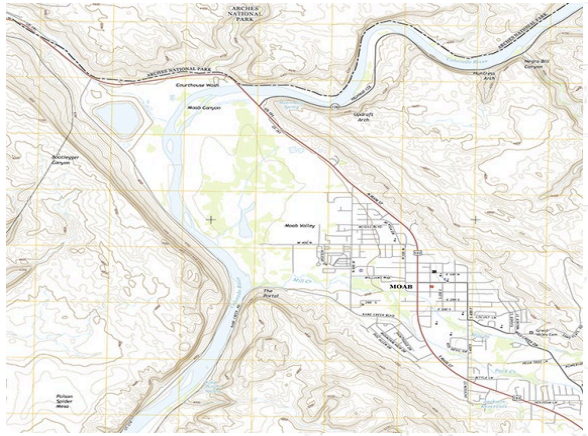
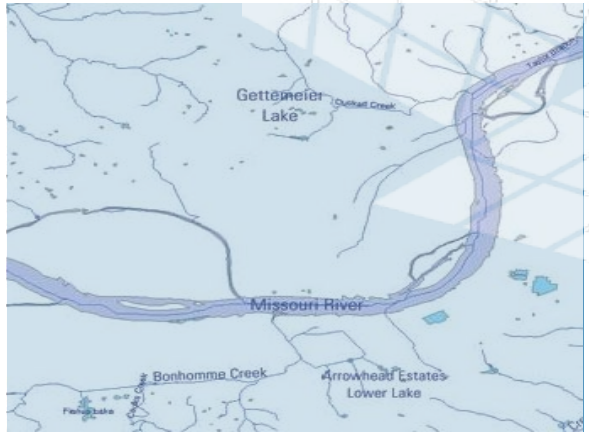
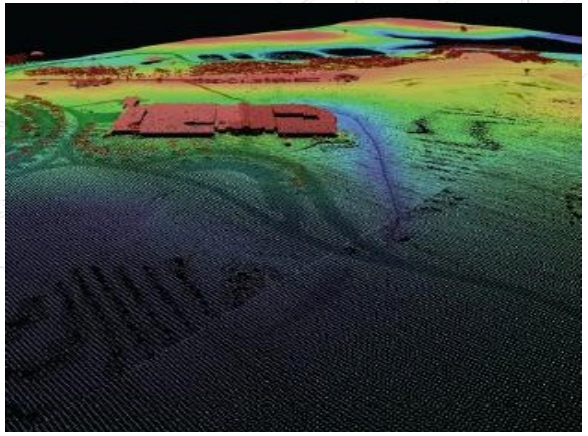
USGS National Geospatial Program Updates

3DEP, 3DHP







Tom Carlson

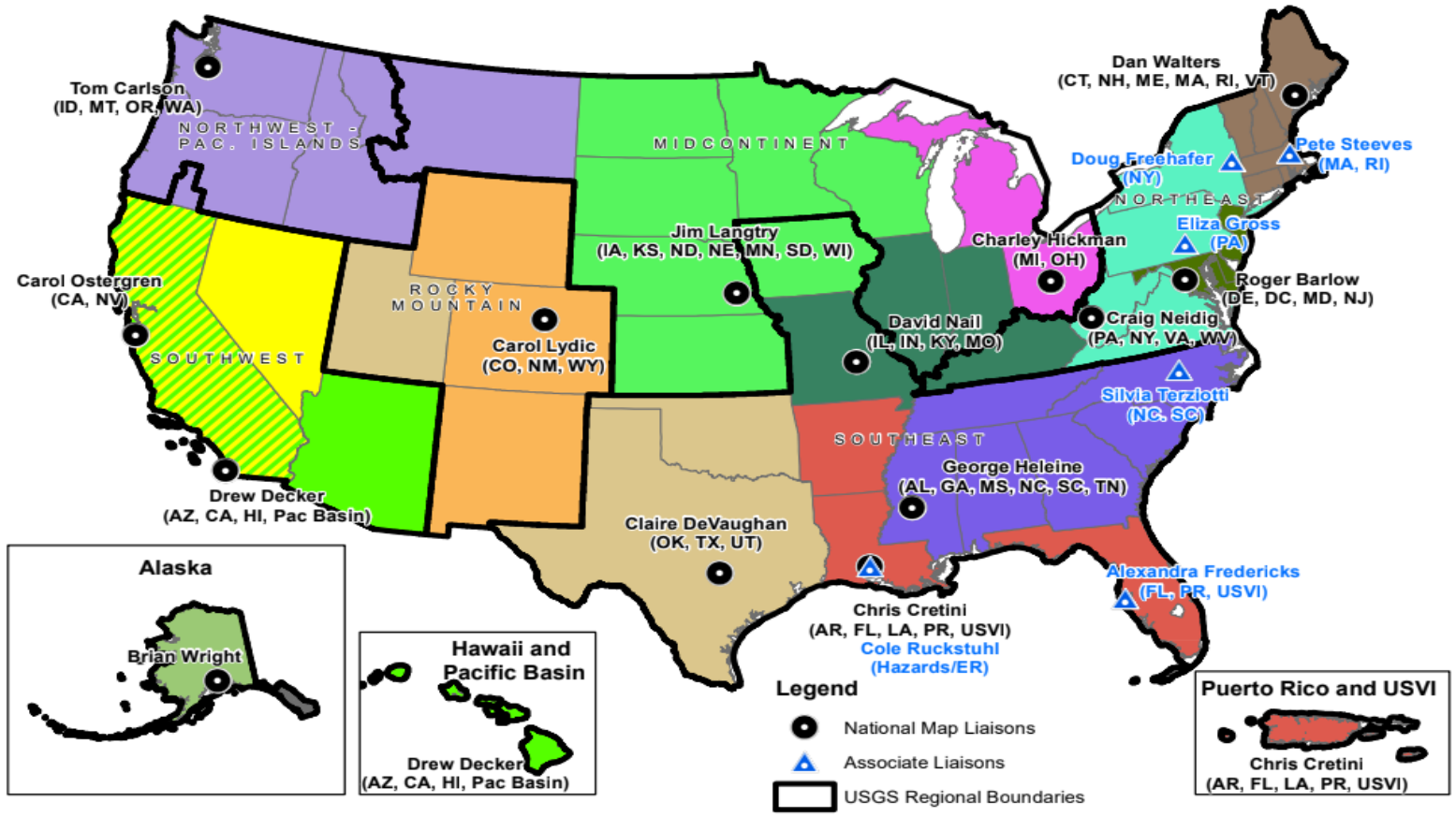
USGS National Geospatial Program Liaison for Idaho, Oregon, Montana, and Washington

tcarlson@usgs.gov

10.25.2022 Oregon Framework Forum

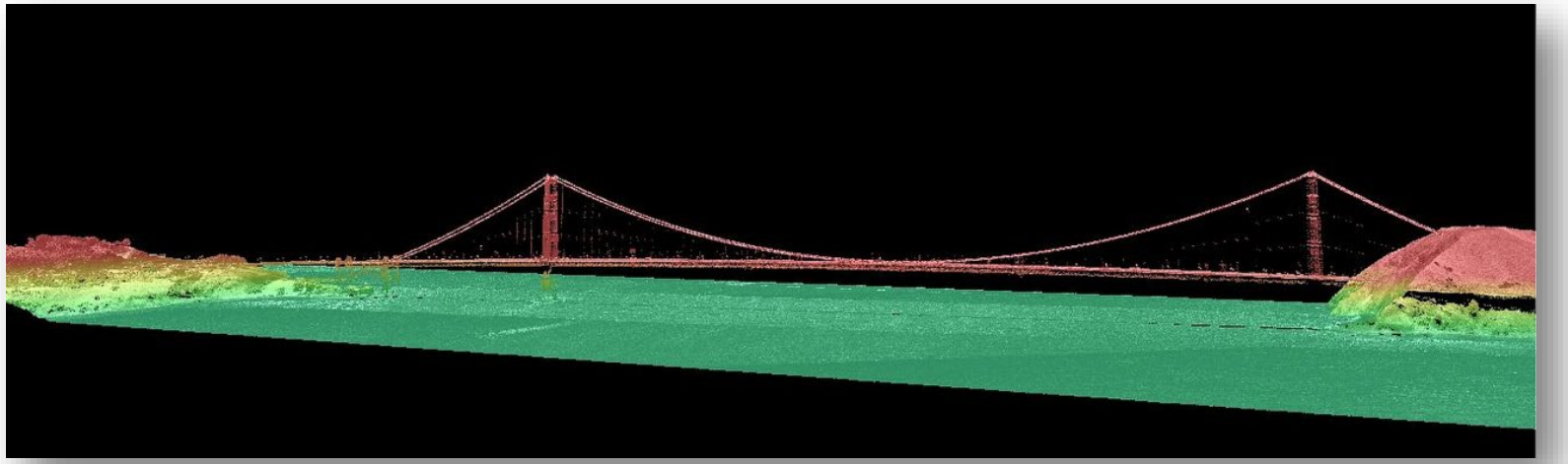
PNW Geospatial Liaison overview

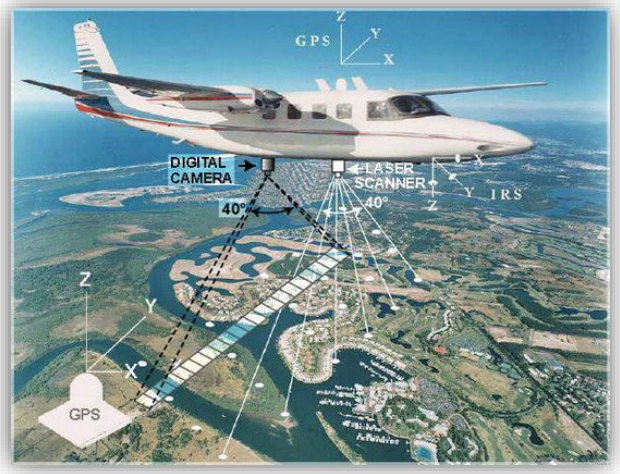
- 3DEP projects
- Topobathy projects
- Earth MRI projects
- NHD support
- Internal science support
- External support to Feds, States, Counties, Tribes, NGOs



