Restoring Tree Islands in the Everglades: Experimental Studies of Tree Seedling Survival and Growth

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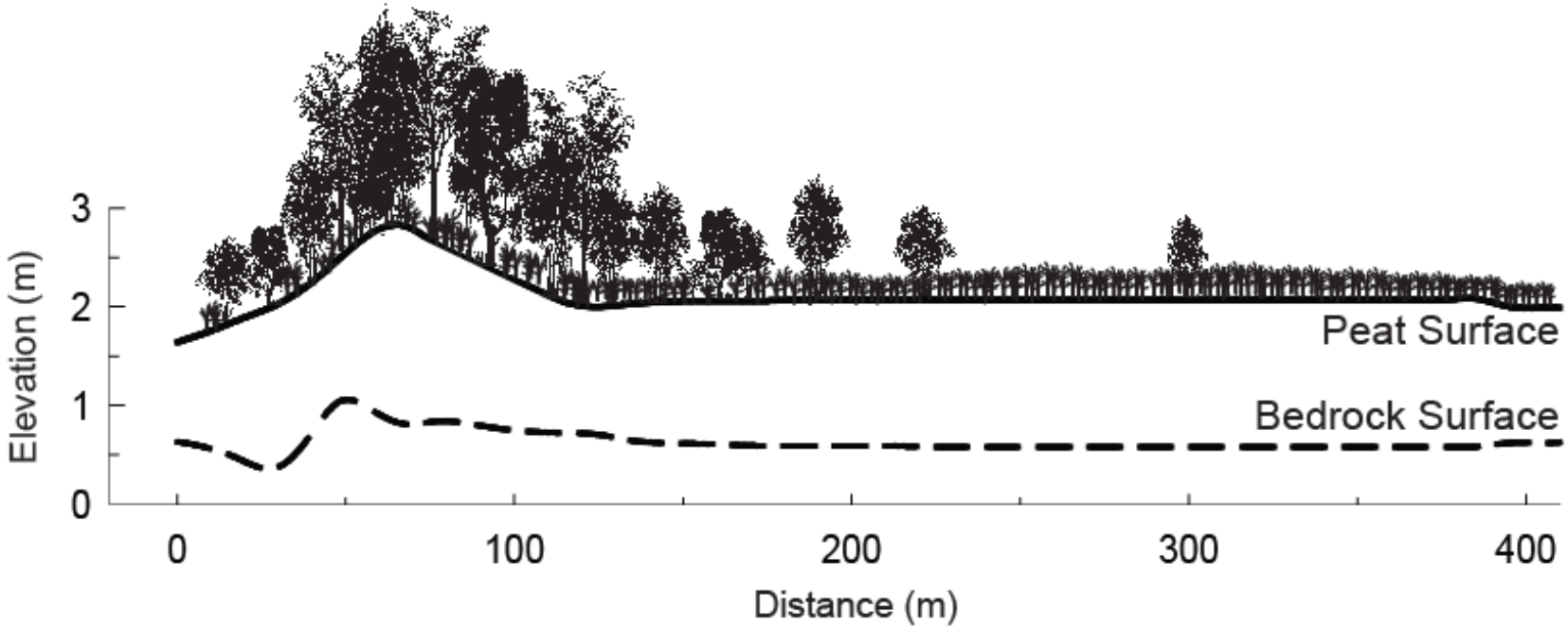
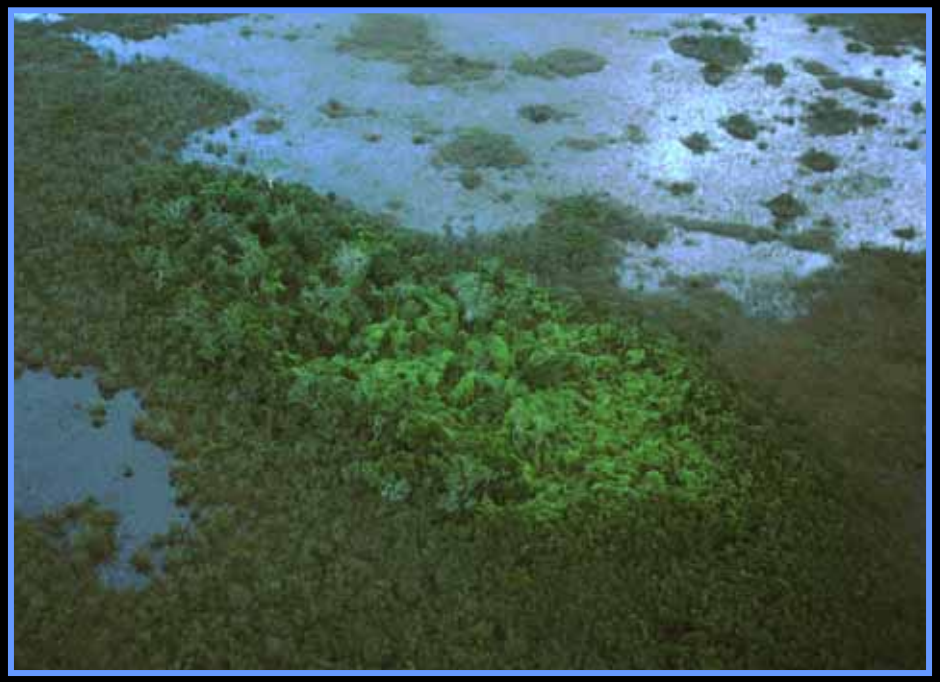
Photo by D. Kilbane


