

The Application of Remotely Sensed Data and Models to Benefit Conservation and Restoration along the Northern Gulf of Mexico Coast



- **Coastal Applications Science Team**

- Mr. Maurice Estes, Jr., USRA/MSFC, PI (technical and science lead)
- Dr. Jean T. Ellis, USC, Co-PI (end user engagement and DSS improvement lead)
- Dr. Dale Quattrochi, NASA/MSFC, Co-I
- Dr. Ron Thom, Battelle/PNNL, Co-I
- Dr. Dana Woodruff, Battelle/PNNL, Co-I
- Dr. Mohammad Al-Hamdan, USRA/MSFC, Co-I
- Ms. Chaeli Judd, Battelle/PNNL, Co-I
- Mr. Hoyt Johnson, Prescott College, Co-I

- **Collaborators**

- Ms. Roberta Swann, Mobile Bay National Estuary Program
- Dr. Rost Parsons, NOAA/NESDIS
- Dr. Becky Allee, NOAA/CSC
- Mr. Walter C. Ernest, Weeks Bay Foundation

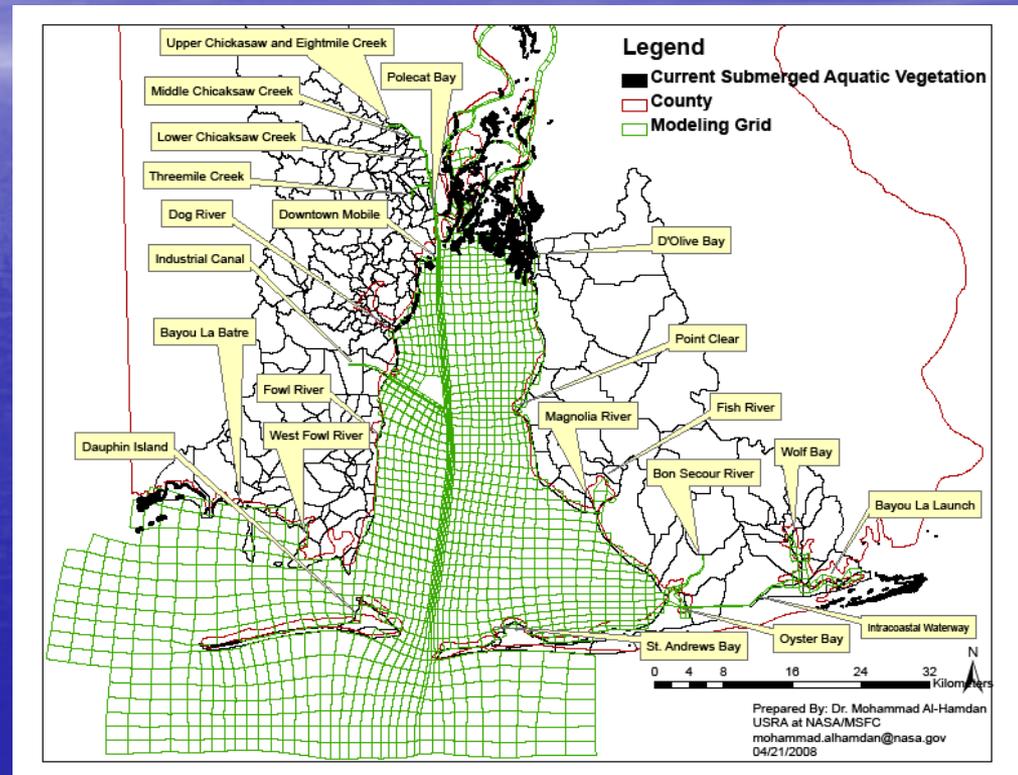


Outline

- Project Team and Roles
- Background
- Methodology
- Project Objectives
- Anticipated Results
 - DSS
 - Data transfer
 - Products and Tools

Background

- Land use changes are increasing freshwater flows into Mobile Bay.
- These increasing freshwater flows are causing increased fluctuations of temperature, salinity, and TSS.
- Seagrasses and SAVs have decreased in Mobile Bay over the past 60 years.

