Providing Data to NGS customers in the Modernized NSRS

National Geodetic Survey Industry Workshop

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The Future Data Delivery System

Public queries and access to the NSRS

Currently ➡ datasheets, shoreline, UFCORS, OPUS, …

Data Formats (JSON, Shapefiles, GeoPackage, GeoTIFF, GGXF, XML)

Web Services and API's (JSON, WMS, WFS, WMTS)

OPUS (Static, Projects)

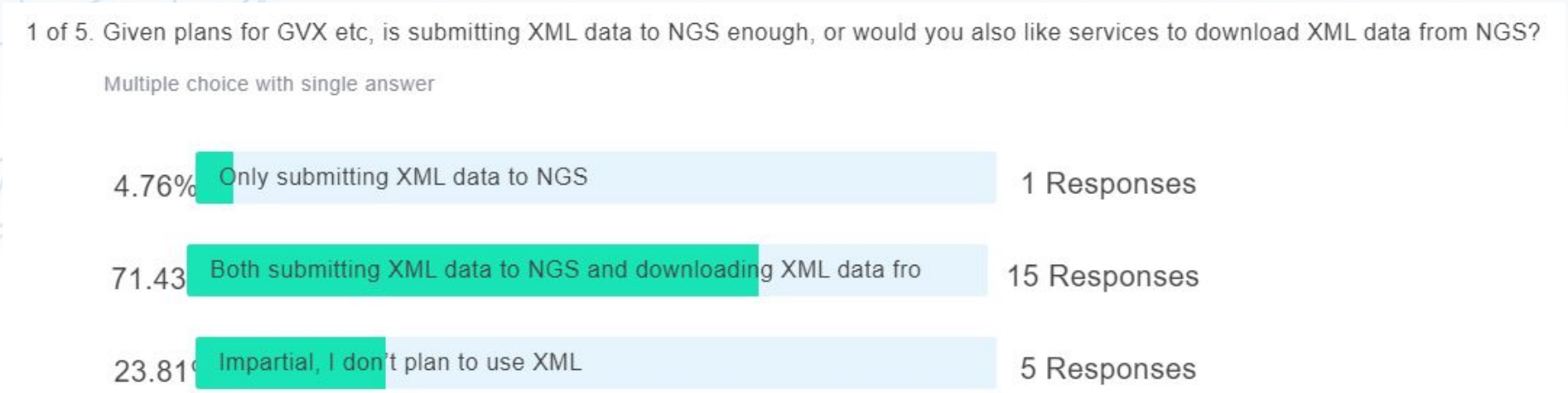
Amazon Web Services (AWS)

Emergency Response Imagery, CORS data (S3 storage bucket)

