

WETLANDS

Steve Henstra
Glen Porter
Alison Campbell

GRASSLANDS

Robbie Lee

FORESTS

Scott Black
Kaeli Stark
Gary Lewis
Tania Perzoff
Andre Arsenault
Andrea Lawson
Rosemary Mason
Daniel Gagnon



Research examples from my lab

COMMUNITY THEORY

Elizabeth Binney
Alfred Brulisauer
Paul Drewa

Bradfield Plant Ecology Lab

OTHER

Eduardo Jovel
Shannon Hagerman
Stephan Kesting
Qiwei Liang
Bob Bandringa
John Binns
Nick Page
Eva Downarowicz

BRYOPHYTES

Kella Sadler
Lyn Baldwin
Pat Williston
Norm Kenkel

Gary...the early years

...to conifer forests

From coastal marshes...





What's going on?



Stability: the capacity for communities to persist in the same state after disturbance

Community assembly: deterministic vs stochastic processes, role of the seedbank, etc.

Vegetation-environment relationships: tidal flooding, soil, climate

PCA application: intertidal marsh creation at the Campbell River estuary

Dawe, N. K., G. E. Bradfield, W. S. Boyd, D. E. C. Trethewey, and A. N. Zolbrod. 2000. Marsh creation in a northern Pacific estuary: Is thirteen years of monitoring vegetation dynamics enough? *Conservation Ecology* 4(2): 12. [online] URL: <http://www.consecol.org/vol4/iss2/art12>

A version of this article in which text, figures, tables, and appendices are separate files may be found by following this [link](#).

Report

Marsh Creation in a Northern Pacific Estuary: Is Thirteen Years of Monitoring Vegetation Dynamics Enough?

[Neil K. Dawe](#)¹, [Gary E. Bradfield](#)², [W. Sean Boyd](#)¹, [Donald E. C. Trethewey](#)¹, and [A. Nana Zolbrod](#)²

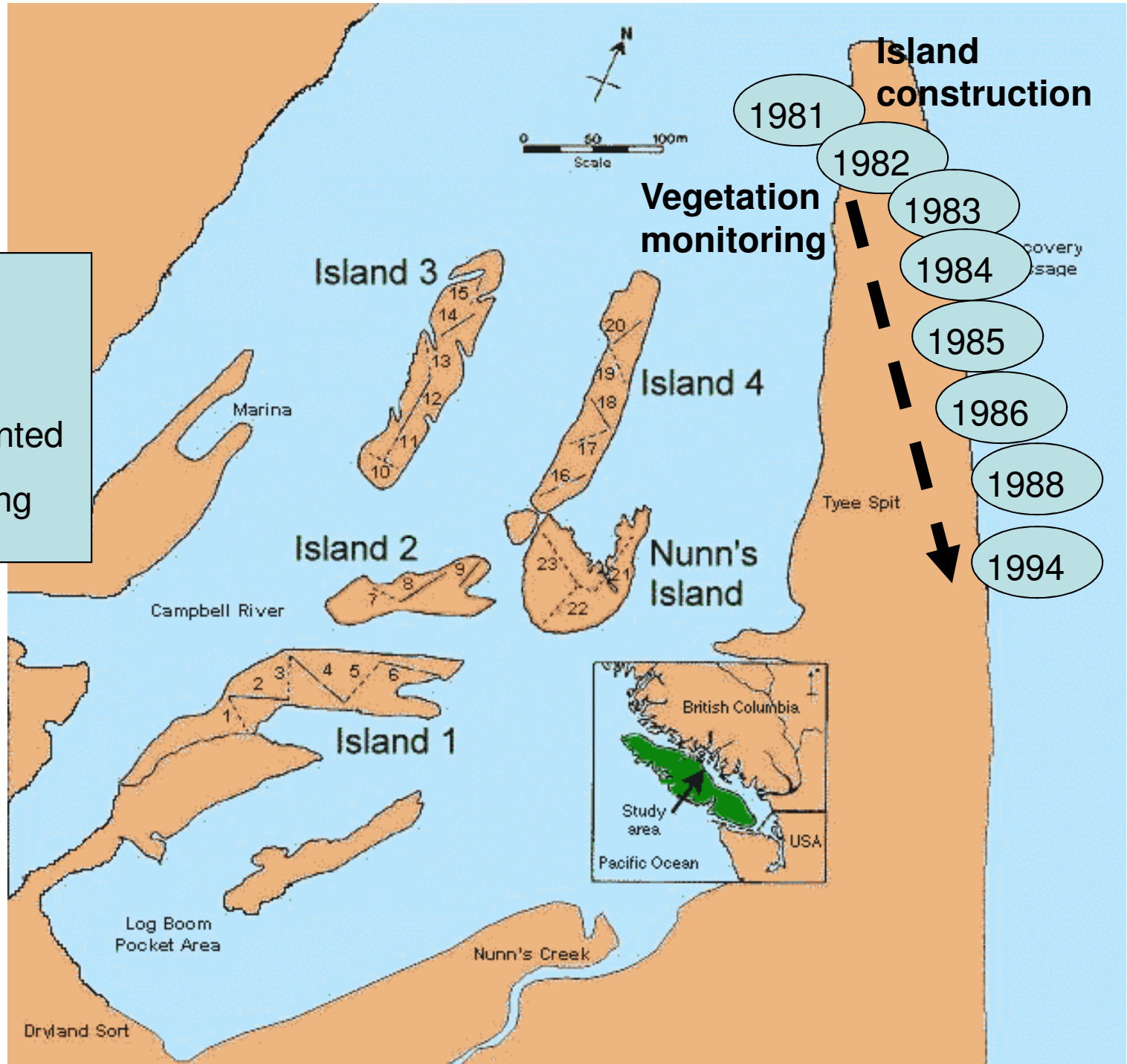
¹*Canadian Wildlife Service*; ²*University of British Columbia*