- https://www.usgs.gov/ngp-user-engagement-office

3D Elevation Program (3DEP)





- Applies ground-breaking lidar technology to acquire and distribute three-dimensional data of bare earth, vegetation and structures at centimeter-level accuracy
- Increases the quality level of lidar being acquired to enable more accurate understanding, modeling, and prediction

3DEP is a Partnership Program

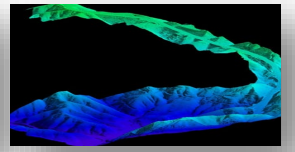
- Relies on joint funding put into projects: 3DEP (USGS, FEMA, NRCS) and outside partners contribute
- Address the mission-critical requirements of 34 Federal agencies, 50 states, and other organizations documented in the National Enhanced Elevation Assessment https://nationalmap.gov/3DEP/neea.html
- Return on investment 5:1, designed to conservatively provide new benefits of $690 million/year with the potential to generate $13 billion/year in new benefits through applications that span the economy
- Leverage the capability and capacity of private industry mapping firms
- Achieve a 25% cost efficiency gain by collecting data in larger projects
- Completely refresh national elevation data holdings with new lidar and IfSAR elevation data products and services


Natural Resource Conservation


Infrastructure Management


Flood Risk Mitigation


Precision Farming


Land Navigation and Safety


Geologic Resources and Hazards Mitigation

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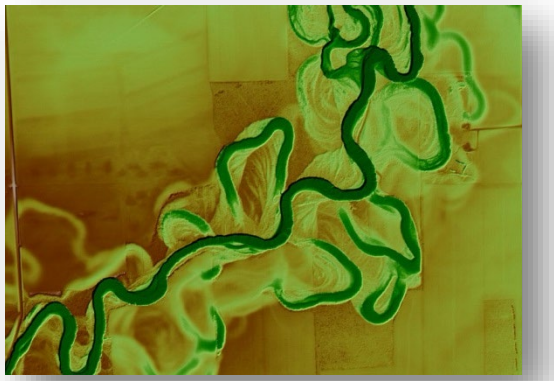
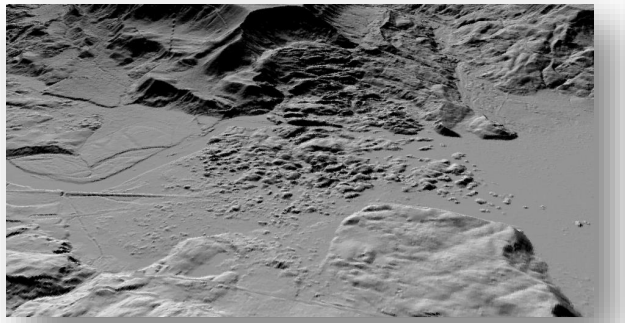
https://nationalmap.gov/3DEP/

3D Elevation Program (3DEP)

