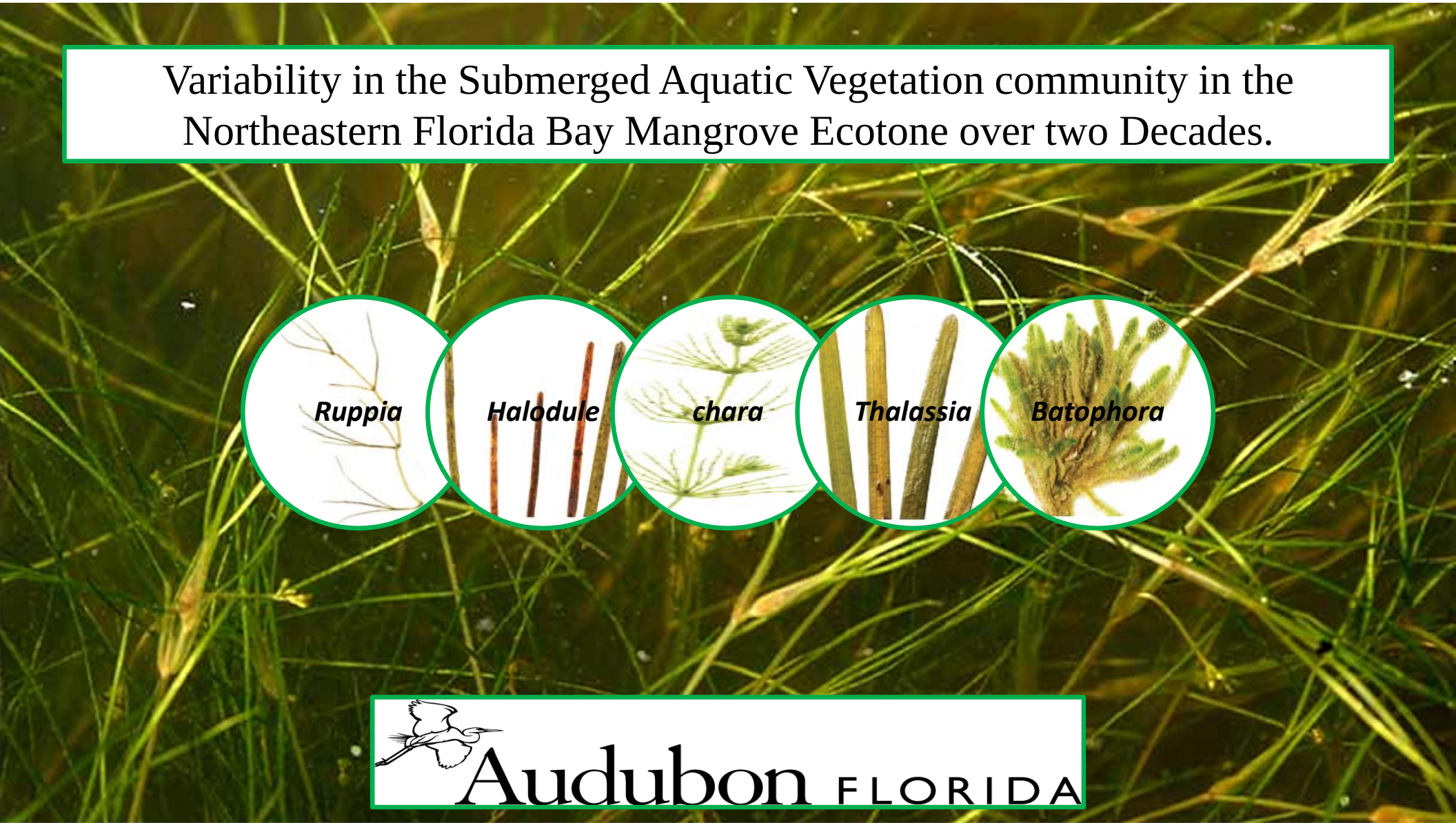
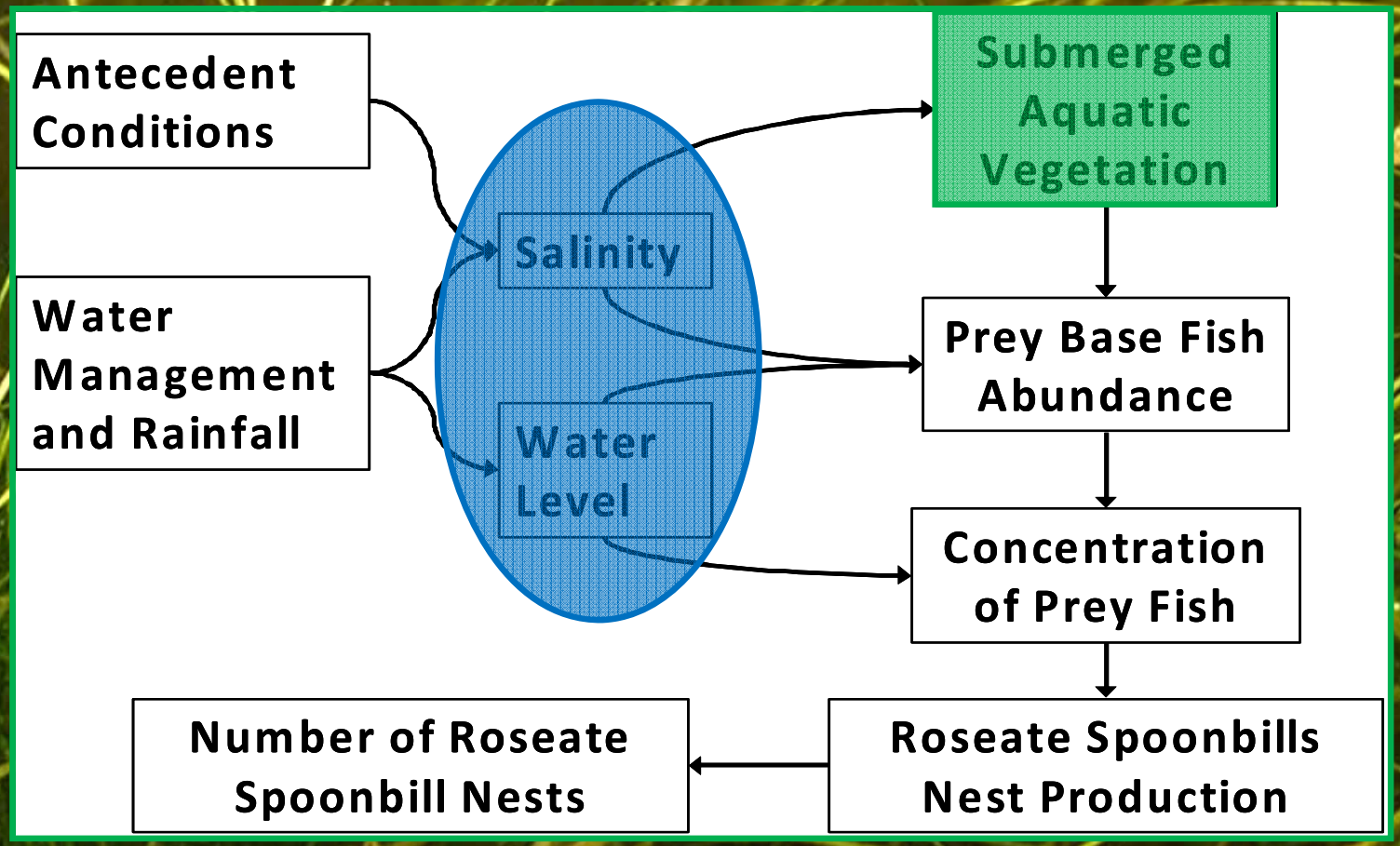
# Variability in the Submerged Aquatic Vegetation community in the Northeastern Florida Bay Mangrove Ecotone over two Decades.

