

# Progress on 2013-2023 National Geodetic Survey Strategic Plan

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April 18, 2017



# The National Geodetic Survey Ten-Year Plan

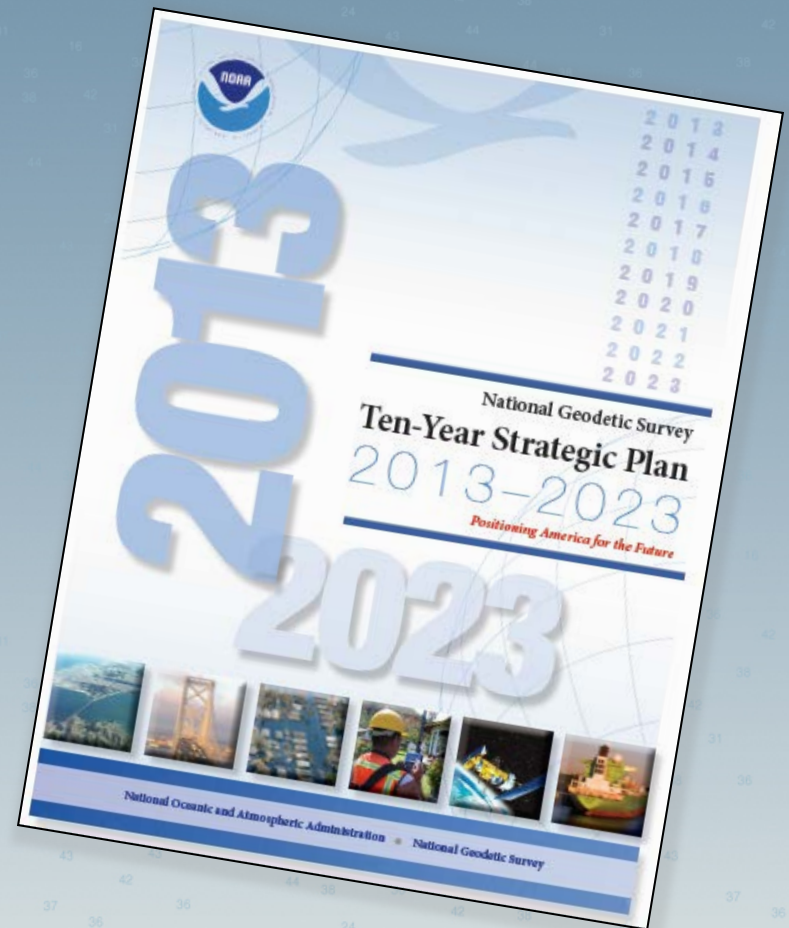
Support the users of the National Spatial Reference System.

Modernize and improve the National Spatial Reference System.

Expand the National Spatial Reference System stakeholder base through partnerships, education, and outreach.

Develop and enable a workforce with a supportive environment.

Improve organizational and administrative functionality.



[https://www.geodesy.noaa.gov/web/news/Ten\\_Year\\_Plan\\_2013-2023.pdf](https://www.geodesy.noaa.gov/web/news/Ten_Year_Plan_2013-2023.pdf)

# Support the Users of the NSRS



Products delivered to date in FY 2017:

- **1.6** million survey mark datasheets
- **19+** million CORS datasets
- **1.4** million online geoid computations

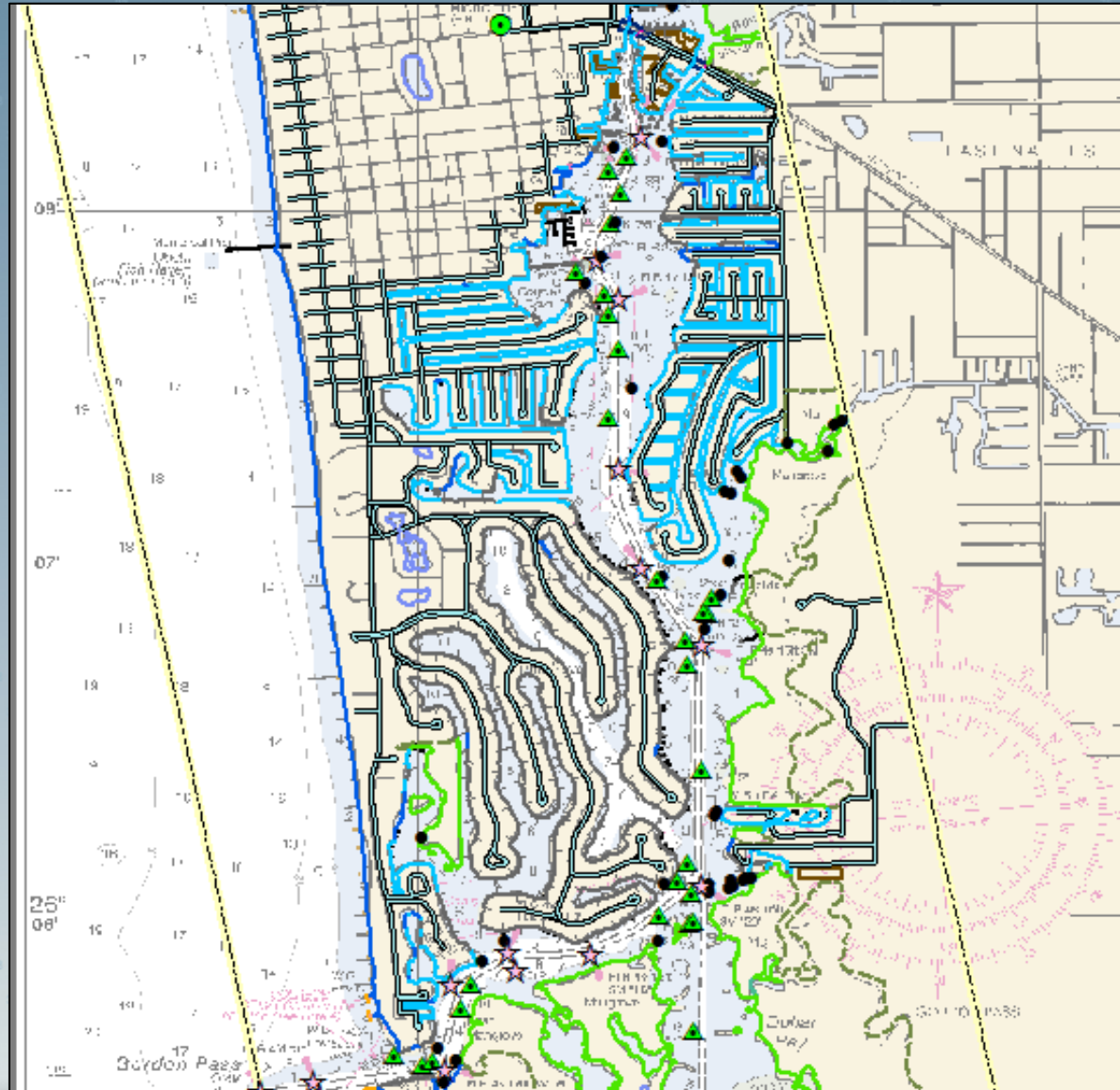
# Support the Users of the NSRS

In FY 2016:

- **9,107** miles\* of shoreline compiled (**5.5%** of US)
- **285+** nautical charts received updated shoreline
- **37** ports updated with new shoreline
- **35** ports analyzed for change (CSCAP)
- **400** sq nm of airborne lidar bathymetry data delivered
- **700** sq nm of airborne lidar bathymetry collected

\*miles measured at 1:80,000 scale

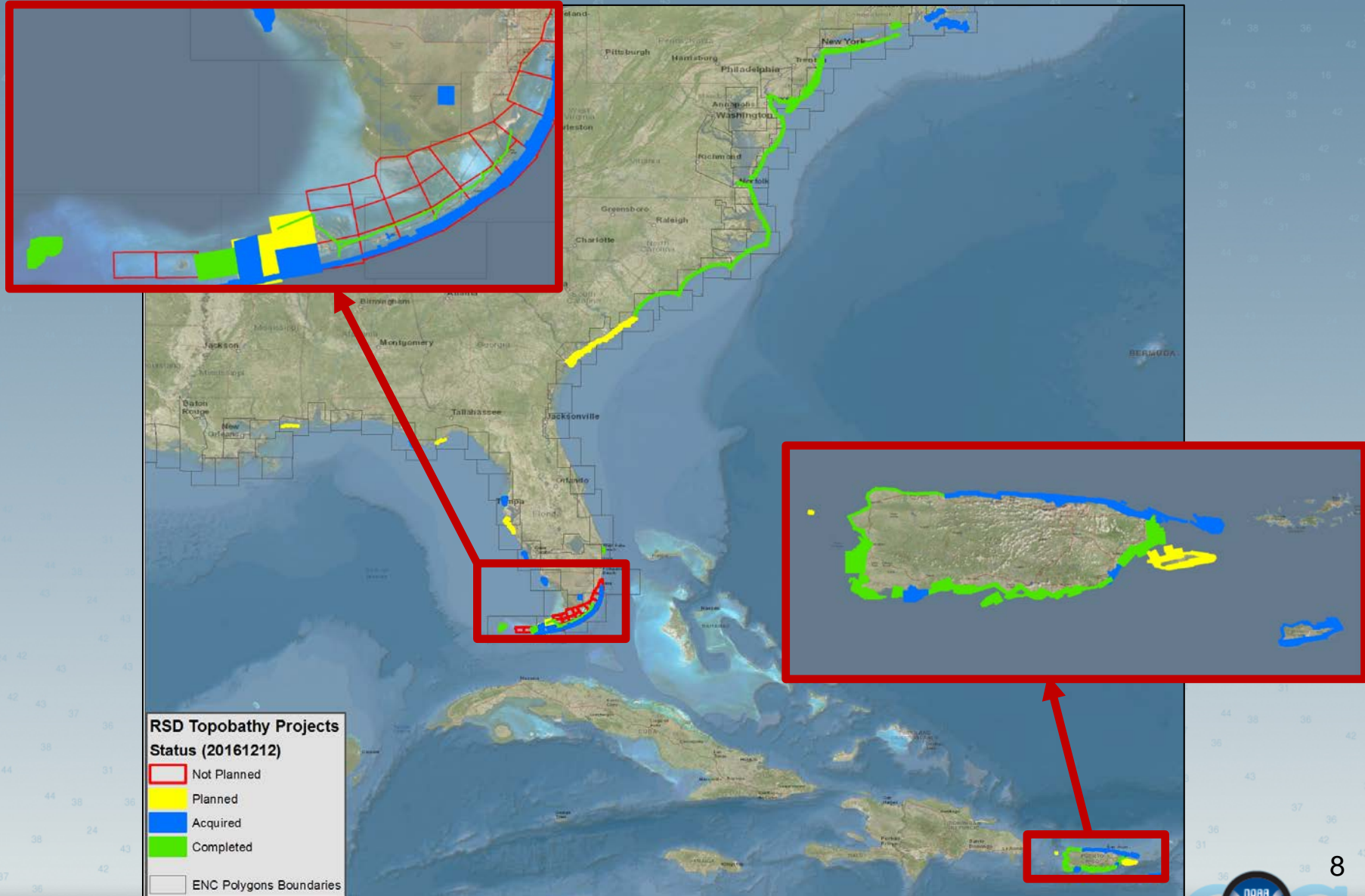
# Shoreline Compilation







# Topobathy Projects

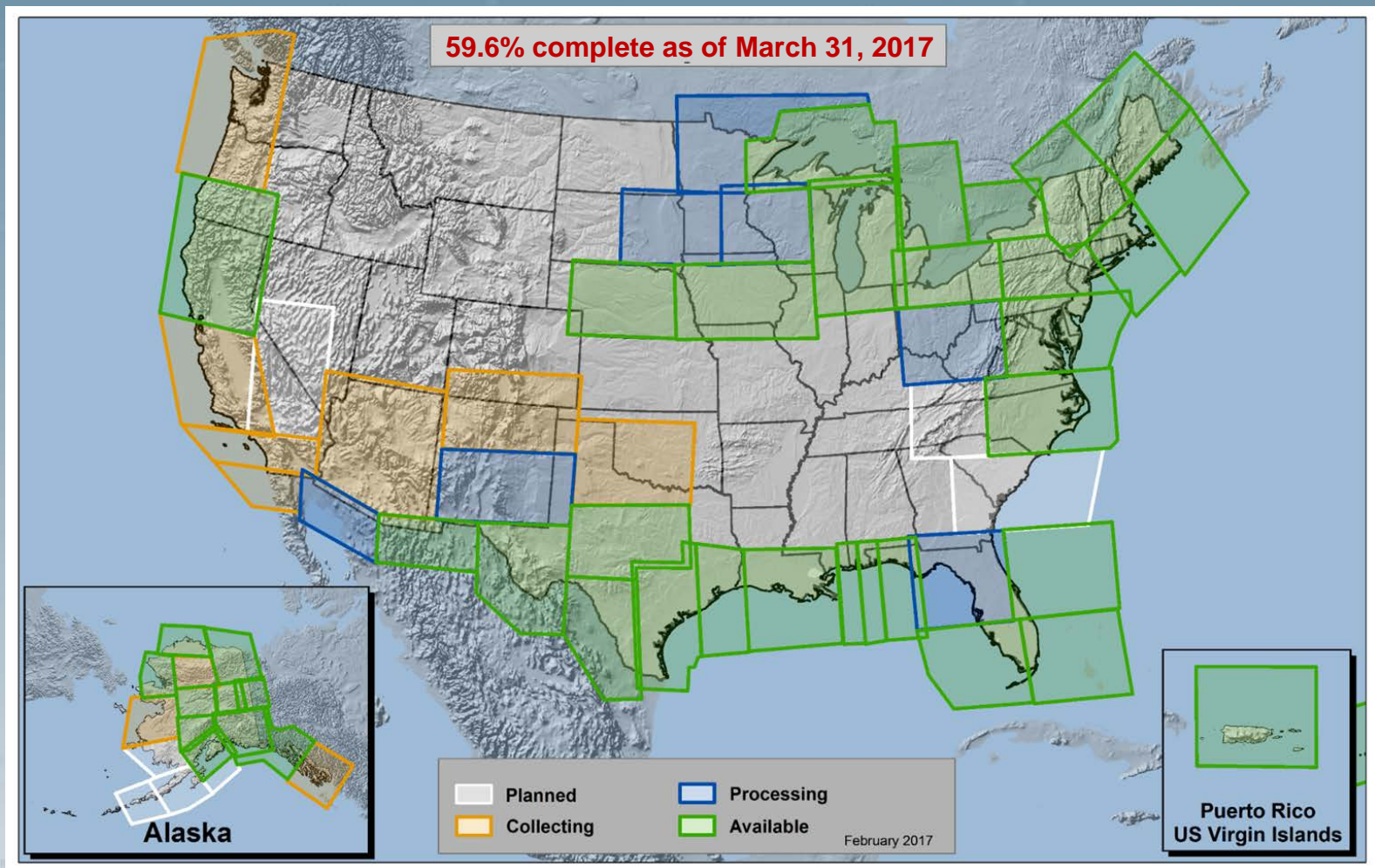




# Modernize and Improve the NSRS

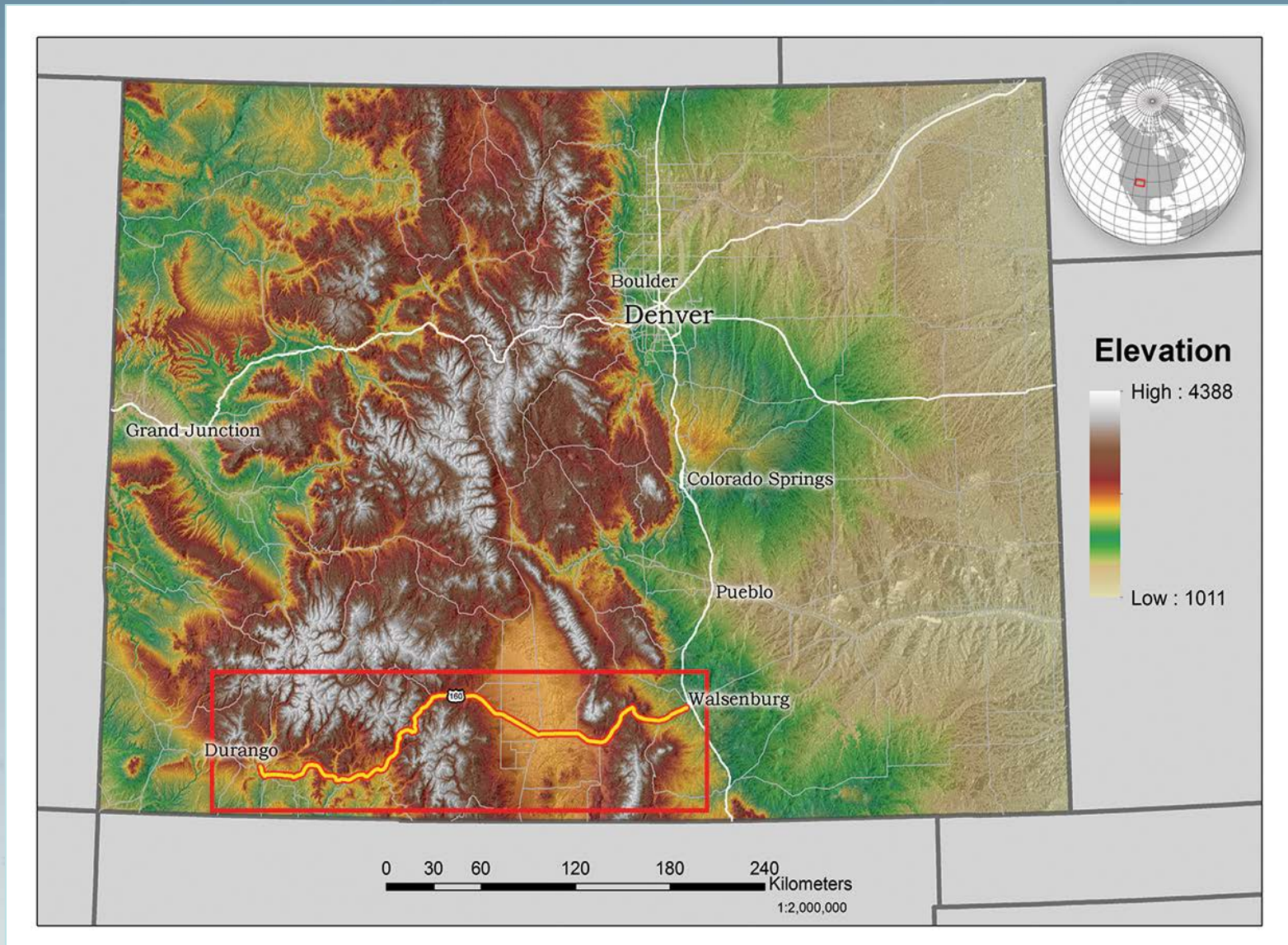
- Replace the geodetic datums
- Improve data submission
- Develop new toolkit
- Update surveying methodologies

