

Coastal Change Analysis

Monitoring Changes in the
Nation's Coasts

Nate Herold

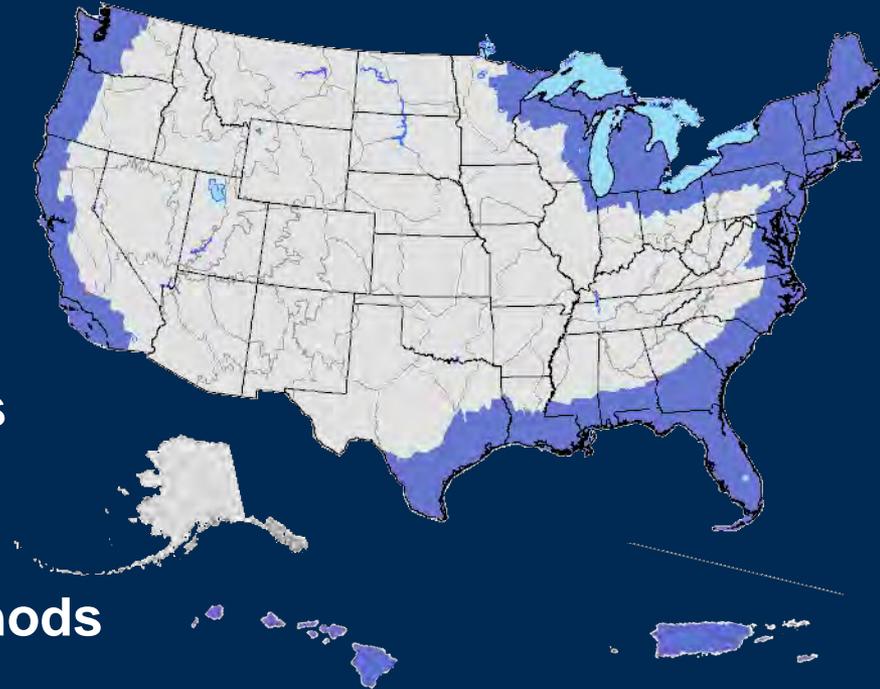
Presentation to the
Wetlands 2008 Conference
September 16, 2008

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The Coastal Change Analysis Program

- National coastal land cover and change mapping program
- Inventory of intertidal areas, wetlands, and adjacent upland, produced/updated every 5 years
- Consistent, accurate products through standard data and methods
- Coastal Expression of the National Land Cover Database (NLCD)



“Designed to help improve understanding of linkages between land change and the environment”



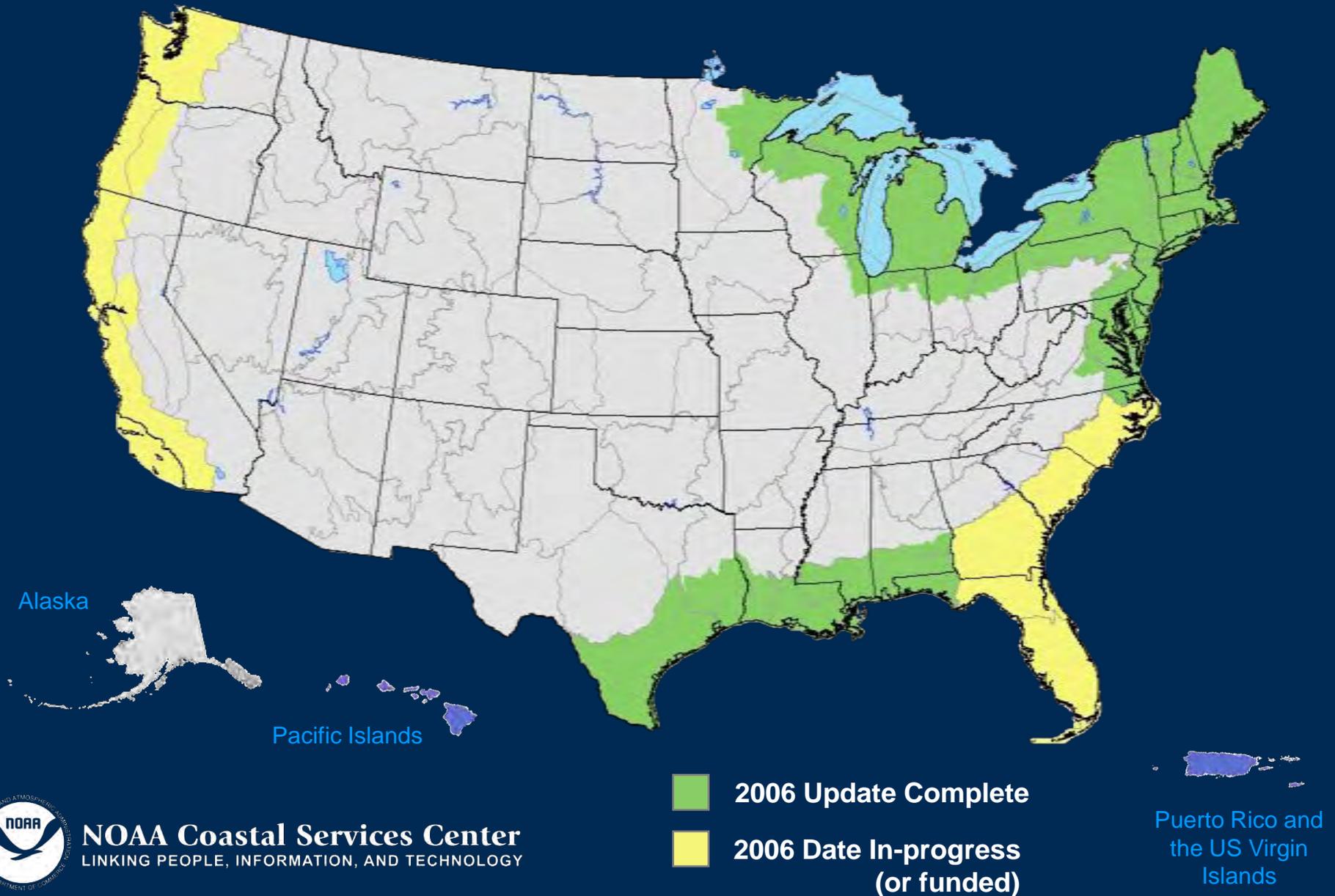
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We've Got You Covered...



NOAA Coastal Services Center
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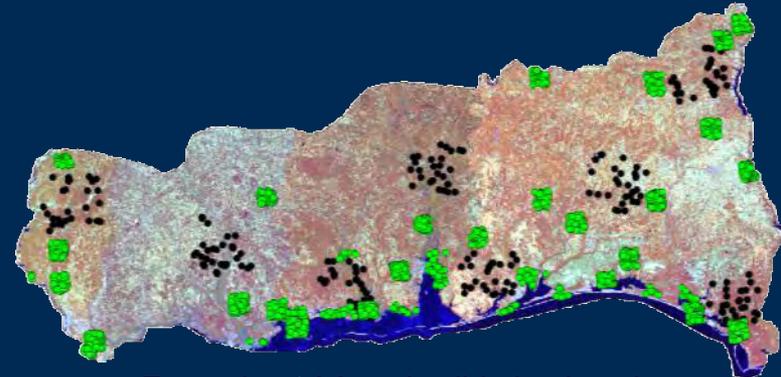
...and Covered.



