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FEDERAL GEOGRAPHIC DATA COMMITTEE

3D Nation Elevation Subcommittee

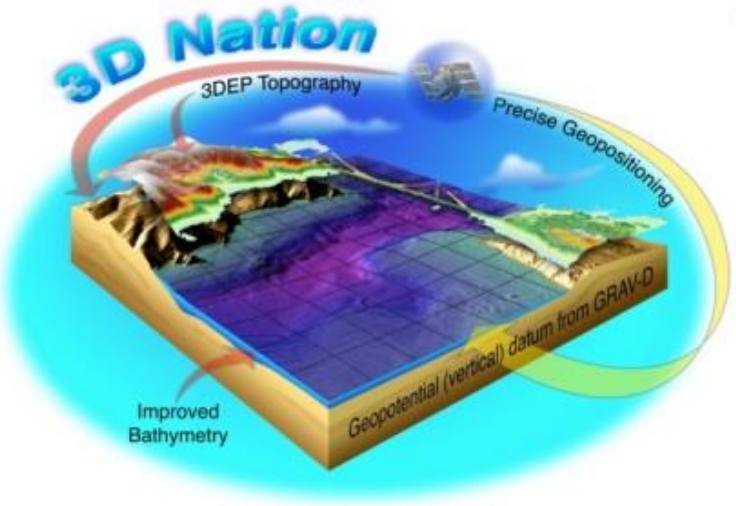
Ashley Chappell NOAA

Diane Eldridge USGS

June 12, 2018

Presentation Outline

- FGDC 3D Nation Elevation Subcommittee
- FGDC Elevation Theme
- Terrestrial Elevation
  - 3D Elevation Program (3DEP)
- Ocean and Coastal Mapping
  - Interagency Working Group on Ocean and Coastal Mapping

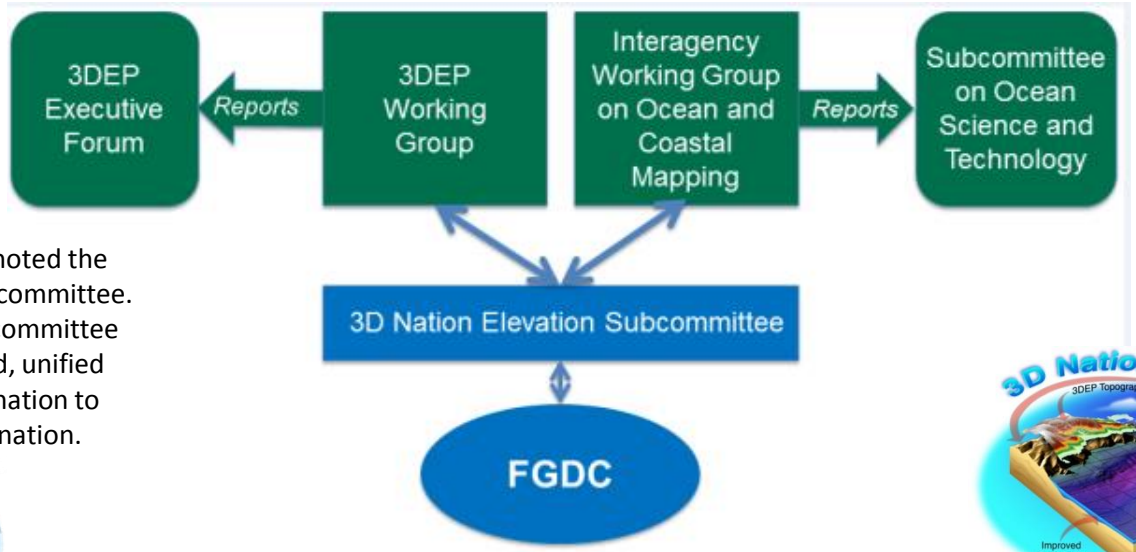


Introduction

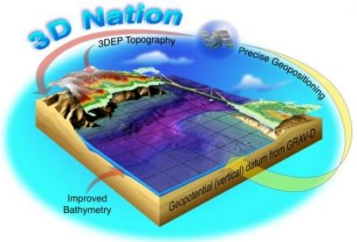
The Elevation theme has adopted a vision of the U.S. as a 3D Nation, where the theme contributes to making communities more resilient and the U.S. Economy more competitive by working to build a modern, accurate elevation foundation form our highest mountains to our deepest oceans. The concept of 3D Nation unites terrestrial and coastal/ocean mapping agencies in common purpose to achieve an authoritative national geospatial foundation in support of national mapping needs.

The Elevation theme co-leads are the US Geological Survey (USGS) for terrestrial elevation and the National Oceanic and Atmospheric Administration (NOAA) for bathymetric elevation. The USGS and NOAA are designated in OMB A-16 as the lead federal agencies for terrestrial and bathymetric elevation data.

