ENVIROATLAS USE CASE

Assessing the compatibility of wetlands compensatory mitigation of lands prioritized for protection adjacent to Forest Service-owned lands

DECEMBER 2017

Ecosystem Marketplace
AN INITIATIVE OF FOREST TRENDS

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Forest Trends' Ecosystem Marketplace

Leveraging compensatory mitigation to achieve USFS Land Ownership Adjustment Strategy and restoration priorities

Background

- In 2013, the US Army Corps of Engineers, Charleston District and the Francis Marion & Sumter National Forests entered into a Conservation Land Use Agreement (CLUA). The CLUA established a framework wherein compensatory mitigation requirements associated with Department of the Army wetland permits could be met by permittees' restoring or enhancing aquatic resources on Forest lands, or contributing to the National Forest System through new protection and incorporation of private inholdings or properties adjacent to National Forest System (NFS) lands.

- This innovative agreement has since been used across a variety of project types, helping to satisfy the compensatory mitigation requirements of permit applicants and to accomplish restoration benefiting Forest Service watersheds.

- This compensatory mitigation mechanism also can help the Forest Service achieve land acquisition, private land protection, and all-lands restoration goals identified in the Francis Marion & Sumter National Forests' 2016 Land Ownership Adjustment Strategy (LOAS).

- A critical need identified in the LOAS is proactive planning so that when compensatory mitigation requests arise, the Forest Service can respond with a strategic decision regarding potential properties for acquisition as part of mitigation activities instead of an ad-hoc response. This means anticipating where demand is likely to arise, and understanding where restoration is likely to succeed.
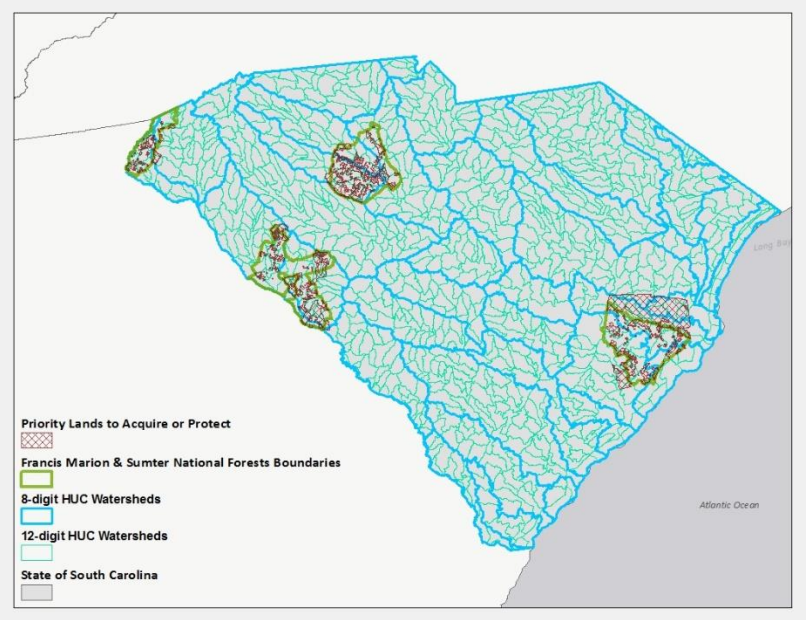
About this use case:
Assessing compatibility of
wetlands compensatory
mitigation on lands prioritized
for USFS acquisition

Introduction

- This use case explores a method for evaluating properties prioritized for protection (e.g., private inholdings and properties adjacent to National Forest System lands) for compatibility with wetland compensatory mitigation. It is intended as a screening tool for the USFS for preparing to respond to future compensatory mitigation requests, by identifying subwatersheds where restoration potential is high and where demand for mitigation is likely to arise.

- The case draws on data on ecosystem services and ecosystem services markets available on the EnviroAtlas federal decision support tool, as well as Department of the Army (DA) permit data and wetland compensatory mitigation transactions from the US Army Corps of Engineers-maintained ORM and RIBITS databases.

- The LOAS has already identified priority lands for USFS acquisition and private protection (shown in red hatch in the map at right).

- This use case develops a compatibility index to score these lands at the subwatershed level in terms of wetland restoration potential and local demand for compensatory mitigation.

