

1. Seagrass Restoration Trade-offs Paper - Spatial Analysis & Plotting

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Meeting Notes & “To Do Lists”

Notes from 7/22 meeting

- Positive correlations vs options for win-wins (depends on whether you pick sites randomly or not)....can have a concave frontier even if association is negative, or convex frontier even if positive association. Important b/c a lot of ES papers stop at correlations
- Abandon all PCA analysis!!
- Possible To-Dos:
 - Make a matrix like the correlation plots but where it shows severity of trade-off instead (metric from Burgess paper)
 - Make pairwise plots for all service combinations, for both conservation areas and for restoration areas
 - Make pairwise plots at two different scales (from practical standpoint, scale should match conservation/restoration scale)
 - Look into ways to draw in frontier that minimizes impacts of outlines?

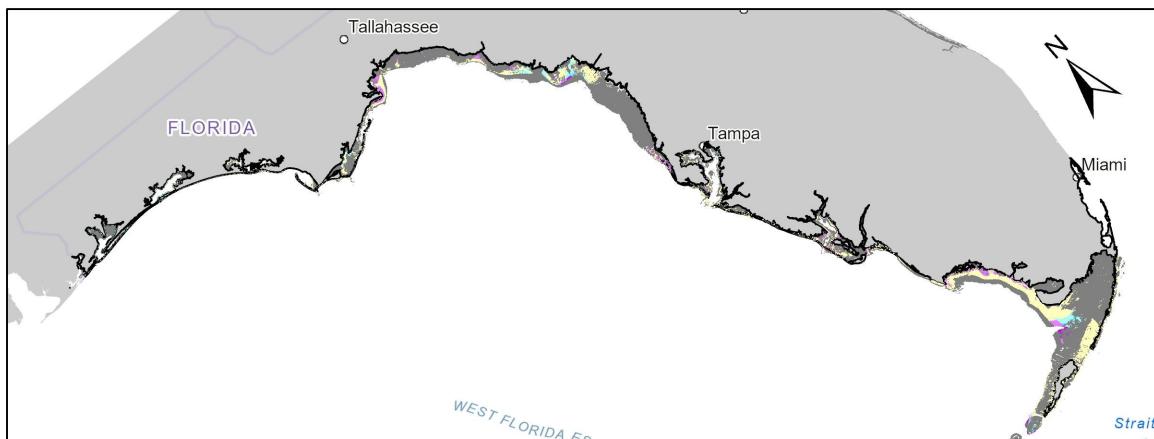
Maps of ES outcomes associated with potential recovery areas (PRAs) for seagrasses

ES Enhancement Hotspot Maps (Exploratory Purposes)

Standardized Ecosystem Service Enhancement (Z-Scores)