The co-leads and their partners coordinate closely on all aspects of the elevation theme management through the following structure:



The 2015 COGO Report Card noted the lack of an FGDC elevation subcommittee. The 3D Nation Elevation Subcommittee established in 2015 formalized, unified and enhanced existing coordination to better serve the needs of the nation.



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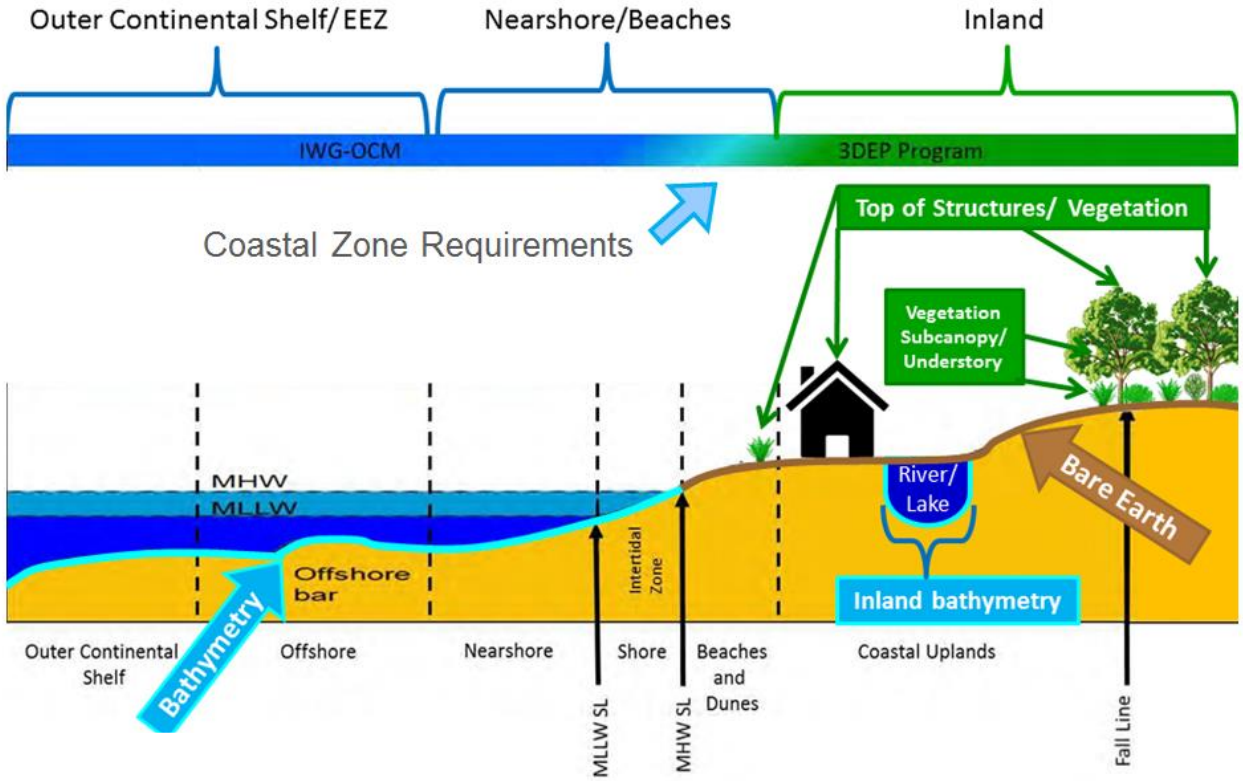
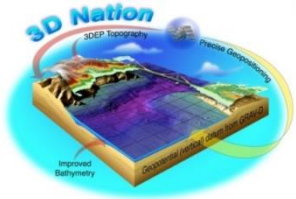
3D Nation – A unified national approach

The concept of 3D Nation unites terrestrial and coastal/ocean mapping agencies in common purpose to achieve an authoritative national geospatial foundation in support of national mapping needs.





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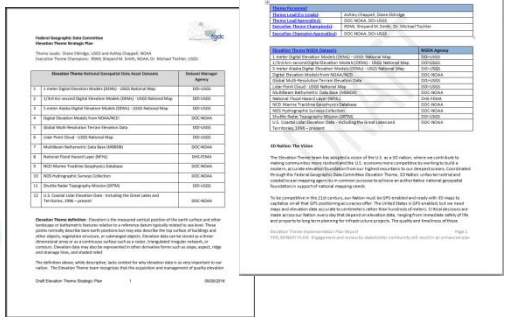
Elevation Theme Implementation Plan
Goals, Objectives and Actions

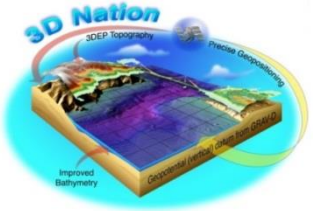
Goal 1: Ensure that federal elevation data programs meet user needs and are robustly managed.

