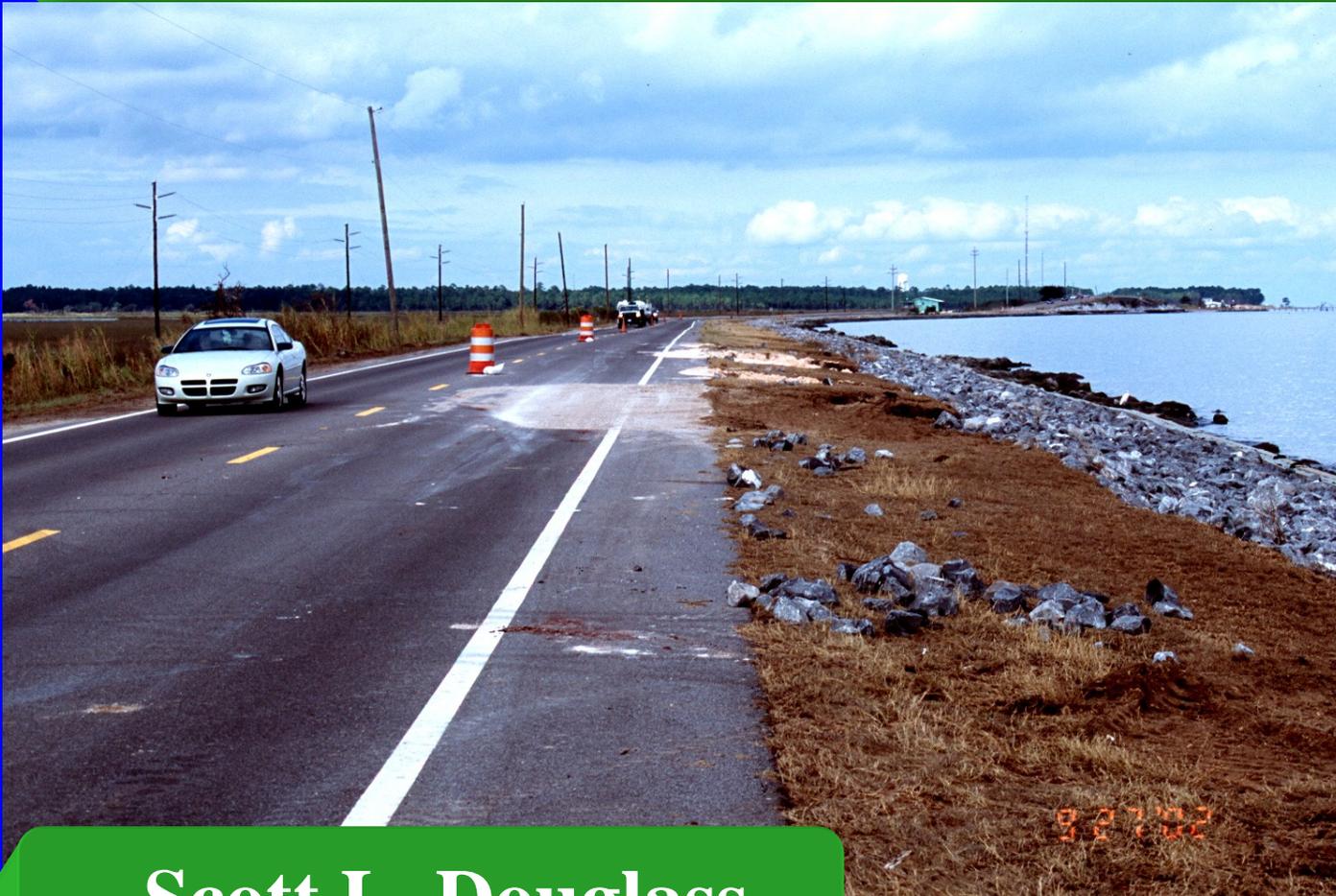


# University of South Alabama's Center on Coastal Transportation Engineering Research



**Scott L. Douglass**

**Midwestern  
Hydraulic  
Engineers  
Conference**

# A need for research on coastal highways

...demand is increasing



Coastal area populations are increasing  
(3,500/day)

Tourism is America's largest industry  
(beaches are #1 tourist destination)

11 25 '99

# A need for research on coastal highways

## ...unique design environment

- water levels
- waves
- sand transport
- tidal currents
- winds
- soils



# A need for research on coastal highways

## ...in environmentally sensitive places

- bays
- wetlands
- dunes
- beaches



Mobile Bay "Causeway" – US 98

*Mobile Register photo*

# Coastal Engineering is...

...engineering...

in the unique wave, water level  
and sand transport climate  
found along the coast



# Coastal Engineering is...

**“the planning, design and construction of projects to satisfy society’s needs and concerns in the coastal environment such as...**



**Harbor and marina  
development**

# Coastal Engineering is...

“the planning, design and construction of projects to satisfy society’s needs and concerns in the coastal environment such as...



**Shore  
protection**

# Coastal Engineering is...

“the planning, design and construction of projects to satisfy society’s needs and concerns in the coastal environment such as...