Photo by T. Gann

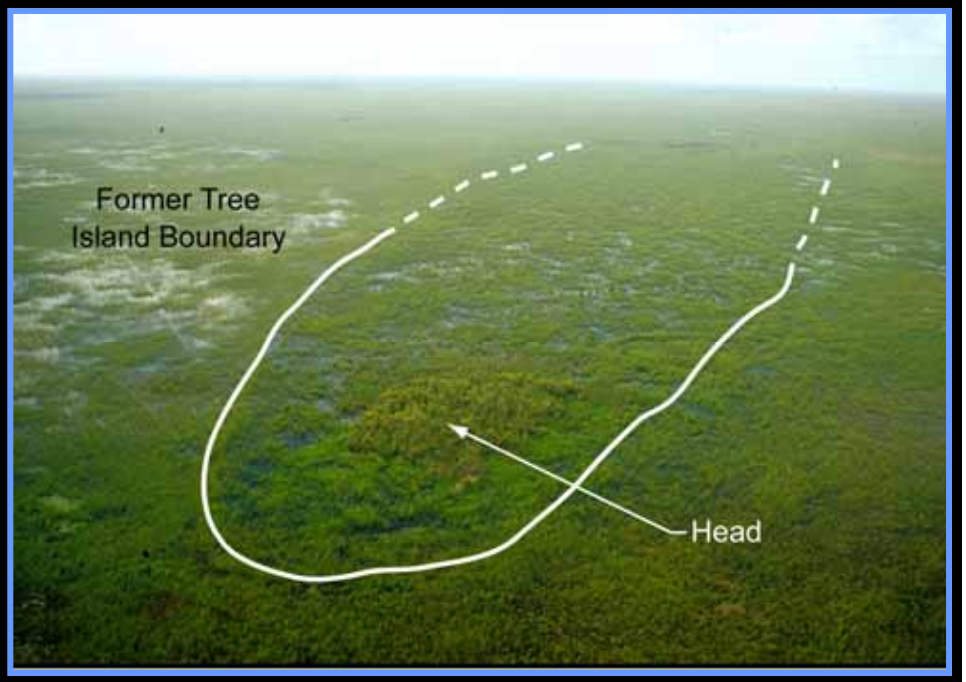

Photo by D. Kilbane


Elevation (m)
3
2
1
0
0
100
200
300
400
Distance (m)
Peat Surface
Bedrock Surface