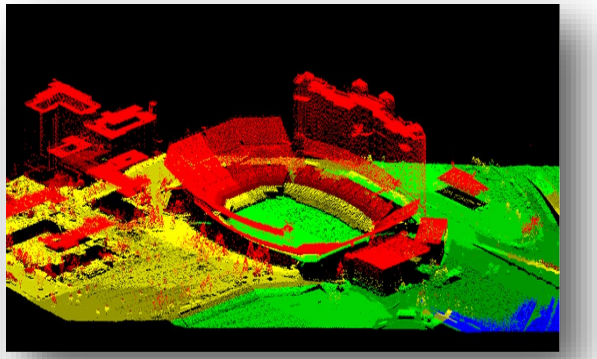
Mission Critical Applications



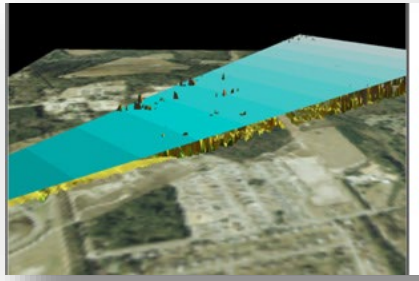
Flood Risk Management

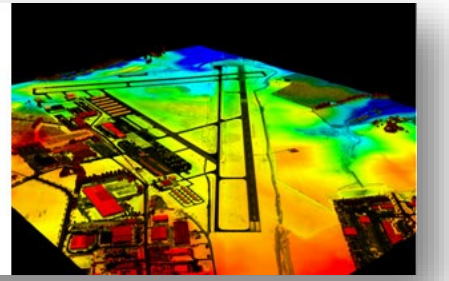


Geologic Hazards

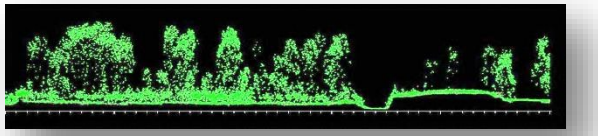


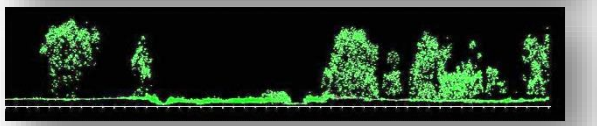
Infrastructure Management

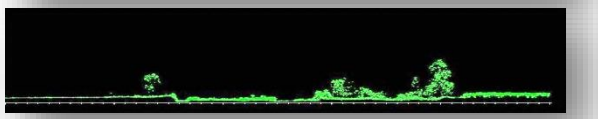




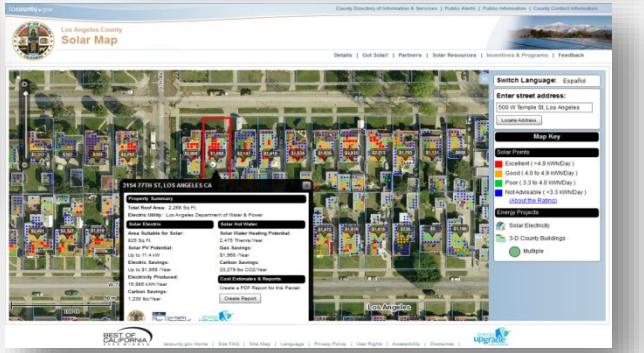
Aviation Safety



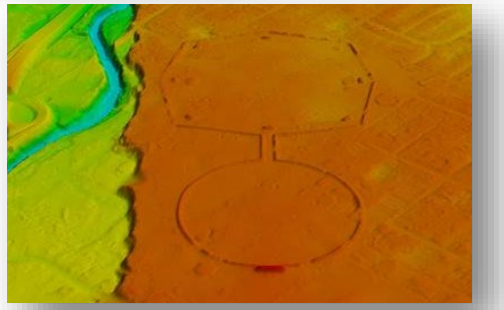




Precision Forestry



Alternative Energy



Archaeology

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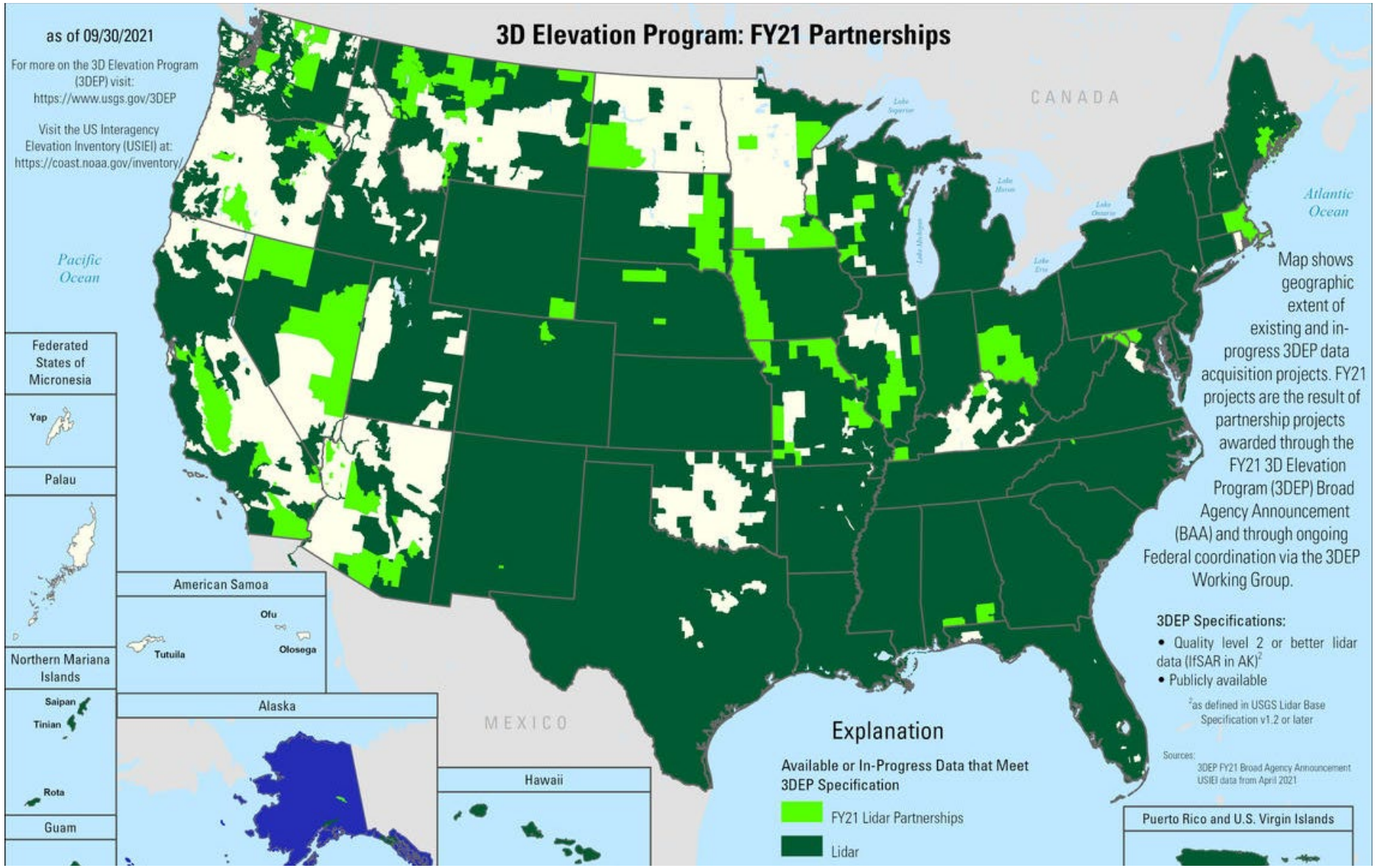
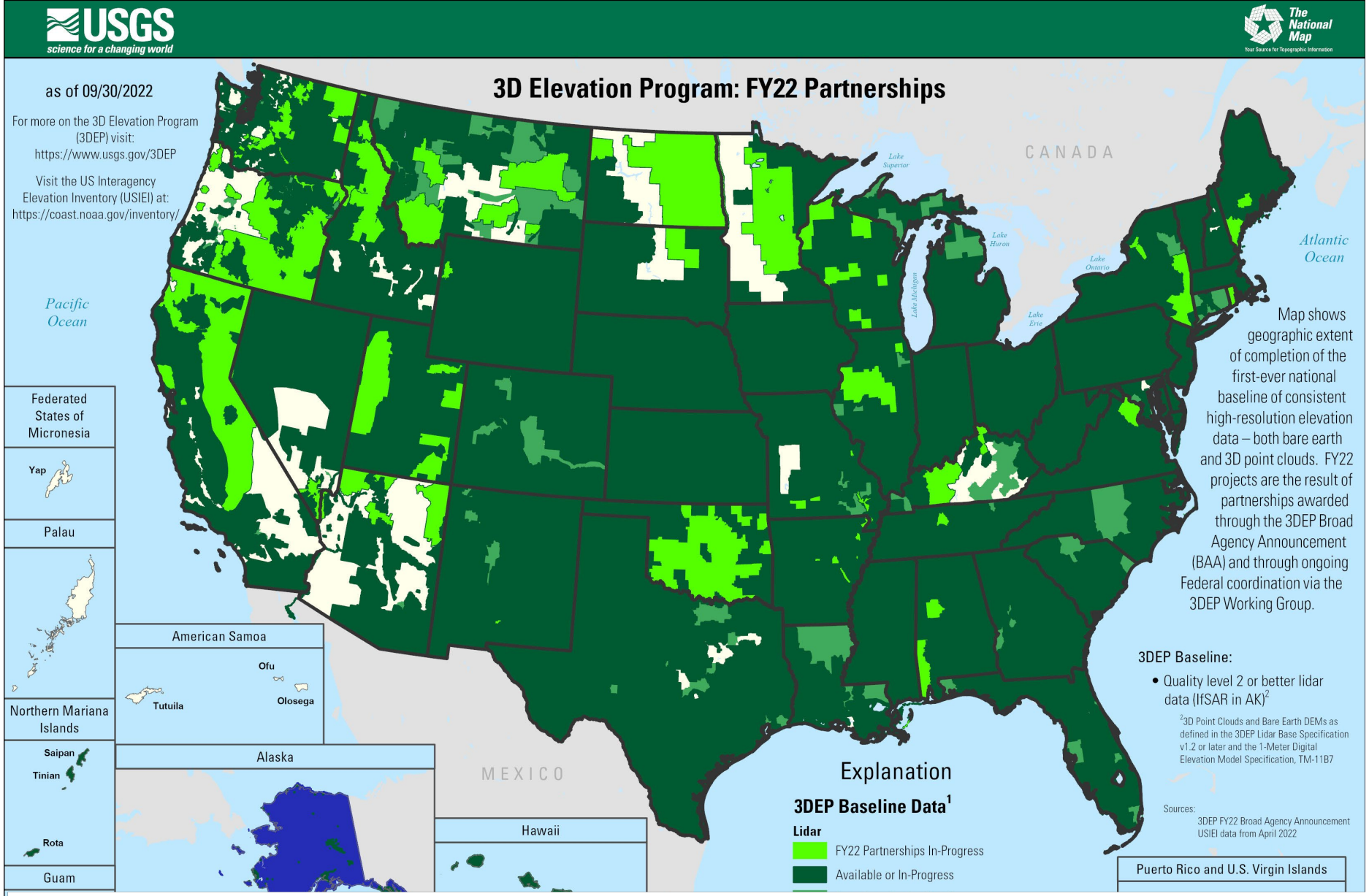
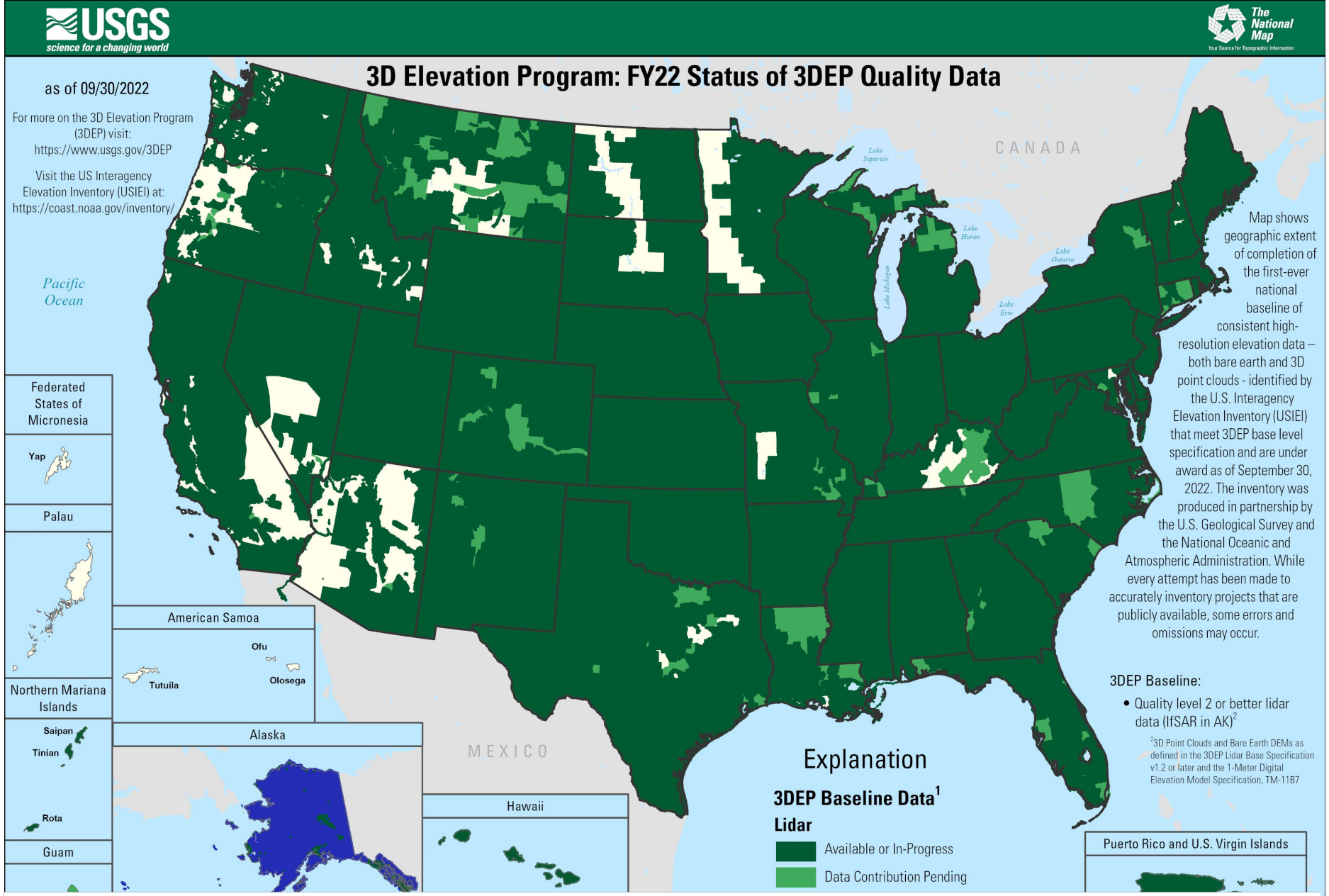


- https://www.usgs.gov/3d-elevation-program/multimedia

USGS
science for a changing wo



- https://www.usgs.gov/3d-elevation-program/multimedia



- https://www.usgs.gov/3d-elevation-program/multimedia

USGS
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The National Map

ArcGIS REST Services Directory

Home > services > 3DEPSpecification (MapServer)

JSON | SOAP | WMS

3DEPSpecification (MapServer)

View In: ArcGIS JavaScript ArcGIS Online Map Viewer ArcGIS Earth ArcMap ArcGIS Pro

View Footprint In: ArcGIS Online Map Viewer

Service Description: Areas covered by lidar projects that meet 3DEP Specification (https://www.usgs.gov/ngp-standards-and-specifications/3d-elevation-program-standards-and-specifications) or by ifsar in Alaska. Includes projec
may be restricted.

