

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

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Paper Resources

Click **here** to see the latest meeting notes in the Google Doc.

To Do List:

- Make a matrix like the correlation plots but where it shows severity of trade-off instead
 - In this case we want to use the proportion of pixels in the upper quartile of both services.
- 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)

Visualizing Tradeoffs plots of services

Simple corrplot for ES outcomes

Confirmed Seagrass Beds (1-Hectare Res.)

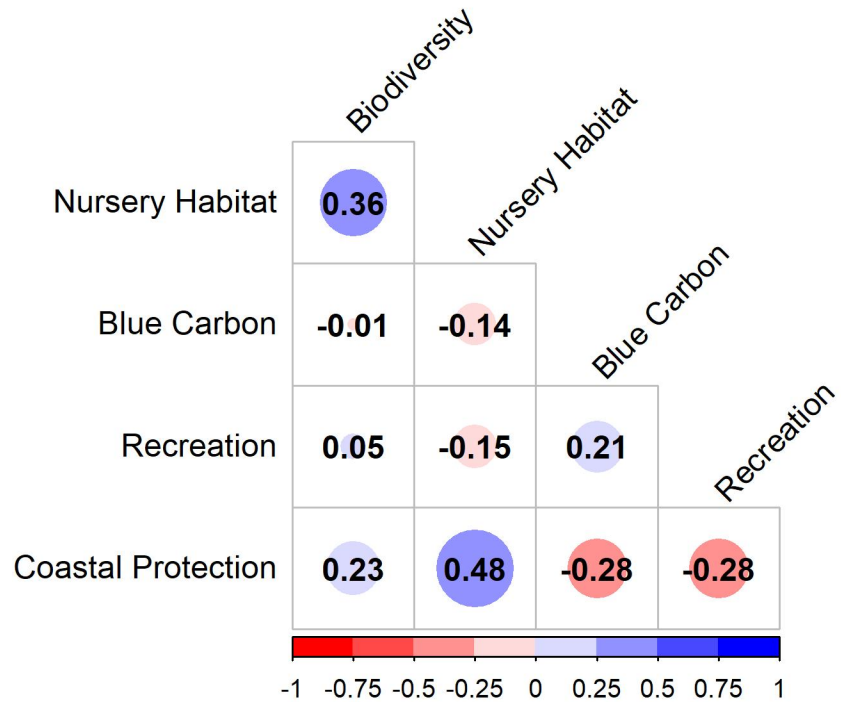


Figure 1: Pearsons correaltion between ecosystem service outcomes assocaited with confirmed seagrass beds in the Florida Gulf Coast (1-Hectare Res)

Potential Restoration Areas (1-Hectare Res.)

The main difference between between PRAs and confirmed beds at this scale is that:

- Blue carbon is now positively correlated with biodiversity and recreation.
- The negative correlation between recreation and coastal protection is also weaker.