PCA application: intertidal marsh creation at the Campbell River estuary

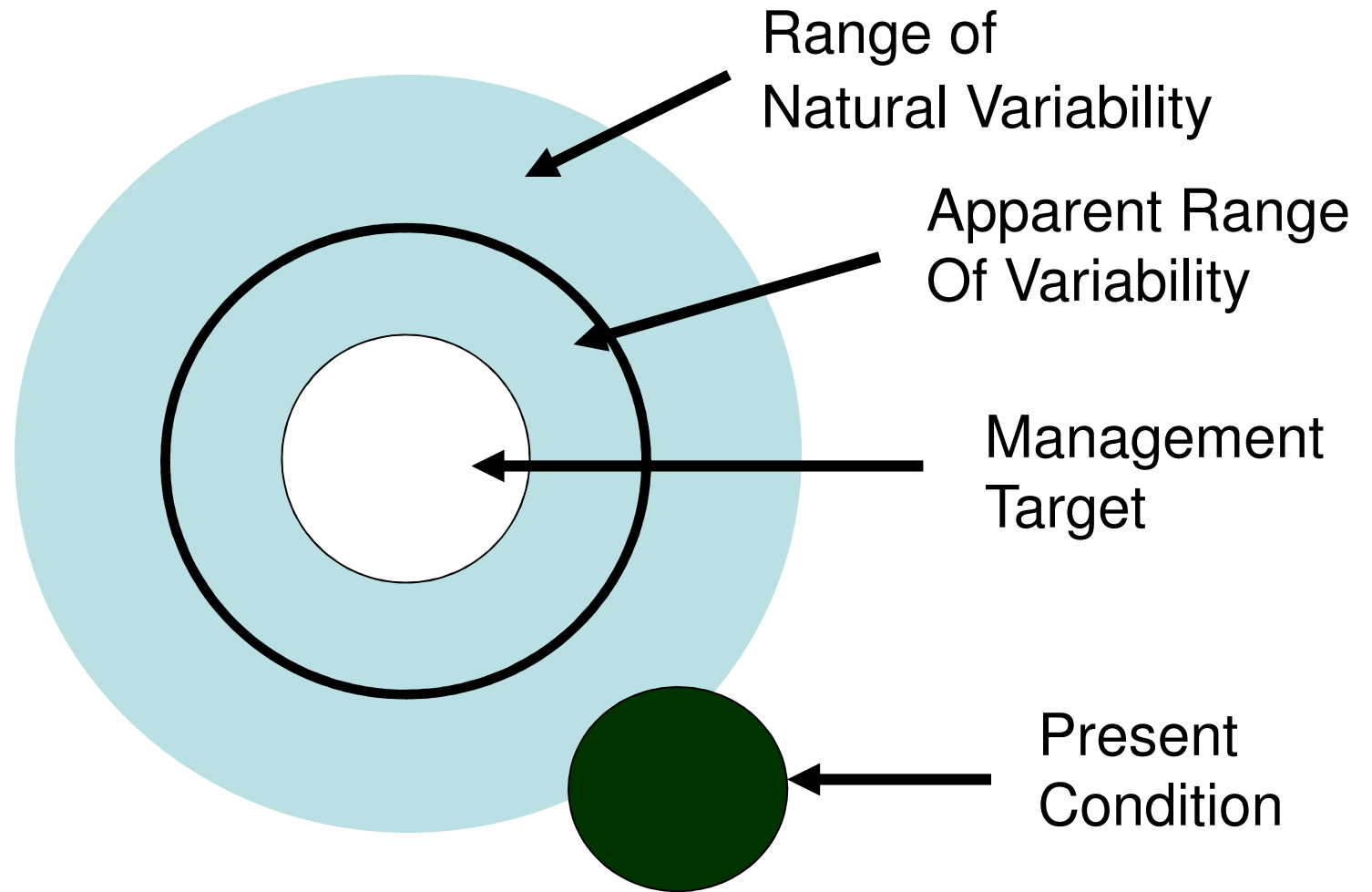


Experimental design

- 4 islands
- 23 transects
- planted vs unplanted
- 1m vs .5m spacing



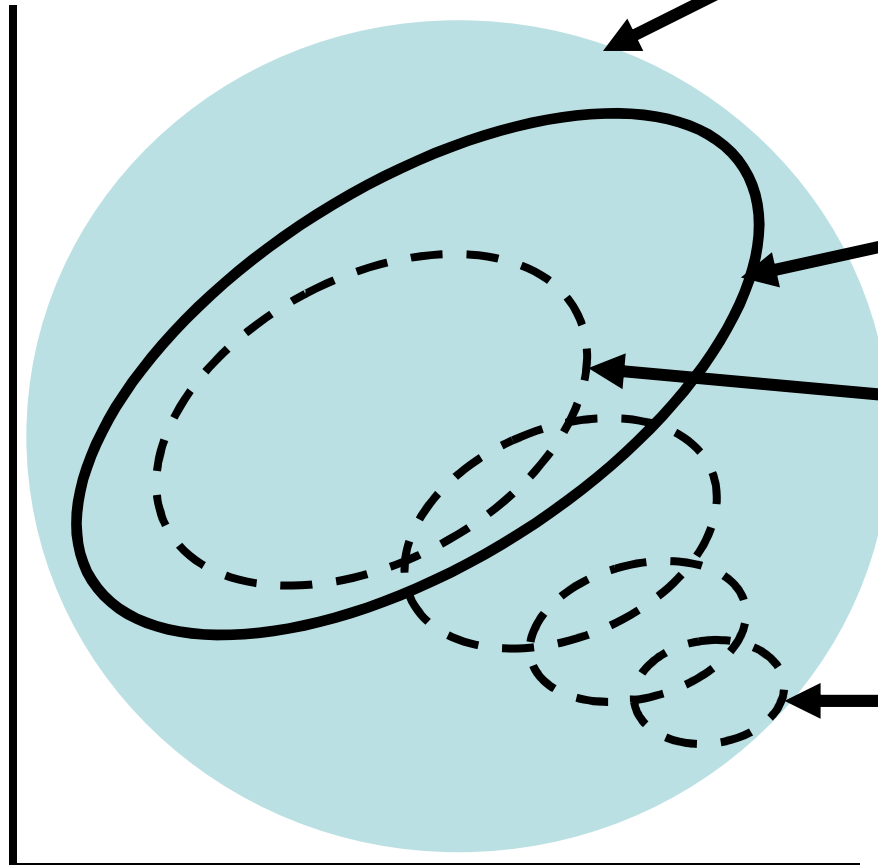
Conceptual model



[Source: Wong, C., & K. Iverson. 2003]