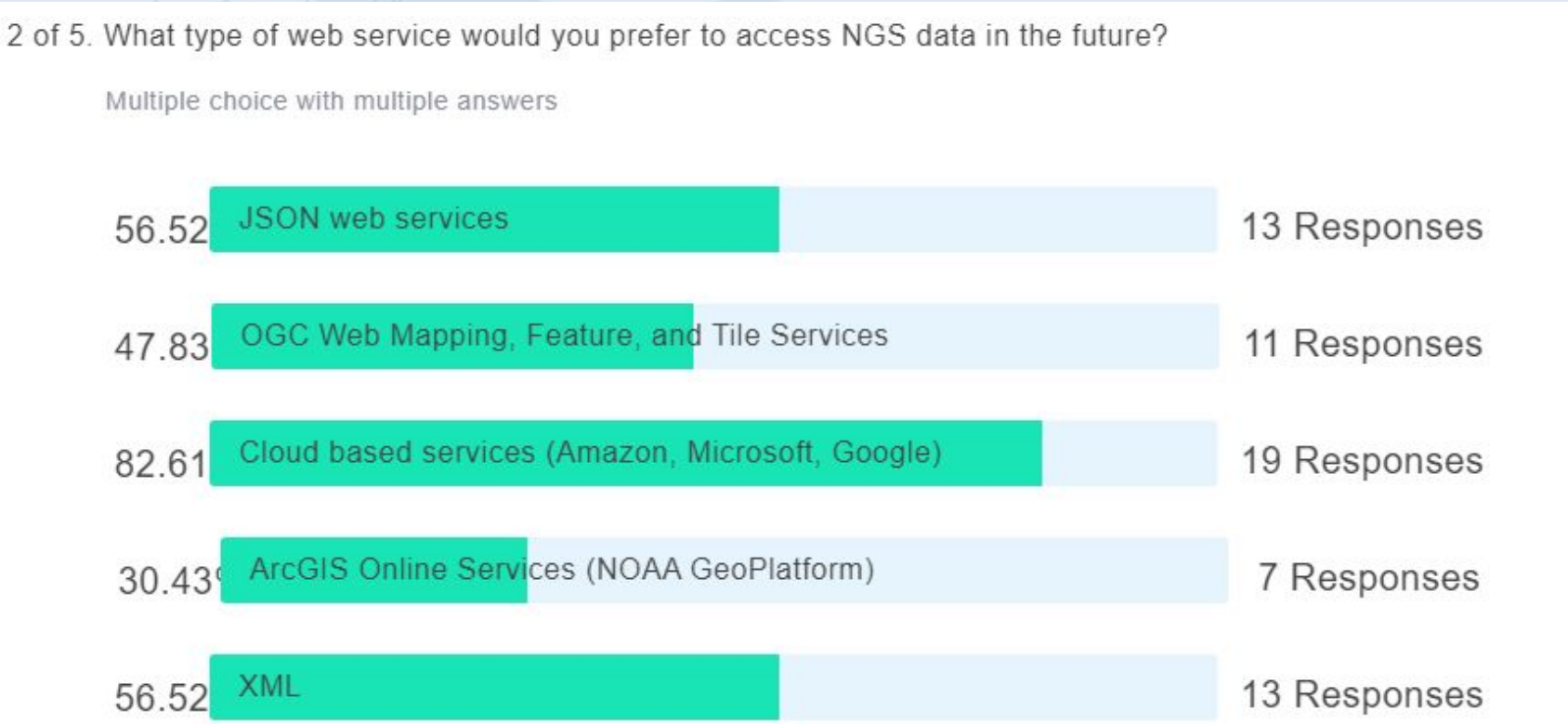
ArcGIS Online and the NOAA Geoplatform

Poll Question 1

With the plans for GVX, LVX and the other standard file formats, would you prefer to only **submit** XML data to NGS or would you also like services to **download** XML data from NGS?