Accuracy of C-CAP Product

Results of 2001 Mapping

- Over 2.3 Billion pixels served
 - Approximately 817,500 mi² mapped per date
- Over 20,000 AA points collected through 11 efforts
- Over 2100 validation points through 9 efforts



Example of AA and validation locations
In Gulf Coast Mapping Zone 46

Overall Accuracy was assessed at 86.3 %

Range of individual assessment were from 76-91%

Validation confirmed a range of 77-90%





Coastal Land Cover Classes

Developed

- Developed, High Intensity
- Developed, Medium Intensity
- Developed, Low Intensity
- Developed, Open Space

Agricultural

- Cultivated Crops
- Pasture/Hay

Rangeland

- Grassland/Herbaceous
- Scrub / Shrub

Forest Land

- Deciduous Forest
- Evergreen Forest
- Mixed Forest

Barren Land

- Barren Land
- Unconsolidated Shore

Water

- Open Water
- Palustrine Aquatic Bed
- Estuarine Aquatic Bed

Wetlands

Woody Wetlands

- Palustrine Forested Wetland
- Palustrine Scrub/Shrub Wetland
- Estuarine Forested Wetland
- Estuarine Scrub/Shrub Wetland

Herbaceous Wetlands

- Palustrine Emergent Wetland
- Estuarine Emergent Wetland

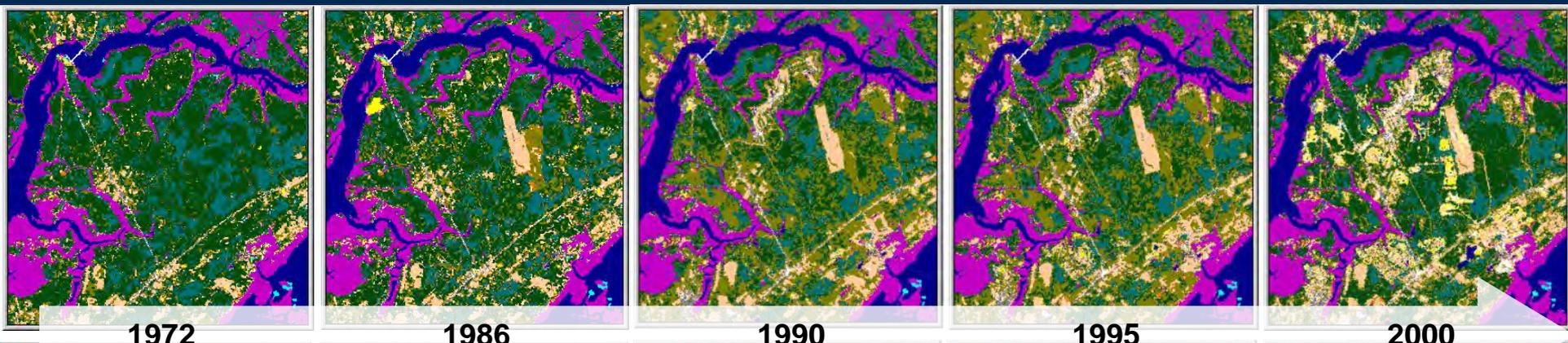
Perennial Ice/Snow

Alaska Only Classes*

- Dwarf Scrub
- Sedge/Herbaceous
- Lichens
- Moss

C-CAP Vision

To monitoring **coastal** changes on a 5-year repeat cycle



Rural
community

Small airport
construction

Impact after
Hurricane Hugo

Golf course
community

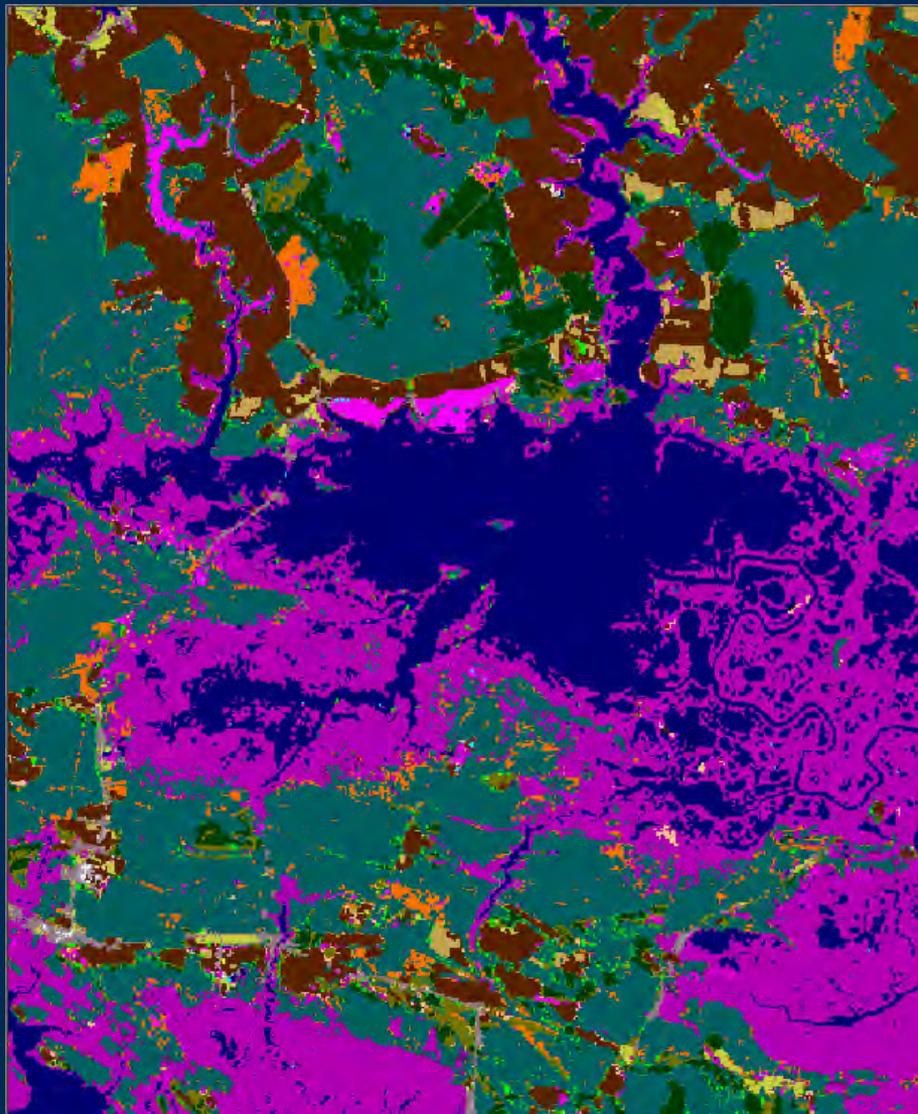
Population
expansion



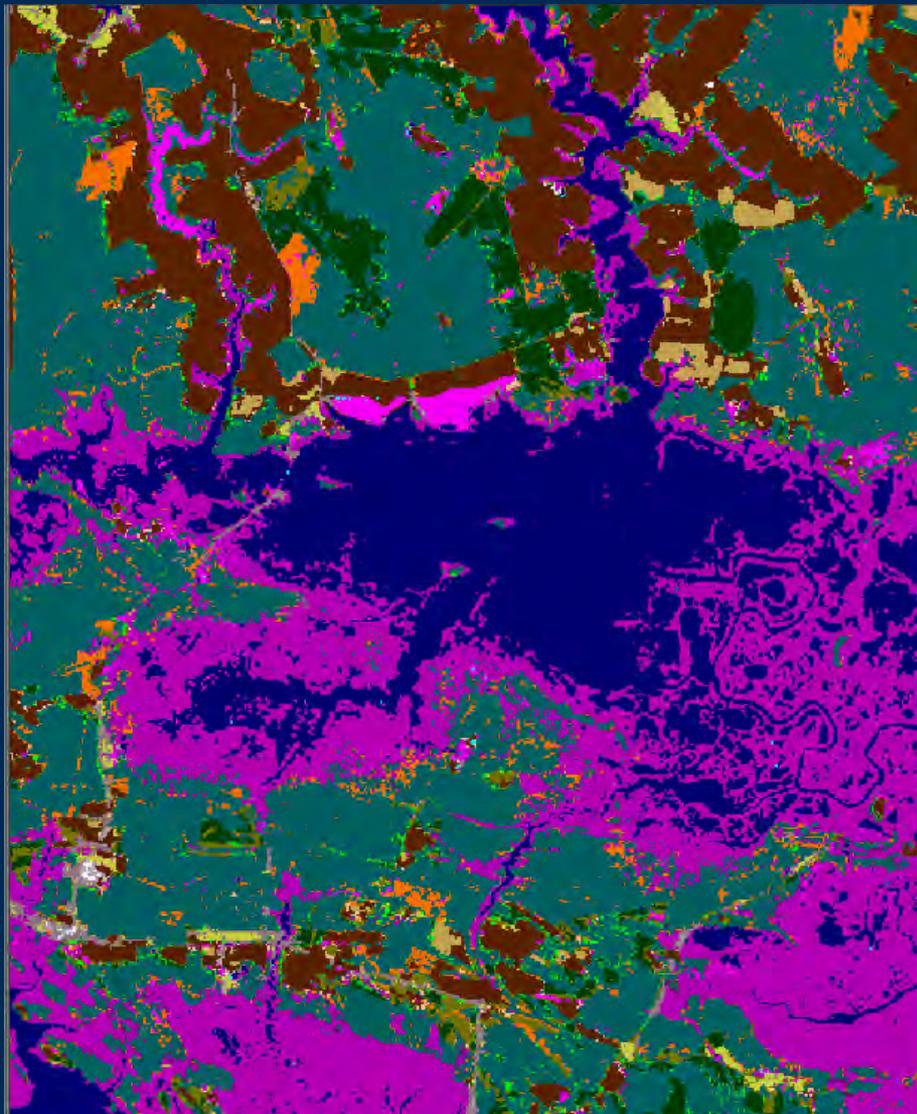
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Screening for Wetland Changes

Blackwater NWR, Maryland



1996



2001

Screening for Wetland Changes

Blackwater NWR, Maryland

