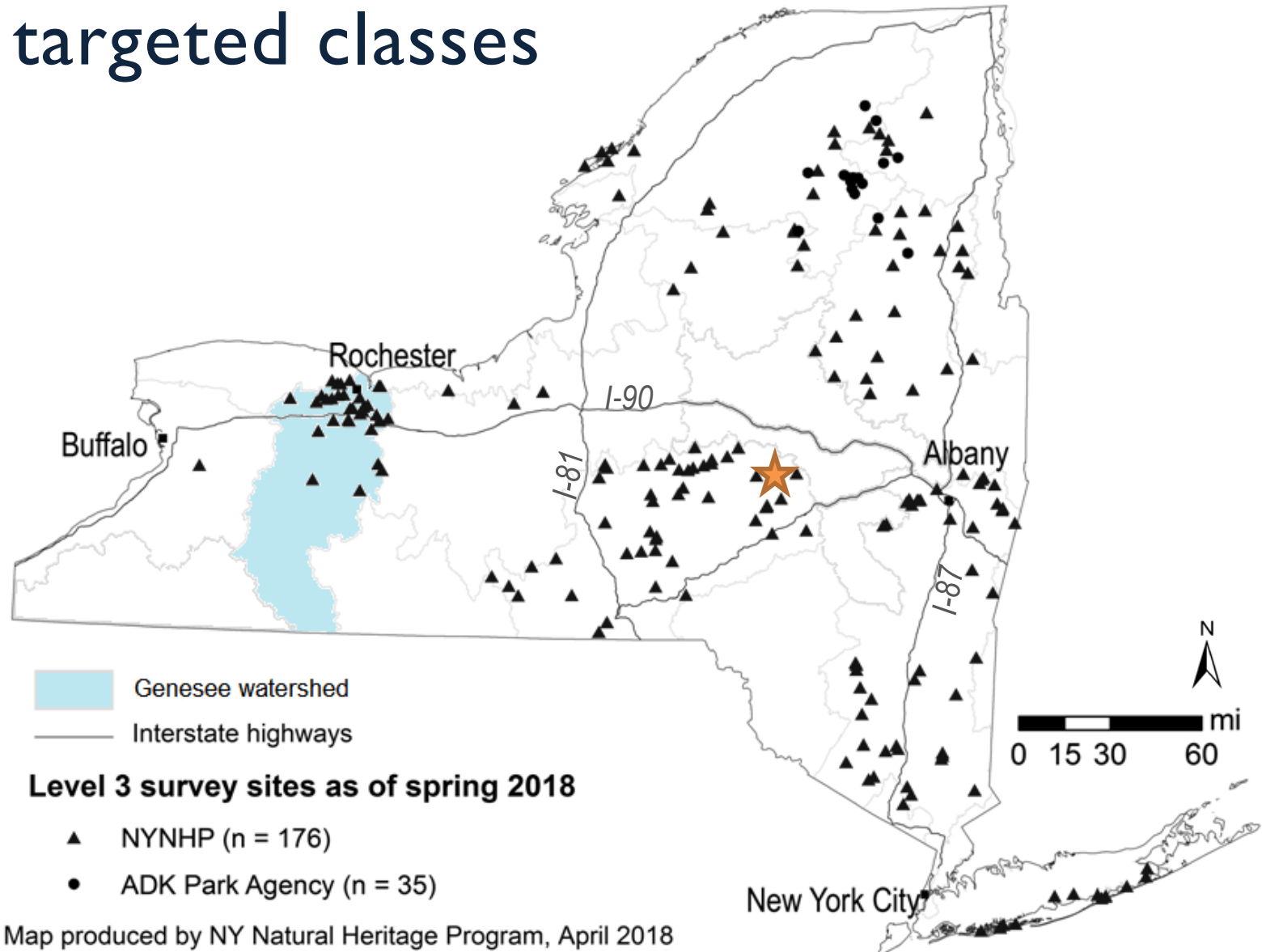


Level 1: Landscape-scale GIS model (LCA)

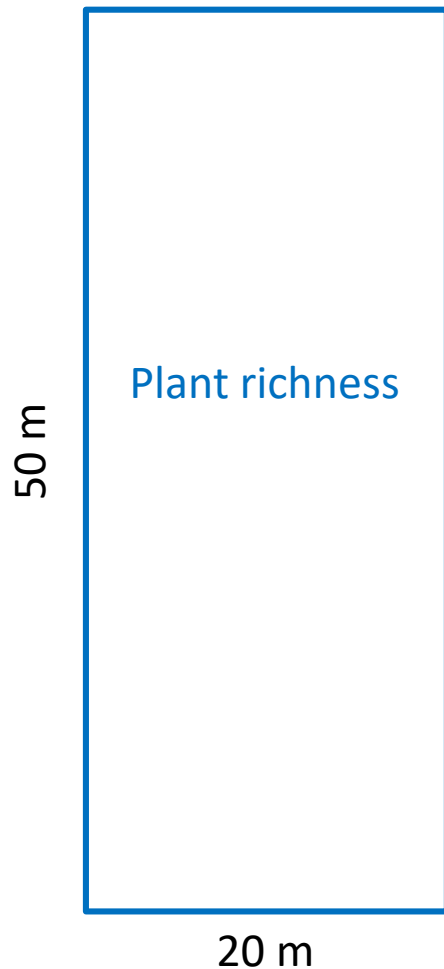
Level 2: rapid assessment (NYRAM)

