

Displaying Potential Sea Level Rise Impacts in the United States using ArcObjects and VBA



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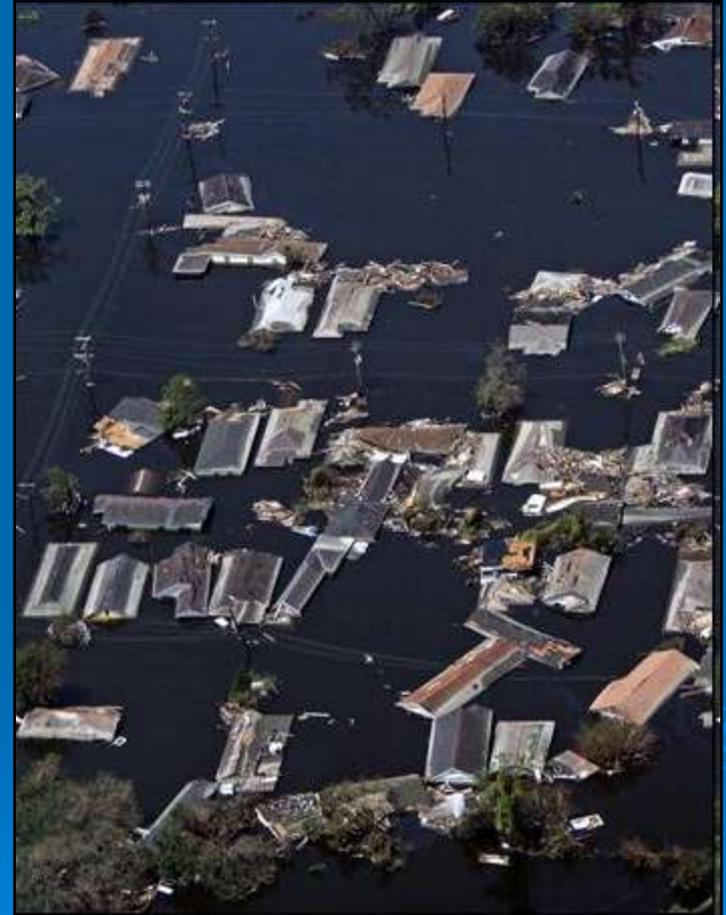
May 12, 2009

Main Points

- 1. The Geography Program at Clark University offered for the first time last fall a course in Computer Programming for ArcGIS and ArcObjects.
- 2. Sea level rise is predicted to impact the east coast of the United States with up to 0.44 meters of sea level rise by the end of the century.
- 3. Visual Basic for Applications and ArcGIS can be used to show the impacts of sea level rise in each coastal state.
- 4. Easy to use applications can be used to convey the impact of sea level rise to the public for national, state and local areas.