# Gravity for the Redefinition of the American Vertical Datum (GRAV-D)



<https://www.geodesy.noaa.gov/GRAV-D/>

# Geoid Slope Validation Survey



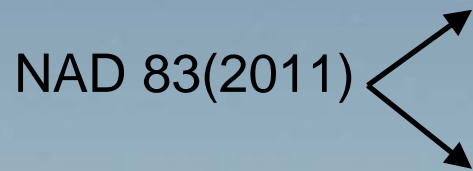
# NSRS Modernization

*New Geometric Reference Frames (“Horizontal”)*

## The Old:

## The New:

NAD 83(2011)



The North American Terrestrial Reference Frame of 2022 (NATRF2022)

The Caribbean Terrestrial Reference Frame of 2022 (CTRF2022)

NAD 83(PA11)

The Pacific Terrestrial Reference Frame of 2022 (PTRF2022)

NAD 83(MA11)

The Mariana Terrestrial Reference Frame of 2022 (MTRF2022)

# NSRS Modernization

*New Geopotential Datum (“Vertical”)*

## The Old:

## The New:

Orthometric  
Heights

NAVD 88

The North American-Pacific  
Geopotential Datum of 2022  
(NAPGD2022)

Normal  
Orthometric  
Heights

PRVD 02

VIVD09

ASVD02

- Includes GEOID2022

NMVD03

GUVD04

Dynamic  
Heights

IGLD 85

Gravity

IGSN71

Geoid  
Undulations

GEOID12B

Deflections of  
the Vertical

DEFLEC12B



# Beta Geodetic Toolkit

- Web service
- Coordinate conversions between latitude and longitude and
  - State Plane Coordinates
  - Universal Transverse Mercator
  - XYZ
  - US National Grid
- Will soon include NADCON5 with many improved transformations from the US Standard Datum to NAD83(2011)

The screenshot shows the BETA Coordinate Conversion web application. The interface includes a navigation menu with options like 'NGS Home', 'About NGS', 'Data & Imagery', 'Tools', 'Surveys', and 'Science & Education'. The main content area has tabs for 'Conversion from lat-long', 'Conversion to lat-long', 'Conversion of multiple coordinates', 'Web services', and 'Downloads'. The 'Conversion from lat-long' tab is active, showing input fields for 'Enter decimal degrees' and 'or drag map marker'. The 'Enter decimal degrees' section has 'Lat' set to 37.393300000 and 'Lon' set to -92.459040000. The 'or degrees-minutes-seconds' section has 'Lat' set to 37-23-35.880000 and 'Lon' set to 092-27-32.544000. The 'Choose a datum' section has 'NAD83' selected. The 'Enter an Ellipsoid Height in meters' field is set to 0.000. A 'Convert' button is located below these fields. A map of Missouri is shown with a red location marker near Springfield. Below the map is a table titled 'Projected Coordinates' with columns for SPC, UTM (m), XYZ (m), and USNG. The table contains various coordinate systems and their corresponding values.

Projected Coordinates				
SPC		UTM (m)	XYZ (m)	USNG
Zone	MO C-2402	Zone		
Northing (m)		Northing	X	
Northing (usft)				
Northing (ift)				
Easting (m)		Easting	Y	
Easting (usft)				
Easting (ift)				
Convergence(dms)		Convergence(dms)		
Scale Factor		Scale Factor	Z	
Combined Factor		Combined Factor		

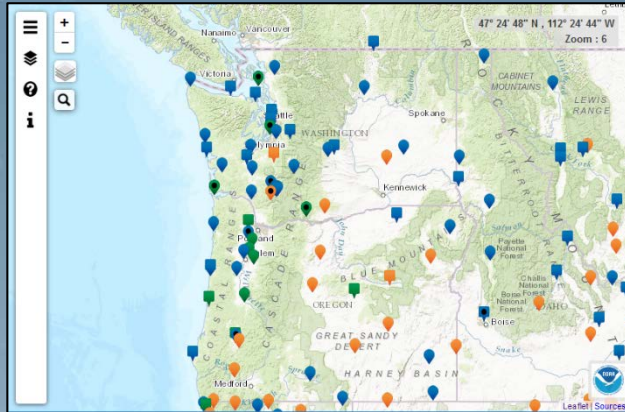
You may change the default SPC zone, datum, or ellipsoid height. These changes are processed interactively once a lat-long is converted; no need to click the Convert button.