Goal 2: Increase the *quantity* and availability of comprehensive elevation data for the building of a 3D Nation enriched by seamless elevation data.

Goal 3: Increase the *quality* and consistency of elevation datasets incorporated into the building of a 3D Nation enriched by seamless elevation data.

Goals and Objectives undertaken during 2017	Status
Goal 1: Ensure that federal elevation data programs meet user needs and are robustly managed.	
Objective 1.1: Continue to evolve and improve NGDA datasets based on documented needs from federal, state and local agencies, tribes, and private and not-for-profit organizations.	Recurring, Completed for FY17
Objective 1.2: Interact with geospatial advisory and stakeholder groups to ensure that federal elevation mapping programs support the broadest needs possible.	Recurring, Completed for FY17
Objective 1.3: Using the Elevation Theme NGDA Lifecycle Maturity Assessment (LMA) scores as a guide, work to improve the overall health of every NGDA dataset and strengthen the NGDA management plans.	In Progress
Objective 1.4: Leverage the existing strategic plans and initiatives that support each of the NGDA Elevation Theme datasets. For example, the USGS 3D Elevation Program Initiative's *A Call for Action* and the draft National Coastal Mapping Strategy are primary strategic documents that provide guidance on elevation data acquisition, data standards, stewardship, dissemination, interagency coordination, and related topics.	Recurring, Completed for FY17
Objective 1.5: Evaluate new types of elevation data collected by federal agencies that are currently not included the NGDA elevation dataset for addition to the NGDA portfolio to promote the managing of these important data as a capital asset.	Not Started
Goal 2: Increase the *quantity* and availability of comprehensive elevation data for the building of a 3D Nation enriched by seamless elevation data.	
Objective 2.1: Elevation mapping data programs establish and share annual acquisition, production and/or distribution goals to increase the availability of existing elevation data.	Recurring, Completed for FY17
Objective 2.2: Improve on the existing good coordination among federal agencies, states, academia, private sector and other partners by documenting requirements, planned acquisitions and data holdings, and by identifying and addressing opportunities for, and obstacles to, collaboration on elevation data acquisition.	Recurring, Completed for FY17
Goal 3: Increase the *quality* and consistency of elevation datasets incorporated into the building of a 3D Nation enriched by seamless elevation data.	
Objective 3.1: Increase awareness and use of federal geospatial standards and specifications throughout the geospatial community through FGDC standards endorsement opportunities, NGDA Elevation Theme Community webpage, education and outreach.	In Progress
Objective 3.2: Lead or facilitate the development and coordination of new geospatial specifications for elevation data.	Not Started





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Elevation Theme Implementation Plan
Goals, Objectives and Actions – Response to User Needs

Goals and Objectives undertaken during 2017	Status
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Objective 1.3: Using the Elevation Theme NGDA Lifecycle Maturity Assessment (LMA) scores as a guide, work to improve the overall health of every NGDA dataset and strengthen the NGDA management plans.	In Progress
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Objective 3.2: Lead or facilitate the development and coordination of new geospatial specifications for elevation data.	Not Started

Goal 2: Increase the *quantity* and availability of comprehensive elevation data for the building of a 3D Nation enriched by seamless elevation data.

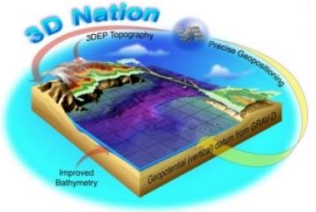
Action 2.1.1 Theme agencies and / or programs establish annual acquisition and/or production goals (not appropriate for static datasets – static datasets focus on availability 2.1.3, 2.1.5)

Action 2.1.2 Theme agencies and /or programs establish annual data publication goals to increase the availability and access to data that can be incorporated into the building of a 3D Nation

Action 2.1.3 NGDA elevation datasets are readily available to the public through federal geospatial programs and public download sites

Action 2.1.4 Theme agencies embrace new acquisition technologies that may result in increased capabilities or efficiencies to acquire data in support of elevation theme goals and objectives

Action 2.1.5 Theme agencies embrace new and evolving distribution technologies to increase the availability of elevation data across distribution platforms



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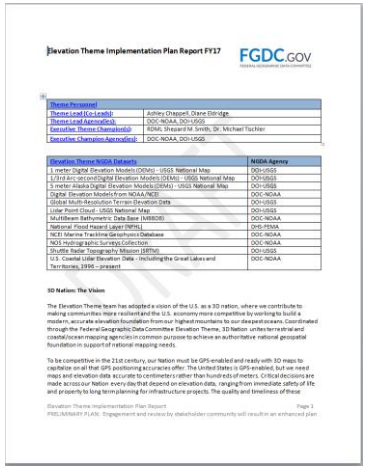
NGDA Data Themes and Data Sets

