



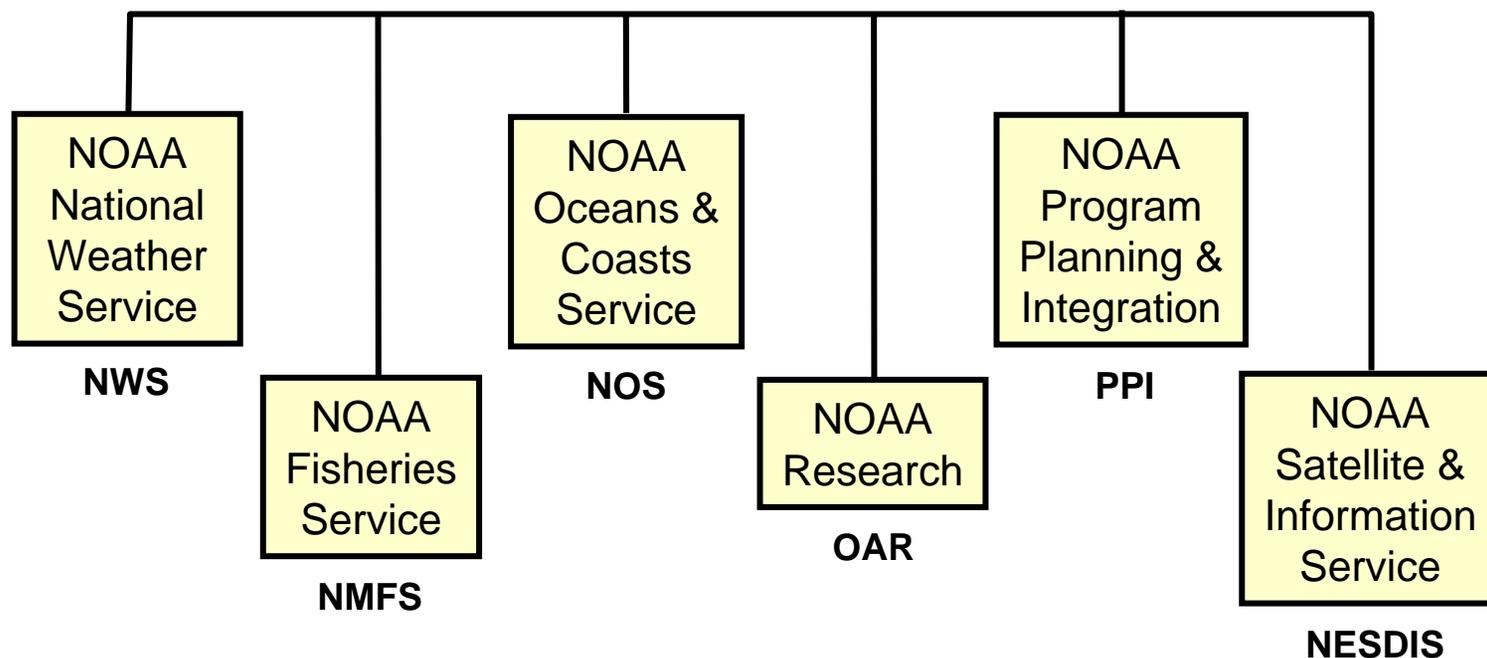
# NOAA's Use of High-Resolution Imagery

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NOAA

March 25, 2008



## One NOAA



**Mission: To understand and predict changes in the Earth's environment and conserve and manage coastal and marine resources to meet our nation's economic, social, and environmental needs.**