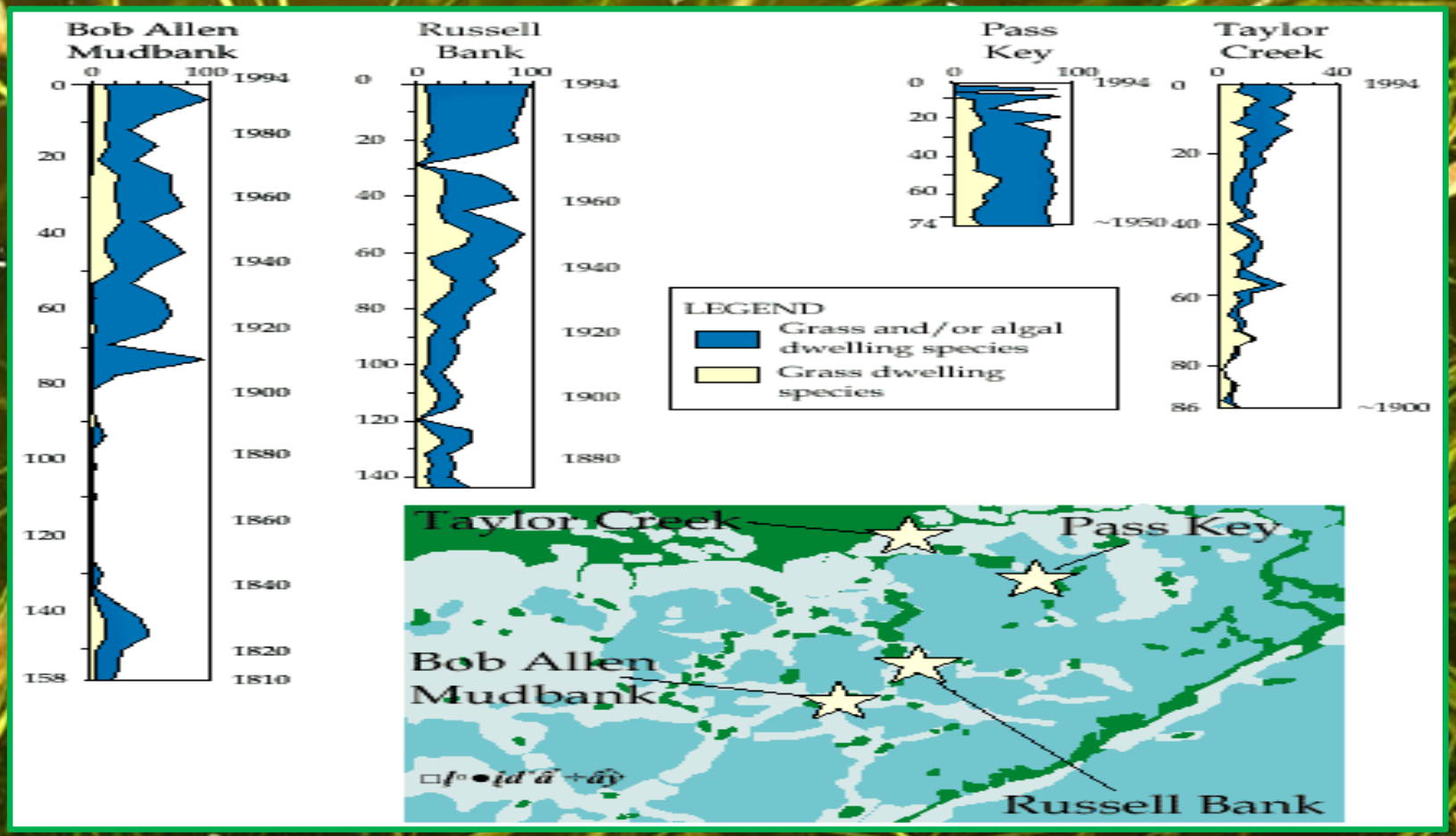



Audubon FLORIDA

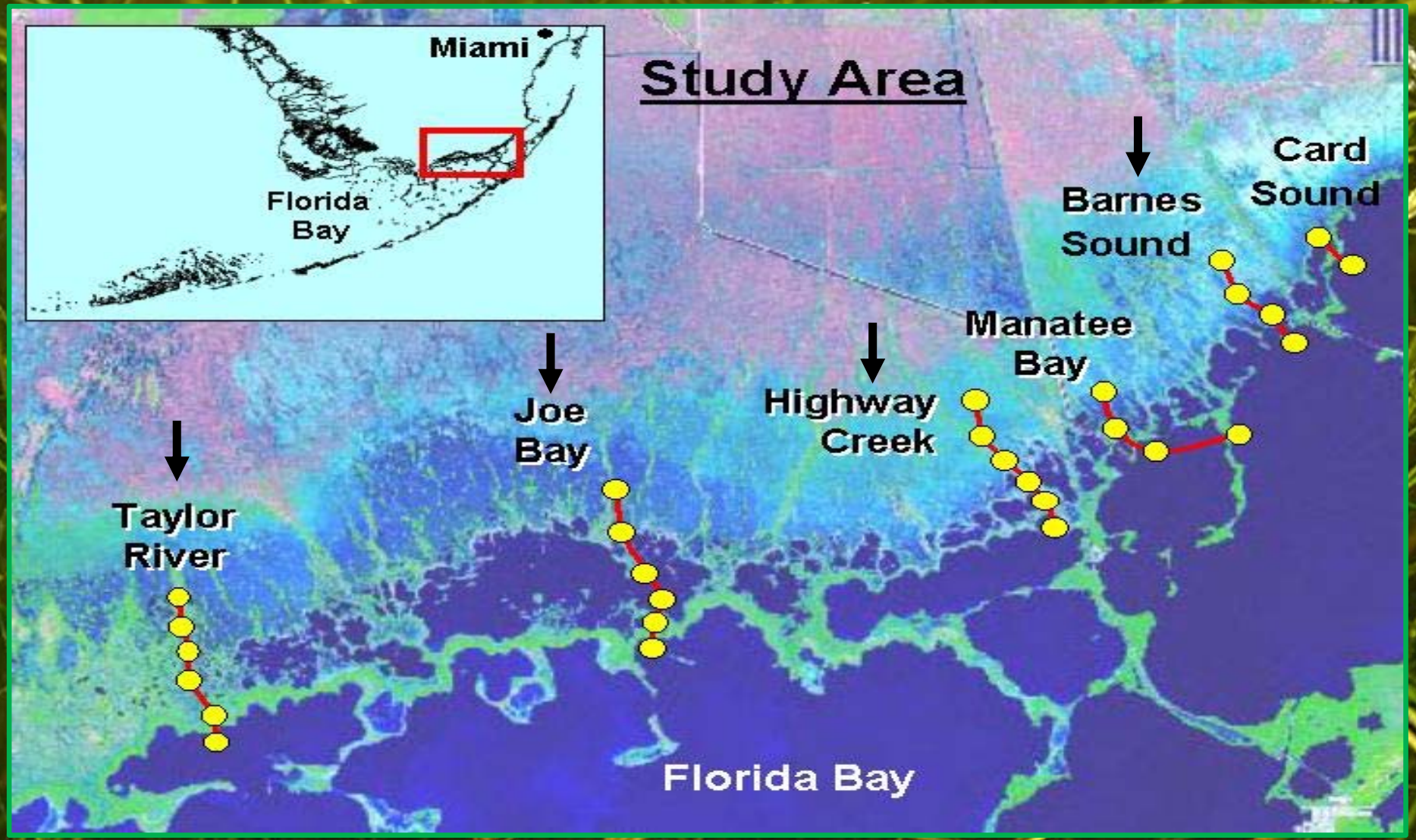
# Conceptual ecological model for spoonbills nesting in Florida Bay



# Historical SAV Patterns in Florida Bay




From: http://sofia.usgs.gov/projects/eh_fbswc/histrecabgeer00.html Authors: G. Lynn Brewster-Wingard and Jeffery R. Stone. Greater Everglades Ecosystem Restoration (GEER) Open File Report


Miami
Florida
Bay
Study Area
Barnes
Sound
Card
Sound
Manatee
Bay
Highway
Creek
Joe
Bay
Taylor
River
Florida Bay

# Sampling Methods

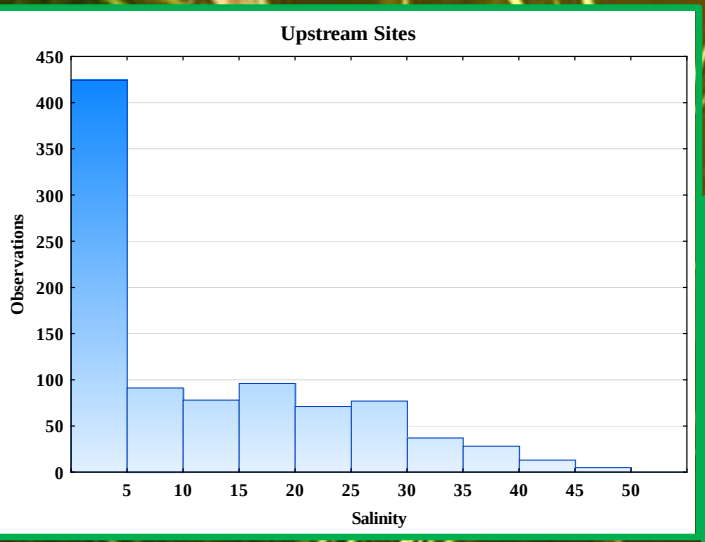
-Bimonthly surveys

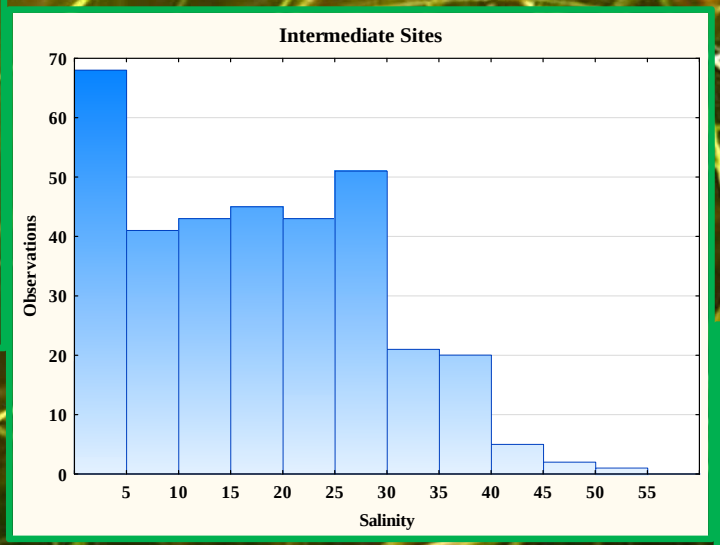
-Point intercept percent coverage method using 0.25 $m^2$ quadrat with 25 points