Poll Question 2



Not always easy to find/use data

The NGS Data Sheet

See file dsdata.pdf for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.12.5.12
Starting Datasheet Retrieval...
1       National Geodetic Survey,   Retrieval Date = APRIL 27, 2021
 SS0436 ***********************************************************************
 SS0436  DESIGNATION -  A 2 Z
 SS0436  PID         -  SS0436
 SS0436  STATE/COUNTY-  MT/CASCADE
 SS0436  COUNTRY     -  US
 SS0436  USGS QUAD   -  BELT NE (2017)
 SS0436
 SS0436                        *CURRENT SURVEY CONTROL
 SS0436 ______________________________________________________________________
 SS0436* NAD 83(1986) POSITION- 47 22 39.      (N) 110 48 04.      (W)   SCALED
 SS0436* NAVD 88 ORTHO HEIGHT -  1341.642 (meters)     4401.70  (feet) ADJUSTED
 SS0436 ______________________________________________________________________
 SS0436  GEOID HEIGHT    -        -13.278 (meters)                     GEOID18
 SS0436  DYNAMIC HEIGHT  -       1341.525 (meters)     4401.32  (feet) COMP
 SS0436  MODELED GRAVITY -    980,477.3   (mgal)                       NAVD 88
 SS0436
 SS0436  VERT ORDER      -  SECOND    CLASS 0
 SS0436
 SS0436.The horizontal coordinates were scaled from a map and have
 SS0436.an estimated accuracy of +/- 6 seconds.
 SS0436.
 SS0436.The orthometric height was determined by differential leveling and
 SS0436.adjusted by the NATIONAL GEODETIC SURVEY
 SS0436.in June 1991.
 SS0436
 SS0436.Significant digits in the geoid height do not necessarily reflect accuracy.
 SS0436.GEOID18 height accuracy estimate available here.
 SS0436
 SS0436.Click photographs - Photos may exist for this station.
 SS0436
 SS0436.The dynamic height is computed by dividing the NAVD 88
 SS0436.geopotential number by the normal gravity value computed on the
 SS0436.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 SS0436.degrees latitude (g = 980.6199 gals.).
 SS0436
 SS0436.The modeled gravity was interpolated from observed gravity values.
 SS0436
 SS0436;                  North         East     Units  Estimated Accuracy
 SS0436;SPC MT       -   348,340.      501,800.     MT  (+/- 180 meters Scaled)
 SS0436
 SS0436_U.S. NATIONAL GRID SPATIAL ADDRESS: 12TWT150471(NAD 83)
 SS0436
```

80 character wide Datasheets

datasheet->BY COUNTY

updated:12/17/20.10:09:18

Data Sheets can be retrieved by County.