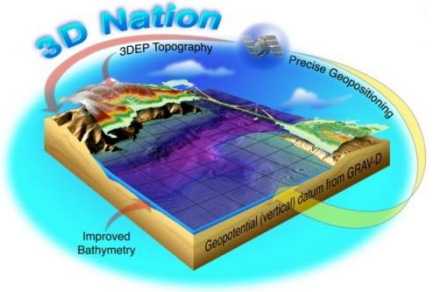
The following data sets fall under the purview of the 3D Nation Elevation Theme

Theme Personnel	
Theme Lead (Co-Leads):	Ashley Chappell, Diane Eldridge
Theme Lead Agency(ies):	DOC-NOAA, DOI-USGS
Executive Theme Champion(s):	RDML Shepard M. Smith, Dr. Michael Tischler
Executive Champion Agency(ies):	DOC-NOAA, DOI-USGS

Elevation Theme NGDA Datasets		NGDA Agency
1 meter Digital Elevation Models (DEMs) - USGS National Map		DOI-USGS ⟵ (3DEP)
1/3rd Arc-second Digital Elevation Models (DEMs) - USGS National Map		DOI-USGS ⟵ (3DEP)
5 meter Alaska Digital Elevation Models (DEMs) - USGS National Map		DOI-USGS ⟵ (3DEP)
Digital Elevation Models from NOAA/NCEI	(IWG-OCM) ⇨	DOC-NOAA
Global Multi-Resolution Terrain Elevation Data		DOI-USGS
Lidar Point Cloud - USGS National Map		DOI-USGS ⟵ (3DEP)
MultiBeam Bathymetric Data Base (MBBDB)	(IWG-OCM) ⇨	DOC-NOAA
National Flood Hazard Layer (NFHL)		DHS-FEMA (*)
NCEI Marine Trackline Geophysics Database	(IWG-OCM) ⇨	DOC-NOAA
NOS Hydrographic Surveys Collection	(IWG-OCM) ⇨	DOC-NOAA
Shuttle Radar Topography Mission (SRTM)		DOI-USGS
U.S. Coastal Lidar Elevation Data - Including the Great Lakes and Territories, 1996 – present	(IWG-OCM) ⇨	DOC-NOAA


Elevation Theme Implementation Plan Report FY17 FGDC.GOV

(* 3DEP data supports the National Flood Insurance Program)



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NGDA Data Themes and Data Sets

Elevation Theme NGDA Maturity Assessment Dashboard

NGDA Lifecycle Maturity Assessment Dashboard

Select a NGDA Dataset Lifecycle Maturity Assessment survey from the filter widget below. The most recent results are displayed by default and shown NGDA Dataset maturity levels. You may choose to filter by Theme or Agency using the Filter selection widgets. For more details, click on a rating box (cell) or hover over column headings.

NGDA ID (low-high) | 2015 and 2017 Lifecycle Maturity Assessment levels are not comparable. For more information see Year over Year Maturity Change. | Legend

NGDA ID	Year	Dataset Name	General	Define/ Plan	Inventory/ Evaluate	Obtain	Access	Maintain	Use/ Evaluate	Archive	Overall	Theme	Agency
		Rollup	4/5	5/5	5/5	4/5	5/5	5/5	4/5	4/5	5/5		
37	2017	US Coastal Lidar Elevation Data Including the Great Lakes and Territories 1996 present	4/5	4/5	4/5	4/5	4/5	4/5	4/5	4/5	4/5	Elevation	DOC NOAA
38	2017	Coastal Digital Elevation Models DEMs	4/5	5/5	5/5	5/5	5/5	5/5	5/5	5/5	5/5	Elevation	DOC NOAA
39	2017	Global MultiResolution Terrain Elevation Data National Geospatial Data Asset NGDA	2/5	5/5	5/5	3/5	5/5	4/5	3/5	5/5	4/5	Elevation	DOI USGS
40	2017	Lidar Point Cloud USGS National Map	4/5	5/5	5/5	4/5	5/5	5/5	5/5	4/5	5/5	Elevation	DOI USGS
41	2017	MultiBeam Bathymetry Database MBBDB	4/5	4/5	5/5	5/5	5/5	5/5	5/5	5/5	5/5	Elevation	DOC NOAA
42	2017	13rd Arcsecond Digital Elevation Models DEMs USGS National Map	4/5	5/5	5/5	5/5	5/5	5/5	5/5	4/5	5/5	Elevation	DOI USGS
43	2017	National Flood Hazard Layer NFHL	5/5	4/5	1/5	4/5	5/5	4/5	2/5	0/5	3/5	Elevation	DHS FEMA
44	2017	NGDC Marine Trackline Geophysics Database	4/5	5/5	5/5	5/5	5/5	5/5	4/5	5/5	5/5	Elevation	DOC NOAA
45	2017	NOS Hydrographic Surveys Collection	4/5	5/5	5/5	4/5	5/5	5/5	5/5	5/5	5/5	Elevation	DOC NOAA
46	2017	Shuttle Radar Topography Mission SRTM	5/5	5/5	5/5	5/5	5/5	5/5	5/5	5/5	5/5	Elevation	DOI USGS
184	2017	1 meter Digital Elevation Models DEMs USGS National Map	4/5	5/5	5/5	4/5	5/5	5/5	5/5	5/5	5/5	Elevation	DOI USGS
185	2017	5 Meter Alaska Digital Elevation Models DEMs USGS National Map	4/5	5/5	5/5	5/5	5/5	5/5	5/5	4/5	5/5	Elevation	DOI USGS

