

National Geodetic Survey Update

Baltimore, Maryland

April 14, 2009

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Director, National Geodetic Survey

HYDROGRAPHIC SERVICES REVIEW PANEL



noaa

Strategic Plan Update

- A look forward 3-5 Years based on NGS 10-Year Plan (2 pages versus 60 plus)
- Discussed/improved based on March 2009 NGS Leadership Summit
- Plan to directly link employee performance plans to strategic plan elements in 2010
- To be finalized by the end of April
- Current draft available at:

http://www.ngs.noaa.gov/INFO/StrategicPlan_20080810.pdf



**The National Geodetic Survey
Strategic Plan (Draft)**

NGS Mission
To define, maintain, and provide access to the National Spatial Reference System to meet our nation's economic, social, and environmental needs, and to be a world leader in geospatial activities, including the development and promotion of standards, specifications, and guidelines.

Strategic Goals and Objectives

Modernize the 3-D Geometric Reference System*
Promote the capability for users to easily obtain accurate values for latitude, longitude, ellipsoid height, and other related geometric coordinates.

- Determine and disseminate a consistent set of 3-D coordinates and velocities on Continuously Operating Reference Systems (CORS) in a global reference frame.
- Complete a plan for the definition of a new geometric reference system for the United States and its territories.
- Implement the foundation CORS system.
- Provide users with tools and education to obtain accurate geometric positional coordinates in all three dimensions.
- Provide low-latency access to Global Navigation Satellite Systems (GNSS) data from selected CORS via the Internet.
- Develop guidelines for both the administration and use of real-time GNSS networks.
- Create models to predict the 3-D crustal velocity at any location in the United States.
- Develop the capability to process all types of GNSS data.
- Generate predicted GPS orbits once every few hours.

Modernize the Geopotential ("Vertical") Datum
Provide easier access to accurate elevation data.

- Complete two-fifths of all GRAV-D (Gravity for the Redefinition of the American Vertical Datum) areas, including flights, data processing, and storage.
- Establish and publish the geoid theory necessary to achieve <1 cm absolute accuracy, with "perfect data" for all non-mountainous regions of the United States, allowing for rock density unknowns in the mountains, and with unknowns not exceeding 1 cm at the coast.
- Provide a fully functional new gravity interpolation Web-based tool to allow users to receive gravity acceleration, geopotential value, geoid undulation, or deflection of the vertical at any point in the United States or above the surface (using upward continuation).

*The geometric reference system is a new terminology being adopted by NGS and replaces the former term "horizontal datum".

June 1, 2008

Achieving the Vision / HSRP Most Wanted Linkages

HSRP Most Wanted

- Aggressively Map the Nation's Shorelines and Navigationally Significant Waters;

10-Year/Strategic Plan areas of emphasis which are driving all future NGS activities:

- Modernize the Geometric (Horizontal) Datum
- Modernize the Geopotential (Vertical) Datum
- Migrate the Coastal Mapping Program toward IOCM
- Evolve Core Capabilities
- Increase Agency Visibility

Achieving the Vision / HSRP Most Wanted Linkages

HSRP Most Wanted

10-Year/Strategic Plan areas of emphasis which are driving all future NGS activities:

- Integrate Coastal Mapping Efforts and Ensure Federally Maintained Channels, Approaches, and Anchorages Are Surveyed to the Highest Standard;
 - Modernize the Geometric (Horizontal) Datum
 - Modernize the Geopotential (Vertical) Datum
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Achieving the Vision / HSRP Most Wanted Linkages

HSRP Most Wanted

10-Year/Strategic Plan areas of emphasis which are driving all future NGS activities:

- Modernize Heights and Implement Real-time Water Level and Current Observing Systems in All Major Commercial Ports;

- Modernize the Geometric (Horizontal) Datum
- Modernize the Geopotential (Vertical) Datum
- Migrate the Coastal Mapping Program toward IOCM
- Evolve Core Capabilities
- Increase Agency Visibility



Achieving the Vision / HSRP Most Wanted Linkages

HSRP Most Wanted

10-Year/Strategic Plan areas of emphasis which are driving all future NGS activities:

- Strengthen NOAA's Navigation Services Emergency Response and Recovery Capabilities; and

- Modernize the Geometric (Horizontal) Datum
- Modernize the Geopotential (Vertical) Datum
- Migrate the Coastal Mapping Program toward IOCM
- Evolve Core Capabilities
- Increase Agency Visibility

Achieving the Vision / HSRP Most Wanted Linkages

HSRP Most Wanted

10-Year/Strategic Plan areas of emphasis which are driving all future NGS activities:

- Disseminate NOAA's Hydrographic Services Data and Products to Achieve Greatest Public Benefit.