Map Name: Layers

Legend

All Layers and Tables

Dynamic Legend

Dynamic All Layers

Layers:

- Meets 3DEP base-level specification for ifsar (Alaska) (0)
- Meets 3DEP base-level specification for Lidar (1)
- Other Lidar data (2)

Description:

Copyright Text: USGS The National Map: 3D Elevation Program

Spatial Reference: 102100 (3857)

Single Fused Map Cache: false

Initial Extent:
XMin: -1.857370595071269E7
YMin: 5020788.67549642
XMax: -6160901.709108796
YMax: 1.0113221184872376E7
Spatial Reference: 102100 (3857)

Full Extent:
XMin: -1.99429488919E7
YMin: -1638971.1482999995
XMax: 2.00122842367E7
YMax: 1.1579650799199998E7
Spatial Reference: 102100 (3857)

Units: esriMeters

Supported Image Format Types: PNG32,PNG24,PNG,JPG,DIB,TIFF,EMF,PS,PDF,GIF,SVG,SVGZ,BMP

Document Info:

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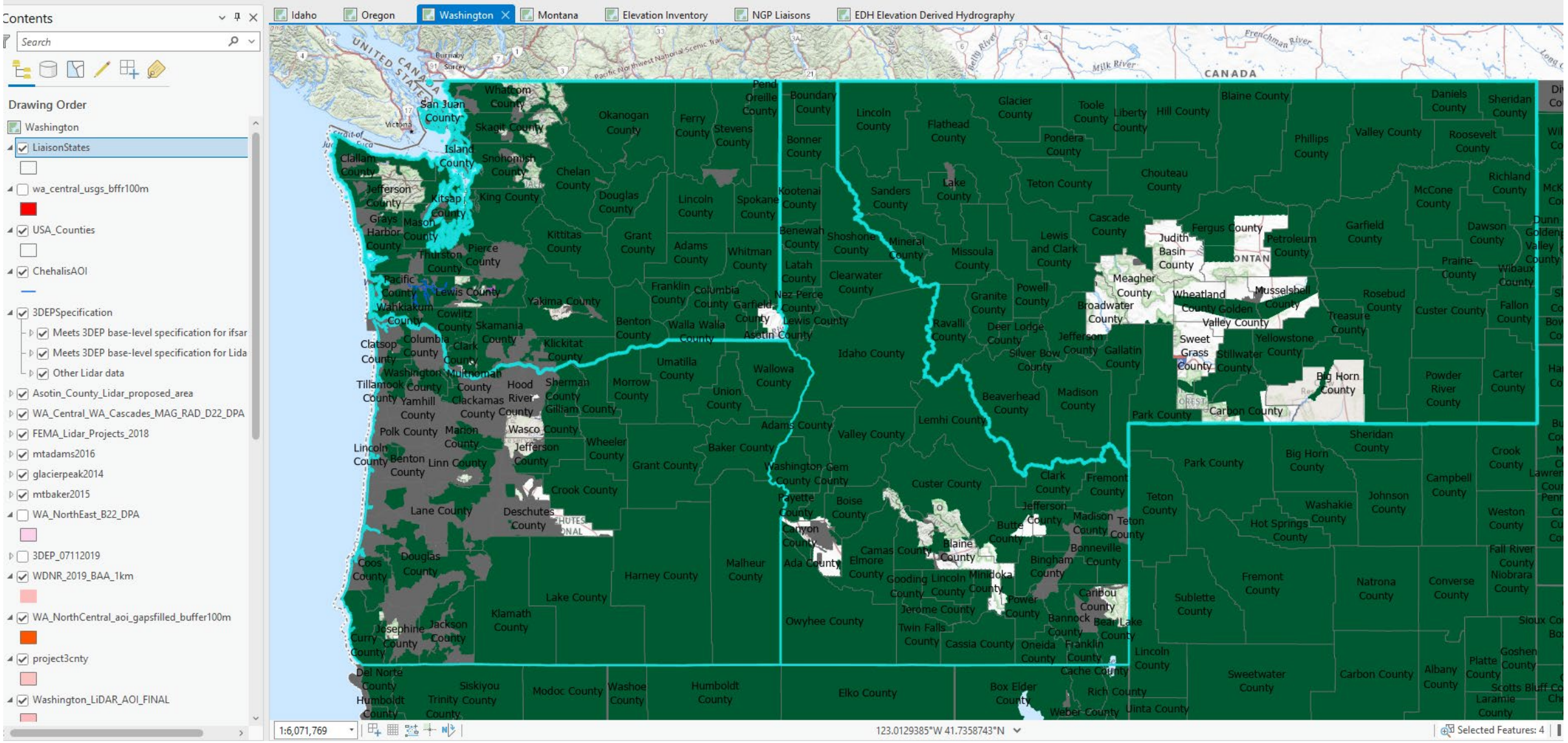
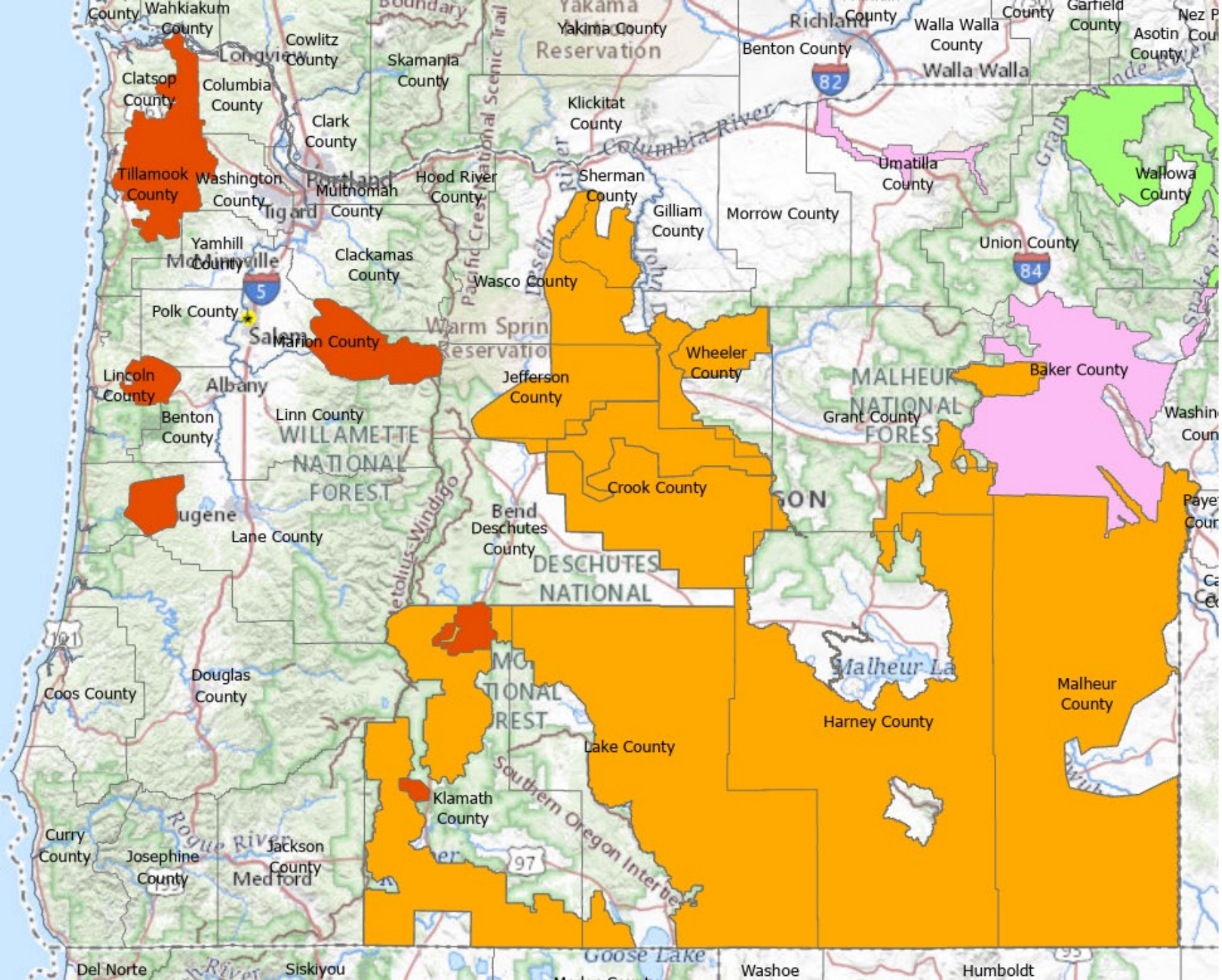
- https://partnerships.nationalmap.gov/arcgis/rest/services/3DEPSpecification/MapServer

3DEP coverage as of 10.13.22



- https://partnerships.nationalmap.gov/arcgis/rest/services/3DEPSpecification/MapServer