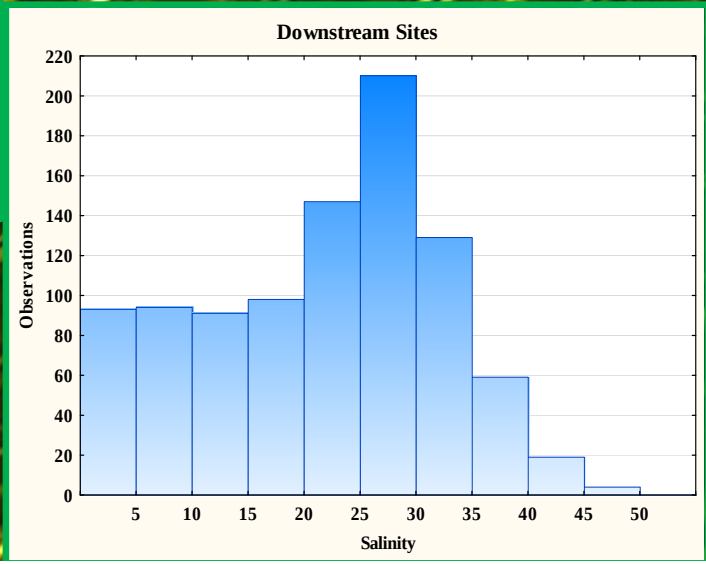
-Relating SAV coverage to hydrologic conditions:

water temperature ($^oC$)
water depth (cm)
Salinity
sediment depth (cm) to bedrock
water clarity