Priority Lands to Acquire or Protect

Francis Marion & Sumter National Forests Boundaries

8-digit HUC Watersheds

12-digit HUC Watersheds

State of South Carolina

This map displays properties (red hatch) prioritized in the LOAS for acquisition and protection and watersheds at the 8- and 12-digit HUC level (in blue) in South Carolina. HUC-12s serve as the primary unit of analysis in this use case unless otherwise noted.

Approach: Evaluate compatibility with compensatory mitigation in terms of restoration potential and indicators of potential demand for mitigation in the sub-watershed.
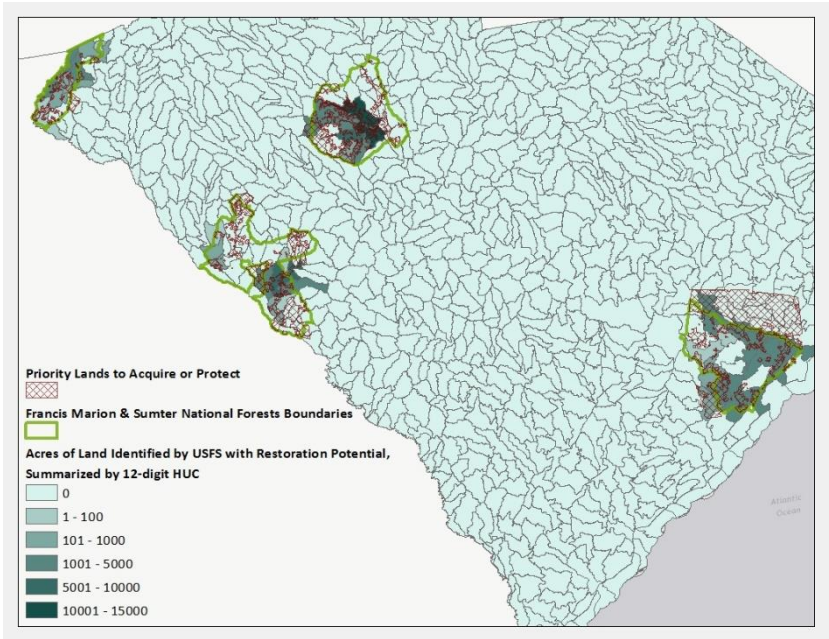
Research approach

1. Develop an index of wetland restoration potential based on properties already identified by USFS in its LOAS as having restoration potential and data on potentially restorable wetlands within 12-digit HUC watersheds.
2. Develop an index of potential demand for compensatory mitigation. Proxy indicators for demand include recent DA permitting volumes (since DA-issued permits are the vehicle for compensatory mitigation requirements), historical compensatory mitigation credit demand volumes, and presence of alternative suppliers of compensatory mitigation. These indicators are assessed at the 8-digit HUC level, since that is the standard "service area" within which mitigation credits can be bought and sold.
3. Normalize and combine these indices into a multi-factor master compatibility index.

| Index	Datasets	Data source
RESTORATION POTENTIAL *These indicators suggest where wetland restoration activities are likely to be successful.*	Acres with USFS restoration potential in the HUC-12 subwatershed	USFS map data
	Percent of the HUC-12 subwatershed with potentially restorable wetlands	EnviroAtlas map data
POTENTIAL DEMAND FOR COMPENSATORY MITIGATION *These indicators tell us about watersheds where demand is most likely, based on historical demand for compensatory mitigation and where demand for mitigation may already be met by other lands.*	Historical number of compensatory mitigation credits transacted in the area, 1988-2016	RIBITS database & EnviroAtlas map data
	Historical number of Department of the Army permits issued for dredge/fill projects in the HUC-8 watershed, 2014-2016	ORM database
	Presence of other mitigation sites providing compensatory mitigation in the same HUC-8 watershed	EnviroAtlas map data

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The wetland restoration potential index is created with two map layers: Acres of high-restoration potential lands identified in the LOAS, and percent potentially restorable wetlands.