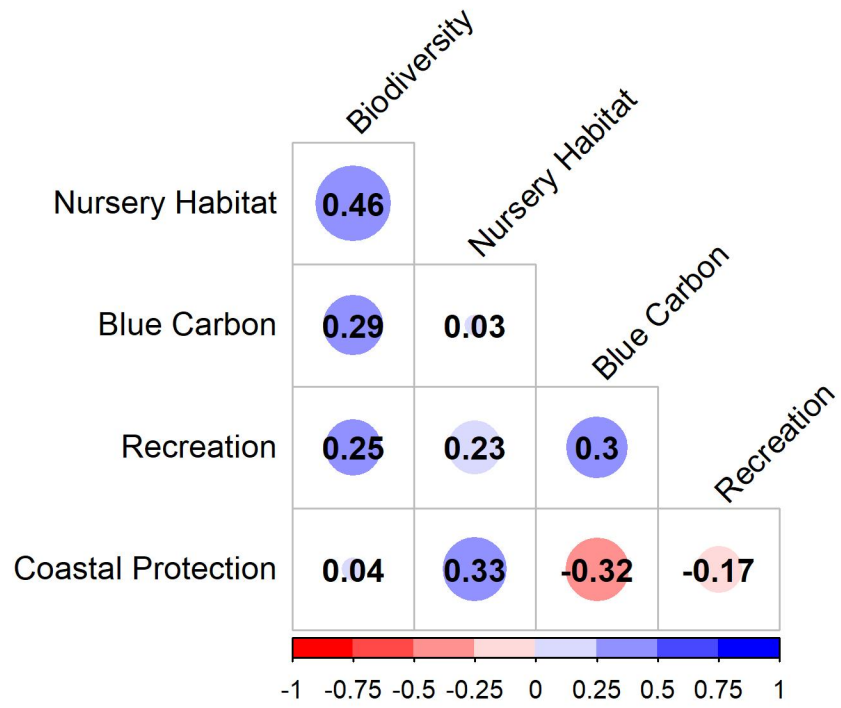


Figure 2: Pearsons correlation between ecosystem service outcomes associated with potential restoration areas for seagrasses in the Florida Gulf Coast (1-Hectare Res)

Simple trade-off severity metric (i.e., fraction of points in the “win-win” quadrant for 2 services)

Proportion of Confirmed Beds in the “Win-Win Quadrat” (75% percentile)

##		X BioDiv	NursHab	BlueCar	RecUse	CoastPro
## 1	BioDiv	1.00	0.13	0.08	0.06	0.13
## 2	NursHab	0.13	1.00	0.03	0.06	0.12
## 3	BlueCar	0.08	0.03	1.00	0.04	0.06
## 4	RecUse	0.06	0.06	0.04	1.00	0.03
## 5	CoastPro	0.13	0.12	0.06	0.03	1.00

Proportion of Confirmed Beds in the “Win-Win Quadrat” (90% percentile)

##		X BioDiv	NursHab	BlueCar	RecUse	CoastPro
## 1	BioDiv	1.00	0.02	0.03	0.01	0.03
## 2	NursHab	0.02	1.00	0.00	0.02	0.02
## 3	BlueCar	0.03	0.00	1.00	0.00	0.02
## 4	RecUse	0.01	0.02	0.00	1.00	0.00
## 5	CoastPro	0.03	0.02	0.02	0.00	1.00

Proportion of Potential Restoration Areas in the “Win-Win Quadrat” (75% percentile)

##		X BioDiv	NursHab	BlueCar	RecUse	CoastPro
## 1	BioDiv	1.00	0.01	0.01	0.02	0.01
## 2	NursHab	0.01	1.00	0.00	0.03	0.01
## 3	BlueCar	0.01	0.00	1.00	0.00	0.00
## 4	RecUse	0.02	0.03	0.00	1.00	0.00
## 5	CoastPro	0.01	0.01	0.00	0.00	1.00

Proportion of Potential Restoration Areas in the “Win-Win Quadrat” (90% percentile)

##		X BioDiv	NursHab	BlueCar	RecUse	CoastPro
## 1	BioDiv	1.00	0.01	0.01	0.02	0.01
## 2	NursHab	0.01	1.00	0.00	0.03	0.01
## 3	BlueCar	0.01	0.00	1.00	0.00	0.00
## 4	RecUse	0.02	0.03	0.00	1.00	0.00
## 5	CoastPro	0.01	0.01	0.00	0.00	1.00

Pairwise plots of services

Restoration Areas vs Confirmed Beds (1-Hectare Scale)