The image is a screenshot of the Google Earth Pro interface. The main window displays a satellite map of the Blackwater National Wetland Reserve in Maryland. The map is overlaid with various colored polygons representing different wetland types, labeled with codes such as PSS1A, PFO1/4A, PUBHh, E2EM1P8, PUB/SS1Fh, PEM1Fh, L2USGh, PSS1/EM1Gh, E1UBL, Bull Point Island, E2EM1U, and E2EM1P. The map also shows geographical features like Betty's Island, Rowland Island, Spriggs Island, and Gum Island. The interface includes a search bar at the top left, a 'Places' panel on the left with a tree view showing 'FWS Wetlands Data' and 'Lower 48 States', and a 'Layers' panel at the bottom left with various map layers like 'Primary Database', 'Geographic Web', 'Roads', '3D Buildings', 'Street View', 'Borders and Labels', 'Traffic', 'Weather', 'Gallery', 'Global Awareness', 'Places of Interest', 'More', and 'Terrain'. The status bar at the bottom shows coordinates (38°25'42.61" N, 76°08'15.96" W), the date (Nov 26, 2006), and the eye alt (14958 ft). Copyright information for Europa Technologies, DigitalGlobe, and Teo Atlas is visible at the bottom center.

C-CAP Provides Important Context

Results of 2001 Mapping

- Area equal to the size of the state of Maine changed, in the Coastal CONUS, between 1996 and 2001
 - Largest area(s) of change are a result of siculture activities
 - Many of these can be offsetting changes with little net impact
- Increase in developed area equal to 7.5 times the area of New York City (2,275 sq miles)
 - 10% of coastal counties account for almost half of this total
 - Occurring at a faster rate in the Southeast (53%)
 - Approx. half of this increased development area is low intensity

7%

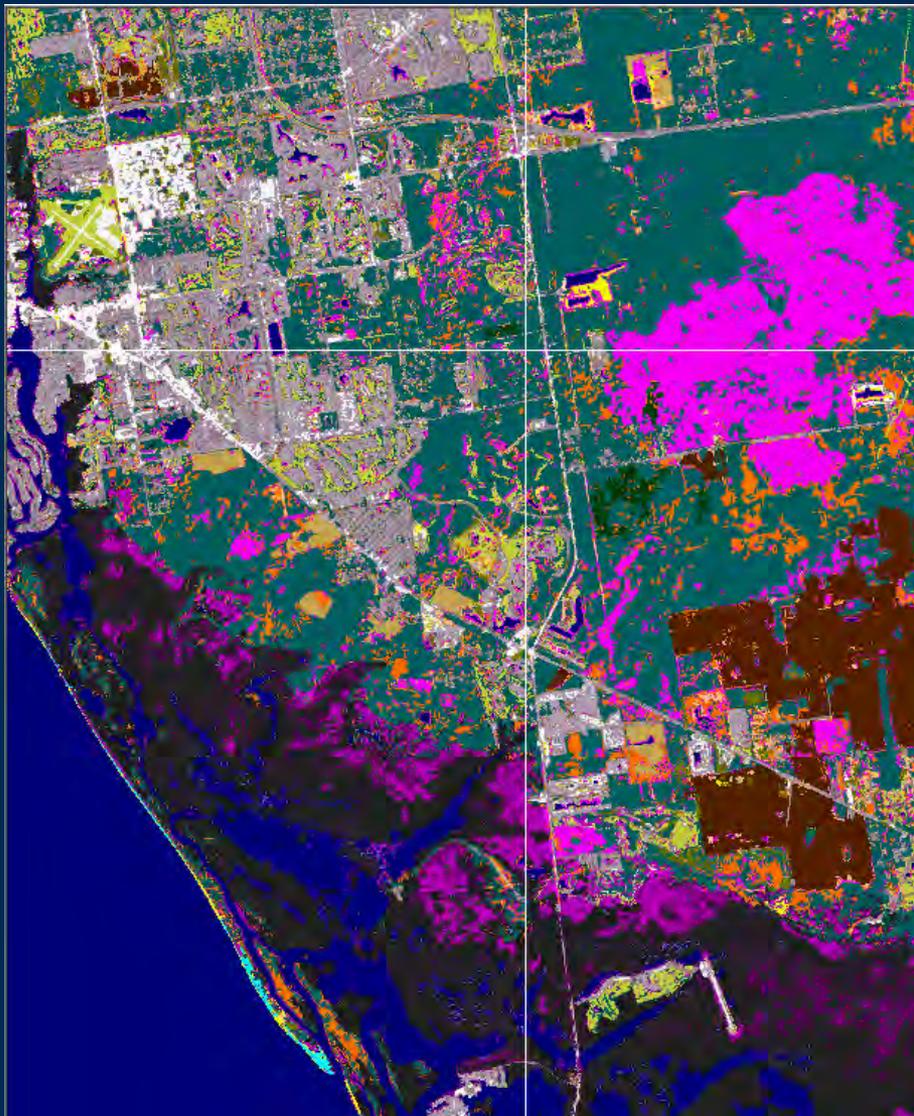
“NOAA Issues New Land Cover Assessment showing Increasing U.S. Coastal Development”