FY 22 3DEP Projects

ODF

DOGAMI

USGS

3DEP Data Acquisition

Broad Agency Announcement (BAA)

- Provides detailed information on how to partner with the USGS and other Federal agencies to acquire 3DEP quality data
- Announced at Fed Biz Opps and Grants.gov
- Partners may propose contributing funds toward a lidar data acquisition project using the USGS Geospatial Products and Services Contracts (GPSC) or they may request 3DEP funds toward a lidar data acquisition project using the partner's contract
- Provides a systematic, transparent process for non-Federal agencies to partner with Federal agencies - state and local governments, tribes, *academic institutions* and the private sector are eligible to submit proposals
- Begun in FY15 and FY22 is in progress with FY23 proposals due Nov 18, 2022
- Augmented with additional Federal investments throughout the year

USGS Geospatial Product and Service Contracts (GPSC)

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USGS Home
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Search USGS

USGS Geospatial Data Contracts

COMMERCIAL CONTRACTS

Geospatial Product and Service Contracts (GPSC)

USGS Geospatial Liaison Guide to the GPSC (PDF file)

Download the free Adobe Reader

Other Links

The National Map

National Geospatial Technical Operations Center

USGS Geospatial Data Contracts

The National Geospatial Technical Operations Center (NGTOC) of the USGS administers a set of Indefinite Delivery Indefinite Quantity (IDIQ) contracts through a competitive process, which provide a mechanism to obtain geospatial data services throughout the United States. The contracts primarily support *The National Map*, but they are flexible enough to be used by other Federal, State, and local agencies. The Geospatial Product and Service Contracts (GPSC) is a suite of contracts, broad in scope, that can accommodate activities related to standard, nonstandard, graphic, and digital cartographic products. Services provided may include: photogrammetric mapping and aerotriangulation; orthophotography; thematic mapping (for example, land characterization); digital imagery applications; IFSAR and LiDAR; geographic information systems development; surveying and control acquisition, including ground-based and airborne GPS; and much more.

NGTOC personnel have been providing technical support to digital cartographic services contracts for over twenty years. This technical expertise supports the contracting officer services provided by the Office of Central Region Services, Acquisition and Grants Branch in Denver, CO. For further information on how the NGTOC can provide Federal, State, and local agencies with access to these contracts, please send inquiries to gpsc@usgs.gov.

Accessibility FOIA Privacy Policies and Notices

U.S. Department of the Interior | U.S. Geological Survey
URL: *http://geodatacontracts.er.usgs.gov/index.html*
Page Contact: Contact USGS
Page Last Modified: Monday, 14-Jan-2013 19:18:00 EST

USA.gov

- http://geodatacontracts.er.usgs.gov/

An official website of the United States government Here's how you know

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3D ELEVATION PROGRAM

FY23 USGS Broad Agency Announcement (BAA)

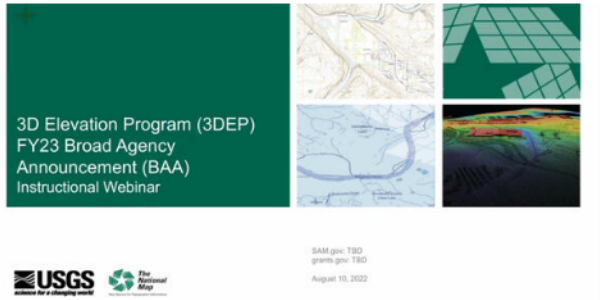
By 3D Elevation Program

- HOME
- COLLABORATION AND PARTNERSHIPS
- PROGRAM BENEFITS AND USES
- STANDARDS AND SPECIFICATIONS
- MULTIMEDIA
- PUBLICATIONS
- WEB TOOLS
- NEWS
- FAQS
- CONNECT
- ABOUT

The FY23 3DEP BAA was released October 14, 2022 (SAM.gov Reference #DOIGFBO230001 & Grants.gov Funding Opportunity #G23AS00052). Initial submissions are due November 18, 2022. The BAA will remain open and proposals received after the initial due date will be considered for review until June 1, 2023 pending available funding.

Return to BAA Portal

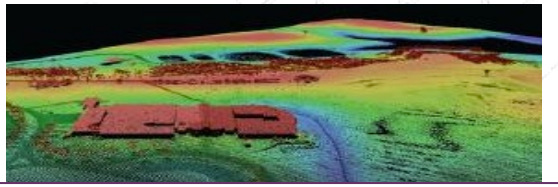
BAA Instructional Webinar



The FY23 BAA instructional webinar was held on August 10, 2022. This webinar provided an overview of the Federal fiscal year (FY) 2023 3D Elevation Program (3DEP) Broad

BAA Frequently Asked Questions

A list of Q & A's filling common knowledge gaps organized under Proposal Submissions, Funding, SeaSketch, Geographic Areas of Interest and Technical / Specs. FAQs



NSGIC 3DEP FOR THE NATION

FY2023 3DEP Broad Agency Announcement (BAA) Open for Submission

The FY2023 3DEP Broad Agency Announcement (BAA) is now open for submissions. The Program Announcement/Solicitation and application materials can be found on SAM.gov (GPSC applicants) and Grants.gov (financial assistance applicants; link TBD will be posted on BAA webpage). The attachments, including shapefiles, FAQ, and more information on the BAA can be found on the FY23 BAA webpage.

Important dates for this year:

- Preliminary IGCE requests deadline: COB Friday, October 28th, 2022.
- Initial proposal submission deadline: COB Friday, November 18th, 2022.

Preliminary IGCE requests received after October 28th, 2022 are not guaranteed a response from the USGS Commercial Partnership Team (CPT) before the November 18th, 2022 proposal deadline. Proposals received by November 18th, 2022 will receive priority consideration for funding. The BAA will remain open and proposals received after the initial due date will be considered for review until June 1st, 2023 pending available funding.

Please reach out to Brian Hadley if you have any questions.

NSGIC National States Geographic Information Council

https://www.usgs.gov/3d-elevation-program/fy23-usgs-broad-agency-announcement-baa

3DEP Quality Levels - QL

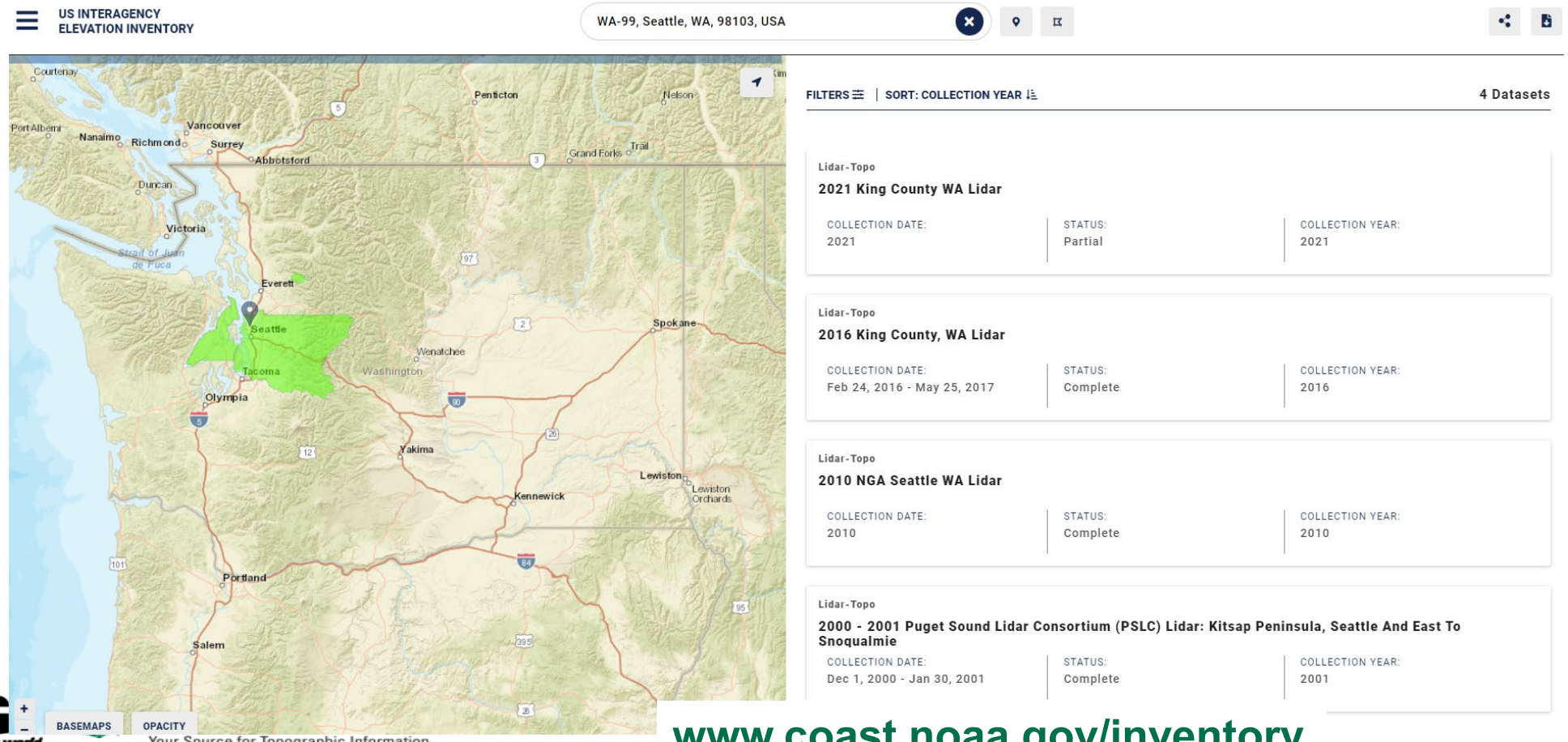
- Quality Level 2 or better, 3DEP Base specification is QL2
- WA, OR, ID, State standard is QL1 and found in State Lidar plans

Quality Level	Data Source	Vertical Accuracy RMSEz (cm)	Nominal Pulse Spacing (NPS) (meters)	Nominal Pulse Density (NPD) (points per square meter)	Digital elevation mode (DEM) cell size (meters)
QL0	Lidar	5 cm	$\leq$ 0.35 m	$\geq$ 8 pts/meter^2	0.5 m
QL1	Lidar	10 cm	$\leq$ 0.35 m	$\geq$ 8 pts/meter^2	0.5 m
QL2	Lidar	10 cm	$\leq$ 0.7 m	$\geq$ 2 pts/meter^2	1 m
QL3	Lidar	20 cm	$\leq$ 1.4 m	$\geq$ 0.5 pts/meter^2	2 m
QL4	Imagery	139 cm	N/A	N/A	5 m
QL5	Ifsar	185 cm	N/A	N/A	5 m

Where has lidar data been collected?