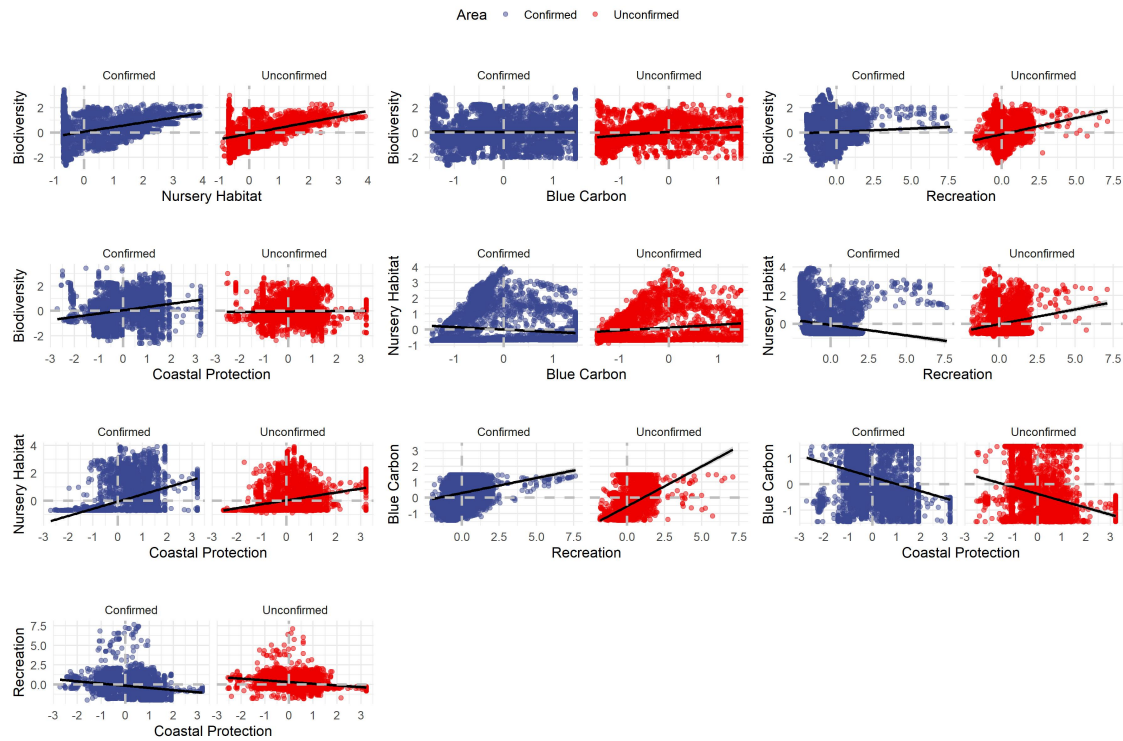


Figure 3: Pairwise plots of ecosystem service outcomes associated with potential restoration areas (red) and confirmed beds (blue) for seagrasses in the Florida Gulf Coast (1-Hectare Res.).

Scale Comparison for Restoration Areas (Scatterplots) - 1-ha vs 1-sqkm vs 5-sqkm vs 10-sqkm

Questions for the group about these plots:

- How can we make this a little more readable??