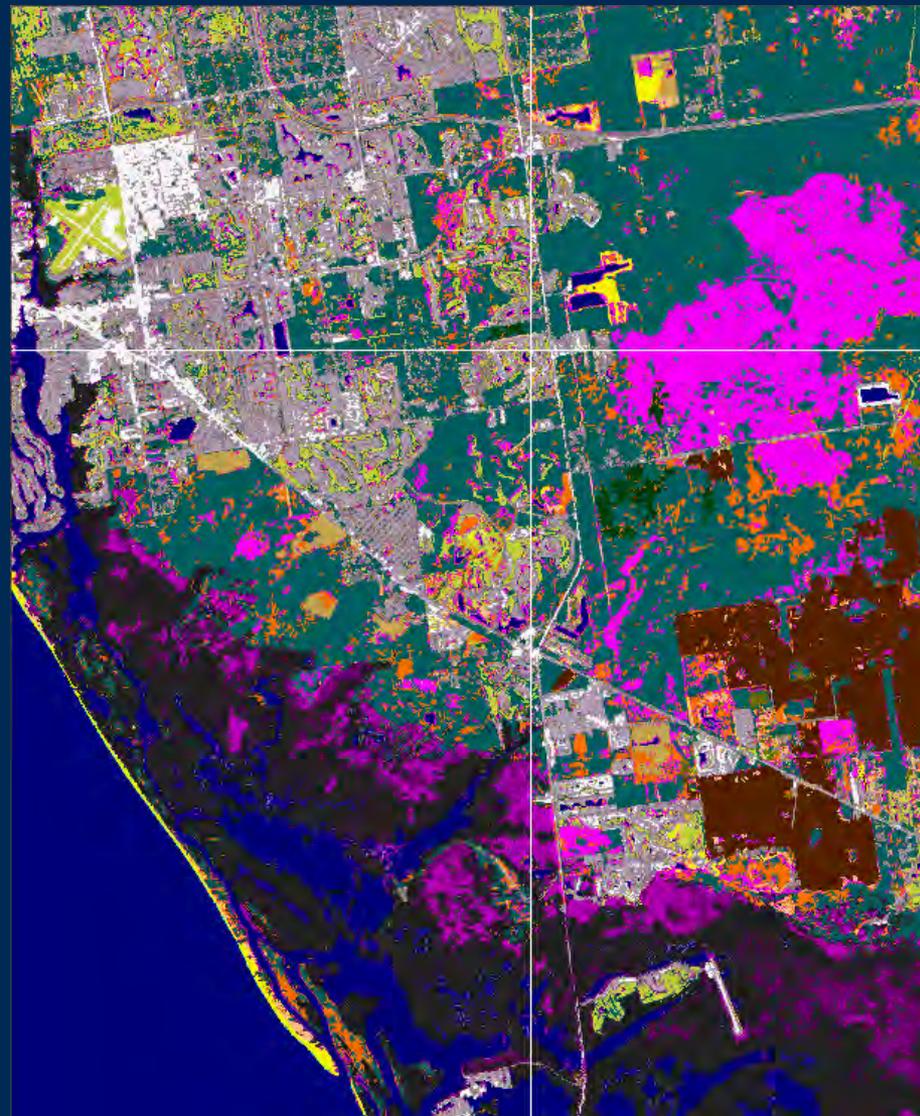
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C-CAP Provides Important Context

Rookery Bay NERR, Florida



1996



2001

Decision Support for Water Quality

Nonpoint-Source Pollution and Erosion Comparison Tool (N-SPECT)

- Calculates nonpoint pollutant and sediment loads
- Utilizes land cover, topography, precipitation data, and soils data (incorporates SCS curve numbers)
- Compares output to water quality standard



Impervious Surface Analysis Tool (ISAT)

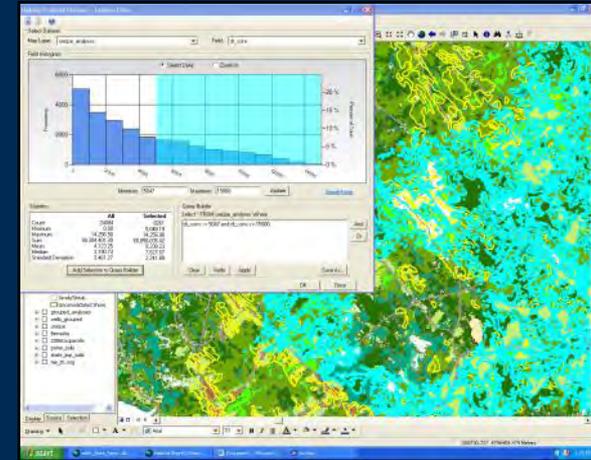
- Calculates nonpoint pollutant and sediment loads
- Utilizes land cover, topography, precipitation data, and soils data (incorporates SCS curve numbers)
- Compares output to water quality standard
- First deployment in Oahu, HI



Decision Support for Conservation

Habitat Priority Planner (HPP)

- Designed as an interactive screening tool for selecting conservation priority sites
- Utilizes land cover, as well as other ancillary data



Land Fragmentation Tool (from NEMO)

- UConn Center for Land Use Education
- Based upon techniques developed by the U.S. Forest Service for analyzing forest fragmentation
- Developed in partnership with Placeway's Inc. (CommunityViz people)
- Incorp into CommunityViz and ArcGIS



High Resolution Land Cover

- Customer demand / need . . .
and
- Increasingly available, high-res imagery and supporting data
provide
- New opportunities to
 - Introduce new data streams
 - Introduce new approaches
 - Increase focus on coastal issues

“Our goal is to provide consistent, accurate, nationally relevant data at a spatial scale more appropriate for support of increasingly detailed, site-specific, management decisions”.