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a. Biodiversity



b. Nursery Habitat

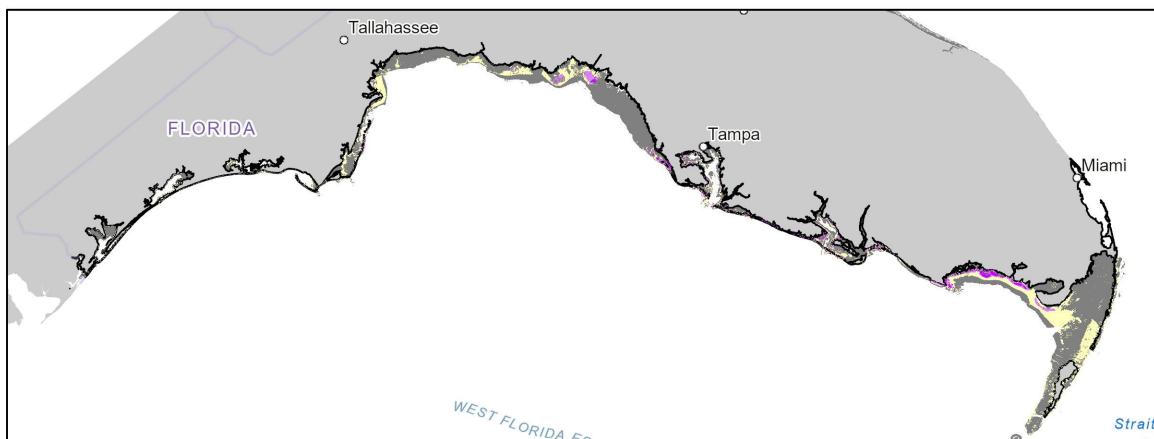
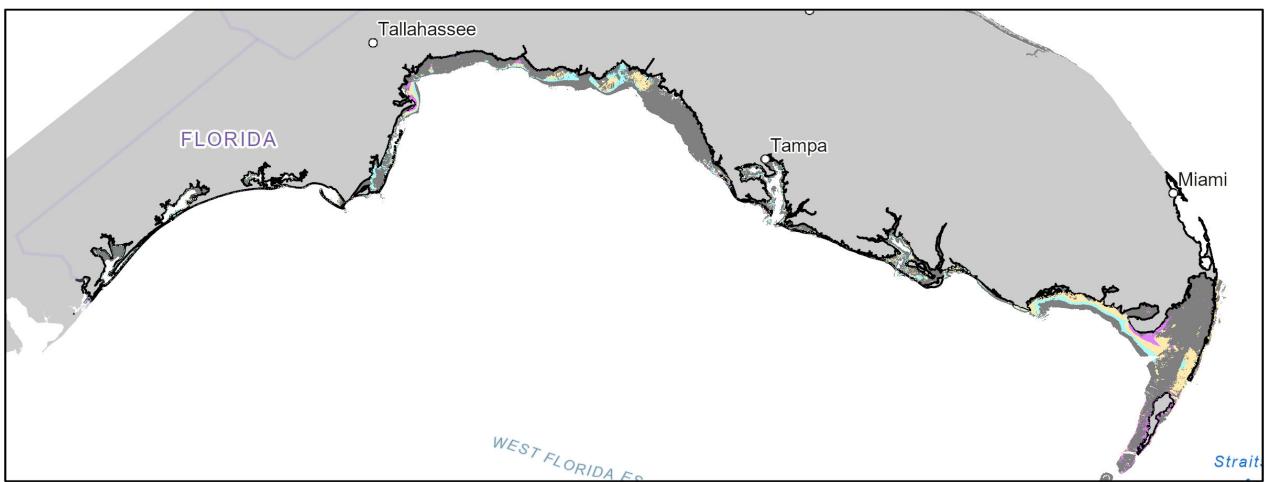
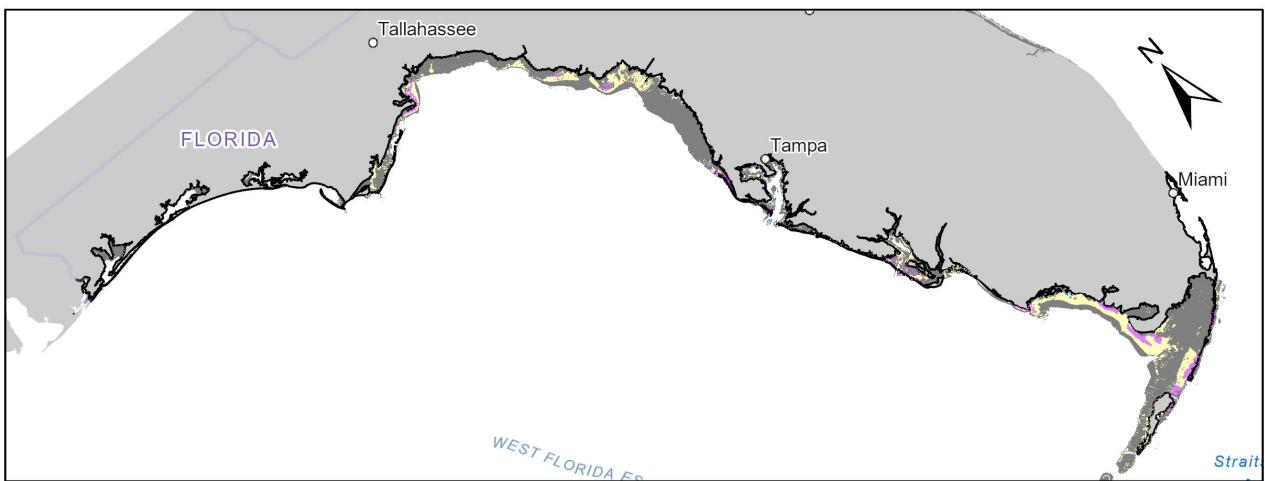


Figure 1: Spatial variation in expected ecosystem service enhancement values of potential restoration areas for seagrasses in the Florida Gulf Coast. Ecosystem service outcomes are quantified in terms of the standardized enhancement effect of seagrasses on the predicted biodiversity, nursery habitat, blue carbon storage, recreation, and coastal protection services relative to levels predicted if the location were unvegetated. Standardized ecosystem service values show how pixels all relative to mean ecosystem service supply for the region in units of standard deviation.

c. Blue Carbon Storage



d. Recreation



e. Coastal Protection

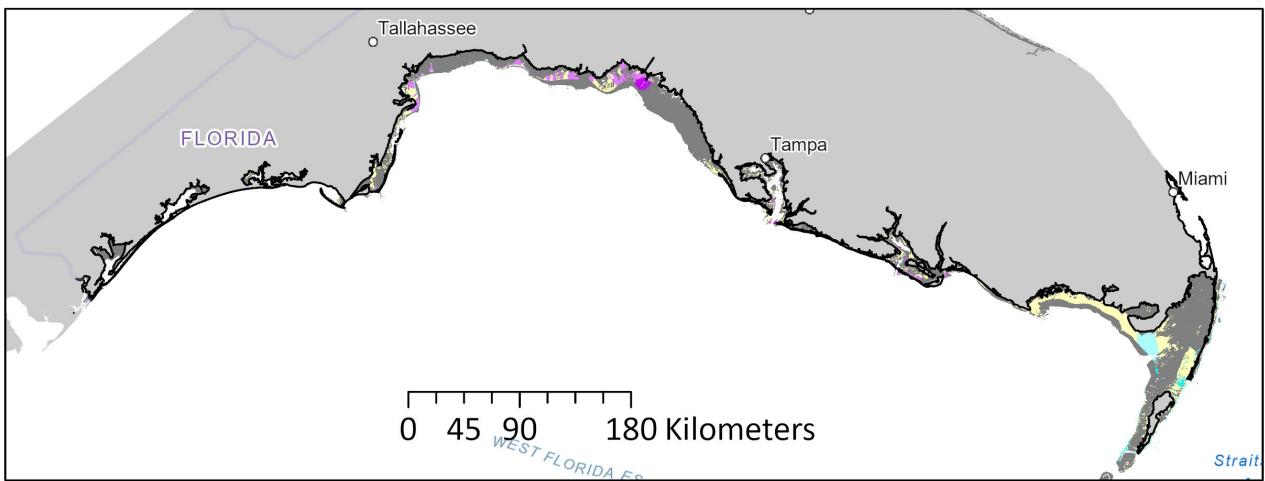


Figure 2: 3 continued...

