Spatial patterns of Atlantic Coastal Plain Flora and structural diversity across Nova Scotian lakeshore edges

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Atlantic Coastal Plain Flora

- Taxonomically unrelated plants that share common habitat types
- Lakeshores & wetlands
- NS: 90 species & 13 species at risk
- Poor competitors but tolerate high stress

(Nova Scotia's Atlantic Coastal Plain Recovery and Stewardship)

Disturbances

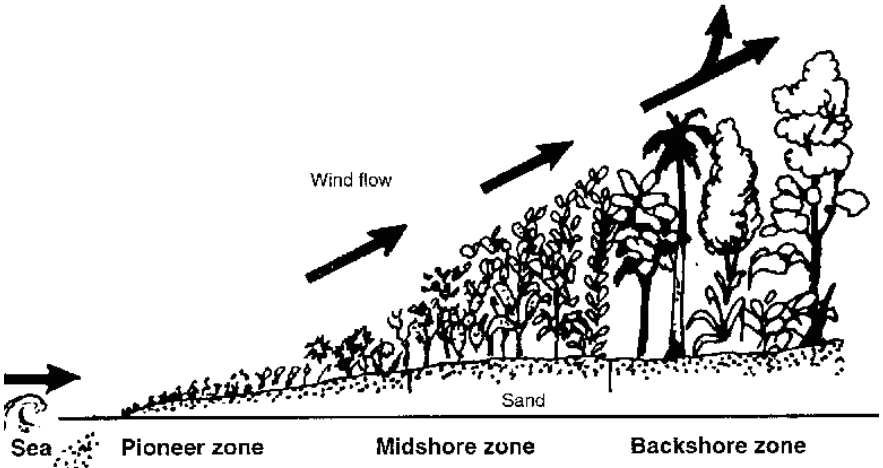
- Water level fluctuations, ice scouring, flooding, wave action
- Exposed shore (no shrubs) + infertile soil → colonization & recruitment
- Creates new populations

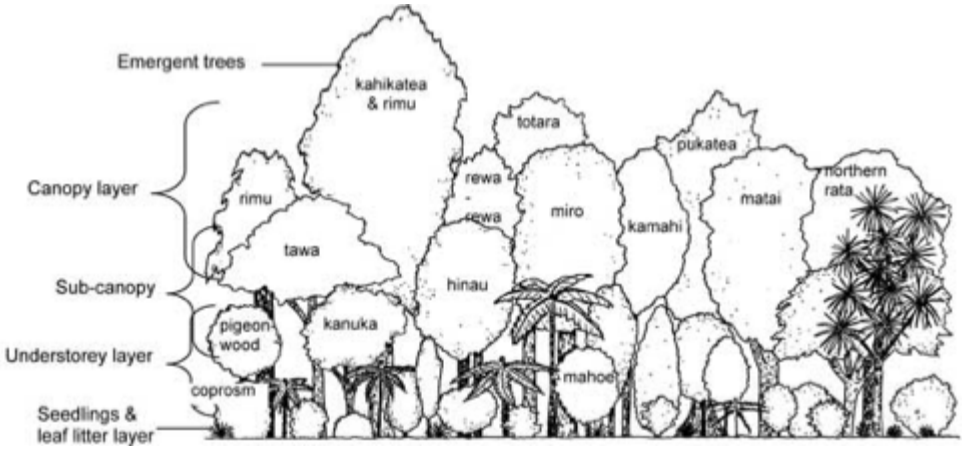
Importance

- Offer important habitat
- Ensure riparian ecosystem services
- Increasingly endangered → 50% habitat destruction
  - Shoreline development & alterations
- Nova Scotia
  - Most suitable remaining habitat
- Conservation effort

Vegetation structure

- Height, coverage & types of vegetation
- Structural diversity → ecological requirements
- Size and spatial arrangement of habitat patches
- Lakeshore edges → physical processes & microclimate





