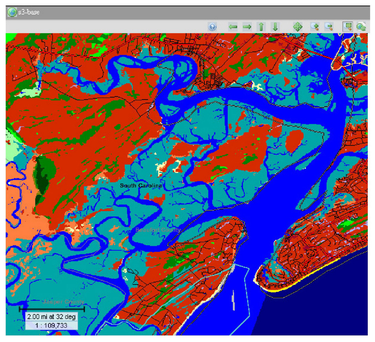
U.S. Fish & Wildlife Service

Southwest Region 2
National Wetlands Inventory (NWI)

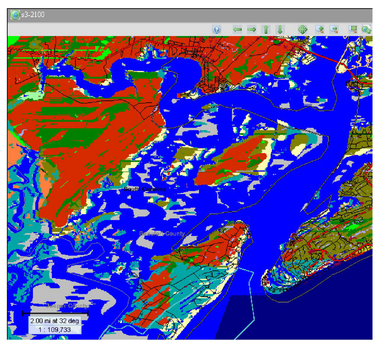
National Wetlands Inventory Data, A Tool For Climate Change Studies: A General Overview

Sea Level Rise

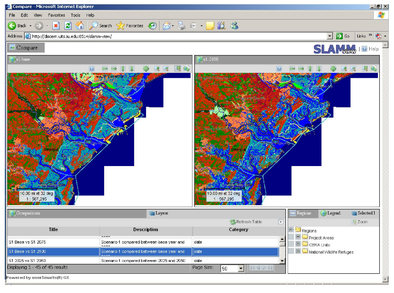
SLAMM (Sea Level Affecting Marsh Model) was developed with EPA funding in the mid 1980s by Dr. Richard Park. It has been used to simulate more than 20% of the coast of the contiguous United States for the EPA Report to Congress on the potential effects of global climate change.
SLAMM uses National Wetlands Inventory (NWI) wetland classification categories to form the basis of the model, converted into SLAMM categories. NWI categories are also used to refine elevation estimates for each cell. Data on dikes, available as an NWI data attribute, show whether each cell is protected by dikes or not. Digital elevation map (DEM) data (meters) are used where NWI data are not available. The slope of each cell (units are degrees) is used to calculate partial changes in cell composition as the sea level rises.



Current Wetland Distribution:
Note the extent of salt marsh (light blue) and dry land (brick red) in this example from the coastal Georgia area.



Projected Wetland Distribution, Year 2100:
Note the same areas in this depiction. Most of the current salt marsh is gone, while dry land areas have converted to wetland.

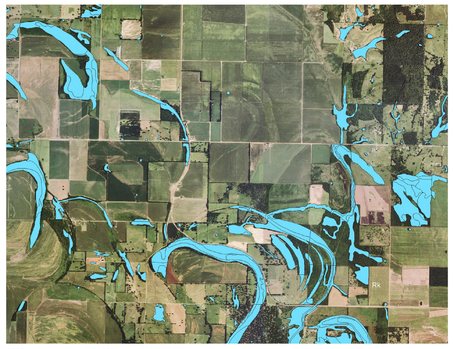


SLAMM has an on-line viewer that shows project areas and all their different sea level rise senarios; http://discern.uits.iu.edu:8514/slamm-view/

For Further infromation on SLAMM, visit their website; http://www.warrenpinnacle.com/prof/SLAMM/index.html or visit the National Wetlands Inventory Hopepage; http://www.fws.gov/nwi/.

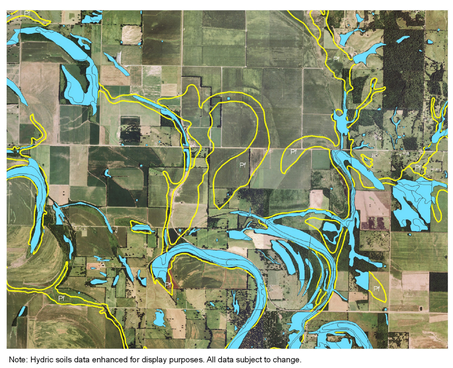
Restorable Wetlands and Carbon Sequestration

Technically, it is possible to quantify carbon stored on wetlands – in particular, restored farmed wetlands. There is a straightforward approach to quantify carbon stored over time on newly restored or created agriculture wetlands by measuring the volume of sediments gained through a variety of mapping techniques. The existing NWI data can be used as a starting point to identify these potential sites as well as to monitor carbon sinks. In Region 2, mapping projects on the Texas coast and in the Playa Lakes region emphasized agriculturally-developed hydric soils, providing baseline data for wetland restoration efforts. The concept can be applied to most areas within Region 2.