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Fly To Find Businesses Directions

Fly to e.g., 94043

Santa Cruz, CA

Places Add Content

- Pacific Trust Islands
[Click for information!](#)
- Legend: Wetland Types
[Click for information!](#)
- Legend: Status Map
[Click for information!](#)
- US Fish and Wildlife
- Temporary Places
- Temporary Places
 - [santa cruz hr ccap 4m](#)
Source Image:
Y:\jcrs/projects/lca/FY08/
 - Logo
 - Legend

Layers

- Primary Database
- Geographic Web
- Roads
- 3D Buildings
- Street View
- Borders and Labels
- Traffic
- Weather
- Gallery
- Global Awareness
- Places of Interest
- More
- Terrain

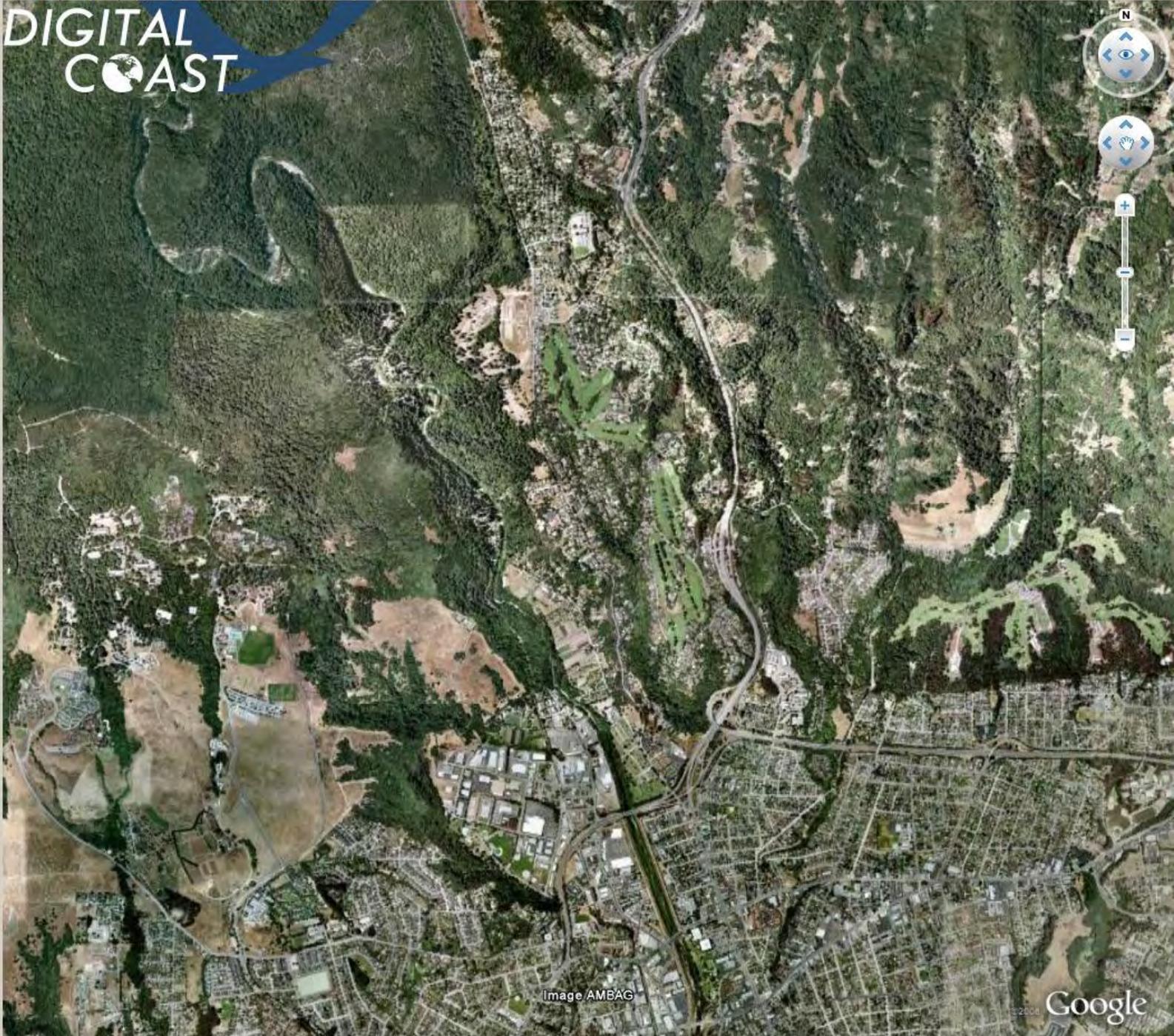


Image AMBAG

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▶ ■ ✕

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Land Cover Classes

- Developed - High Intensity
- Developed - Medium Intensity
- Developed - Low Intensity
- Developed - Open Space
- Cultivated
- Pasture / Hay
- Grassland
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Scrub / Shrub
- Palustrine Forested Wetland
- Palustrine Scrub / Shrub Wetland
- Palustrine Emergent Wetland
- Estuarine Forested Wetland
- Estuarine Scrub / Shrub Wetland
- Estuarine Emergent Wetland
- Unconsolidated Shore
- Bare Land
- Water
- Palustrine Aquatic Bed
- Estuarine Aquatic Bed
- Tundra
- Snow / Ice