Conceptual model

PCA 2



Full range of variability
in coastal marshes

Apparent range
of variability at CR

Management
Target (after X years)

1982 veg plugs

PCA 1

Early planting success on Island 1

1982



1983



1984



1985



Longer term success on Island 4

1982



1983



1985



1986



1988



1994



Also some concerns...

Island 3 (low elev.)



1988

Island 1 (Carex dieback)



1994



1994

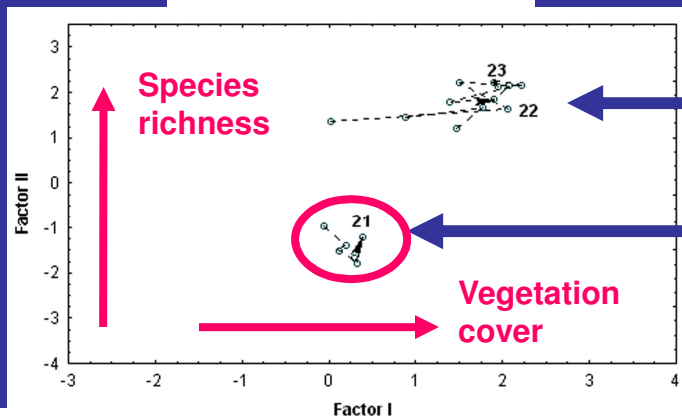
Aerial view of dieback zones



Plant community dynamics 1983 - 1994

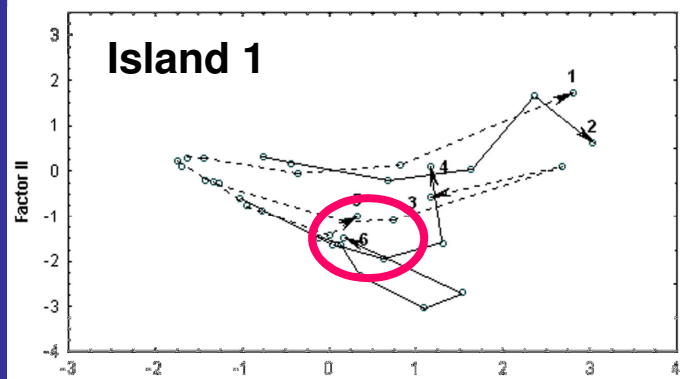
PCA trajectories of transects
1983 - 1994

Nunn's Island

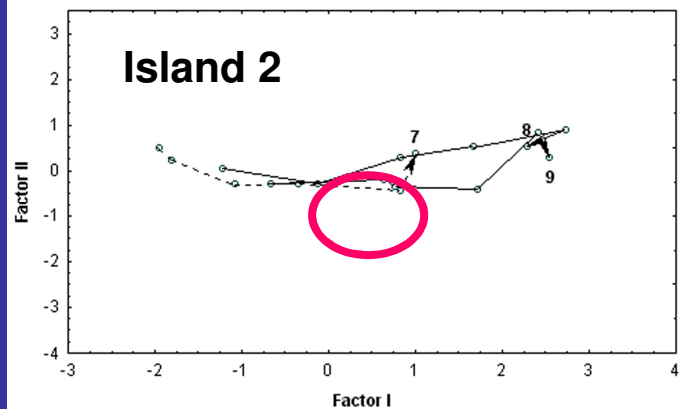


Mid
marsh

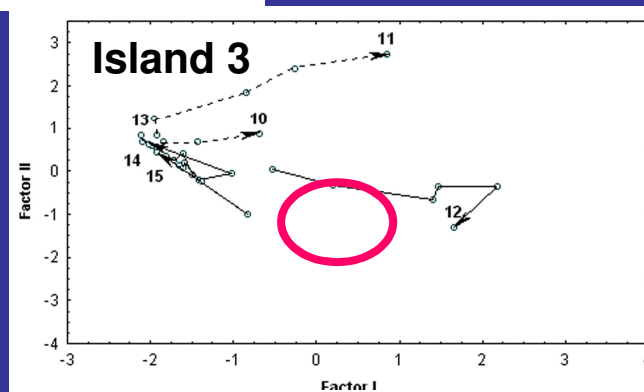
Low
Marsh (Target)



