Crowdsourced Flood Mapping & STEM Education, A Geospatial Analytical Approach

iCAR Community Engagement and STEM education project

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Project Description

This proposed project will build on our strong working relationships with marginalized communities in Pinellas County, Florida. Over the past two years, we (Drs. Dixon and Johns) have worked with neighborhood association leaders where we have done in-depth surveys, participation observations and interviews to assess the community's knowledge and awareness of climate change impacts, including sea level rise (SLR), heat, and flooding. This proposed project will engage in informal education of middle and high school students from marginalized communities about the processes involved in flooding (infiltration/runoff relationship and the role of impervious surfaces in increased runoff) and their relationship to climate change and SLR. Previous qualitative research in these communities indicates a lack of knowledge about the present and future impacts of climate change on environmental processes in our area. In this project, we will bring appropriate earth science education to the community, particularly in reference to the difference between inland and coastal flooding, the likelihood of flooding increase, potential hazards of flooding and possible risk mitigation strategies. We will ask students to record GPS locations (or identify areas on the map during community gathering sessions) where they often notice standing water on the streets following heavy rainfall, to build on data already gathered in our previous research in these neighborhoods. We will then ask participants to use high resolution aerial imageries to estimate impervious surfaces within the 1-mile buffer of the GPS sites and assess infrastructure needs using City's GIS data layers (including storm-water systems) to make recommendations (e.g. either to increase pervious surfaces or increase the diameter of the drainage pipes at problem locations). Further, we will work with students to map their environmental assets that help promote infiltration. All crowdsourced data gathered by this project will then be compiled in a map along with other relevant GIS data layers and aerial imageries and printed, and laminated to be displayed at the Child's Park community center and also be available via Johnsons Branch Library.

Project outcome

Benefits and outcomes include promoting awareness of fundamental concepts of climate change, impacts of SLR, storm events, and dangers of increased flooding; community skill building through the use of remote sensing, GIS and GPS technologies to map environmental and ecological assets in their own neighborhoods; increased citizen participation in environmental information creation and governance. Citizens will be able to participate in decision making armed with their enhanced understanding of fundamentals of flood mechanisms and maps they created. This will allow for direct translation of earth science concepts and tools in decision making where the populace plays a key role (in gathering and communicating key information).