Image AMBAG

Google

37°00'01.32" N 122°01'49.40" W

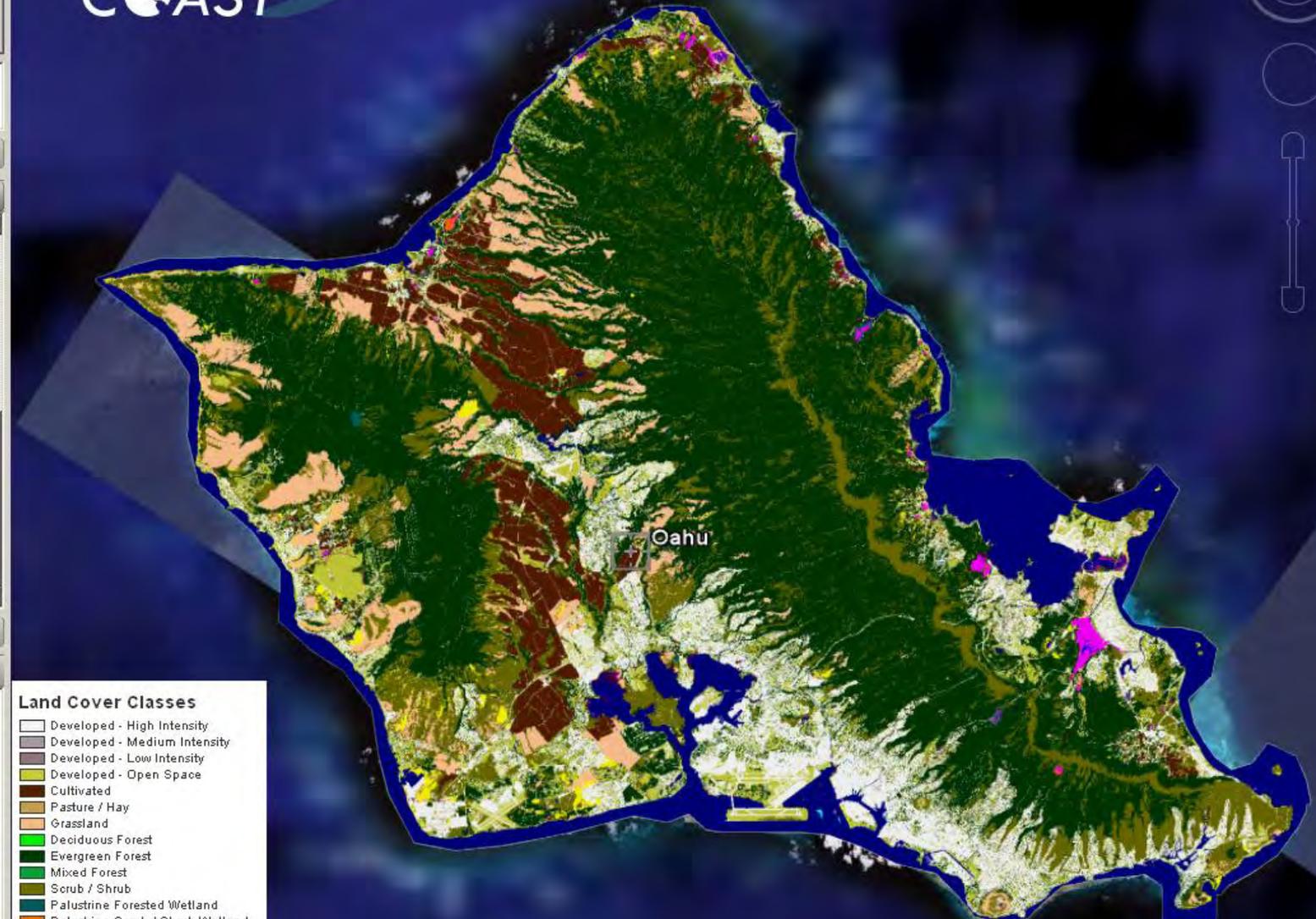
Jul 2003

Eye alt 19867 ft

- Status Map
- Wetland Polygons
- Puerto Rico & US VI
 - [Click here for Metadata](#)
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DIGITAL COAST



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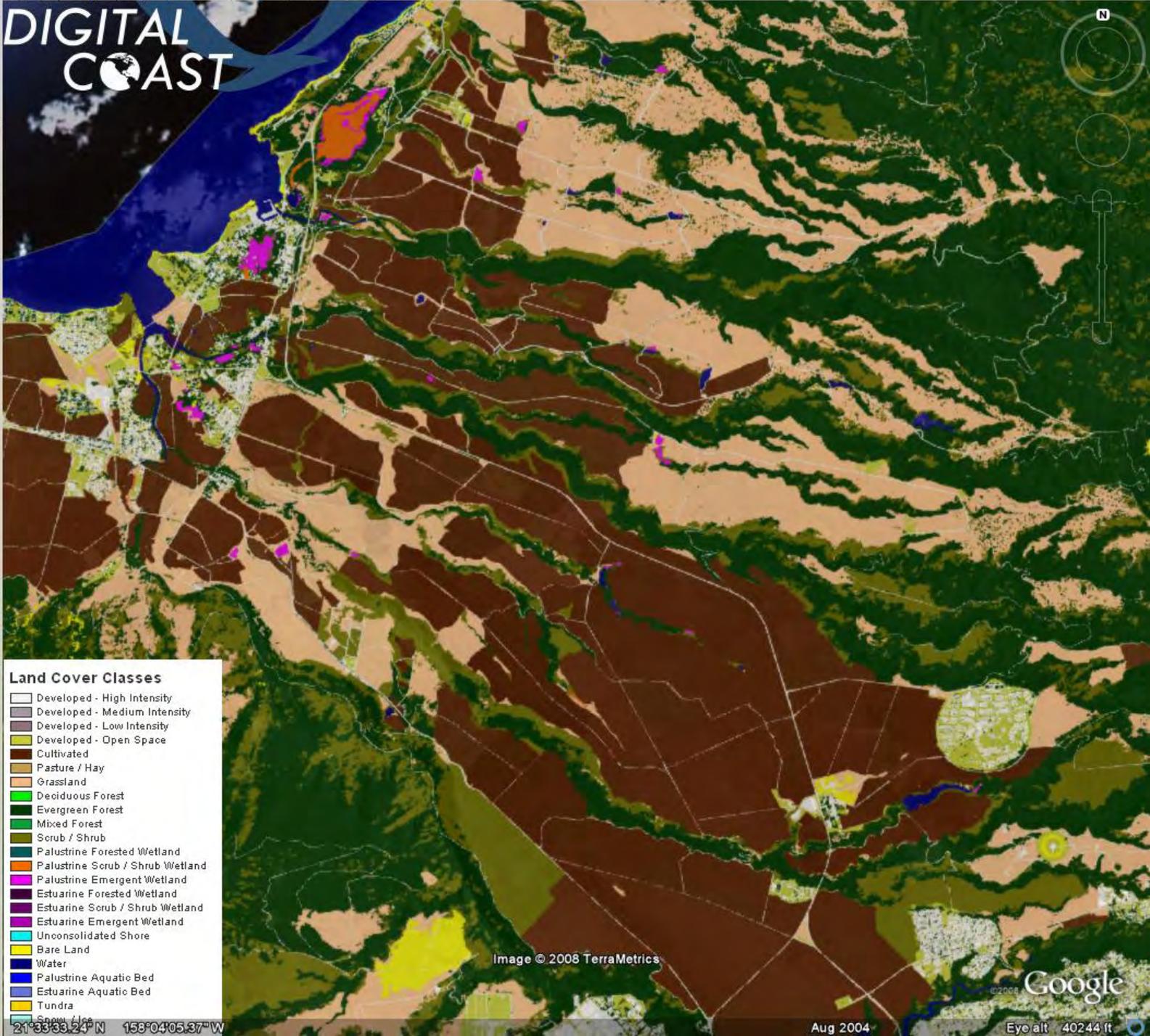
- Oahu