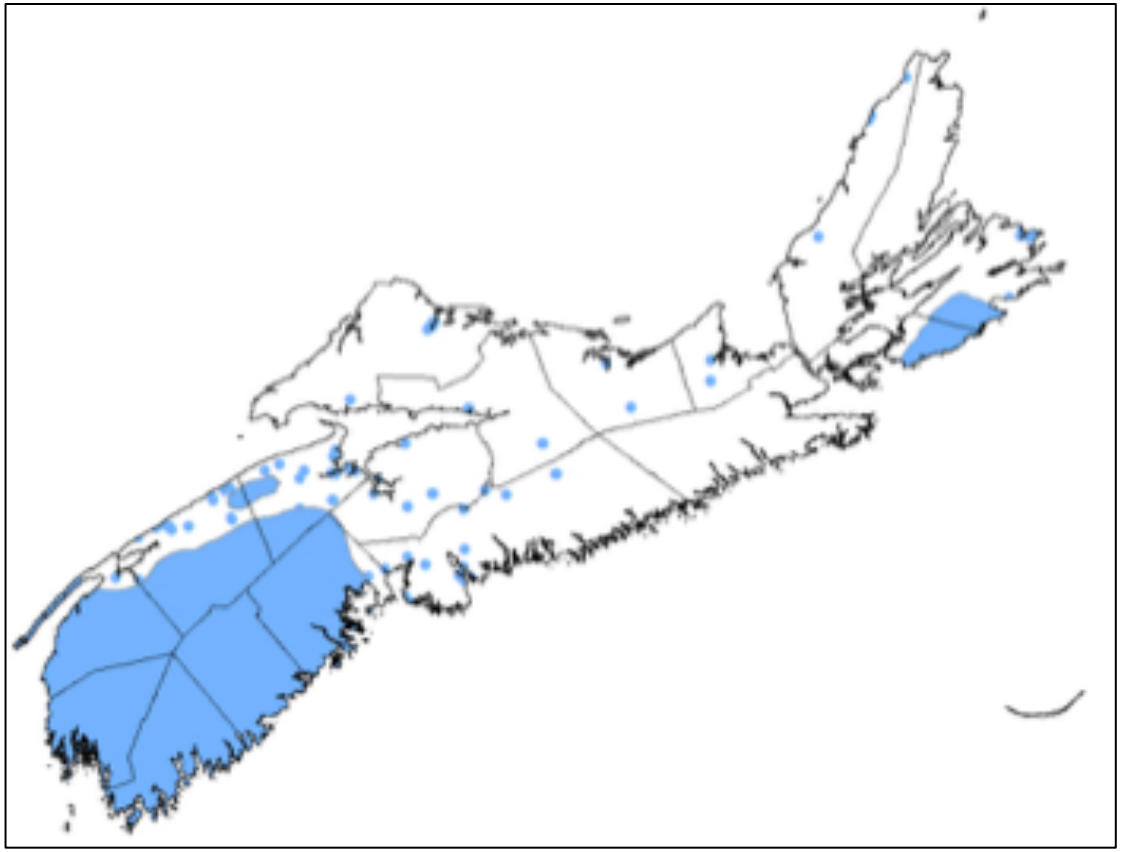
Objectives

- To define habitat requirements of Atlantic Coastal Plain Flora species
- To assess and relate spatial patterns of Atlantic Coastal Plain Flora species and vegetation structure




Study area

- Southwestern Nova Scotia
  - High priority ACPF species



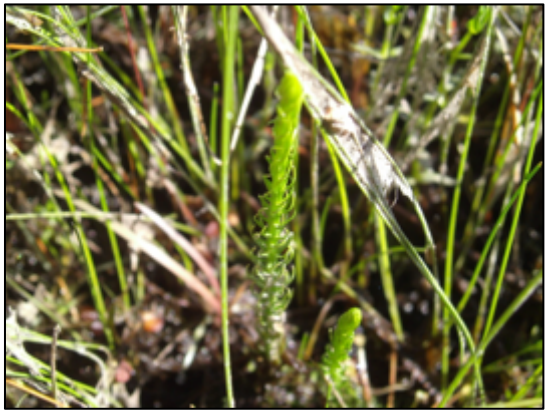
(Environment Canada and Parks Canada Agency, 2015)

Species selection

- MTRI database → subset of common & associated species
- Around Queens county
- 19 species