Select a State to get a County listing.

Pick a State:

ALABAMA
ALASKA
ARIZONA
ARKANSAS
CALIFORNIA
COLORADO
CONNECTICUT
DELAWARE
DISTRICT OF COLUMBIA
FLORIDA
GEORGIA
HAWAII
IDAHO
ILLINOIS
INDIANA
IOWA
KANSAS
KENTUCKY
LOUISIANA
MAINE

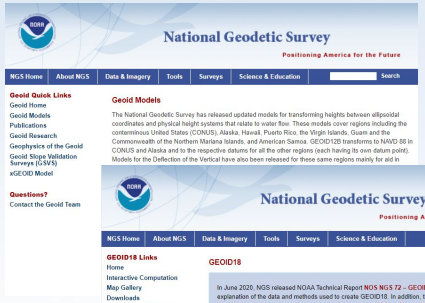
Get County List | Reset

Return to DATASHEET PAGE Return to NGS HOME PAGE

NOS Home | Contact Info | Privacy Policy | Disclaimer | Document Viewers

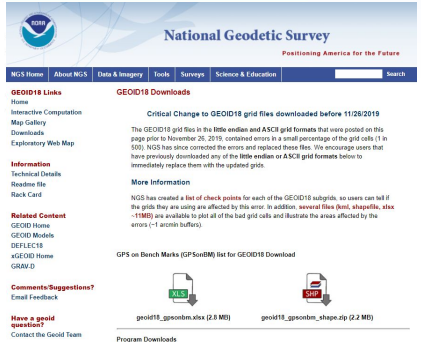
Web site owner: National Geodetic Survey (NGS), National Oceanic & Atmospheric Administration (NOAA)

Perl Webpages



GEOID Home Page

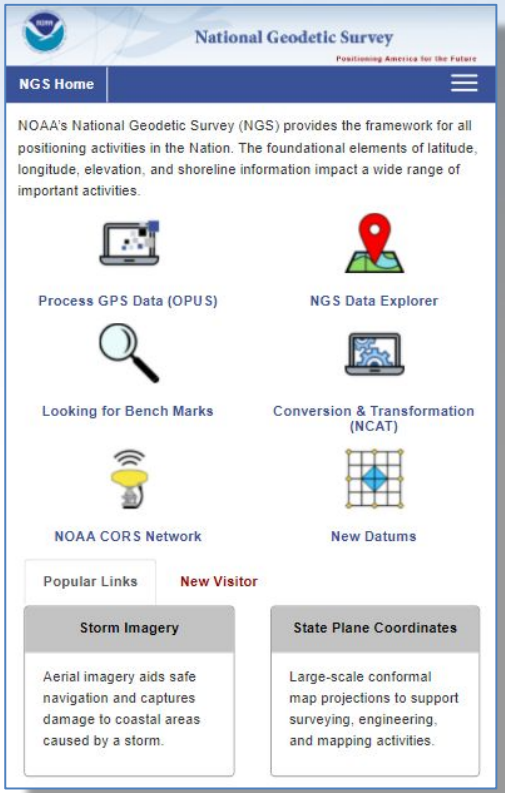
GEOID18 Page



GEOID18 Downloads

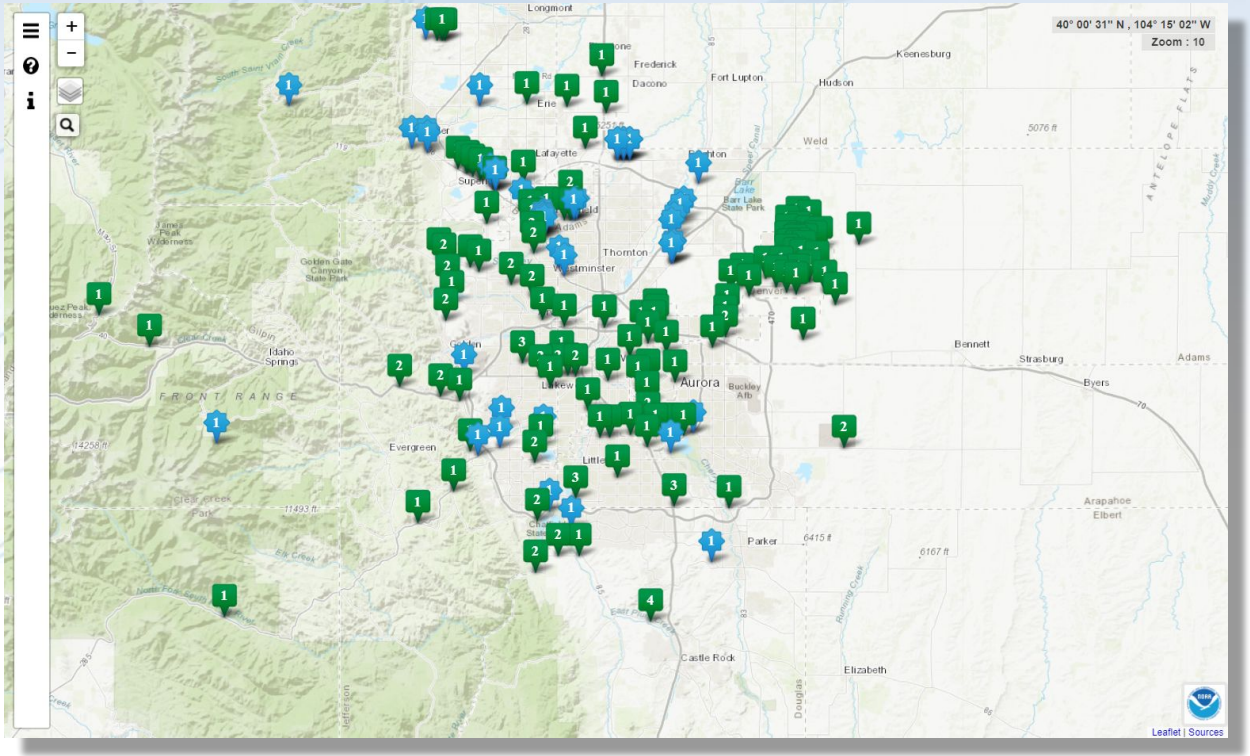
Nested Web Pages

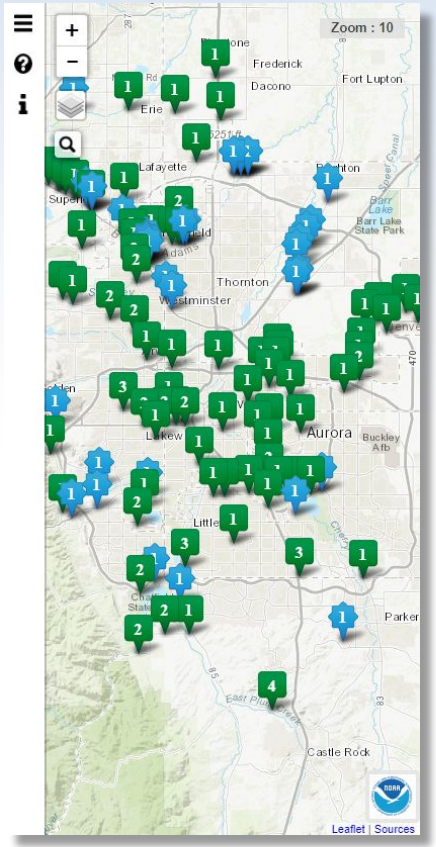
Continuing to improve



New Responsive Home Page

Continuing to improve





Responsive Web Maps https://geodesy.noaa.gov/opusmap/

Passive Mark Page

Passive Mark Page

***Note: This page does not work with Internet Explorer.

This is a Beta product. NGS is interested in your feedback concerning its function and usability as well as how users would like to interact with NGS datasheet information in the future. Email us at ngs.feedback@noaa.gov

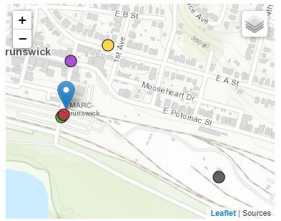
The information provided on this page may be out of date with the current published datasheet. Whenever there are differences the datasheet will be the authoritative source. Visit the Datasheet

Enter PID: JV3192 Get Data Recover this mark Go to Datasheet

Designation:	Q 35
Setting:	36 = SET IN A MASSIVE STRUCTURE
Last Recovery Date/Condition/By:	06/05/2019 - Recovered in good condition - NATIONAL GEODETIC SURVEY

PID:	JV3192	State, County:	MD,FREDERICK
Stability:	B	Country:	US
GNSS Useable:	Y	Latitude:	N 39° 18' 42.63"
Orthometric Ht. (m):	75.185	Longitude:	W 077° 37' 37.59"
Vertical Datum:	NAVD 88	Ellipsoid Ht.:	
Vertical Source:	ADJUSTED	Position Datum:	NAD 83(1986)
Order/Class:	1/2	Position Source:	HD_HELD1
Geoid Ht (m).:	-33.056	Network Accuracy Hz (cm):	N/A
Geoid Model:	GEOID18	Network Accuracy Ellip (cm):	N/A
GNSS Ortho Ht. (m):	N/A	Ortho Ht. Residual (cm):	N/A

Q 35, JV3192, 1, 20080221



Nearby Marks Hide

PID	Designation	Position Source	Vertical Source	Condition
JV3193	RAIL SECTION BORR	SCALED	ADJUSTED	MARK NOT FOUND
JV3194	IRON BAR BORR	SCALED	ADJUSTED	GOOD