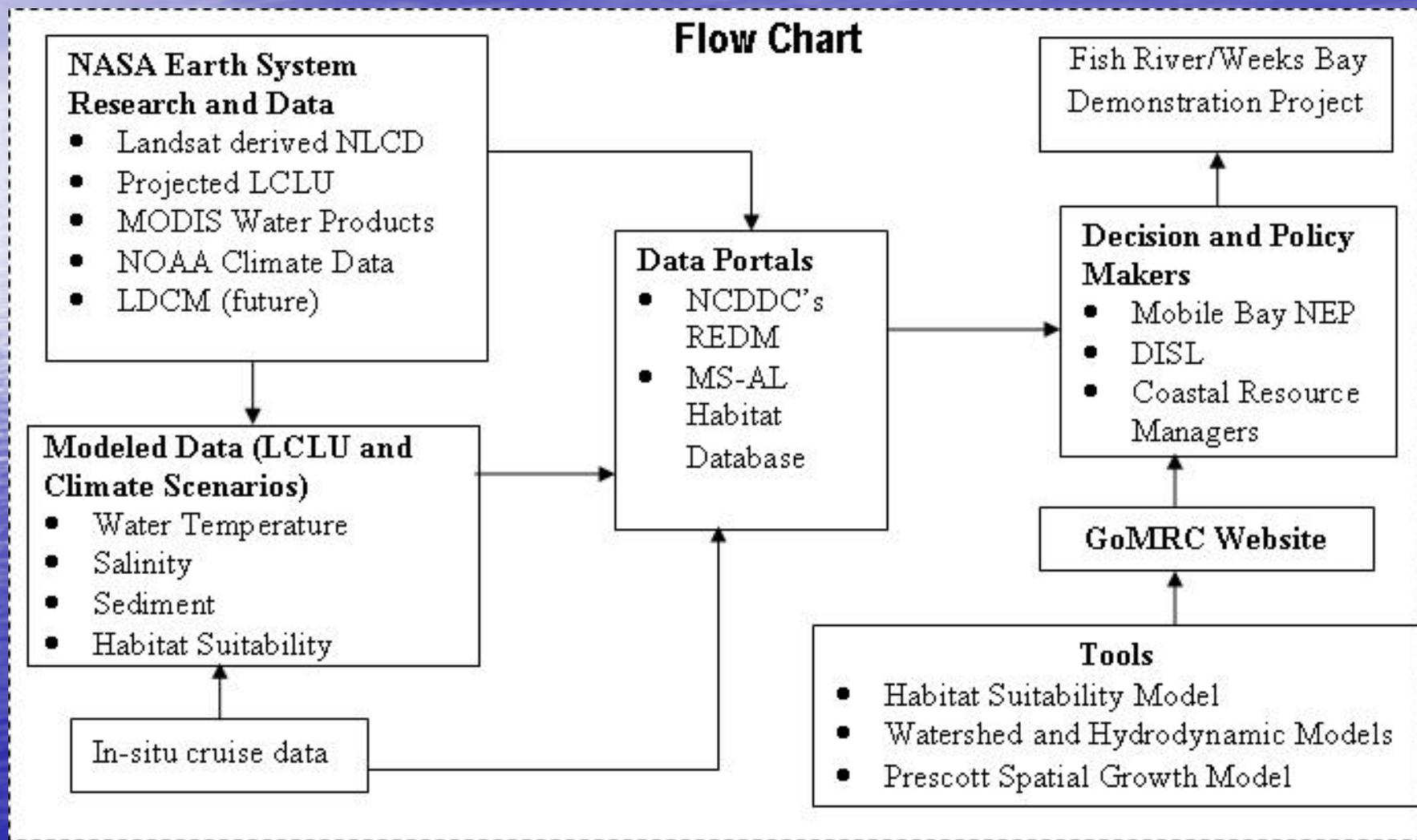


Background (Con't)

- Greatest impact of land use change could potentially be on highly dynamic edge areas.
- It is likely that understanding the frequency of light limiting events rather than the average amount of light will help our understanding of critical areas.
- This is cutting edge research that will benefit understanding and conservation of valuable coastal resources and benefit stakeholders.