<https://beta.ngs.noaa.gov/gtkweb/>



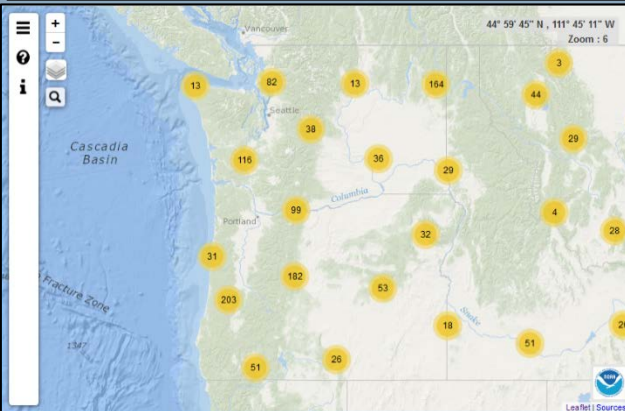
# Beta Mapping Applications

*Responsive design, mobile friendly*



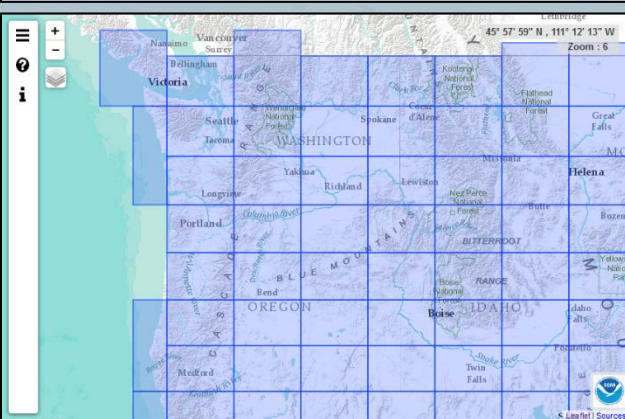
## CORS Map

<https://beta.ngs.noaa.gov/corsmap/>



## OPUS Share Map

<https://beta.ngs.noaa.gov/opusmap/>



## Geodetic Control Diagrams

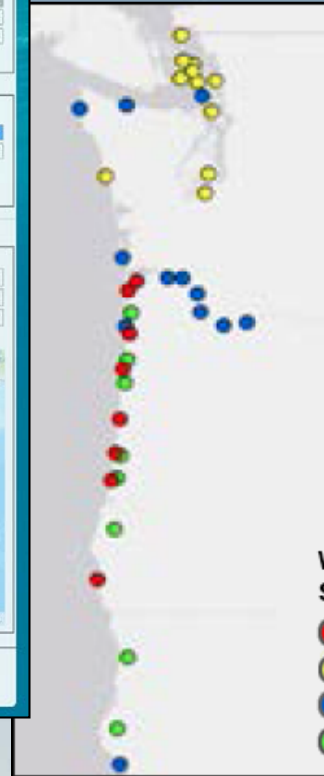
<https://beta.ngs.noaa.gov/gcd/>

# VDatum Tool

*Integrating America's Elevation Data*

The screenshot shows the NOAA VDatum web application interface. At the top, it features the NOAA logo and the text "ONLINE VERTICAL DATUM TRANSFORMATION INTEGRATING AMERICA'S ELEVATION DATA". Below this are navigation links: Home, About VDatum, Download, Docs & Help, and Contact Us. The interface is divided into several sections: "Horizontal Information" with fields for Source and Target Datum, Coordinate System, Unit, and Zone; "Vertical Information" with fields for Source and Target Datum, Unit, and GEOD model; "Point Conversion" and "ASCII File Conversion" tabs; and a "Vertical Uncertainty" section. At the bottom, there is a map of the United States with a legend for datum types: Alternating Horiz. Datum, Ellipsoidal Datum, Orthometric Datum, and Vertical Datum. The NOAA logo is also present in the bottom right corner of the interface.

The screenshot shows the NOAA's Vertical Datum Transformation - v3.6.1 software window. It has a similar layout to the web application but with a more detailed "File Conversion" section. The "Horizontal Information" section includes fields for Source and Target Datum, Coordinate System, Unit, and Zone. The "Vertical Information" section includes fields for Source and Target Datum, Unit, and GEOD model, with radio buttons for Height and Sounding. The "File Conversion" section includes a "File type:" dropdown menu, a "File name(s):" field, and a "Save as:" field. There are also checkboxes for "Use VDatum's" and "Excluding NODATA points (points with coors. = -999999)". A "Convert" button is located at the bottom right of the window.



## West Coast VDatum Station Installations

- FY14
- FY15
- FY16
- FY17 (Preliminary)

<https://vdatum.noaa.gov/>





# Expand the NSRS Stakeholder Base

- Outreach and education
- University engagement
- Integrated Ocean and Coastal Mapping (IOCM)



# Geospatial Summit

April 24-25, 2017



## National Geodetic Survey

Positioning America for the Future

[NGS Home](#)

[About NGS](#)

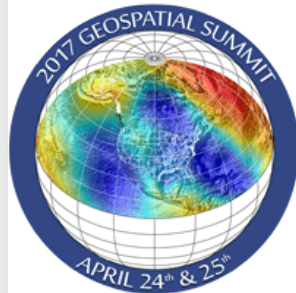
[Data & Imagery](#)

[Tools](#)

[Surveys](#)

[Science & Education](#)

Search



### 2017 Geospatial Summit



### Registration Extended

On April 24-25, 2017 we will host the 2017 Geospatial Summit at the Silver Spring Civic Building at 1 Veterans Pl, Silver Spring, MD 20910.

The 2017 Geospatial Summit will provide updated information about the planned modernization of the National Spatial Reference System (NSRS). Specifically, NGS will replace the North American Datum of 1983 (NAD 83) and the North American Vertical Datum of 1988 (NAVD 88) in 2022.

The Summit will provide an opportunity for stakeholders to discuss projects related to NSRS Modernization. NGS is currently collecting requirements from its stakeholders across the country. This event will help continue discussions from the 2015 Summit.

Additional information about the 2017 Geospatial Summit, or to ask questions or comments, [contact us](#).

Attend in person or by webinar!

[2017 Summit Home](#)

[Register](#)

[Logistics](#)

[Agenda](#)

[FAQs](#)

#### Related Links

[NGS 10-year plan](#)

[2015 Summit Proceedings](#)

[2010 Summit Proceedings](#)

[New Datums Web page](#)

Website Owner: National Geodetic Survey | Last Modified: NGS Infocenter Apr 05 2017

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# NGS Regional Advisor Program



# University Engagement



Civil & Construction Engineering

COLLEGE OF **ENGINEERING**

A photograph of a surveying station (GNSS receiver) mounted on a green tripod in a field of tall grass. In the background, there are dense evergreen trees and a clear blue sky.

**Collaborative research with Oregon State University (OSU) and NOAA\NGS: Towards Optimizing the Determination of Accurate Heights with GNSS**

NOAA NGS Brownbag Seminar

SSMC 3, Silver Spring, MD

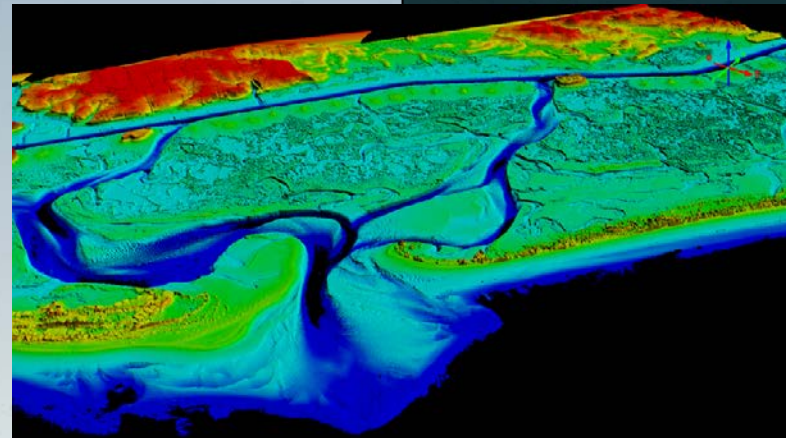
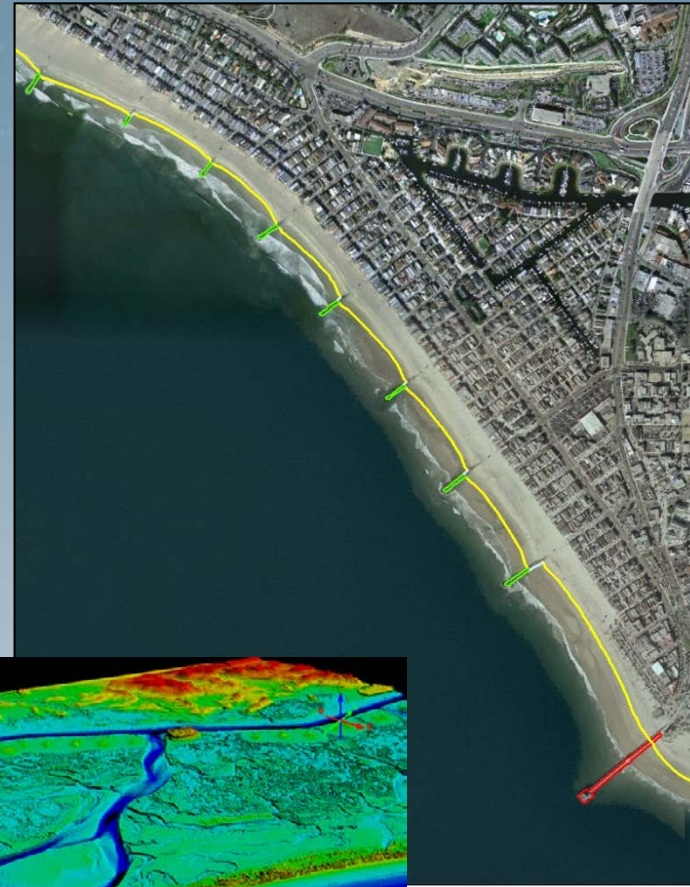
3/16/2017

