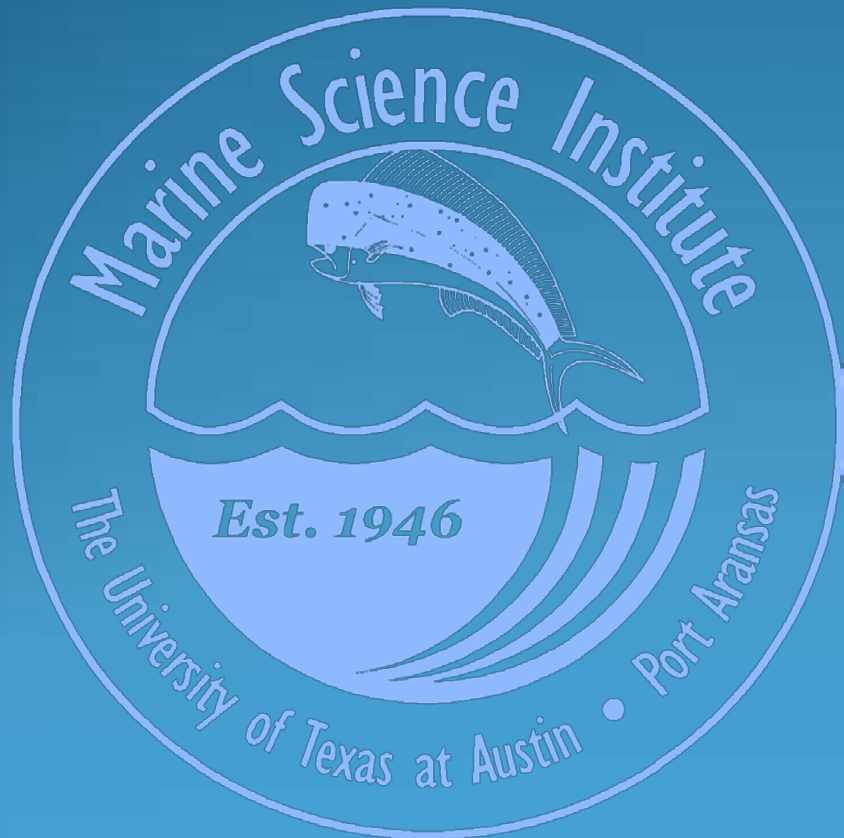


Using high-resolution GIS mapping and analysis to
quantify seagrass habitat fragmentation and
changes in resident animal communities



Geoff Hensgen
Restore America's Estuaries
Annual Conference
November 2010



Habitat Fragmentation

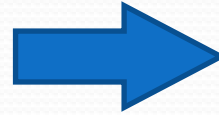
- Biodiversity
- Isolation

Studies in Seagrass:

- Variable impacts
- Shrimp and fish?