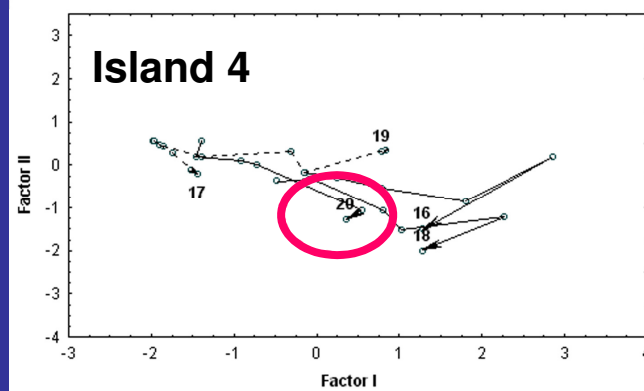
Island 1



Island 2

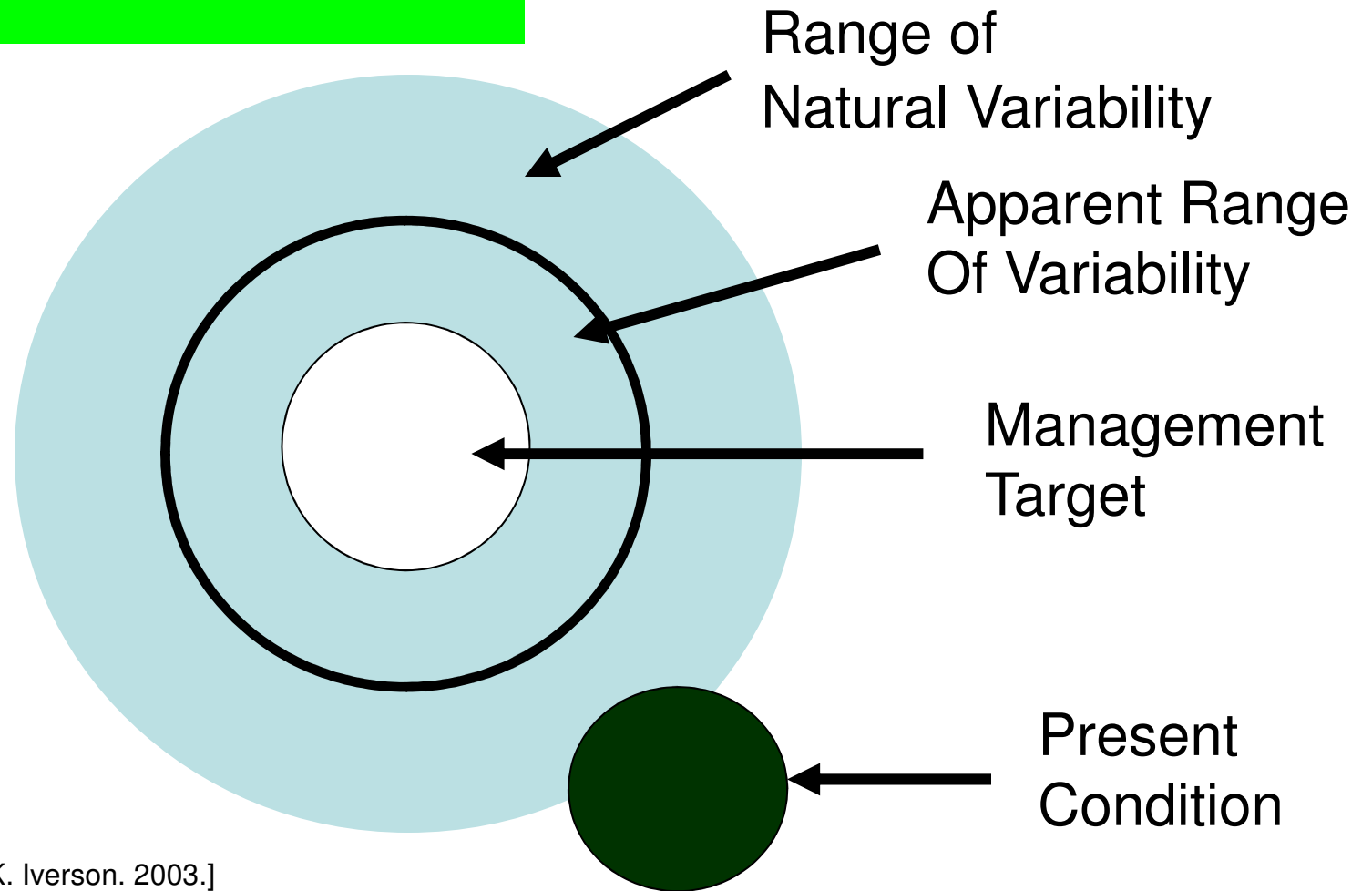


Island 3



Island 4

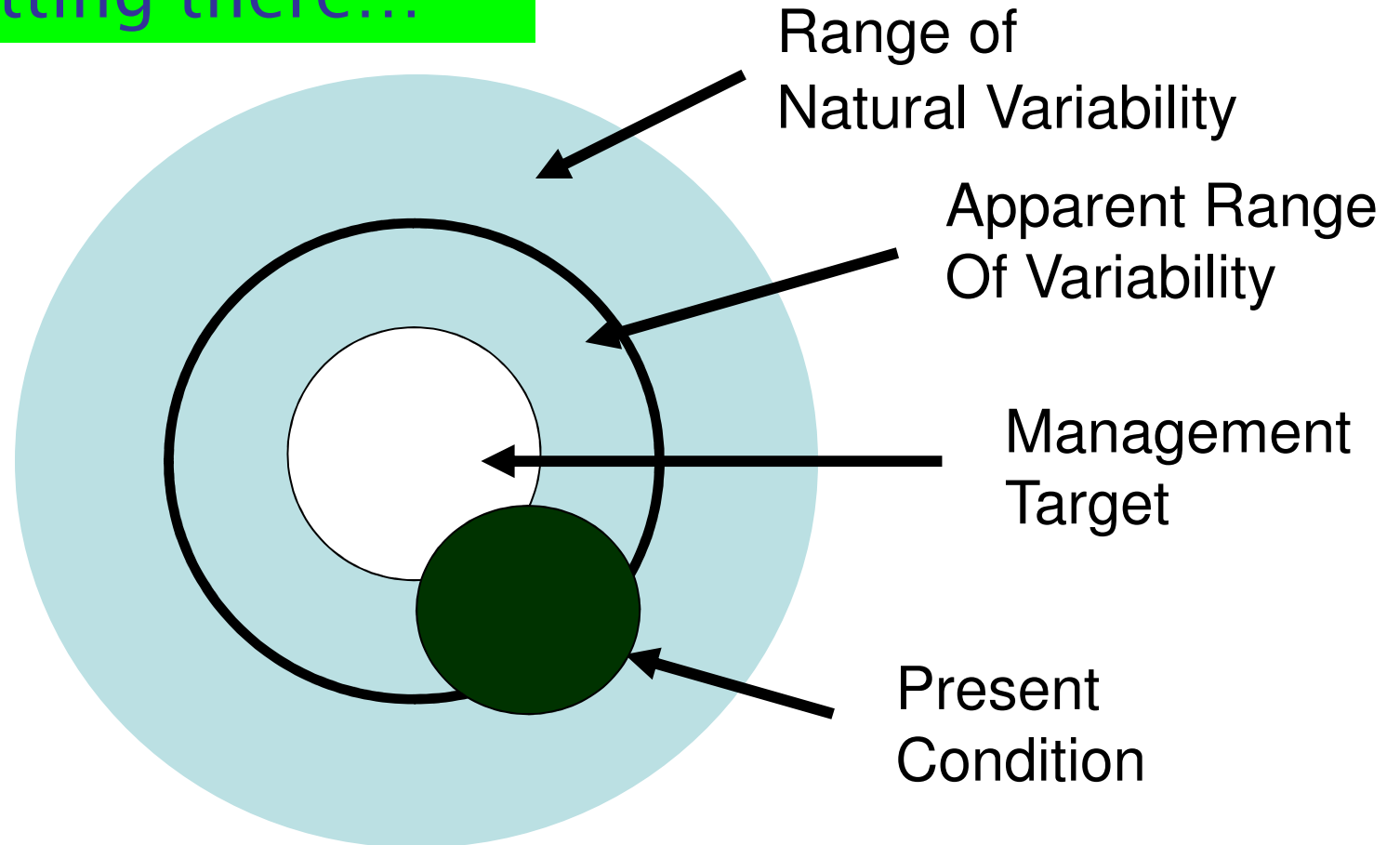
Summary of Coastal Marsh Research



[Wong, C., & K. Iverson. 2003.]

Summary of Coastal Marsh Research