https://dashboard.geoplatform.gov/lma?assessments=2017&themes=5

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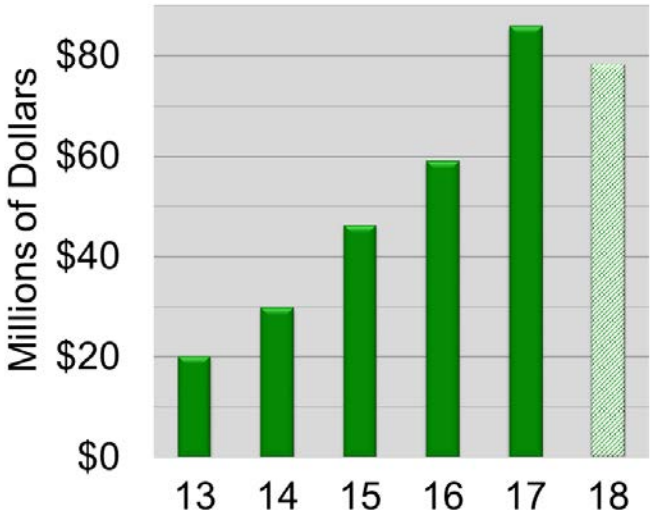
3DEP Status Including FY18 Partnerships to Date

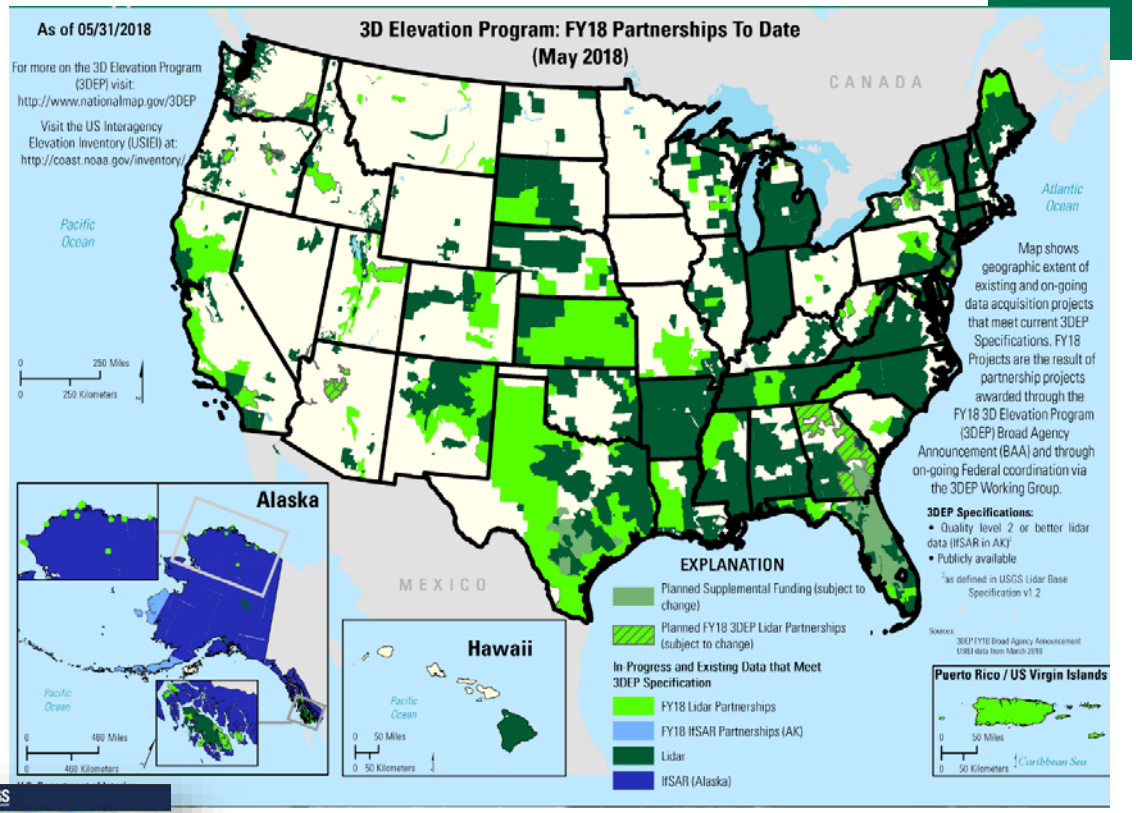
Data are available or in progress for 48% of the Nation