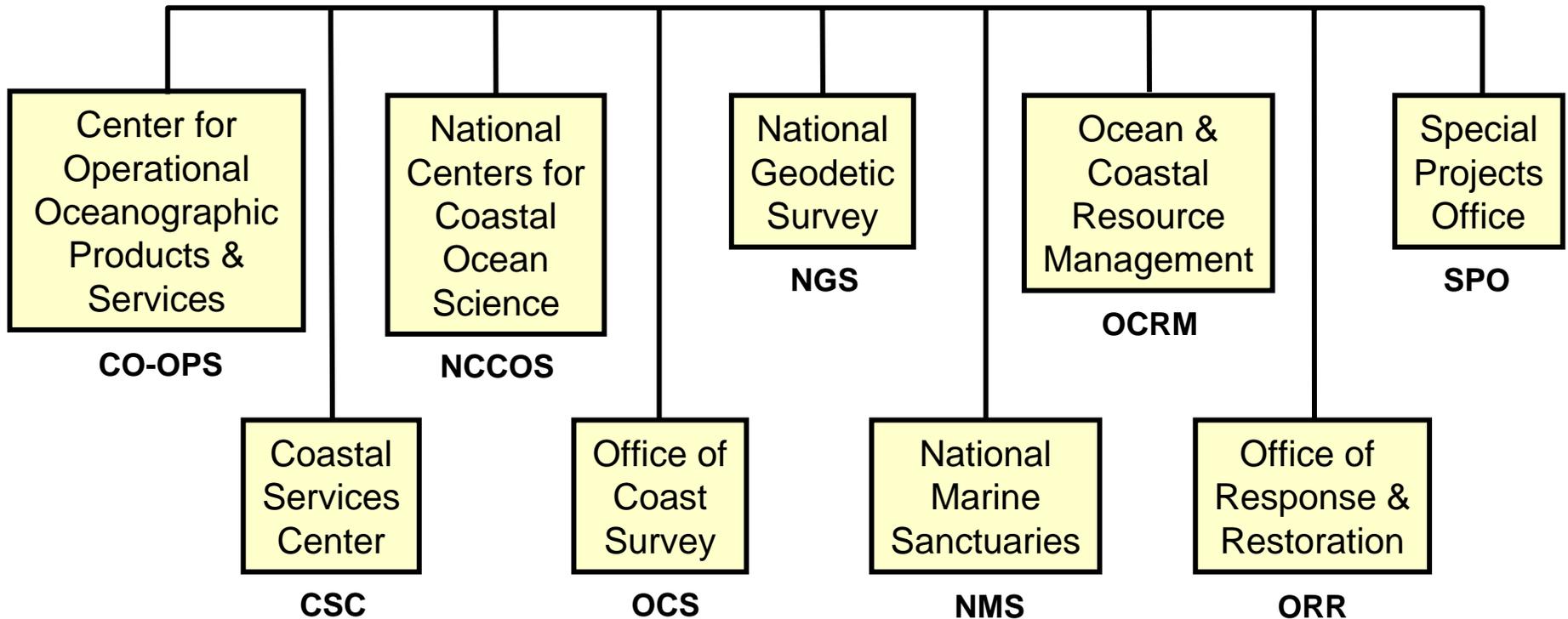


# NOAA Mission Goals

- **Ecosystems**
- **Climate**
- **Weather and Water**
- **Commerce and Transportation**



# NOAA Ocean Service



**High-resolution use and expertise is concentrated in NOS**



## Importance of Imagery

- Coastal hazards and flooding
- Coastal uplands and wetlands
- Ecosystem management
- Shoreline mapping
- Aids to navigation
- Coastal erosion
- Benthic habitats



# Shoreline Mapping

- Coast and Shoreline Change Analysis Program (CSCAP)
- Aerial and satellite image sources
- Shoreline delineation, addition/removal of piers, etc.
- Update NOAA nautical charts – including Electronic Navigational Charts (ENC)
- Key coordination groups
  - National Geodetic Survey, Office of Coast Survey
- Primary NOAA office: National Geodetic Survey

**NOAA goal relevance: Commerce and Transportation**



# Shoreline Mapping



Houston, Texas



Electronic Navigational Chart (ENC)