Assessment and Goals

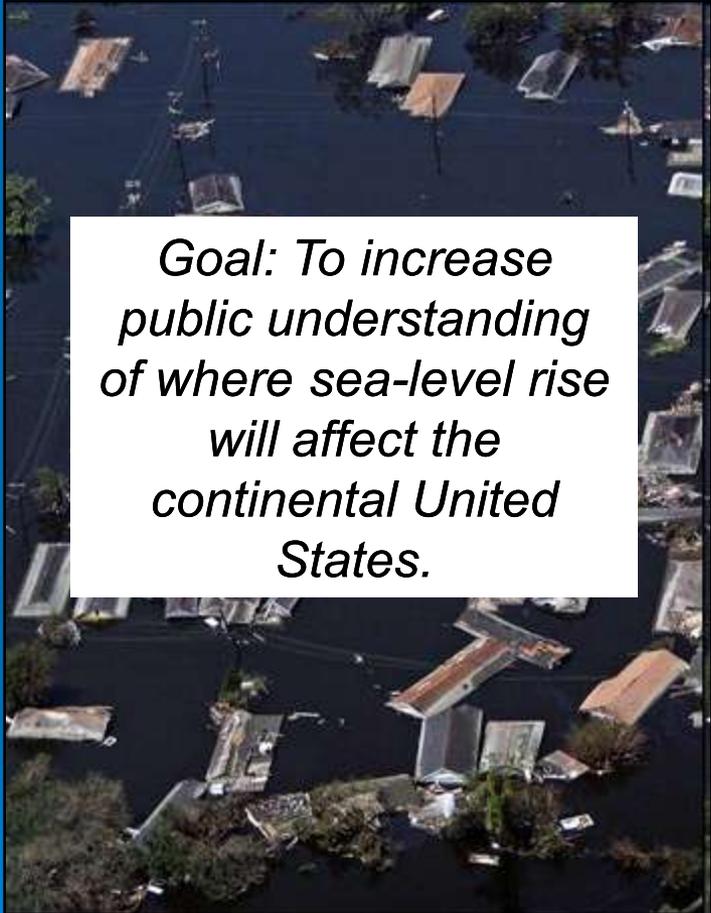
- Sea level is predicted to rise by .22 to .44 meters by the end of the 21st century, and several meters in the next few centuries (IPCC 2008)
- Flooding along the heavily populated US coasts could cause property damage and dislocation for millions of people.



Assessment and Goals

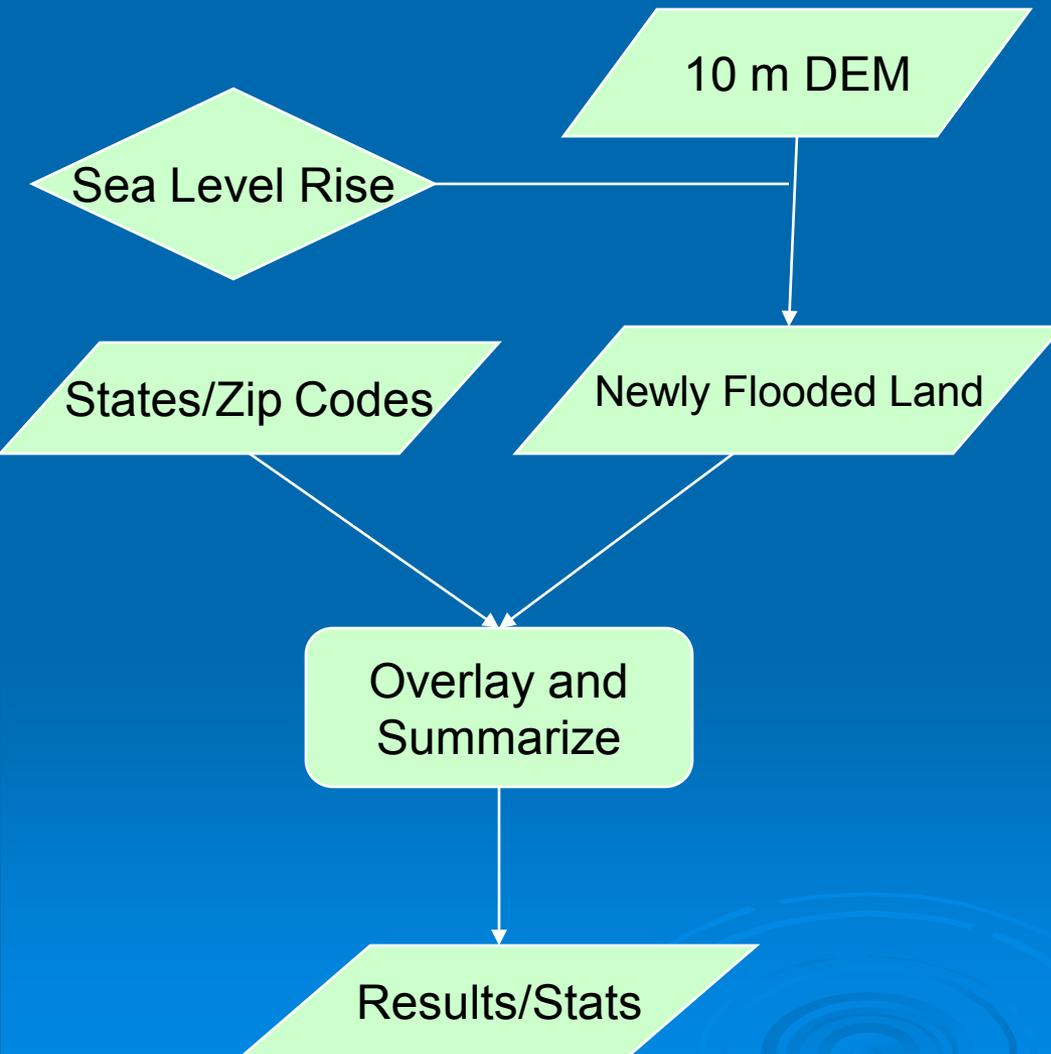
Objective:

- By using intuitive tools and buttons to interactively explore sea level rise data, for different sea level rise scenarios, members of the public will know how sea level rise will affect their local area, their state, and the nation.



Goal: To increase public understanding of where sea-level rise will affect the continental United States.

Project Design and Methods



Necessary Data Layers:

- National Atlas
 - 10 m DEM
 - States Shapefile
- US Census Bureau
 - Census Tract Data
 - US Zip Codes

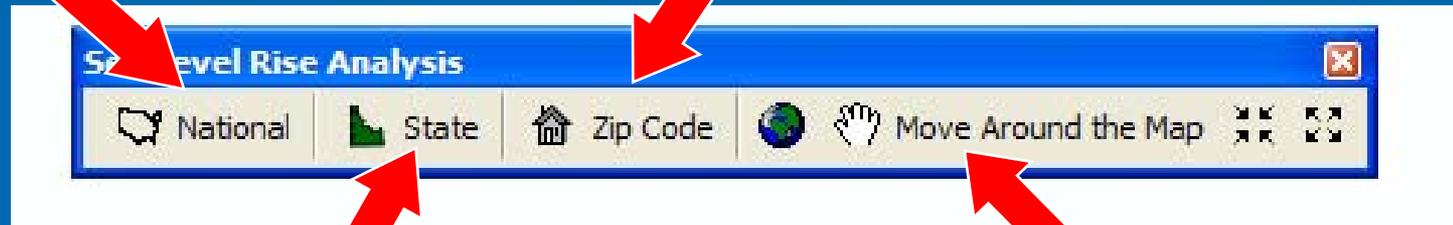
The Toolbar

National Analysis:

This button displays the results of the sea level rise model/analysis at the national scale.

Zip Code Analysis:

This button zooms into a selected zip code and displays the results of the sea level rise model/analysis at that scale.



State Analysis:

This button zooms into a selected state displays the results of the sea level rise model/analysis at that scale.

Navigation Tools:

These tools allows a user to move around the map window.