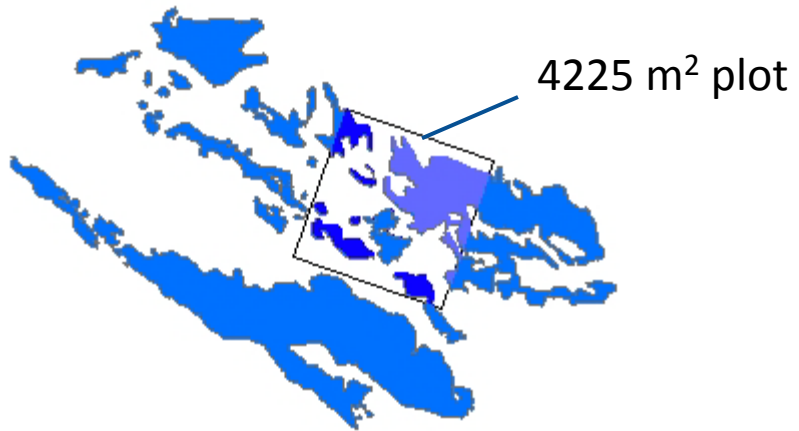
Objectives

- Landscape fragmentation
- Patch size, shape, and isolation

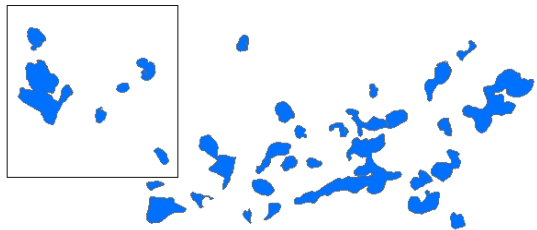


**Community
Diversity &
Abundance**

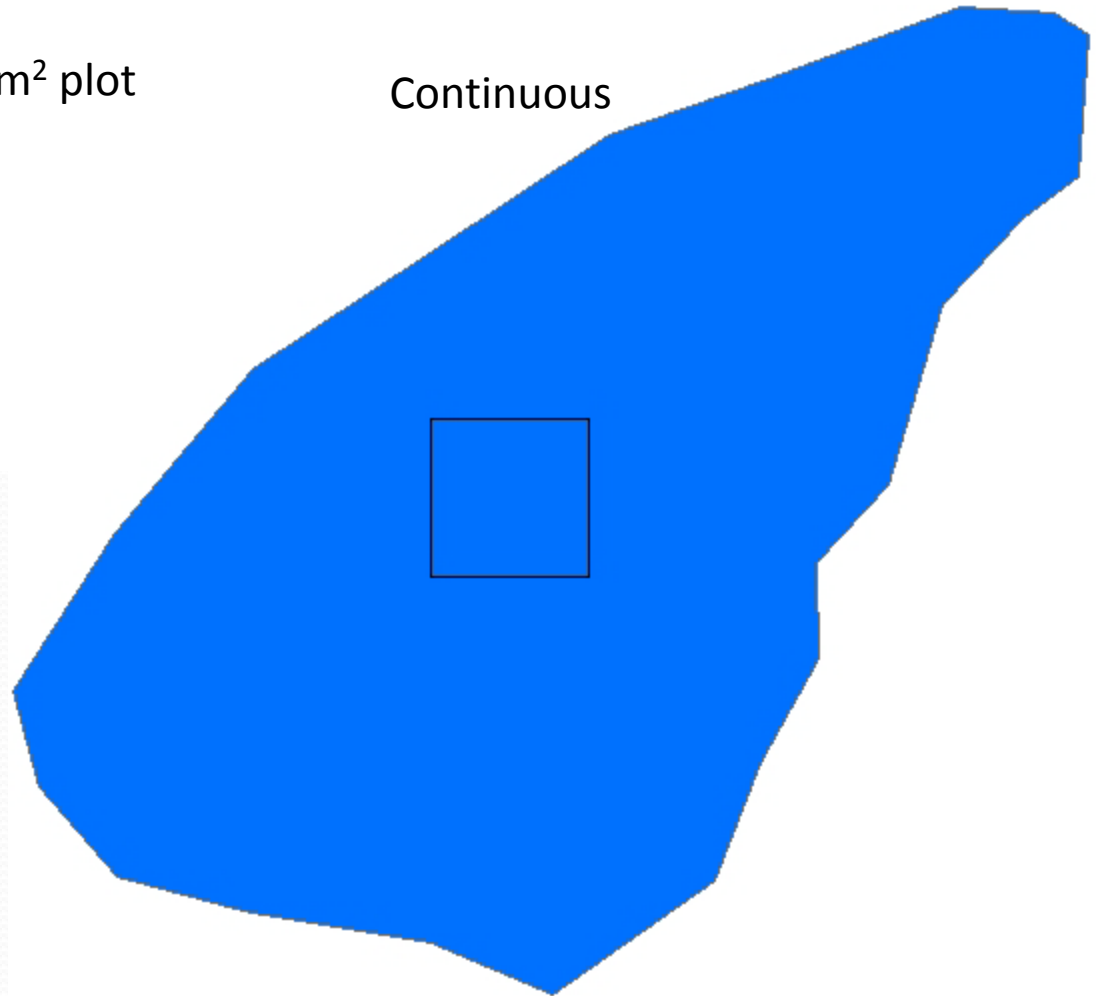
- **Prediction: Habitats with intermediate fragmentation and patch size have the greatest animal diversity and abundance**



Intermediate
(Medium)