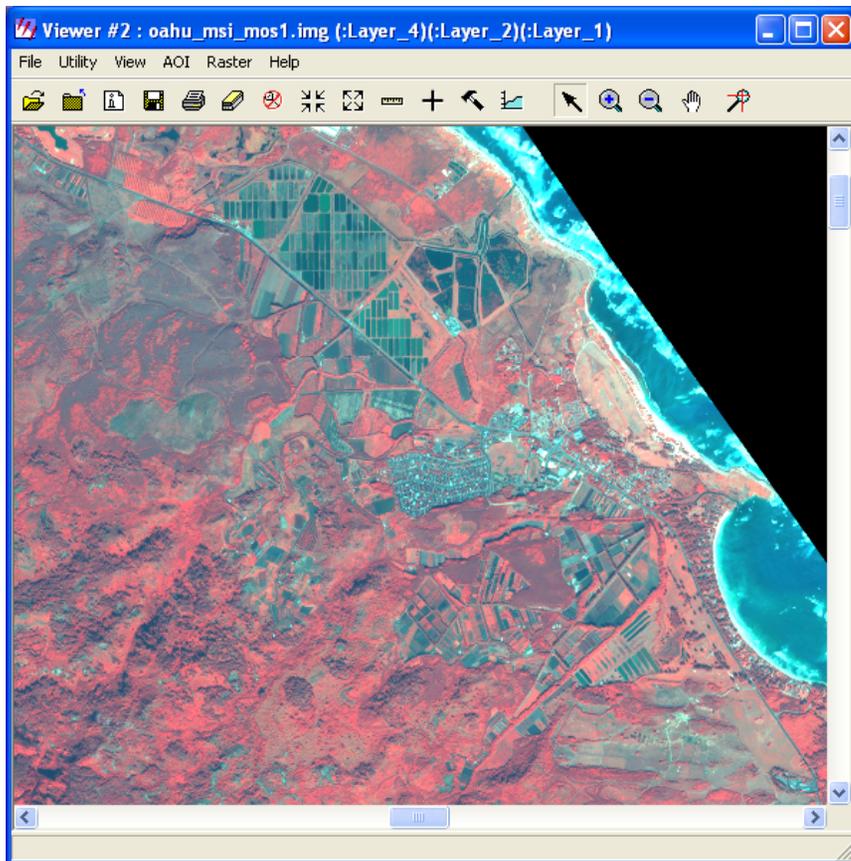
# Coastal Uplands Mapping

- Land cover: Coastal Change and Analysis Program (C-CAP)
  - 22 category land cover classification derived from Landsat Enhanced Thematic Mapper (ETM)
- Next generation C-CAP
  - Land cover classification derived from high-resolution sensors
- Key coordination groups
  - Multi-Resolution Land Characteristics (MRLC) Consortium, federal and state agencies
- Primary NOAA office: Coastal Services Center