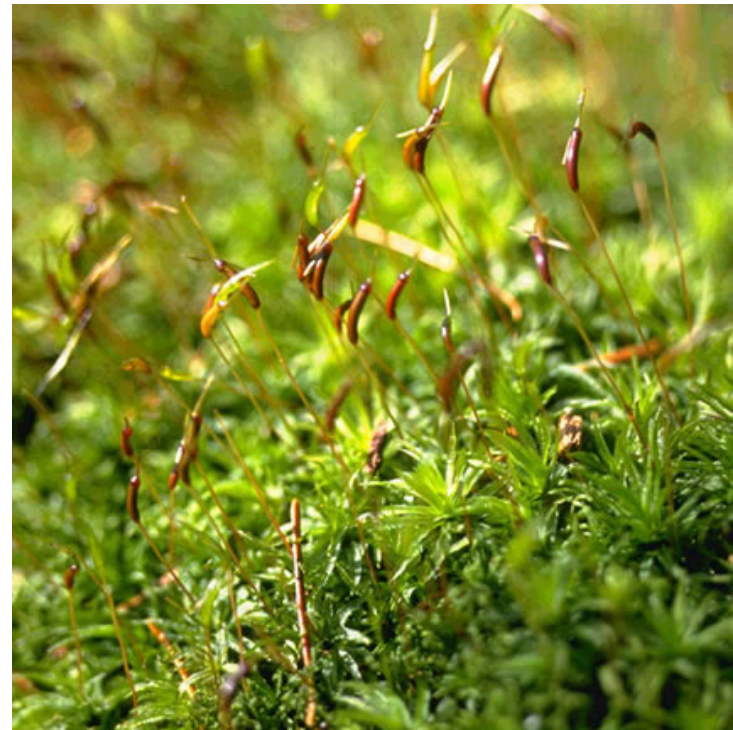
We're getting there...



PCA application: bryophyte community dynamics



Most forest floor bryophyte associations are “transient”



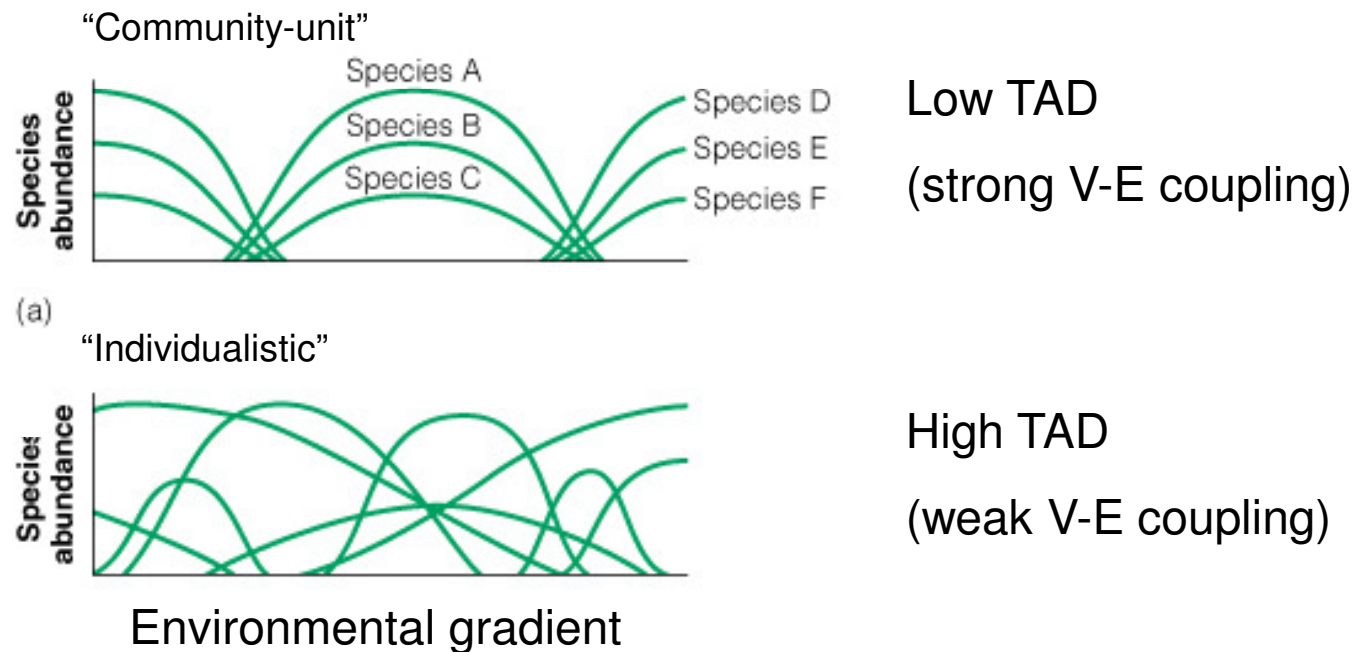
PCA application: bryophyte community dynamics