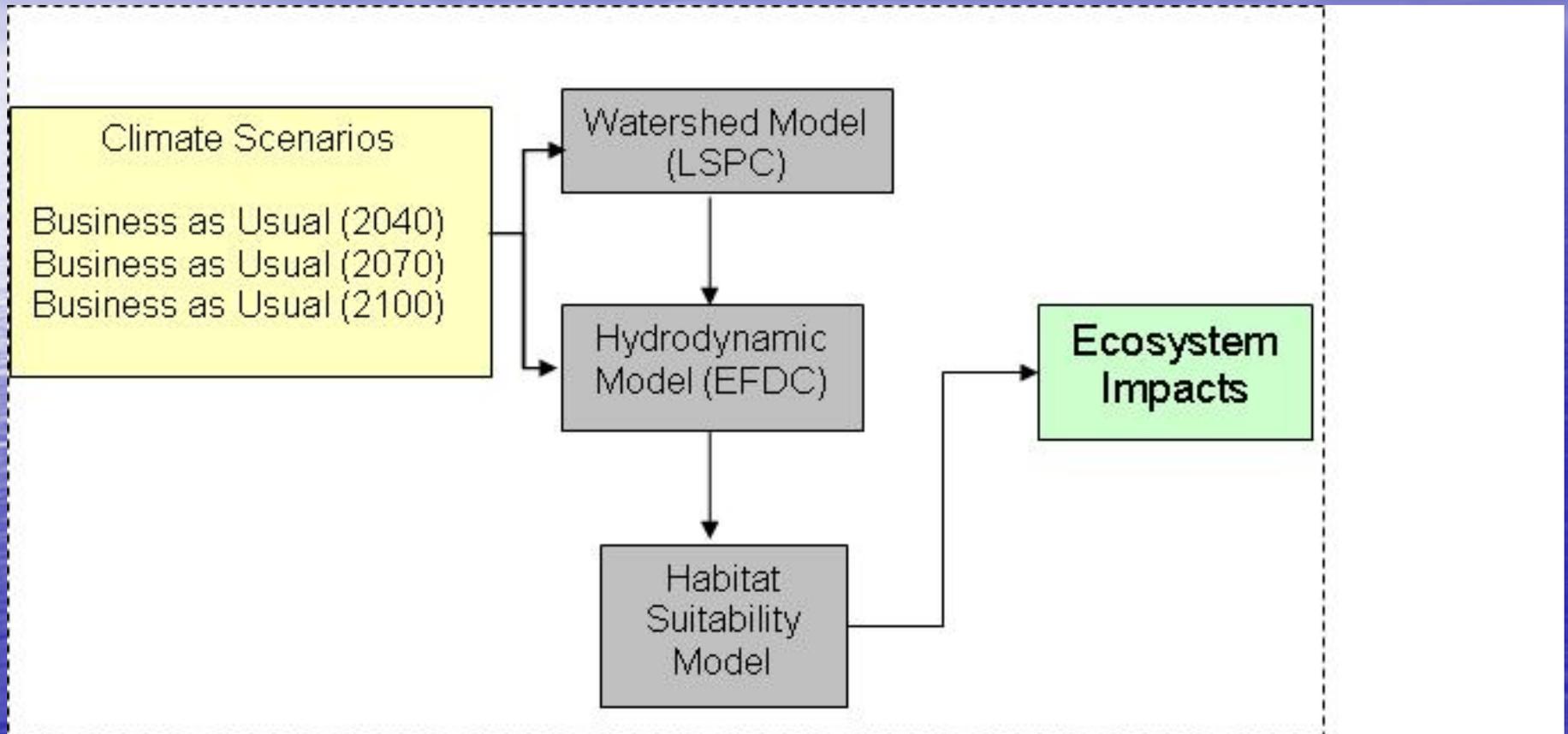
Methodology



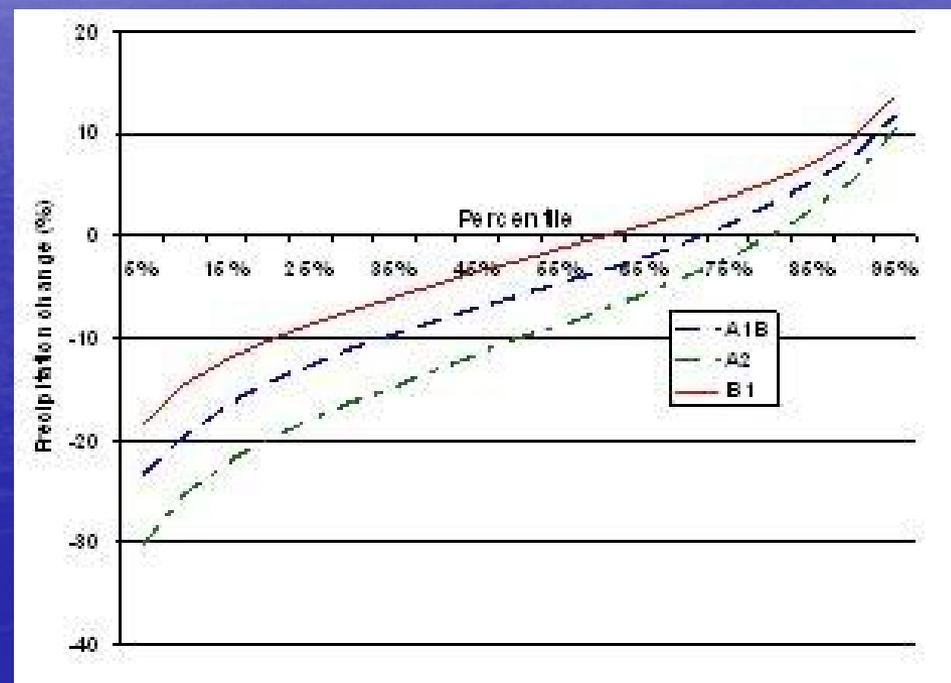
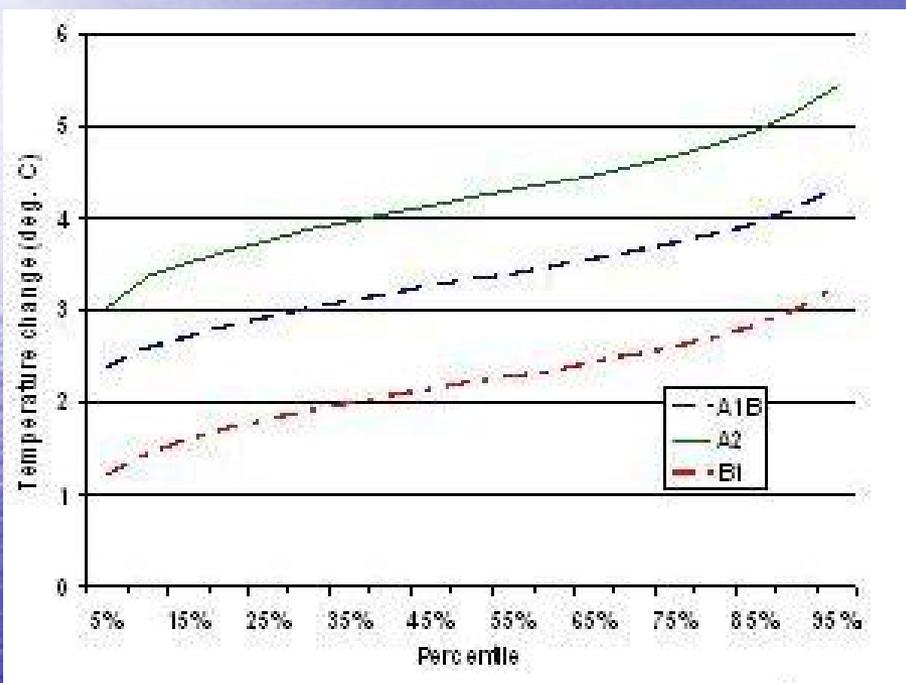
Objectives

- 1. Utilize Earth observations and models to provide new data and information on the impacts of climate change on coastal terrestrial and aquatic ecosystems**
 - Perform Watershed and Hydrodynamic Modeling for Mobile Bay to Evaluate the Impact of Climate Change Scenarios
 - Compare MODIS SST data to Hydrodynamic Model Outputs
 - Assess shallow water habitats

Climate Change Modeling



Climate Scenarios



Probability distributions for projected mean annual temperature (left) and annual precipitation (right) changes, 1990-2090, for the U.S. Southern region, estimated by an ensemble of global climate models for each of the IPCC climate scenarios

Objectives

2. Provide a methodology and complete the transfer of our data and data products into an existing operational Decision Support System (DSS) used throughout the Gulf of Mexico

- Integrate Mobile Bay data and modeling results into REDM and MS-AL Habitat Database
- Integrate Tools into the GoMRC website

Objectives

3. Work with end users who have committed to utilize our data, information and tools to benefit wetland and coastal conservation restoration planning

- End User Demonstration: Fish River Watershed and Weeks Bay National Estuarine Research Reserve
- Mobile Bay National Estuary Program support.

Anticipated Results

- Gridded model outputs and time series plots for salinity, temperature and sediment throughout Mobile Bay for several climate scenarios.
- Map(s) of potential SAV habitat, including change over time and map(s) of potential stressors (end products for stakeholders based on peer reviewed science).
- Develop metadata and transfer protocol with end users for data products and model outputs and make them available via REDM and MS-AL Habitat Database.



Anticipated Results

- Make the models and tools available to end users through the GoMRC website along with user manuals and training programs.
 - Hydrologic Models
 - Spatial Growth Model
 - Habitat Suitability Model
- Demonstrate the usefulness of the data and products for the Mobile Bay NEP, Weeks Bay NERR, and other end users in a project workshop.
- Presentations, technical papers and journal publications as well conference presentations.