Level 3: intensive veg plots

Spatially balanced within basin, stratified by targeted classes

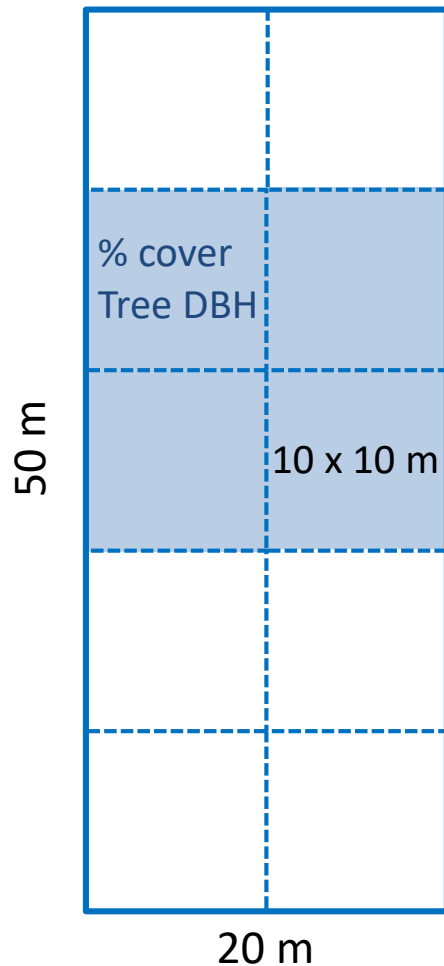


Level 3 – intensive veg plots (n = 204)



(Methods follow Peet et al. 1998)

Level 3 – intensive veg plots (n = 204)



(Methods follow Peet et al. 1998)



Level 3 – floristic integrity

Coefficient of Conservatism, “C”