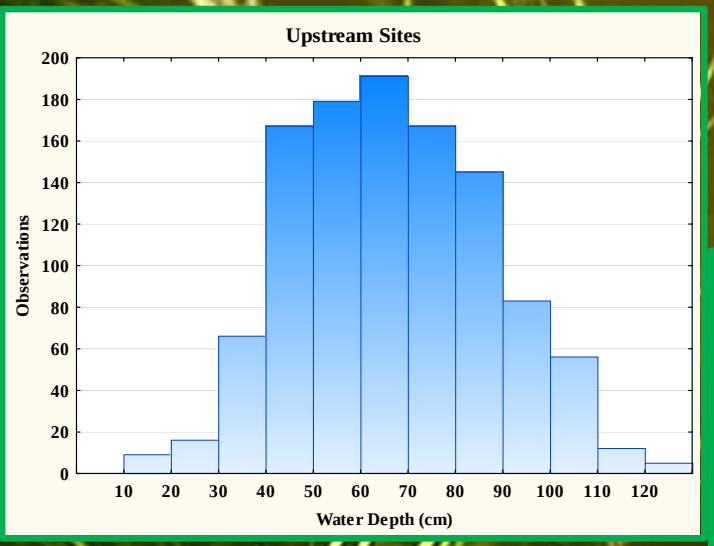
# Salinity Trends along Transect

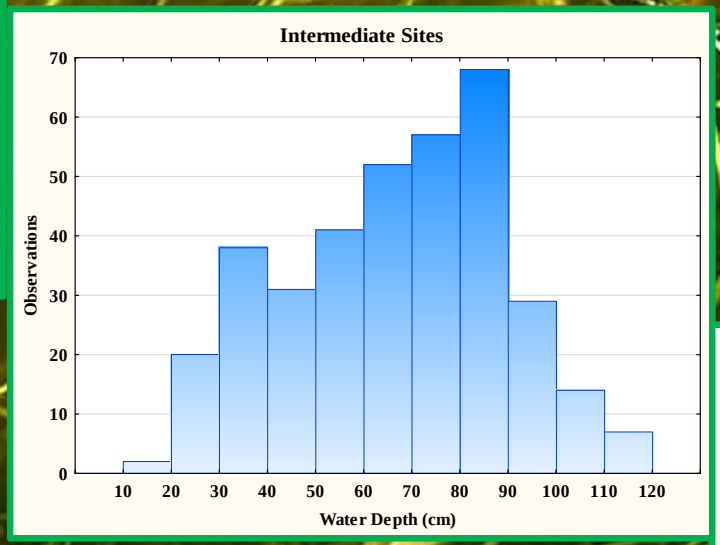


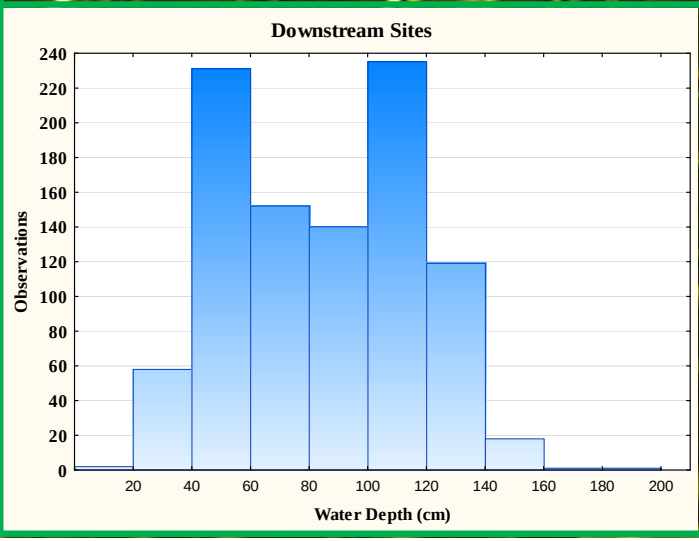



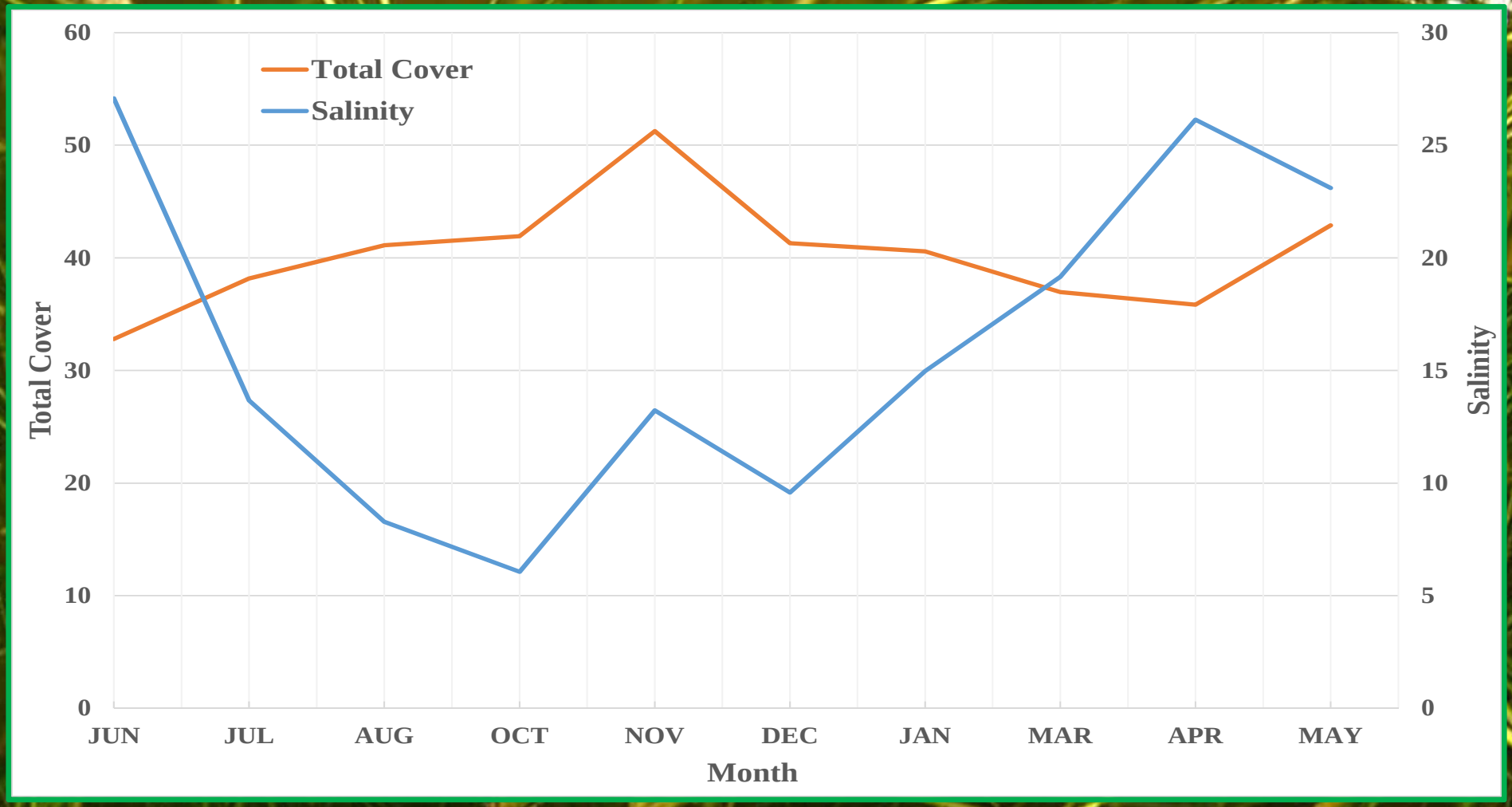
# Water Depth Trends along Transect

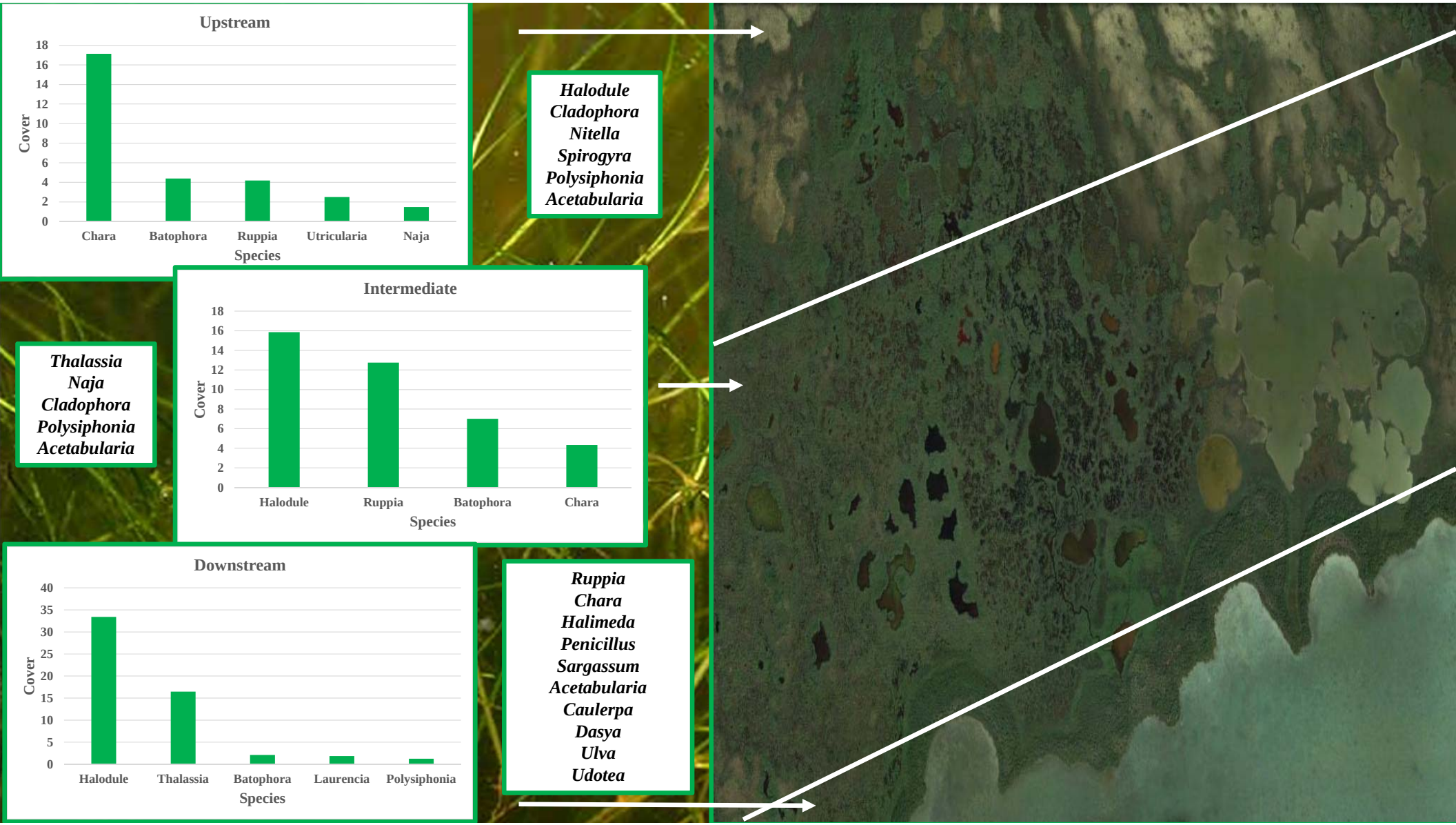


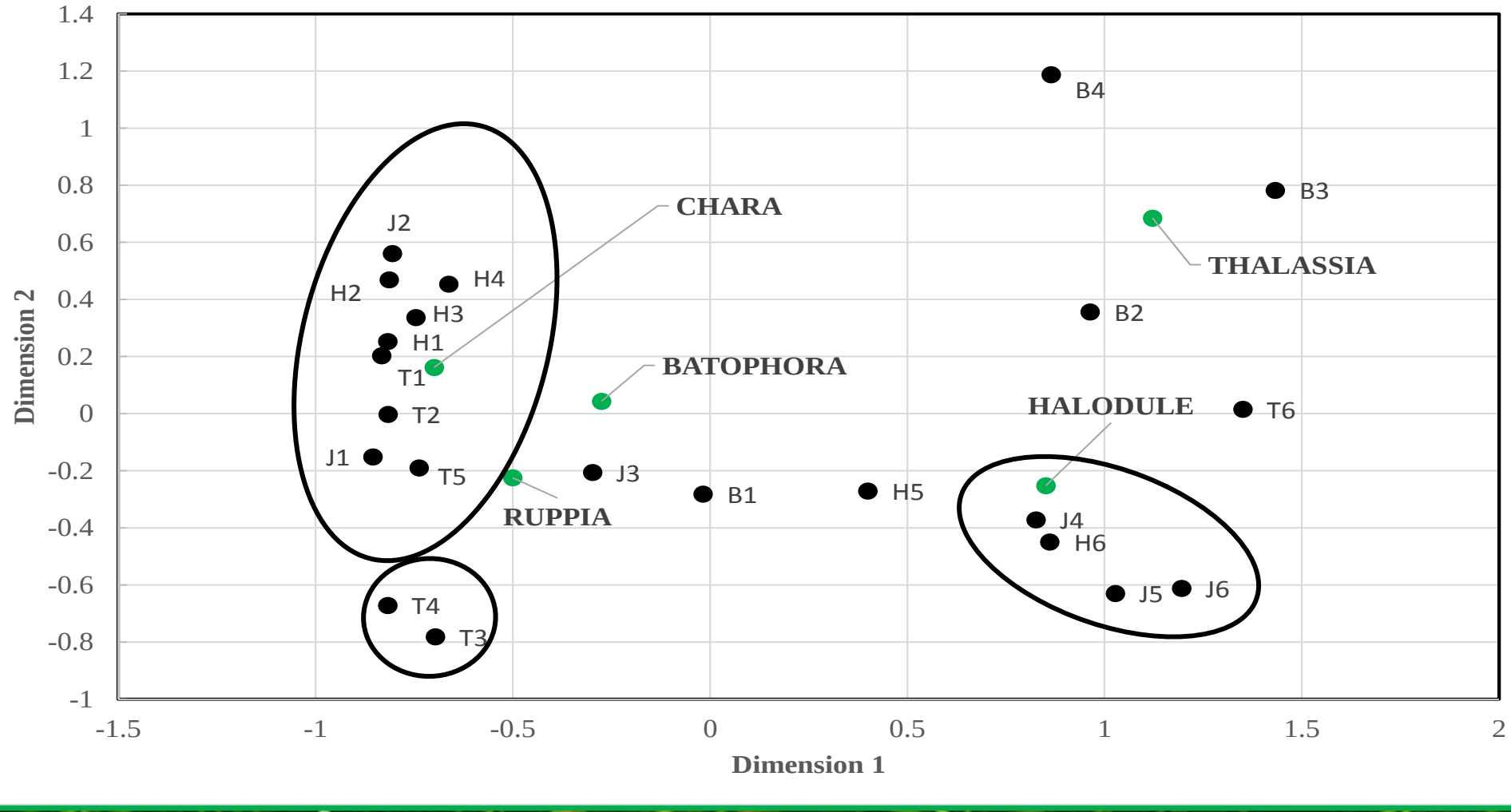



Changes in SAV Total Cover with Seasonal Salinity Fluctuations



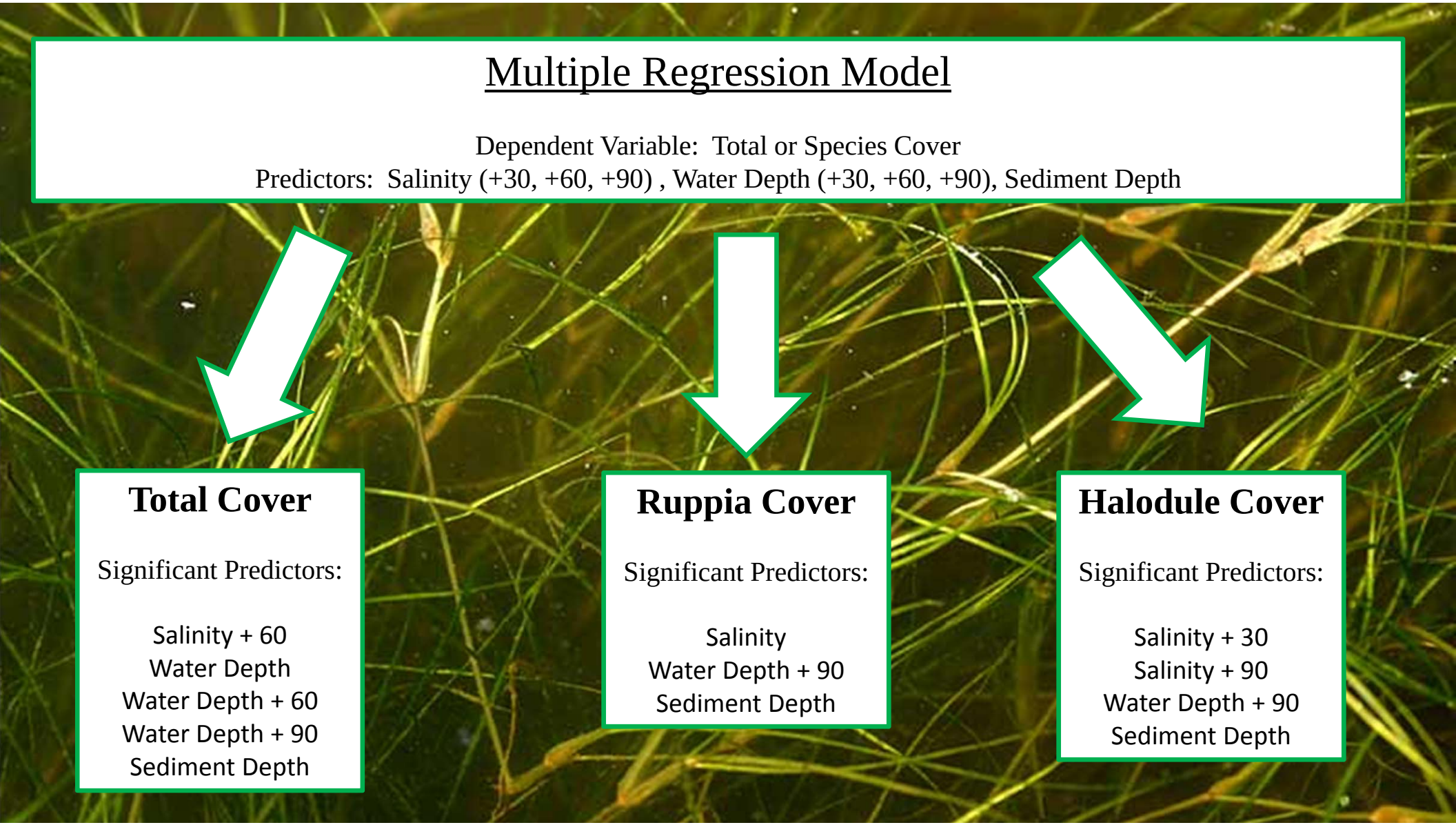

Upstream
Cover
18
16
14
12
10
8
6
4
2
0
Chara
Batophora
Ruppia
Utricularia
Naja
Species
Halodule
Cladophora
Nitella
Spirogyra
Polysiphonia
Acetabularia
Intermediate
Cover
18
16
14
12
10
8
6
4
2
0
Halodule
Ruppia