Visualizing Tradeoffs plots of services

Simple corrplot for ES outcomes from potential restoration areas for seagrasses

Note that correlation plots for confirmed beds shows similar relationships except that now blue carbon is positively correlated with biodiversity and recreation.

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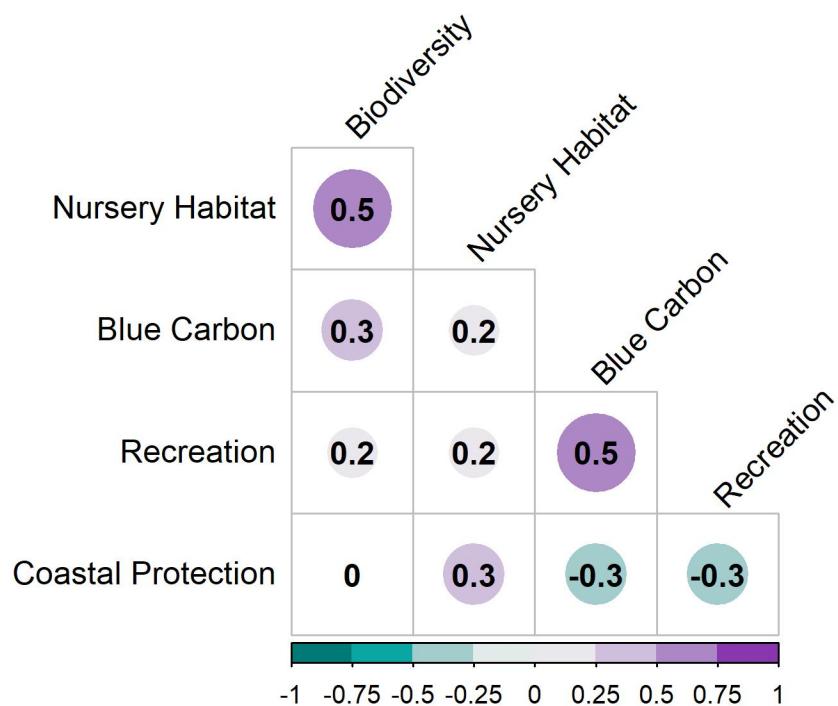


Figure 3: Spatial associations among ecosystem service outcomes associated with potential restoration areas for seagrasses in the Florida Gulf Coast.

Expanded corrplot for ES outcomes from potential restoration areas for seagrasses