Scores vary among NY assemblages, ecological tolerance

Wide: 0-3



Moderate: 4-6



Limited: 7-8



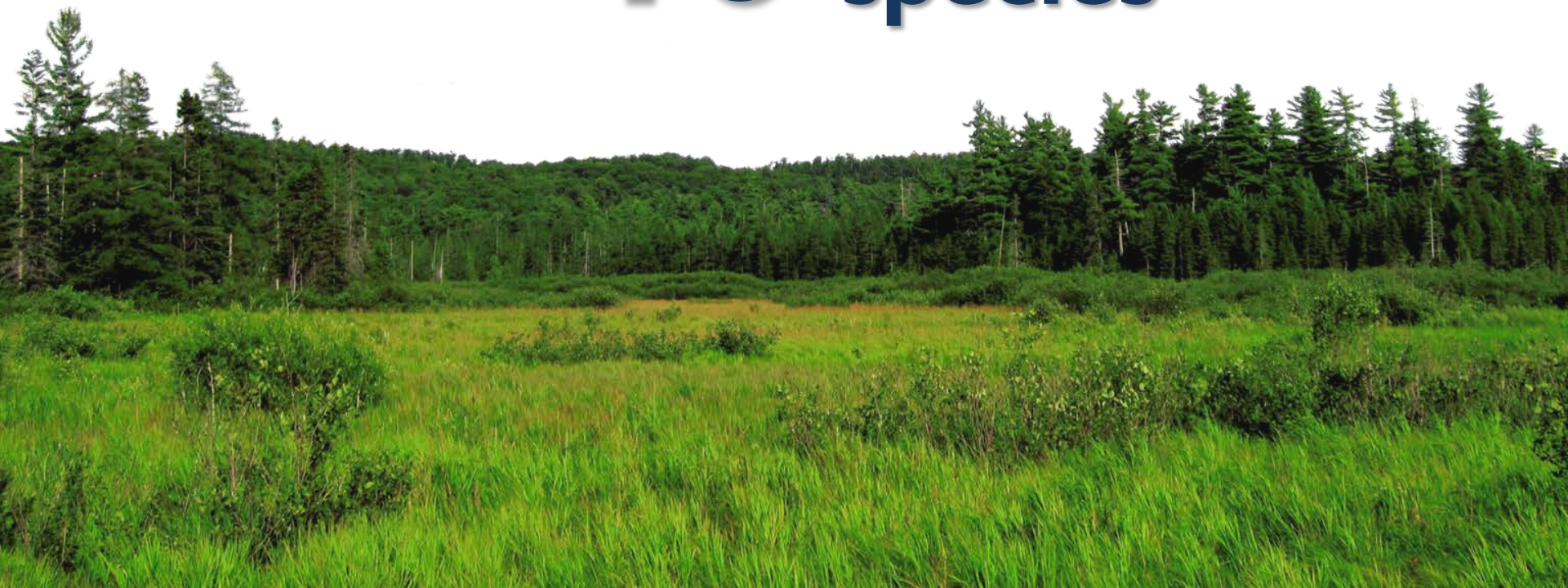
Narrow: 9-10



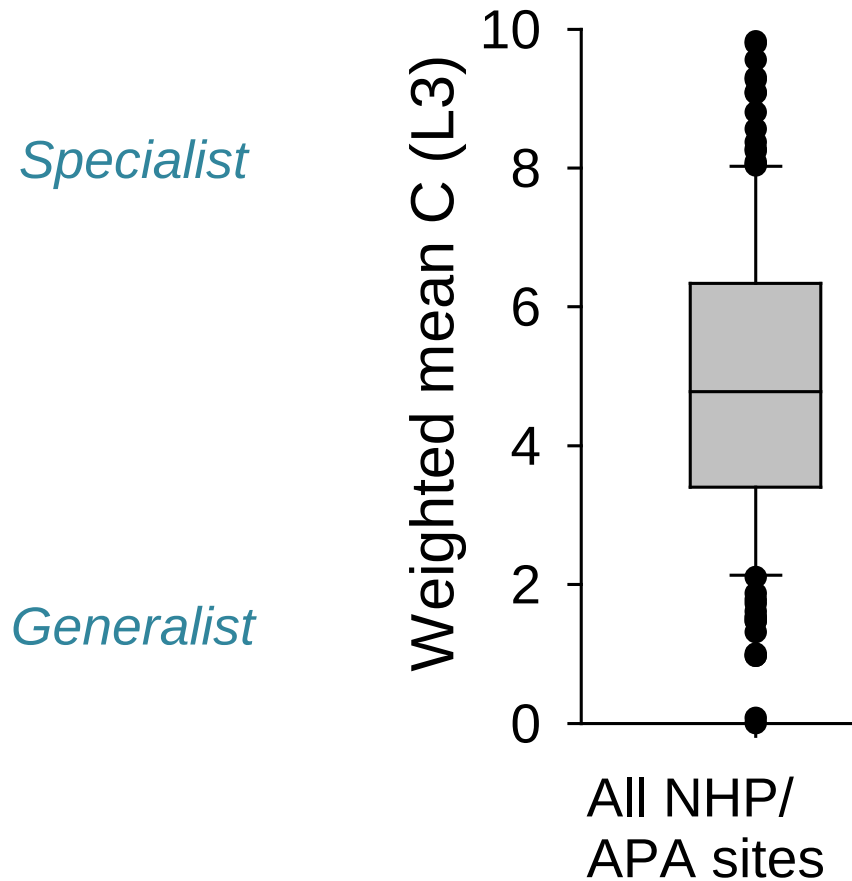
(Swink & Wilhelm 1994; Wilhelm & Masters 1995; NYS C-values: Ring et al. 2015, NYNHP)

