

**DEP AGREEMENT NO. CM836**

***Evacuation Zone Creation Tool***

***Tampa Bay Regional Planning Council***

**Final Project Report**



This report funded in part, through a grant agreement from the Florida Department of Environmental Protection, Florida Coastal Management Program, by a grant provided by the Office of Coastal Management under the Coastal Zone Management Act of 1972, as amended, National Oceanic and Atmospheric Administration Award No. NA16NOS4190120. The views, statements, findings, conclusions and recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of the State of Florida, NOAA or any of their sub-agencies.

***March 2019***

## **Final Project Report for CM836**

### ***Evacuation Zone Creation Tool***

#### **Executive Summary**

Starting in 2016, the National Hurricane Center started replacing many smaller SLOSH basins with larger super-basins. These basins are now being created sequentially and not at once as they were in 2007. Two-thirds of the state's coastal counties will have new surge zones within the next few years. Once the counties have their surge zones, they will next create evacuation zones. In the past, they would tend towards a more manual approach which would take a few months to accomplish. This could be problematic if the basins are finished just before Hurricane season. They would align zones with road centerlines and a few would use the surge zones as they existed without making any changes. Since the new South Florida SLOSH basin was released and the new Surge Modeling Tool was used by the counties, most counties would use their GIS departments to create the evacuation zones as well. This usually resulted in Evacuation Zones being the same as the surge zones. Surge zones do not follow man-made features like roads, sub-divisions, and parcels, which make it very difficult to convey the evacuation zones to officials and the public who evacuates, especially when 2 zones could cross one homeowner's parcel.

What we propose to accomplish in this project is to create a GIS tool that makes it rather straightforward and even easy to create preliminary evacuation zones for counties and their emergency management departments. It will be a tool with a user interface similar to what the counties have used already for creating surge zones. What this tool will do is create baseline evacuation zones that adhere to certain parameters that the user will choose to run the model. Essentially it will be creating an evacuation model from a storm surge model. If the output meets the expectations of the user, no further editing or changes are needed. Further editing may be the direction that most users would take after running this model.

Defining evacuation zones in a consistent manner that can be repeated using the same parameters bolsters the resilience of the county towards evacuations from the threat of storm surge. Not only will it speed up the process of creating the actual zones, but subsequent required modeling like transportation evacuation clearance times, will get in the workflow pipeline sooner. Although this is intended for the two-thirds of the state's coastal counties soon to update surge zones, it may be of use for counties that just finished creating evacuation zones for the recent South Florida 'super basin', perhaps to revisit evacuation zone creation again to aid in smoother evacuation announcements and perhaps gain better clearance times through transportation clearance times.

## Methodology

The methodology for this project was pretty straightforward. Using GIS technology and programming geoprocesses together with a simple user interface, the Tool has consistent results and output.

A progressive and technologically advanced county emergency management department was used as a litmus test for automating the creation of evacuation zones from existing surge zones. That county had been using parcel-based evacuation zone assignment for years along with a ruleset for determining assignment. Only recently, have other counties used GIS with property parcel based assignment.

Starting with the existing surge zones previously created throughout the state by another TBRPC GIS Tool, the idea was to incorporate standardized layers into the model to produce the assigned evacuation zones in output. A standardized set of layers would work to reduce variable incompatibility. One such set of layers is the Florida Department of Revenue's county parcel layers and property tax roll data that link to those GIS layers. Another is the statewide Land Use/Land Cover layer prepared by Water Management Districts and housed at UF Geoplan's FGDL website.

To perform the entire background layer processing, ArcGIS's ArcMAP was the framework for building the Tool. Assimilating all the code and low-level GIS functions was performed by Microsoft Visual Studio .NET programming language.

Creating choices for end users was important. There are two main approaches to evacuation zone assignment. One is the detailed, parcel-based methodology and the other is the more aggregated Land Use/Land Cover methodology. The parcel method allows the user to assign parcels based on triggers setup before the model run.