U.S. Interagency Elevation Inventory, USIEI

- Interagency Collaboration
  - USGS leads the topographic component by leveraging on-the-landscape knowledge of the USGS National Map liaison network
  - NOAA (Bathy-Lead), FEMA, USACE, USFS, NRCS, NPS



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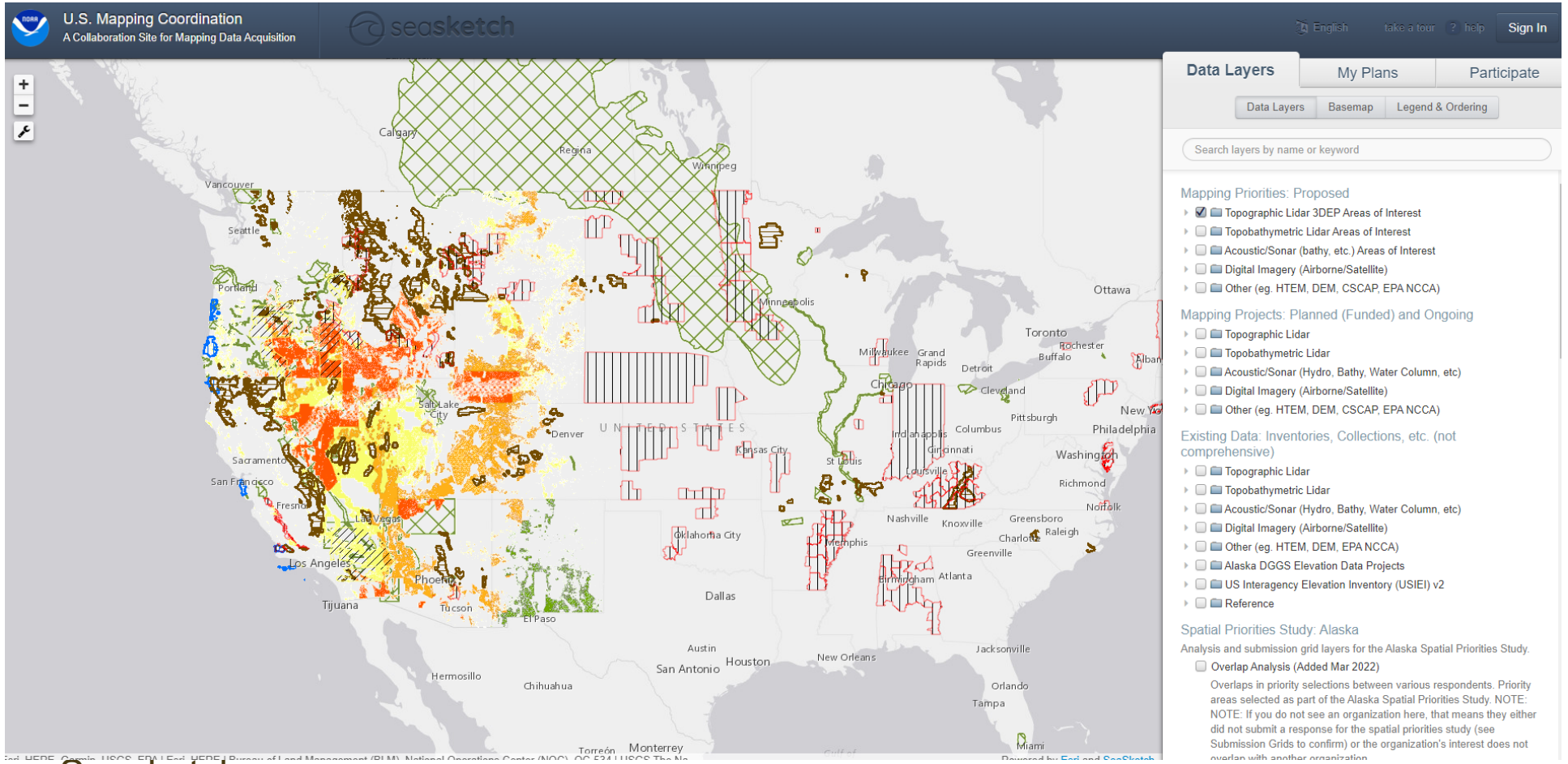
Your Source for Topographic Information

www.coast.noaa.gov/inventory

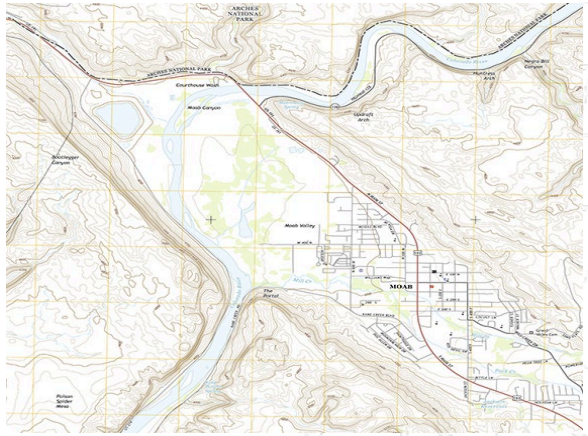
Where do people want to collect data?

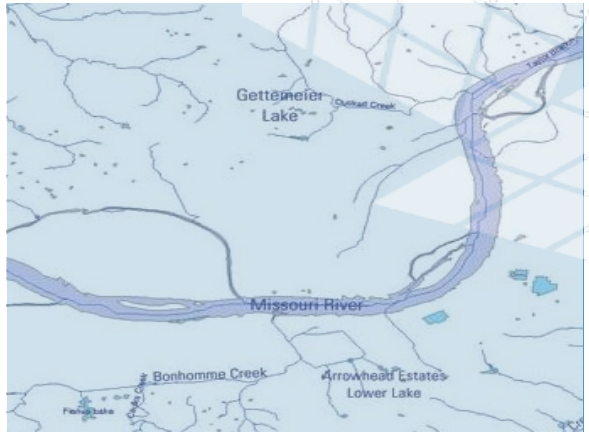
Areas of Interest – **Seasketch**

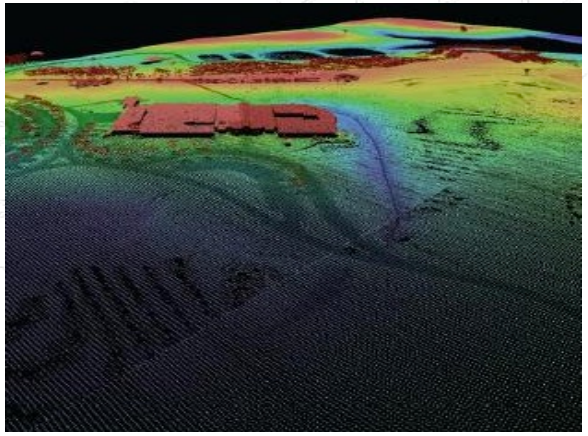


Seasketch - https://www.seasketch.org/#projecthomepage/5272840f6ec5f42d210016e4/layers

Elevation Derived Hydrography - EDH







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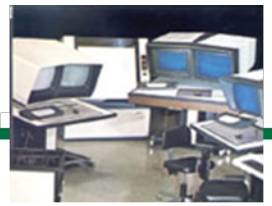
The National Map
Your Source for Topographic Information

There and back again

- Topographic maps included inherently integrated data – ***USGS collected data to make maps***
- We harvested data from those maps to develop NHD and early elevation – ***USGS maps made the data***
- We are now able to collect new, high accuracy 3DEP data and derive new, aligned hydrography data – **USGS back again to collecting data to make maps**

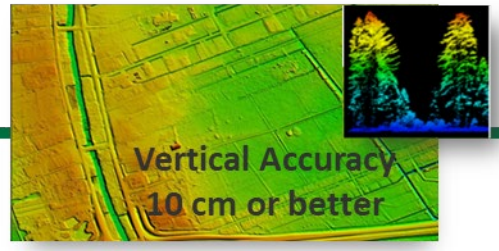
Topographic mapping began began at the USGS

1884



1976

1st Digital Elevation Model
1st Digital Line Graph (DLG)
Digitized from contours and delivered as 24k tiles