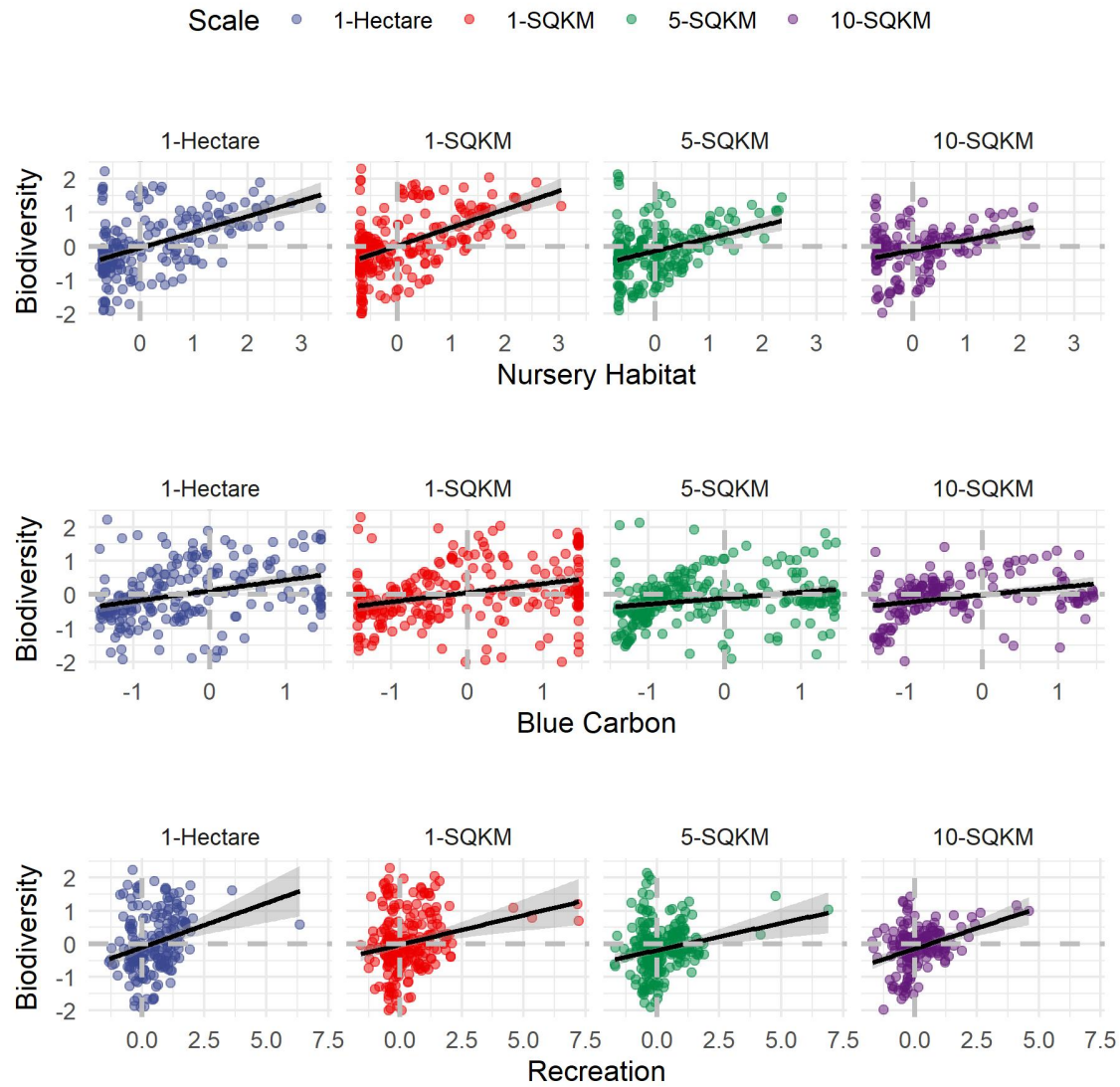


Figure 4: Scale comparison for restoration sites.