Modules and Subroutines

- Modularity increases the coding efficiency



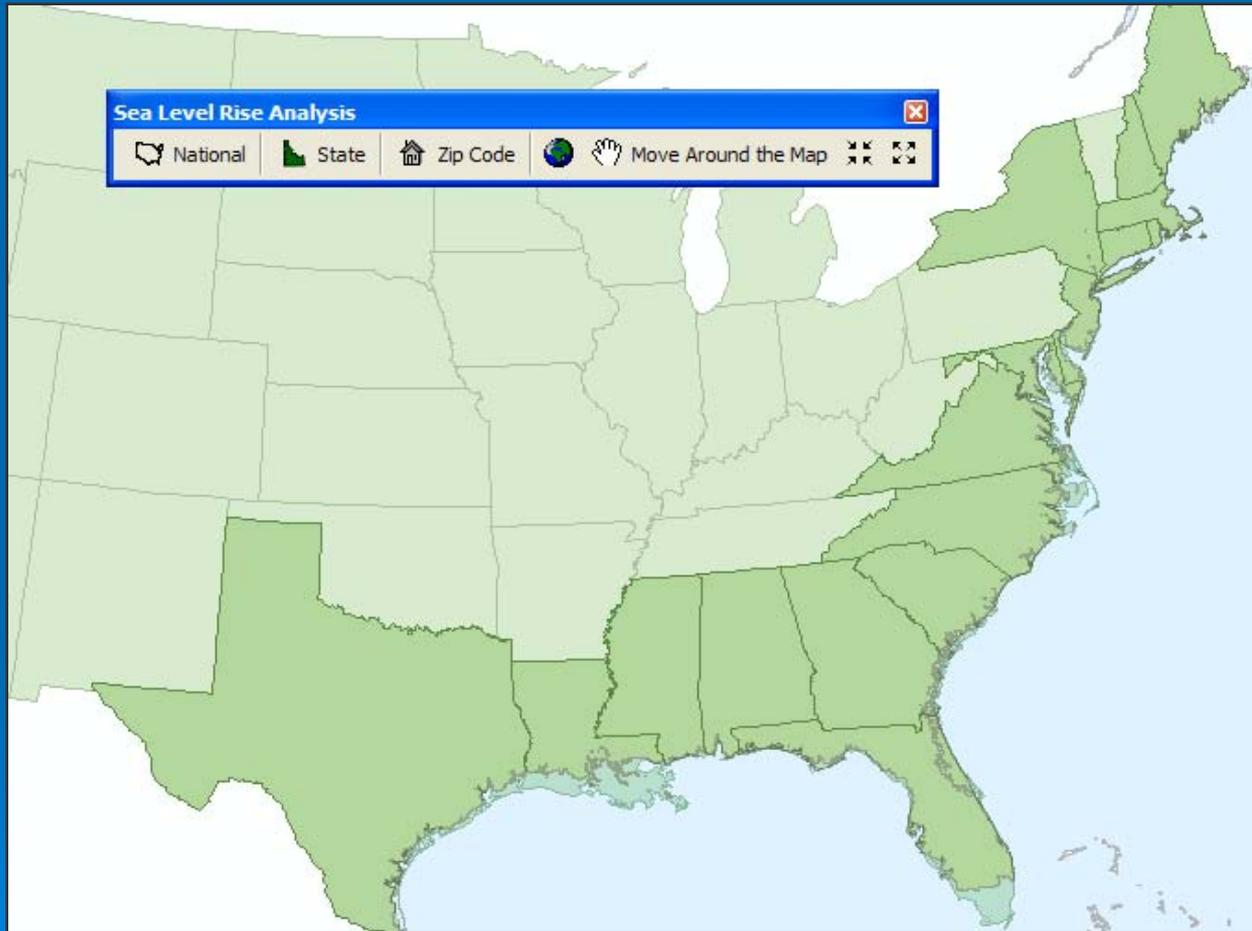
The National Button



This is the Visual Basic form that shows when the “National” button is clicked on the toolbar.

Let’s look at the map!