- Modernize the Geometric (Horizontal) Datum
- Modernize the Geopotential (Vertical) Datum
- Migrate the Coastal Mapping Program toward IOCM
- Evolve Core Capabilities
- Increase Agency Visibility



Achieving the Vision / HSRP Most Wanted Linkages

HSRP Most Wanted

- Aggressively Map the Nation's Shorelines and Navigationally Significant Waters;
- Integrate Coastal Mapping Efforts and Ensure Federally Maintained Channels, Approaches, and Anchorages Are Surveyed to the Highest Standard;
- Modernize Heights and Implement Real-time Water Level and Current Observing Systems in All Major Commercial Ports;
- Strengthen NOAA's Navigation Services Emergency Response and Recovery Capabilities; and
- Disseminate NOAA's Hydrographic Services Data and Products to Achieve Greatest Public Benefit.

10-Year/Strategic Plan areas of emphasis which are driving all future NGS activities:



Modernize the Geometric (Horizontal) Datum

Modernize the Geopotential (Vertical) Datum

Migrate the Coastal Mapping Program toward IOCM

Evolve Core Capabilities

Increase Agency Visibility

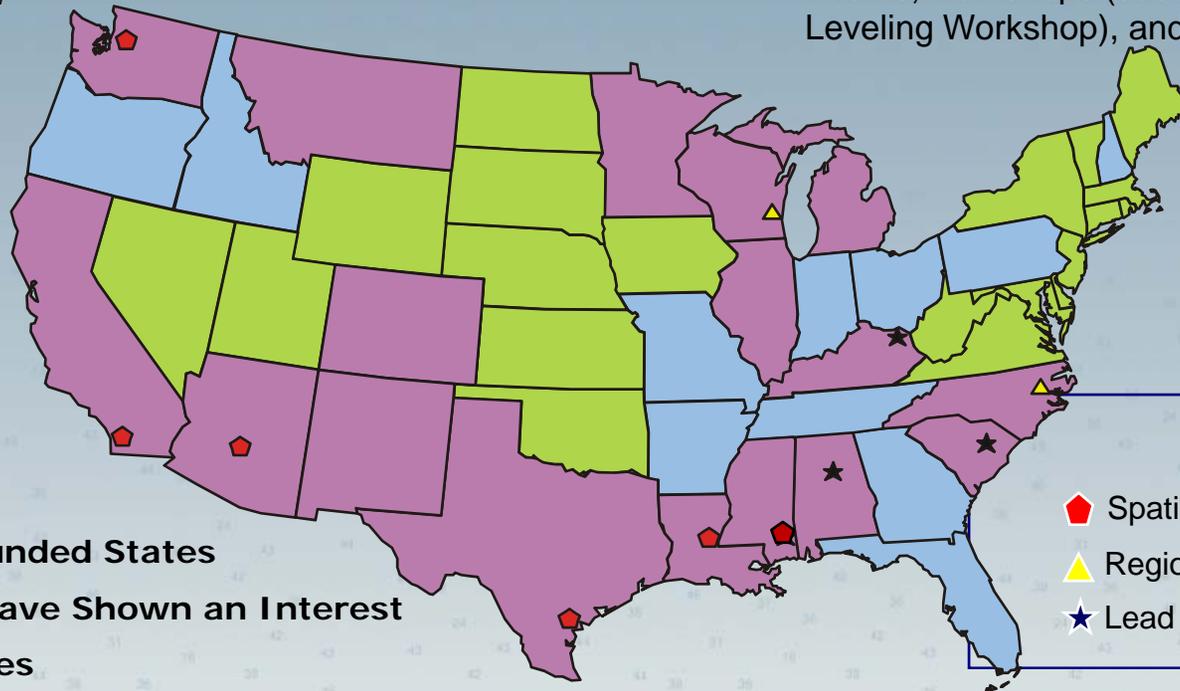
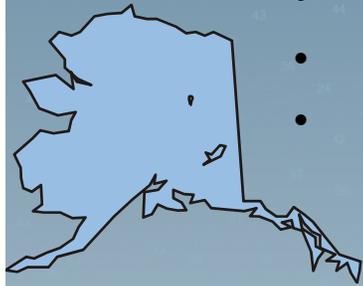
Height Mod Update

Involved stakeholders:

- Universities
- Spatial Reference Centers
- State Agencies (DOTs and DNRs)

Recent accomplishments:

- National Annual Height Mod Forum
- Enhanced NGS' Corbin Training Center's courses on leveling.
- Awarded 11 competitive grants to states.
- Outreached through 12+ Height Mod user forums, workshops (such as the Phoenix Leveling Workshop), and meetings.