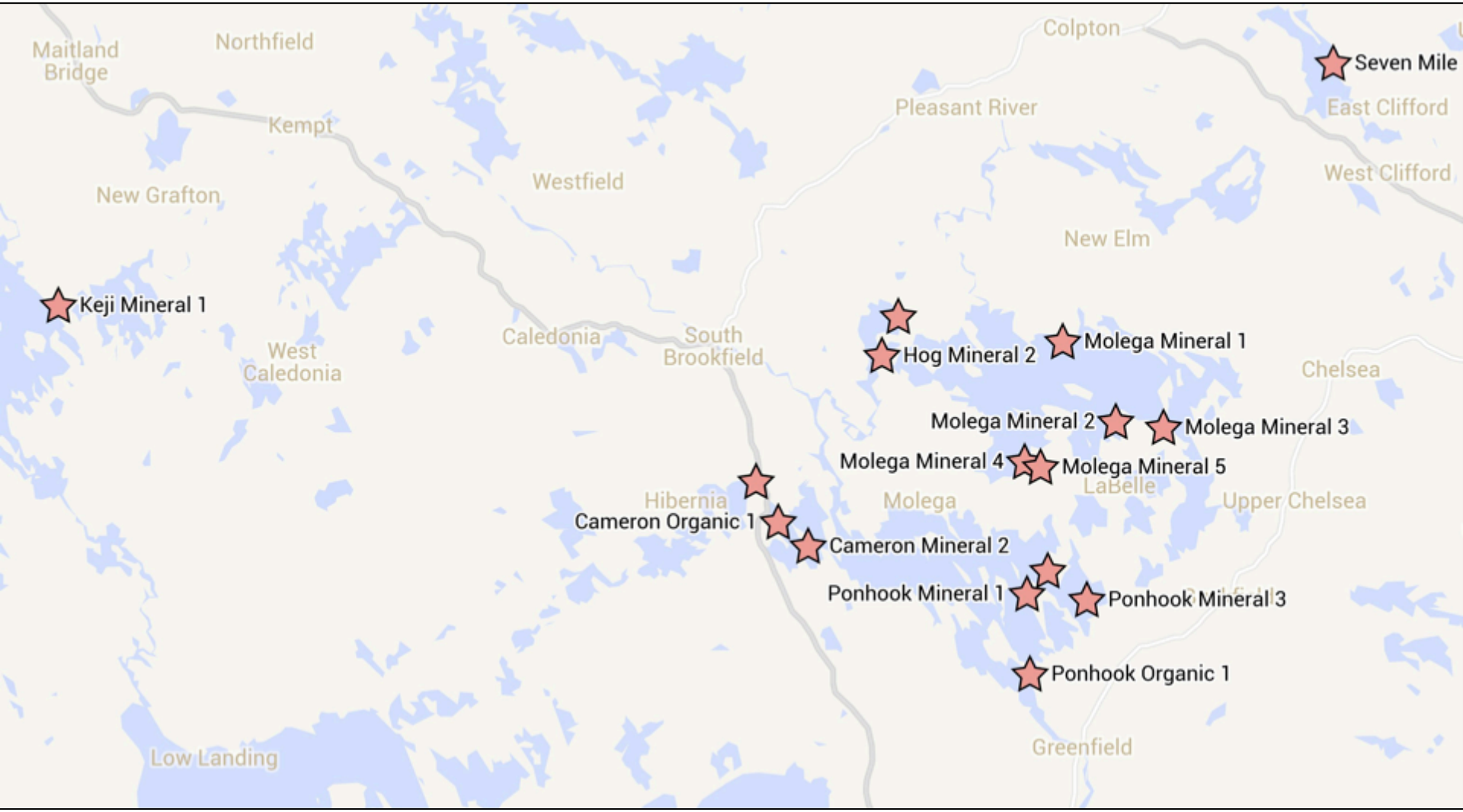



Lake selection

- 7 lakes: Kejimkujik, Cameron, First Christopher, Hog, Seven Mile, Ponhook, and Molega

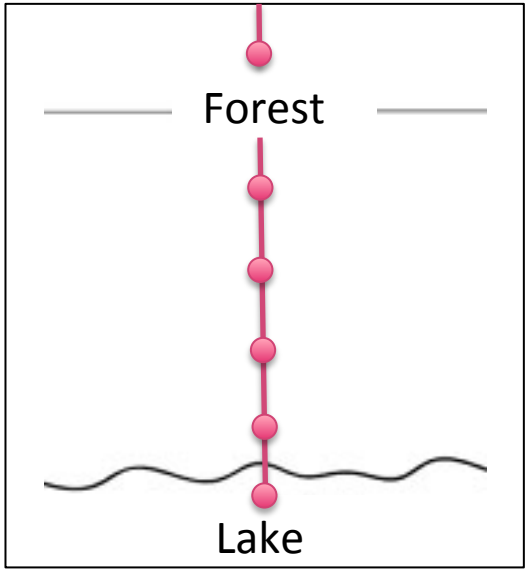
Site selection

- 16 sites
  - High likelihood of as many ACPF species
    - Intermediate substrate
    - Gentle slope
    - West facing shorelines


Maitland Bridge
Northfield
Colpton
Seven Mile
Pleasant River
East Clifford
Kempt
West Clifford
Westfield
New Grafton
New Elm
Keji Mineral 1
Caledonia
South Brookfield
West Caledonia
Hog Mineral 2
Molega Mineral 1
Chelsea
Molega Mineral 2
Molega Mineral 3
Molega Mineral 4
Molega Mineral 5
LaBelle
Hibernia
Molega
Upper Chelsea
Cameron Organic 1
Cameron Mineral 2
Ponhook Mineral 1
Ponhook Mineral 3
Ponhook Organic 1
Greenfield
Low Landing

Soil transect

- Two transects (20 m) / site
- Perpendicular to shoreline
- Sampling points : 2 m

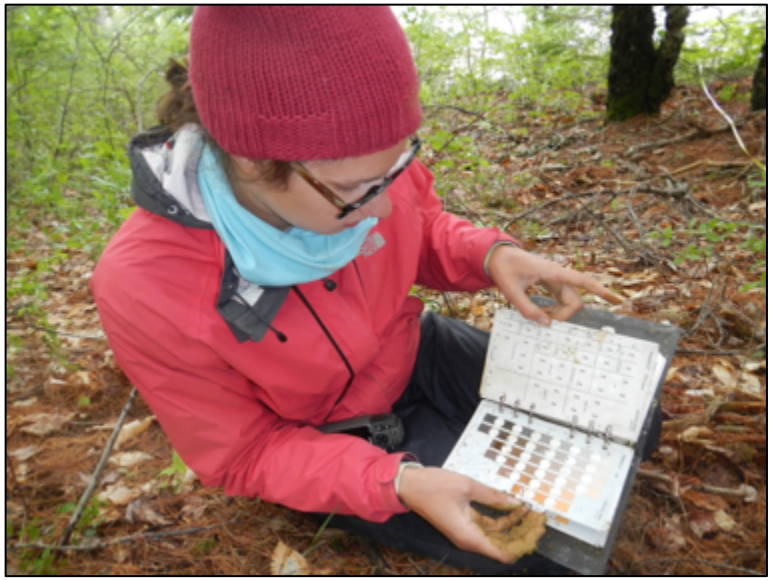


Inclination

pH

Soil auger

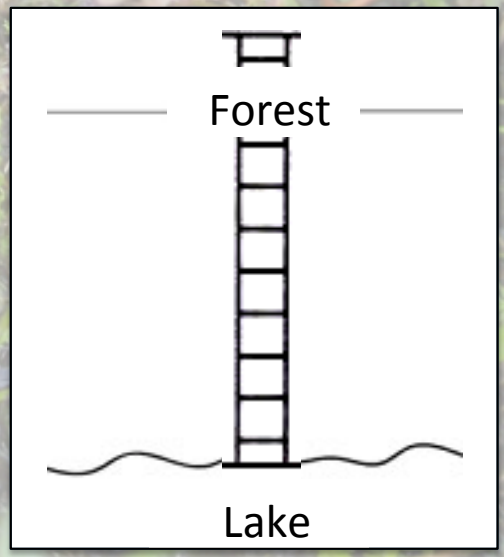
Texture (sand, silt, clay)