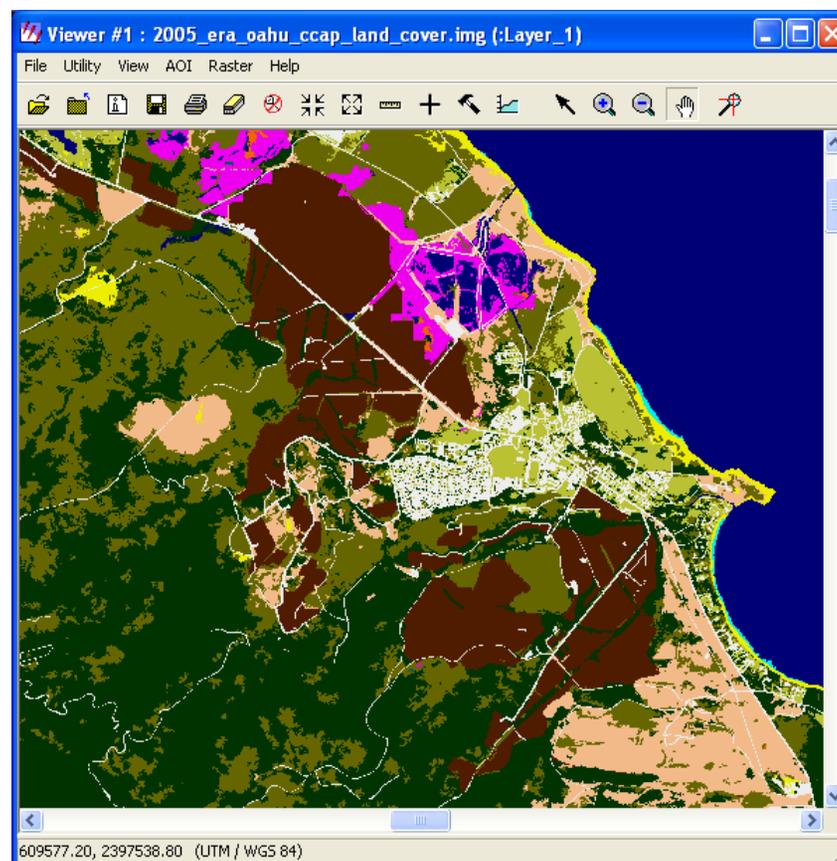
**NOAA goal relevance: Ecosystems**



# Coastal Uplands

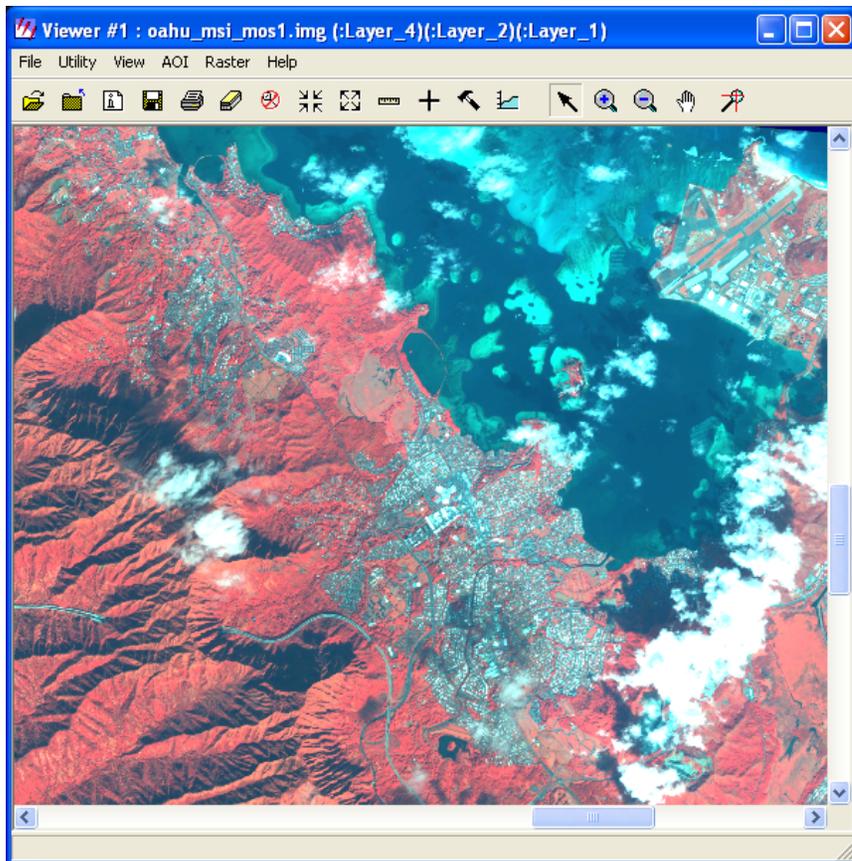


Quickbird Imagery

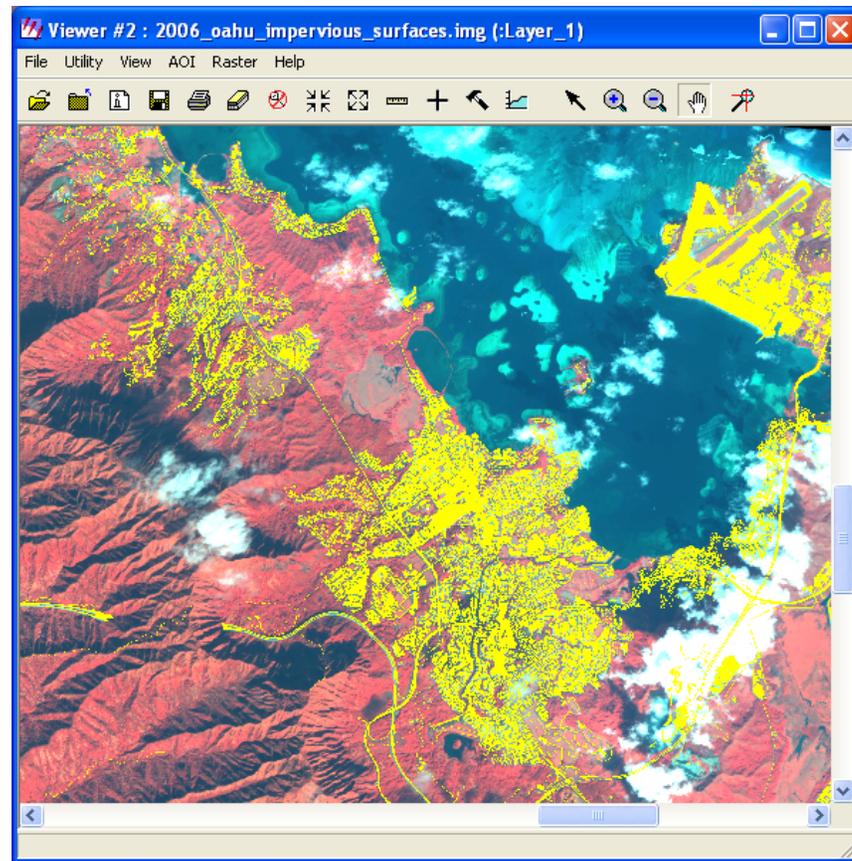


High-Resolution Land Cover

# Coastal Uplands



Quickbird Imagery



High-Resolution Impervious Surfaces



# Benthic Habitat Mapping

- Geography: coastal zone
- High-resolution aerial imagery
  - Submerged aquatic vegetation (SAV)
- Sources
  - Frame cameras
  - Digital cameras (ADS-40, Ultracam, OMC, etc.)
- Key coordination groups
  - State agencies, NOAA
- Primary NOAA office: Coastal Services Center

**NOAA goal relevance: Ecosystems**

## Benthic Habitat



NAIP ADS 40 imagery from 2004 of Aransas Pass, TX.