820 Plant
species

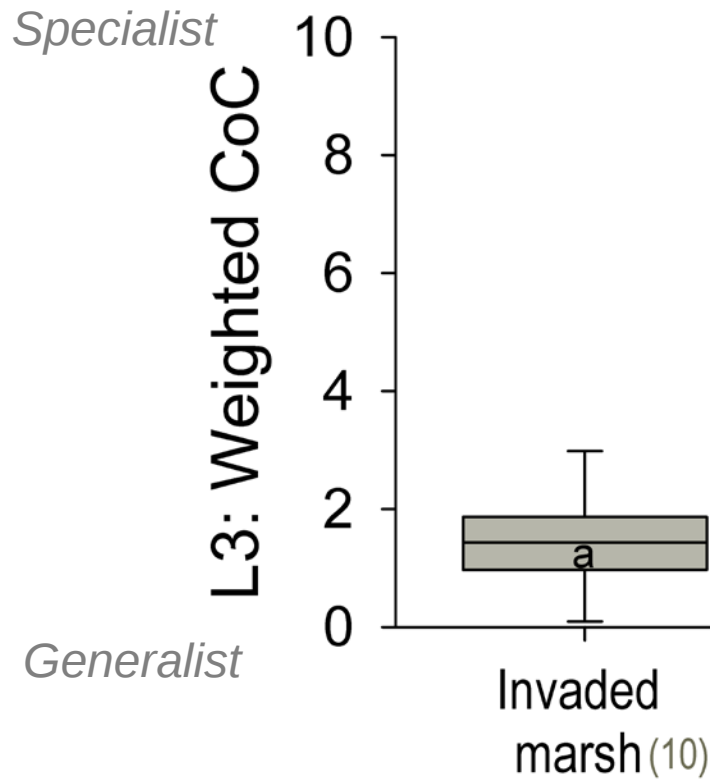
16 T & E
species



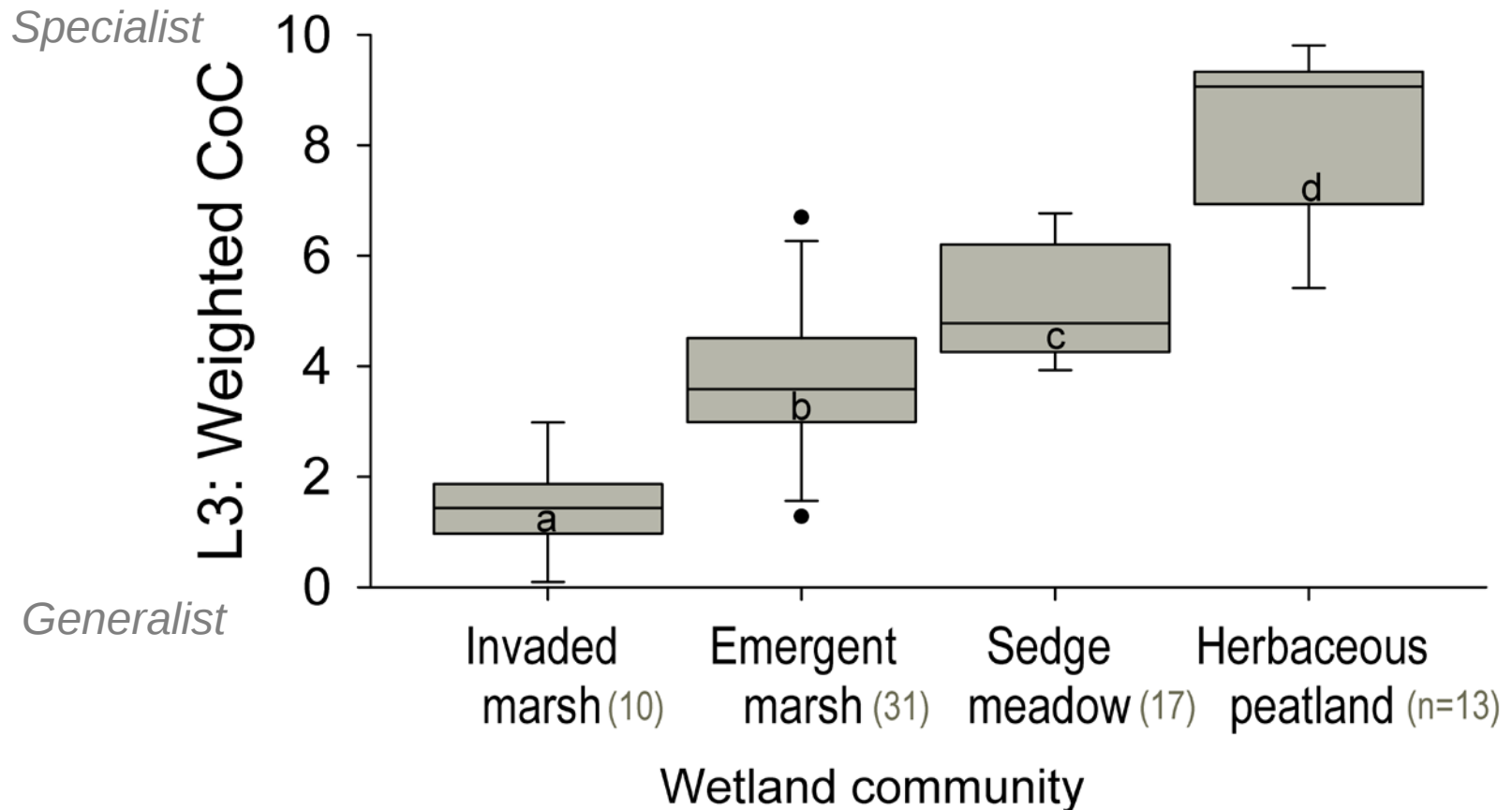
L3 basic floristic quality benchmarks



Significant differences among herbaceous wetland types