Batophora
Chara
Species
Thalassia
Naja
Cladophora
Polysiphonia
Acetabularia
Downstream
Cover
40
35
30
25
20
15
10
5
0
Halodule
Thalassia
Batophora
Laurencia
Polysiphonia
Species
Ruppia
Chara
Halimeda
Penicillus
Sargassum
Acetabularia
Caulerpa
Dasya
Ulva
Udotea




Salinity: 10.32 16.88 21.68

# Multiple Regression Model

Dependent Variable: Total or Species Cover
Predictors: Salinity (+30, +60, +90) , Water Depth (+30, +60, +90), Sediment Depth



## Total Cover

Significant Predictors:

Salinity + 60
Water Depth
Water Depth + 60
Water Depth + 90
Sediment Depth

## Ruppia Cover

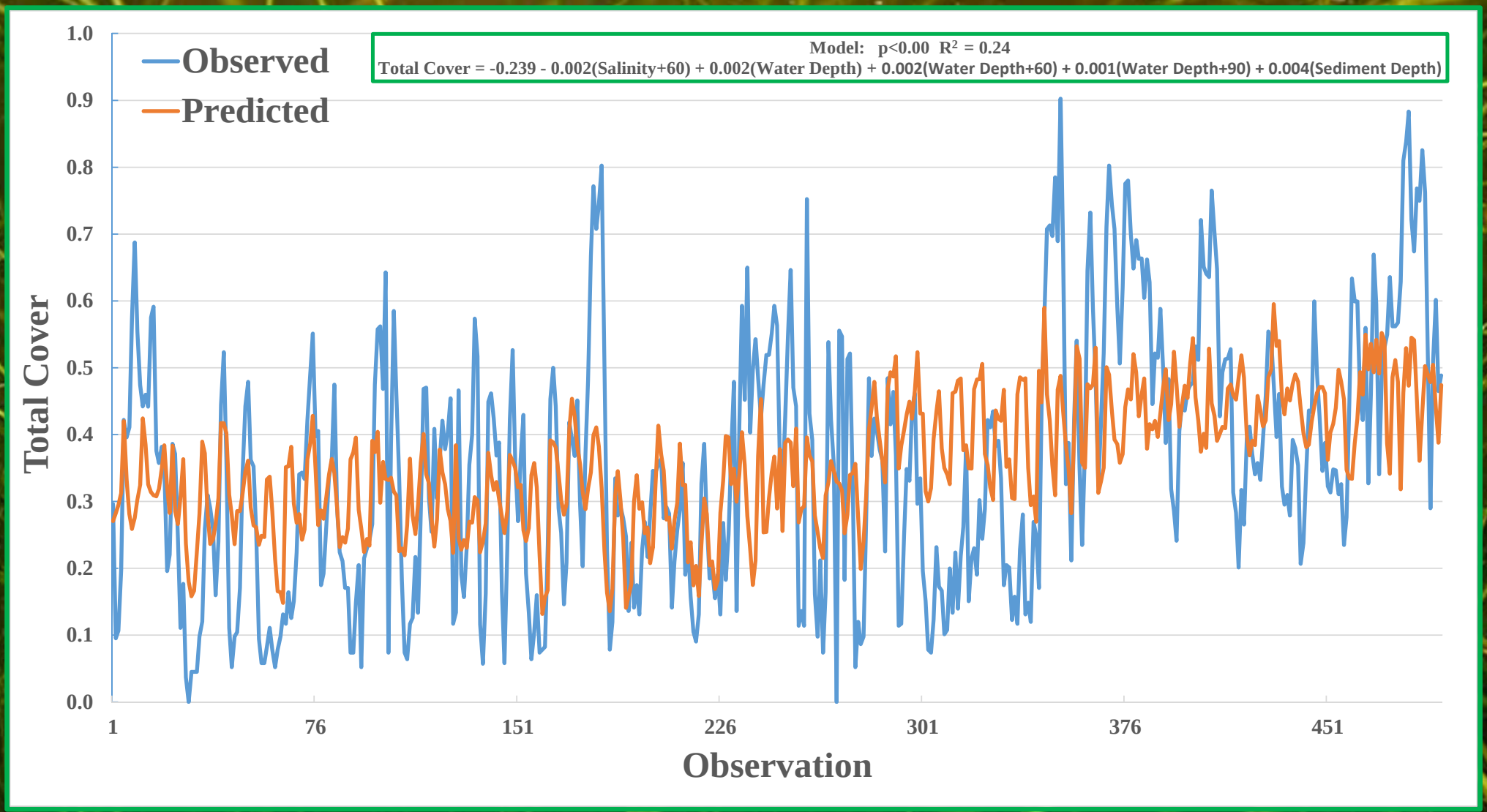
Significant Predictors:

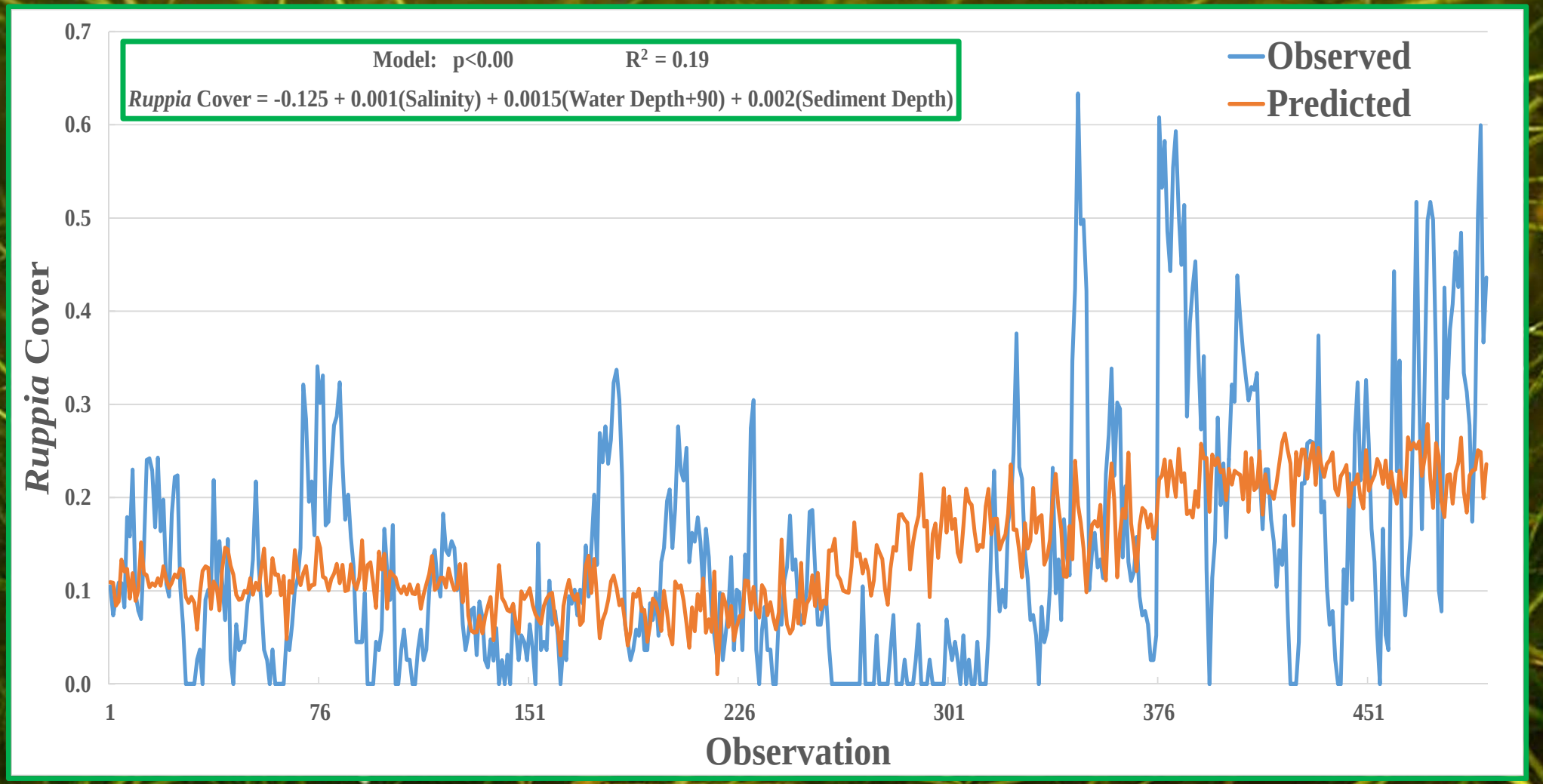
Salinity
Water Depth + 90
Sediment Depth