- Previously Funded States
- States that Have Shown an Interest
- Inactive States

Legend

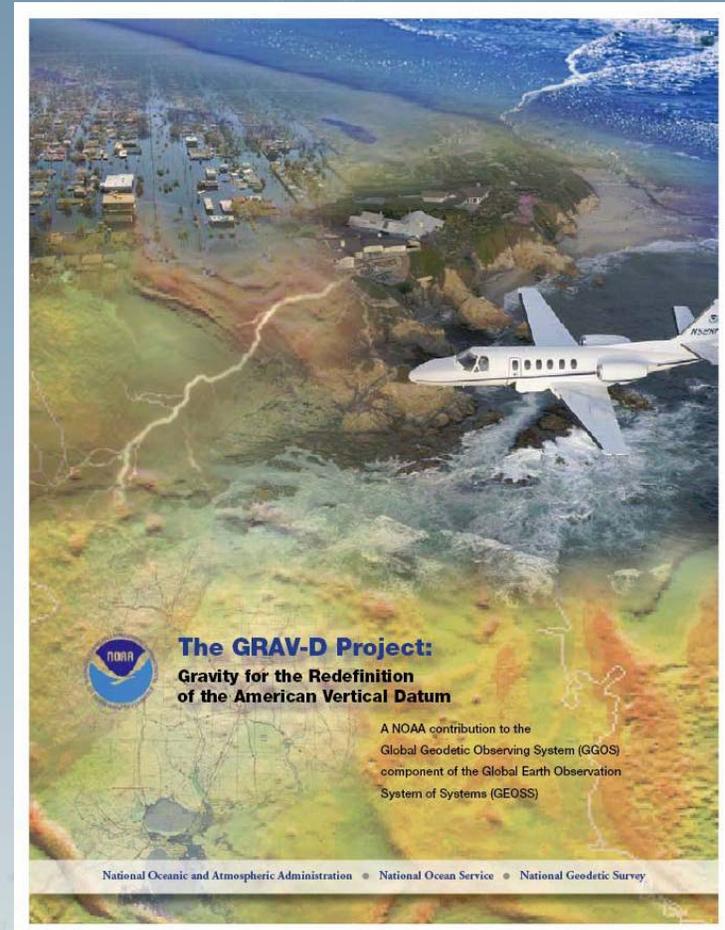
- ◆ Spatial Reference Centers
- ▲ Regional Leaders
- ★ Lead Agencies



The Future of Height Mod: GRAV-D

Gravity for the Redefinition of the American Vertical Datum

- **GRAV-D**
 - Airborne gravity survey (10 years)
 - Gravity monitoring into the future
 - Coastal areas surveyed first
 - All USA states and territories
 - www.ngs.noaa.gov/GRAV-D
- **2017 Targets:**
 - Orthometric heights (“elevations” on maps) good to 2 cm anywhere, anytime from GNSS technology
 - Height changes easily monitored using new vertical datum



GRAV-D Update

FY 2008

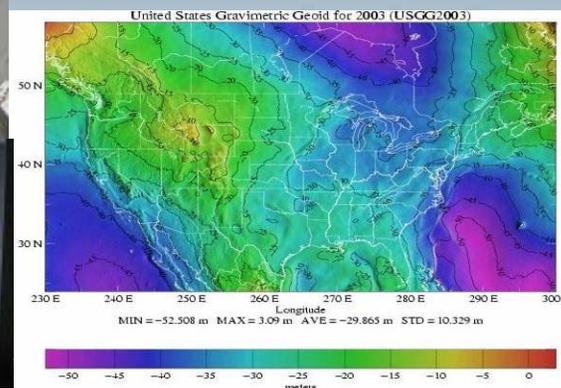
- NGS Acquires Airborne Gravimeter.
- NGS Releases Final Version of the GRAV-D plan and Trains Airborne Gravimeter Operators.
- NGS conducts successful test flights of gravimeter along Gulf Coast.
- NGS conducts successful Alaska gravity flights at Hydropalooza in Alaska.

FY 2009

- Oct. '08:
 - NGS begins operational gravity collection along Gulf Coast.
- Feb. '09:
 - NGS collects gravity data in Puerto Rico/Virgin Islands.
- May. '09:
 - NGS plans to finish gravity collection from AL/GA state line to the Mexican border.