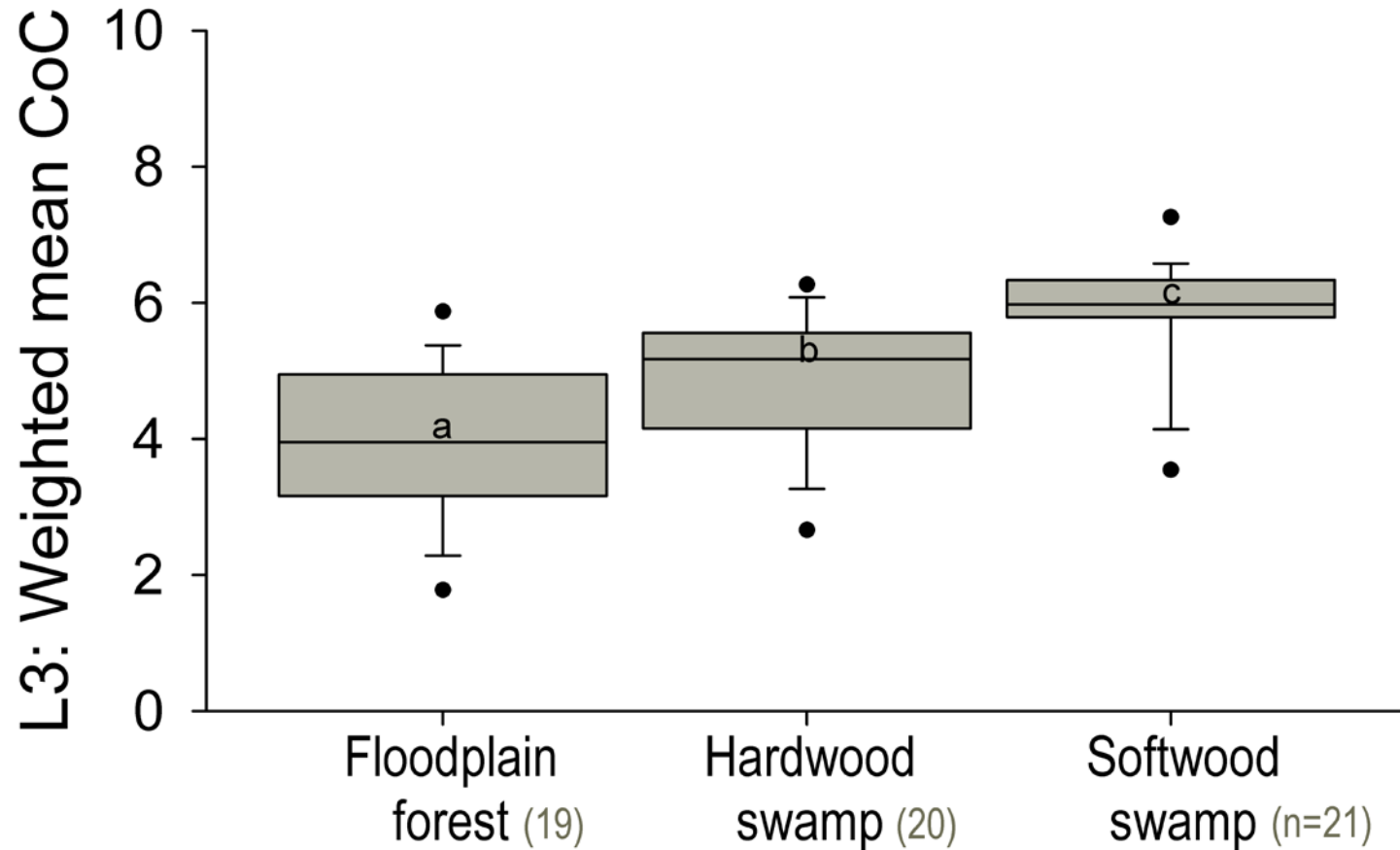


Significant differences among herbaceous wetland types



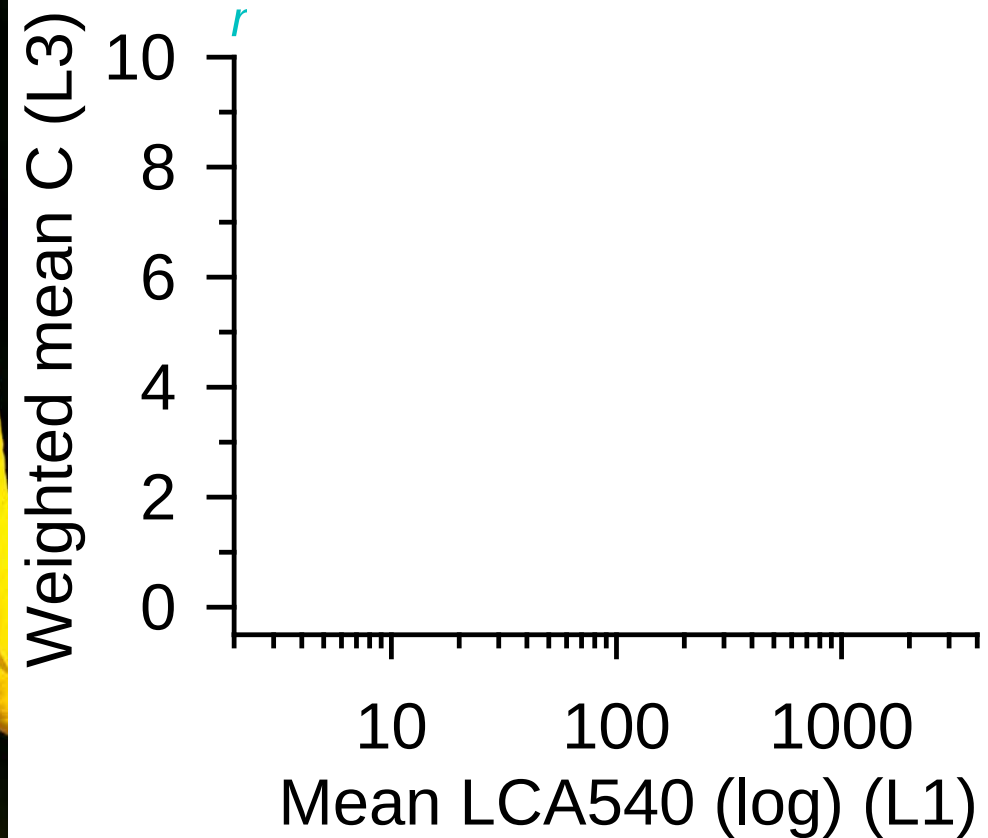
ANOVA: $F(3,68) = 59.05$; $P < 0.001$