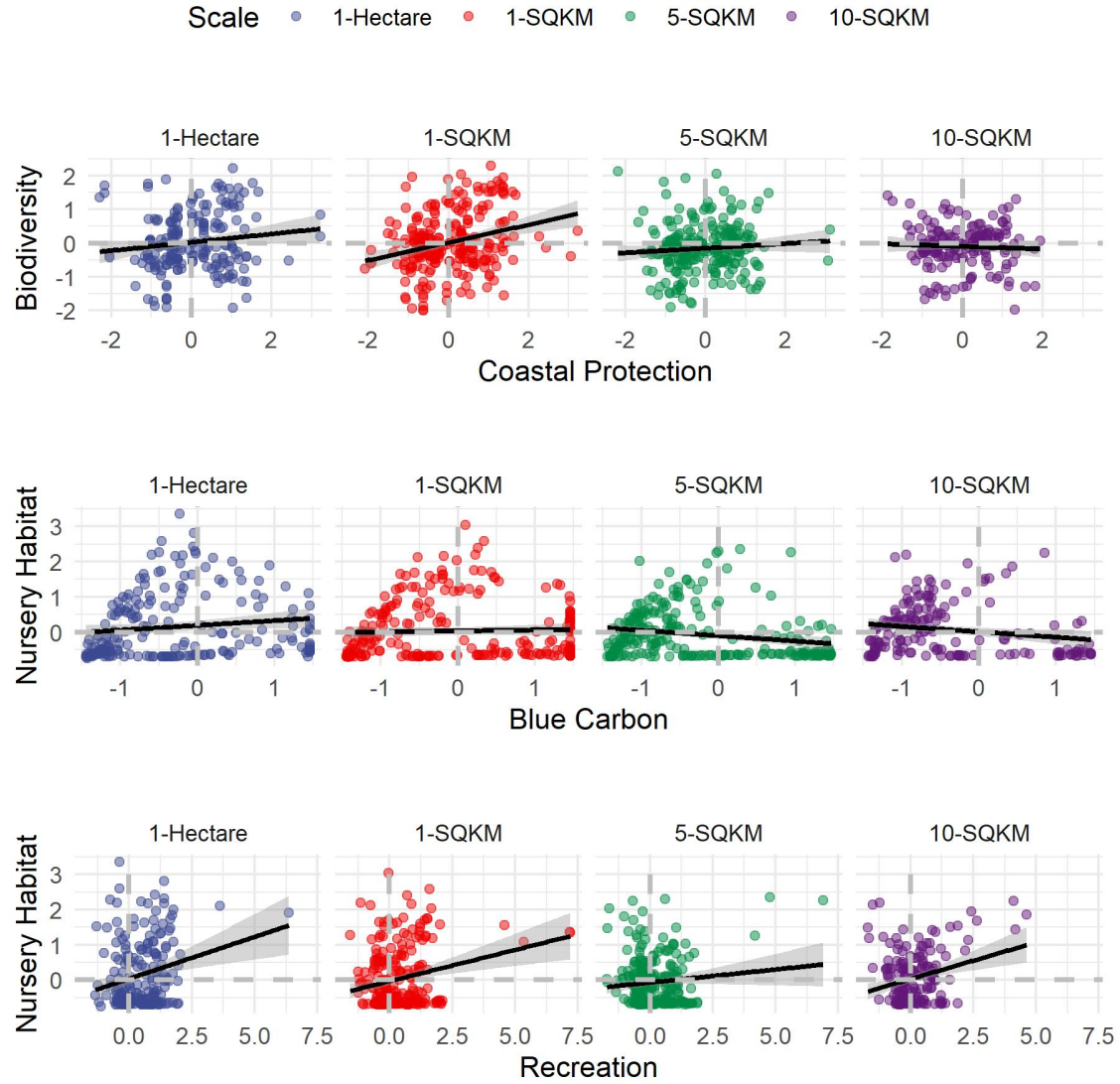


Figure 5: Scale comparison for restoration sites.