Acres identified in the LOAS as having wetlands restoration potential

This map displays data from the LOAS for the Francis Marion and Sumter National Forests identifying land with restoration potential. The total number of acres categorized as having "restoration potential" are summarized for each subwatershed (12-digit HUC).
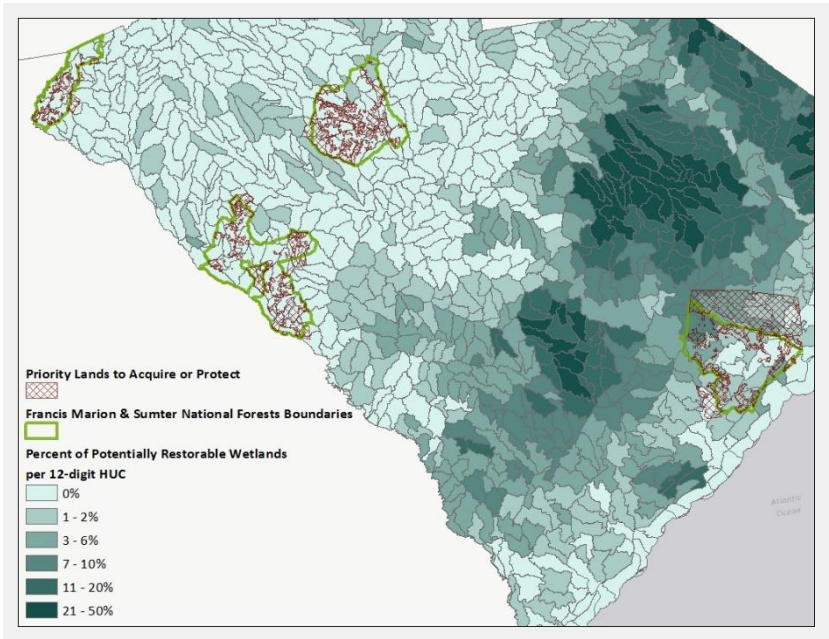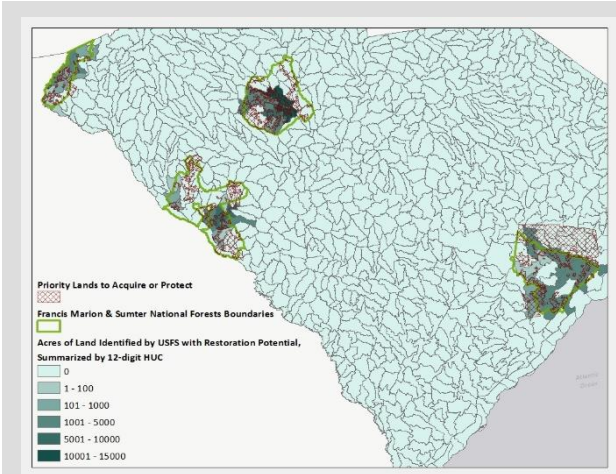
Percent potentially restorable wetlands

This EnviroAtlas national map depicts the percent of a subwatershed with potentially restorable wetlands (12-digit HUC) in the U.S. Potentially restorable wetlands are defined as agricultural areas that naturally accumulate water and contain some proportion of poorly-drained soils. The EnviroAtlas team produced this dataset by combining three data layers—land cover, digital elevation, and soil drainage information.
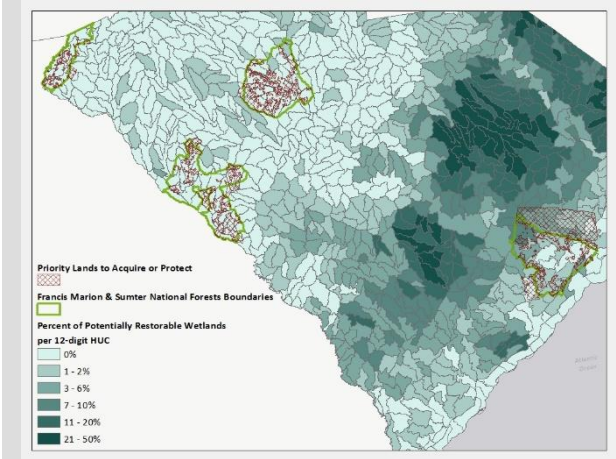
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The wetland restoration potential index is created with two map layers: Acres of high-restoration potential lands identified in the LOAS, and percent potentially restorable wetlands.