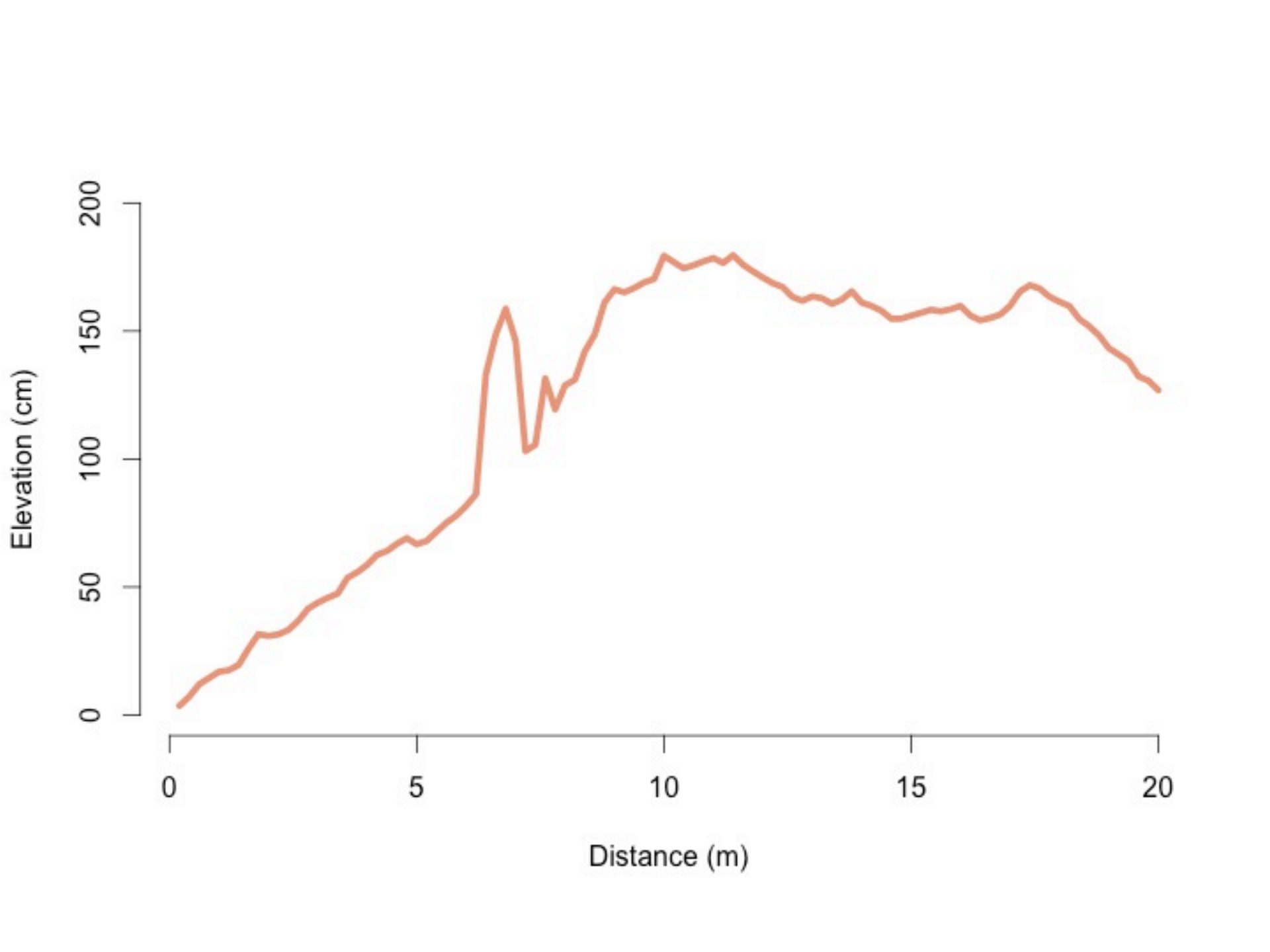


Munsell color

Vegetation transect

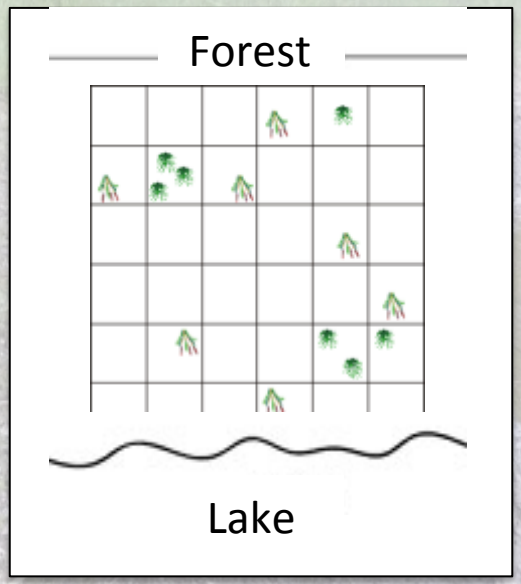
- One transect (20 m) with contiguous quadrats / site
- Abundance/richness of ACPF species
- Fine-scale elevation




Elevation (cm)
0
50
100
150
200
0
5
10
15
20
Distance (m)

