RAPID FQI FOR PENNSYLVANIA

What's a Nice Intensive Assessment Tool Like You Doing in a Rapid Assessment World Like This?

Floristic Quality Assessment

- Estimates condition of site based on plant species list
- Developed initially in Chicago region by Swink and Wilhelm to determine “nativity”
- Suite of metrics - shown to be good predictors of anthropogenic disturbance
- Most well known is Floristic Quality Index

Floristic Quality Index

- FQI can be conceptualized as a weighted richness metric
- Plants are weighted based on the breadth of their ecological tolerances
- Weighting factor called a coefficient of conservatism (CoC or C value)

Coefficients of Conservatism

- Number between 0 and 10
  - Plants with broad ecological tolerances are assigned low numbers (0-3)
  - Plants with narrow ecological tolerances are assigned high numbers (8-10)
- Assigned on a regional or statewide basis


Ageratina altissima


Viola
pedata

3

8

0

5

10


Conyza canadensis


Asclepias incarnata


Goodyera
repens

Adjusted Floristic Quality Index

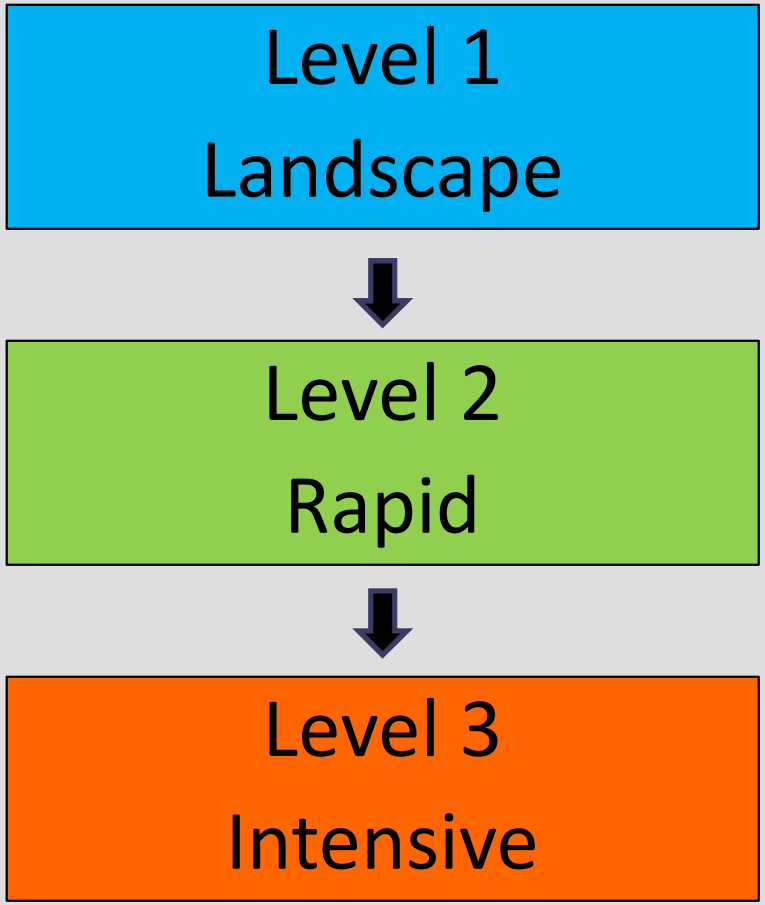
$$I' = \left(\frac{\overline{C}}{10} \frac{\sqrt{N}}{\sqrt{N + A}} \right) * 100$$

$\overline{C}$ = Mean coefficient of conservatism
N = Number of native species
A = Number of non-native species

(Miller and Wardrop 2006)

