



COASTAL SYSTEMS
INTERNATIONAL, INC.

Tidal Current Study

Virginia Key Beach Park

Miami-Dade County, Florida



- **High current speeds along Park shoreline**
- **Swimmer safety concerns**

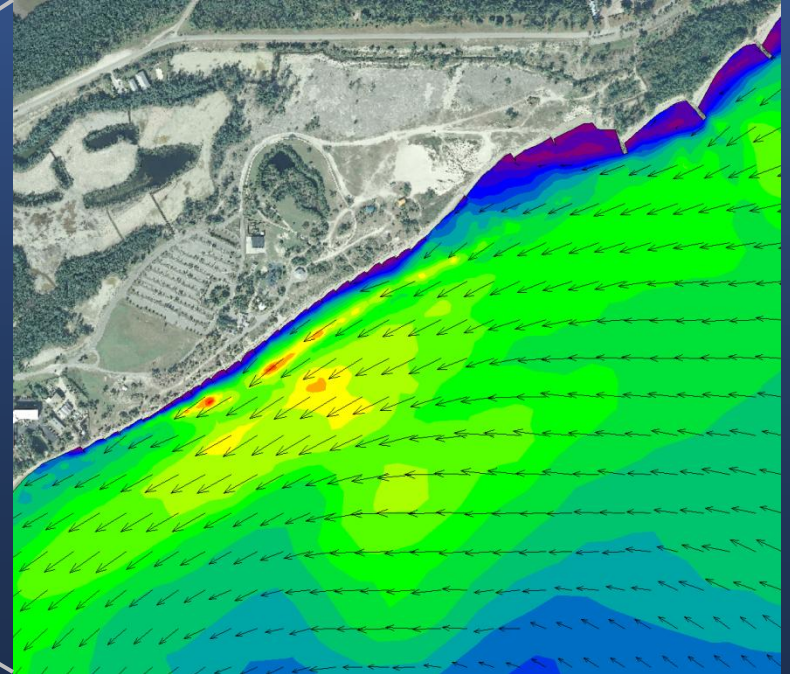
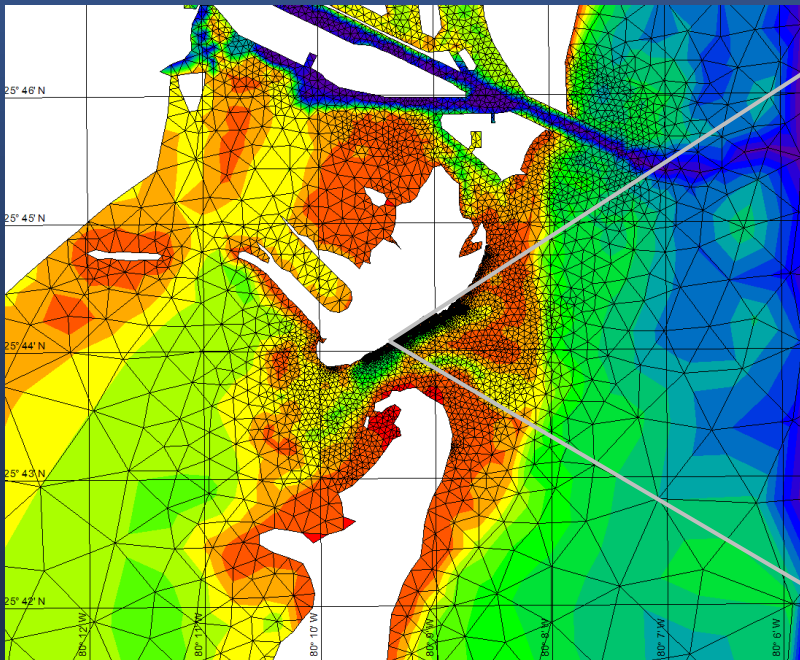
- **NOAA**
 - **1-Year current measurements**

- **Coastal Systems**
 - **Tidal hydrodynamic modeling**
 - **Hazardous areas mapping**
 - **Beach safety**