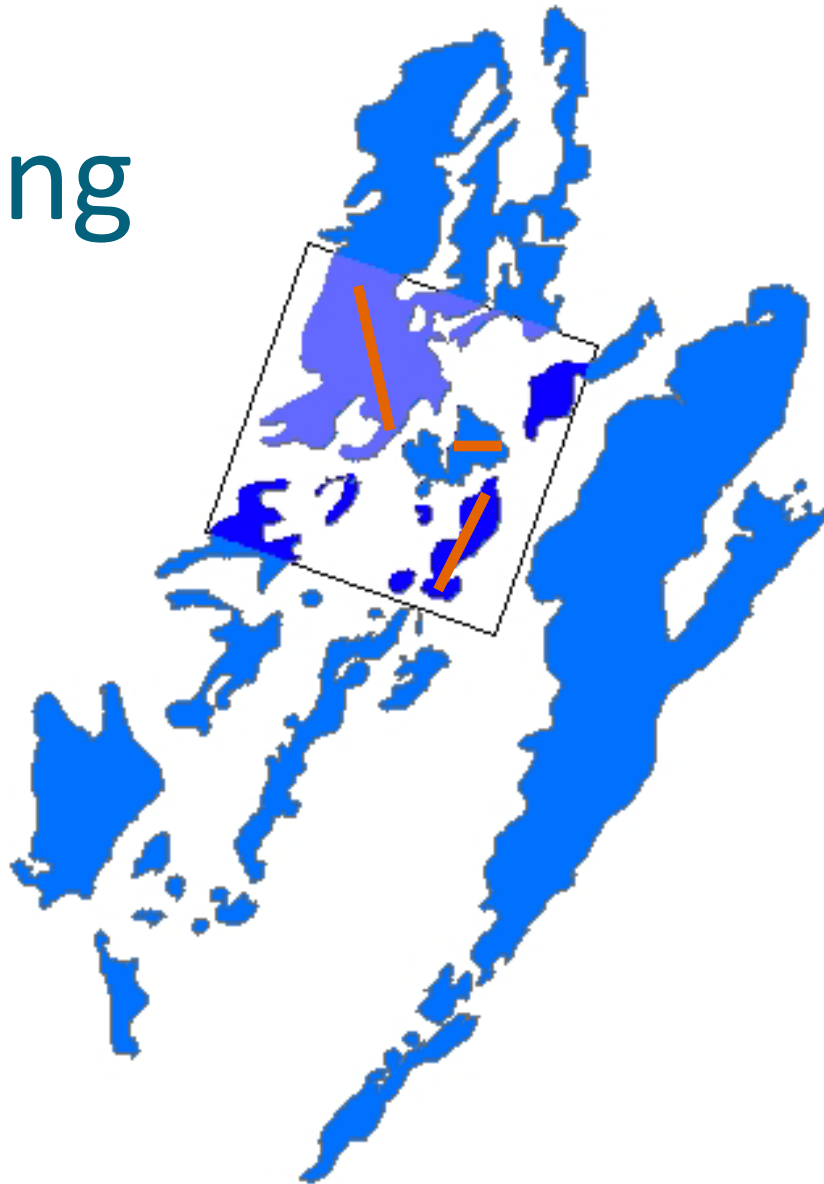


High



200 M

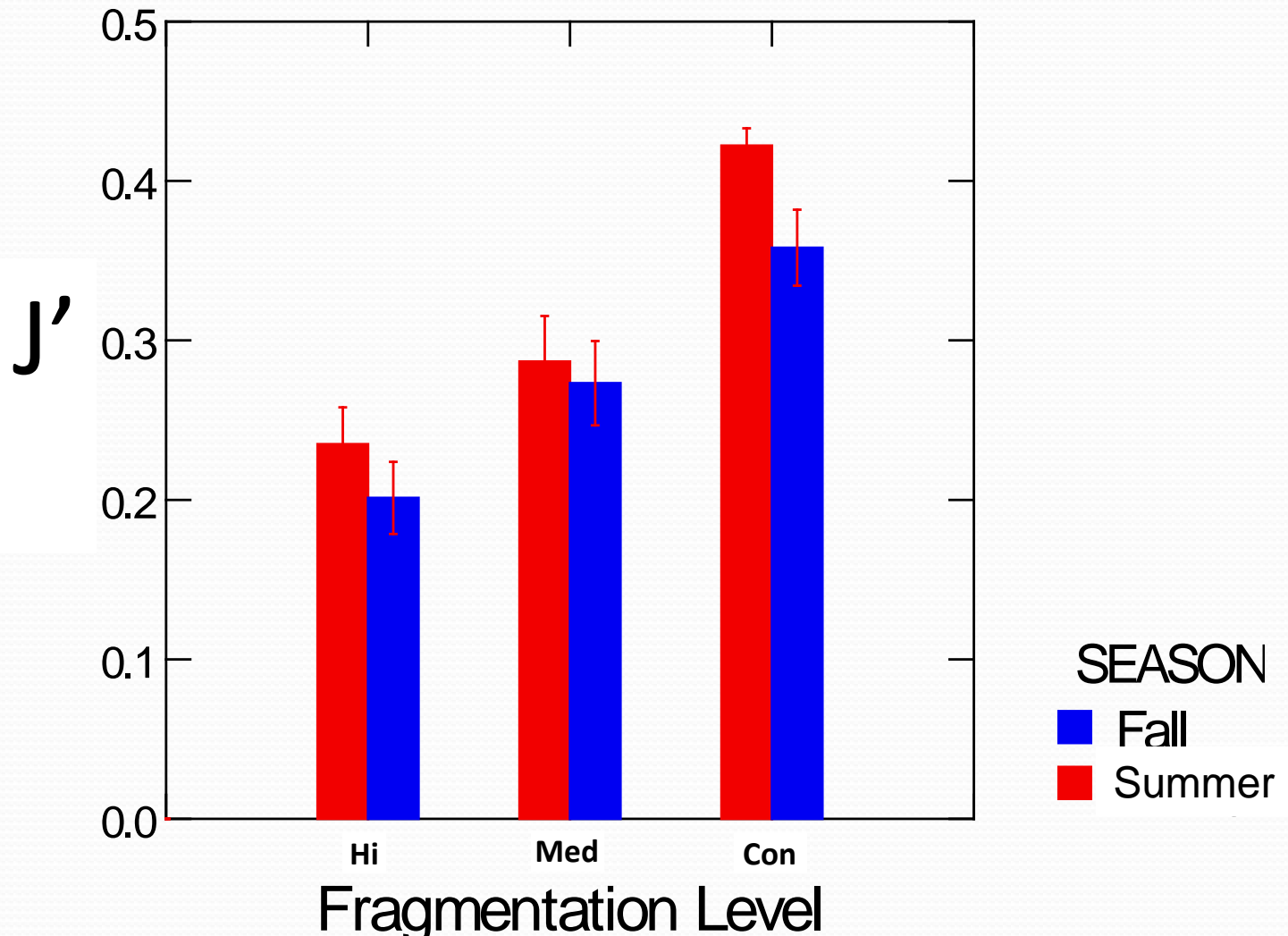
Sampling



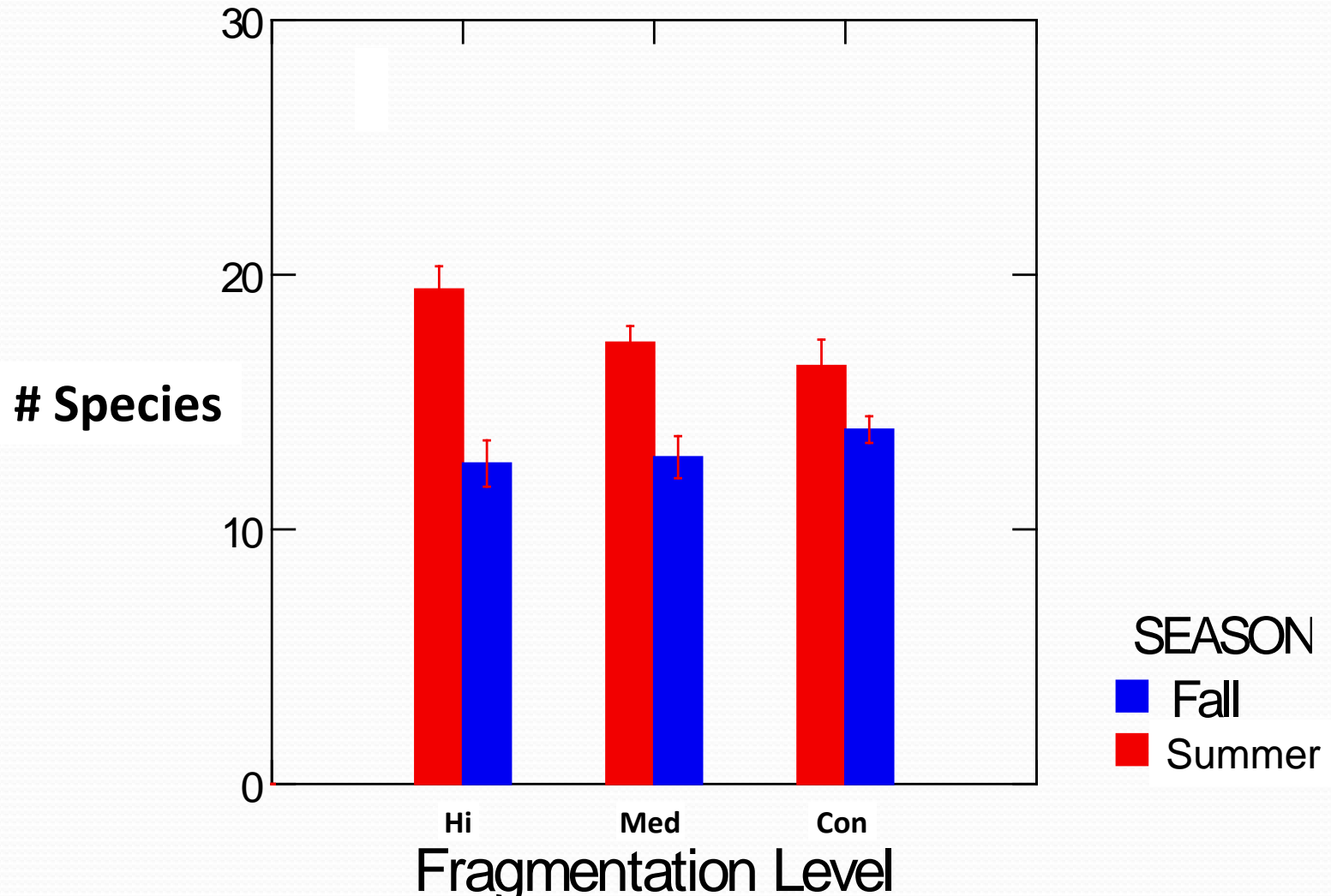