*includes lidar and AK IfSAR



Data acquisition investments by all partners, by fiscal year

FY18 shows investments to date and is not complete



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	≤ 0.35 m	≥ 8 pts/meter²	0.5 m
QL1	Lidar	10 cm	≤ 0.35 m	≥ 8 pts/meter²	0.5 m
QL2	Lidar	10 cm	≤ 0.7 m	≥ 2 pts/meter²	1 m

Map reflects all lidar data that adheres to the USGS lidar base specification; 3DEP minimum and standard point density is 2PPSM

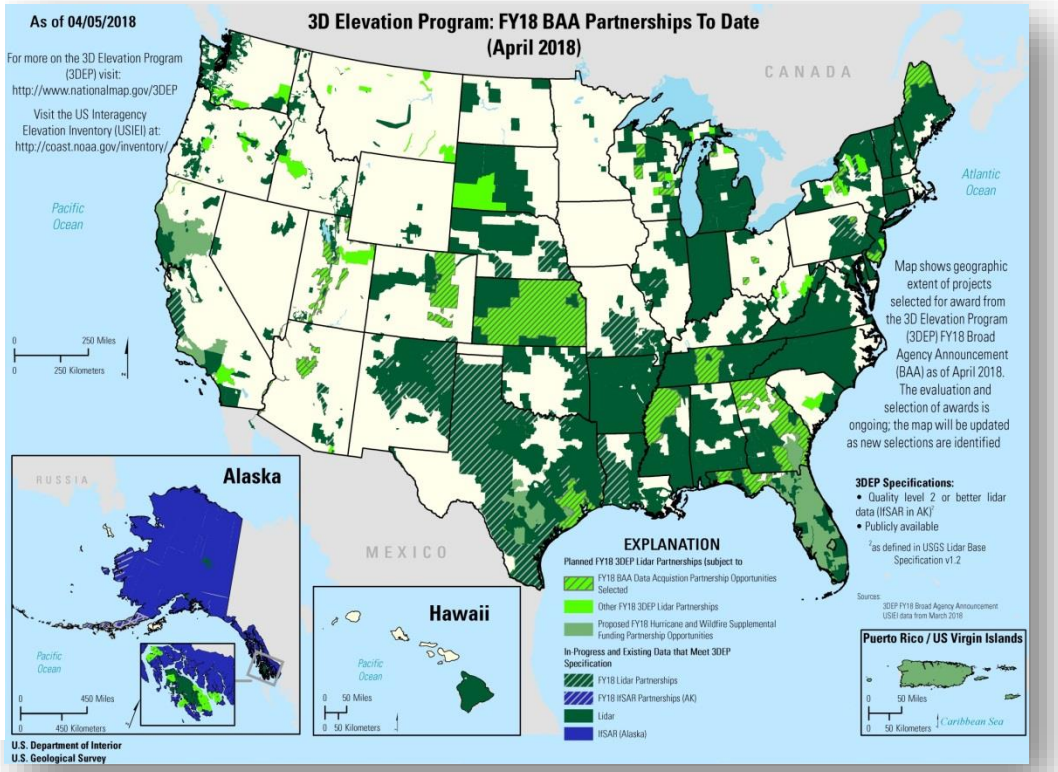
USGS science for a changing world

The National Map
Your Source for Topographic Information

3D Elevation Program (3DEP) FY18

Data are available or in progress for 48% of the Nation

- Federal Partnerships
  - Significant contributions from FEMA and NRCS
  - Increasing contributions from the USFS
- Broad Agency Announcement (BAA)
  - Open, transparent, competitive process for partnership funding for 3DEP projects
  - FY15 – FY18 a total of 119 proposals funded
  - Continued growth in partners – in FY18 over 95 different federal, state, regional, local, private and non-profit participants



USGS science for a changing world

The National Map
Your Source for Topographic Information

Establish State-based 3DEP Lidar Acquisition Planning Guides

- February 2018 – February 2019; build the project foundation
- NSGIC Project Objectives
  - Promote lidar acquisition and use
  - Identify local, state, regional, and federal 3DEP needs, priorities, advocates
  - Organize needs and priorities into a cohesive set of state acquisition planning guides that support multi-year acquisition and will result in nation-wide 3DEP coverage
  - Identify funding sources and develop partnerships
- NSGIC Project Process
  - Review of Current Plans and Processes
  - Developing a State Lidar Acquisition Planning Guide template
    - Piloted in 5 or 6 states
  - Interactive Statewide Maps and Applications
    - Current requirements viewer is Seasketch
    - Goal to develop an interactive GIS enabled decision support system to gather and coalesce requirements

INTERAGENCY WORKING GROUP ON
Ocean and Coastal Mapping

What is IOCM?