JV3191	266 RESET	HD_HELD1	ADJUSTED	GOOD
JV3190	266	SCALED	ADJUSTED	GOOD
JV3189	P 35	SCALED	ADJUSTED	MARK NOT FOUND

Superseded Values

NGVD 29 (11/26/84) 75.397 (m) 247.37 (f) ADJUSTED 1 2

Projects

Leveling Projects Hide

L24378/1

Start Date:	05/07/1979	Order:	1	Agency:	NGS
End Date:	06/06/1979	Class:	2	BM Count:	84

L9532/3

Start Date:	04/10/1942	Order:	2	Agency:	NGS
End Date:	04/21/1942	Class:	0	BM Count:	22

L8007

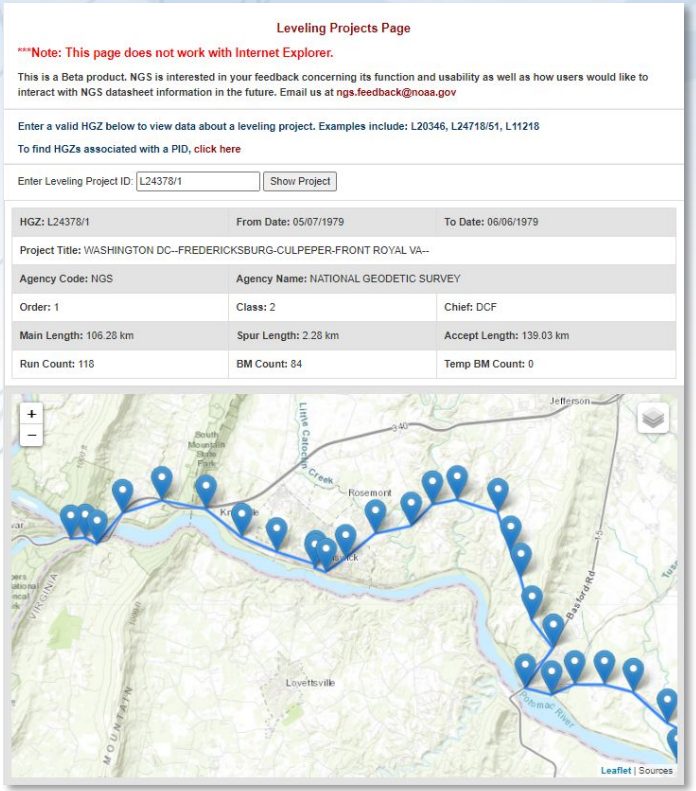
Start Date:	05/27/1938	Order:	1	Agency:	NGS
End Date:	06/25/1938	Class:	2	BM Count:	71

Descriptive Information Hide

PID:	JV3192	Designation	Q 35
Setting Agency:	CGS	Setting Date:	1938
Marker Type:	DB	Magnetic Code:	
Stability Code:	B	Setting Class:	36
Setting Phrase:	SIGNAL BRIDGE FOUNDATION	Logo:	CGS
Stamping:	Q 35 1938	UDG Mark Type:	
UDG Magnetic Code:		UDG Mark Stability:	
UDG Mark Setting:		UDG Mark Set Date:	
Rod/Pipe Depth:		Sleeve Depth:	
Position Source:	O	Position Quality:	4
Position Technique:	X	Alias:	

https://beta.ngs.noaa.gov/datasheets/passive-marks/index.html

Leveling Project Page



Leveling Projects Page

***Note: This page does not work with Internet Explorer.

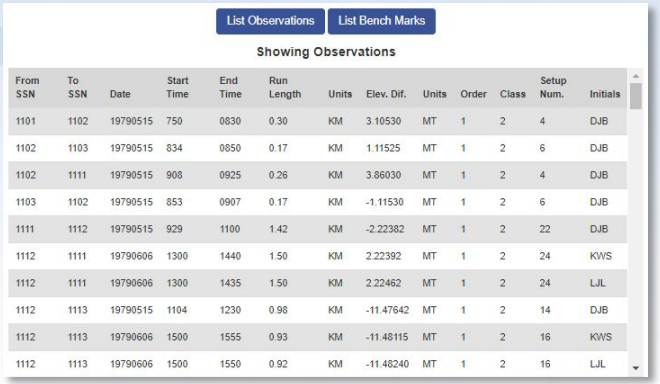
This is a Beta product. NGS is interested in your feedback concerning its function and usability as well as how users would like to interact with NGS datasheet information in the future. Email us at ngs.feedback@noaa.gov

Enter a valid HGZ below to view data about a leveling project. Examples include: L20346, L24718/51, L11218

To find HGZs associated with a PID, click here

Enter Leveling Project ID: L24378/1 Show Project

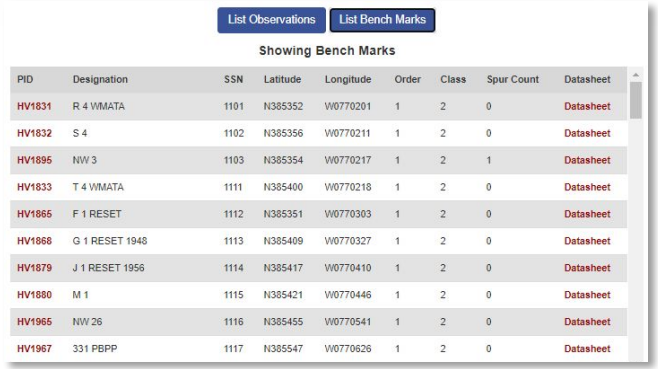
HGZ: L24378/1	From Date: 05/07/1979	To Date: 06/06/1979
Project Title: WASHINGTON DC--FREDERICKSBURG-CULPEPER-FRONT ROYAL VA--		
Agency Code: NGS	Agency Name: NATIONAL GEODETIC SURVEY	
Order: 1	Class: 2	Chief: DCF
Main Length: 106.28 km	Spur Length: 2.28 km	Accept Length: 139.03 km
Run Count: 118	BM Count: 84	Temp BM Count: 0



List Observations List Bench Marks

Showing Observations

From SSN	To SSN	Date	Start Time	End Time	Run Length	Units	Elev. Dif.	Units	Order	Class	Setup Num.	Initials
1101	1102	19790515	750	0830	0.30	KM	3.10530	MT	1	2	4	DJB
1102	1103	19790515	834	0850	0.17	KM	1.11525	MT	1	2	6	DJB
1102	1111	19790515	908	0925	0.26	KM	3.86030	MT	1	2	4	DJB