Floodplain forests have lower FQ scores

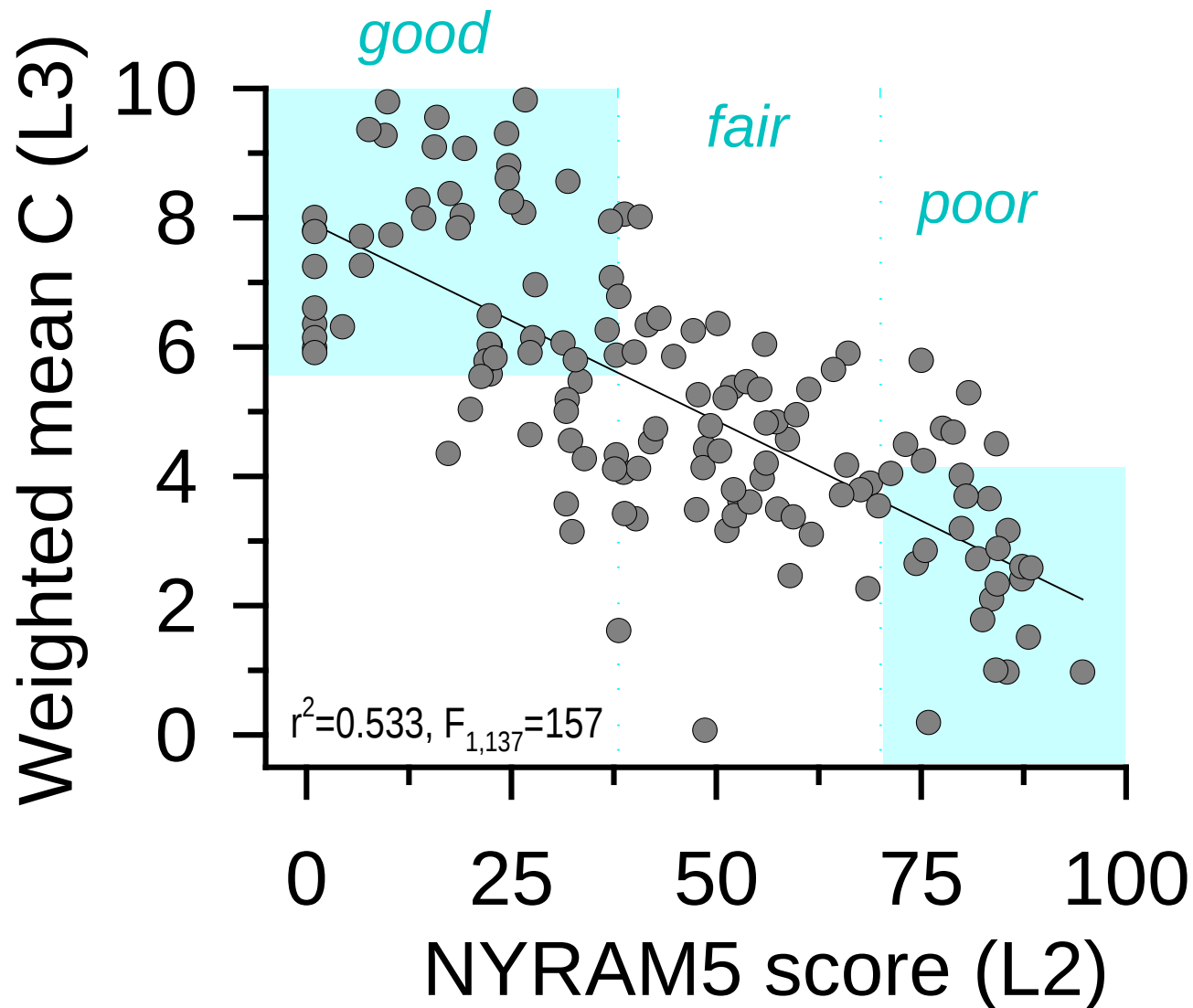


K-W: $H = 33.792$; $P < 0.001$

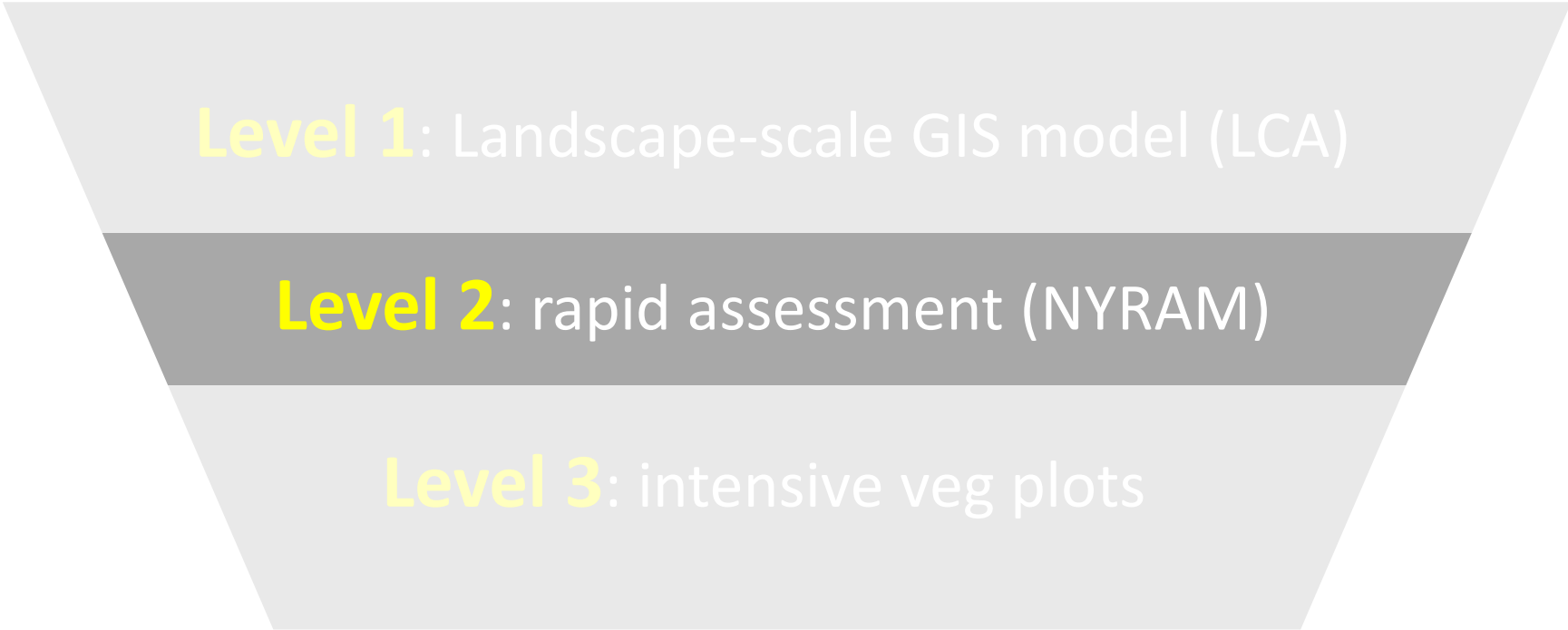
Urban areas have more generalists