Medium
Fragmentation



Species Evenness



Species Richness



Habitat Mapping

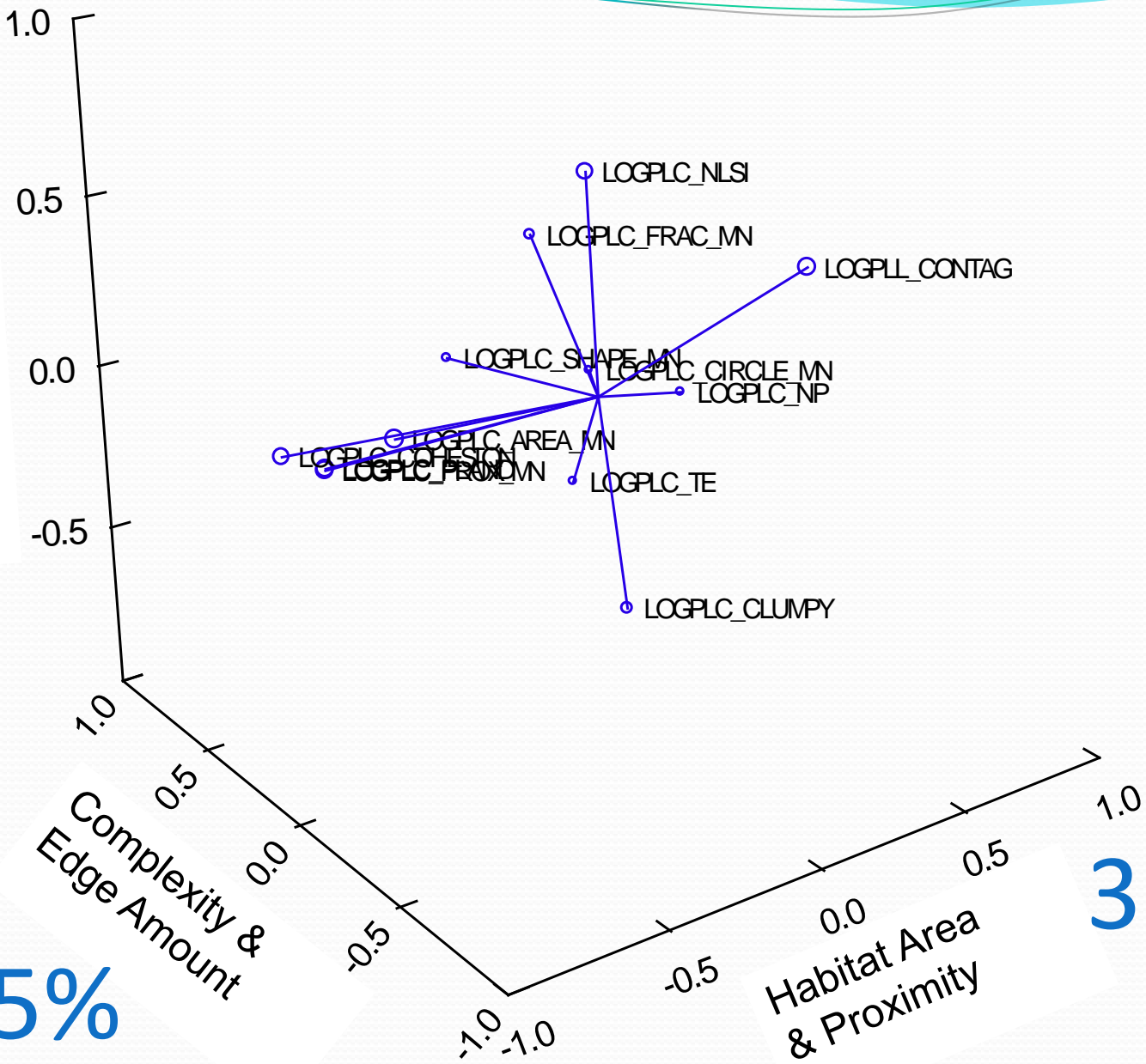


Medium
Fragmentation