1103	1102	19790515	853	0907	0.17	KM	-1.11530	MT	1	2	6	DJB
1111	1112	19790515	929	1100	1.42	KM	-2.22382	MT	1	2	22	DJB
1112	1111	19790606	1300	1440	1.50	KM	2.22392	MT	1	2	24	KWS
1112	1111	19790606	1300	1435	1.50	KM	2.22462	MT	1	2	24	LJL
1112	1113	19790515	1104	1230	0.98	KM	-11.47642	MT	1	2	14	DJB
1112	1113	19790606	1500	1555	0.93	KM	-11.48115	MT	1	2	16	KWS
1112	1113	19790606	1500	1550	0.92	KM	-11.48240	MT	1	2	16	LJL



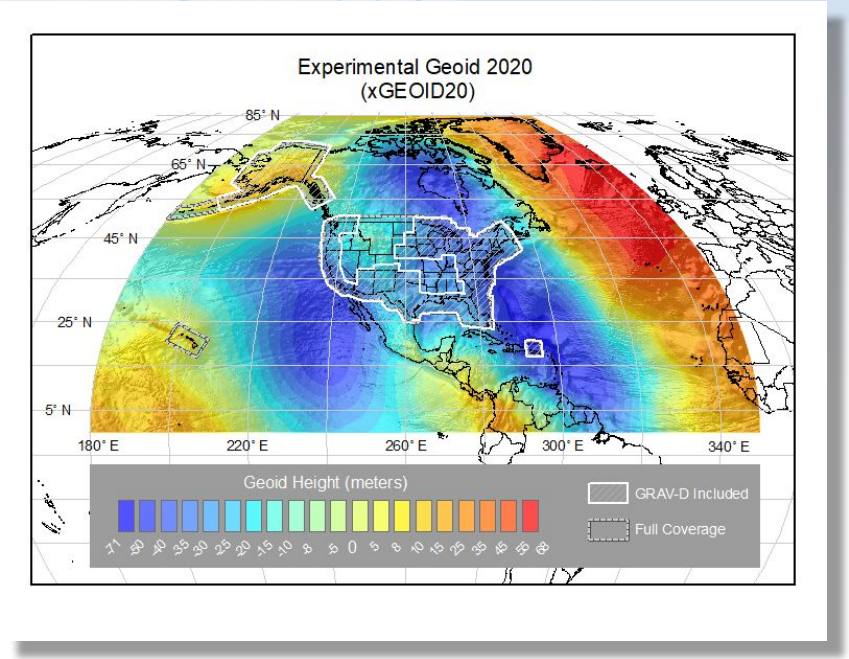
List Observations List Bench Marks

Showing Bench Marks

PID	Designation	SSN	Latitude	Longitude	Order	Class	Spur Count	Datasheet
HV1831	R 4 WMATA	1101	N385352	W0770201	1	2	0	Datasheet
HV1832	S 4	1102	N385356	W0770211	1	2	0	Datasheet
HV1895	NW 3	1103	N385354	W0770217	1	2	1	Datasheet
HV1833	T 4 WMATA	1111	N385400	W0770218	1	2	0	Datasheet
HV1865	F 1 RESET	1112	N385351	W0770303	1	2	0	Datasheet
HV1868	G 1 RESET 1948	1113	N385409	W0770327	1	2	0	Datasheet
HV1879	J 1 RESET 1956	1114	N385417	W0770410	1	2	0	Datasheet
HV1880	M 1	1115	N385421	W0770446	1	2	0	Datasheet
HV1965	NW 26	1116	N385455	W0770541	1	2	0	Datasheet
HV1967	331 PBPP	1117	N385547	W0770626	1	2	0	Datasheet

https://beta.ngs.noaa.gov/datasheets/leveling-projects/index.html

NGS Grid Files



GeoTIFF

README.md

GGXF (Gridded Geodetic data eXchange Format)

Motivation

The use of gridded data in geodetic applications is increasing. For some geodetic datum transformations the Natural Resources Canada NTv2 format is widely used although other national and ad hoc formats are also in use. There is no global standard for these and other geodetic data such as geoid grids, position displacement grids and numerous others. Producers often define a proprietary or some other convenient format. The adoption of a standard file format will facilitate the creation and use of gridded data sets. It would relieve grid producers of the necessity for producing file readers and will assist application developers to incorporate new grids with minimal effort. Users will benefit from quicker access to the data. GGXF is a proposed standard format for the exchange of gridded geodetic data.

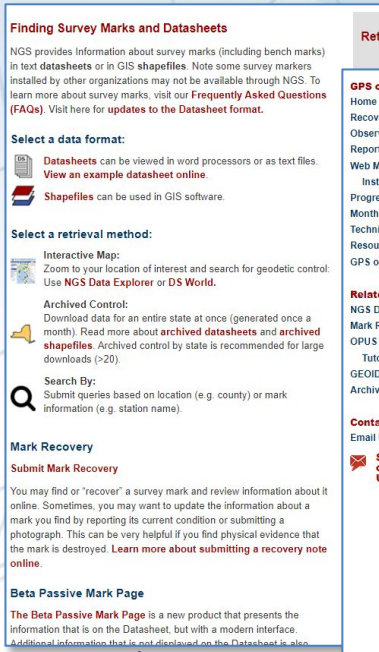
Development History

GGXF is an Esri research and development project to define a standardized format for the exchange of gridded geodetic data. The project began in 2013 and has progressed in fits and starts since then. The requirements of GGXF are as follows:

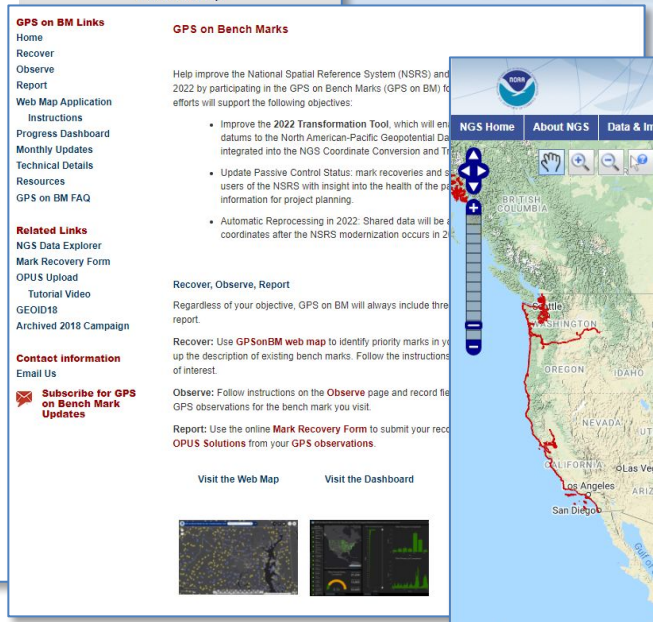
- Multi-dimensional
- Multi-resolution
- Self-defining (metadata/header)
- Applicable to any datatype defined on a graticular grid
- Binary data storage structure
- Open-source GGXF reader/writers from commonly used existing formats

OGC & GGXF

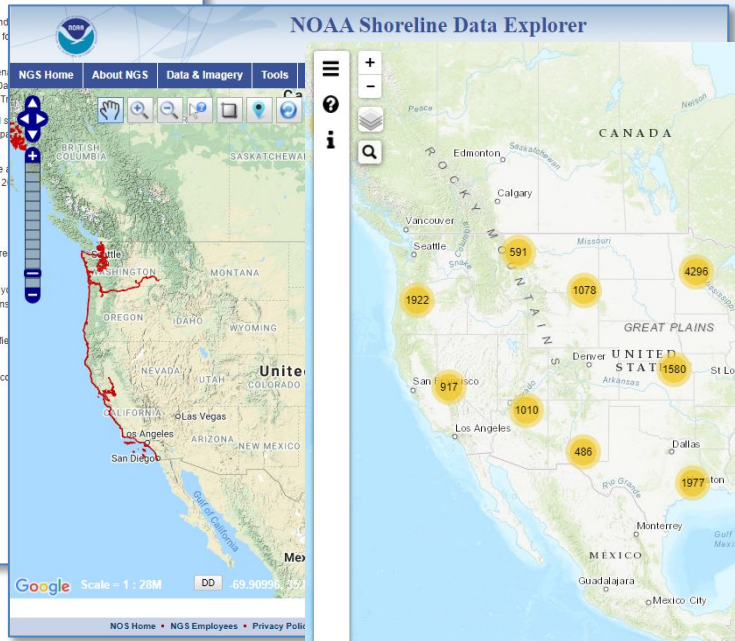
Shapefiles and GeoJSON



Datasheets



GPS on Benchmarks



Shoreline

OPUS Share

Application Programming Interfaces (APIs)

GEOID API - The Geoid Height Service

Web service that distributes the geoid height of the NGS geoid models in a concise and portable way. The web service provides the geoid height (of a model specified by its model ID) at any given latitude and longitude. Learn more

Related Content: GEOID Models

API for Gravity Predictor using GRAV-D (airborne gravity) Data

Web service that distributes gravity data collected from the GRAV-D project in a concise, portable, and expandable way. The web service allows a user the ability to provide any geodetic location (latitude, longitude, and ellipsoid height), and the tool will output a gravity value based upon the GRAV-D data. Learn more

Related Content: GRAV-D , GRAV-D Data Blocks

API for NGS Data Explorer

Web service that distributes limited attributes from publishable data sheets for varying types of survey control. The primary purpose of this web service is to provide location and metadata for the many survey control marks throughout the nation and territories. Learn more

Related Content: NGS Data Explorer

API for NGS Coordinate Conversion and Transformation Tool (NCAT)

NGS's Coordinate Conversion and Transformation Tool (NCAT) allows users to easily convert between different coordinate systems as well as different datums, in a single step. Learn more

Related Content: NCAT

API for VDatum Tidal

VDatum Tidal API is designed to vertically transform geospatial data among a variety of ellipsoidal and orthometric vertical datums to tidal datums. Learn more

Related Content: VDatum

API for OPUS

Web service that distributes limited attributes from OPUS shared solutions. Learn more

Related Content: OPUS

https://geodesy.noaa.gov/web_services/

API JSON Outputs

GEOID

Example:

https://geodesy.noaa.gov/api/geoid/ght?lat=40.0&lon=W0800000.0

Sample Result Set (Units of Geoid Height and Error are meters):