National Map

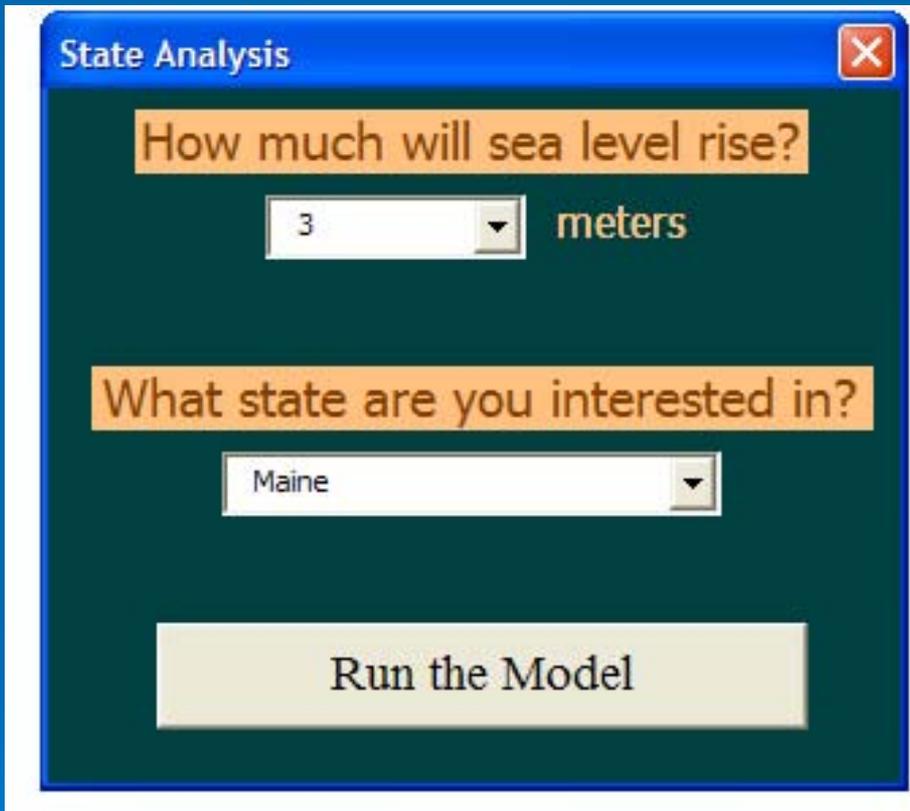


Form 1: National

Sub: RemoveLayers

Sub: SeaRise

The State Button



State Analysis

How much will sea level rise?

3 meters

What state are you interested in?