Fragmentation
quantified in
GIS and FRAGSTATS

17%

Patch Aggregation



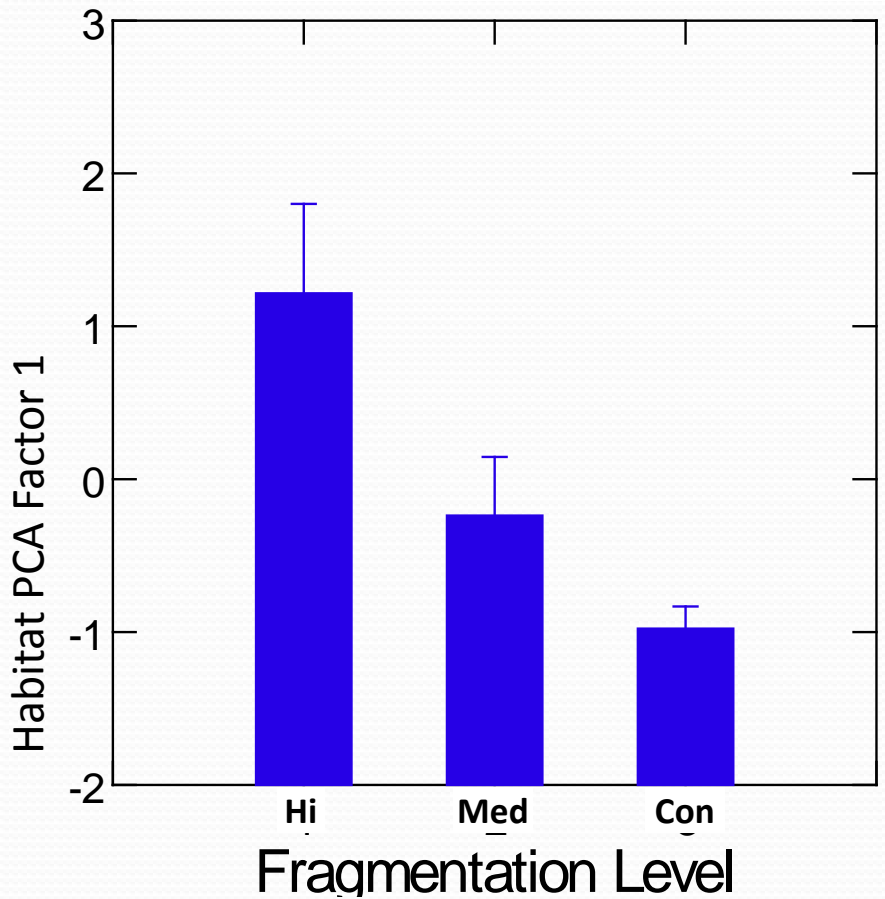
25%

Complexity & Edge Amount