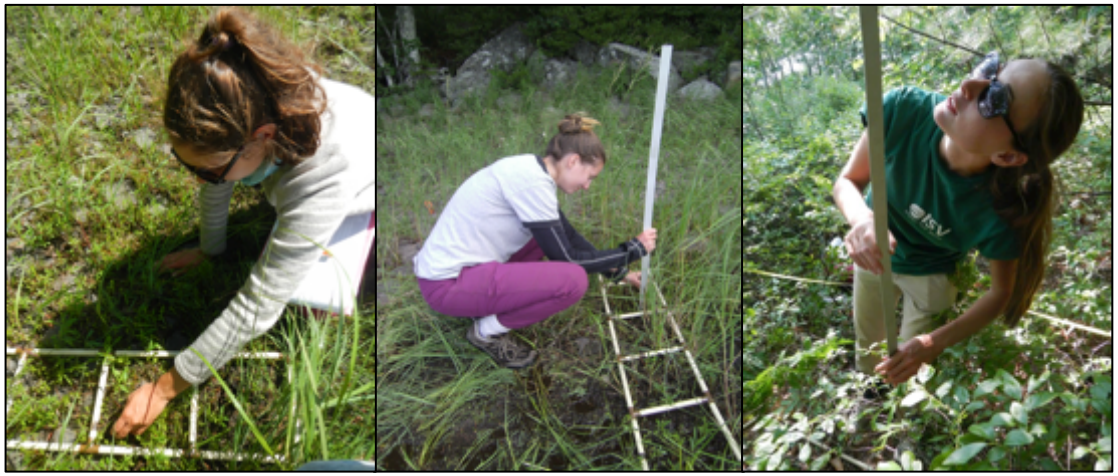
Vegetation grid

- Gain more information
- 5 x 5 m with contiguous quadrats
- Five sites : transect → highest ACPF richness/abundance

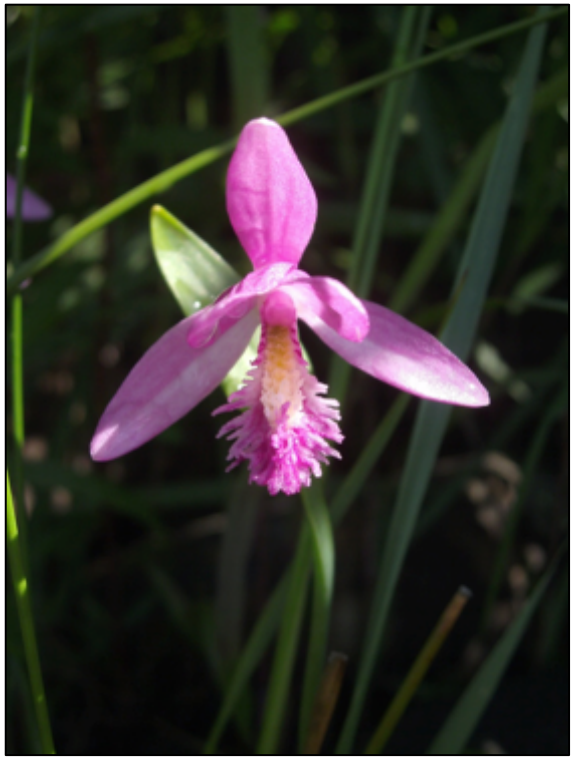


Quadrat sampling

- Cover
  - ACPF
  - Structural elements (ground, plants, canopy) at different height
- Substrate (gravel, cobble, stone, boulder)