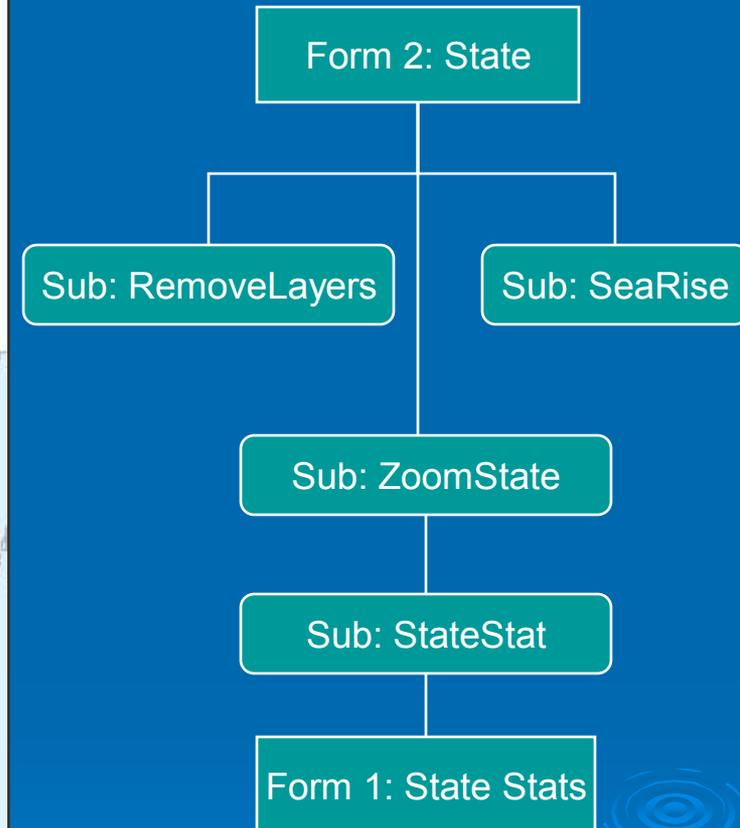
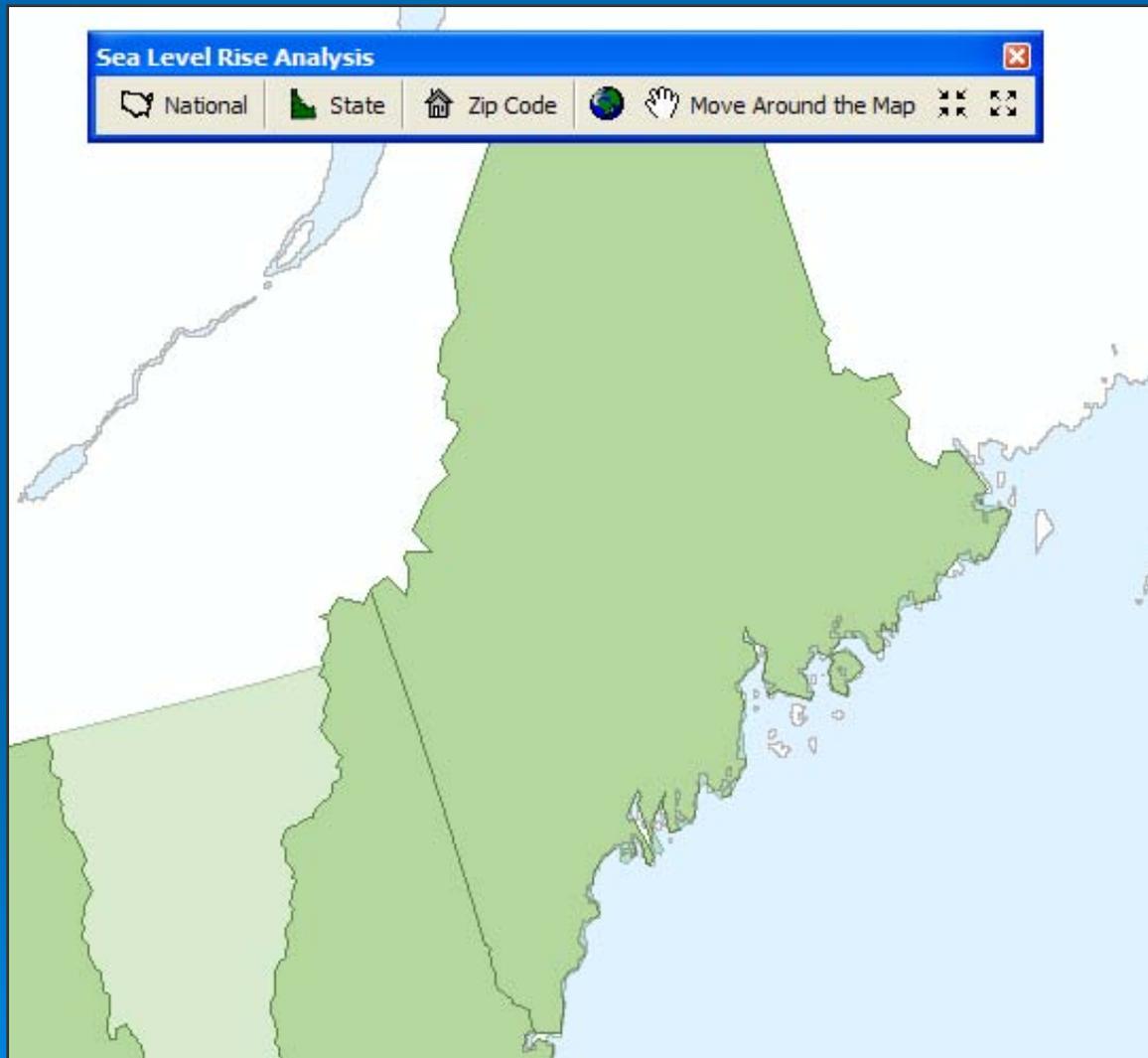
Maine