FQI Requirements

- Comprehensive species list
- Identification to species level



Sensitivity Analysis

$$I' = \frac{\overline{C}}{10} \frac{\sqrt{N}}{\sqrt{N + A}} * 100$$

C value	No. Natives	Sqrt	No. Non-Natives	Natives + Non-Natives	Sqrt (Nat + Nnat)	Constant	Denom	Numerator	Adj FQI
0	1	1	1	2	1.414214	10	14.14214	0	0
0.1	1	1	1	2	1.414214	10	14.14214	0.1	0.707107
0.2	1	1	1	2	1.414214	10	14.14214	0.2	1.414214
0.3	1	1	1	2	1.414214	10	14.14214	0.3	2.12132
0.4	1	1	1	2	1.414214	10	14.14214	0.4	2.828427
0.5	1	1	1	2	1.414214	10	14.14214	0.5	3.535534
0.6	1	1	1	2	1.414214	10	14.14214	0.6	4.242641
0.7	1	1	1	2	1.414214	10	14.14214	0.7	4.949747
0.8	1	1	1	2	1.414214	10	14.14214	0.8	5.656854
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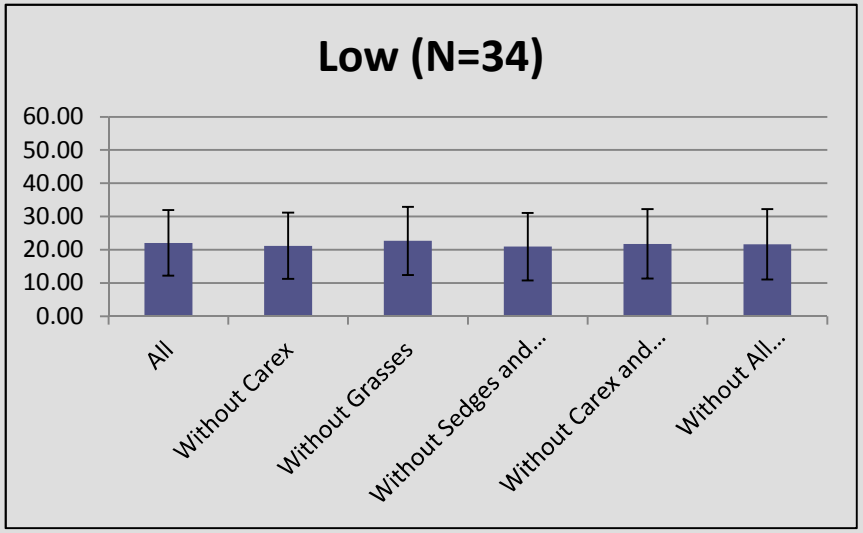
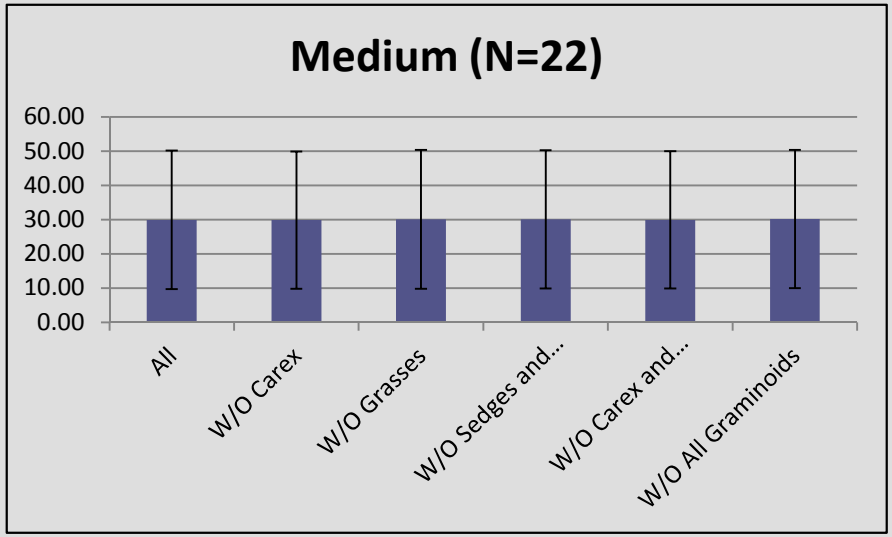
5.6	1	1	1	2	1.414214	10	14.14214	5.6	39.59798
5.7	1	1	1	2	1.414214	10	14.14214	5.7	40.30509
5.8	1	1	1	2	1.414214	10	14.14214	5.8	41.01219
5.9	1	1	1	2	1.414214	10	14.14214	5.9	41.7193
6	1	1	1	2	1.414214	10	14.14214	6	42.42641