Delineation of seagrass beds derived from an automated mapping processes

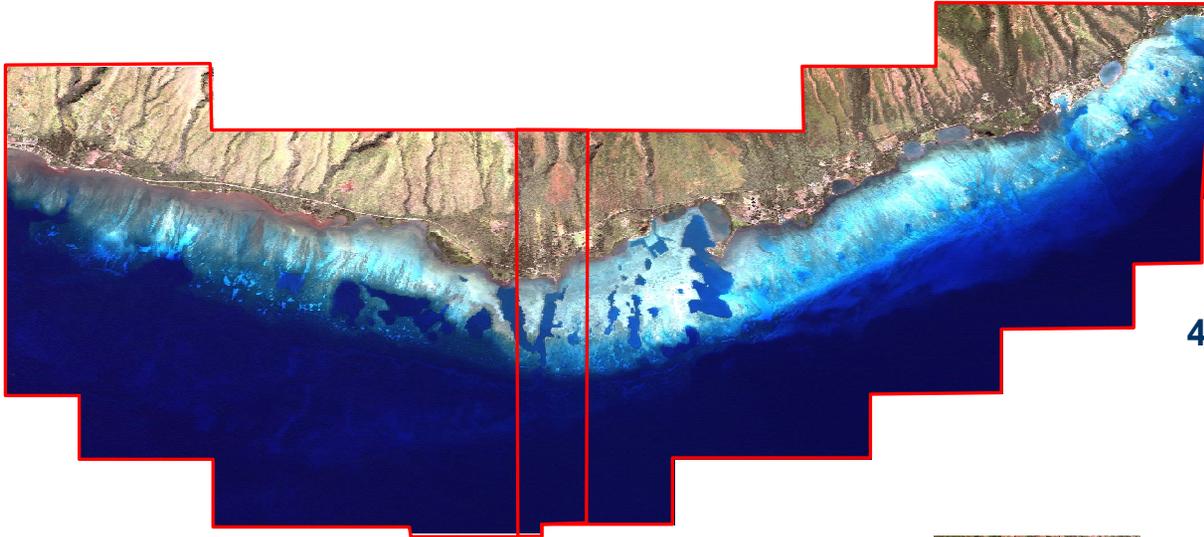


# Benthic Habitat Coral Mapping

- Geography
  - Hawaii (main islands and northwestern Hawaiian Islands), Florida, Guam, American Samoa, Northern Marianas, Puerto Rico, U.S. Virgin Islands, other U.S. flag islands
- Sources and classification categories
  - 4 meter and 1 meter IKONOS imagery
  - 13 habitat structure types
  - 21 habitat cover types
- Key coordination groups
  - State of Hawaii, University of Hawaii, territorial agencies, NOAA
- Primary NOAA office: National Centers for Coastal Ocean Science