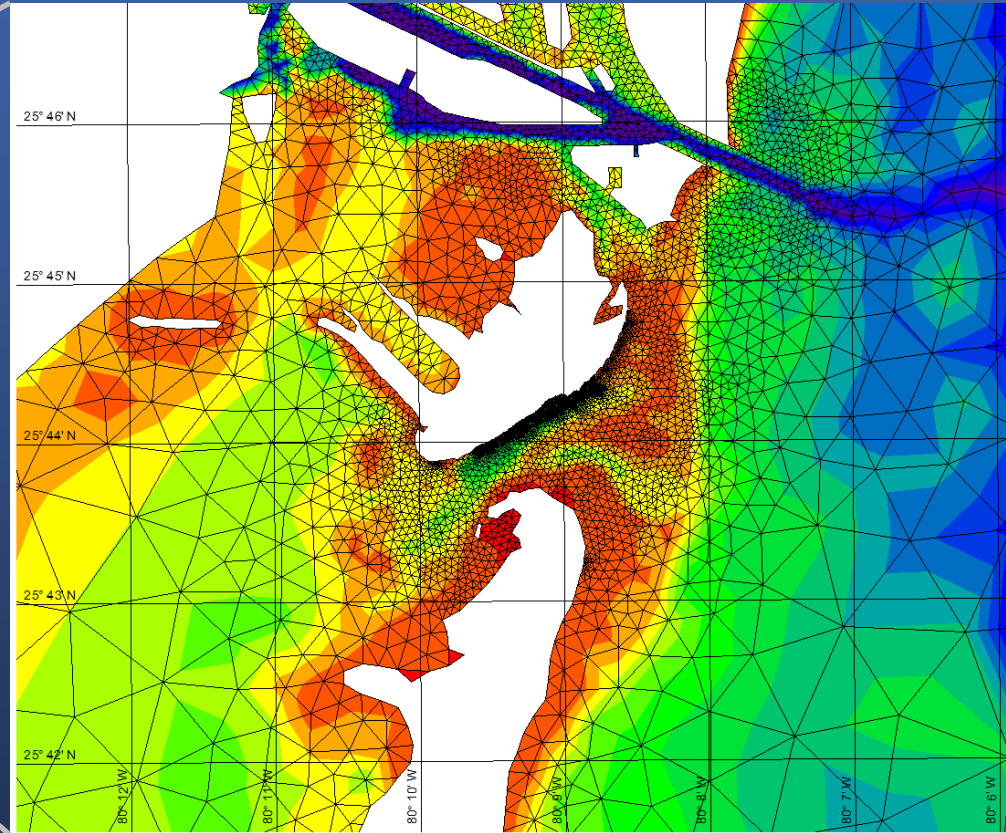
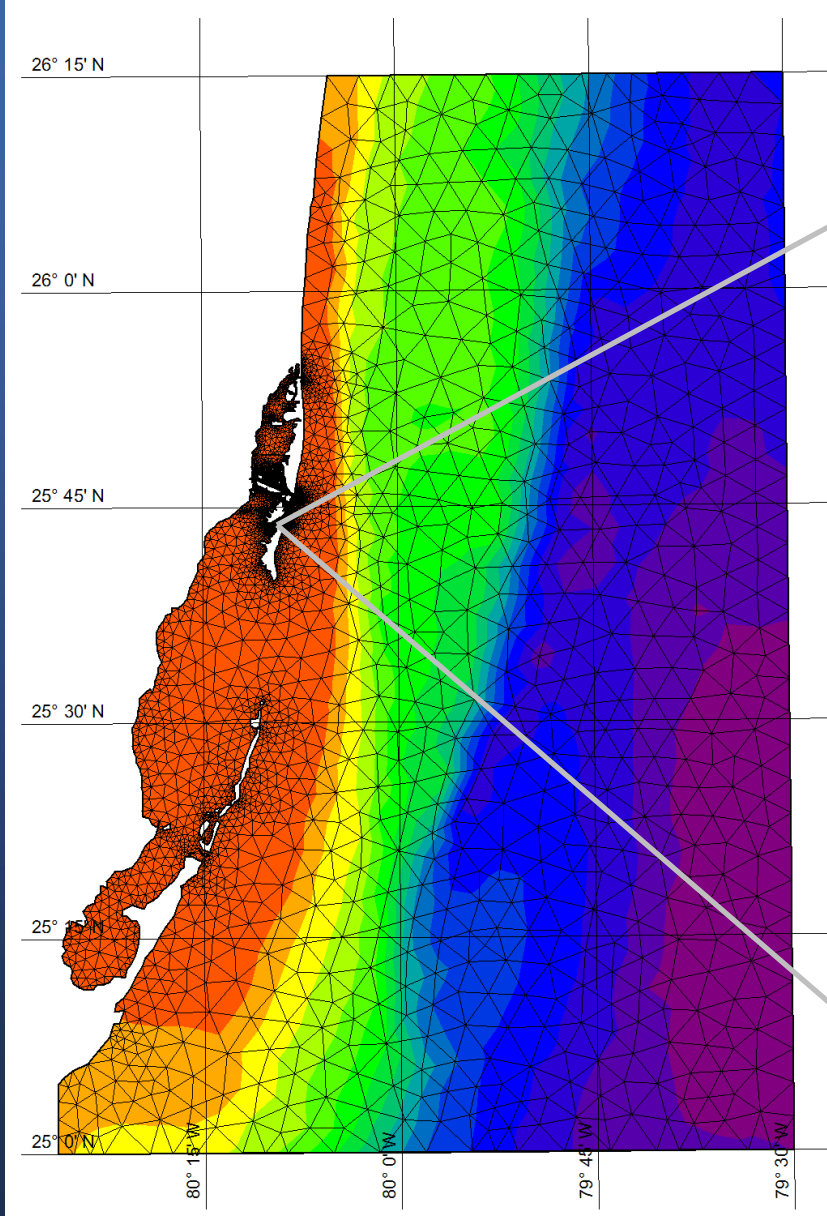
Site Conditions