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# NGS Coastal Mapping Program

- Defines the National Shoreline and provides nearshore elevation data
- NOAA nautical charts updates
- Other important applications:
  - Used in defining U.S. territorial limits
  - Coastal resource management
  - Storm surge and coastal flooding modeling
  - GIS analysis
  - Benthic habitat mapping

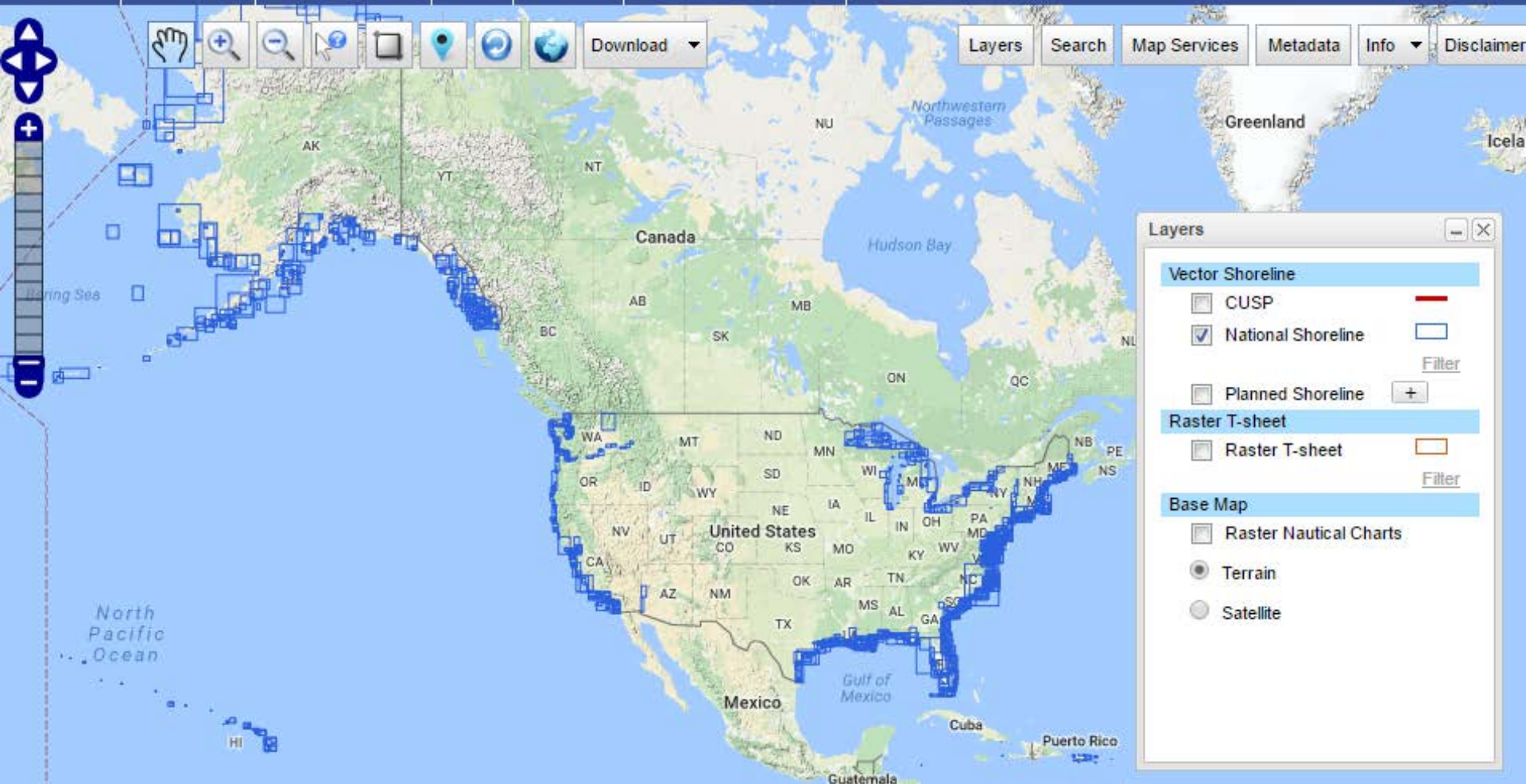




# NOAA Shoreline Data Explorer

National Geodetic Survey

- NGS Home
- About NGS
- Data & Imagery
- Tools
- Surveys
- Science & Education



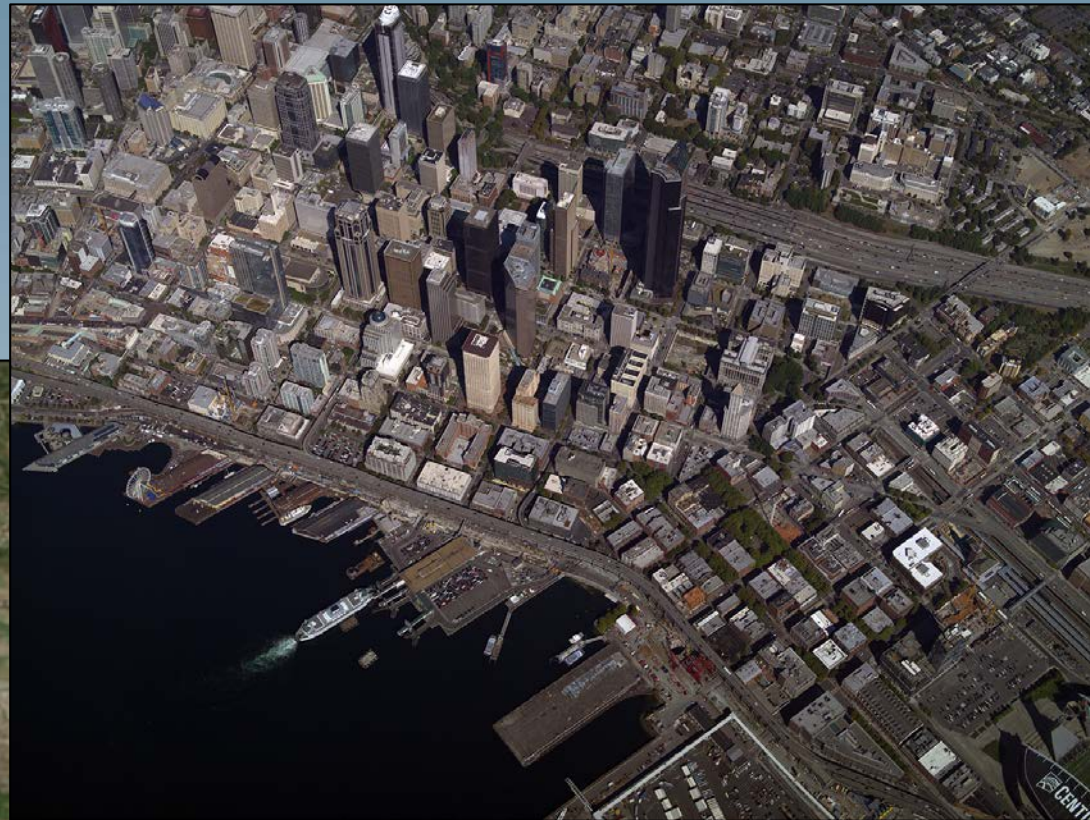
**Layers**

- Vector Shoreline**
  - CUSP
  - National Shoreline
  - Planned Shoreline
- Raster T-sheet**
  - Raster T-sheet
- Base Map**
  - Raster Nautical Charts
  - Terrain
  - Satellite