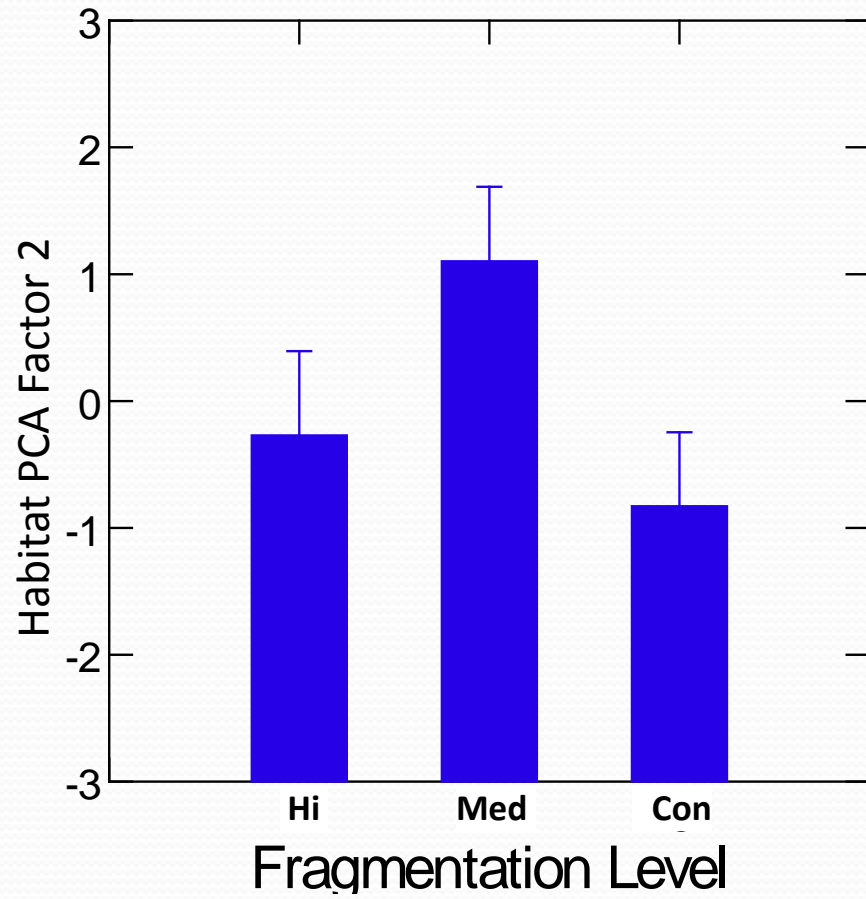
Habitat Area & Proximity

37%

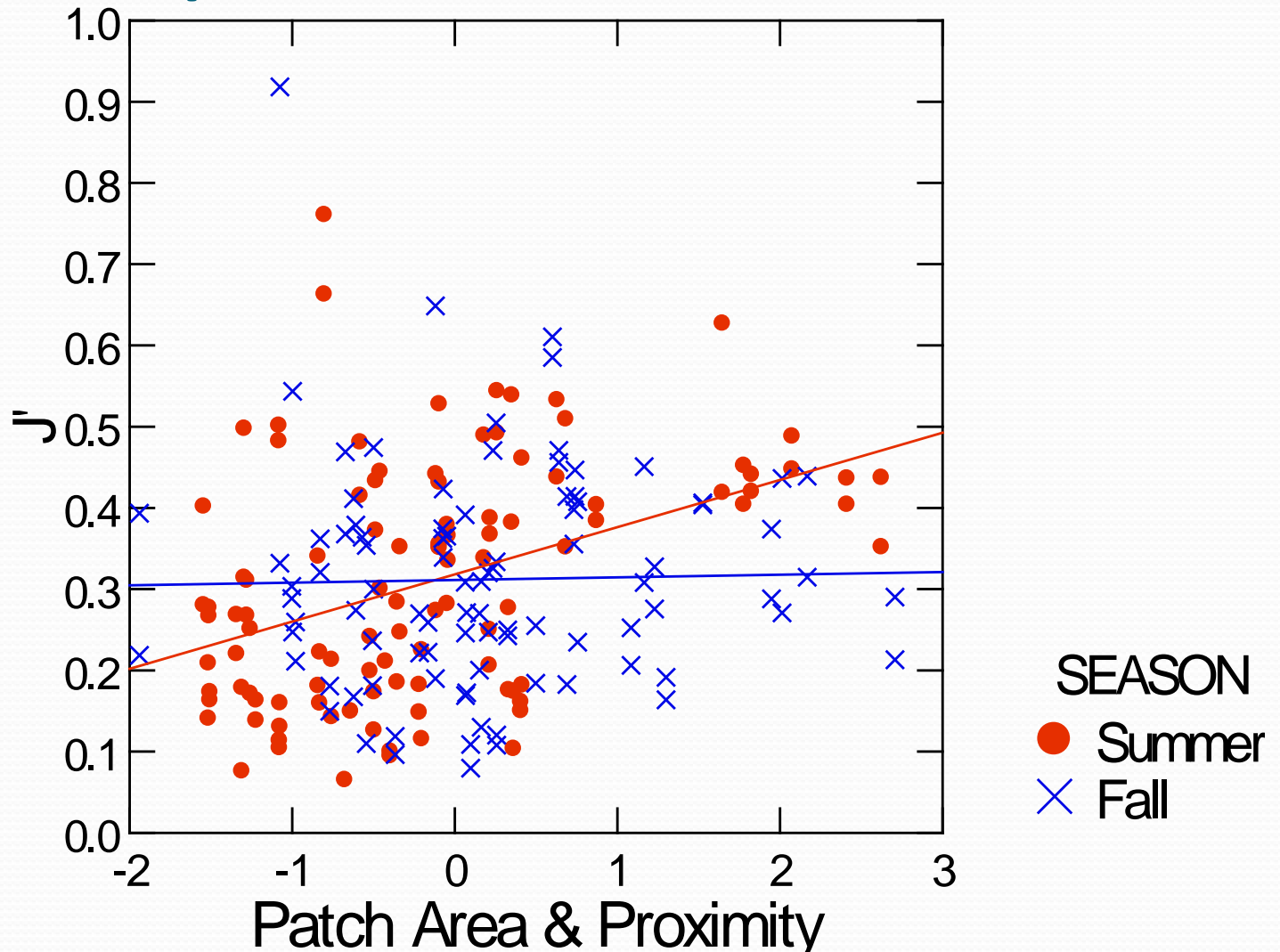
Habitat Area & Proximity (reduction)