Causes of Tree Island Loss

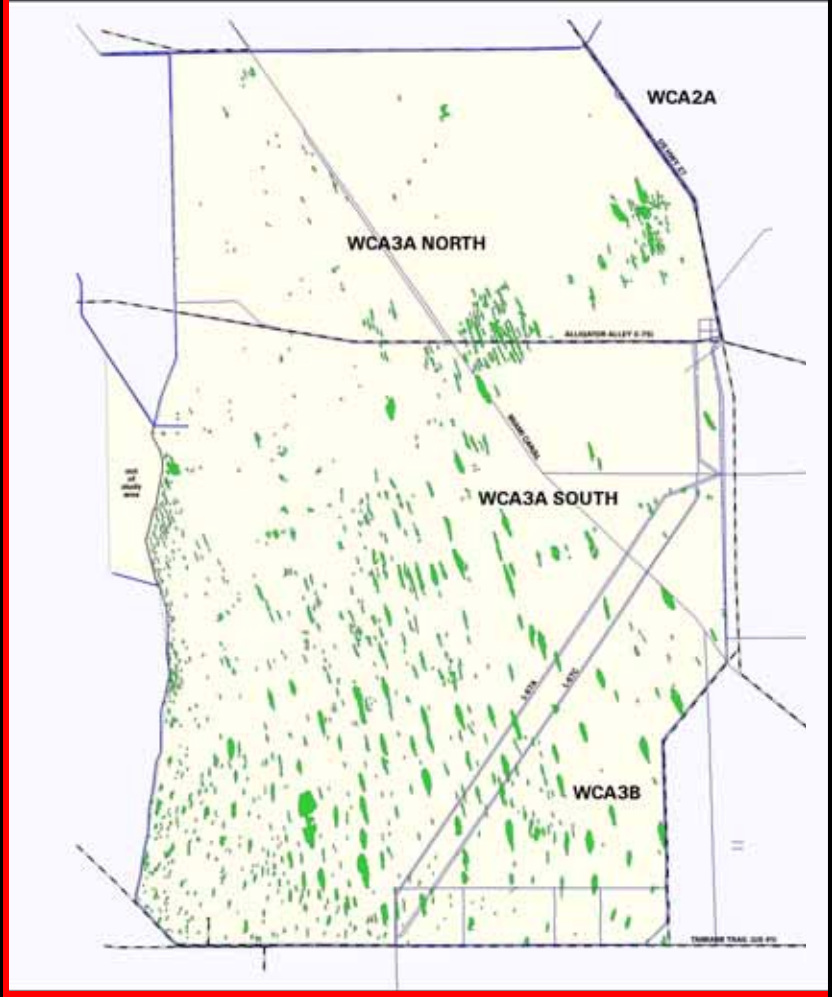


Lygodium blanket

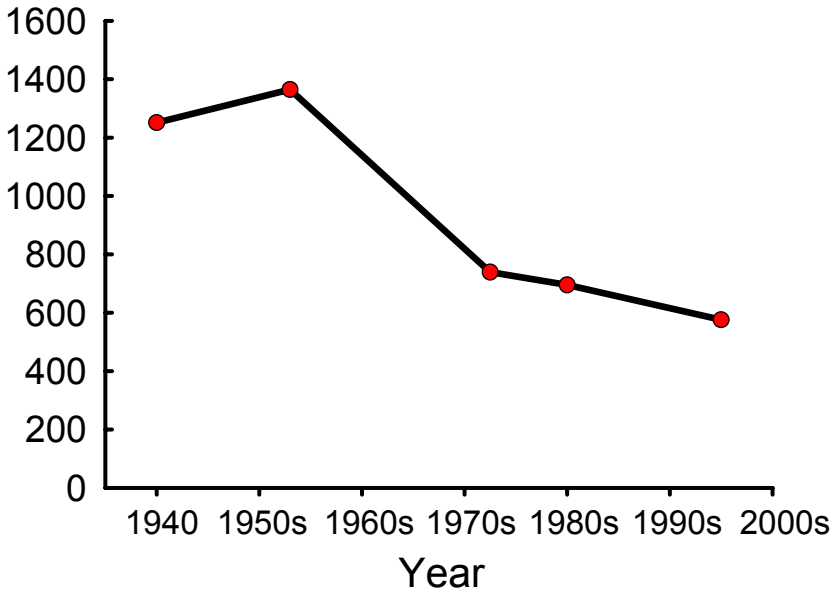


"Ghost Island"

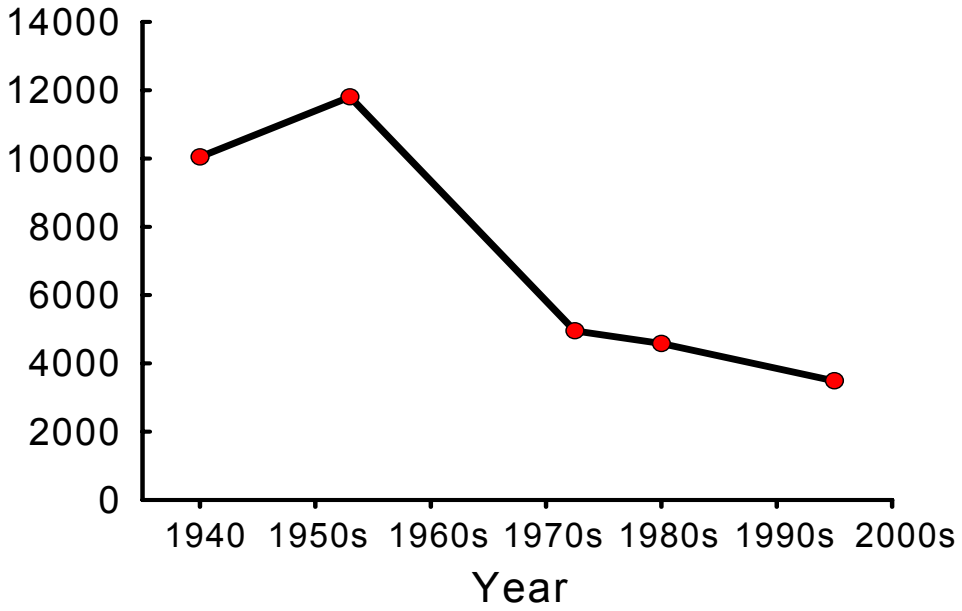
Tree Islands of WCA3
1940



Total Number of Tree Islands in WCA 3A



Total Tree Island Area in WCA 3A (ha)