**Beach  
nourishment**

# Coastal Engineering is...

“the planning, design and construction of projects to satisfy society’s needs and concerns in the coastal environment such as...



and other  
constructed  
systems in the  
coastal wave and  
tide environment”



**including  
highways!**

# Coastal Highways



U.S. Highway 101 revetment  
Curry County, OR

# Coastal Highways



California Hwy.1  
Pacific Palisades

# Coastal Highways



Louisiana Hwy. 82  
Holly Beach (1973)

# Coastal Highways



**Beach nourishment and stepped seawall**  
US Highway 90, Biloxi, Mississippi

# Coastal Highways



Relocated portion of Florida Hwy. 399  
Gulf Islands Nat. Seashore

# Coastal Highways



Florida Highway A1A revetment  
Flagler Beach

# Coastal Highways



North Carolina Highway 12  
relocated section north of Buxton

# Coastal Highways



Dare County, North Carolina  
(beach nourishment to protect road!)

# Coastal Highways



**Geotextile tube inside sand dune**

**Ocean Dr. (Cape May CR 619)  
Whale Beach, New Jersey**

# Coastal Highways



**Wave overtopping**

Roughan's Point, Massachusetts

# Lake coasts?



“Yield or else”

Painesville, Ohio

# survey of highways exposed to coastal surge and waves



## Methodology:

- FEMA 100-year flood plain maps
- ARCGIS 8.3 "Streetmap"
- Overlays of roads in flood zones in coastal counties

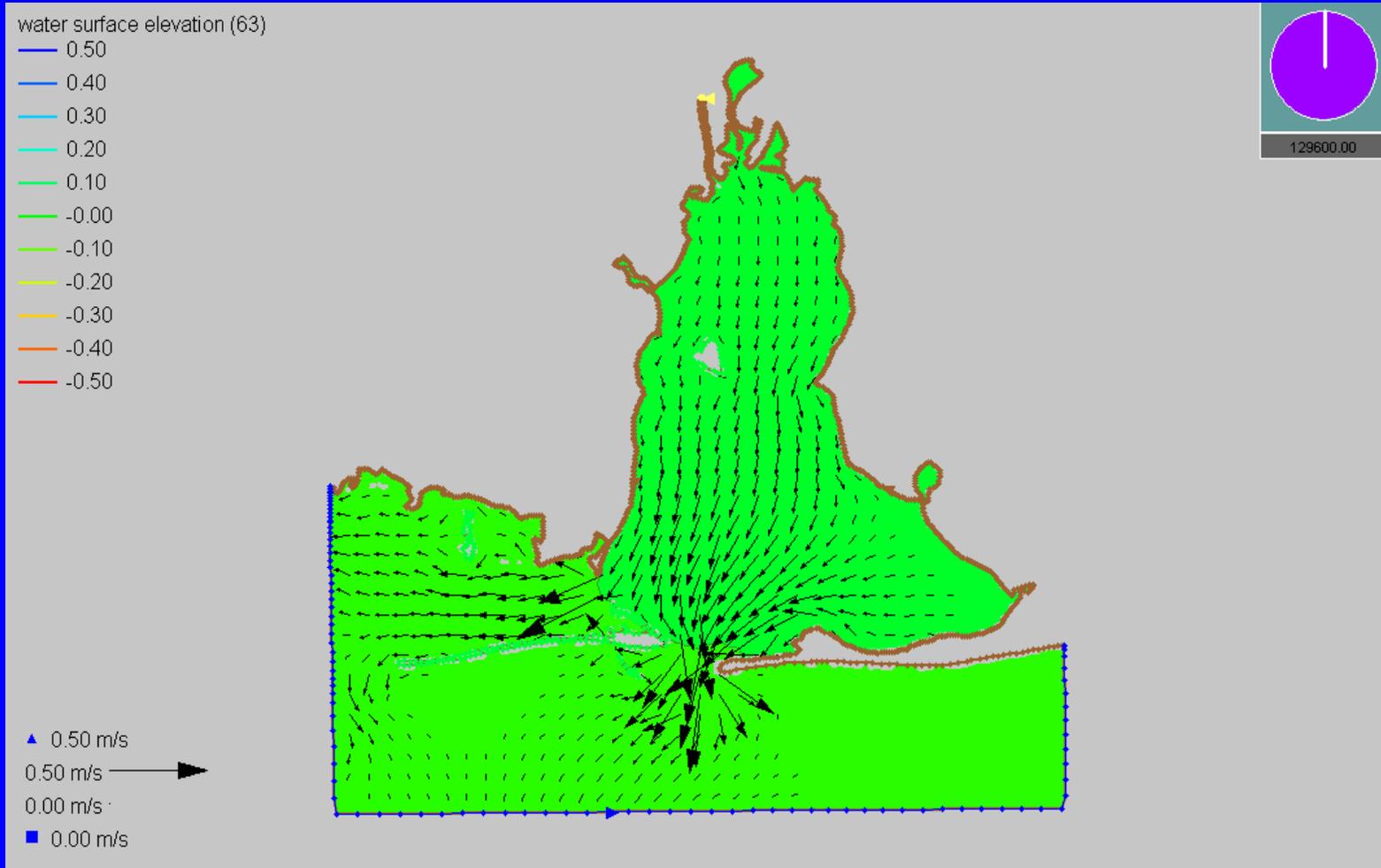


**Example of some of the 64 miles of roadway in Dukes County (Martha's Vineyard), MA that are in the 100-yr flood plain**

## Preliminary results:

**There are over 75,000 highway miles in  
the 100-year coastal storm surge  
floodplain**

# Improved storm surge modeling



# runoff from elevated highways

I - 10:  
Mobile Bay



# sizing rip-rap for waves



Coden,  
Alabama

# Design of roadways exposed to waves during storms



# Coastal Engineering Technical Assistance