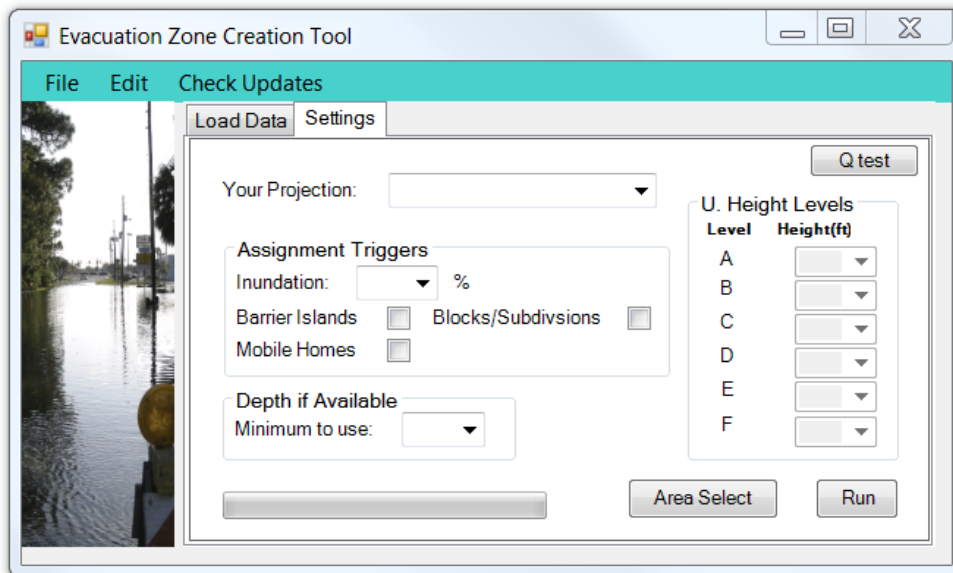
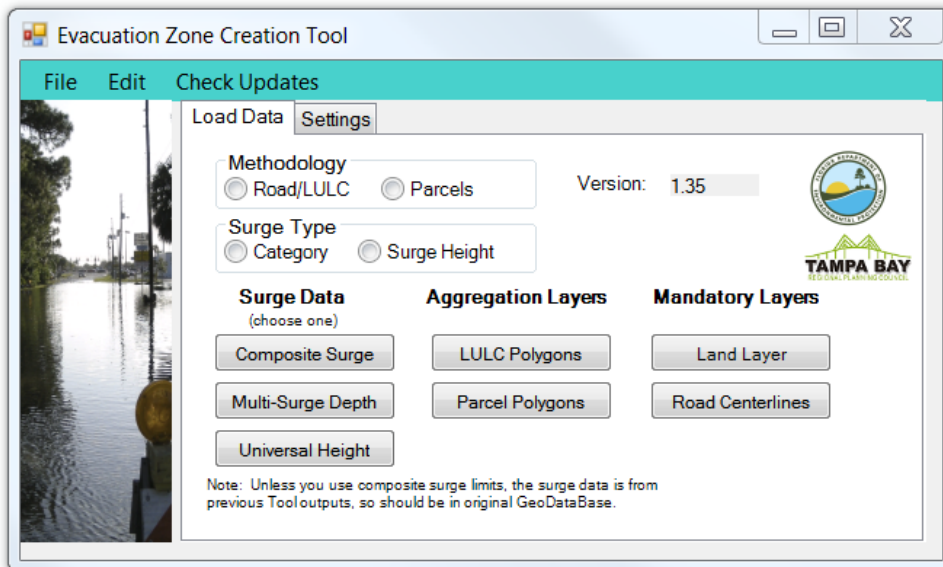
Percent inundation is one trigger where the parcel is not assigned the underlying surge category until the parcel is inundated past the chosen percentage. Another trigger is whether the parcel is a mobile home. In Florida, mobile homes are almost always evacuated no matter what strength the storm is. This Trigger allows assignment of "M" for those parcels and the county emergency management department can re-assign those to another evacuation level if necessary. The last trigger is whether or not the parcel is on an island, particularly a barrier island. This trigger, if checked, will assign barrier island properties an "A" level. Block/Subdivision is not a trigger, but essentially dissolves together adjacent similar parcels.

Choosing Land Use/Land Cover as the methodology allows larger chunks of land to be assigned. Another benefit of this method is the assignment uses the edges of roads and land use types to create a zone. The parcel method uses parcels which have no assignment where there are roads and rights-of-way. Barrier islands can still be assigned as a trigger, but Land Use/Land Cover is not granular enough to use mobile homes as a trigger.

## Outcome

The outcome of the project was as expected. The Tool has worked as planned.

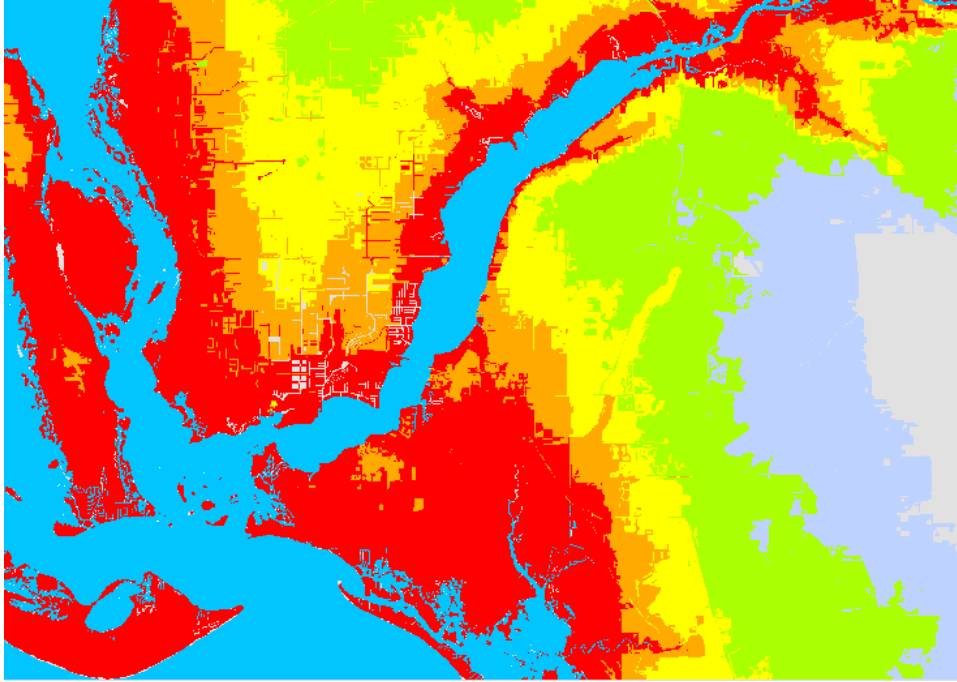
The interface of the tool looks like this:



Much more detailed information can be found in the Manual/Tutorial:

<ftp://ftp.tbrpc.org/GIS/Tools/evactool>

Land Use/Land Cover Method Output:



### **Further Recommendations**

No further recommendations.