SFWMD 2004

54% Decline

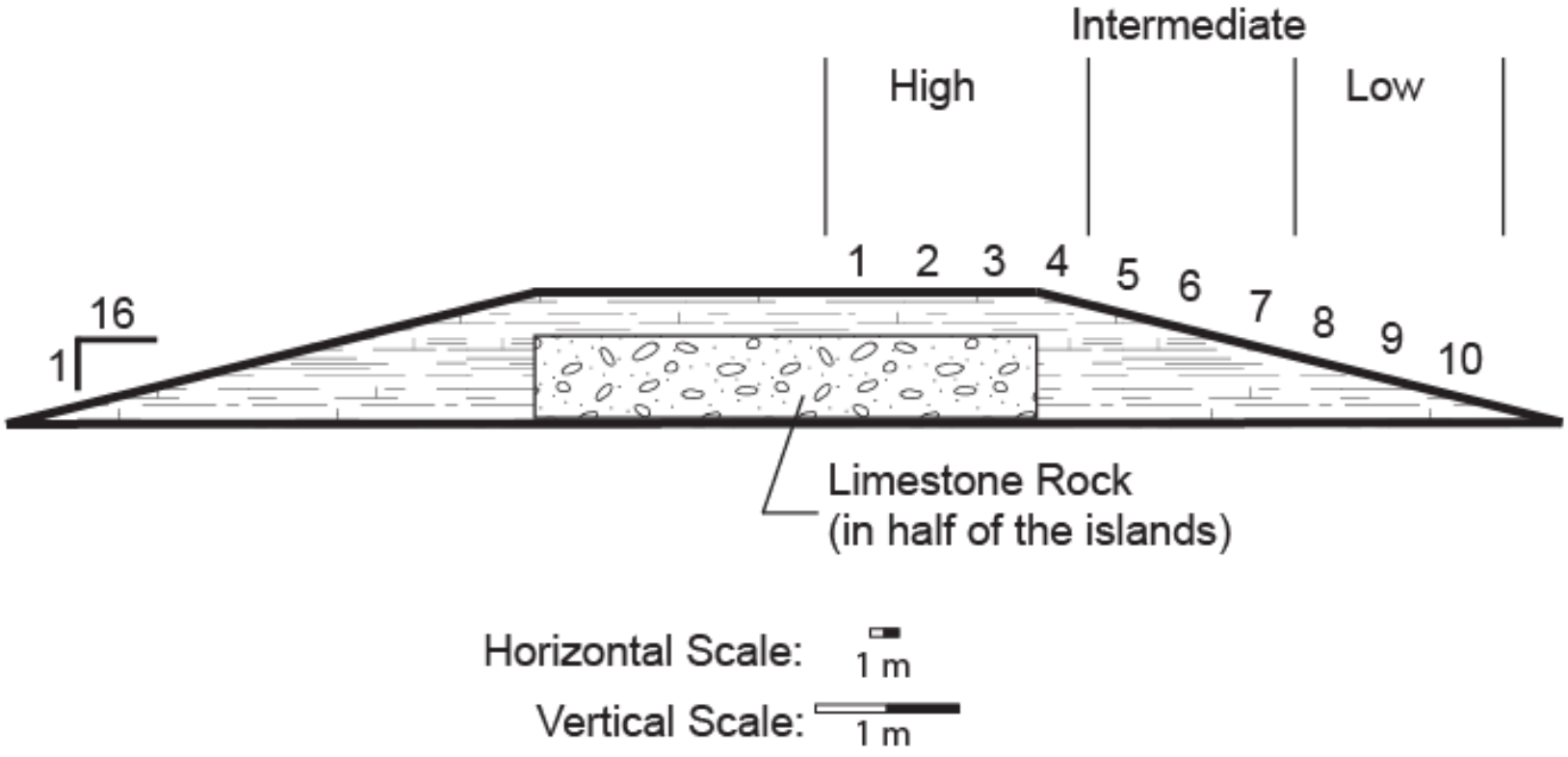
67% Decline

Study Objectives

- Determine the most hardy seedling species for tree island restoration
- Determine hydrologic range of common tree island seedlings
- Test effect of limestone core on seedling establishment

Loxahatchee Impoundment Landscape Assessment (LILA)

Hydrologic Categories



Species Tested

- *Acer rubrum*
- *Annona glabra*
- *Chrysobalanus icaco*
- *Ilex cassine*
- *Magnolia virginiana*
- *Myrica cerifera*
- *Salix caroliniana*


IFAS Ext.