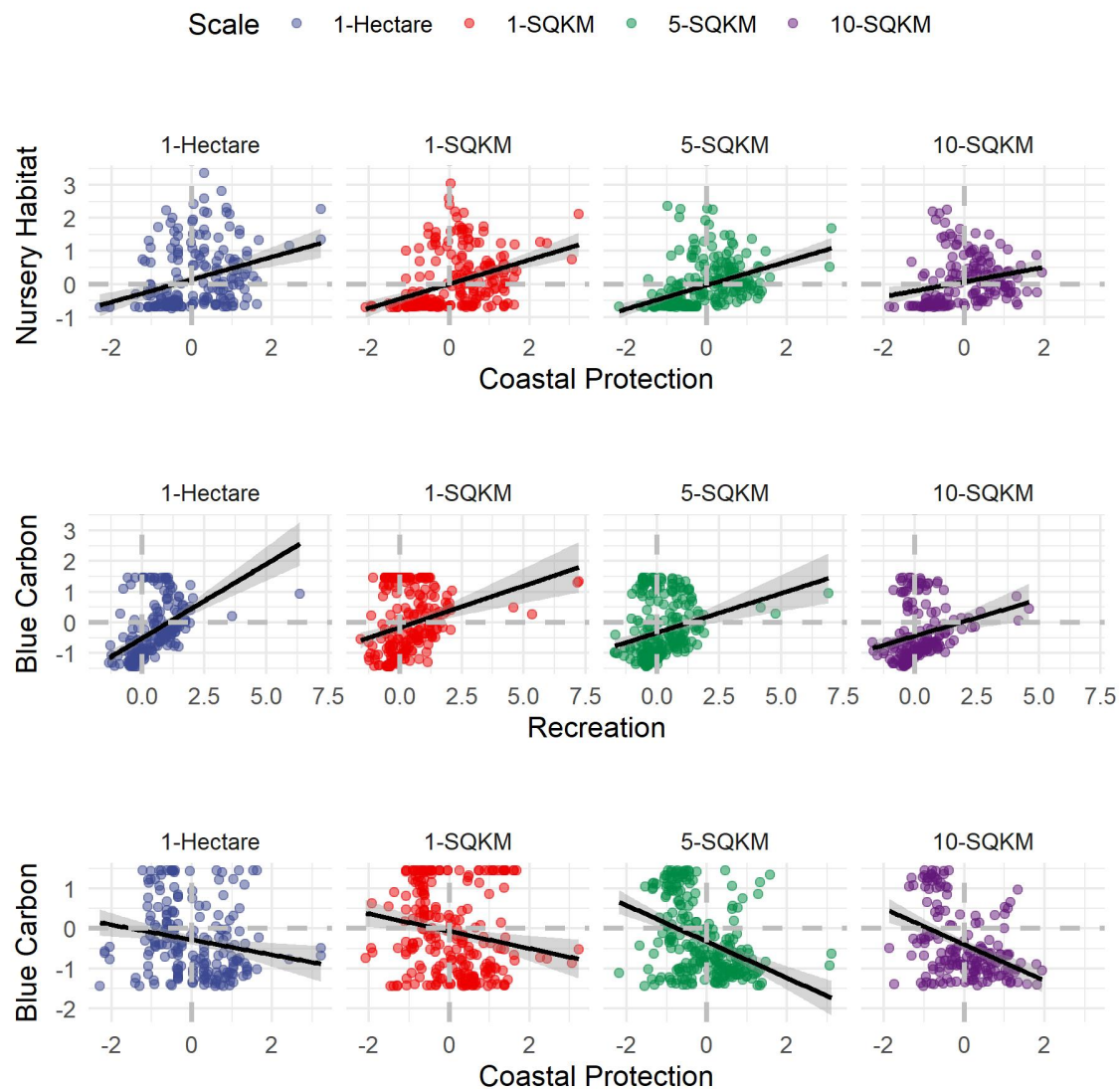


Figure 6: Scale comparison for restoration sites.

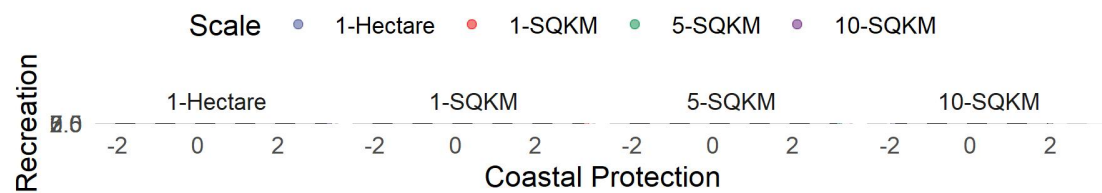


Figure 7: Scale comparison for restoration sites.