1. Introduction
2. Research question
3. Identify relevant datasets and develop research approach
4. Analysis: Areas with high wetlands restoration potential
5. Analysis: Potential demand for compensatory mitigation
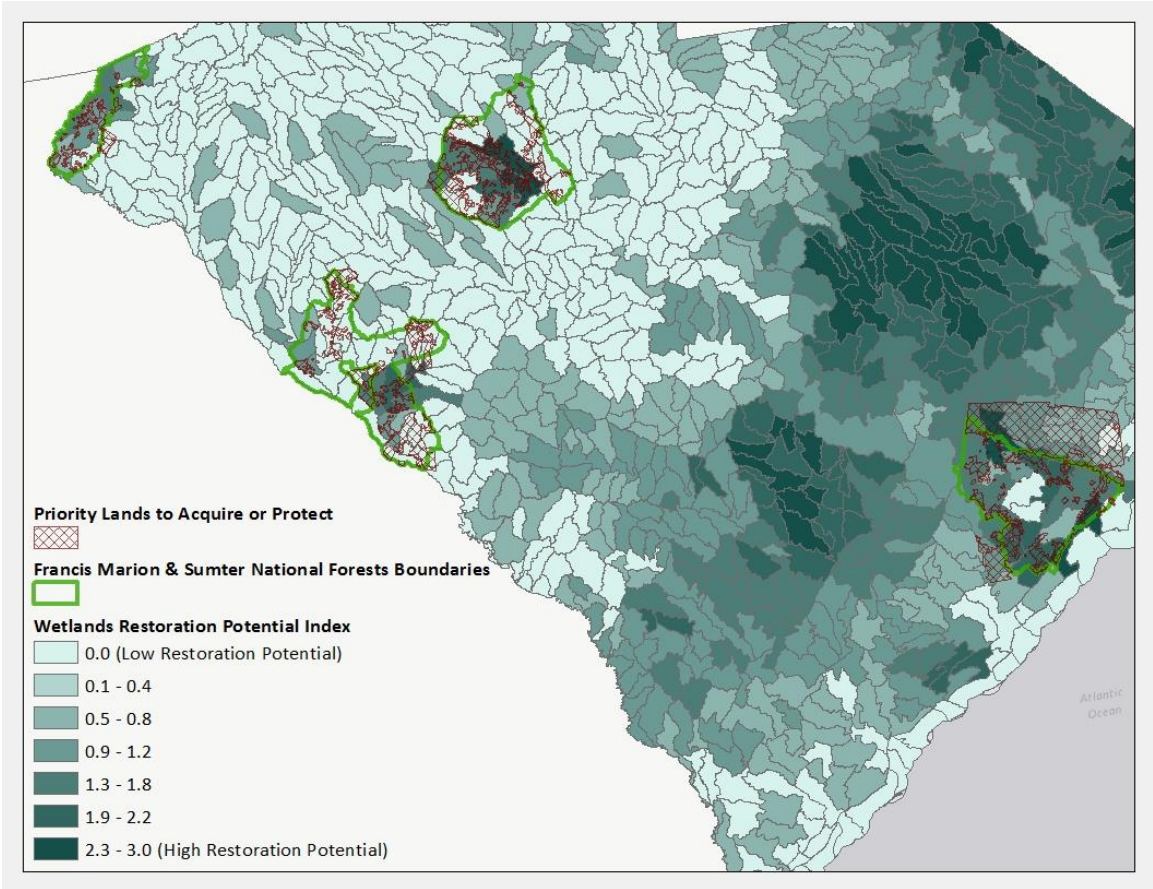6. Combine indices
7. Findings

Priority Lands to Acquire or Protect

Francis Marion & Sumter National Forests Boundaries

Acres of Land Identified by USFS with Restoration Potential, Summarized by 12-digit HUC
- 0
- 1 - 100
- 101 - 1000
- 1001 - 5000
- 5001 - 10000
- 10001 - 15000

Acres Identified in the LOAS as Having Wetlands Restoration Potential

Priority Lands to Acquire or Protect

Francis Marion & Sumter National Forests Boundaries

Percent of Potentially Restorable Wetlands per 12-digit HUC
- 0%
- 1 - 2%
- 3 - 6%
- 7 - 10%
- 11 - 20%
- 21 - 50%

Percent Potentially Restorable Wetlands

For each data layer, subwatersheds (12-digit HUCs) were assigned a score of 0-5. Then, these scores were averaged to generate a composite index score for each subwatershed.
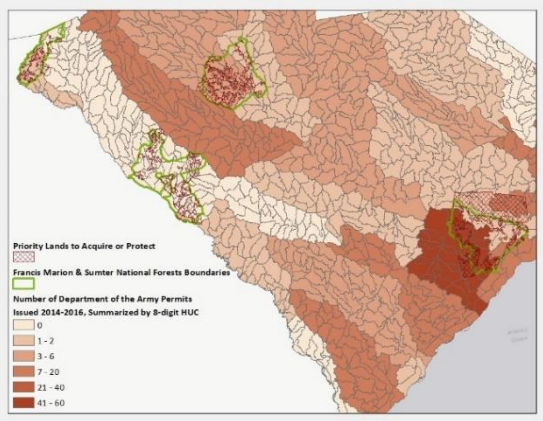
Priority Lands to Acquire or Protect