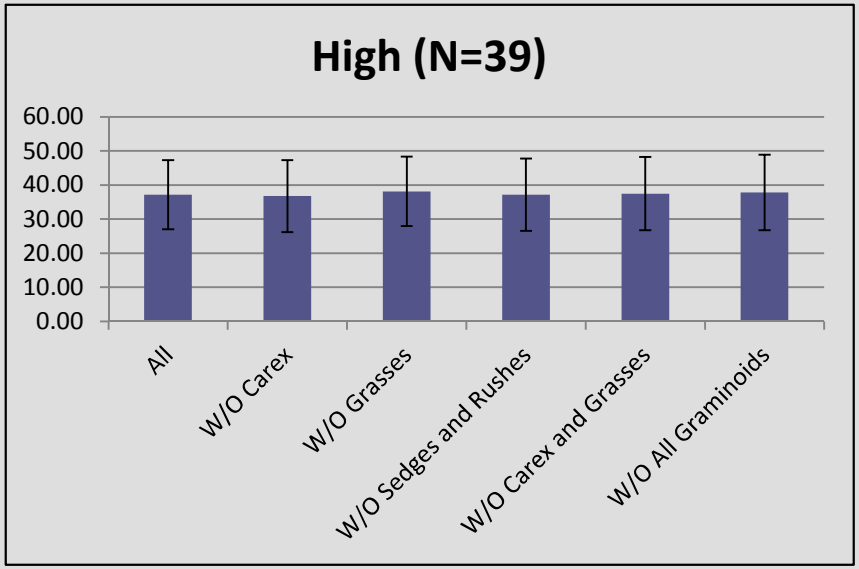
Removing Select Groups

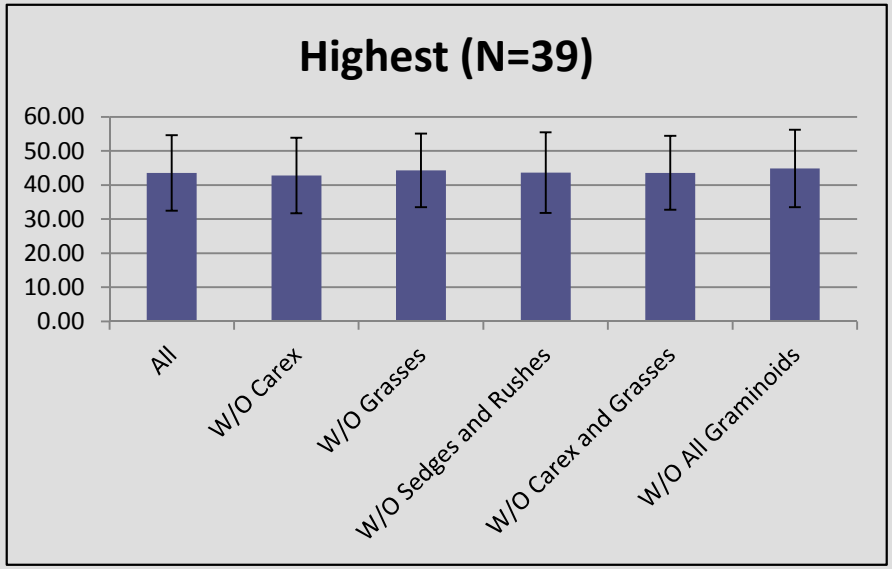
- Graminoids
  - Difficult to ID
  - Span the range of C values
- Systematically Removed
  - Carex spp.
  - Grasses
  - Sedges and Rushes
  - Carex and Grasses
  - All Graminoids

Removing Select Groups ($\overline{C}$)