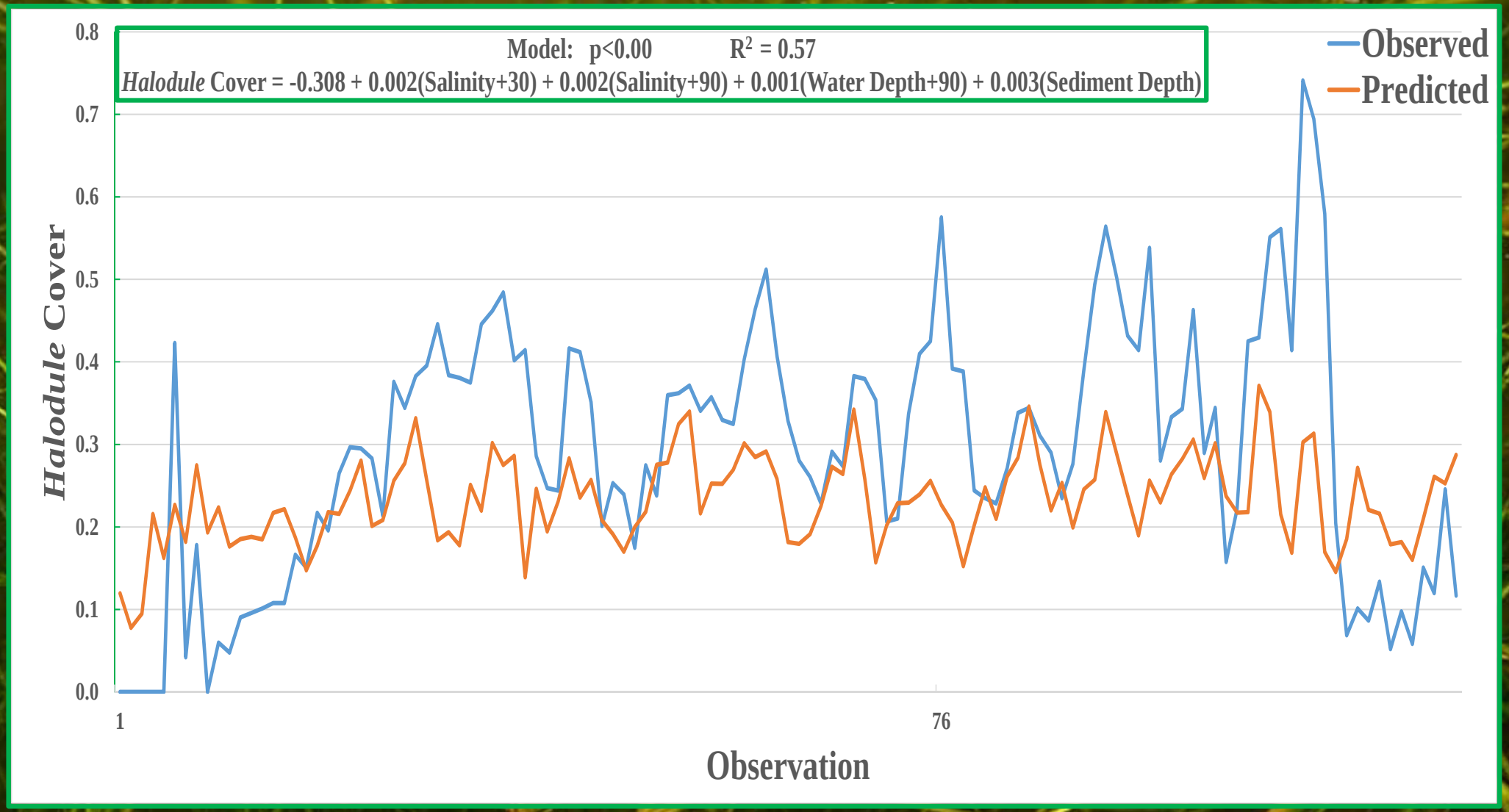
## Halodule Cover

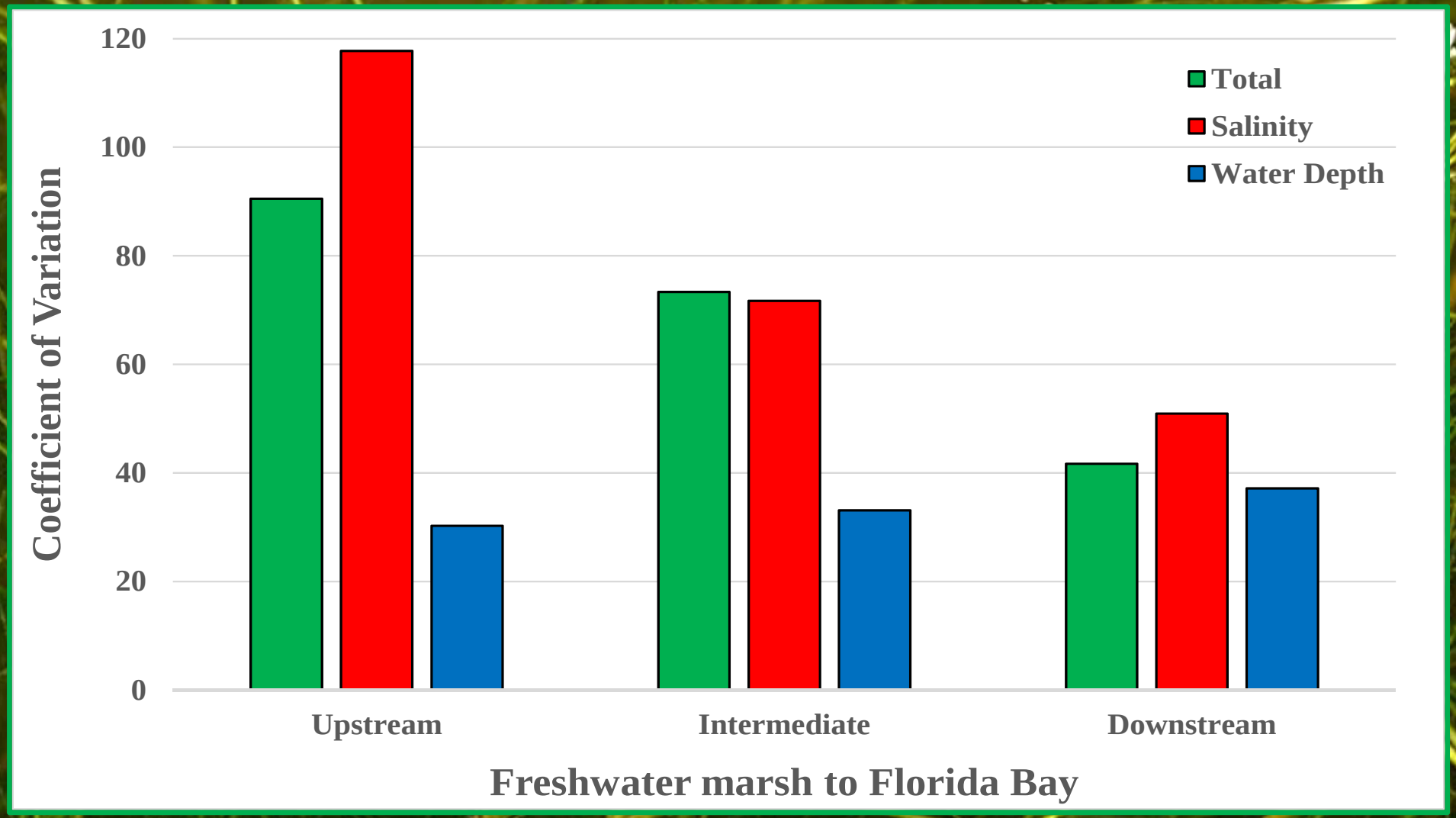
Significant Predictors:

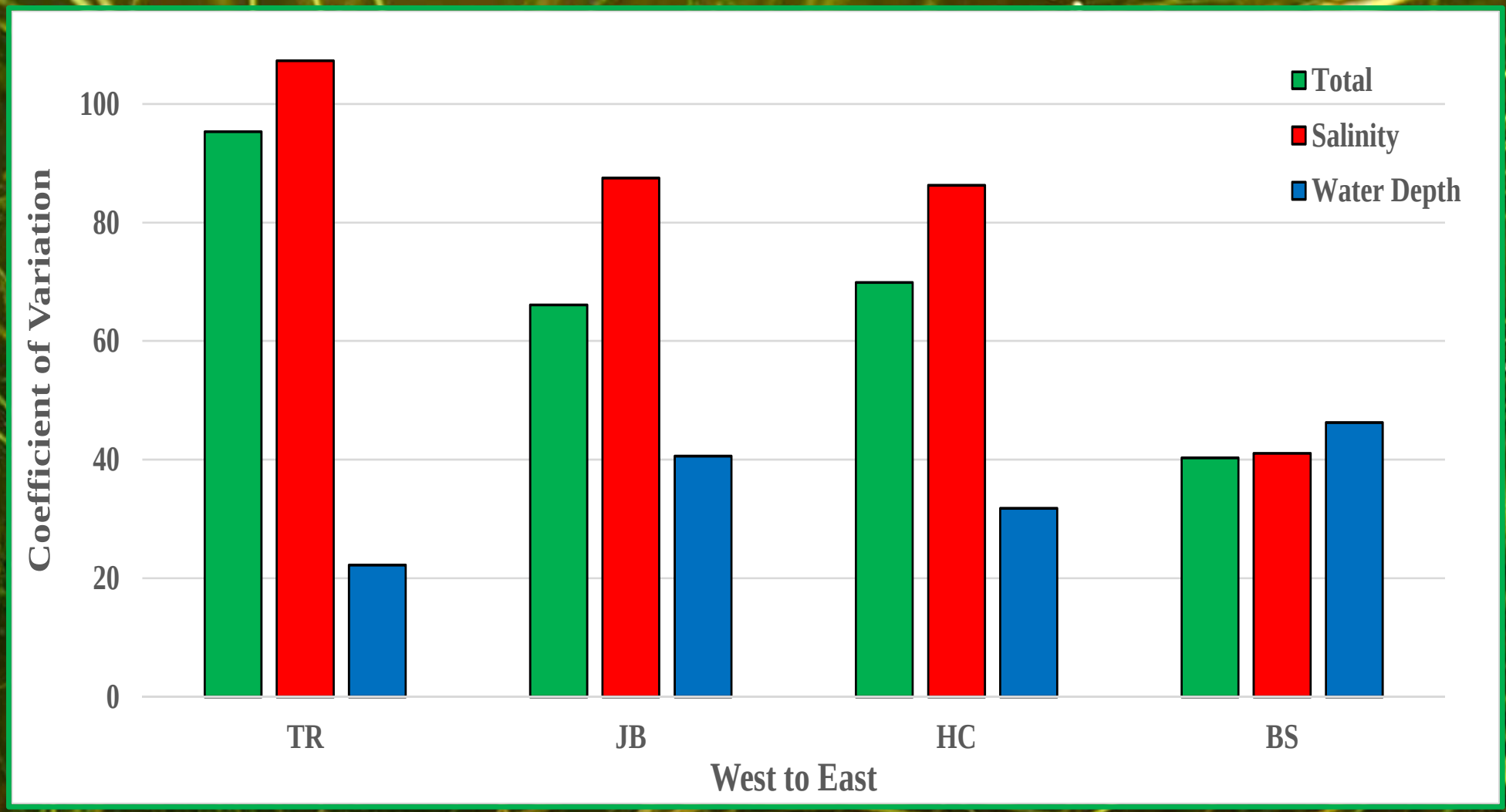
Salinity + 30
Salinity + 90
Water Depth + 90
Sediment Depth