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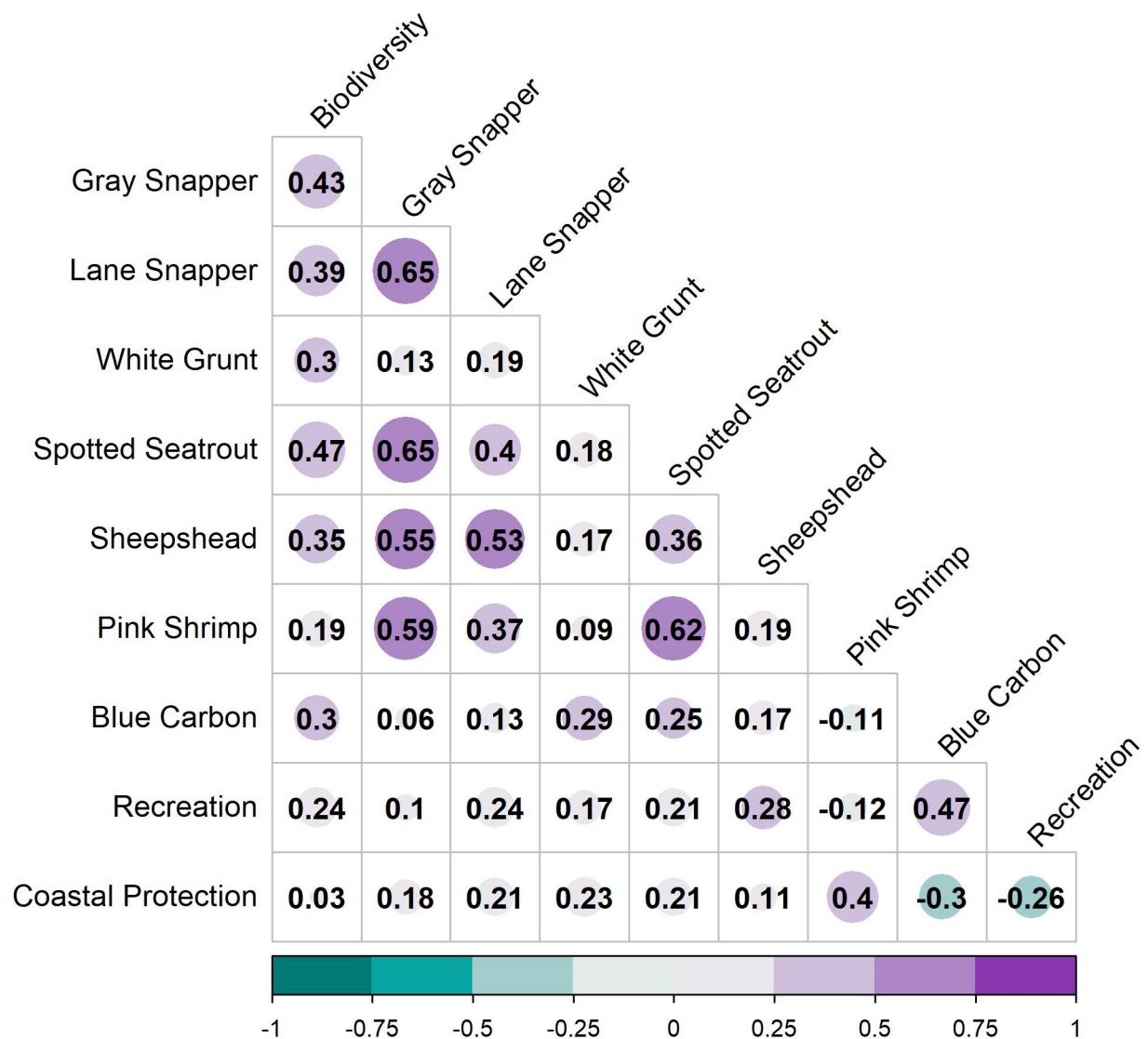
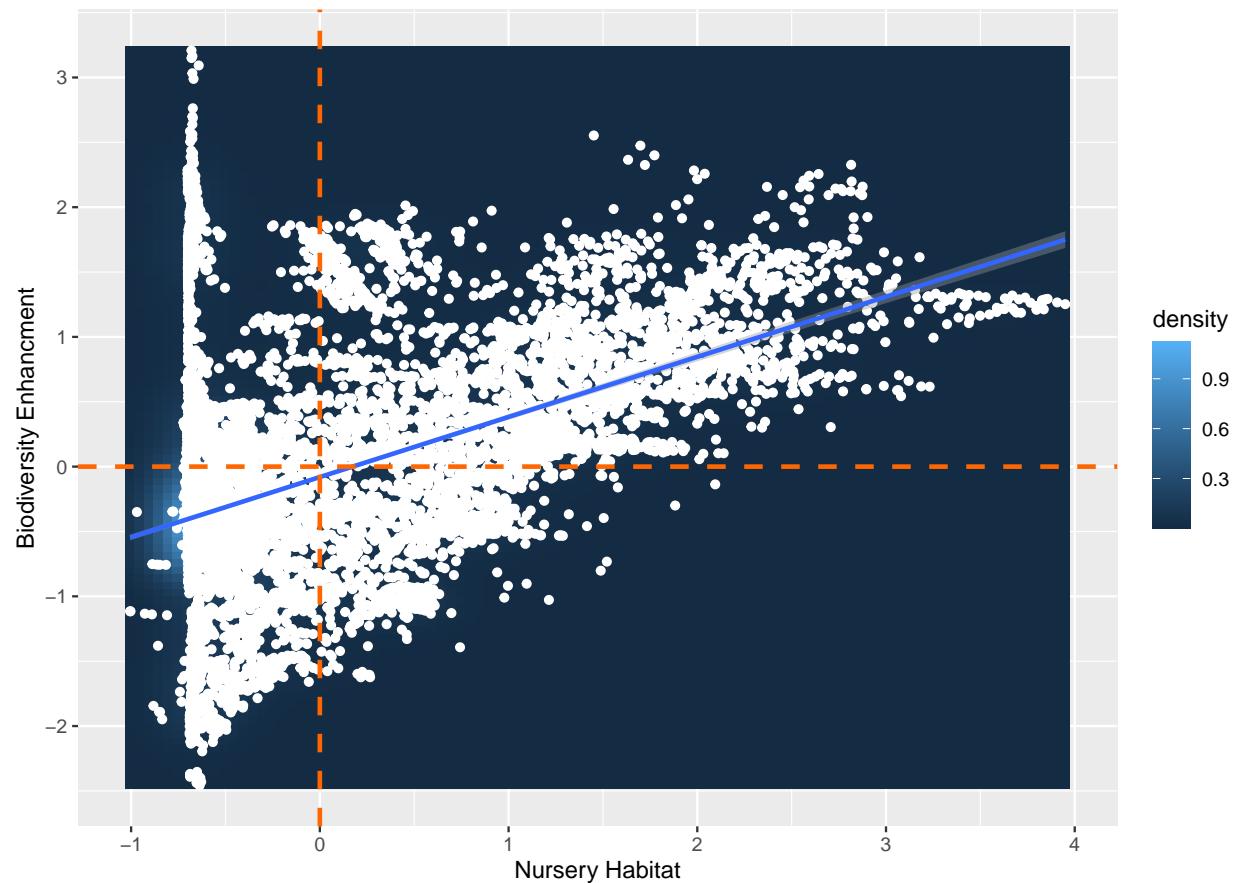