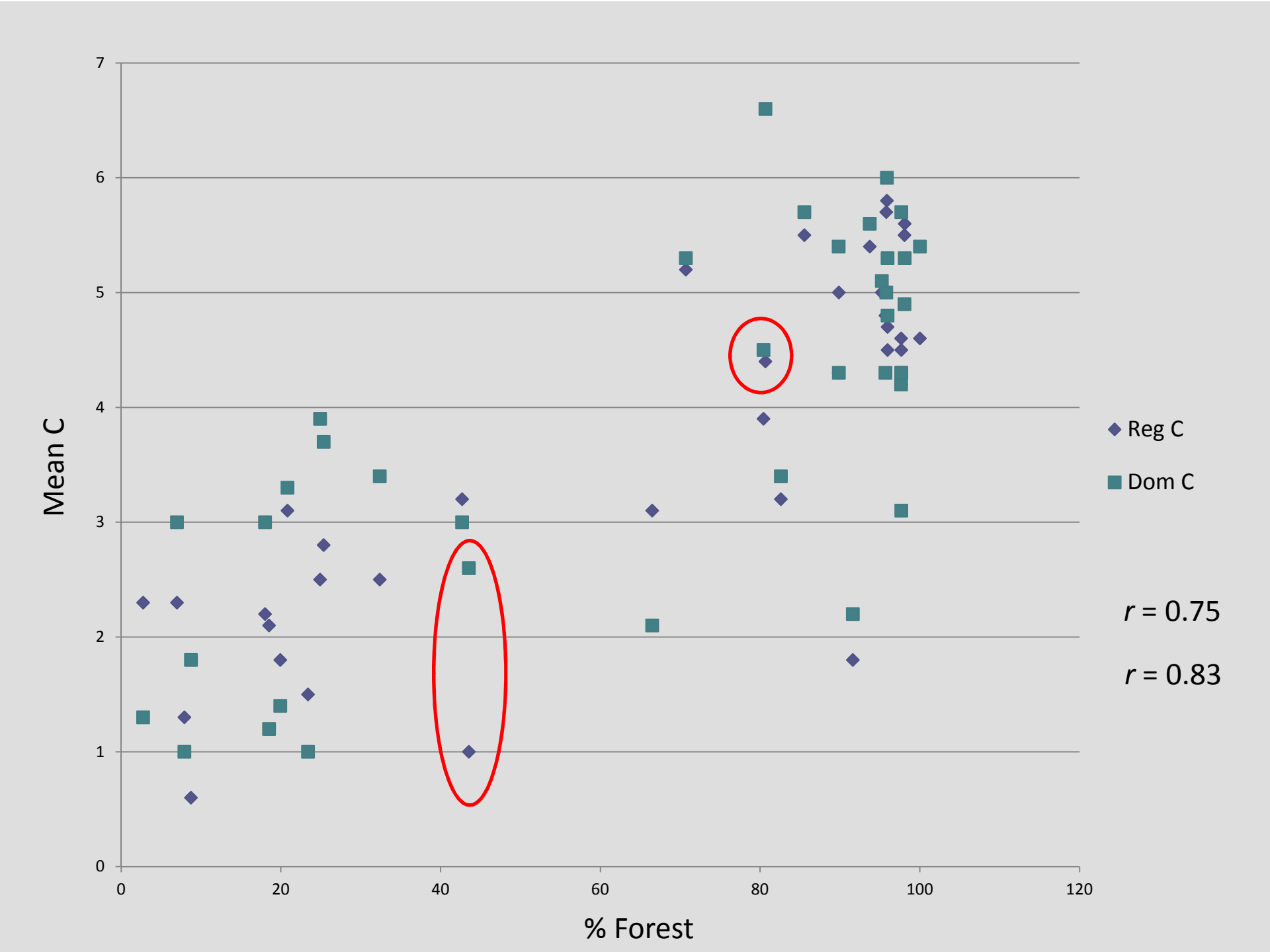
- Acer rubrum
- Acer saccharum
- Anemone quinquefolia
- Arisaema triphyllum
- Eurybia divaricata
- Berberis thunbergii
- Carex blanda
- Carex prasina
- Carpinus caroliniana
- Carya ovata
- Claytonia caroliniana
- Equisetum arvense
- Erythronium americanum
- Fragaria virginiana
- Fraxinus nigra
- Fraxinus pennsylvanica
- Glechoma hederacea
- Heracleum maximum
- Impatiens capensis
- Juncus tenuis
- Lindera benzoin
- Lysimachia nummularia
- Mitchella repens
- Onoclea sensibilis
- Ostrya virginiana
- Parthenocissus quinquefolia
- Pinus strobus
- Poa pratensis
- Podophyllum peltatum
- Polystichum acrostichoides
- Prunus serotina
- Quercus bicolor
- Quercus rubra
- Quercus velutina
- Sanguinaria canadensis
- Packera aurea
- Solidago canadensis
- Solidago rugosa
- Symplocarpus foetidus
- Taraxacum officinale
- Thalictrum pubescens
- Tilia americana
- Toxicodendron radicans
- Tsuga canadensis
- Ulmus americana
- Viburnum acerifolium
- Viola cucullata
- Viola labradorica