State of Queensland

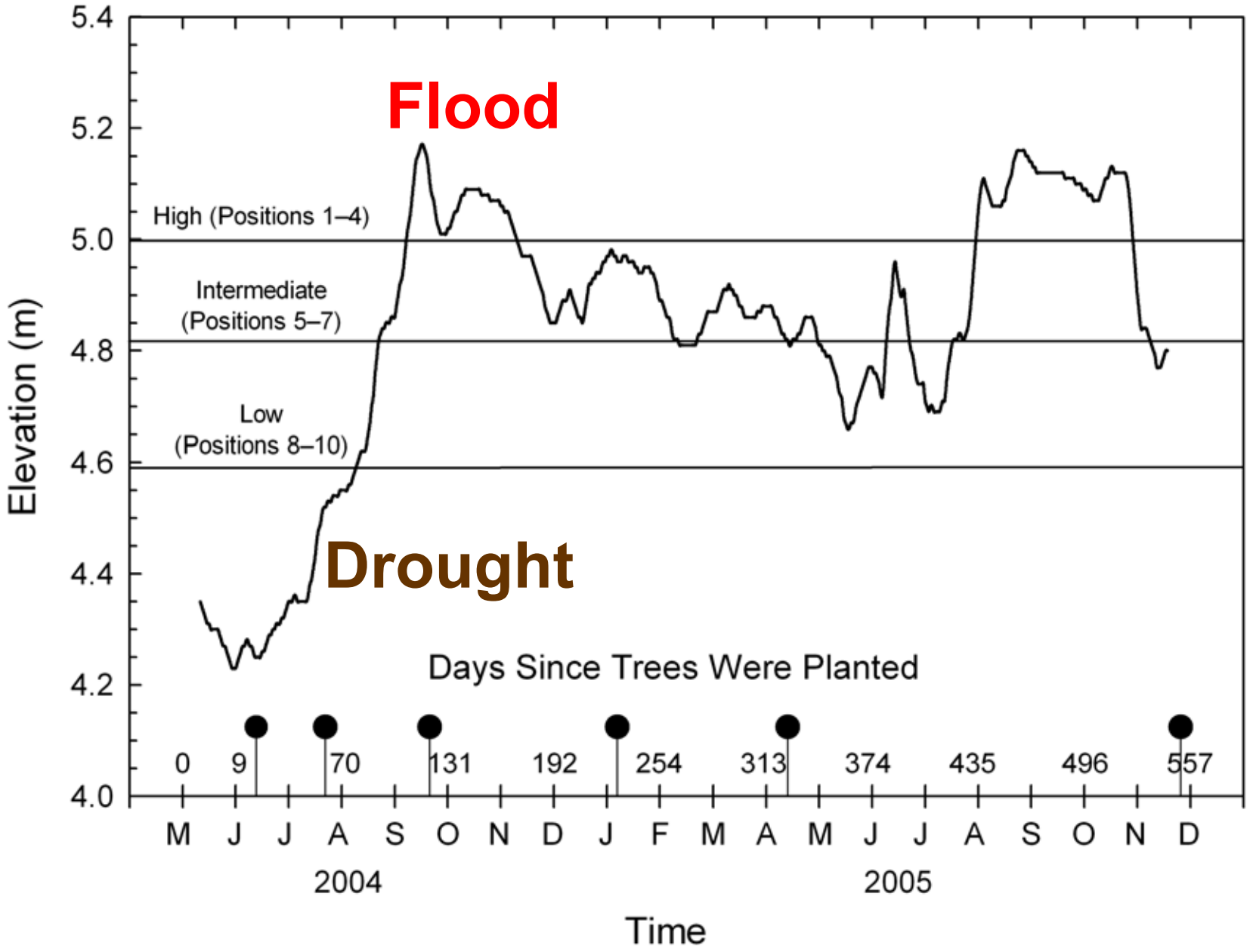

New York Botanical Garden


IFAS Ext.