L3 biotic integrity supports L2 RAM



Going forward

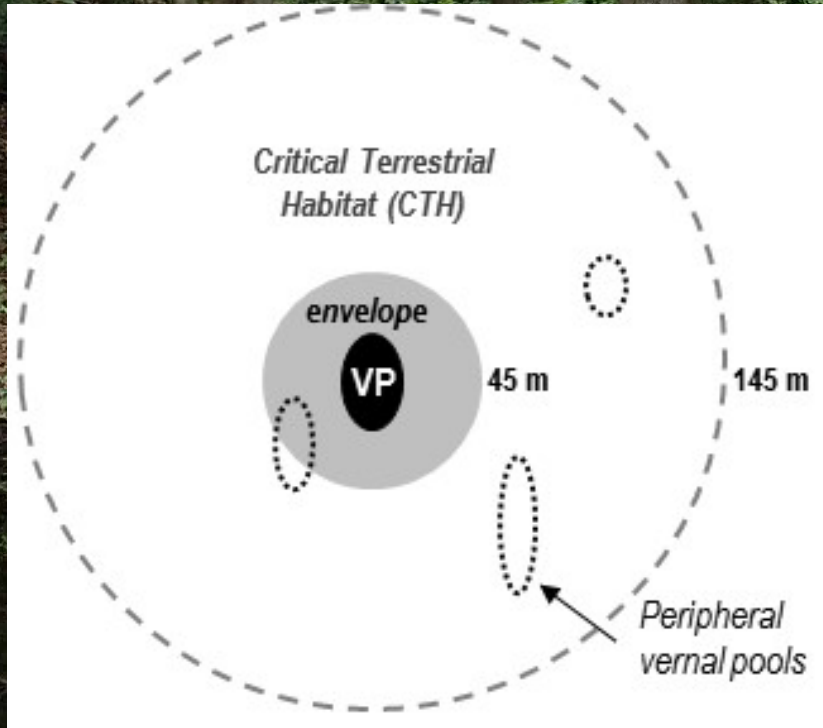


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Level 2: rapid assessment (NYRAM)