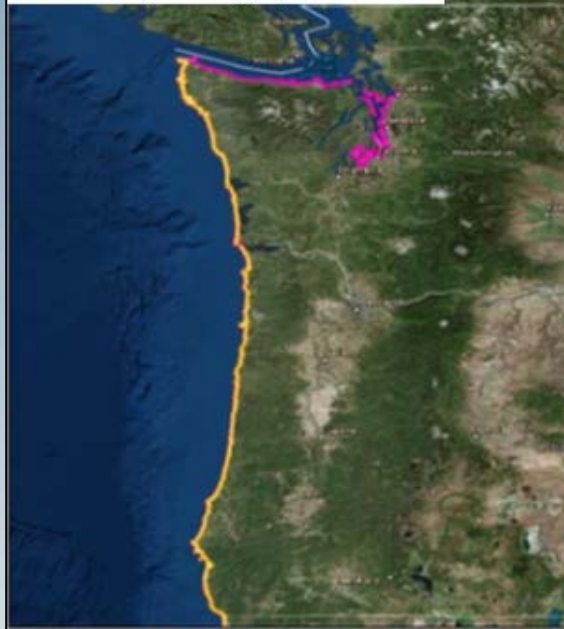
<https://www.ngs.noaa.gov/NSDE/>



# Northwest Oblique Imagery



NGS Oblique Imagery Collection

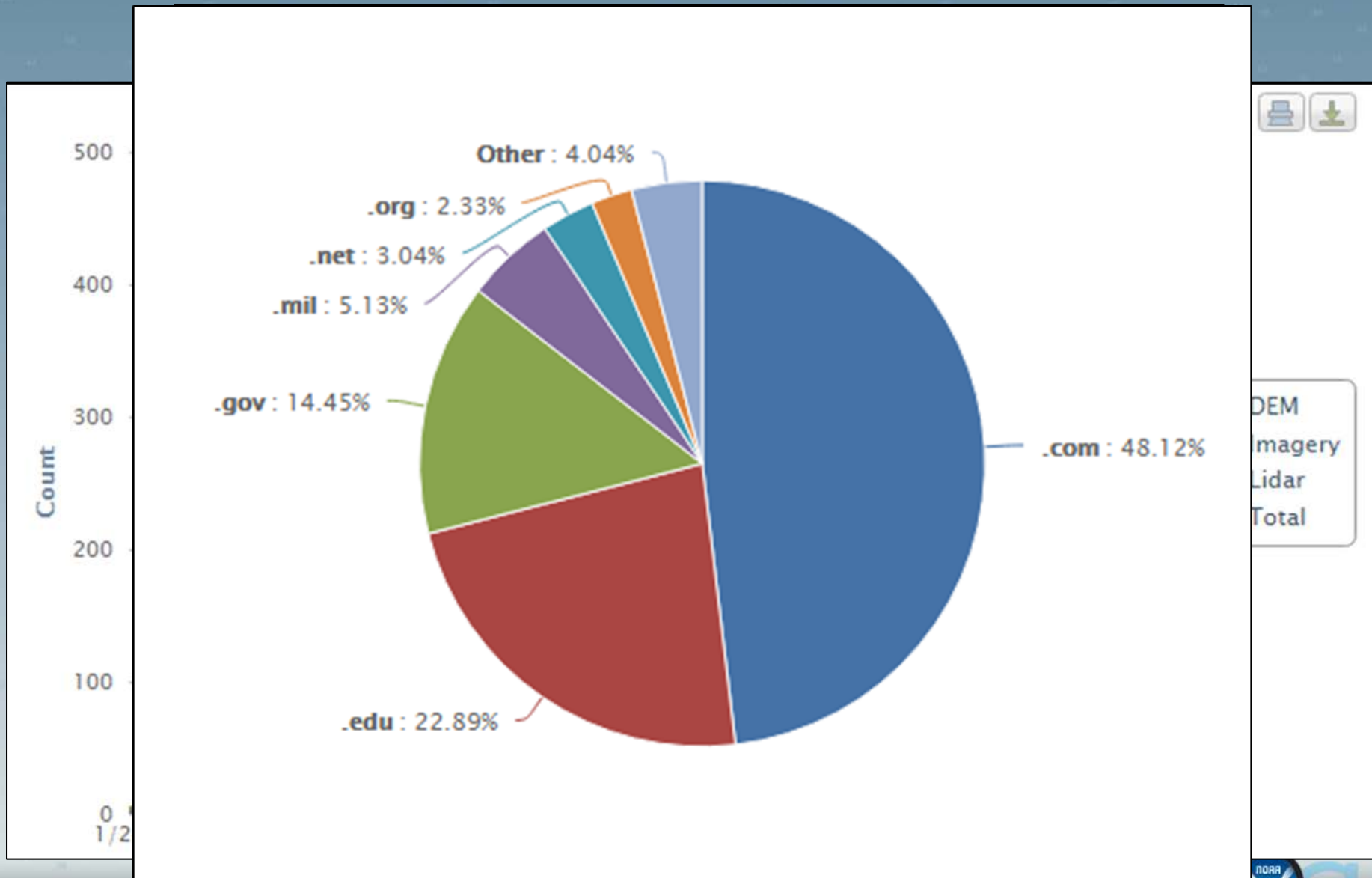


Year Acquired

- 2015
- 2016

[https://geodesy.noaa.gov/storm\\_archive/coastal/viewer/](https://geodesy.noaa.gov/storm_archive/coastal/viewer/)

# Stakeholder Growth





# NGS Partnerships

## Research

Modeling, Survey Methodologies, Sensor Development, Cloud Processing by **Contractors, Cooperative Institutes, Grantees, Visiting Scientists**