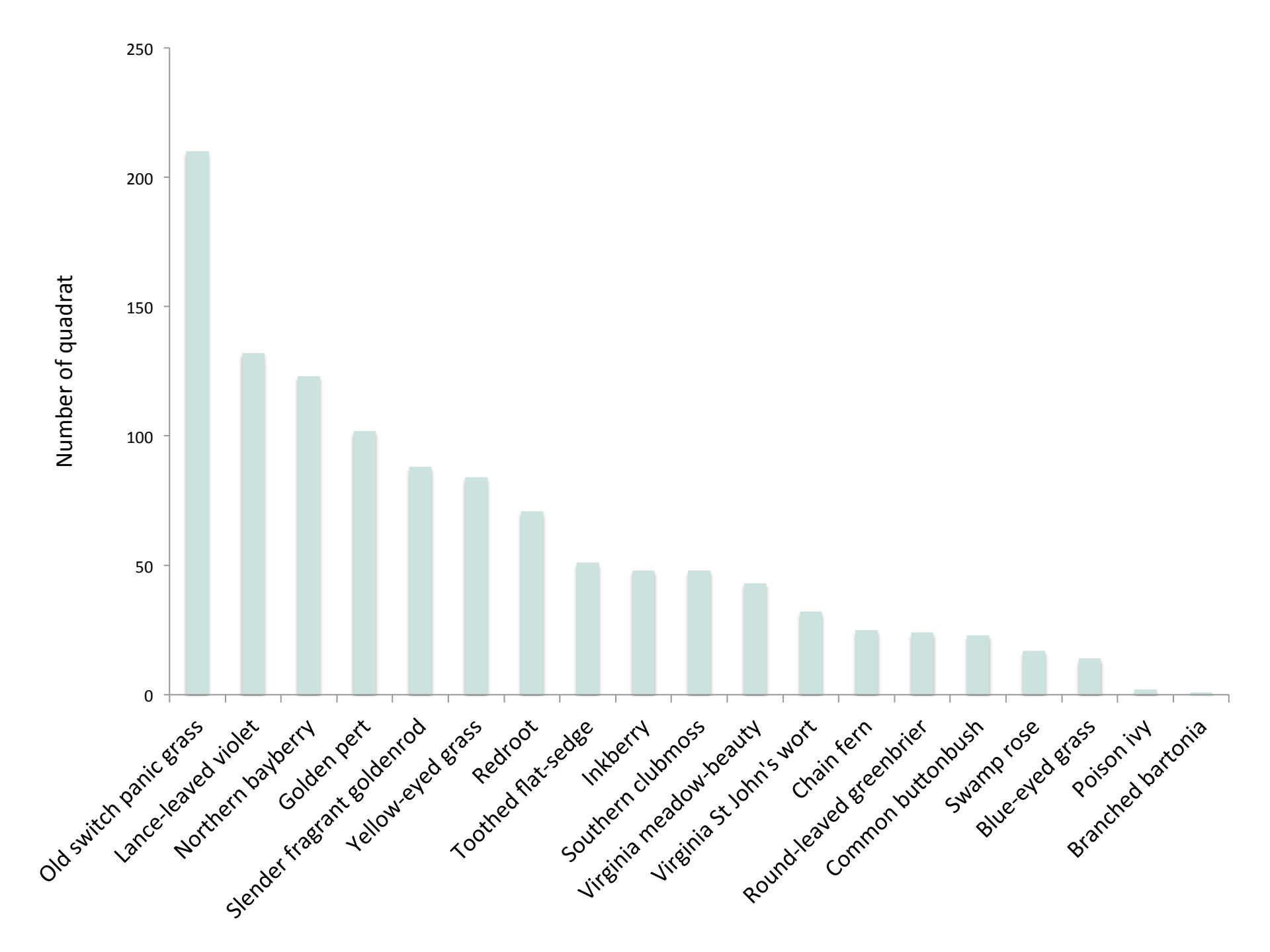


Elements	1	2	3
Water			
Rock			
Substrate (sand, gravel, cobble, water)			
Algea			
Sundew			
Needle litter			
Leaf litter			
Woody debris			
Roots			
Seeds			
Twigs < 1 cm			
Twigs 1-5 cm			
Log			
Lichen			
Mosses			
Peat			
Graminoids			
Herbs 0.2 m			
Herbs 0.4 m			
Herbs 0.6 m			
Herbs > 0.6 m			
Ferns 0.2 m			
Ferns 0.4 m			
Ferns 0.6 m			
Ferns 0.8 m			
Ferns > 0.8 m			
Evergreen 0.2 m			
Evergreen 0.4 m			
Evergreen > 0.4 m			
D Woody sp 0.2 m			
D Woody sp 0.4 m			
D Woody sp 0.6 m			
D Woody sp 0.8 m			
D Woody sp 1 m			
D Woody sp 1.2 m			
D Woody sp 1.4 m			
D Woody sp 1.6 m			
D Woody sp 1.8 m			
D Woody sp 2 m			
D Woody sp 2-3 m			
D Woody sp 3-5 m			
D Woody sp > 5 m			
C Woody sp 0.2 m			