1st full year of 3DEP Production
Including lidar point cloud as a product

2016

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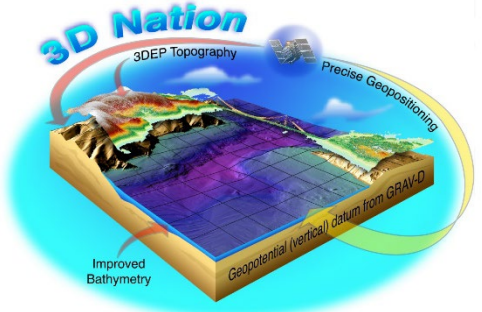
3D National Topography Model (3DNTM)

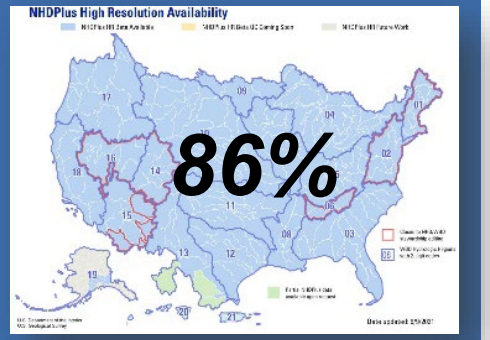
Integrates elevation and hydrography to model the Nation's topography in 3D



National Baseline Datasets

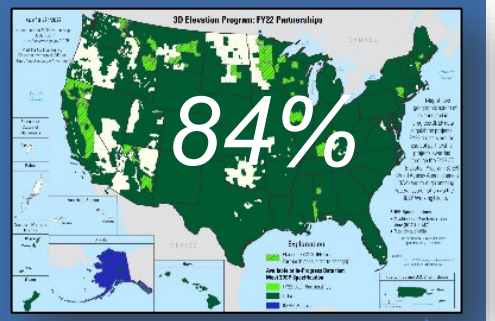
NHDPlus High Resolution (NHDPlus HR) hydrography framework

On track to complete by 2029



3D Elevation Program (3DEP) first national high-resolution elevation baseline

On track to complete acquisition by FY26



Next Generation Programs

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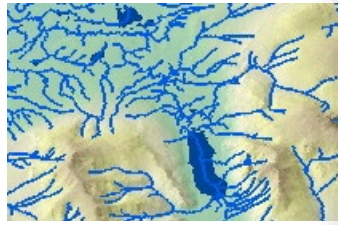
3DNTM Call for Action Part 1: 3D Hydrography Program (3DHP)



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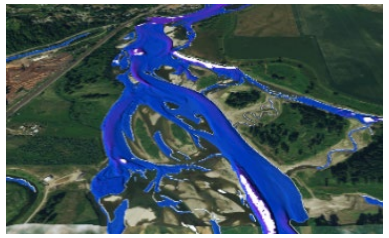
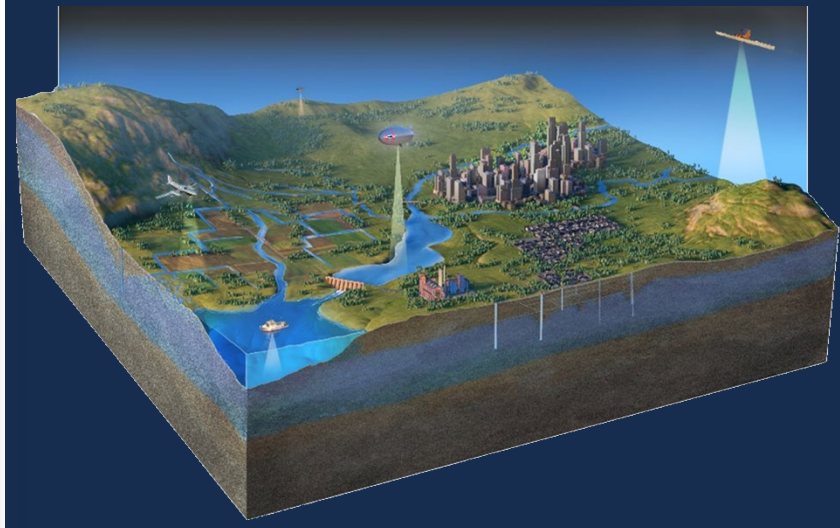
3DNTM Call for Action Part 2: Next Gen 3DEP



Integrated 3D Model



- Research and develop a 3D data model to fully integrate 3DHP and Next Gen 3DEP
- Integrate other data from *The National Map*

Ongoing → *Under development* → *Longer-term goal*

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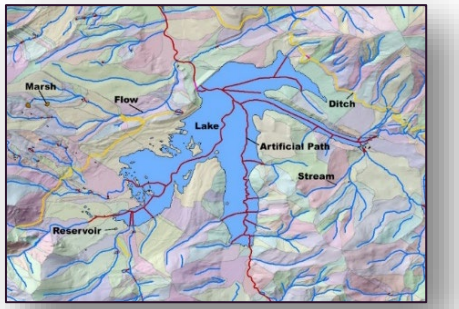
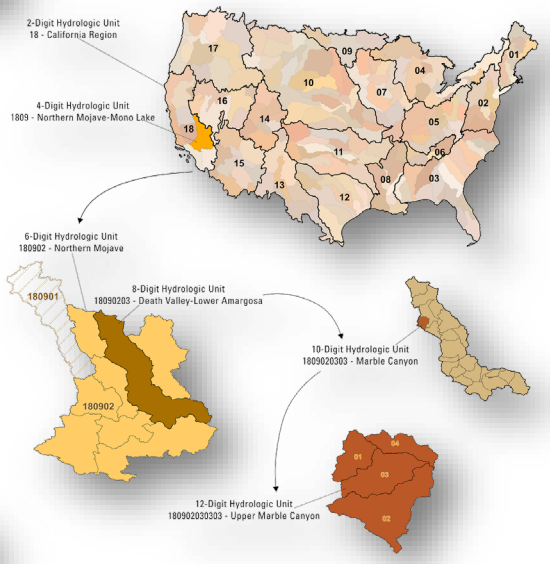
Current Approach to National Hydrography Datasets

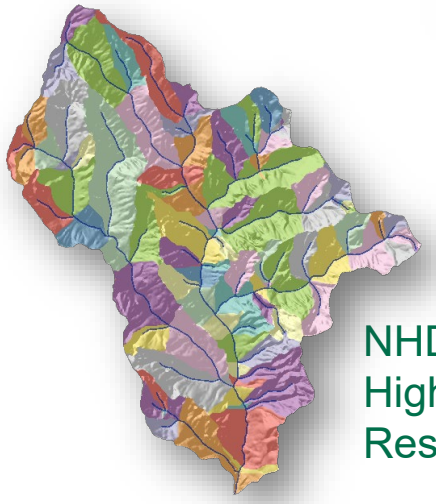
- The National Hydrography Dataset (NHD) portfolio of datasets is the most comprehensive and current data of the Nation's surface waters
  - 9.4 million miles stream of network, including 8 million waterbodies and over 130,000 nested hydrologic units
- NHD and Watershed Boundary Dataset (WBD) leverage local knowledge and updates through a stewardship program with participants from 41 states and Washington DC
- Updates are not uniform
  - Some areas have been updated, others untouched and based on older information – sometimes 40+ years old
  - National consistency of data quality has decreased over time
  - NHD surface water features don't align well with highly accurate 3D Elevation Program data



National Hydrography Dataset



Watershed Boundary Dataset

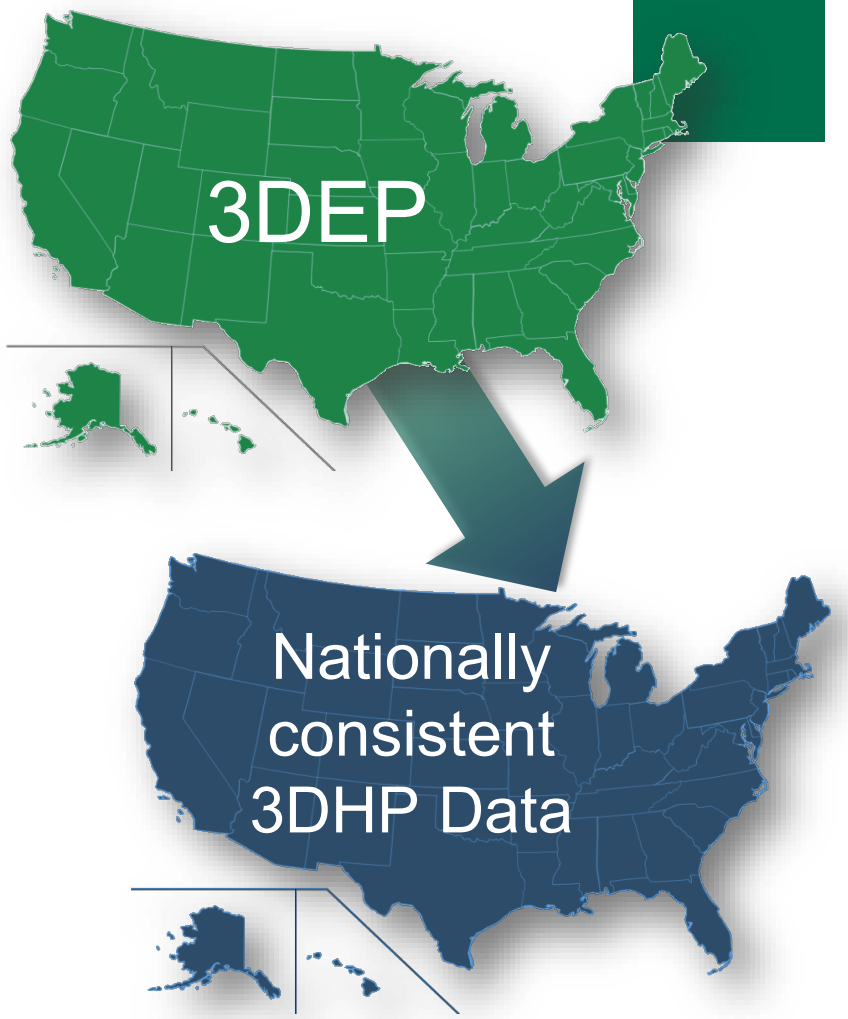


NHDPlus High Resolution

Hydrography Derived from Elevation Offers a Solution!

