**NASA DEVELOP National Program**

****NASA Jet Propulsion Laboratory

**Fall 2015**

**Short Title: Louisiana Ecological Forecasting**

**Subtitle:** Examining Historic Trends and Modeling Sediment Transport in Delta Growth within Louisiana’s Wax Lake Delta Using UAVSAR and AirSWOT Instruments to Inform Restoration Efforts

**VPS Title:** Modeling Sediment Transport to Inform Wetland Restoration in Coastal Louisiana

**Project Team & Partners**

**Project Team:**

Emily Beck (Project Lead), Emily.C.Beck@JPL.NASA.gov

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**Advisors & Mentors:**

Dr. Cathleen Jones (NASA Jet Propulsion Laboratory)

Dr. Marc Simard (NASA Jet Propulsion Laboratory)

**Partner Organizations:**

Naval Research Laboratory (End-User), POC: Richard Crout

Louisiana Universities Marine Consortium (Collaborator/Boundary Organization), POC: Alexander Kolker

**Project Details**

**Applied Sciences National Applications Addressed:** Ecological Forecasting

**Study Area:** Wax Lake Delta, LA

**Study Period:** May 2009 – May 2015

**Earth Observations & Parameters:**

UAVSAR, NASA Gulfstream III – vegetation biomass

AirSWOT, NASA King Air B200 – water height

AVIRIS – vegetation type

**Ancillary Datasets Utilized:**

* DNR Strategic Online Natural Resources Information System (SONRIS) – bathymetric data
* DNR Strategic Online Natural Resources Information System (SONRIS) – infrastructure
* CPRA Coastal Information Management System (CIMS) - accretion estimates
* USGS National Land Cover Dataset (NLCD) - land cover

**Models Utilized:**

* University of South Carolina Marsh Equilibrium Model (MEM)
* TELEMAC - MASCARET modeling software
* Deltares Delft3D modeling suite

**Software Utilized:**

ArcGIS – raster manipulation, model input preparation and map creation

QGIS – radiometric correction of UAVSAR data

ENVI – classification, image analysis, and enhancement of AVIRIS data

TELEMAC –modeling sediment transport within the Delta

Delft-3D – modeling sediment transport within the Delta

**Project Overview**

**80-100 Word Objectives Overview:**

To use remotely sensed data, *in situ* data, and three different modeling software suites, to model water flow and sediment transport within the Wax Lake Delta in order to predict the future extent of the Delta and obtain a better understanding of why the area is experiencing aggregation. The results will provide crucial data to coastal scientists and managers and offer insight into how to direct coastal restoration projects in areas of Louisiana where coastal marshes are eroding, often at rapid rates.

**Abstract:**

Insert here (150 - 250 words, preferably one paragraph)

* The abstract should be fully contained and give the reader a good grasp of the project.
* While there is a maximum word limit, if you can say it with fewer words, do so.
* State the most important information first.
* Avoid passive words like “might” or “could” – use powerful language.
* Use key words and phrases that will quickly give the reader an idea about the content and focus of the work (ex. Navajo Nation, drought, TRMM, PRISM).
* Don’t include citations.
* Don’t define terms.
* Read other projects’ abstracts for inspiration.
* Any major restrictions or limitations on results (if results are included) should be stated.
* Reread the abstract – did it answer who, what, where, when, and why? If it didn’t, then revise it!

**Community Concerns:**

* 4900 km2 of land loss along Louisiana’s coastline has occurred since the 1930s due to erosion, land subsidence, and sea level rise, threatening one of the most economically important port systems in the United States.
* The State of Louisiana’s Comprehensive Master Plan for a Sustainable Coast (2012) confirmed that Louisiana has the potential to lose up to an additional 4500 km2 over the next 50 years

**Current Management Practices & Policies**:

Currently, restoration decisions are based on findings from ~400 projects identified by experts, citizens, and government studies. Restoration efforts can take the form of structural protection, bank stabilization, oyster barrier reefs, ridge restoration, shoreline protection, barrier island restoration, marsh creation, sediment diversion, and hydrological restoration. Nearly all of these projects rely on moving or trapping sediment, yet Louisiana has limited supplies of, or access to, renewable sediment. Thus, it is, imperative to understand the dynamics of delta building to maximize the use of the limited sediment available. These dynamics are currently studied using spot field measurements and labor-intensive, boat-based, surveys.

**Decision Support Tools & Benefits:**

|  |  |  |
| --- | --- | --- |
| **End-Product** | **Earth Observations Used** | **Benefit & Impact** |
| Time Series of AirSWOT data | AirSWOT | Information on where and how restoration is conducted |
| Modeled Elevation Time Series | UAVSAR, AVIRIS | Illustrates where risk zones are located |
| Comparison of Different Datasets | UAVSAR, AirSWOT, AVIRIS | Information on where and how restoration is conducted |

**Project Imagery**

**[Insert image here]**

**Caption:** [Insert Caption Here. Max of 25 words.] Image Credit: [Insert project short title] Team.

**Image:** File Name (Please submit your image as a separate .jpeg as well as inserting it in this document)

**Software Release Requirements**

What category do the tools your project is creating fall within?

Category I