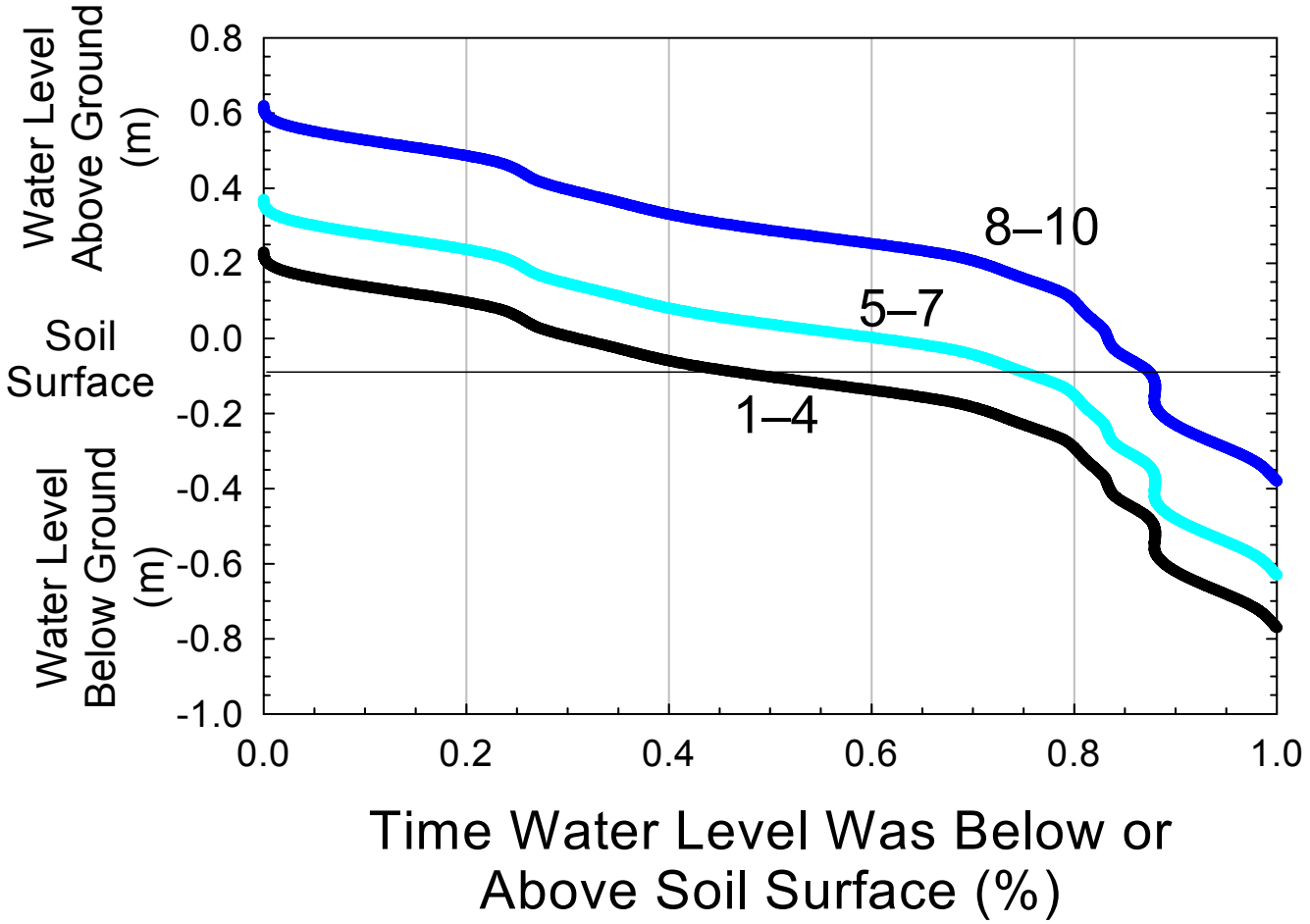

Steve Nix

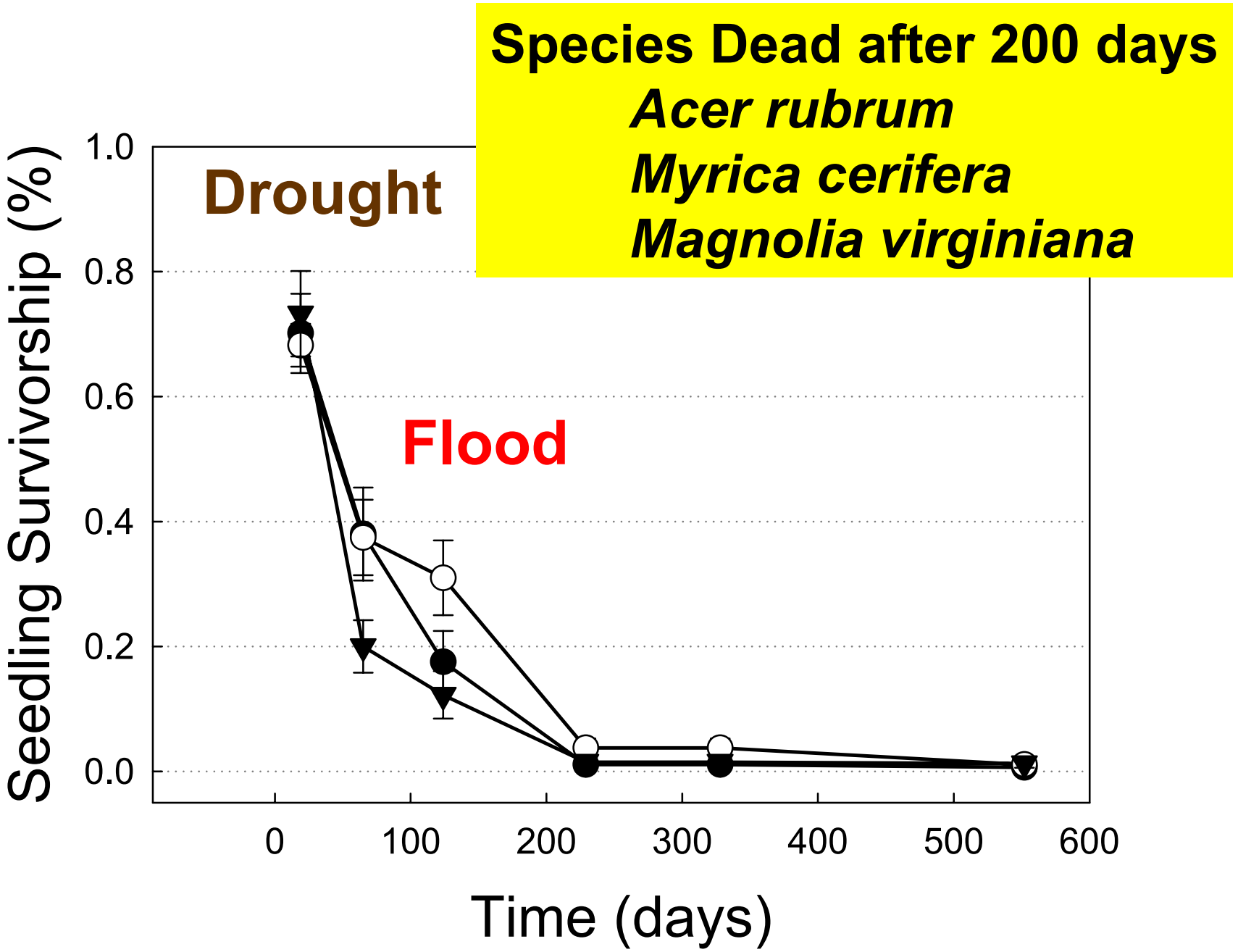

IFAS Ext.