## Data Collection

Shoreline, Topobathy Lidar, CORS, GRAV-D, Geodetic Control by **Contractors, CORS Partners, Academia, Surveyors, Federal and State Agencies, Private Citizens**

## Product Development

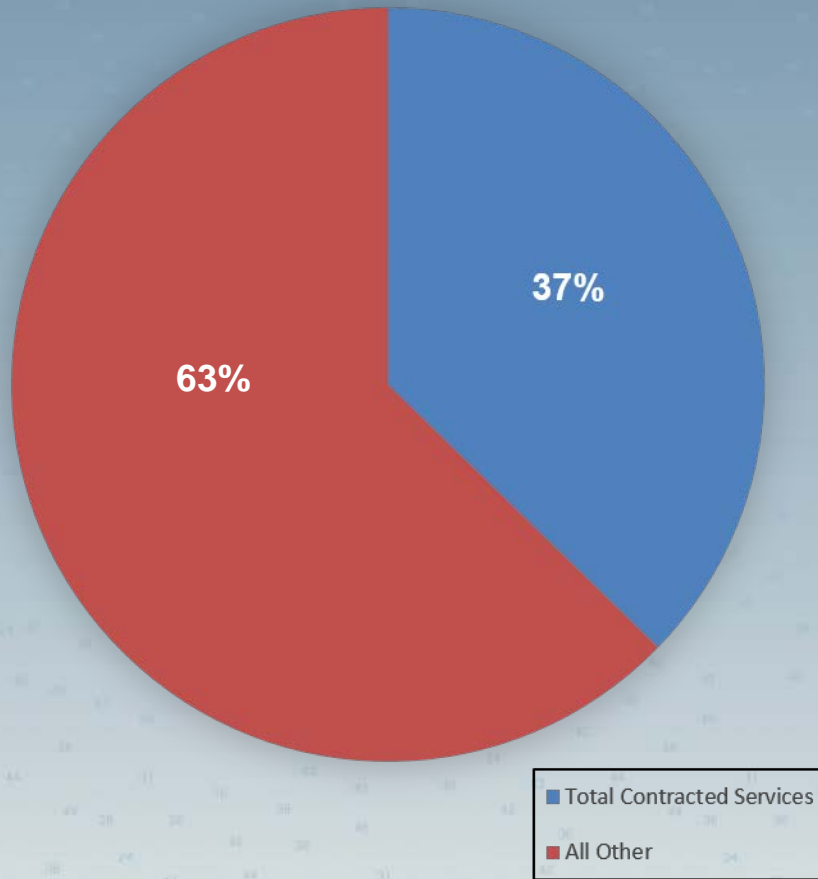
Data Processing, Compilation, Data Management by **Contractors, Third Party Vendors**

## Product Distribution

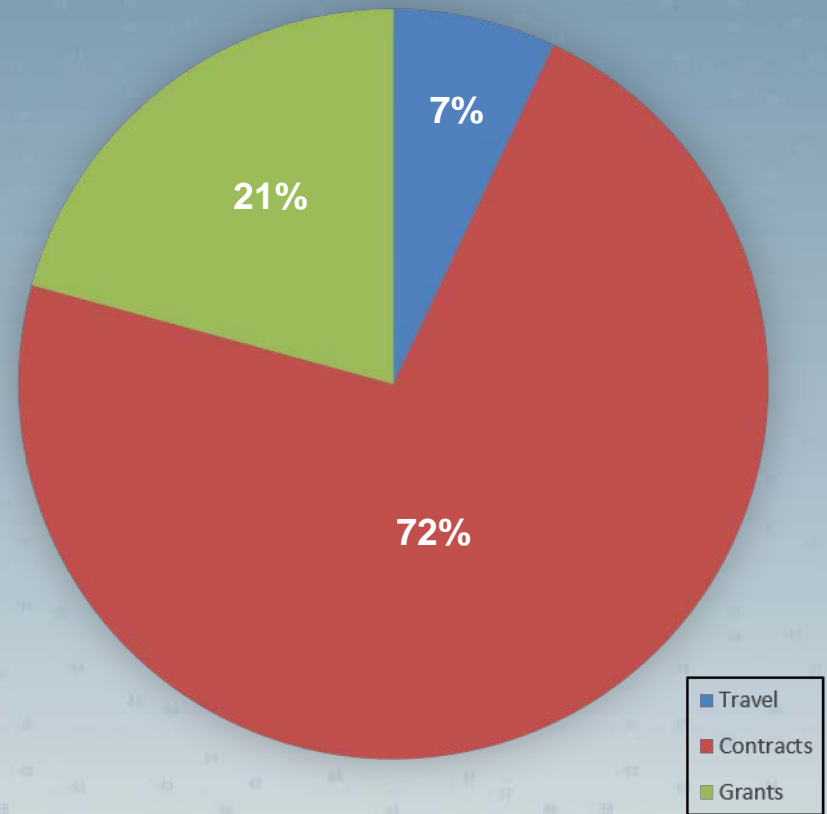
Data Ingestion by **Federal, State and Local Agencies, GIS Community, Academia, Third Party Vendors**

# Resource Allocation

## Resources Available



## Contracted Services



■ Total Contracted Services  
■ All Other

■ Travel  
■ Contracts  
■ Grants