Places

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Image © 2008 TerraMetrics

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oahu, hi

Oahu

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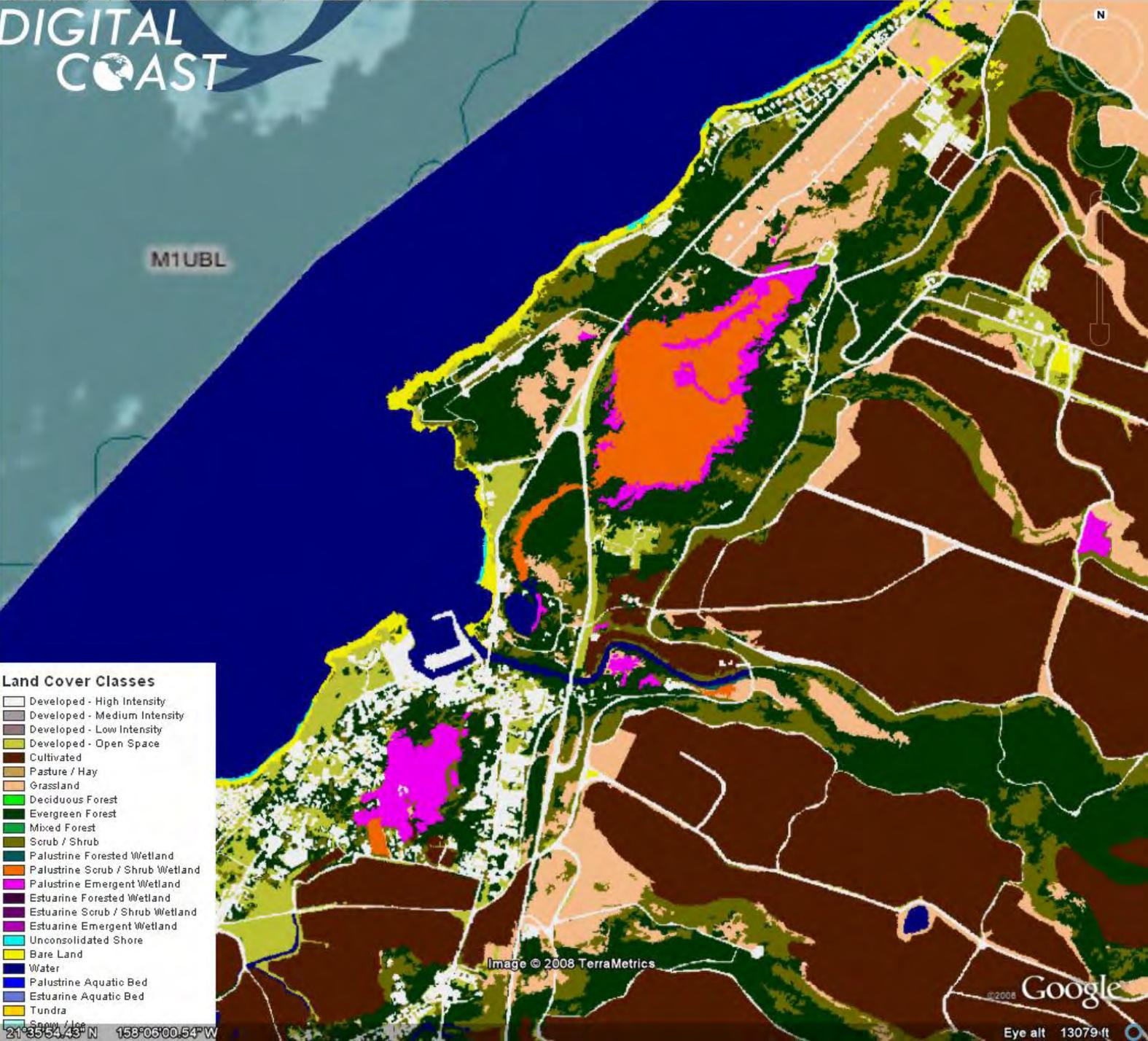
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21°35'54.43" N 158°05'00.54" W

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oahu, hi

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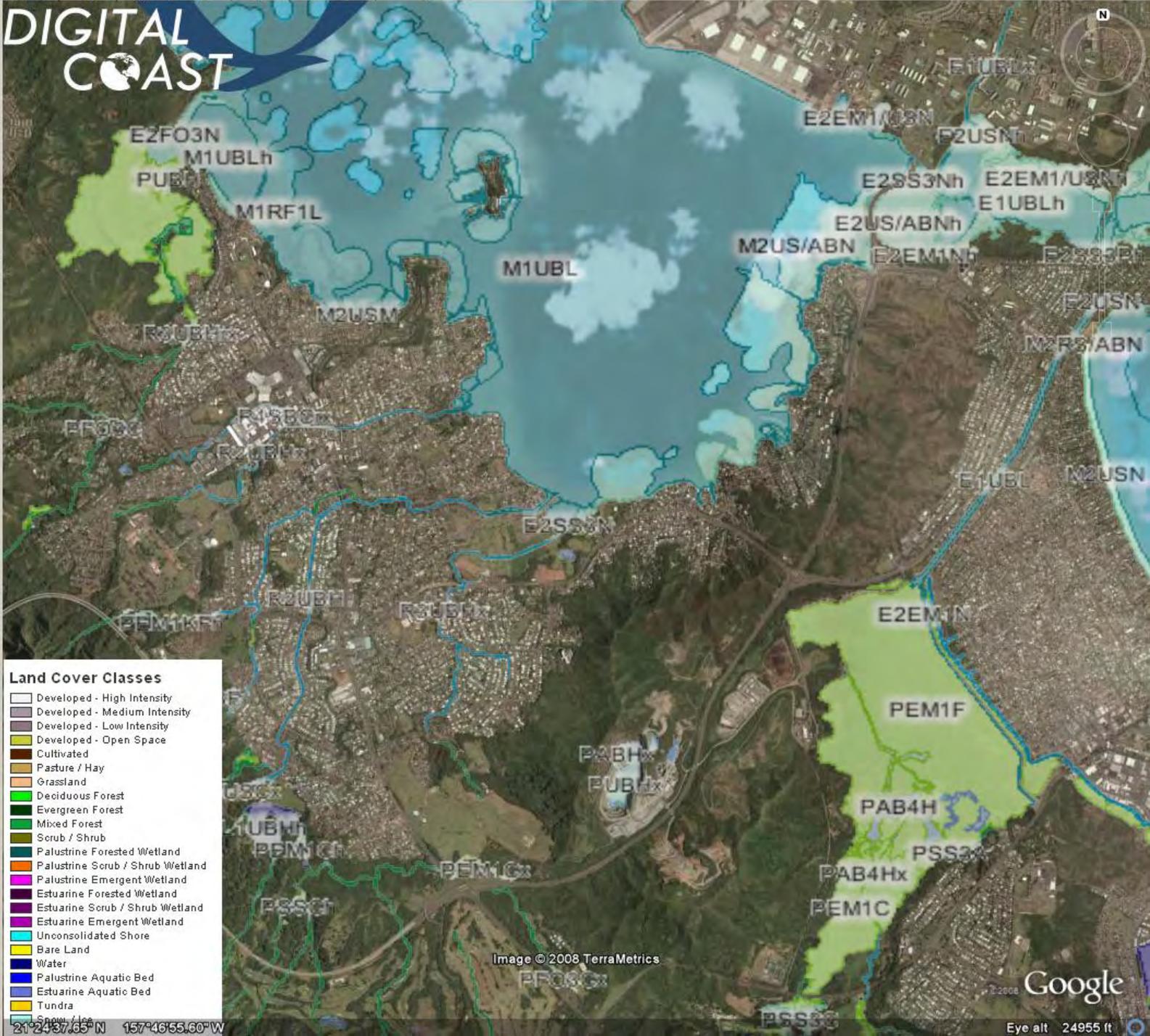


Image © 2008 TerraMetrics

Google

21°24'37.65" N 157°46'55.60" W

Eye alt 24955 ft

Fly To Find Businesses Directions

Fly to e.g., 94043

oahu, hi

Oahu

▶ ■ ✕

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▼ Layers Sets the transparency of an overlay