Run the Model

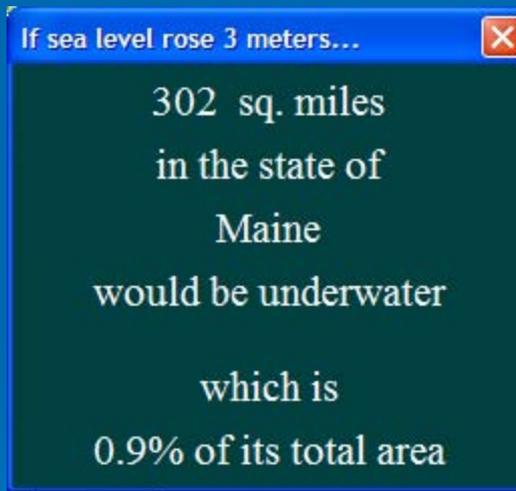
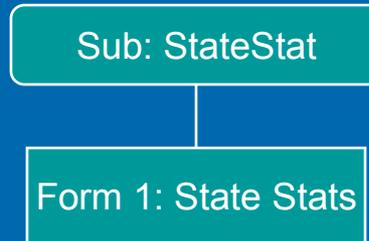
This is the Visual Basic form that shows when the “State” button is clicked on the toolbar.

Let’s look at the map!

State Map



State Map



A window detailing state statistics also pops up on the map

The Zip Code Button

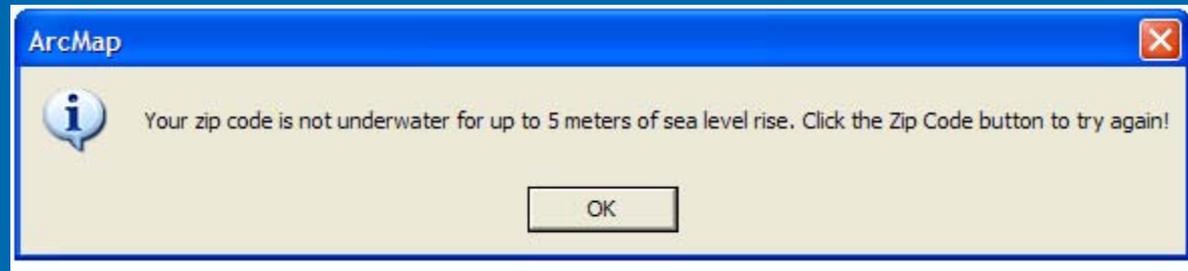
The screenshot shows a Visual Basic form titled "Zip Code Analysis" with a close button in the top right corner. The form has a dark green background and contains three instructional steps:

- 1. Choose Sea Level Rise:** A white dropdown menu with a downward arrow.
- 2. Enter Zip Code:** A white text input field.
- 3. Click Photo to Zoom to your Zip Code!** A photograph of a flooded residential area with houses partially submerged in water.