**Aerial Gravity
Collection
for a new national
vertical datum**



Collaboration with Potential GRAV-D Partners

Sent letters to potential federal partners

- **U.S. Army Corps of Engineers**
 - Director of Civil Works
 - Chief, Engineering and Construction
- **National Geospatial-Intelligence Agency**
 - Director, Source Operations and Management Directorate
 - Director and Dep. Dir., Source Operations and Management Directorate
- **U.S. Geological Survey**
 - Associate Director for Water
 - Associate Director for Geology
 - Senior Advisor for Science Applications
 - Chief Scientist, Geology
 - Coordinator, Coastal and Marine Geology Program
- **NASA**
 - Director for Earth Science
 - Associate Director for Research
 - Lead, Earth Surface and Interior Focus Area
- **FEMA**
 - Assistant Administrator, Mitigation Directorate
 - Director, Risk Analysis Division
- **Office of Naval Research**
 - Chief of Naval Research
 - Commanding Officer, Naval Research Laboratory
- **FAA**
 - FAA Chief Operating Officer
 - Associate Director for Geology
 - VP of System Operations



Airborne Gravimeter

IOCM – New Products and Tools Required by Ocean and Coastal Geospatial Data Users

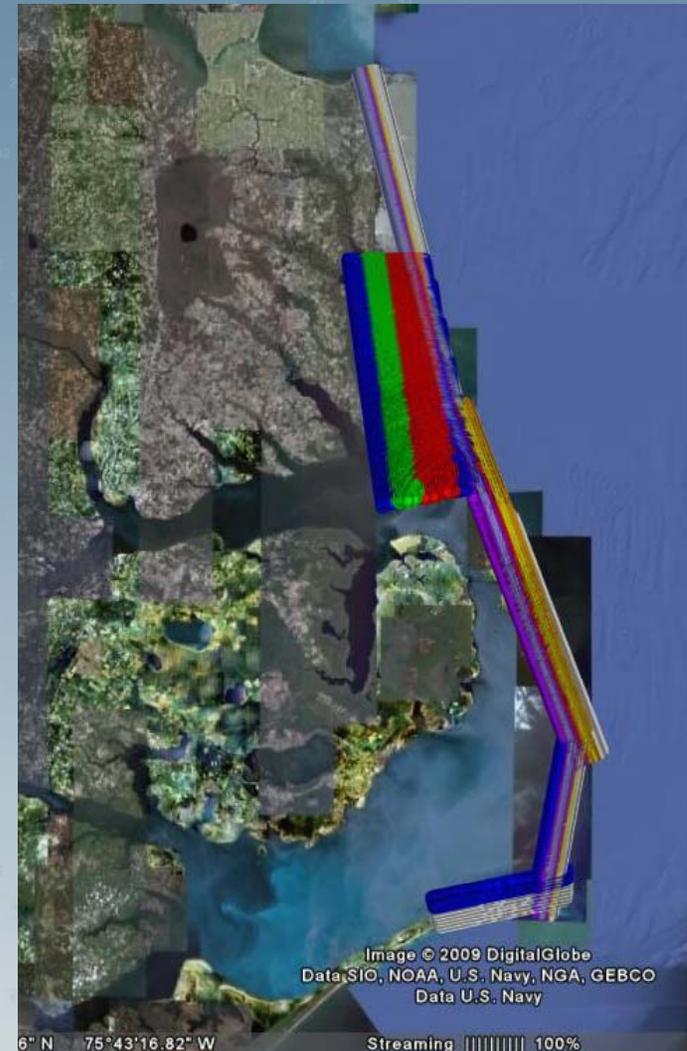
- International Working Group on Ocean and Coastal Mapping (IWG-OCM)
- Coordination of ocean and coastal mapping data and activities
- Partnerships for resource synergies
- Integrated products and services



Goal: Increase efficiency and improve coordination of many Federal mapping agencies.

IOCM – Data Applications

- Beach Processes (erosion, accretion, renourishment)
- Analyzing storm impacts
- Emergency response & impact assessment
- Habitat restoration
- Shoreline change analysis
- Storm surge planning
- Marine Boundary determination
- Permitting
- Tsunami Modeling
- Climate Changes
- Sea-level rise models
- Many more...