```
{
"geoidModel": "GEOID12B",
"station": "UserStation",
"lat": 40.0,
"latDms": "N400000.00000",
"lon": -80.0,
"lonDms": "W0800000.00000",
"geoidHeight": -33.185,
"error": 0.07
}
```


Data Explorer

Examples:

https://geodesy.noaa.gov/api/nde/radial?lat=40.0&lon=-80.0&radius=0.5

Using METER as units

https://geodesy.noaa.gov/api/nde/radial?lat=40.0&lon=-80.0&radius=400&units=METER

Sample Result Set:


```
{
"pid": "KX2493",
"name": "MR 63 LB",
"lat": "40.00258",
"lon": "-79.99739",
"ellipHeight": " ",
"posDatum": "NAD 83(1986)",
"posSource": "HD_HELD1",
"posOrder": " ",
"orthoHt": "239.017",
"vertDatum": "NAVD 88",
"vertSource": "ADJUSTED",
"vertOrder": "2"
}
```

Geospatial Web Services

Today

Emergency Response Imagery (WMTS, cloud formatted GeoTiff)

https://storms.ngs.noaa.gov/storms/tilesp/services/tileserver.php/wmts

Shoreline

WMS https://geodesy.noaa.gov/GeoServer/NSDE/ows?service=wms&request=GetCapabilities

WFS https://geodesy.noaa.gov/GeoServer/NSDE/ows?service=wfs&request=GetCapabilities

Tomorrow

Datasheets, CORS, OPUS Share, OPUS Projects, GNSS Vectors, Leveling, NGS Grid WMS

OPUS for Everything (OPUS 6.0)

Simplify upload and allow for multiple file upload

Will provide simultaneous processing for multiple files

Eliminates the email currently required to get solution

Will migrate to a browser based system and provide a URL to the solution that can be shared

Download solutions in multiple formats

Cloud Based Platforms

Amazon Web Services (AWS)

Emergency Response Imagery hosted and served
https://storms.ngs.noaa.gov/
https://registry.opendata.aws/noaa-eri/

NOAA CORS Network S3 bucket (data downloads)
https://registry.opendata.aws/noaa-ncn/

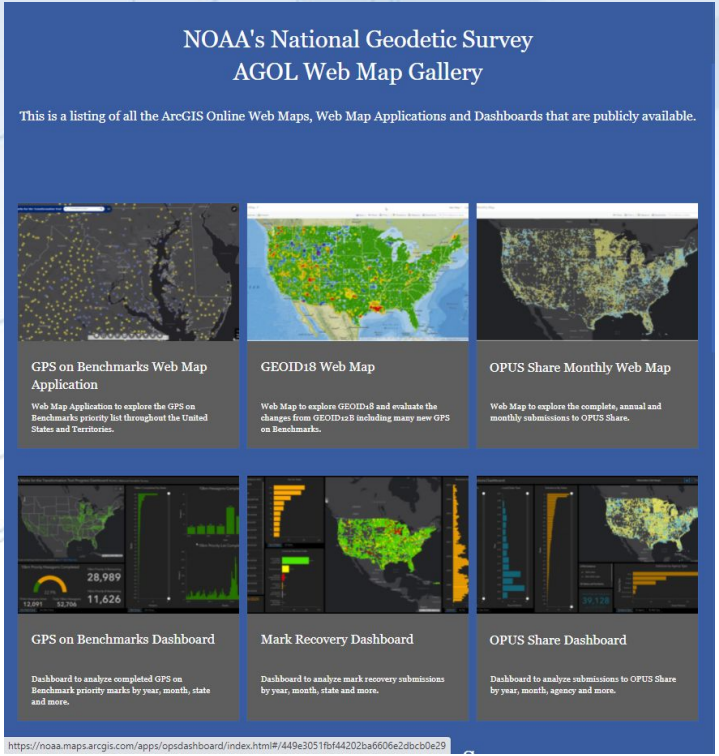
Database and Website testing on AWS

Cloud Based Platforms

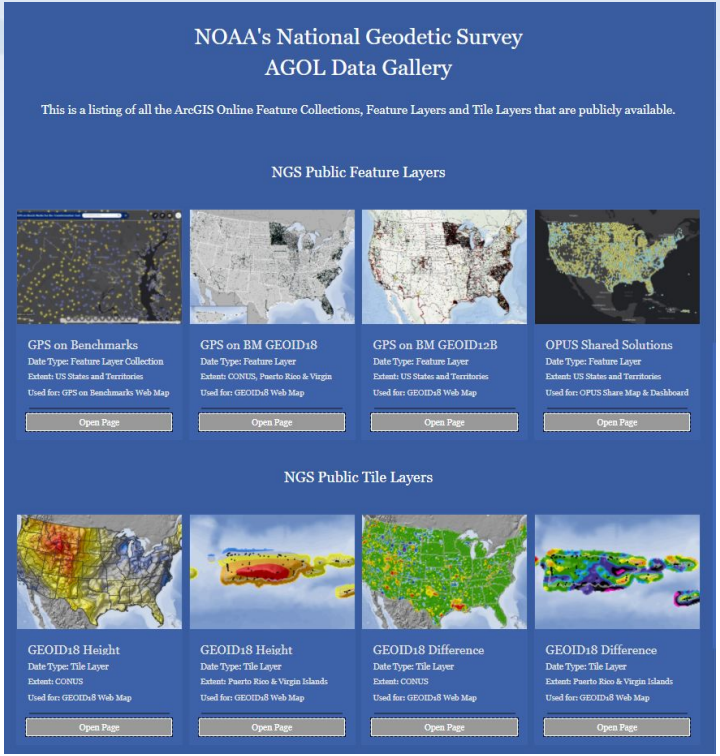
ArcGIS Online (AGOL)

- GPS on Benchmarks
  - Web Map Application, Dashboard, Feature Layers
- OPUS Shared Solutions
  - Web Map, Dashboard, Feature Layers
- GEOID18 Exploratory Map
  - Web Map, Tile Layers, Feature Layers
- Mark Recoveries
  - Dashboard, Feature Layers

ArcGIS Online Prototype Galleries



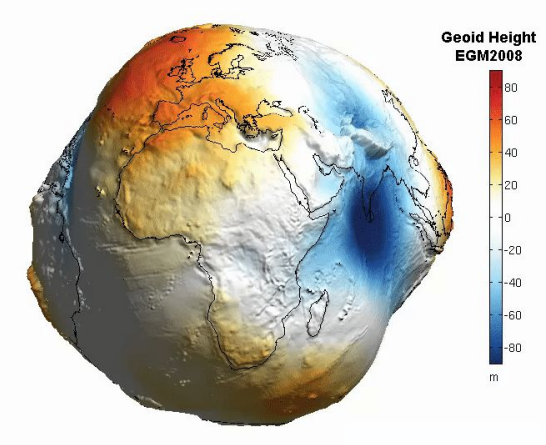
Web Maps and Dashboards



Datasets

Questions?

NGS Industry Workshop



Brian Shaw
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Magnitude of the Deflection of the Vertical