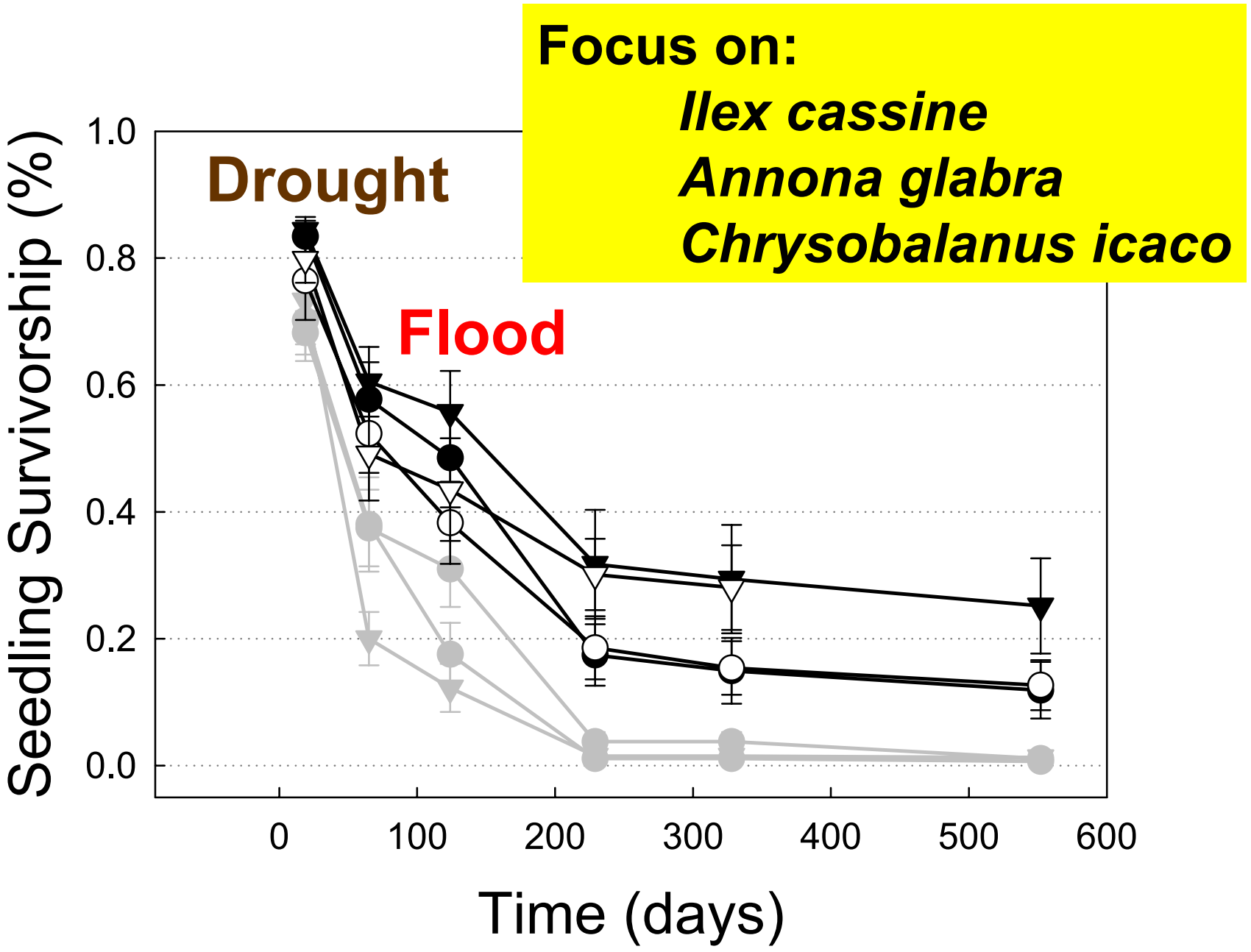

IFAS Ext.

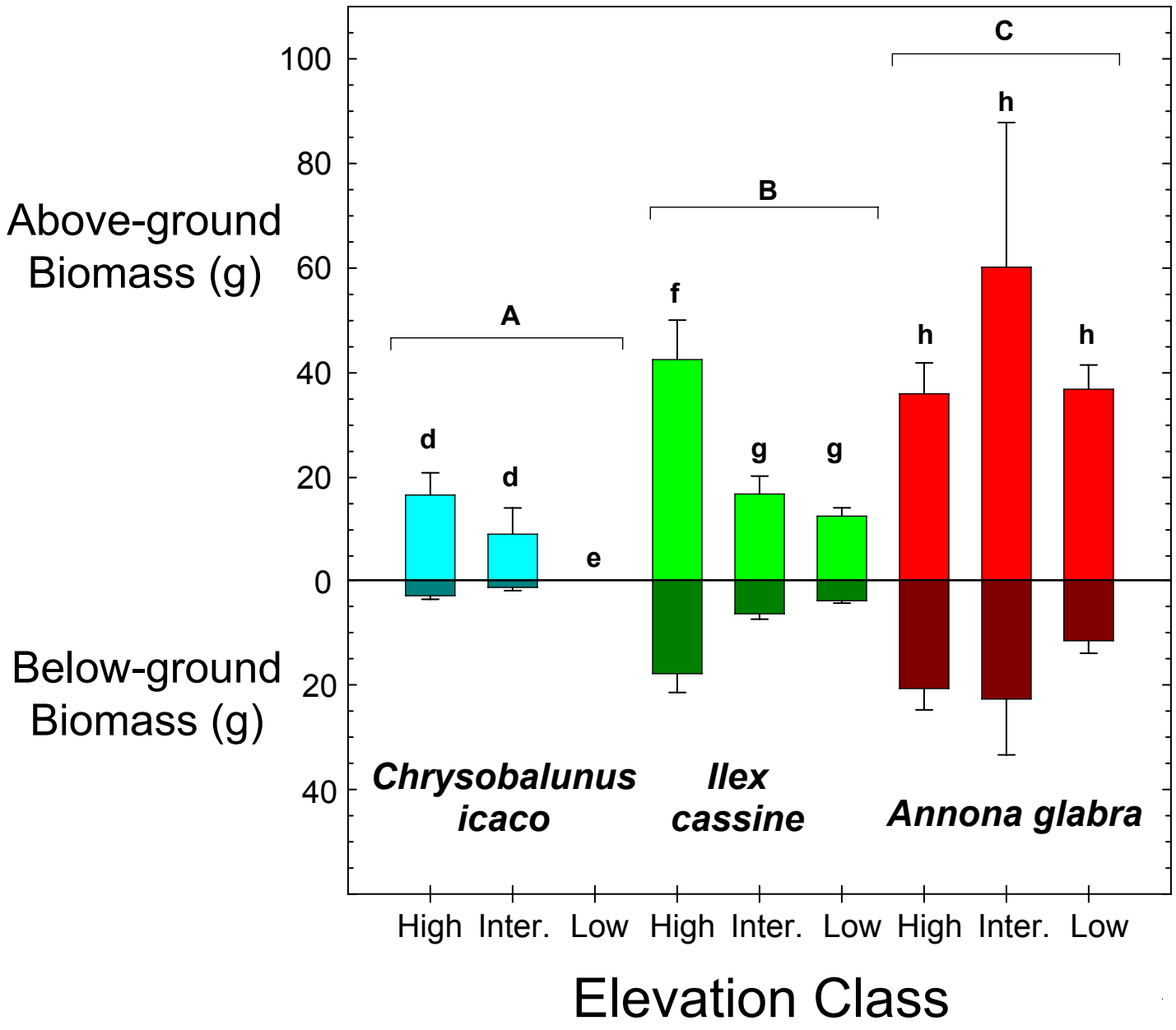

Flood
Drought
High (Positions 1–4)
Intermediate
(Positions 5–7)
Low
(Positions 8–10)
Elevation (m)
5.4
5.2
5.0
4.8
4.6
4.4
4.2
4.0
Days Since Trees Were Planted
0
9
70
131
192
254
313
374
435
496
557
M J J A S O N D J F M A M J J A S O N D
2004
2005
Time