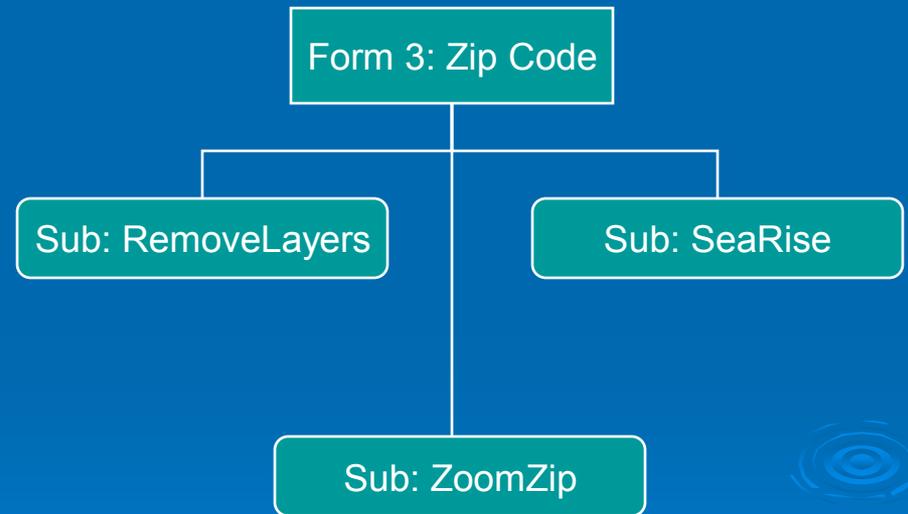
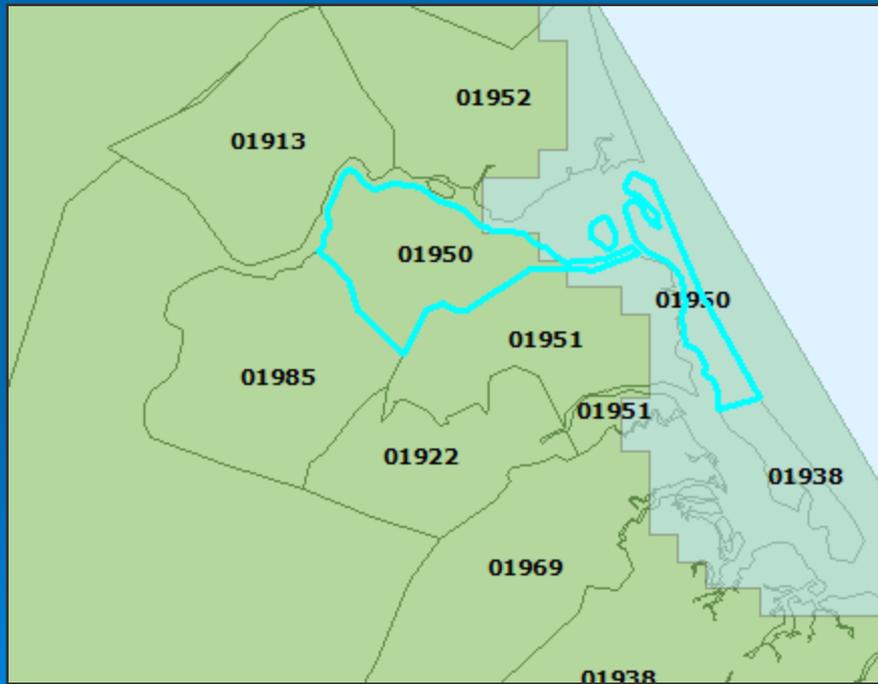
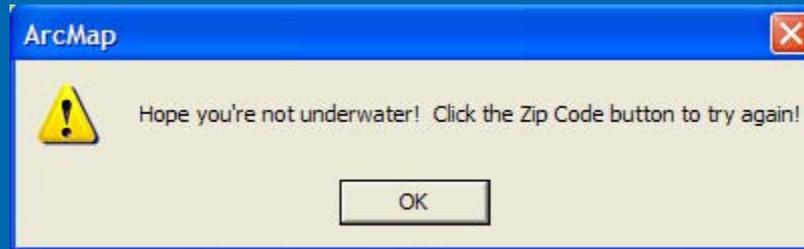
At the bottom of the form, there is a copyright notice: "Copyright Kate and Nick Enterprises, Worcester, MA".

This is the Visual Basic form that will show when the “Zip Code” button is clicked on the toolbar.

Zip Code Map



Zip Code Map



Recommendations

- 1. Visual Basic for Applications and ArcGIS can be used to show the impacts of sea level rise in each coastal state.
- 2. Easy to use applications can be used to convey the impact of sea level rise to the public for national, state and local areas.
- 3. Applications are easily developed with the aid of tutorial-driven books like Getting to Know ArcObjects and web resources like the ESRI user forums... so jump right in!

Thank you

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Acknowledgments: Nick Gebauer, Clark University



References

Burke, R. Getting to Know ArcObjects: Programming ArcGIS with VBA. ESRI, Inc., 2003.

Intergovernmental Panel on Climate Change, *Climate Change 2007 - Impacts, Adaptation and Vulnerability: A Report of Working Group II of the IPCC*. Cambridge University Press, 2008.