North Carolina IOCM Project

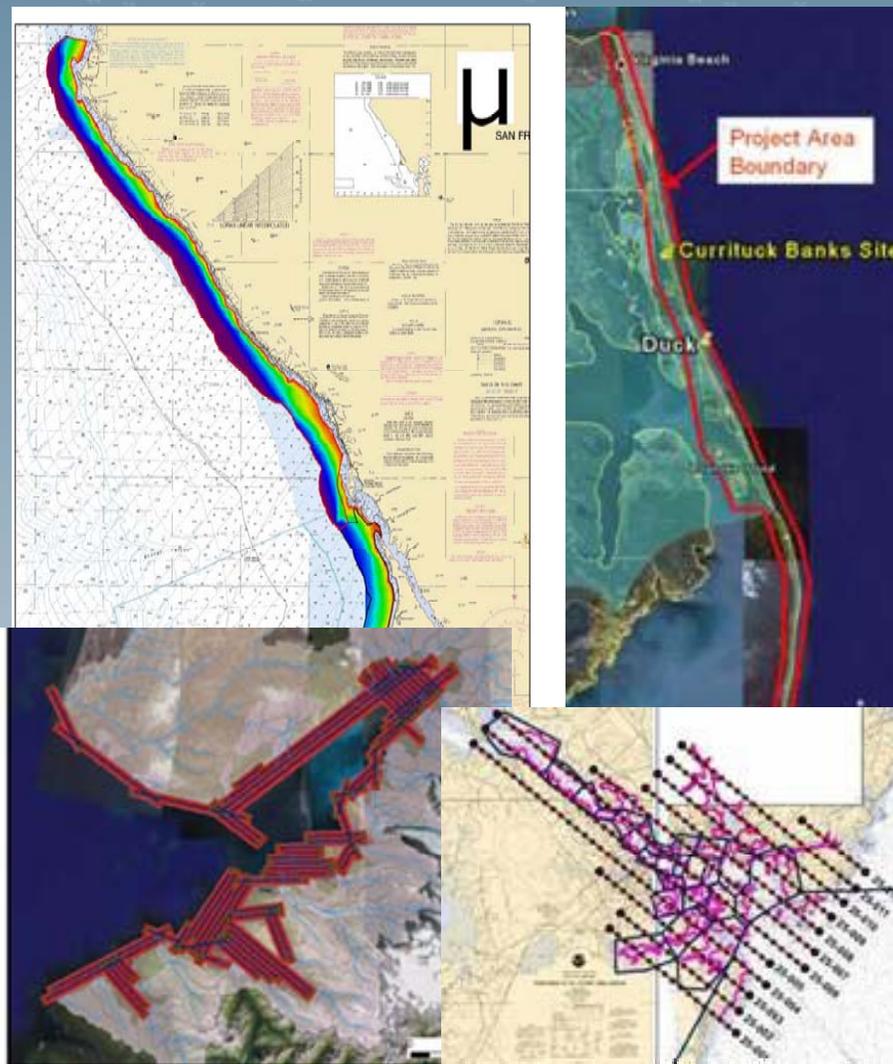
IOCM – External Partners

- NCDOT
- NCNERR
- NCGS
- NCEM
- USACE
- FEMA
- City of Homer, AK
- Alaska Sea Grant
- Center for Alaskan Coastal Studies
- CA Coastal Conservancy
- Pratt Museum
- University of Alaska Fairbanks – Kasitsna Bay Lab
- University of New Hampshire
- Alaska Dept. of Fish & Game
- California Geological Survey

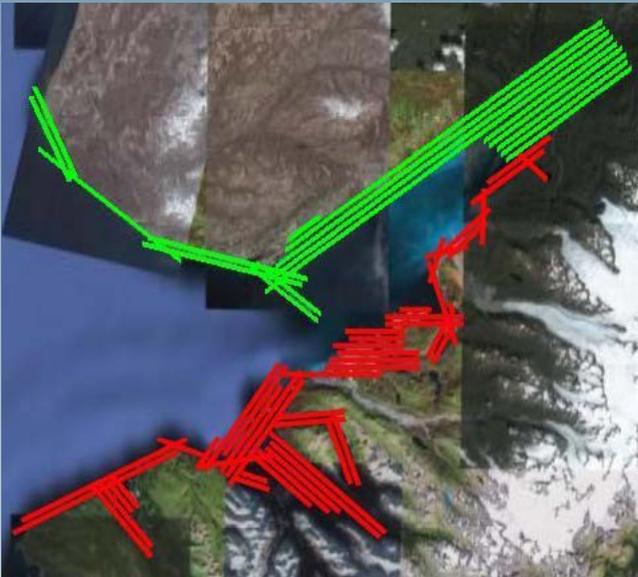


FY08 IOCM Projects

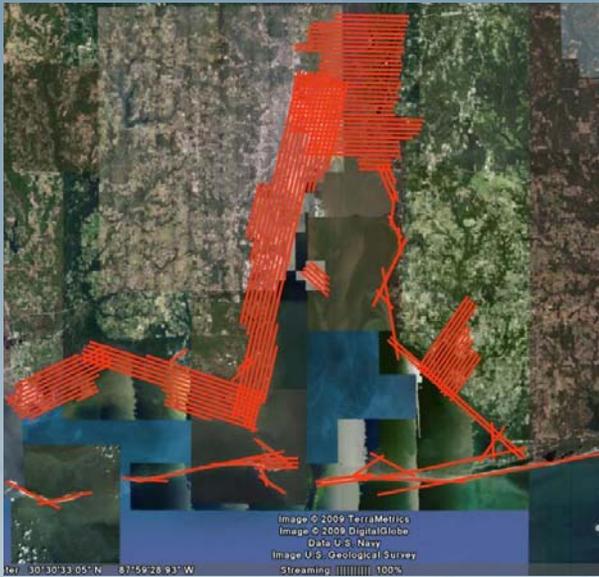
1. California Seafloor Mapping Project (FY08-09)
2. North Carolina Integrated Ocean & Coastal Mapping Project (FY08)
3. Kachemak Bay, AK Integrated Ocean & Coastal Mapping Project (FY08-09)
4. New Hampshire Integrated Ocean & Coastal Mapping Project (FY08)