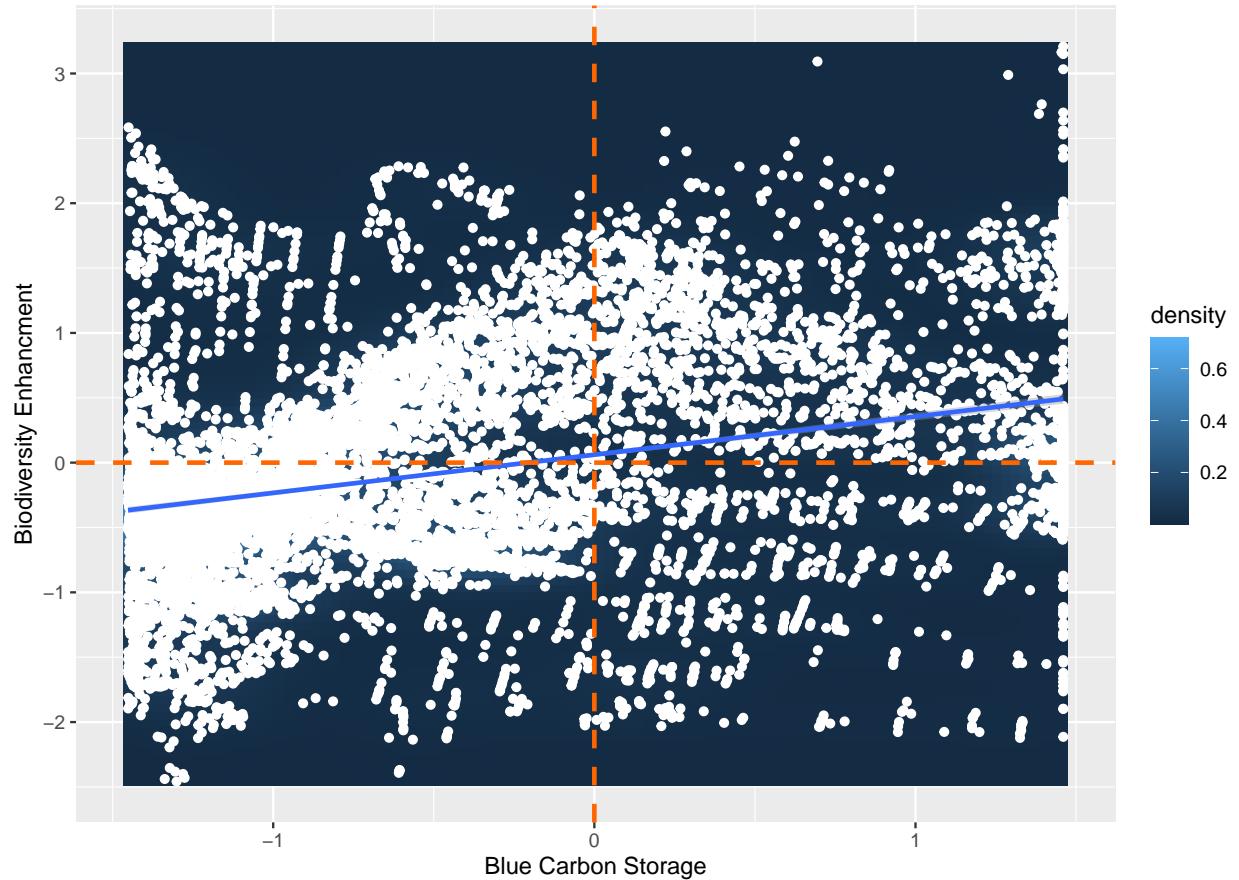
Figure 4: Spatial associations among ecosystem service outcomes associated with potential restoration areas for seagrasses in the Florida Gulf Coast. Note that this version includes associations for individual nursery species.