Transient assemblage dynamics of terrestrial bryophytes

in a subalpine forest *THE BRYOLOGIST* 109(1), pp. 18–25

GARY E. BRADFIELD AND KELLA D. SADLER

General Question: Do forest floor bryophyte communities show transience?



PCA application: bryophyte community dynamics

Unstable

- slope $>25^\circ$
- small twigs & branches



Stable

- slope $<25^\circ$
- compressed needles

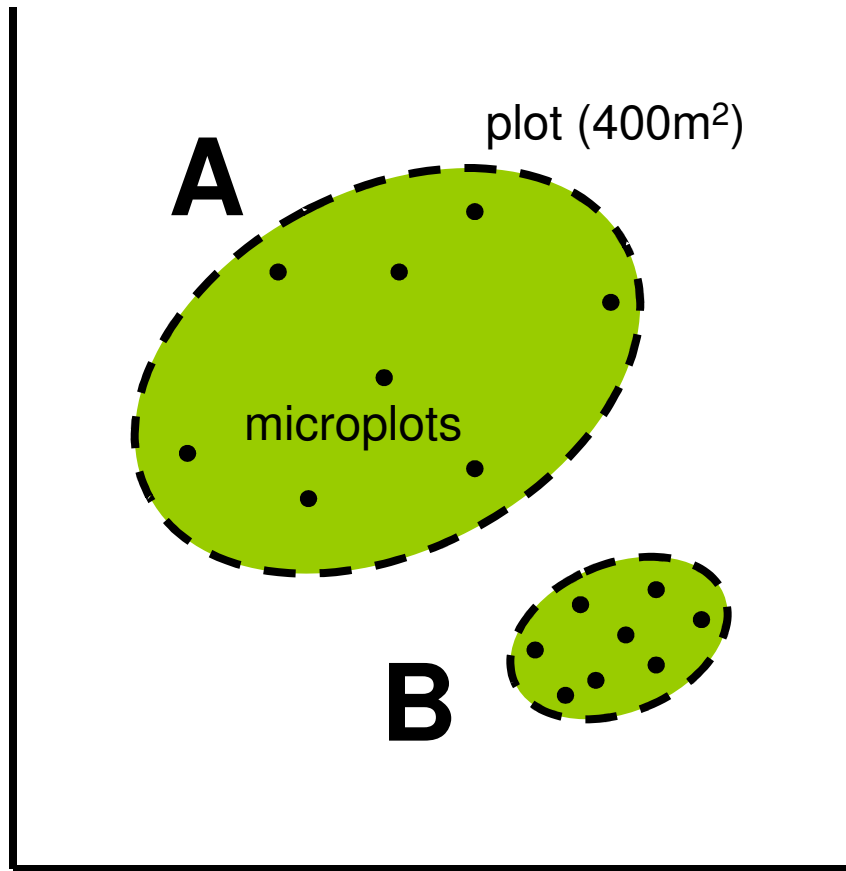
Forest floor stability gradient



Q: How measure transience?

