

Scale Matters: Relating Wetland Loss and Commercial Fishing Activity in Louisiana Across Spatial Scales

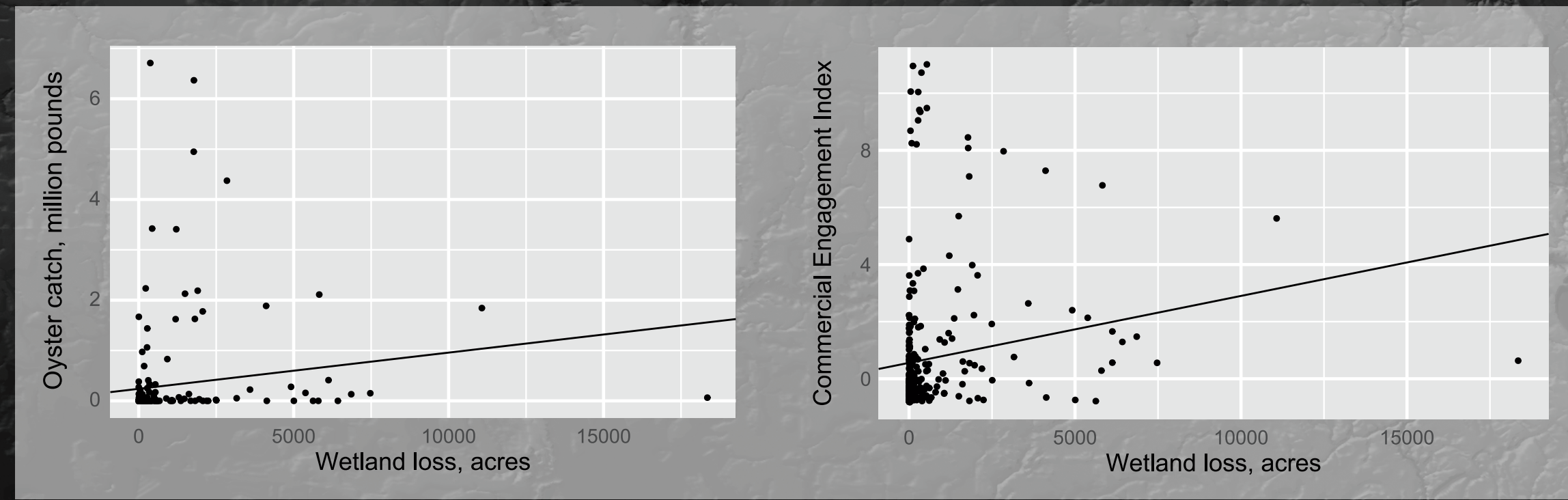
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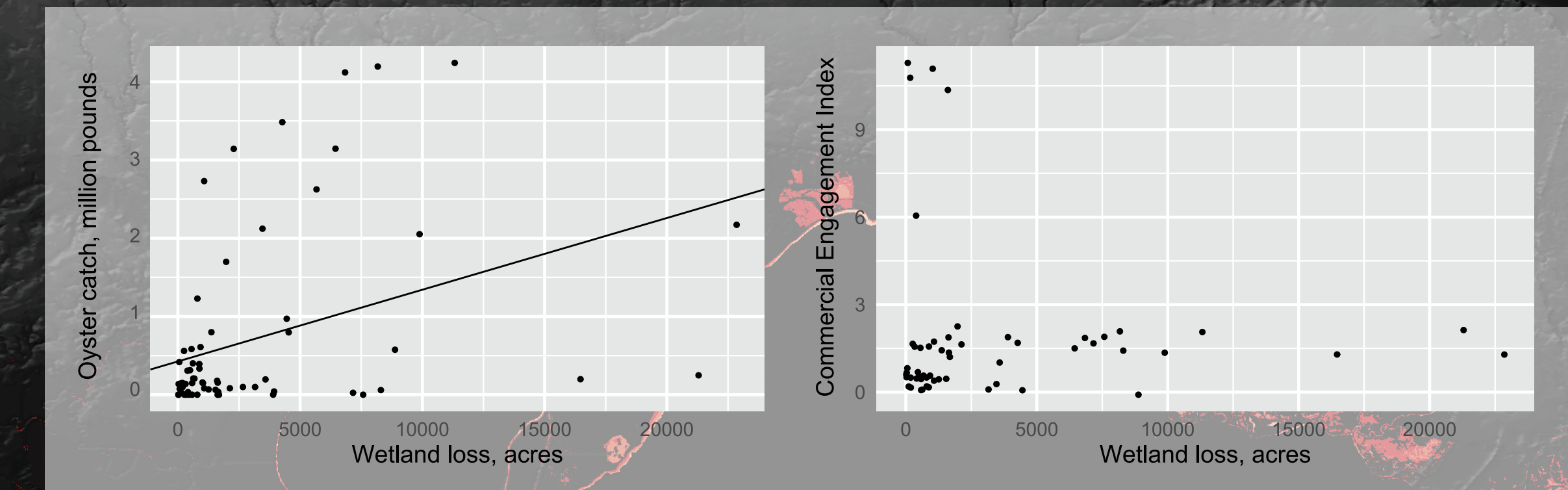
Abstract:

Globally wetlands are on the decline, and these losses in important habitat are not spatially homogenous, with losses in some regions reaching catastrophic levels. Coastal Louisiana is a prime example of extreme wetland loss. Coastal subsidence, river channelization, and sea level rise, have decimated coastal wetlands. These wetland ecosystems represent a frontier where aquatic and terrestrial systems come together. Highly productive and biodiversity rich they provide a multitude of benefits including carbon sequestration, water filtration, flood mitigation, shoreline protection, and habitat for various species of importance. These "ecosystem services" are important to all, however they are vital to coastal communities. Wetland loss and the connection to ecosystem services has been studied around the world, what is known to a lesser degree is the connection to various ecosystem services and how these ecosystem services impact upon coastal communities at different spatial scales.

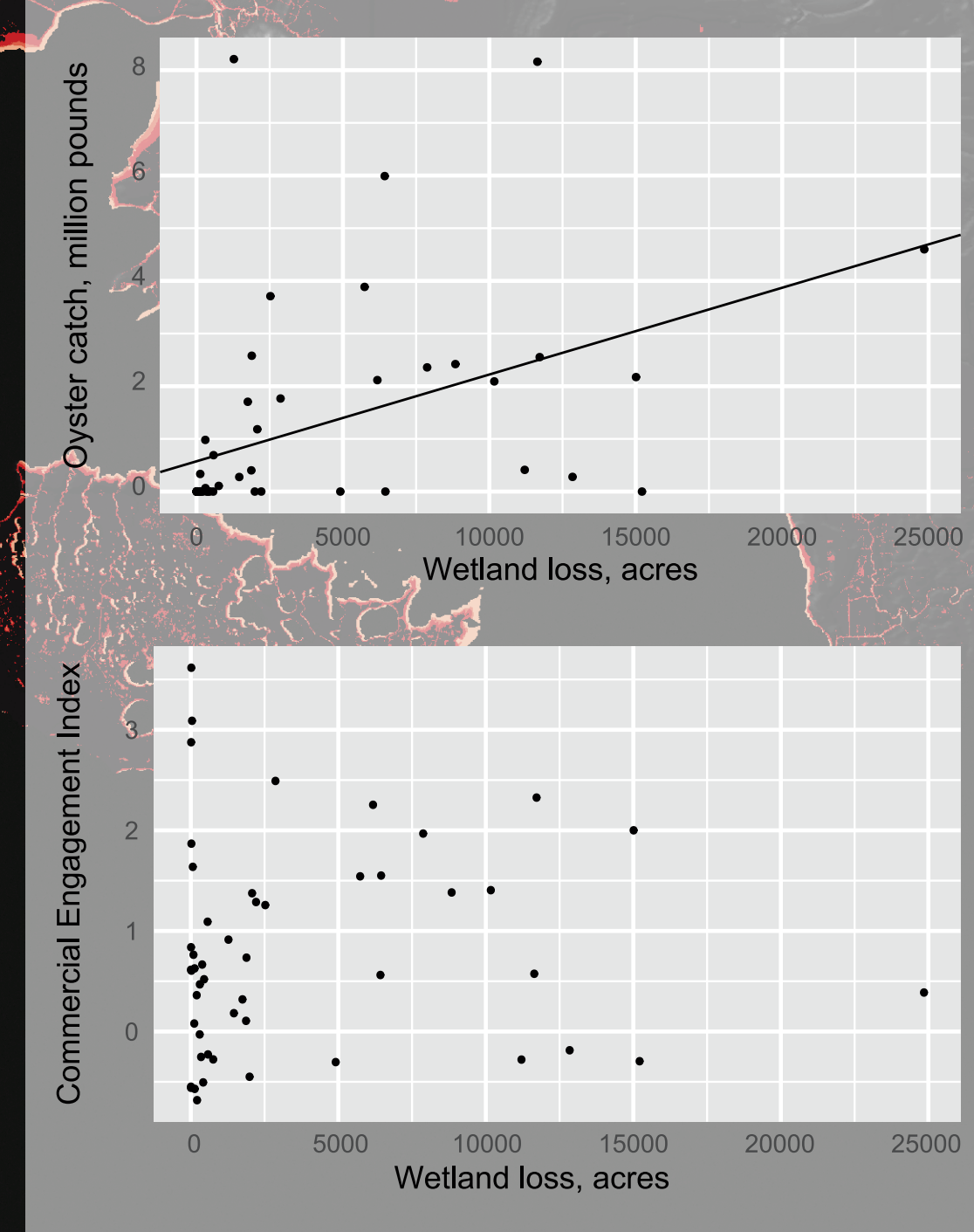
Trip Ticket Level



Parish Level



Watershed (HUC 8) Level



Lake Charles

Baton Rouge

Elevation

Slidell

New Orleans

Houma

Buras

Lafayette

Areas of wetland loss in red

Areas of wetland loss in red

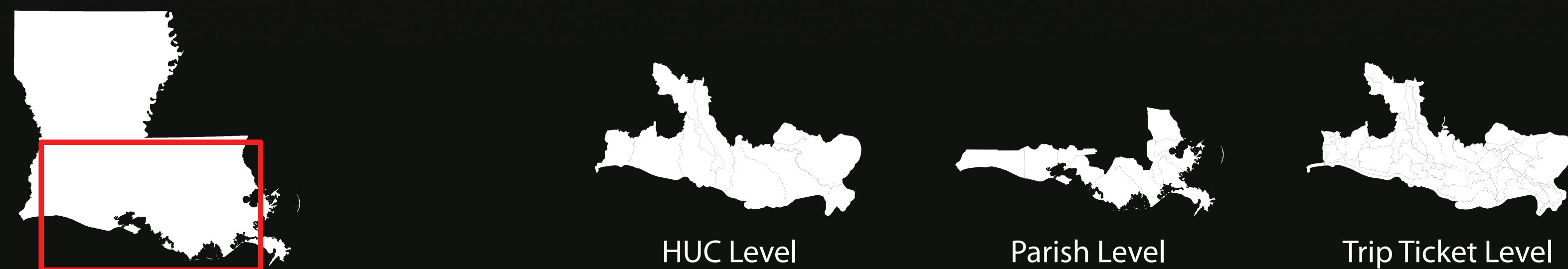
Methods:

For each of the three scales of analysis, we compared acres of wetland loss with a commercial engagement index using a Spearman correlation. The commercial engagement index is calculated by running a one-component principal component analysis using four contributing factors: number of fishermen reporting catch, number of dealers reporting catch, pounds of fish caught, and sum of the landings values for fish caught. We also compared wetland loss with landings and revenue data for three wetland-dependent species via Spearman correlation: oysters, blue crab, and northern brown shrimp. All three species showed the same pattern of relationship (significant Spearman correlation at all three scales), so oyster landings are presented here as a representative data set.

Year of wetland loss



Scale of Analysis



Discussion:

In these analyses we were looking to investigate how the relationship between humans and nature vary depending on the scale of inquiry, specifically the relationship between wetland loss and commercial fishery engagement. The particular set of indicators we chose to look at also highlight a somewhat counterintuitive relationship: with increasing wetland loss, metrics of commercial fishery success increase. This may be because as wetland recedes, there is more access to good fishing grounds and secondary productivity (most commercial fishery species) increase with increased wetland edge area. These results also show that Louisiana fishermen are resilient, finding areas of increased fishery production while the community and land around them disappears. This resilience may soon reach a tipping point, however, when the increased edge area produced by wetland loss thus far transitions into open ocean water.