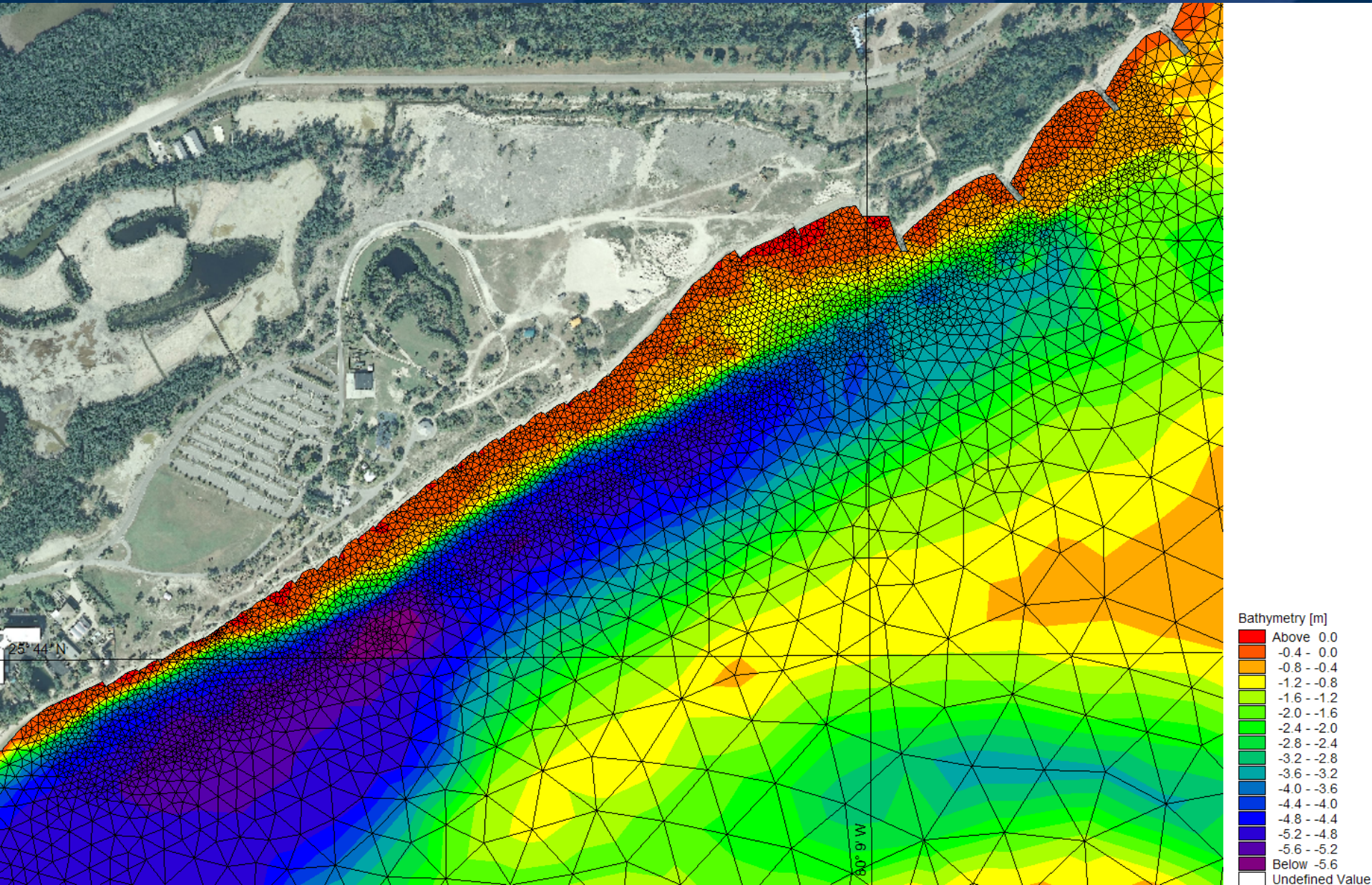
- Establish Domain and Mesh
- Calibrate Model using NOAA Measurements
- Perform Simulation
- Analyze Results