Level 3: intensive veg plots

Vernal pools



Functional assessment



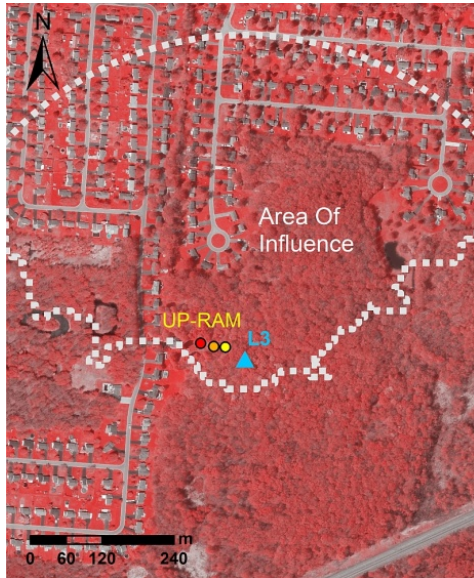


Adjacent upland land use

Adjacent area condition



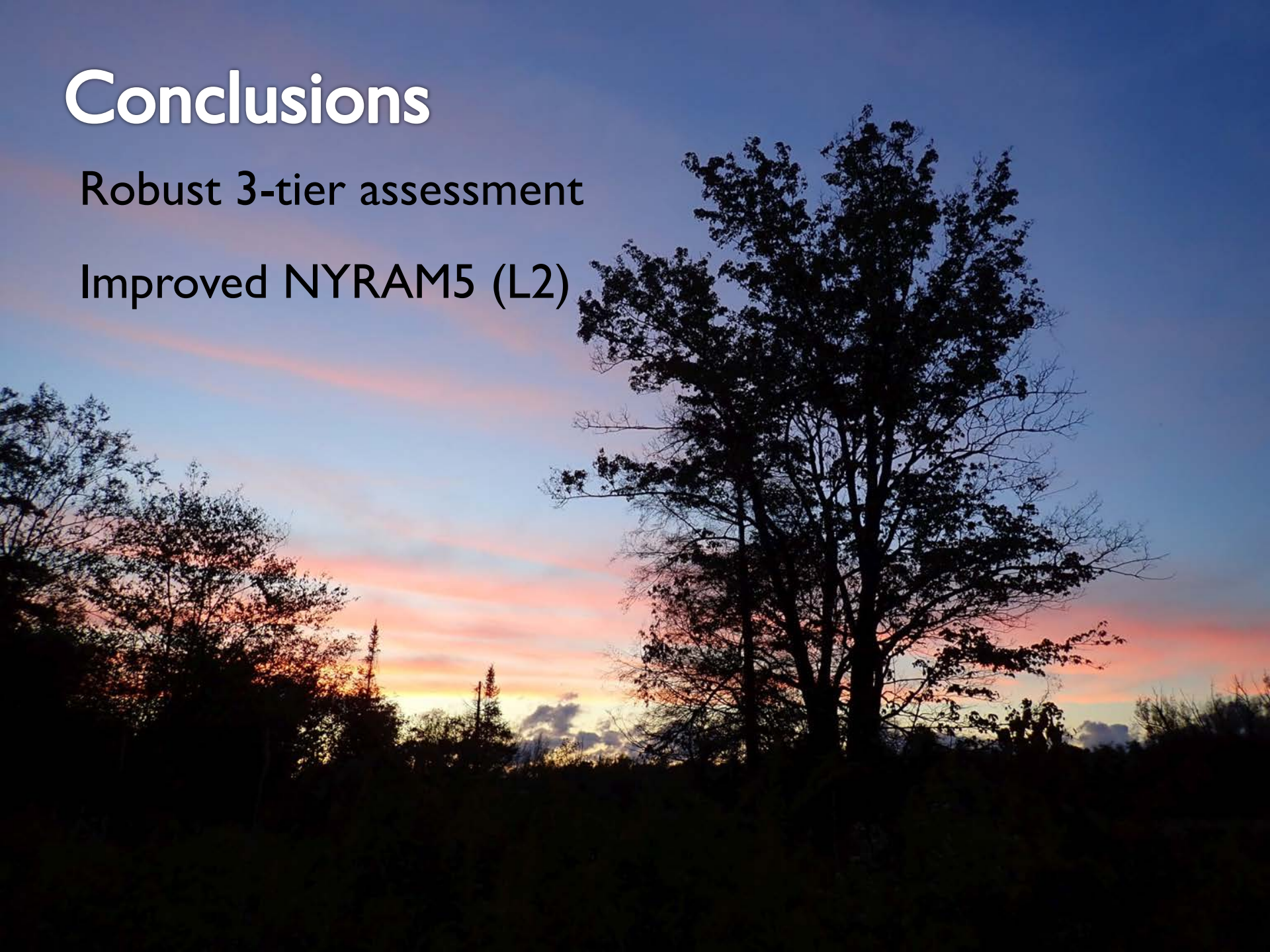
Adjacent area of interest



Conclusions

Robust 3-tier assessment

Improved NYRAM5 (L2)



Acknowledgements

Tim Howard, Greg Edinger,
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