Francis Marion & Sumter National Forests Boundaries

Wetlands Restoration Potential Index
- 0.0 (Low Restoration Potential)
- 0.1 - 0.4
- 0.5 - 0.8
- 0.9 - 1.2
- 1.3 - 1.8
- 1.9 - 2.2
- 2.3 - 3.0 (High Restoration Potential)

**INDEX: WETLAND RESTORATION POTENTIAL**

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Next, we assessed potential demand for mitigation. Historical number of DA permits issued and compensatory mitigation credit transactions were used as proxy indicators of demand. Proximity to other mitigation suppliers (e.g., In-Lieu-Fee and bank sites) was also considered.

Historical Number of DA Permits Issued, 2014-2016

This map displays the number of DA permits issued to parties with anticipated impacts to waters of the United States in the 2014-2016 period. The number of permits per 8-digit HUC (the standard "service area" for compensatory mitigation requirements) was calculated using coordinate data drawn from the ORM database. Total permit counts were transferred to HUC-12 watersheds contained within each HUC-8. HUC-12s were assigned a rank of 0-5 based on total volume of permits issued.
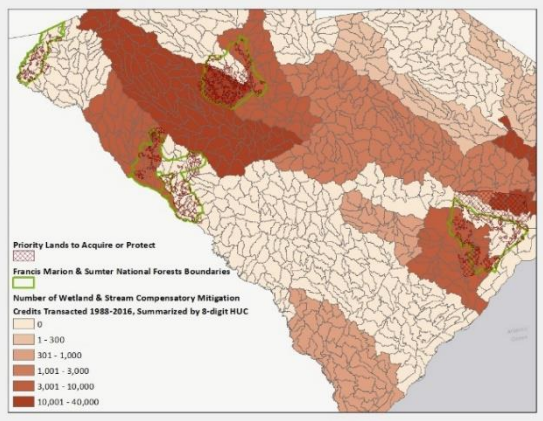
Historical Number of Compensatory Mitigation Credits Transacted, 1988-2016

This map displays the number of mitigation credits that have historically been purchased within each 8-digit HUC watershed (the standard "service area" within which mitigation credits can be traded). The number of transacted credits was calculated for each ILF site or bank in South Carolina based on reporting in the RIBITS database. These totals were matched to spatial bank records available on RIBITS and EnviroAtlas. Transaction totals were transferred to 12-digit HUC watersheds contained within each HUC-8. HUC-12s were assigned a rank of 0-5 based on total volume of transactions.
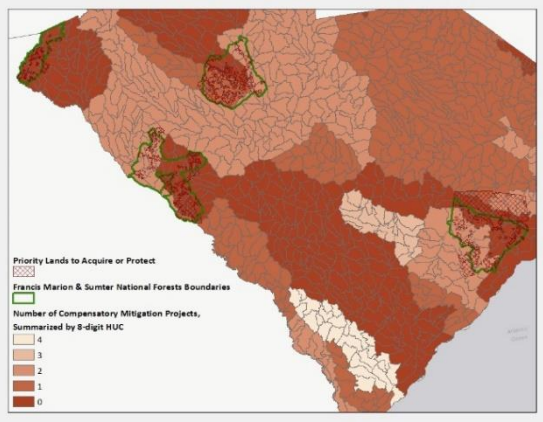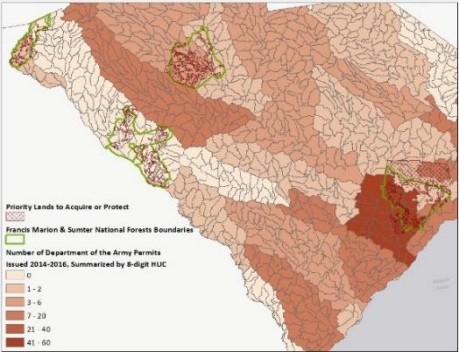
Count of Compensatory Mitigation Projects in the HUC-12 Watershed