Pairwise plots of services

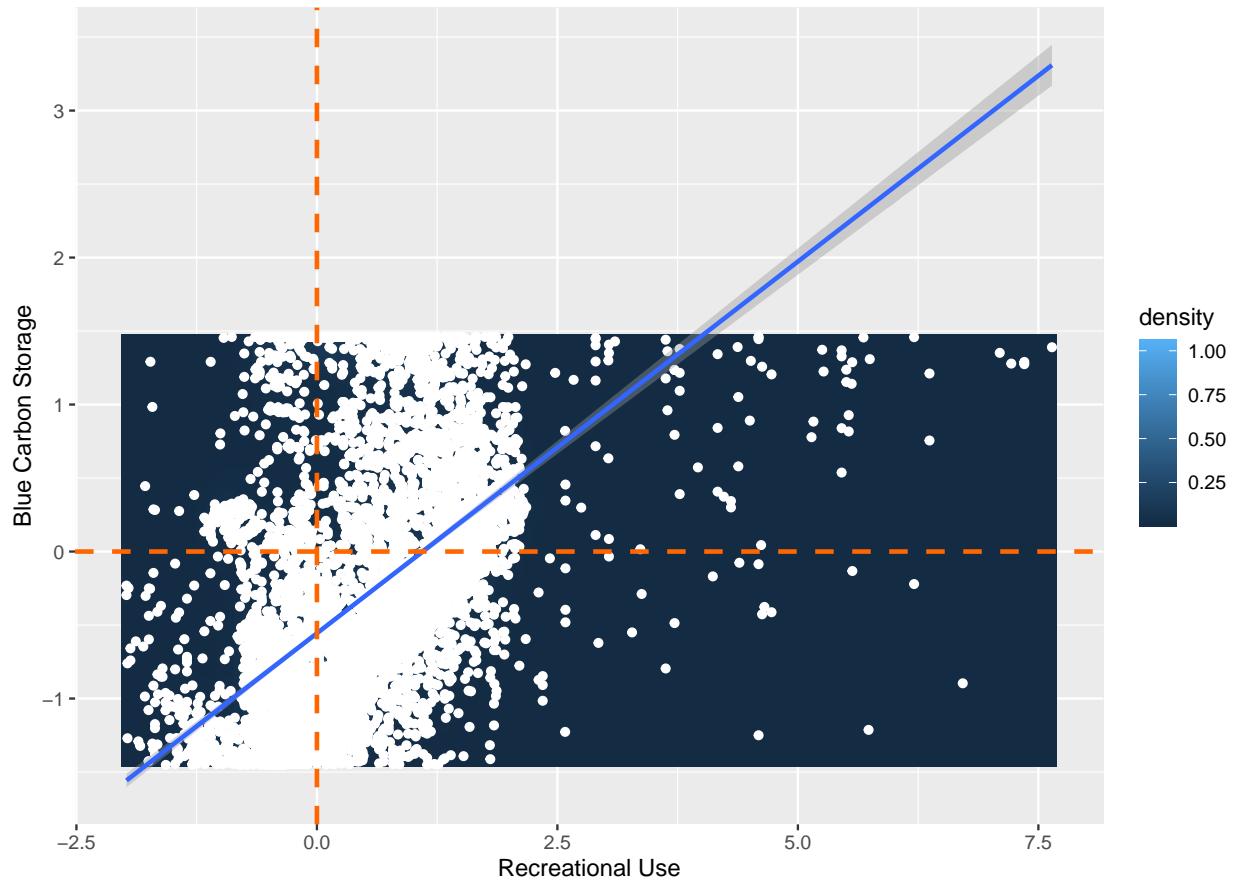
Biodiversity vs Nursery Habitat



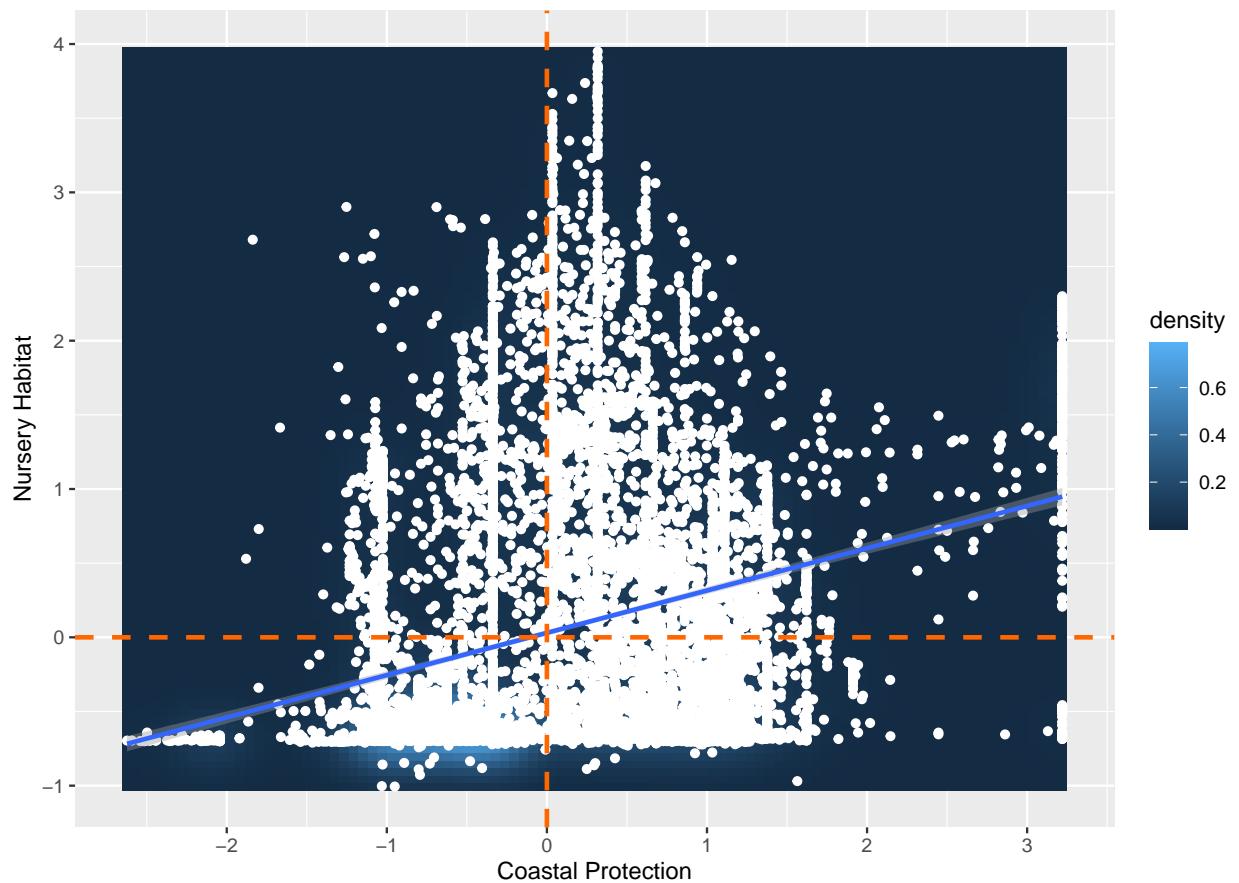
Biodiversity vs Carbon Storage



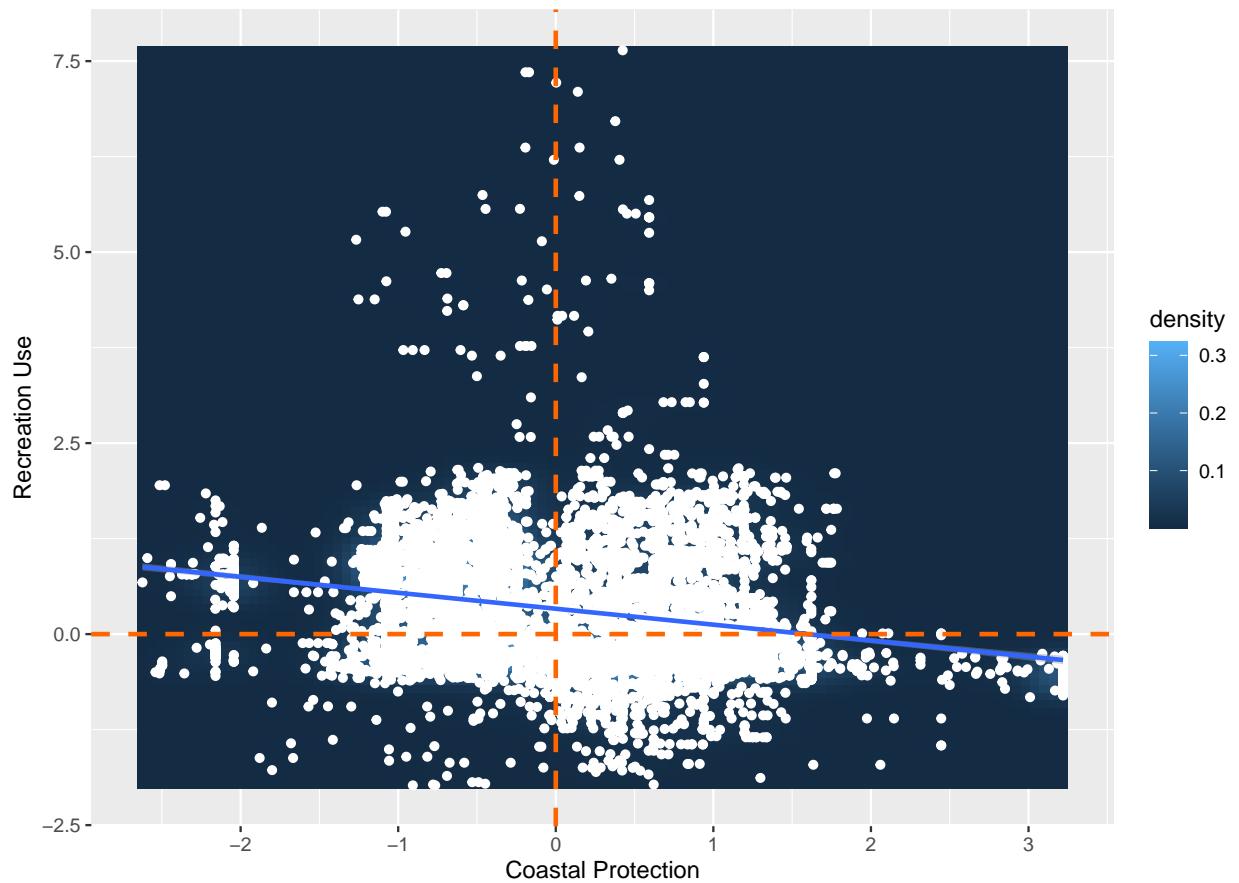
Carbon Storage vs Recreation



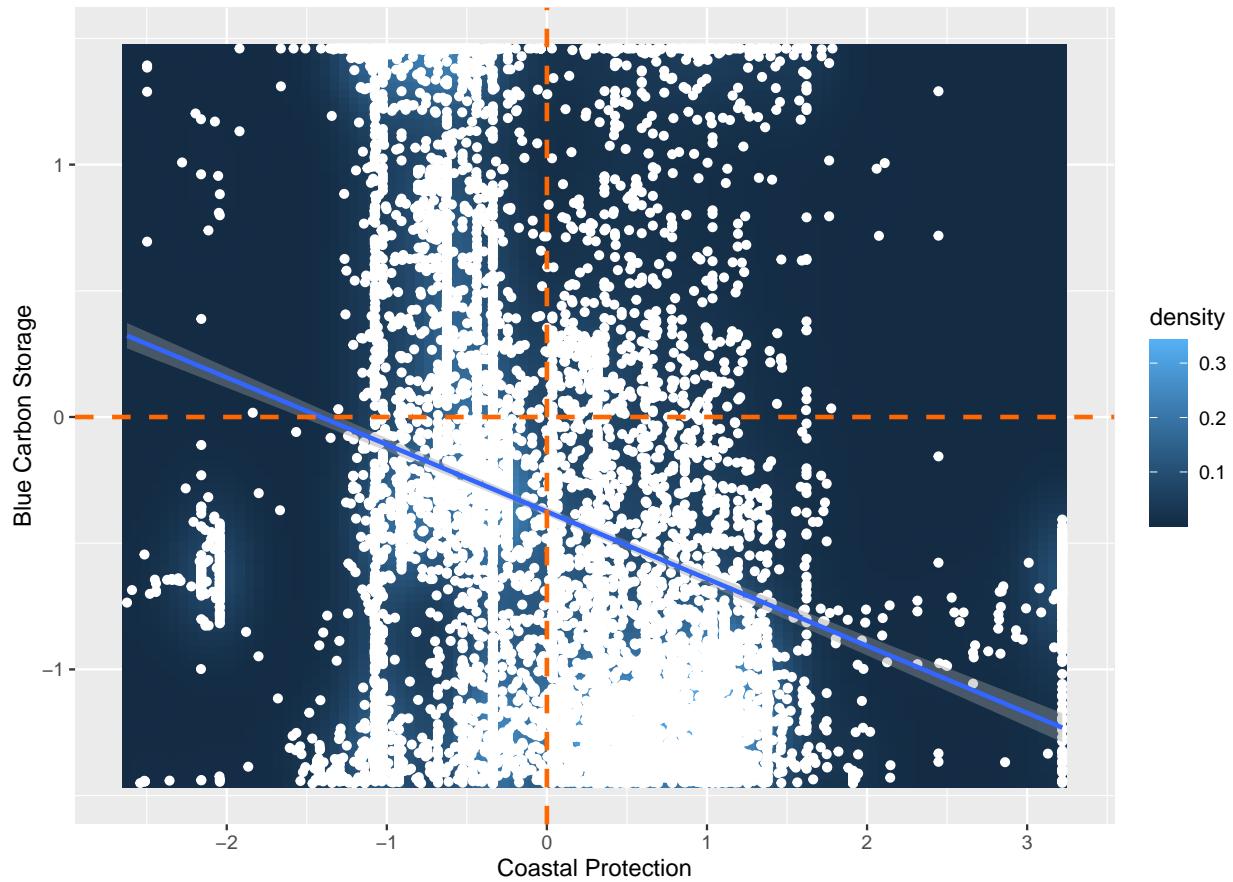
Nursery Habitat vs Coastal Protection



Recreation vs Coastal Protection