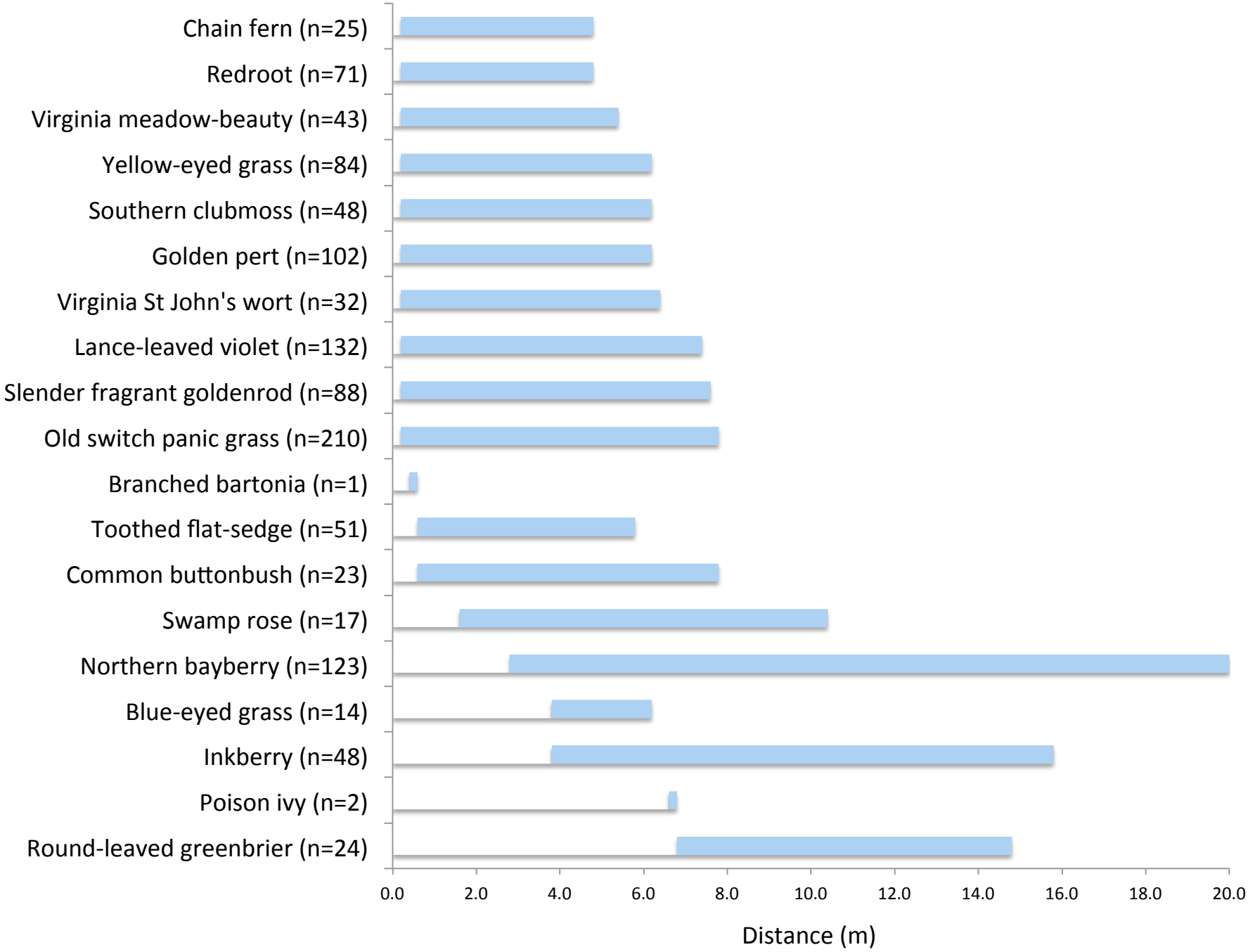


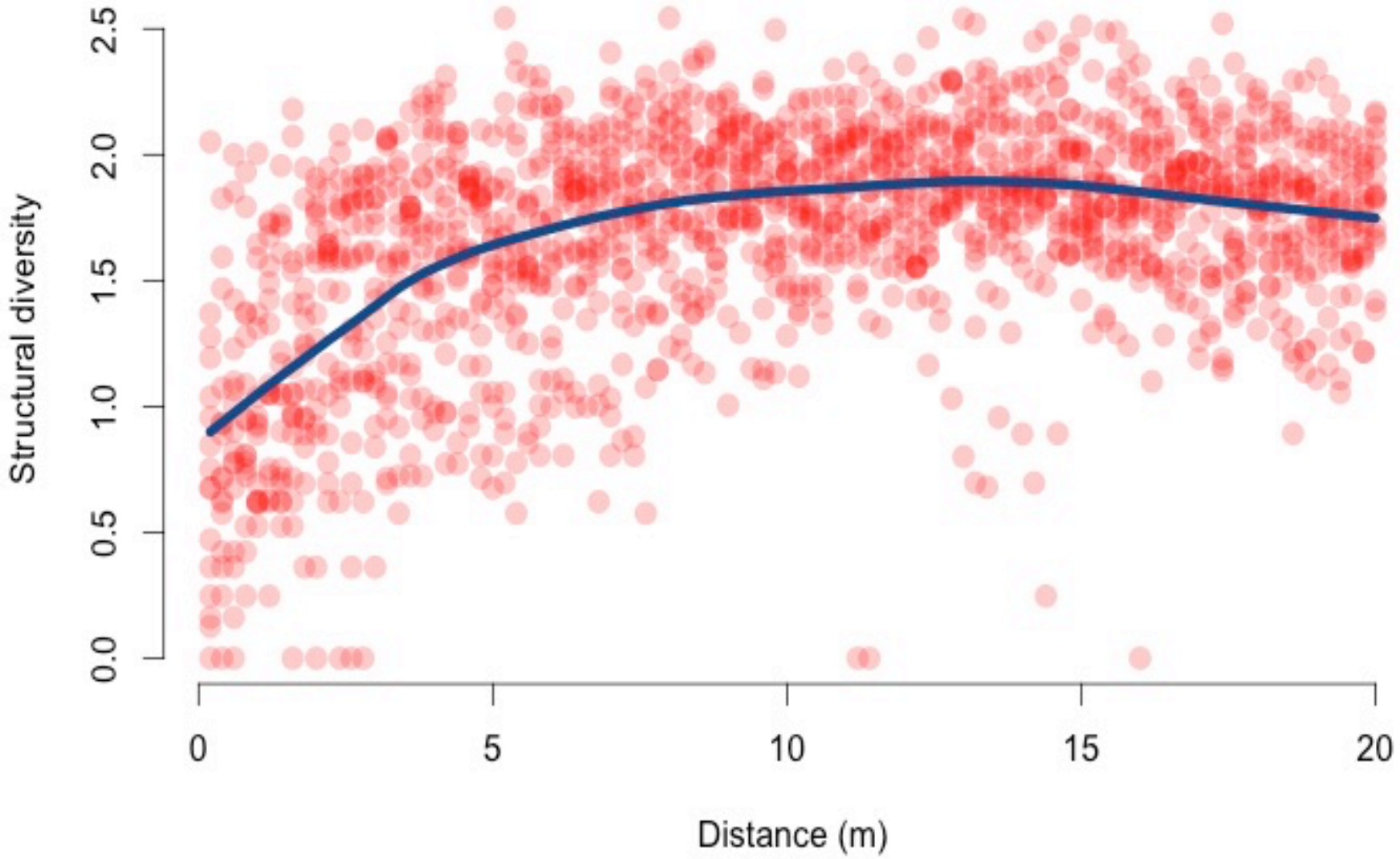
Results

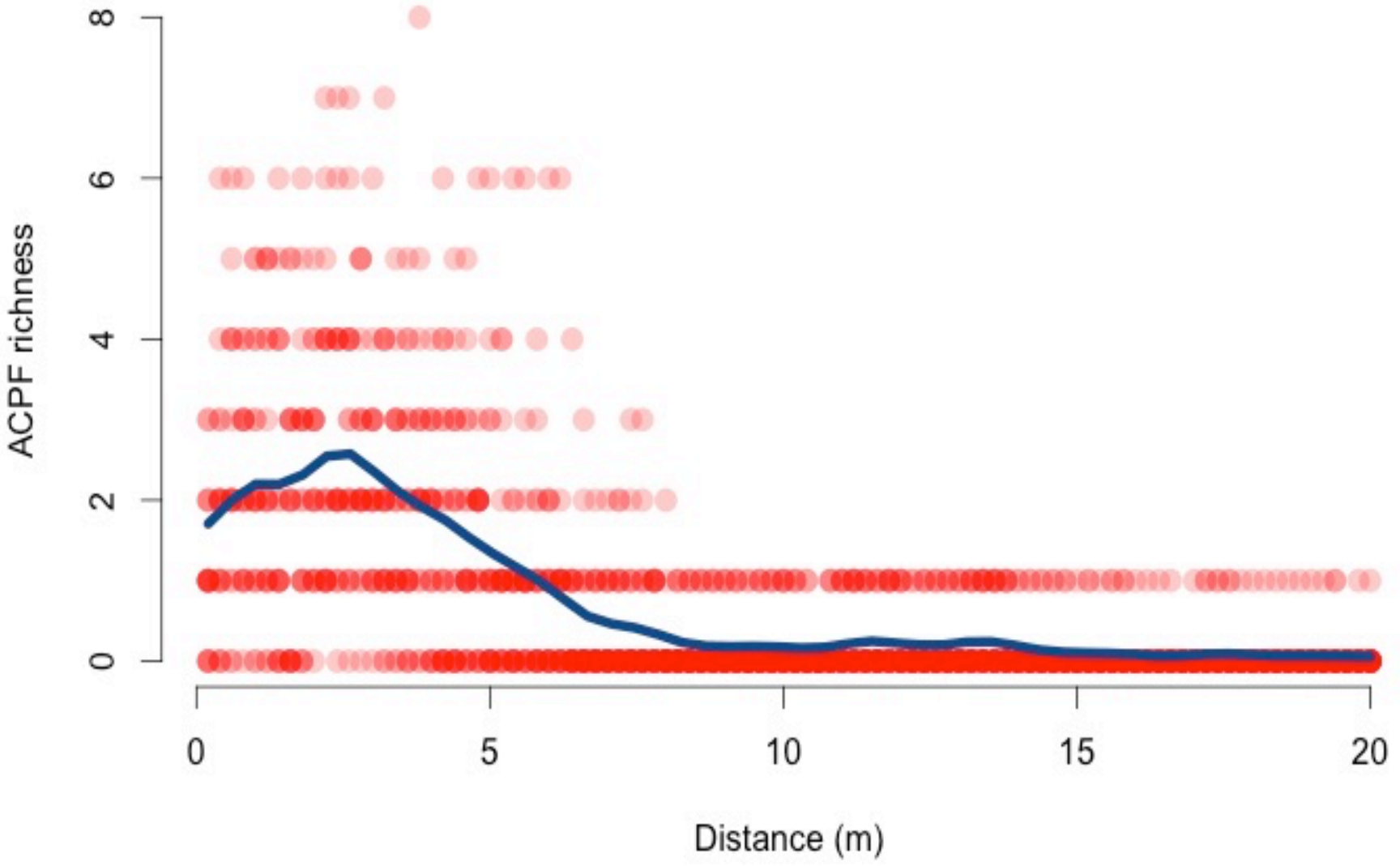
- Soil transect → 336 points
- Vegetation transect/grid → > 4500 quadrats


Number of quadrat
250
200
150
100
50
0
Old switch panic grass
Lance-leaved violet
Northern bayberry
Golden pert
Slender fragrant goldenrod
Yellow-eyed grass
Redroot
Toothed flat-sedge
Inkberry
Southern clubmoss
Virginia meadow-beauty
Virginia St John's wort
Chain fern
Round-leaved greenbrier
Common buttonbush
Swamp rose
Blue-eyed grass
Poison ivy
Branched bartonia





Chain fern (n=25)
Redroot (n=71)
Virginia meadow-beauty (n=43)
Yellow-eyed grass (n=84)
Southern clubmoss (n=48)
Golden pert (n=102)
Virginia St John's wort (n=32)