This map displays the count of compensatory mitigation sites – i.e., credit banks and In-Lieu-Fee sites – within each 8-digit HUC watershed in South Carolina. Project counts were calculated at the HUC-8 level (the standard "service area" for compensatory mitigation providers) using centroids of project footprints or project primary impact areas from EnviroAtlas ecosystem markets map data. These project counts were transferred to the 12-digit HUC scale. HUC-12s were assigned a rank of 1-5 based on compensatory mitigation project counts.
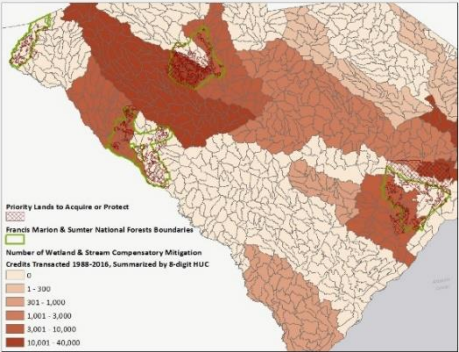
ENVIROATLAS USE CASE

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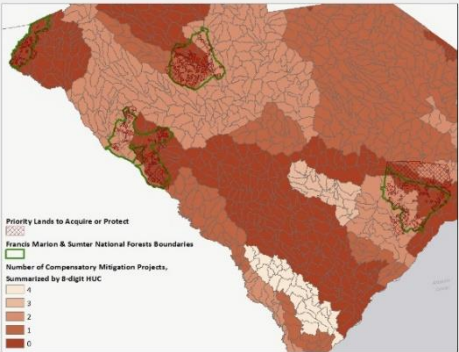
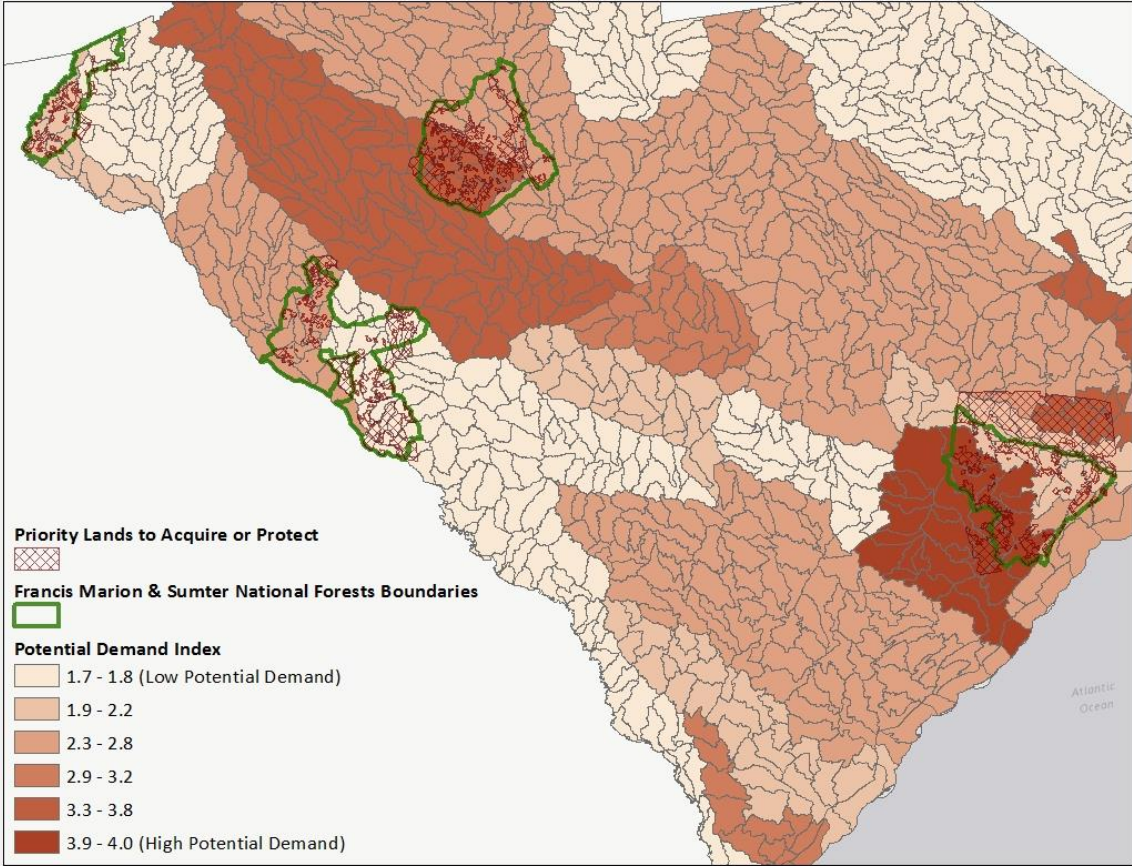Historical Number of DA Permits Issued, 2014-2016