Prioritization of restoration sites

Tutorial for PrioritizR -> https://prioritizr.net/articles/gurobi_installation_guide.html

Potential Supplemental Figures

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

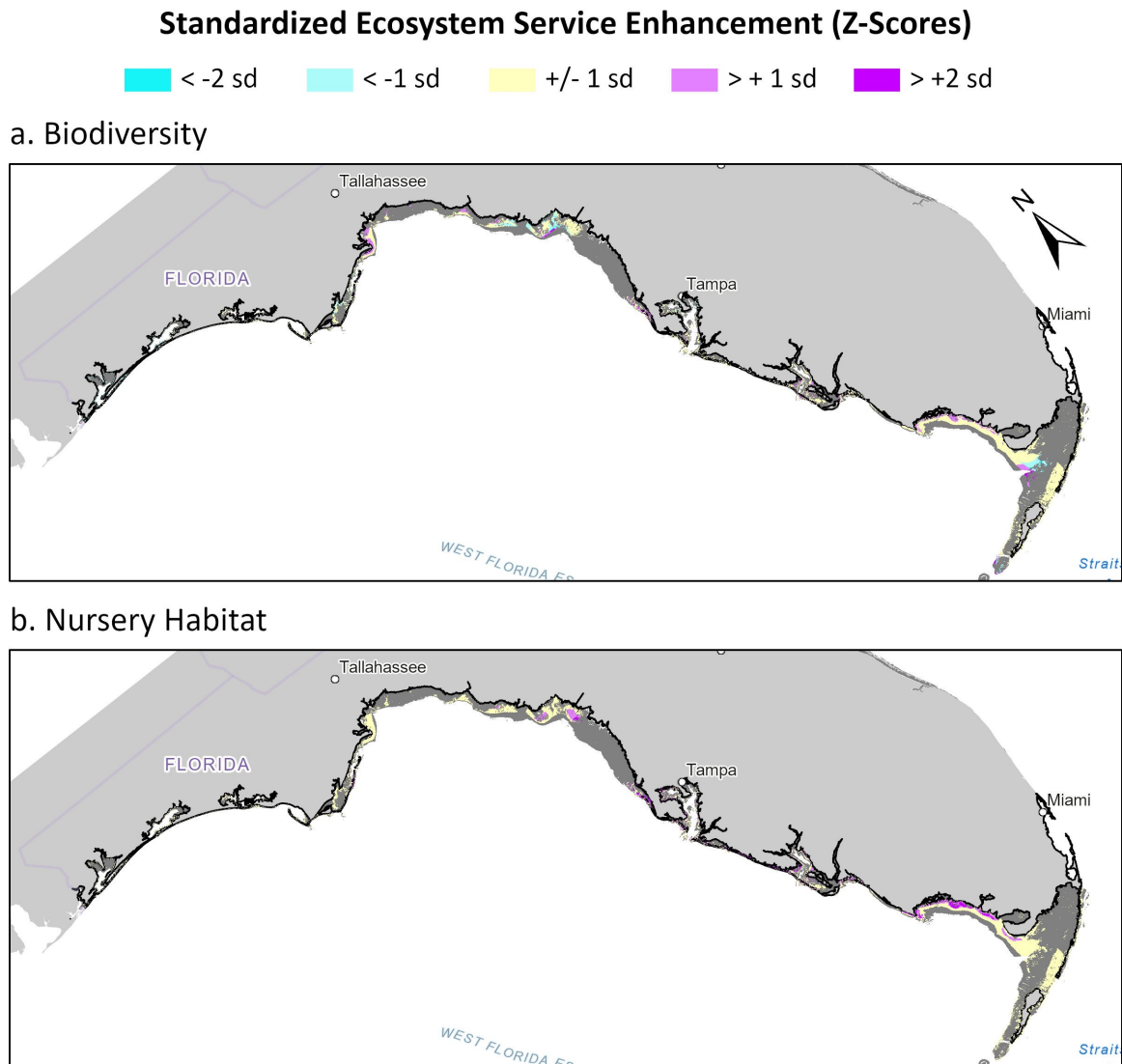
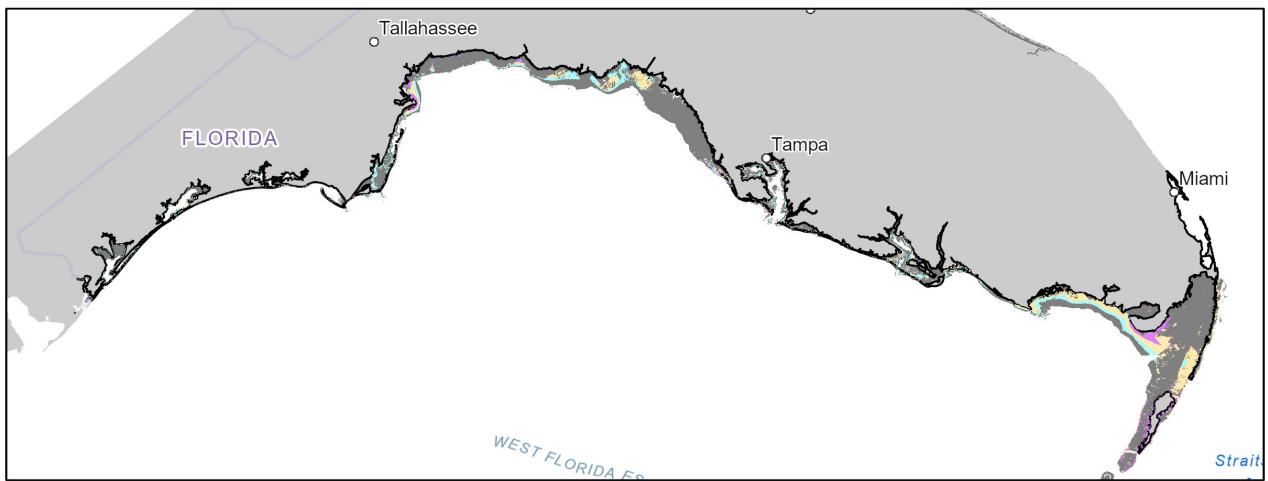
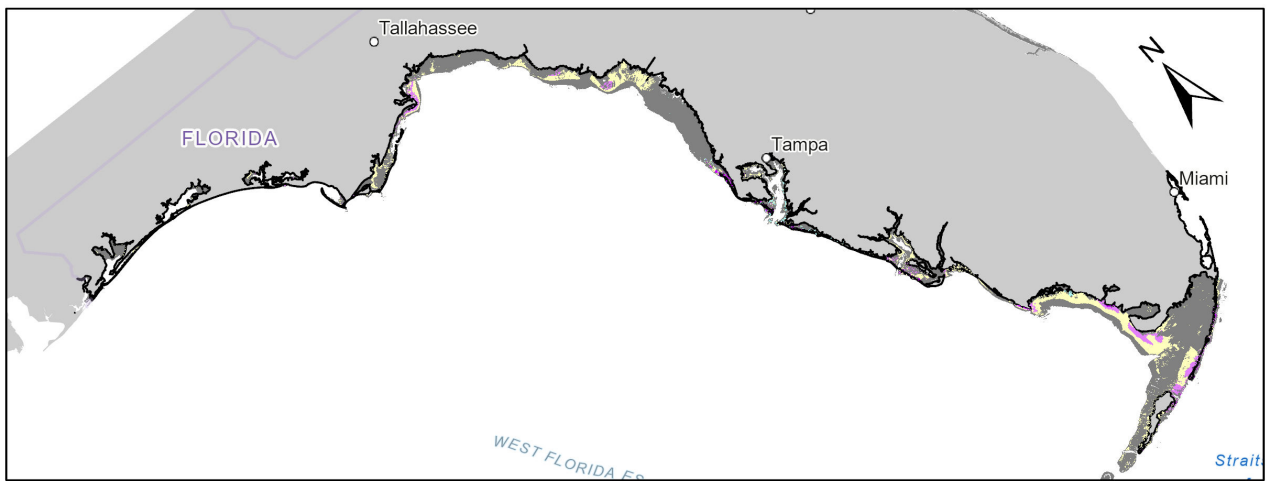


Figure 8: Spatial variation in expected ecosystem service enhancement values of potential restoration areas for seagrasses in the Florida Gulf Coast. Ecosystem service outcomes are quantified in terms of the standardized enhancement effect of seagrasses on the predicted biodiversity, nursery habitat, 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