Introducing the 3D Hydrography Program (3DHP)

- 3DHP will provide national consistency while meeting local needs
- Goal to acquire new hydrography standardized to align vertically, horizontally, and temporally with 3DEP data, as well as other improvements
  - Supports national and regional-level issues like flooding, contaminant spills, water quality and quantity, drought, climate change, etc.
  - Supports more accurate, updated modeling and analysis capabilities
  - Supports sharing of water data as the geospatial framework underpinning the internet of water
- Data acquisition process to follow 3DEP Best Practices including coordinated governance and data acquisition
- Building on decades of work and concepts from current hydrography products



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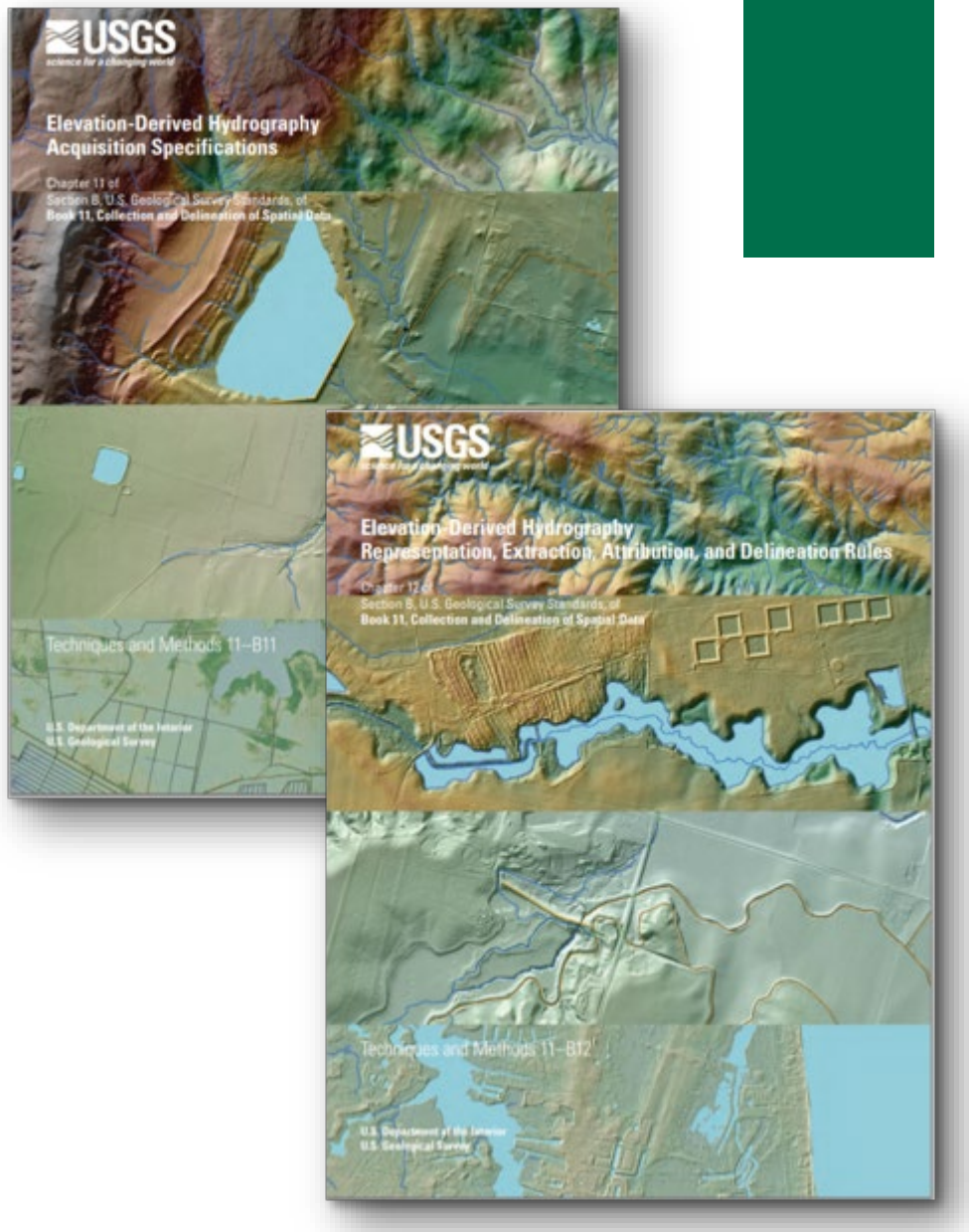
Specifications

Published July 2020

- **USGS Techniques and Methods 11–B11: Elevation-Derived Hydrography Acquisition Specifications**
  - Terziotti, S., and Archuleta, C.M., 2020, Elevation-Derived Hydrography Acquisition Specifications: U.S. Geological Survey Techniques and Methods, book 11, chap. B11, 74 p., https://doi.org/10.3133/tm11B11.
- **USGS Techniques and Methods 11–B12: Elevation-Derived Hydrography—Representation, Extraction, Attribution, and Delineation Rules**
  - Archuleta, C.M, and Terziotti, S., 2020, Elevation-Derived Hydrography—Representation, Extraction, Attribution, and Delineation Rules: U.S. Geological Survey Techniques and Methods, book 11, chap. B12, 60 p., https://doi.org/10.3133/tm11B12.
- In progress to moving to new hydro-spec site (similar to our Lidar Base Specification page)



Transition period – Federal FY 2023

Finalize NHD, WBD, NHDPlus HR

- USGS will complete queued markups to NHD and WBD
  - User markups submitted before **November 30, 2022** will be implemented
- Phase out NHD Editing during Q1 (**December 31, 2022**)
  - Discontinue new editor training
  - Phase out new job checkouts
  - Phase out external edit access to the database
- Phase out WBD Editing by Q3 **(June 30, 2023)**
- Complete production work on NHDPlus HR after meeting 2023 GPRA goals
- Publish static versions of NHD, WBD, and NHDPlus HR (**Sept 30, 2023)**
  - Static versions will remain available for the foreseeable future
  - Services will remain active for the foreseeable future
- HydroAdd
  - Line event functionality will be released in FY23 and will continue to work against the static NHD.
  - HydroAdd will also work with 3DHP in FY24.

THANK YOU!

Tom Carlson
USGS National Geospatial Program
tcarlson@usgs.gov

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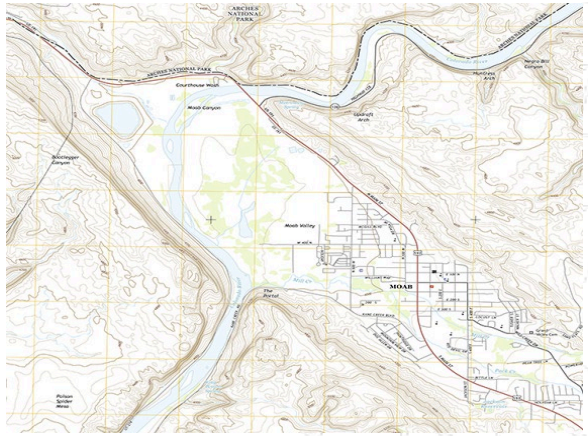
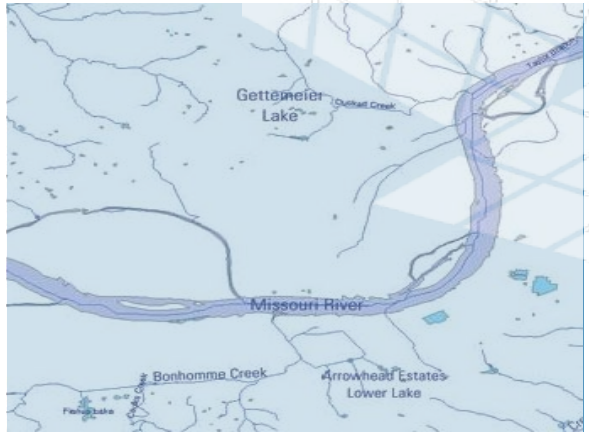
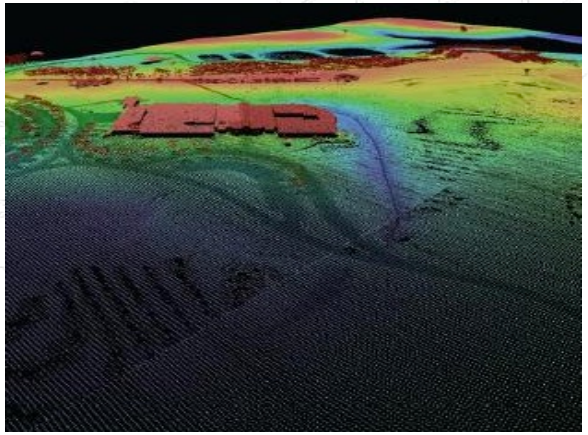
Bismarck, ND
3D Elevation Program (3DEP) data







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