Historical Number of Compensatory Mitigation Credits Transacted, 1988-2016

Number of Compensatory Mitigation Projects in the HUC-12 Watershed

For each data layer, subwatersheds (12-digit HUCs) were assigned a score of 0-5 according to their data layer value. These scores were averaged to generate a composite index score for each subwatershed.
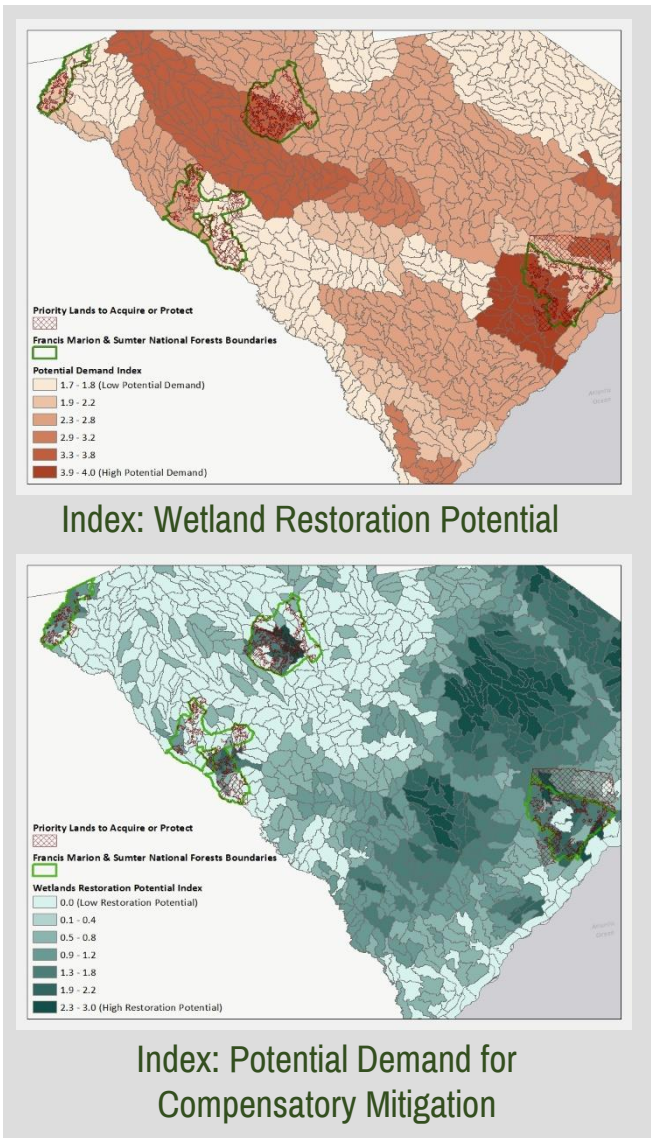
Priority Lands to Acquire or Protect

Francis Marion & Sumter National Forests Boundaries

Potential Demand Index
- 1.7 - 1.8 (Low Potential Demand)
- 1.9 - 2.2
- 2.3 - 2.8
- 2.9 - 3.2
- 3.3 - 3.8
- 3.9 - 4.0 (High Potential Demand)