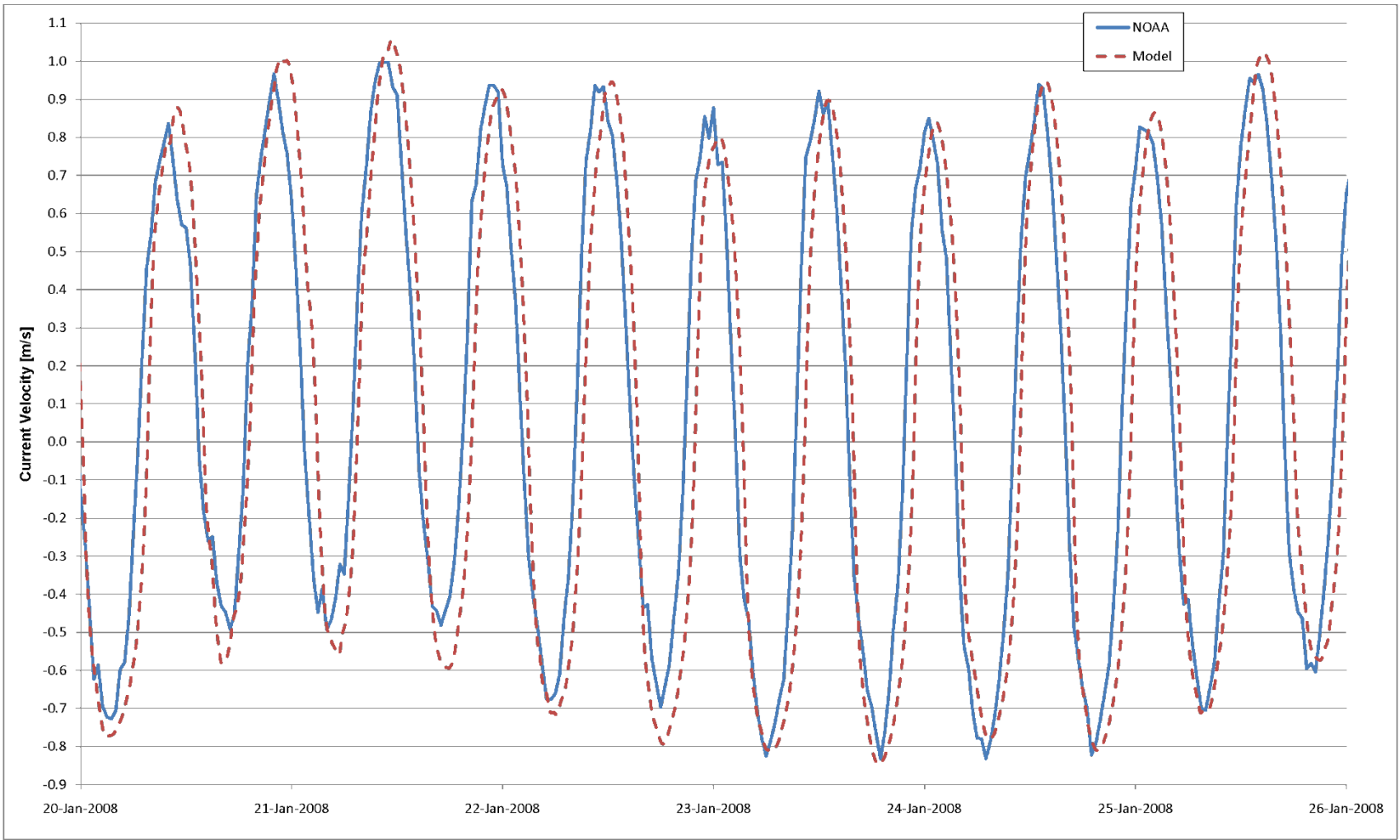


Domain and Mesh

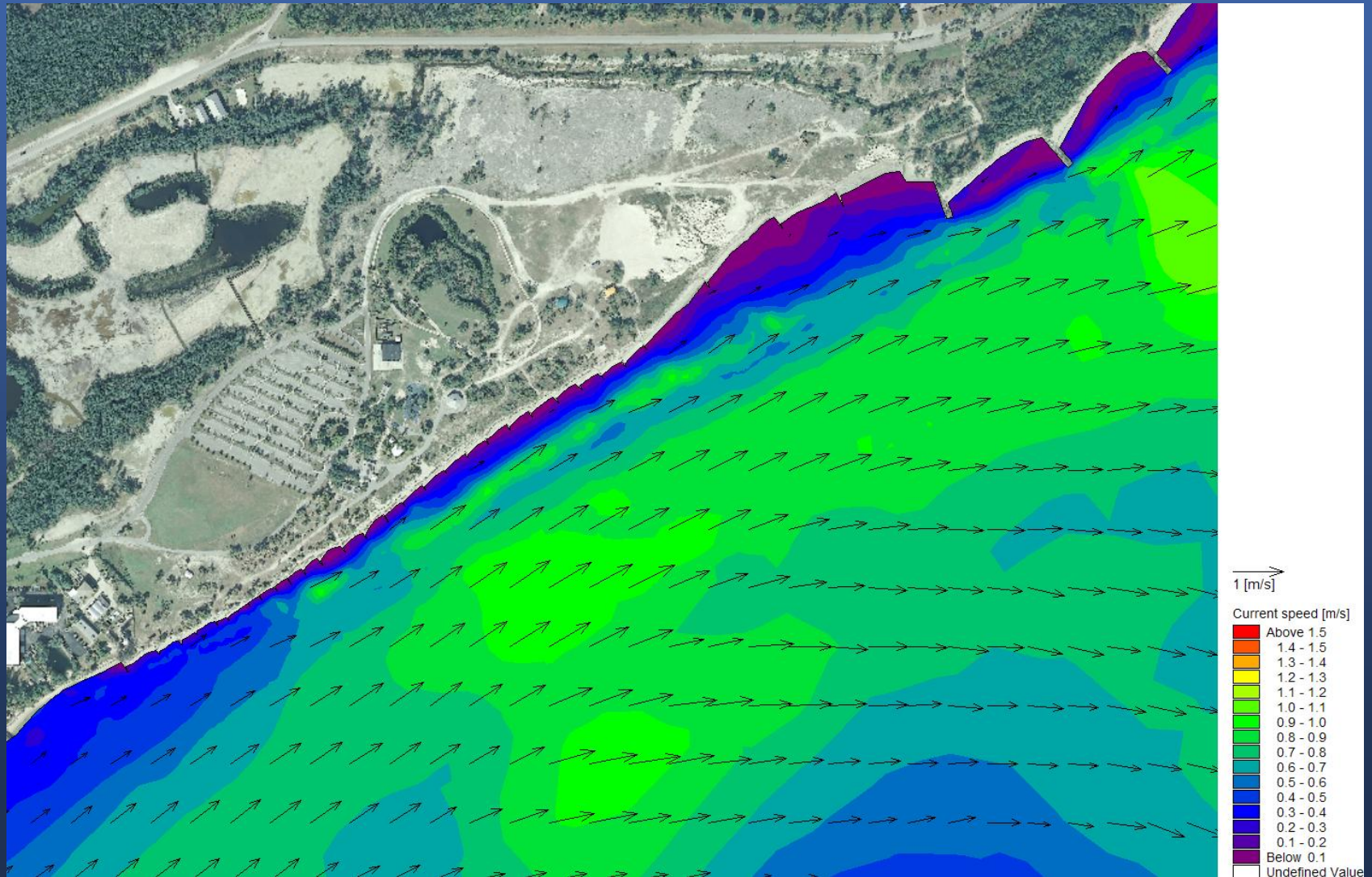


Domain and Mesh

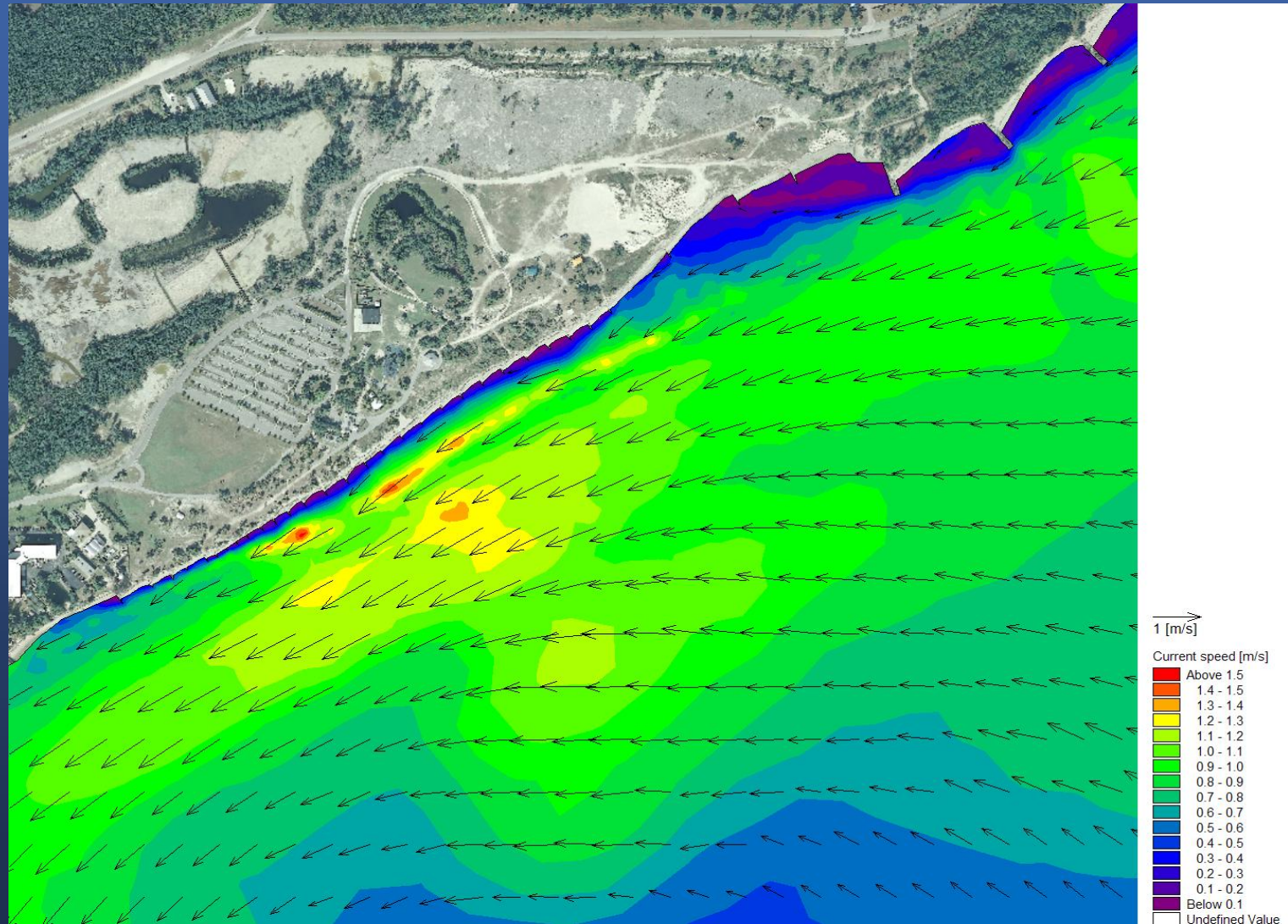




Peak Ebb Flow Conditions



Peak Flood Flow Conditions



Two Main Parameters

1. Current Speed

- **Current Speeds greater than 1.0 ft/sec (0.3 m/s) and 2.0 ft/sec (0.6 m/s) occur approx 30 and 60 feet from shoreline along West.**
- **Increases to 200 and 300 feet along East.**
- **Olympic Swimmers ~ 7.0 ft/sec (2.1 m/s).**

2. Water Depth

- **Dependant on height of individual**
- **Varies with tidal range**
- **Varies throughout seagrass shelf**

Hazardous Areas