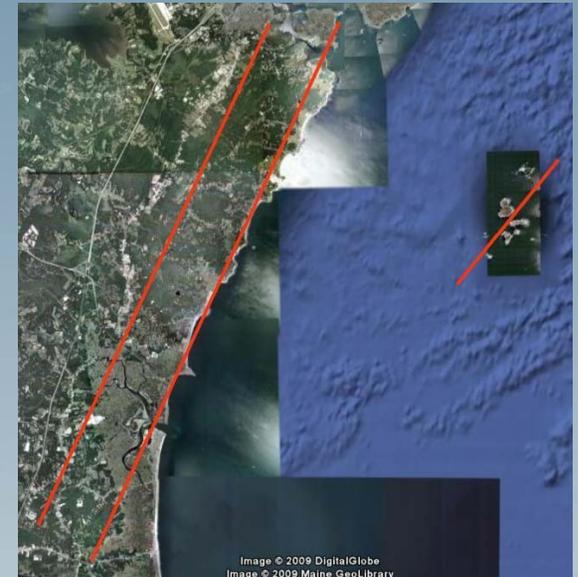
FY09 Planned IOCM Projects



Kachemak Bay, AK



Mobile Bay, AL



Great Bay Area, NH

Shoreline Mapping Production Update

Shoreline FY08 Production

Updated Shoreline in Priority Ports = 33

Analyzed Priority Ports for Change = 24

US Shoreline Miles = 5014 statute miles

Shoreline FY09 Production

Update Shoreline in Priority Ports = 16

Analyze Priority Ports for Change = 26

US Shoreline Miles = 5480 statute miles

RSD / NGS

10/2/2008

FY08 CMP Year-end Shoreline Mileage Summary

DONE (QA / Released)			
MP0703 Farallon de Medinilla NTM	5	WA0702 Bremerton/Manchester CSCAP	25
FL0705 Key West CSCAP-NC	118	GU0701 Apra Harbor, Guam CSCAP	41
WA0703 Bangor CSCAP-NC	19	CA0606 Richmond CSCAP	51
HI0702 Kawaihae CSCAP-NC	5	HI0601B Pearl Harbor CSCAP	58
WA0601D Vancouver CSCAP	30	HI0601C Honolulu CSCAP	22
MP0704 Tinian & Agujan Islands NTM	43	MS0601 Port of Gulfport	15
MA0601 New Bedford	41	UM0505 Kingman Reef NTM	2
OH0602 Lorain CSCAP	17	AK0807A E Kachemak NTM	233
HI0602 Nawiliwili Harbor CSCAP	10	MD0703A Cambridge	7
LA0401C Point Au Fer I.	244	TX0602 Matagorda Shp Ch CSCAP	32
MI0705 Port Inland CSCAP-NC	8	CA0702B Suisun Slough	37
LA0604 Port Fourchon	194	LA0603 Chandeleur Islands	144
ME0401A W Shr Penobscot Bay/Contract	343	CA0604 Stockton CSCAP	66
AK0605A Alaska Peninsula/Contract	185	TX0604 Victoria CSCAP	208
WA0701 Tacoma CSCAP	76	AK0605B S Deer I. / Sandman Rf/Contract	69
MI0706 Penwater Harbor	12	CT0401B Conn. Coast (part B)/Contract	242
MI0702 Eagle Harbor	11	NY0501A Lake Erie, Conneaut/Sturgeon Pt	179
AK0802 Icy Bay	33	AK0605C E Pavlov Islands/Contract	66
MI0701 Black River Harbor	23	ME0401D W Shr Penobscot Bay/Contract	397
MI0710 Stoneport Harbor CSCAP	6	ME0401B W Shr Penobscot Bay/Contract	248
TX0601C Texas City CSCAP	40	CA0610 Redwood City CSCAP	58
MI0713 Sebewaing Harbor	17	TX0601B Freeport CSCAP	107
MI0712 Port Austin	7	CA0702A Sacramento Dp Wat Riv Chan	175
MD0703B Herrington Harbor N	11	CA0611 Port of Humboldt/Eureka CSCAP	102
		NY0501B Lake Erie & Niagara R.	230
		CT0401A Conn. Coast (part A)/Contract	262
		OR0501 Coos Bay	150
		ME0401C W Shr Penobscot Bay/Contract	287

NEARLY DONE (1 month)