Dominants

Anemone quinquefolia
Carex prasina
Carpinus caroliniana
Erythronium americanum
Pinus strobus
Quercus bicolor
Symplocarpus foetidus

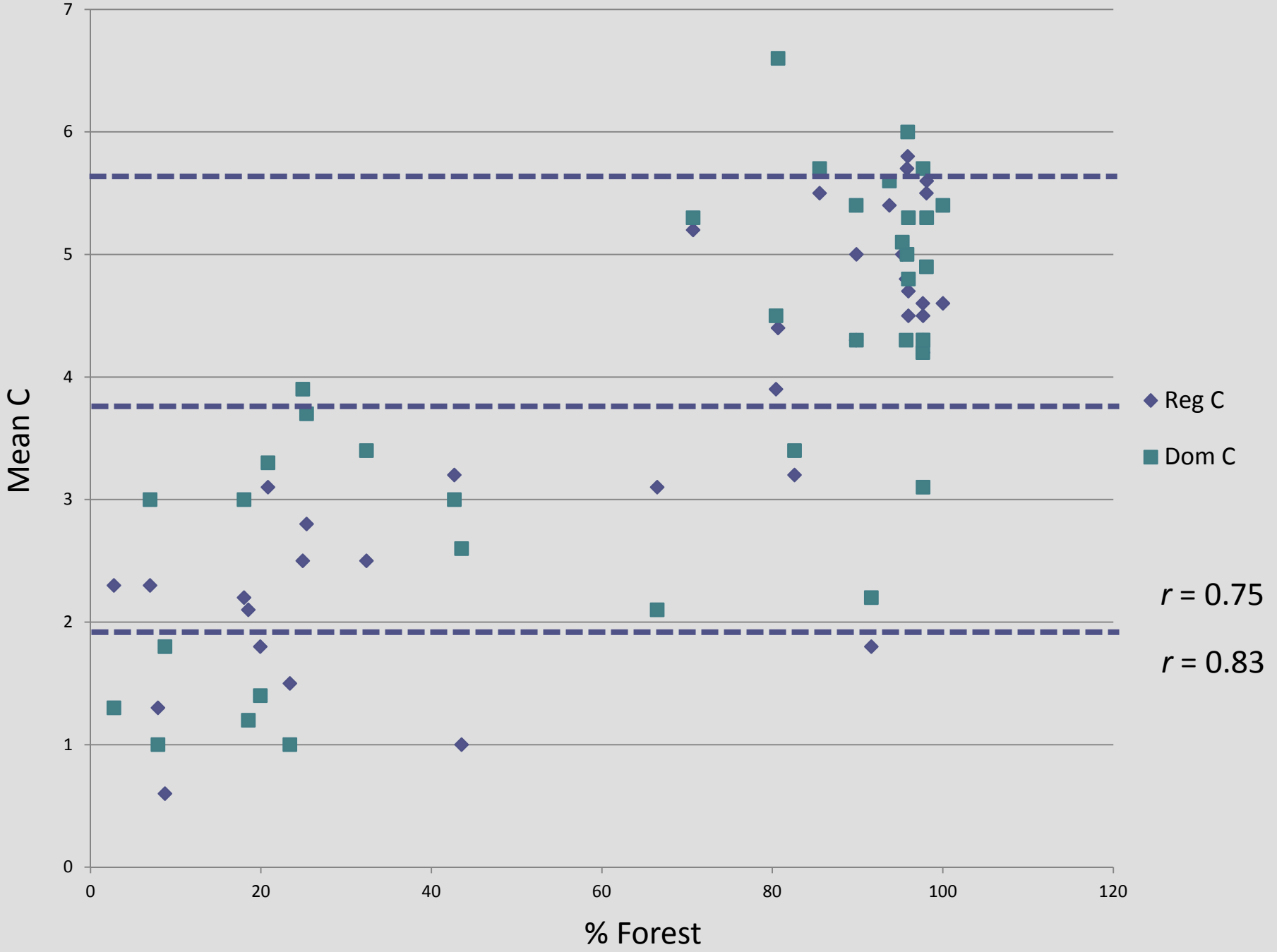
$\overline{C}$ (dom) = 6.6

$\overline{C}$ (all) = 4.4


Mean C
% Forest
0
1
2
3
4
5
6
7
0
20
40
60
80
100
120
Reg C
Dom C
r = 0.75
r = 0.83

