

Request for Research Funding for FY 2020-2021

Requesting Office	Planning – Office of Policy Planning	Priority	2 of 8
Proposed Title	Development of Geospatial Framework to Support Robust Analysis of Transportation Infrastructure to Climate Impacts		
Justification	<p>The University of Florida GeoPlan Center, with funding from FDOT, developed a geospatial tool for identification of transportation infrastructure exposed to current flood risks and future flood risks from rising sea levels. The Sea Level Scenario Sketch Planning Tool is used by FDOT, MPOs, local governments, and regional planning agencies to assess potential impacts of sea level rise (SLR) on transportation facilities. The tool includes a publicly accessible map interface; downloadable GIS data; and a GIS tool for creating custom SLR inundation layers.</p> <p>The Sketch Planning Tool provides planners with screening-level analyses that show when, where, and how much of surface transportation facilities might be impacted under future SLR scenarios. While this information is useful for long-range planning, it does not include less extreme flood events which will impact transportation facilities in the short-to-midterm (5-20 years). Examples include extreme rainfall events and nuisance or high tide flooding, which are projected to increase with rising sea levels and climate changes. Other threatening flood events, such as compound flooding (future storm surge with SLR and extreme precipitation), have also not been incorporated into the tool. Each of these flood events must be modeled at different geographic scales based on data inputs and the geographic extent of the phenomena. Development of statewide datasets for multiple future scenarios of these events would take considerable time and computing infrastructure to pre-process and make readily available like in the Sketch Planning Tool. While “out of the box” maps and analyses would be difficult to produce, an extension of the Sketch Planning Tool could produce custom analyses for smaller geographic areas.</p>		
Impact	<p>In this project, we propose to develop a geospatial framework for analyzing transportation vulnerability to multiple climate stressor inputs at finer geographic scales and shorter time frames. This framework would extend the online geospatial platform of the Sketch Planning Tool through additional functionality that could produce more robust analysis of transportation facilities. This new functionality would produce “on-demand” analyses of custom, user-chosen areas, time periods, and climate stressors (as they become available) for FDOT and its regional partners. A primary goal of this development would be to support inclusion of almost any climate data (in geospatial format) as they are developed and updated. Another goal would be to develop a roadway profile tool, which would show climate impacts temporally over the roadway’s service life. This project will facilitate more robust and standardized vulnerability assessments of transportation infrastructure.</p> <p>Development of the framework would include development and deployment of hardware and software infrastructure to support processing of spatial functions; assessment of existing data sources for climate stressors; establishment of partnerships with other universities (FIU and UCF) to develop and pilot new climate datasets; development of interoperability standards between climate datasets and Sketch Planning Tool framework; and testing and piloting new datasets within the framework. The project will also include pilot testing the framework for potential integration with existing FDOT applications.</p>		
Affected Offices	<p>This proposed project will potentially benefit a wide range of FDOT Offices and stakeholders, including:</p> <ul style="list-style-type: none"> • FDOT Office of Policy Planning • FDOT Forecasting and Trends Office • FDOT Systems Implementation Office • FDOT Office of Environmental Management • FDOT Emergency Management Office • FDOT Office of Design • FDOT Maintenance Office • FDOT Districts • Florida’s Metropolitan Planning Organizations • Various local city and county departments and regional planning councils throughout the State of Florida 		
Existing Work	A review of the TRID and RIP databases did not show duplicative or similar work.		
Keywords Used In Existing Work Search	Sea Level Rise, GIS, Geospatial, Climate Change, Geospatial framework		

Related Contracts (Give contract numbers)	BDK75-977-63 - Development of a Geographic Information System (GIS) Tool for the Preliminary Assessment of the Effects of Predicted Sea Level Changes BDV31-932-01 - Testing and Enhancement of the Florida Sea Level Scenario Sketch Planning Tool BDV31-932-06 - Updating the Florida Sea Level Scenario Sketch Planning Tool BDV31-932-09 - Florida Sea Level Scenario Sketch Planning Tool Updates		
Funding Request	\$200,000	Anticipated Duration	18 months
Project Manager	Jennifer Carver	Contracting Method	Anticipated procurement method (e.g., supplement to existing project, RFP to all registered vendors, direct contract with university)
Urgency	2	No such tool exists in Florida that allows for robust analysis of transportation infrastructure to the State's most pressing climate stressors. Information is needed now to incorporate into the planning process and insure sound investments for future transportation facilities.	
Implementability	1	This project will include a phased implementation. First, the framework and tools be piloted and tested with a small set of proposed transportation projects. Next, the framework and tools will be opened up to a small set of users (planners and designers) who will test a live implementation of the online tools. After robust testing, the tools will be opened up for all FDOT and MPO partners. Pilot testing will take approximately 4 to 6 months, culminating in full implementation towards the end of the 18-month project period. Future work should involve in-depth user training of the tools and climate information included.	
Project Benefits (Succinct, complete explanation)			
The results of this project will help FDOT and its partner agencies better integrate climate resiliency data into their planning and design processes. The proposed framework will bring together various indicators of climate stressors and allow planners and designers to see their proposed transportation projects in the context of these indicators. These indicators and the framework will provide more robust, detailed, and standardized vulnerability assessments of transportation infrastructure, thereby reducing the potential for future facilities to incur increased maintenance costs and suffer shorter service lifespans from climate stressors. No such public tool is yet available to FDOT and its regional partners.			
Project Benefits (Select all that apply and explain)	Quantifiable Benefits (units, dollars, etc...if applicable)	Methodology or Data Sources Used to Determine Quantifiable Benefits. If not applicable, please give justification of project benefits	
<input type="checkbox"/> Materials Enhancement			
<input type="checkbox"/> Materials Savings			
<input type="checkbox"/> Time Savings		This project will save FDOT and its partners considerable time by providing detailed and localized climate information and standardized analyses of projects.	
<input type="checkbox"/> Lives Saved/Injuries Prevented			
<input type="checkbox"/> Other (Explain)		The results of this project will allow transportation agencies to run their own in-house analyses of transportation vulnerabilities to climate change, resulting in capacity building and cost savings.	

*Comments should explain and support urgency, financial benefit, and implementability scores