Conceptual model

PCA 2



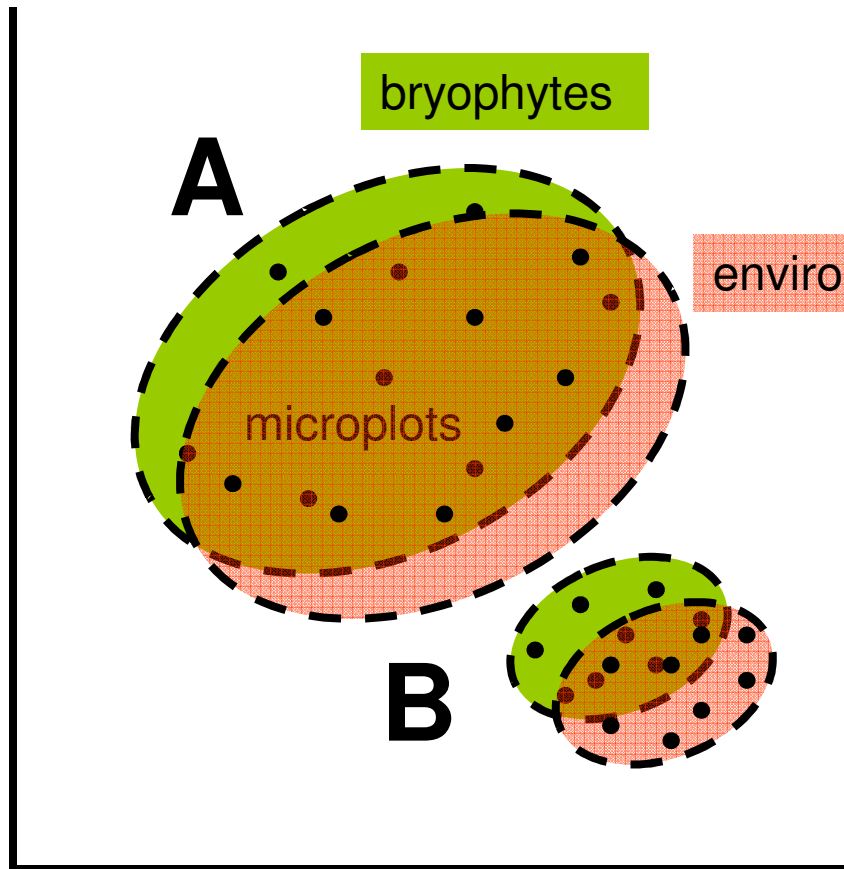
**Within-plot
bryophyte
heterogeneity**

A > B

PCA 1

Conceptual model

PCA 2



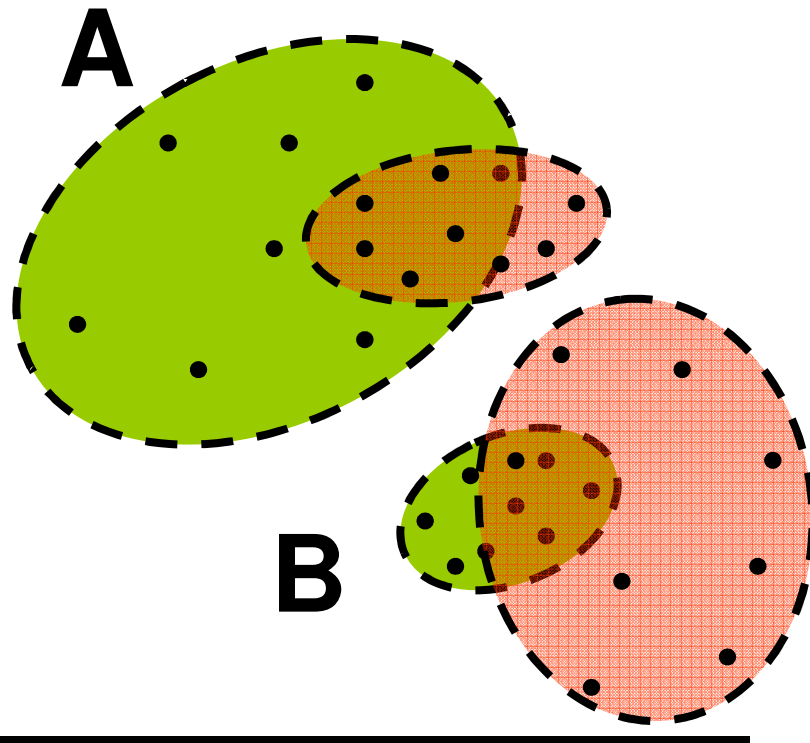
environment

**Strong V-E
coupling
(low TAD)**

PCA 1

Conceptual model

PCA 2



Weak V-E
coupling
(high TAD)