**NOAA goal relevance: Ecosystems**

# Benthic Habitat



4.0 meter IKONOS



Habitat structure map

Molokai Island, Hawaii



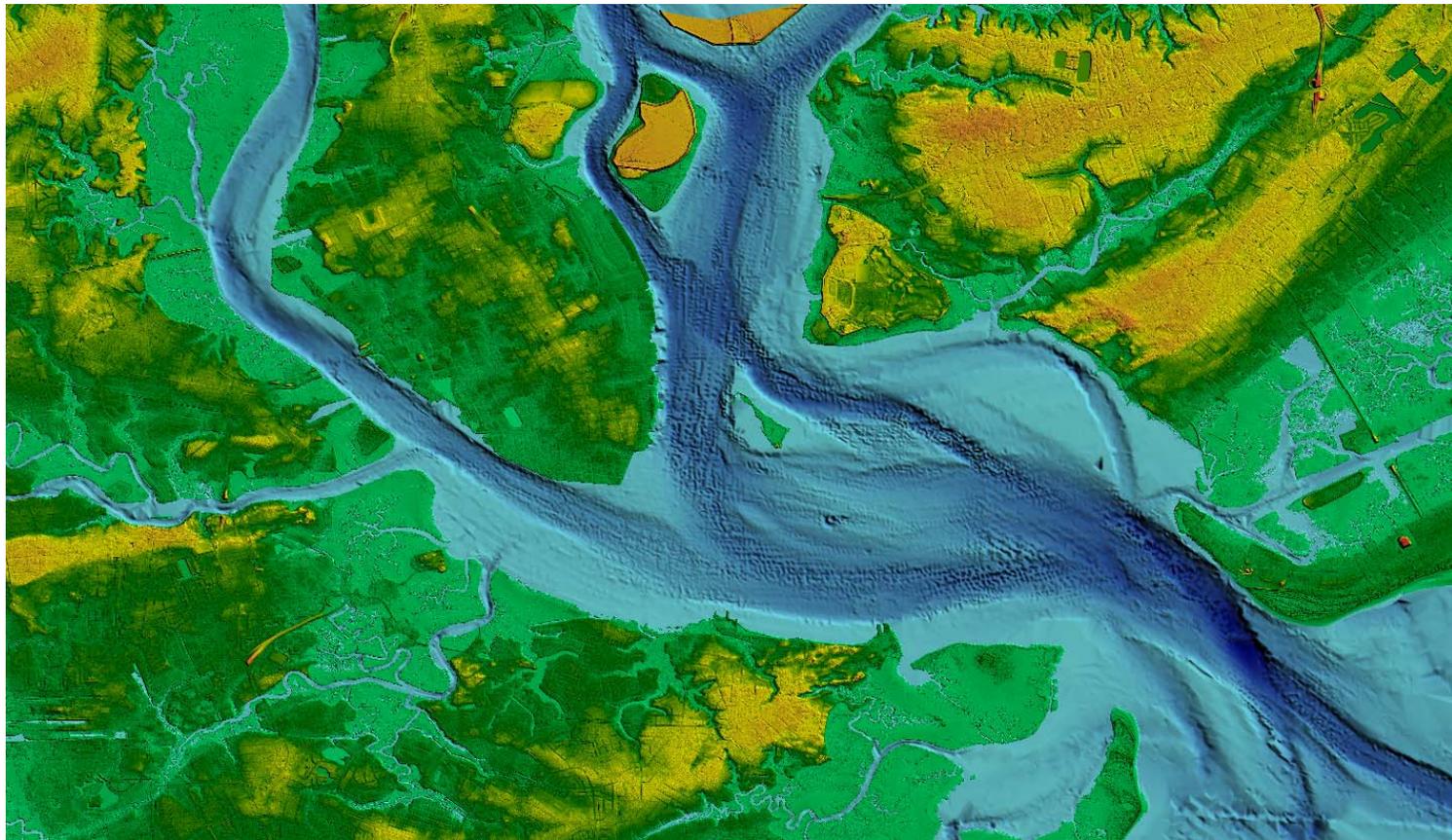
# Coastal Elevation Mapping

## Mapping

- Geography: coastal zone
- High-resolution elevation data
  - lidar
  - IfSAR
- Sources
  - Airborne lidar and IfSAR
- Key coordination groups
  - State & local agencies, NOAA, FEMA, USACE
- Primary NOAA office: Coastal Services Center