2003 aerial imagery with 1980's era NWI digital data overlayed.

Here is an example from the Red River floodplain in southeastern Oklahoma. The light blue features indicate vegetated and open water NWI wetlands currently in the wetlands database.



Note: Hydric soils data enhanced for display purposes. All data subject to change.

Here are the same NWI wetland features with digital hydric soils data (SSURGO) added.

Historically, these areas (in yellow) may have supported functioning wetlands, prior to being developed. New NWI data will contain this type of information to aid in targeting potential wetland restoration sites. These areas are typically identified as "palustrine farmed" (Pf) through NWI data.

SSURGO digital data is a product of the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS).

For further information on NRCS digital soils data, go to; http://soils.usda.gov/survey/geography/ssurgo/

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Habitat Modeling/Trends

Upcoming studies will analyze how drier climate regimes may affect wetland habitats in the Playa Lakes Region.
Potential impacts of climate change could have adverse affects on the central flyway. Using newly created wetlands digital data, for future model development, could lend insight as to what drier climate regimes may mean for the playa lakes of the southern plains. By analyzing how drier precipitation patterns will affect the flooding frequency of these wetlands, models can be developed to determine the loss of functionality of these closed basin systems.

In the example below, the current precipitation gradient (Figure 1.) is predicted to shift to the east, moving drier precipitation patterns into this area.

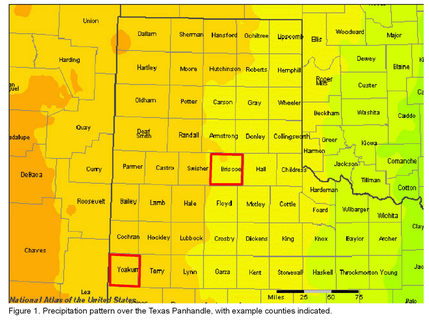
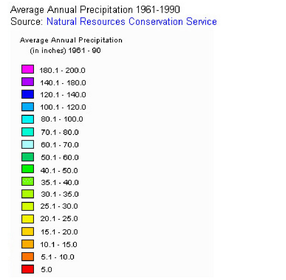
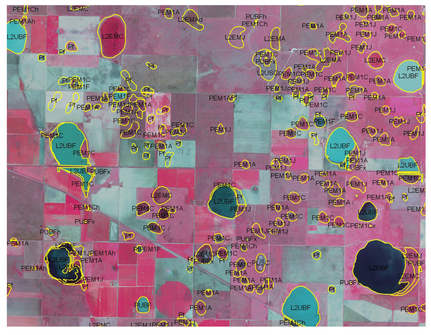


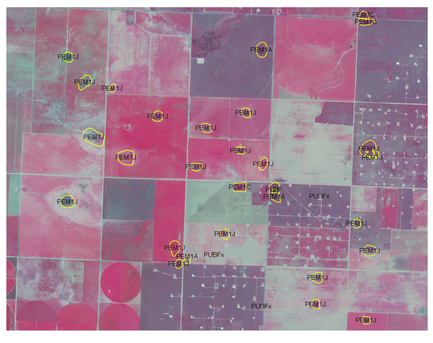
Figure 1. Precipitation pattern over the Texas Panhandle, with example counties indicated.





Here is an example of the distribution and relative hydrologic condition of playa features mapped in Briscoe County, TX from 2004 imagery.
This County is located in the 20.1 to 25.0 inches precipitation zone.

Note the wetter hydrologic condition of these playas, exhibiting standing water (blue/light blue photo signatures) and wetter, more robust wetland vegetation (darker red/purple photo signatures).



Here is an example of the distribution and relative hydrologic condition of playa features mapped in Yoakum County, TX from 2004 imagery.
This County is located in the 15.1 to 20.0 inches precipitation zone.

Note the drier hydrologic condition of these playas, exhibiting no standing water and drier, less robust wetlandvegetation (light red/grey photo signatures).

Could shifting precipitation patterns have long-term effects on the hydrologic conditions of playa lakes? NWI and Texas Tech University will attempt to answer these, and other, questions in future analytical collaborations.

Note on this example; hydrologic conditions of playa lakes are naturally influenced by long-term and short-term climatic and meteorological conditions. Isolated weather events and seasonal variations can easily effect these conditions. Future studies will have to concider these variables.