Stats – Dom $\bar{C}$

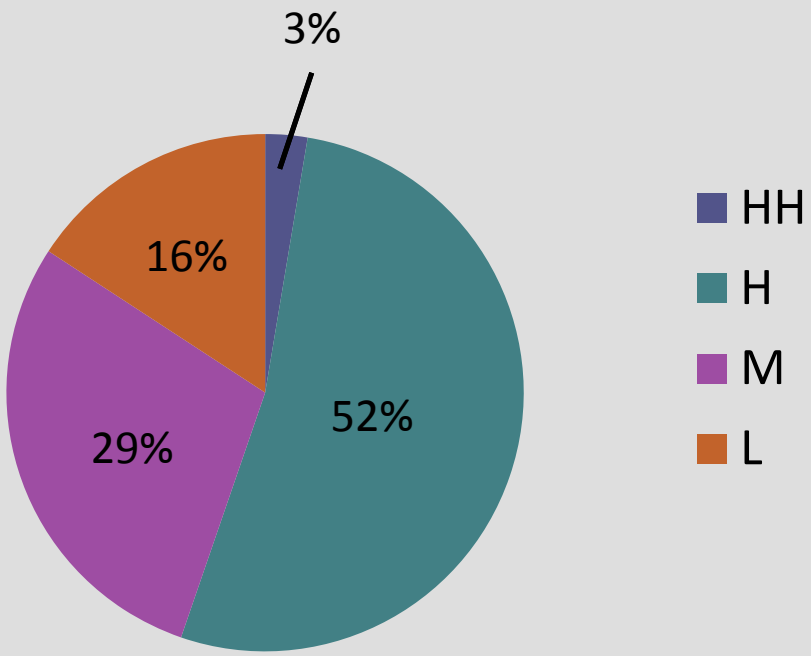
- 38 sites total
  - 23 sites with higher $\bar{C}$ values
  - 14 sites with lower $\bar{C}$ values
  - 1 site with no change


7
6
5
4
3
2
1
0
Mean C
0
20
40
60
80
100
120
% Forest
Reg C
Dom C
r = 0.75
r = 0.83

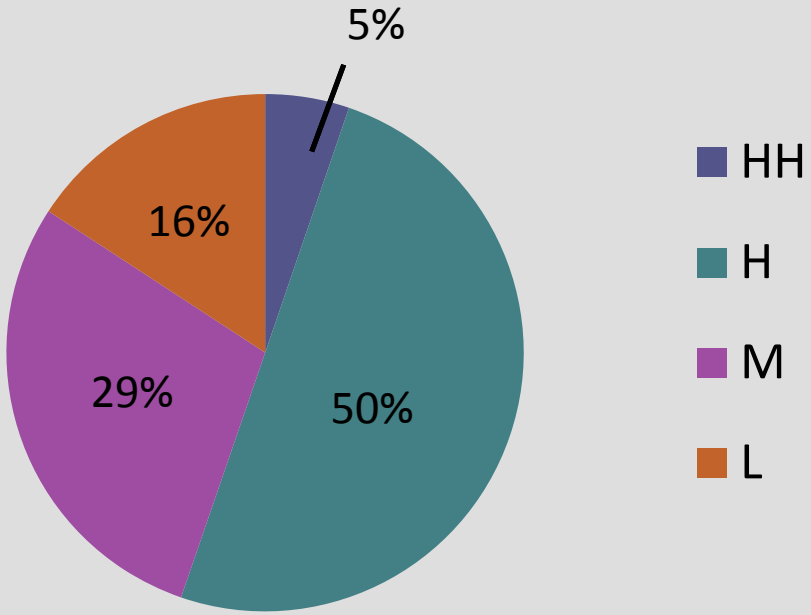
Stats – Dom $\overline{C}$

- 38 sites total
- Rankings (Low, Medium, High, Highest)
  - 7 sites with change in rankings (18%)
  - 4 sites overestimated by dom $\overline{C}$
  - 3 sites underestimated dom $\overline{C}$

All Taxa



Dominants



Next Steps

- Examine other HGM types and Physiographic Provinces
- Examine distribution of C values between all species and dominant species
- Look at Routine Delineation Forms
  - Proxy for rapid assessment sites
  - Can delineation data be used to inform wetland assessment?