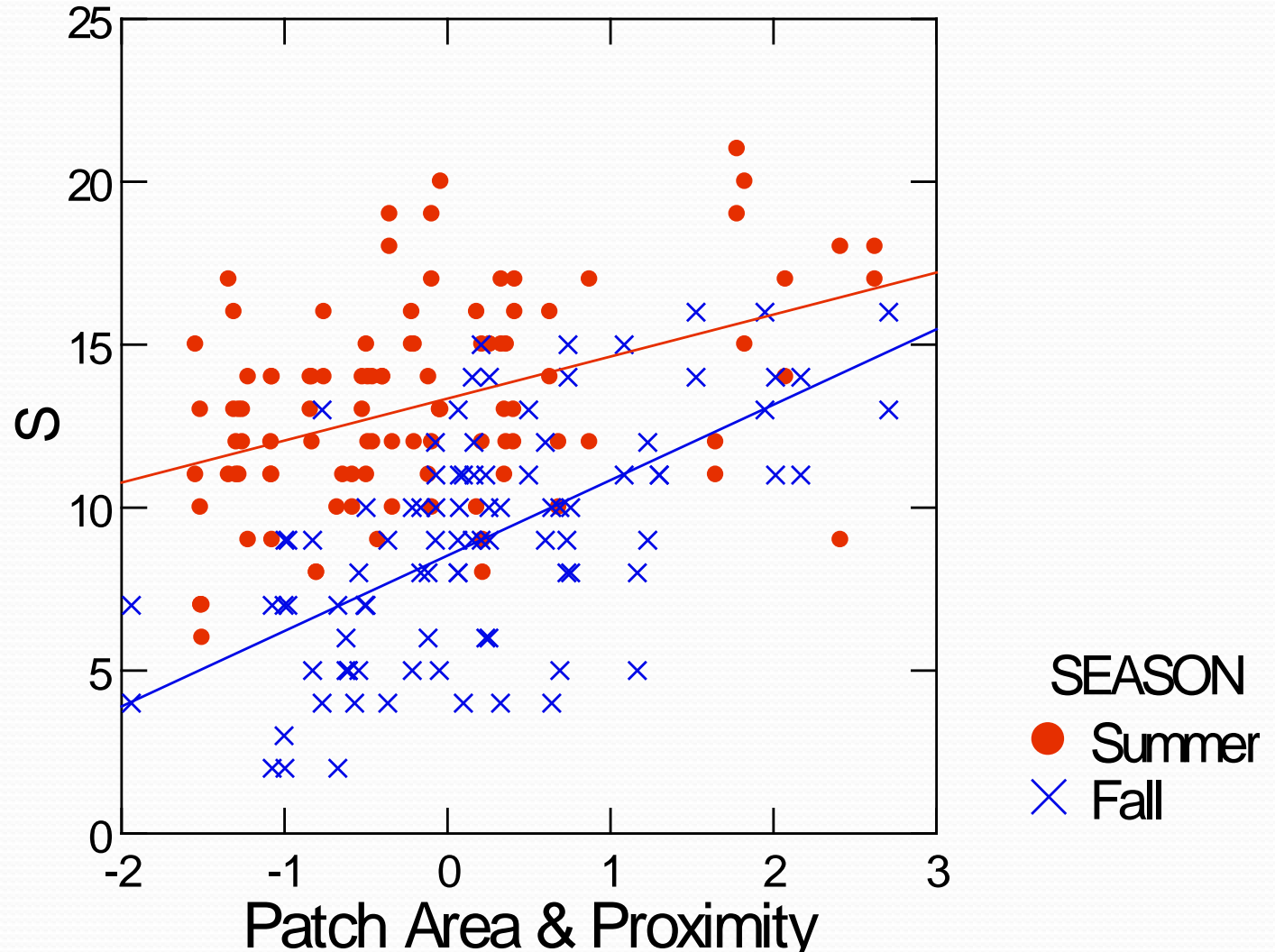
Landscape Complexity & Edge Amount



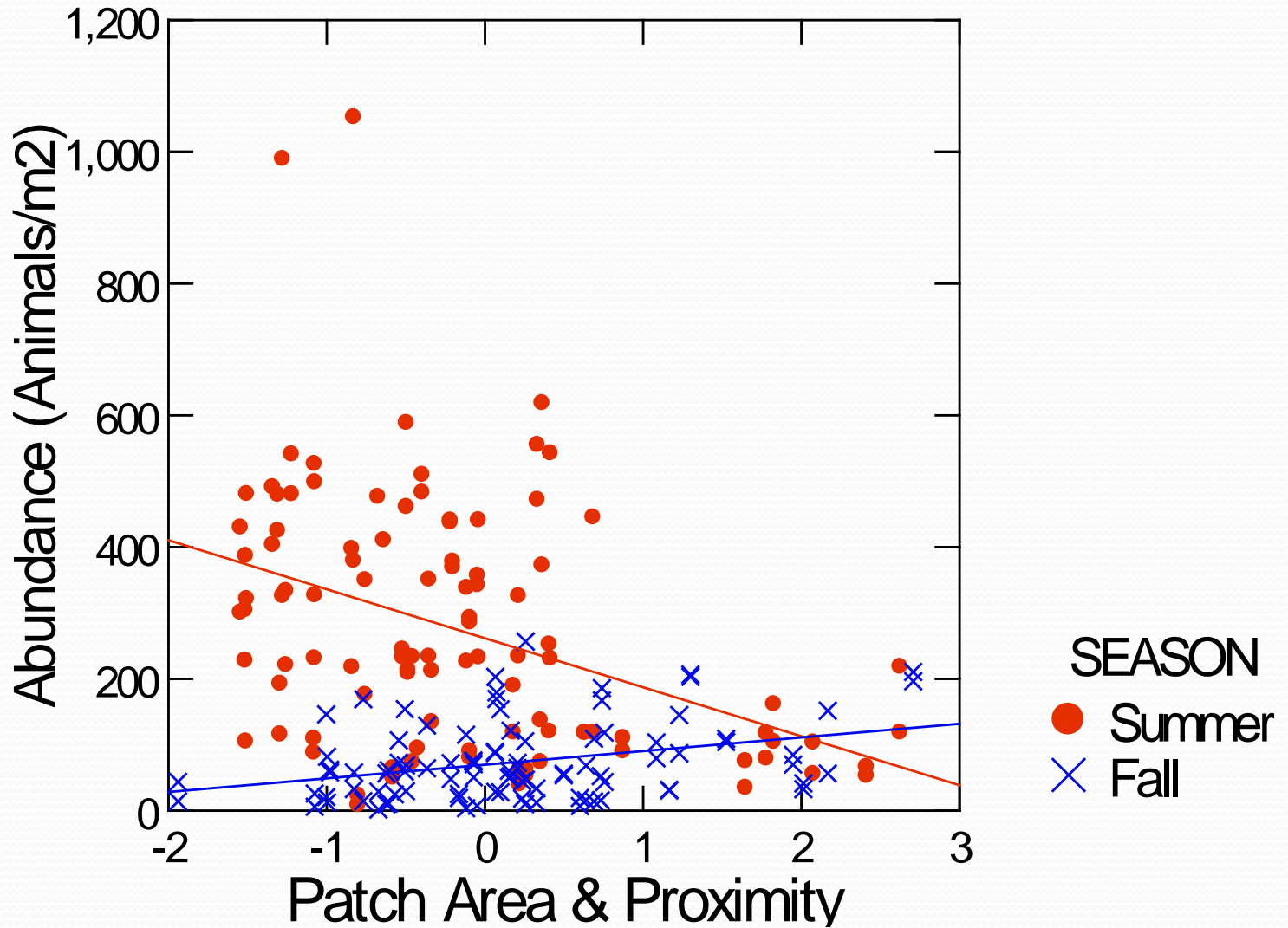
Species Evenness



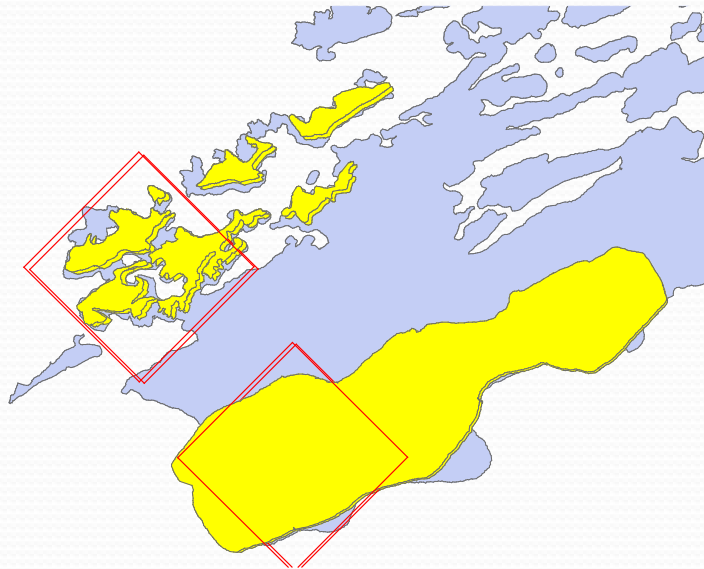
Species Richness



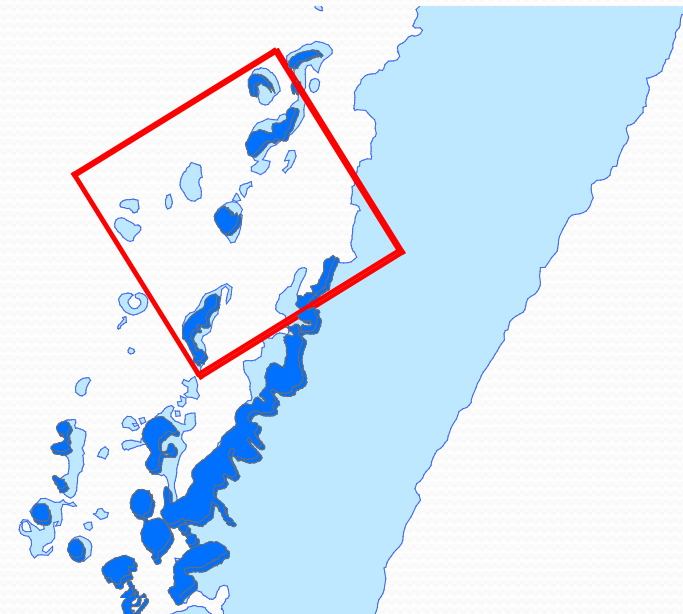
Abundance



Seasonal Change Examples



225 M



160 M

Conclusions

1. Complex landscapes
2. Restricted, isolated habitats
3. Individual patches

Lessons Learned

- **Cost-effective and accurate**
- **Multiple-scale analyses**
- **Spatially explicit information:**
 - Within seagrass patches
 - Across patch landscapes
 - Across ecotones & systems
- **Useful for impact & restoration assessment of *habitat* or *resident biota* over any time interval**

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