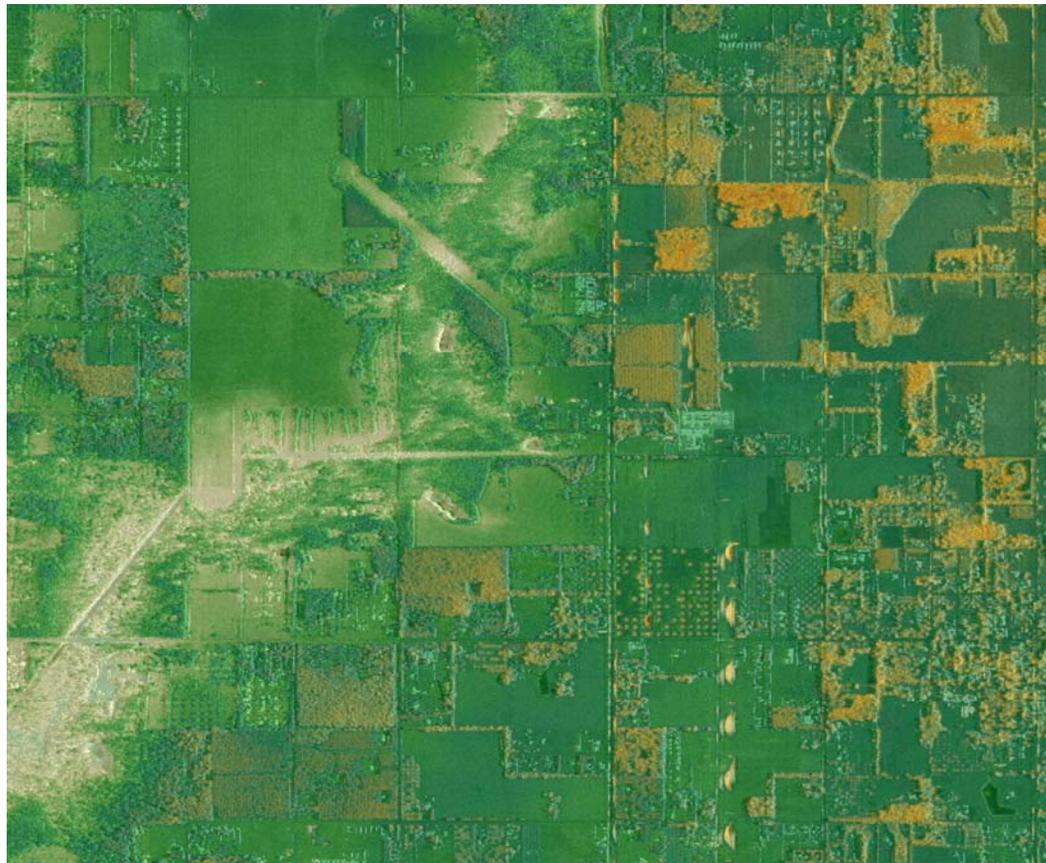
**NOAA goal relevance: Ecosystems**

# Coastal Elevation Mapping



**Topobathy DEM of Charleston, SC created from NOAA  
CSC lidar data and NOS hydrography data**

# Coastal Elevation Mapping



**5 meter elevation model derived  
from Intermap IfSAR**



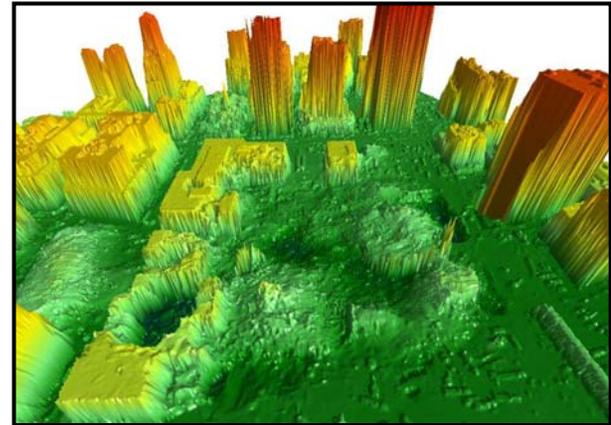
# Disaster Response

- Post-storm damage assessment
  - Support to NOAA's homeland security and emergency response requirements
  - Oil and HAZMAT spills, Barrier Island breaches, hazards to navigation, structural damage
- Disaster events
  - Hurricanes Camille, Frederick, Isabel, Ivan, Dennis, Katrina, Ophelia, Rita
  - Earthquakes and oil spills
  - World Trade Center
- Key coordination groups:
  - FEMA, U.S. Coast Guard, U.S. Army Corps of Engineers, NOAA
- Primary NOAA office: National Geodetic Survey

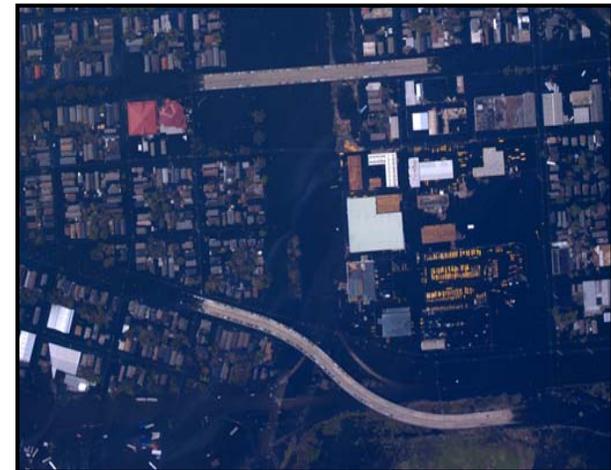
**NOAA goal relevance: Ecosystems, Climate, Weather and Water, Commerce and Transportation**

# Disaster Response

- NOAA sensors
  - Emerge/Applanix Digital Sensor System (DSS)
  - Optec Lidar Airborne Topographic Mapper System (ALTM 2050)
  - Itres Compact Airborne Spectrographic Imager-2 (CASI-2)



World Trade Center



Hurricane Katrina

# Disaster Response



Hurricane Isabel



Hurricane Ivan



# Imagery Support to Coastal Programs

- Project goal
  - Assist state and U.S. territory coastal programs with image collection within the coastal zone
  - Hawaii, Pacific Islands, Florida, Connecticut, Louisiana, Mississippi
- Sources
  - ADS-40 digital camera
  - IKONOS, Quickbird
- Key coordination groups
  - State agencies, universities, nongovernmental organizations, NOAA
- Primary NOAA office: Coastal Services Center

**NOAA goal relevance: Ecosystems**



# NOAA's Use of High-Resolution Imagery

- Shoreline mapping and nautical chart revision
- Coastal land cover mapping
- Benthic habitat mapping
- Disaster response
- Imagery collection and support for coastal programs



**For more information**

**Erik Hund or Stephen White**

***[www.noaa.gov](http://www.noaa.gov)***

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