MS0604*	22
Port of Biloxi CSCAP	
MS0602 Port of Pascagoula	80
AK0808 Taylor Bay NTM	31
CA0609 (OB) Camp Pendleton CSCAP	6
MI0707 (WE) Port Dolomite	44
MI0703 (IT) Marquette/Presque I.	15
AK0603B (IT-GIS) SE Shore of Kodiak I./Contract	689

OTHER PROJECTED

AK0708 Dutch Harbor CSCAP	26
AK0707 Petersburg CSCAP	23
AK0709 Ketchikan CSCAP	14
LA0501A (IT) W Vermilion Bay/Contract	470
LA0501B (WE) Marsh Island/Contract	318
LA0501C (CL) N Vermilion Bay/Contract	347
WA0301 Columbia R. /Contract	1191
MP0702 Salpan Harbor CSCAP	10

Done (1:80k miles) ...	5014	Nearly done ...	865	Other projected ...	2399
Pct of FY08 goal ...	100.2%		17.3%		47.9%
Pct of US shoreline ...	3.0%				

Products to MCD:

Miles released in FY08:	5014	} Expected for FY08:	5014
FY08 release imminent:	0		100.2%
FY08 release likely:	0		
FY08 release in doubt:	3264		
Total FY08 miles projected:	8278	(165.4%)	

FY08 Goal (100%)
3.0% of total US shoreline miles, or
5004.0 miles @ 1:80,000 scale

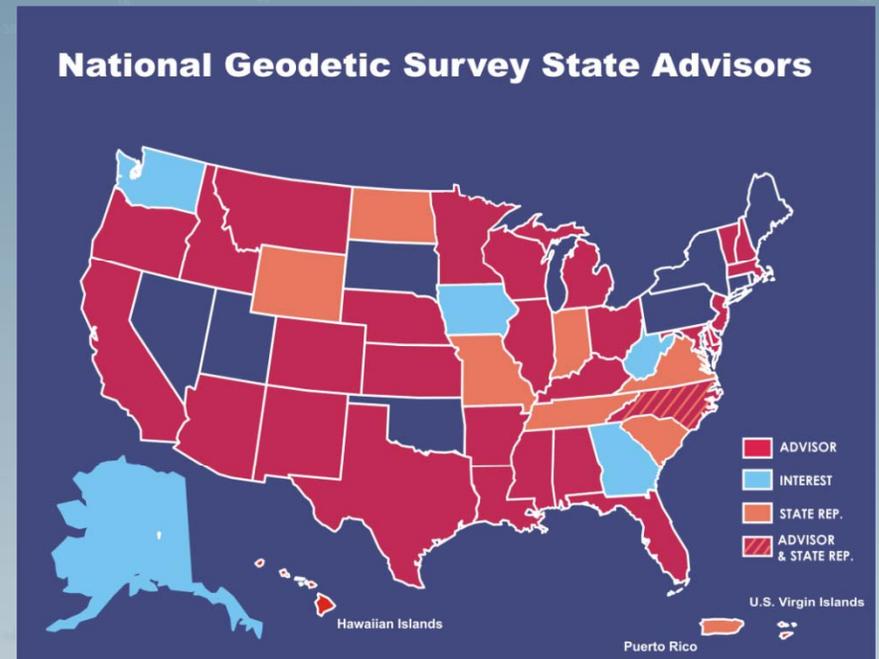
-10 miles needed to reach FY08 goal

NC = no compilation



State Advisor Update: Reaching Out to Local Partners/Stakeholders

- **Conducting State Advisor Study in FY09** to determine what approach is best for the State Advisor program to meet capacity building goals in the NGS Ten Year Plan
- **Reassignment in FY08:**
 - Alabama (Jim Harrington)
- **Recent Vacancies of Advisors**
 - South Carolina (Jim Harrington)
 - Mississippi (Kurt Shinkle)
 - Washington State (Gary Perasso)
- ** these positions are being temporarily covered by Ronnie Taylor (ronnie.taylor@noaa.gov), State Advisor Branch Chief
- **Recent Job Announcements/Reposting of Advisor Positions:**
 - Mississippi
 - Florida
 - Oregon
 - Texas (additional advisor)
- **Other Prospects/Replacements:**
 - Georgia
 - West Virginia
 - Alaska



For a current list, visit:

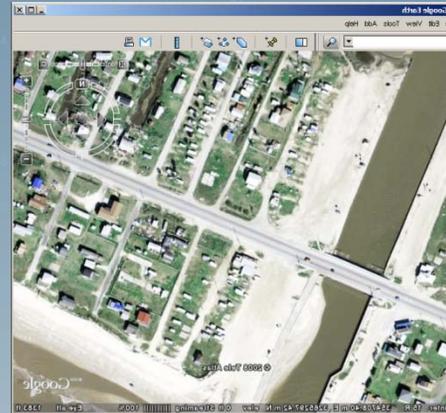
<http://www.ngs.noaa.gov/ADVISORS/>

Other Recent Accomplishments/Updates

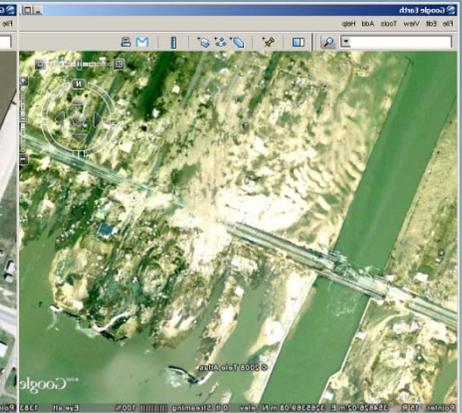
Damage Assessment Flights to collect imagery of damage from Hurricanes Gustav and Ike.

- NOAA collected over 5,500 color aerial images of the hardest hit areas in Texas and Louisiana after Hurricane Ike made landfall. Using two aircraft, approximately 1,620 square miles of the affected area was imaged from September 14 – 17.
- In the last 12 months, there were over 32 million views/downloads of NOAA hurricane damage assessment imagery from the 2008 Hurricane Season (including Hanna, Ike and Gustav)

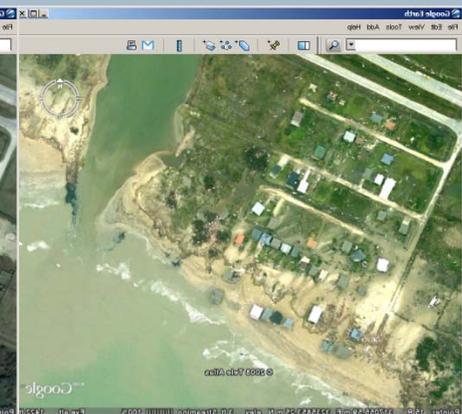
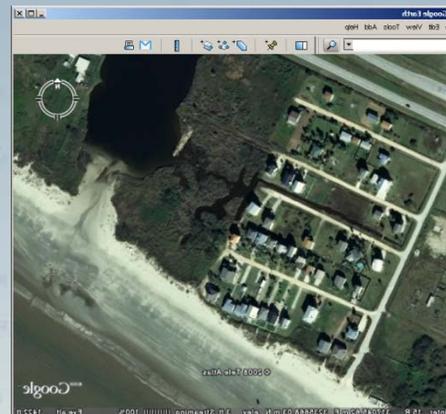
Before
2008 Google Earth®



After
NOAA Imagery 14Sep08



Gilchrist, TX



Galveston Island, TX

Other Recent Accomplishments/Updates

2009 Socio-economic Scoping Study

- Shows \$\$ billions in estimated benefits from NOAA Positioning Products and Services:
 - National Spatial Reference System (NSRS): \$2.4 billion per year
 - CORS: \$758 million per year.
 - GRAV-D (Once completed): \$4.8 billion over 15 years, including \$2.2 billion in avoidance costs from improved floodplain management.
- **Soon to be Released Publically:**
Planning May 2009 Press Release and Congressional Rollout of Study/Results

Socio-Economic Benefits Study:

Scoping the Value of CORS and GRAV-D

Irving Leveson



FINAL REPORT

revised January 2009

Prepared for the National Geodetic Survey

Other Recent Accomplishments/Updates

NGS Celebrates 15th Anniversary of the CORS Program

- From one in 1994 to 1400+ Continuously Operating GPS Reference Stations (CORS) today operated by 200+ partner organizations.
- Annual value of CORS benefits has increased by an average of 22% per year over the past 5 years.

NGS Expands Real-Time Positioning Role

- Dozens of FY08/09 presentations and workshops related to real time positioning.
- Presented NGS plans to support a growing real time network infrastructure at recent American Congress on Surveying and Mapping (ACSM) Conference and at the Trimble Dimensions Conference
- Developing guidelines for the users and administrators of real time networks (RTN)
- Operating a prototype real time data streaming server using several CORS.



Other Recent Accomplishments/Updates

NGS Celebrates 100 Million Digital Products Served

- Recent analysis of web statistics suggest NGS achieved a major new milestone in March 2009 by delivering 100 million digital geospatial products since NGS began tracking usage in 2003.
- These products include:
 - CORS GPS datasets,
 - electronic survey mark data sheets
 - GIS shape files
 - Online Positioning User Service (OPUS) solutions
 - **ONE MILLIONTH OPUS Solution “served” in December, 2008**
 - Shoreline Explorer downloads via NGS/NOS website
 - a variety of other NGS digital products.
- Not included in these statistics are the downloads of Hurricane damage assessment imagery.
 - In the last 12 months, there were over **32 million views/downloads** of this imagery from the 2008 Hurricane Season (including Hanna, Ike and Gustav)