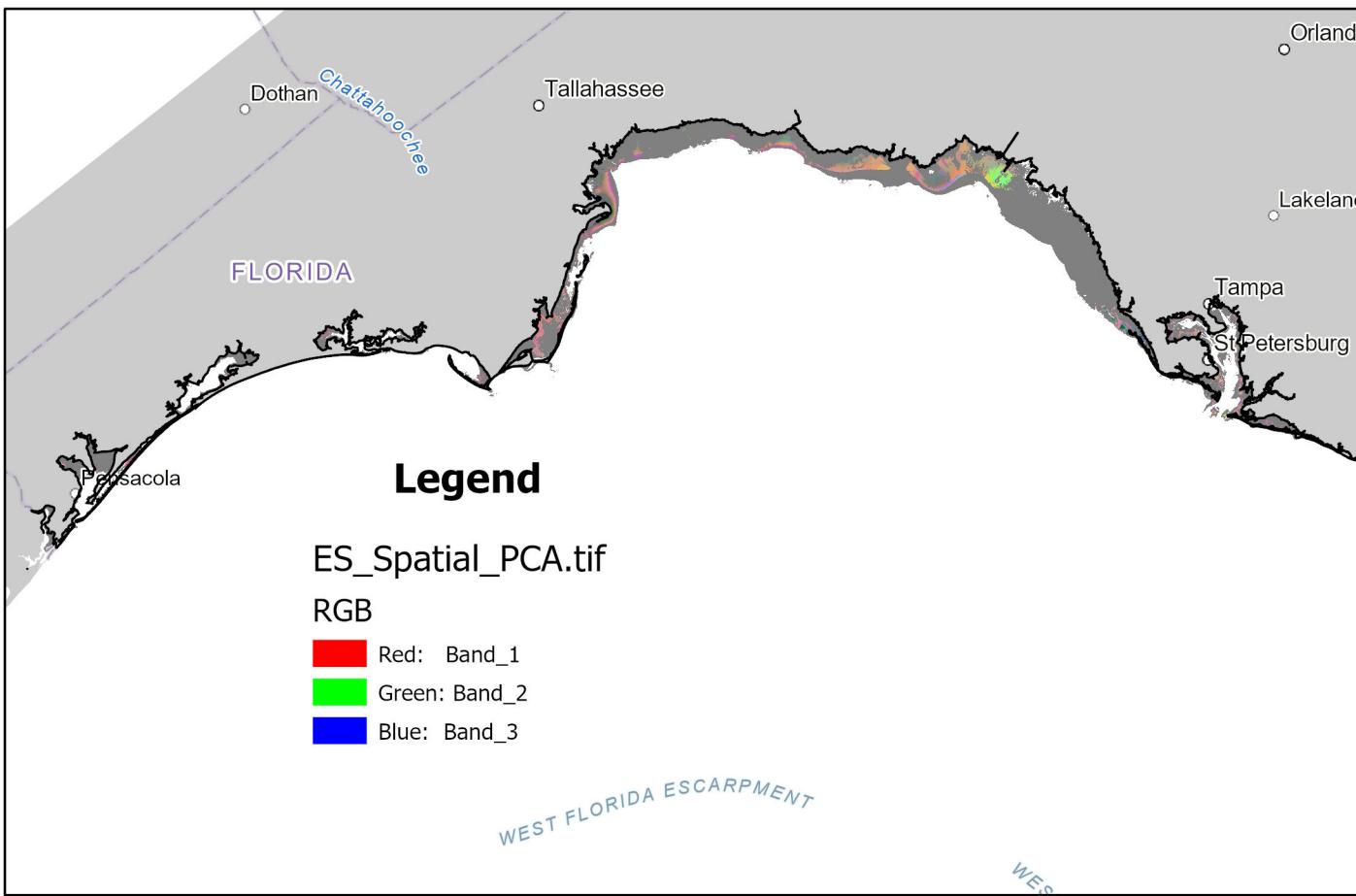
Carbon Storage and Coastal Protection



Multi-dimensional plot of service bundles

#	PERCENT AND ACCUMULATIVE EIGENVALUES		
# PC Layer	EigenValue	Percent of Eigenvalues	Accumulative of EigenValues
1	0.00957	36.4115	36.4115
2	0.00853	32.4408	68.8523
3	0.00323	12.2838	81.1362
4	0.00264	10.0556	91.1918
5	0.00231	8.8082	100

PC Layer	1	2	3	4	5
<hr/>					
Eigenvalues					
	0.00957	0.00853	0.00323	0.00264	0.00231
Eigenvectors					
Input Layer					
Biodiversity	-0.56	0.10	0.51	-0.32	0.56
Nursery Habitat	-0.55	0.38	0.21	0.41	-0.58
Blue Carbon	-0.51	-0.35	-0.49	-0.53	-0.30
Recreation	-0.34	-0.26	-0.44	0.64	0.46
Exposure	0.00	0.81	-0.52	-0.18	0.22
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Prioritization of restoration sites