Position Inundation (time)
1–4 → 22–32%
5–7 → 43–60%
8–10 → 74–83%

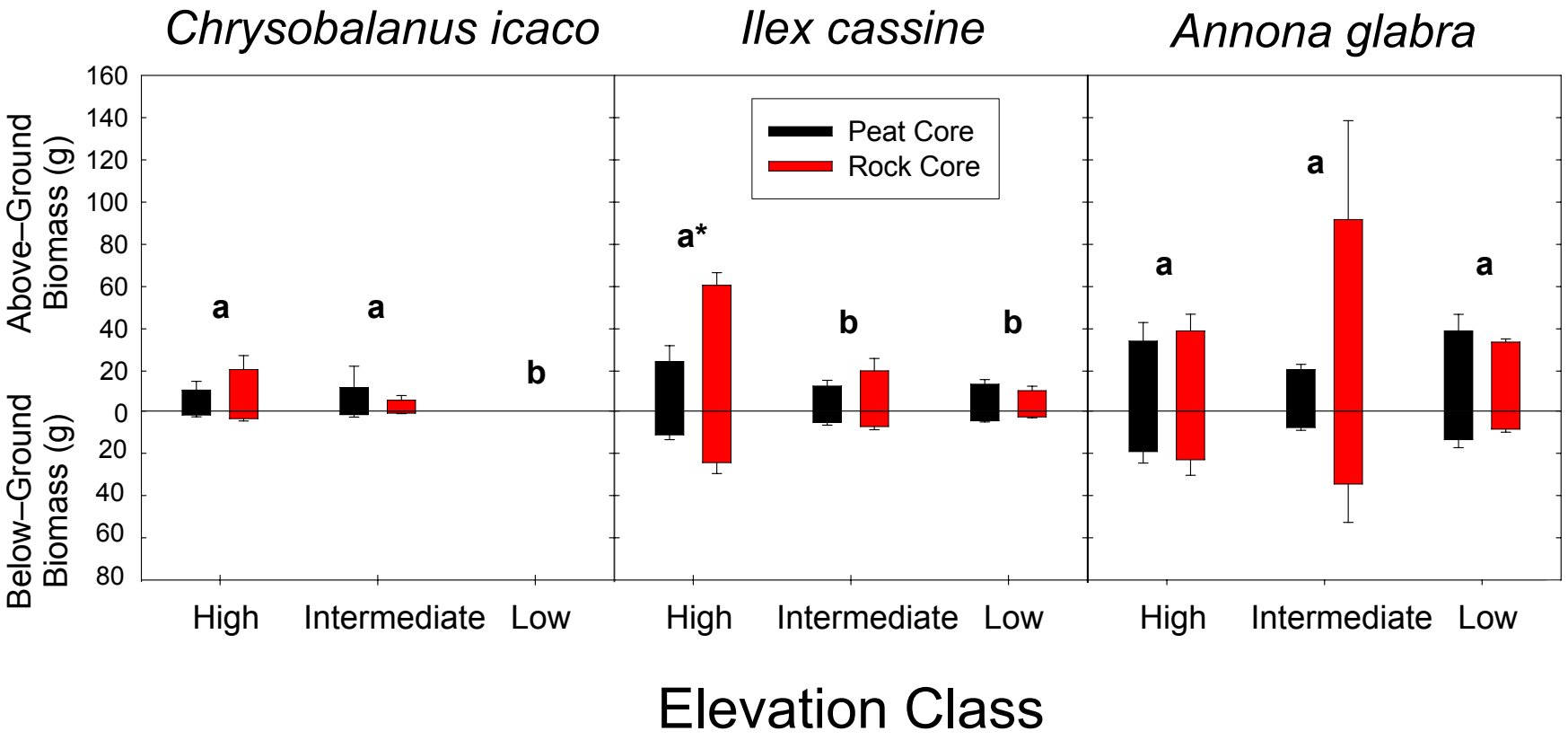



Species Dead after 200 days
Acer rubrum
Myrica cerifera
Magnolia virginiana
Drought
Flood
Seedling Survivorship (%)
1.0
0.8
0.6
0.4
0.2
0.0
0
100
200
300
400
500
600
Time (days)


Focus on:
Ilex cassine
Annona glabra
Chrysobalanus icaco
Drought
Flood
Seedling Survivorship (%)
1.0
0.8
0.6
0.4
0.2
0.0
0
100
200
300
400
500
600
Time (days)


Above-ground Biomass (g)
Below-ground Biomass (g)
100
80
60
40
20
0
20
40
A
B
C
d
d
e
f
g
g
h
h
h
Chrysobalunus icaco
Ilex cassine
Annona glabra
High
Inter.
Low
High
Inter.
Low
High
Inter.
Low
Elevation Class

Biomass by Island Core



Implications for Restoration

- *Annona glabra*, *Ilex cassine*, and *Salix caroliniana* survived both low and high water periods best.
  - Most suitable species for the initial re–vegetation of restored tree islands.
- Larger seedlings (1 m tall) should be planted on restored tree islands.
- Limestone cores may improve growth of tree seedlings.
  - Constructed islands should have limestone cores if economically feasible.