- **Drowning is third leading cause of accidental death in U.S.**
- **Drowning is leading cause of accidental death in Florida for persons under 15 years of age.**

Category	2004	2005	2006	2007	2008
Drowning Deaths	122	83	100	109	102
Unguarded	103	71	89	89	84
Guarded	19	12	11	20	18

- **In 2005, Section 380.276 of the Florida Statutes was amended to require that all public beaches displaying warning flags use only the flags developed for the State's warning program.**
- **The Statute also supports the development and utilization of beach safety educational material.**

BEACH WARNING FLAGS

BANDERAS DE ADVERTENCIA EN LA PLAYA



Water Closed to Public

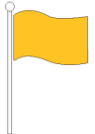
Agua Cerrada al Público



High Hazard

High Surf and/or Strong Currents

Peligro Alto, Resaca Alta y/o Corrientes Fuertes



Medium Hazard

Moderate Surf and/or Currents

Peligro Medio, Resaca Moderada y/o Corrientes Fuertes



Low Hazard

Calm Conditions, Exercise Caution

Peligro Bajo, Condiciones Calmas, Tenga Cuidado



Dangerous Marine Life

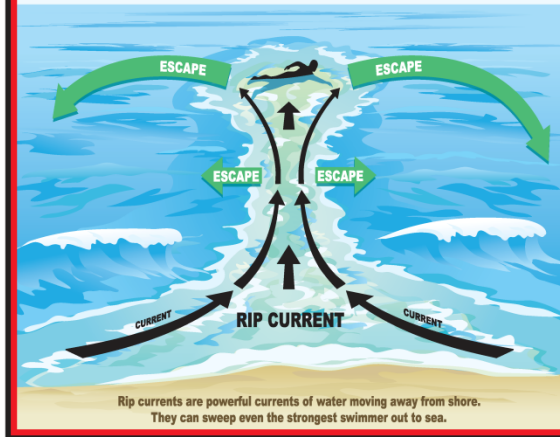
Vida Marina Peligrosa

Absence of Flags Does Not Assure Safe Waters

La Ausencia de Banderas No Asegura Aguas Seguras

RIP CURRENTS

Break the Grip of the Rip!



IF CAUGHT IN A RIP CURRENT

- ◆ Don't fight the current
- ◆ Swim out of the current, then to shore
- ◆ If you can't escape, float or tread water
- ◆ If you need help, call or wave for assistance

SAFETY

- ◆ Know how to swim
- ◆ Never swim alone
- ◆ If in doubt, don't go out

More information about rip currents can be found at the following web sites:

www.ripcurrents.noaa.gov
www.usla.org



Beach Safety



Beach Use Alternative



Beach Swimming Safety

- **Lifeguards**
- **Florida Beach Warning Flag Program**
- **Educational Sign Program**
- **Promotion of Local Water Safety Education**

Improvements

- **Beach Use Alternative Concept**
- **Environmental Permit Feasibility**
- **Funding Sources**
- **Engineering**



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