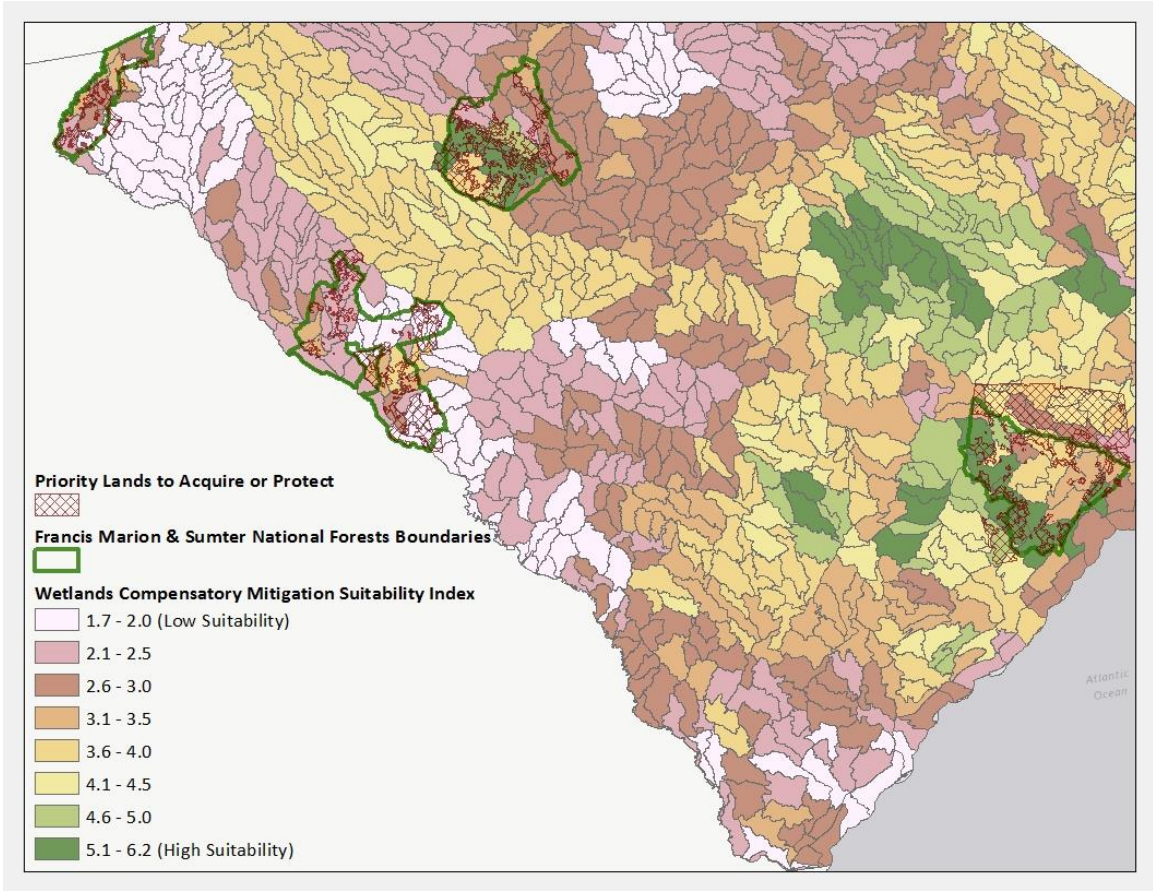**INDEX: POTENTIAL DEMAND FOR COMPENSATORY MITIGATION**

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The multi-factor index reflects the relative compatibility of properties with wetland compensatory mitigation, based on:

1. Wetland restoration potential
2. Potential demand for compensatory mitigation

Index: Wetland Restoration Potential

Index: Potential Demand for Compensatory Mitigation

Composite index scores for each subwatershed (12-digit HUC) were summed to generate a multi-factor compatibility index.

MULTI-FACTOR INDEX: COMPATIBILITY WITH COMPENSATORY MITIGATION OF SITES PRIORITIZED FOR ACQUISITION AND PROTECTION IN THE LOAS

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Summary

- Compensatory mitigation can help to support the Forest Service achieve land acquisition, private land protection, and all-lands restoration outcomes identified in the Francis Marion & Sumter National Forests' 2016 Land Ownership Adjustment Strategy.

- The Forest Service has identified a need for proactive planning so that when compensatory mitigation requests arise, the Forest Service can respond with a strategic decision. This means anticipating where demand is likely to arise, and understanding where restoration is likely to succeed.

- In this use case, indicators of restoration potential and potential demand for compensatory mitigation were used to develop a multi-factor index of the degree to which subwatersheds located in zones prioritized in the LOAS are compatible with wetland compensatory mitigation.

- The master compatibility index provides a first "screen" of where opportunities for meeting compensatory mitigation needs may exist. Additional research and verification on the ground will be required to understand compatibility with compensatory mitigation as well as with the broader set of priorities established in the LOAS. Our analysis only considered wetland restoration potential; similar studies in the future could also consider stream or saltmarsh restoration potential which is also of interest to the USFS.