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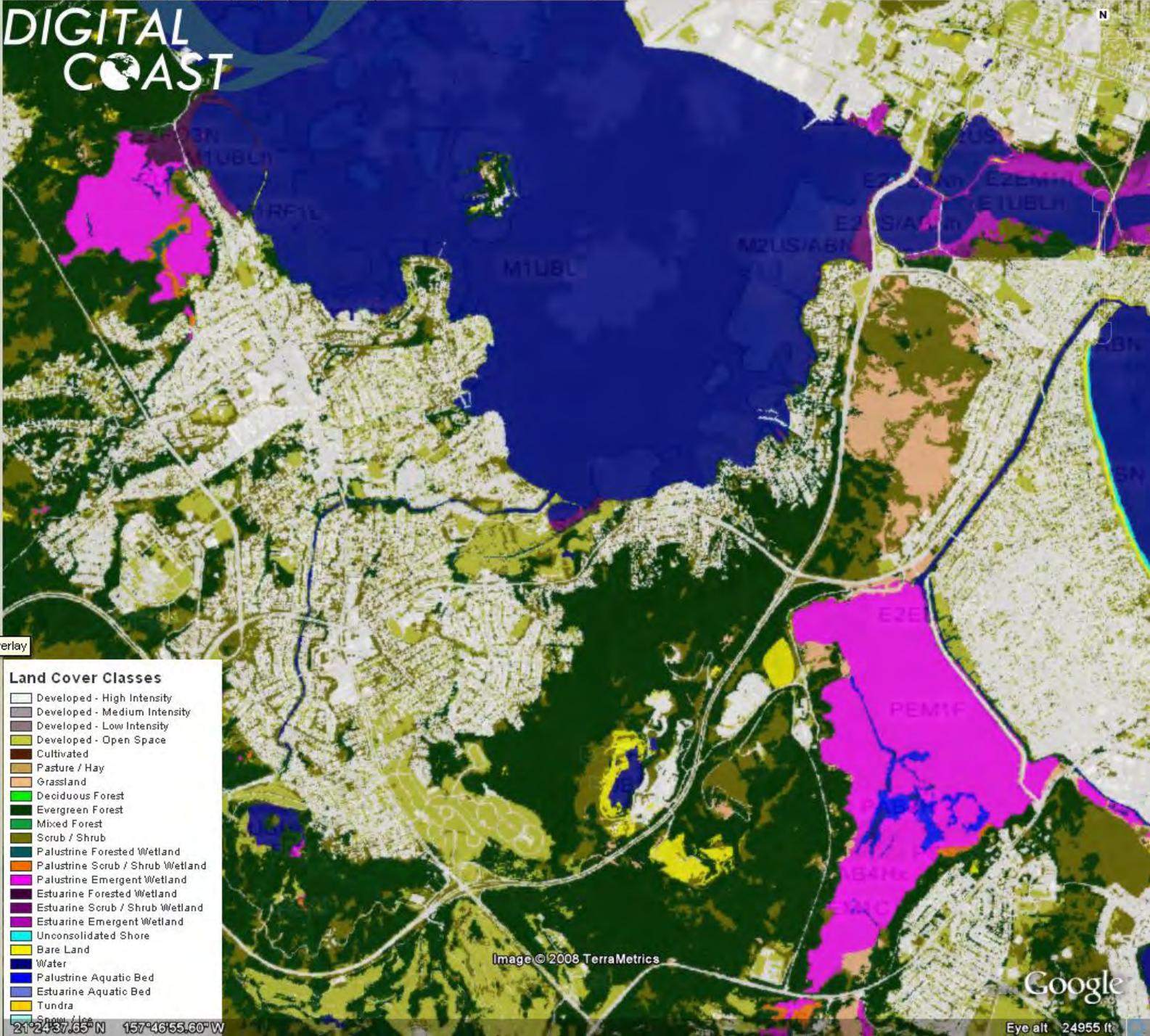
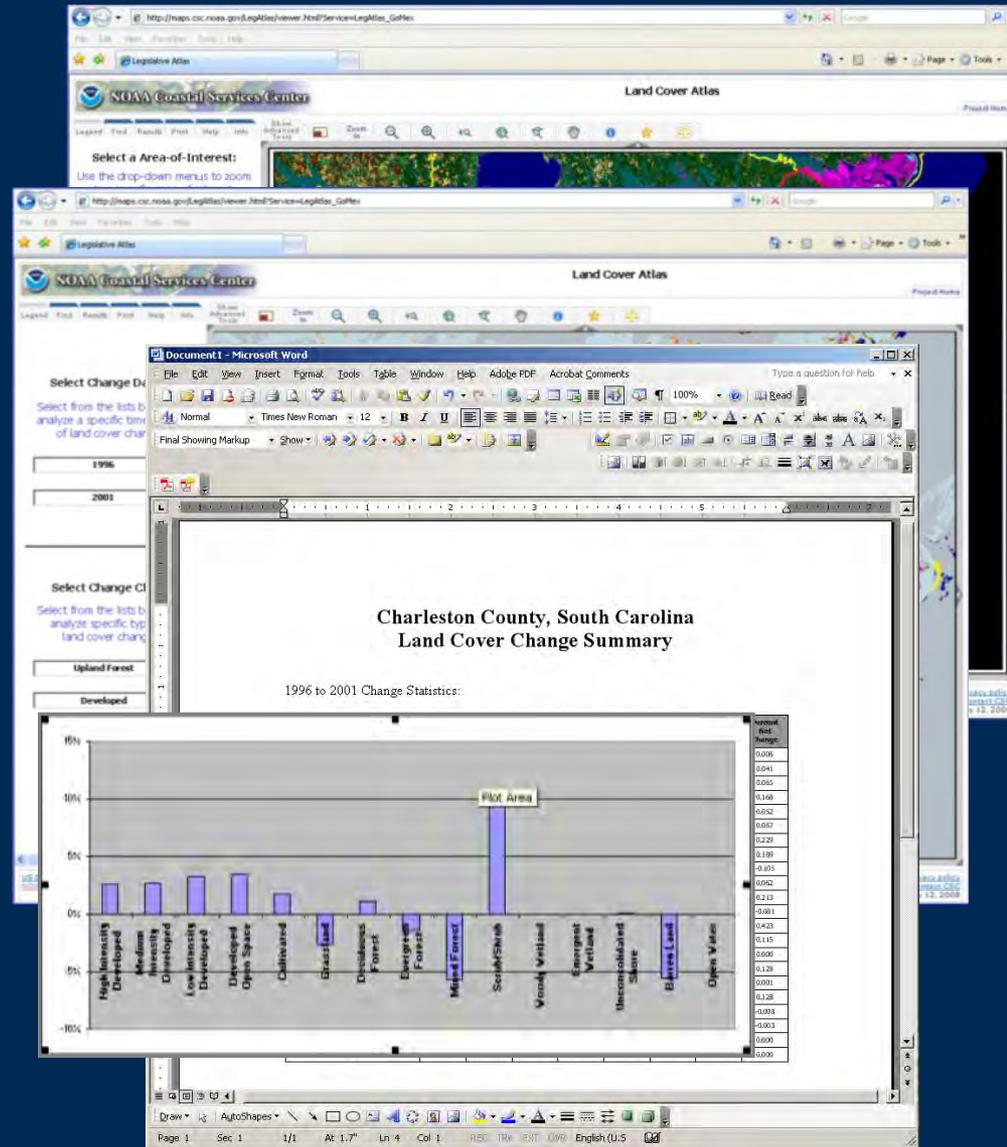


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Land Cover Atlas

Coming Soon!

- Concept similar to the Washington Coastal Atlas
- Tied closely to NOAA's Digital Coast Effort
- Way for technical and non-technical users to:
 - Visualize land cover distribution, condition
 - Query and analyze specific changes of interest
 - Generate reports, maps, and summary info



March 2 to 5, 2009
Myrtle Beach, South Carolina



COASTAL GEOTOOLS

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conference for coastal officials!*

www.csc.noaa.gov/geotools/

Questions?

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Nate.Herold@noaa.gov

www.csc.noaa.gov/landcover

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