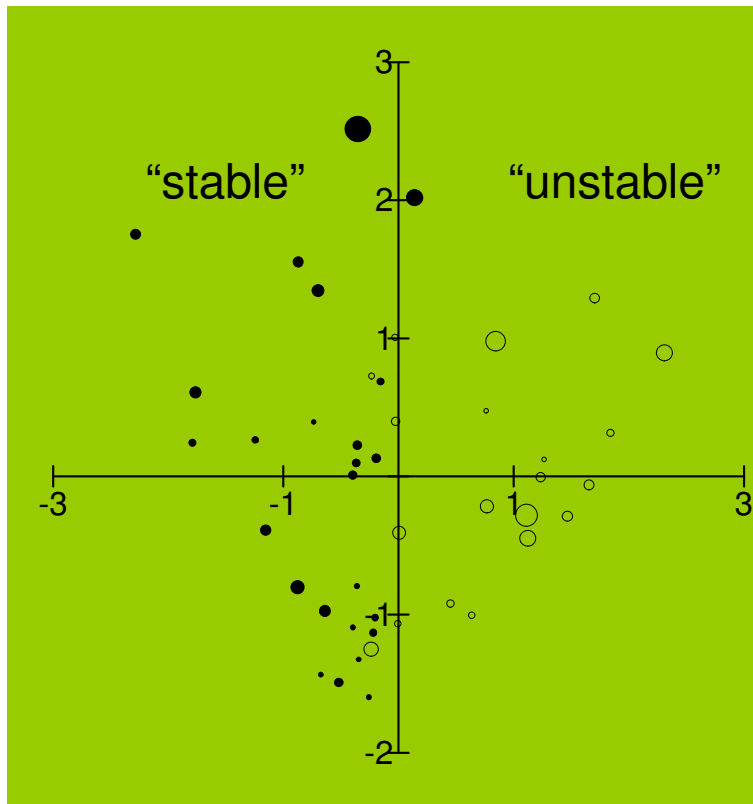
PCA 1

Steps in data analysis

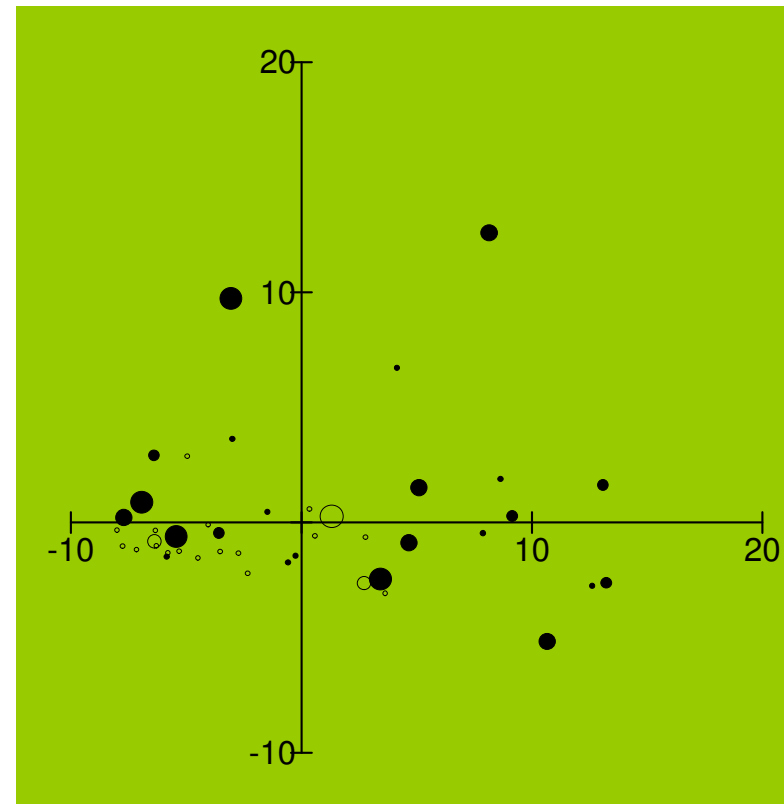
- Divide plots into 2 groups based on environmental (microhabitat) stability.
- Use PCA to calculate within-plot heterogeneity. Do separately for bryophyte vegetation (V) and environment (E).
- Compare V-E for the 2 stability groups:
 - strong V-E => low transience
 - weak V-E => high transience

PCA application: bryophyte community dynamics

PCA environment

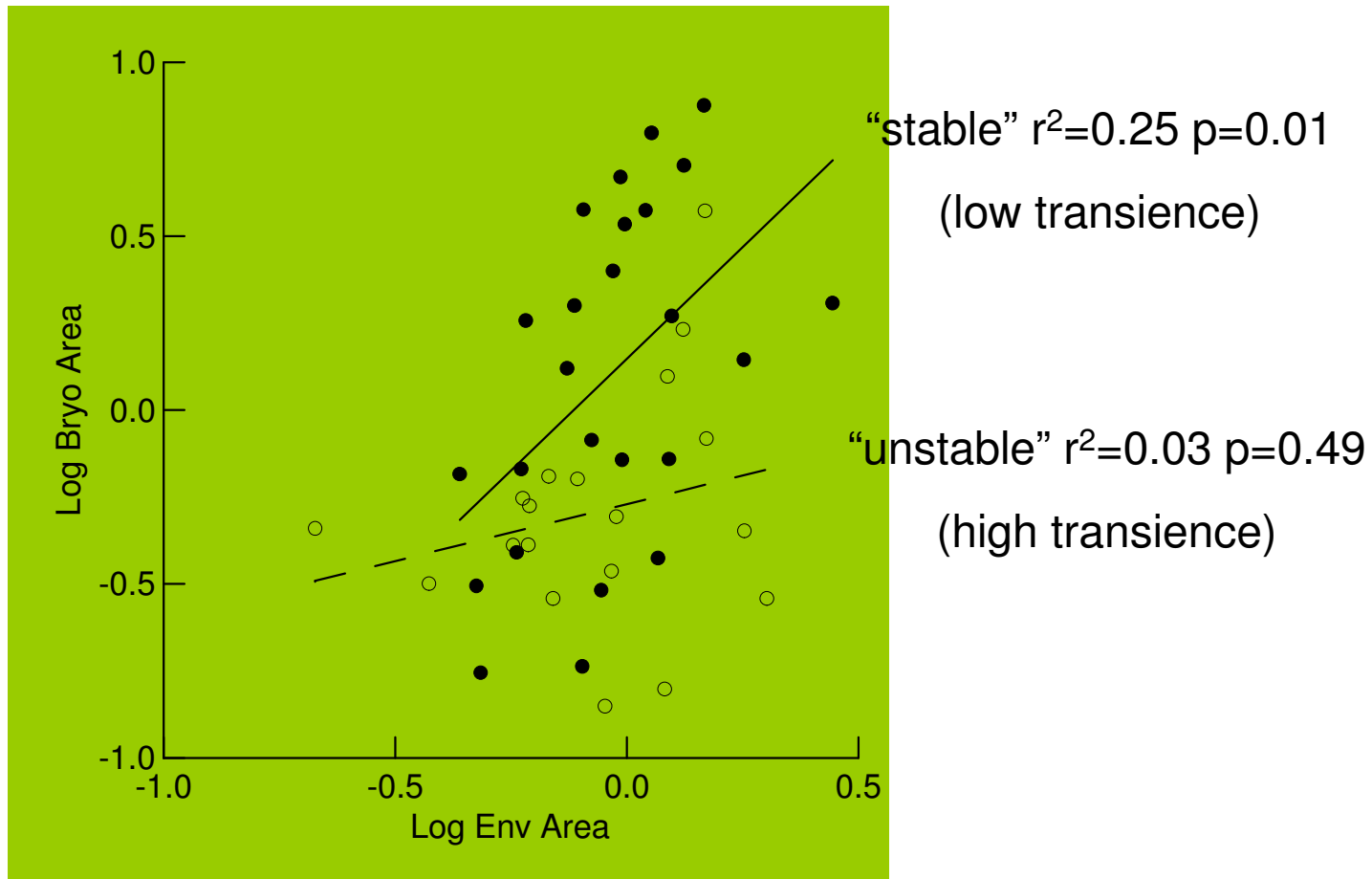


PCA bryophytes



- symbols show 400m² study plots
- symbol size indicates degree of heterogeneity for each plot

PCA application: bryophyte community dynamics



- symbols show 400m² study plots

Conclusion: TAD may be an important community structuring mechanism