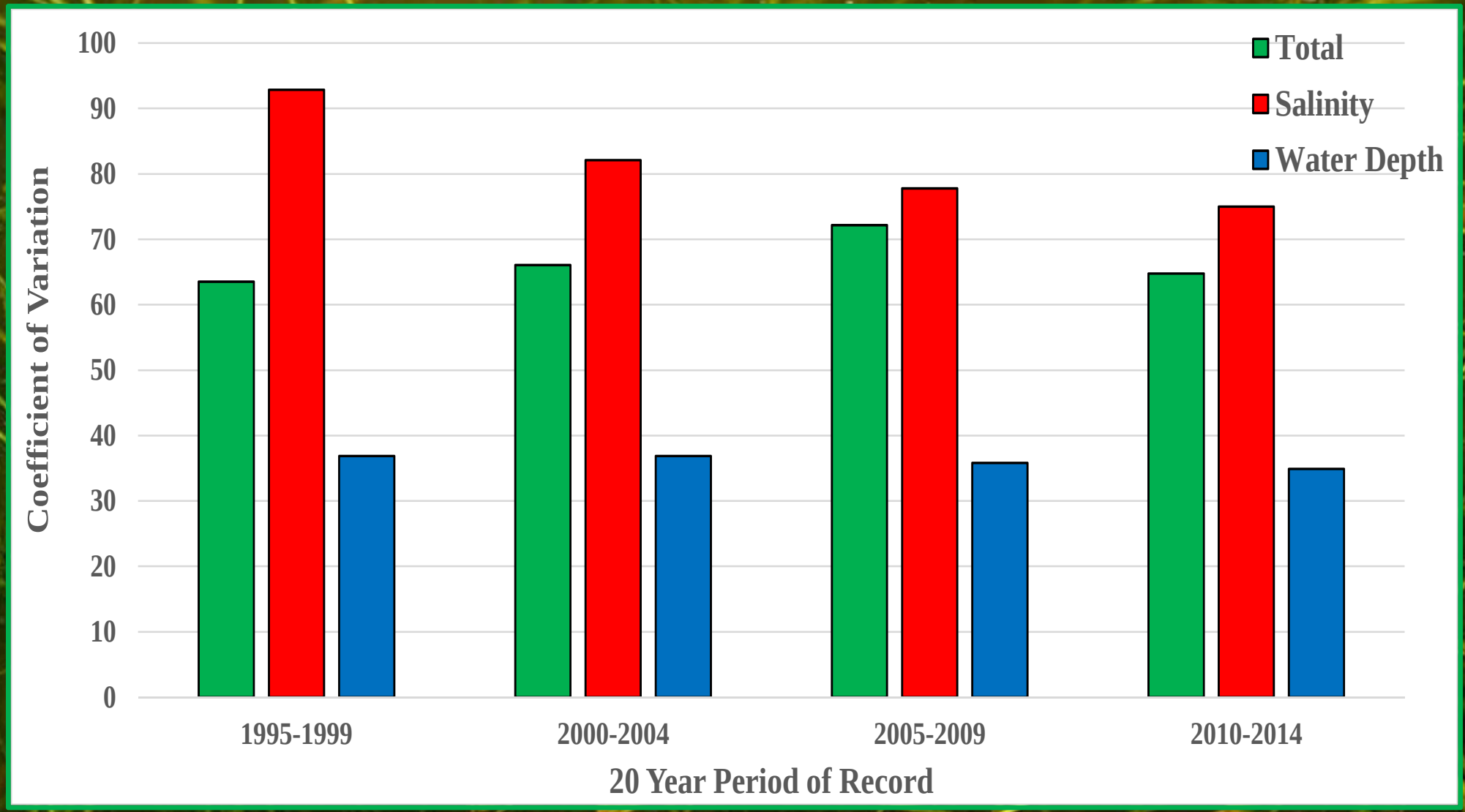

Observed
Predicted
Model: p<0.00 R² = 0.24
Total Cover = -0.239 - 0.002(Salinity+60) + 0.002(Water Depth) + 0.002(Water Depth+60) + 0.001(Water Depth+90) + 0.004(Sediment Depth)
Total Cover
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
76
151
226
301
376
451
Observation

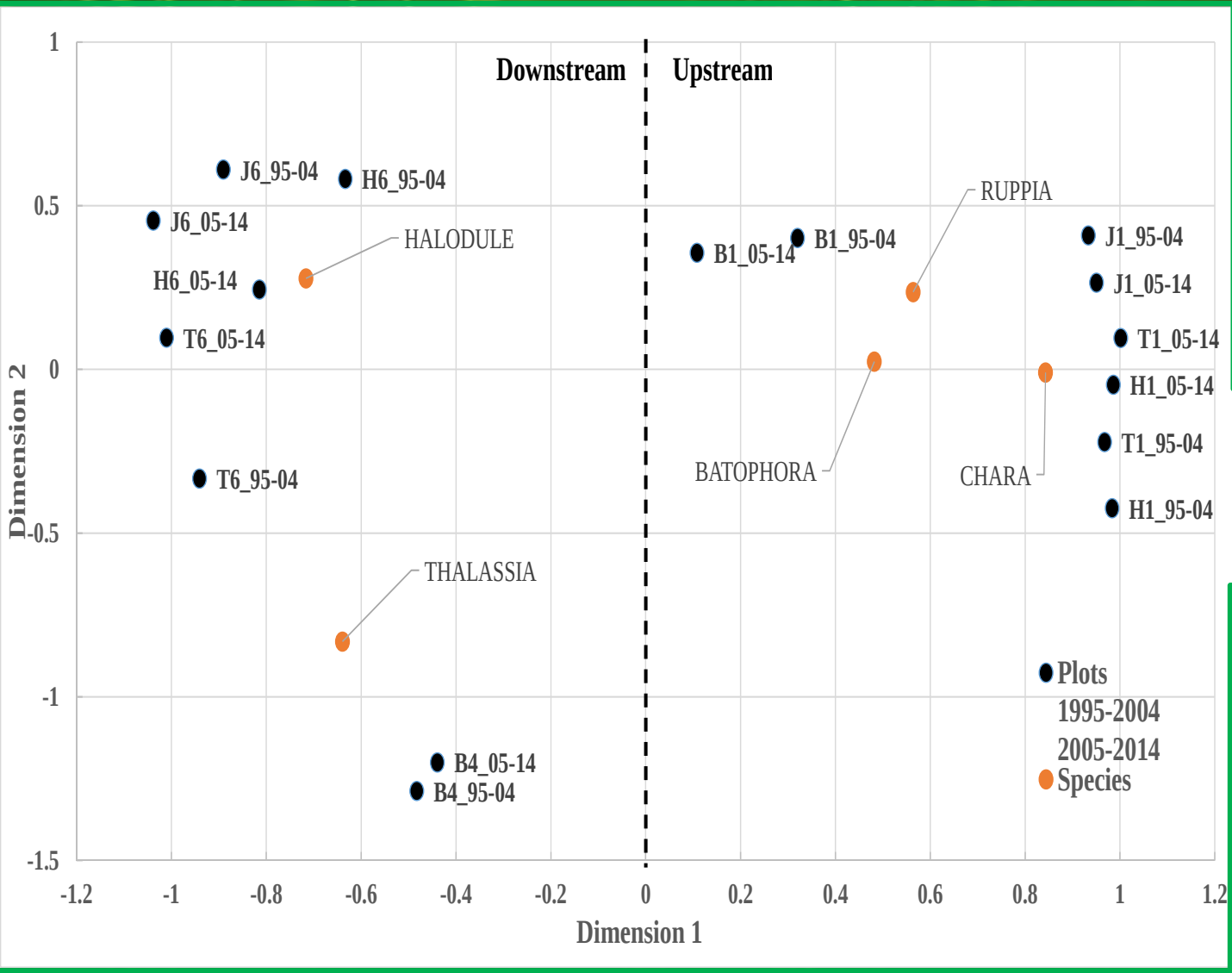

Model: p<0.00 $R^2$ = 0.19
*Ruppia* Cover = -0.125 + 0.001(Salinity) + 0.0015(Water Depth+90) + 0.002(Sediment Depth)
Observed
Predicted
*Ruppia* Cover
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
76
151
226
301
376
451
Observation

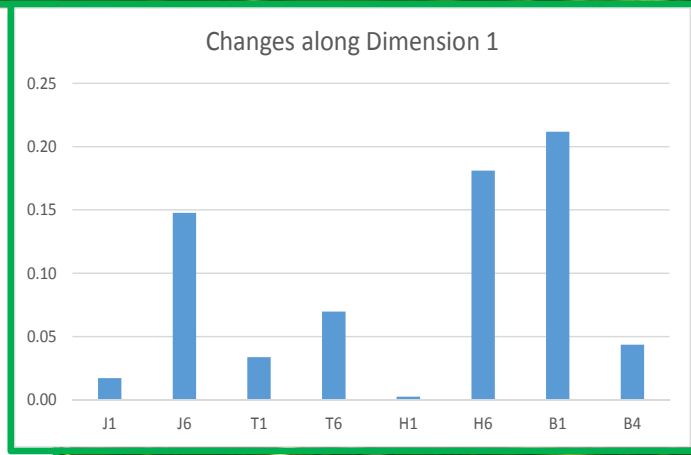

Model: p<0.00 $R^2$ = 0.57
*Halodule* Cover = -0.308 + 0.002(Salinity+30) + 0.002(Salinity+90) + 0.001(Water Depth+90) + 0.003(Sediment Depth)
Observed
Predicted
*Halodule* Cover
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
76
Observation

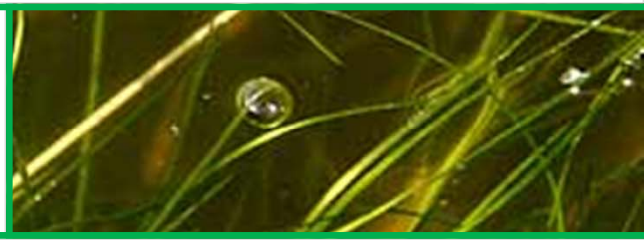

120
100
80
60
40
20
0
Coefficient of Variation
Total
Salinity
Water Depth
Upstream
Intermediate
Downstream
Freshwater marsh to Florida Bay


Coefficient of Variation
100
80
60
40
20
0
TR
JB
HC
BS
West to East
Total
Salinity
Water Depth


Coefficient of Variation
100
90
80
70
60
50
40
30
20
10
0
Total
Salinity
Water Depth
1995-1999
2000-2004
2005-2009
2010-2014
20 Year Period of Record


Downstream
Upstream
J6_95-04
H6_95-04
J6_05-14
HALODULE
H6_05-14
T6_05-14
T6_95-04
THALASSIA
B4_05-14
B4_95-04
B1_05-14
B1_95-04
RUPPIA
BATOPHORA
CHARA
J1_95-04
J1_05-14
T1_05-14
H1_05-14
T1_95-04
H1_95-04
Plots
1995-2004
2005-2014
Species
Dimension 1
Dimension 2
1
0.5
0
-0.5
-1
-1.5
-1.2
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
1.2


Changes along Dimension 1
0.25
0.20
0.15
0.10
0.05
0.00
J1
J6
T1
T6
H1
H6
B1
B4




Changes along Dimension 2
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
J1
J6
T1
T6
H1
H6
B1
B4

# Conclusions

-A large proportion of the variability in SAV community cover can be explained using long term records of primarily salinity in conjuction with depth, and sediment depth.

-Despite initial increases in the variability of the SAV community cover with decreasing variability in salinity over the past 20 years; within the past five years SAV community variability has begun to decrease.

-The most notable changes in the SAV communities are occurring in the downstream portions of the transects closest to Florida Bays marine influence.