IOCM is *planning, acquiring, integrating, and managing* ocean and coastal geospatial data and derivative products for easy access and use by the greatest range of users.

Three primary tasks:

1. Data Acquisition

2. End-to-End Data Management

3. Maximum Use and Re-Use of data

Ocean and Coastal Mapping Integration Act of 2009

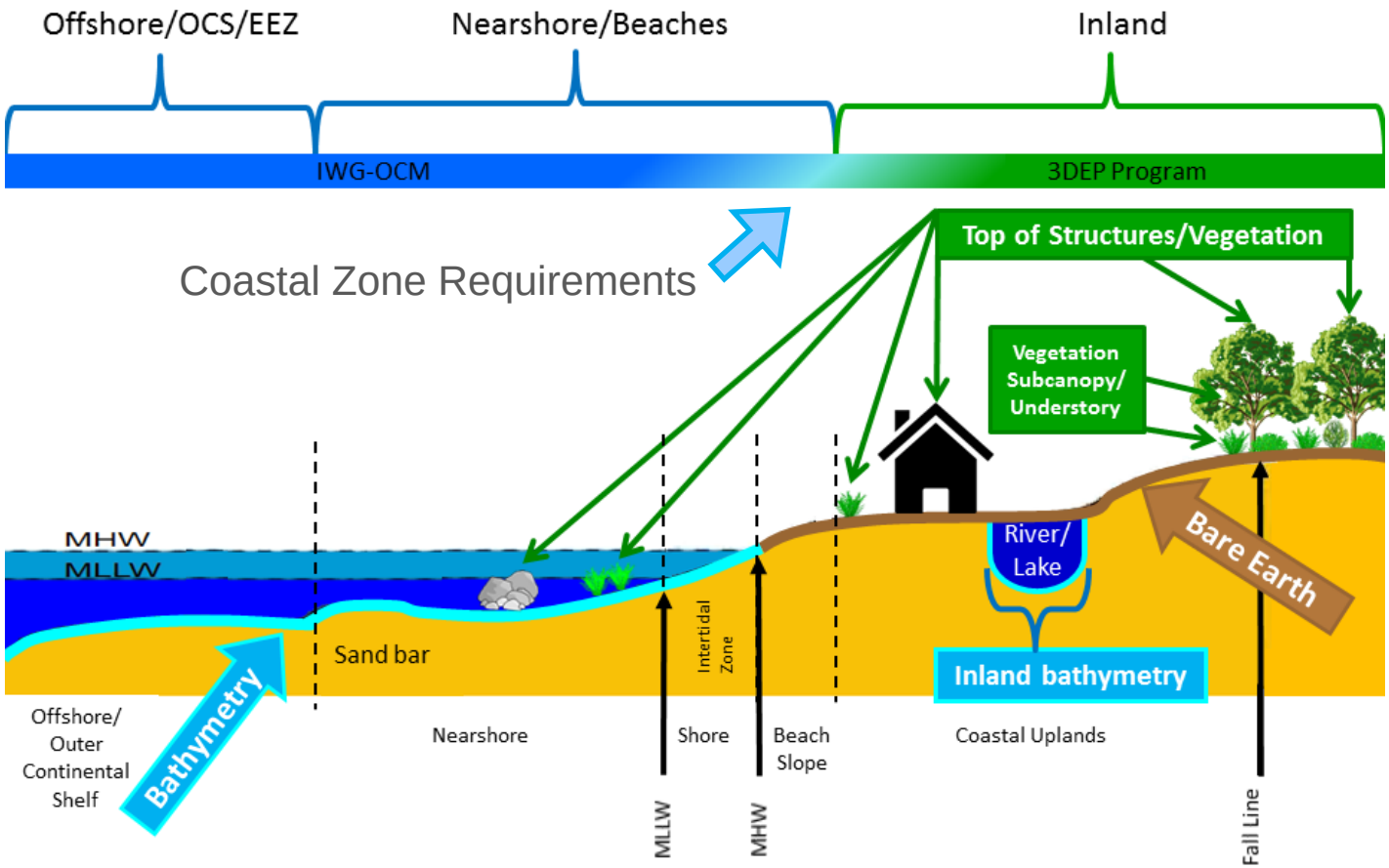
Mapping a 3D Nation: Requirements and Benefits Study Goals