Lance-leaved violet (n=132)
Slender fragrant goldenrod (n=88)
Old switch panic grass (n=210)
Branched bartonia (n=1)
Toothed flat-sedge (n=51)
Common buttonbush (n=23)
Swamp rose (n=17)
Northern bayberry (n=123)
Blue-eyed grass (n=14)
Inkberry (n=48)
Poison ivy (n=2)
Round-leaved greenbrier (n=24)
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
Distance (m)


Structural diversity
0.0
0.5
1.0
1.5
2.0
2.5
0
5
10
15
20
Distance (m)


ACPF richness
0
2
4
6
8
0
5
10
15
20
Distance (m)

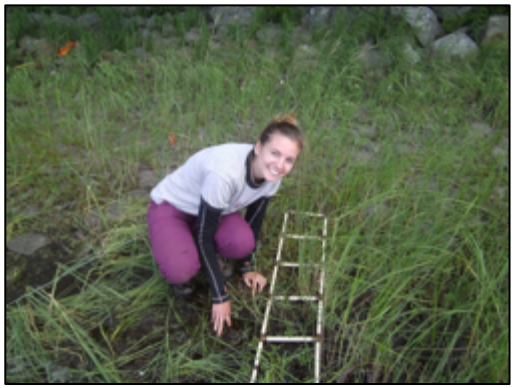
Implications

- Structural diversity → ecological requirements
- Identification of suitable habitats
- Preserving habitat → multiple species

and ecological processes







Questions?