Understand 3D Data Requirements

- IWG-OCM and 3DEP agencies
- Refresh NEEA for the years beyond the initial 8-year acquisition program
- Understand inland, nearshore, and offshore bathymetric data requirements and benefits
- Understand how requirements and benefits dovetail in the coastal zone
- Sensor agnostic/Technology Neutral
  - Focused on need for, and value of, elevation data

3D Nation Study Context

Inland, Nearshore, Offshore and Topo, Bathy, Topo/Bathy

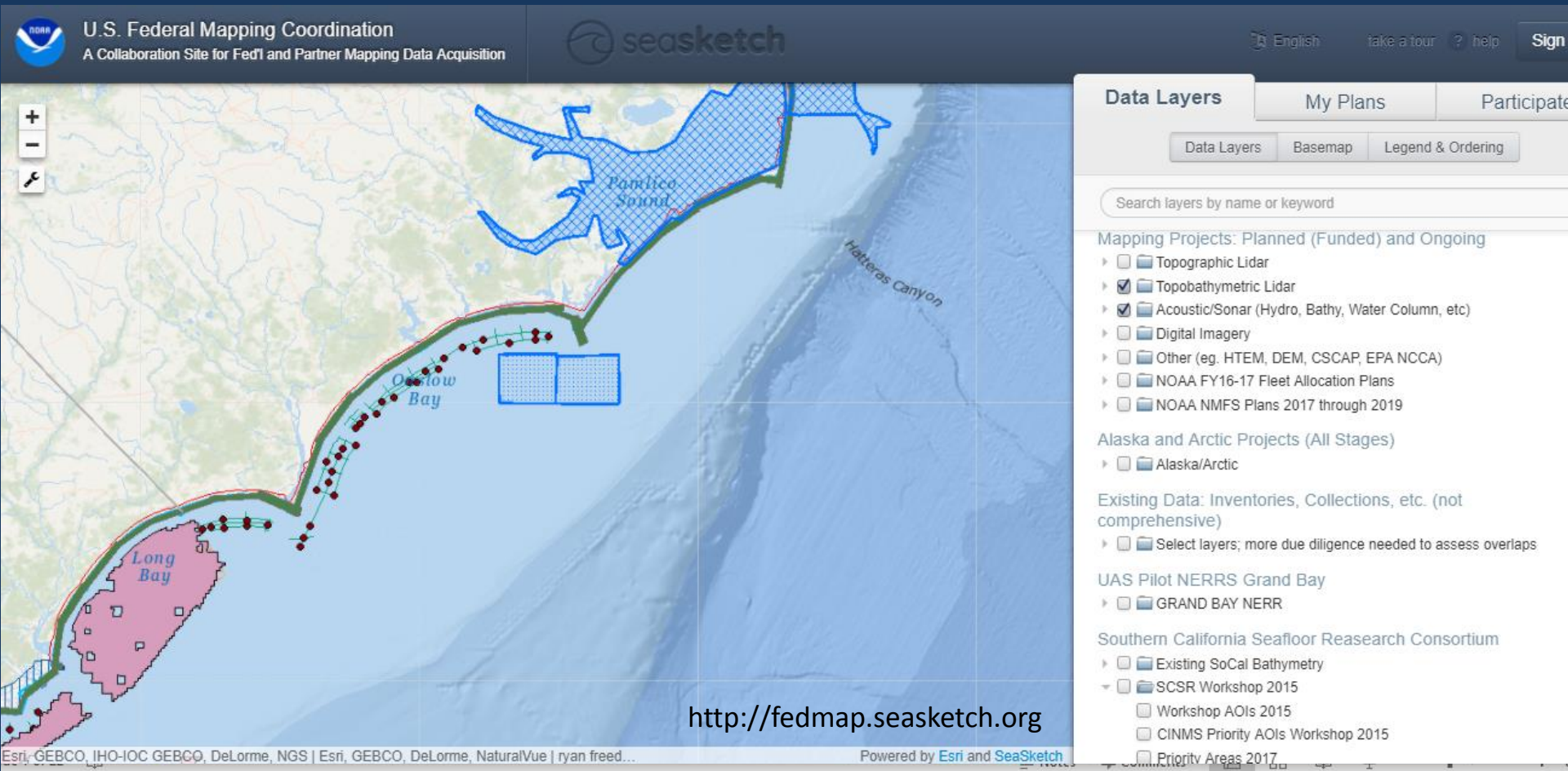


Technology Neutral Approach

USGS science for a changing world | The National Map Your Source for Topographic Information | Dewberry | Interagency Working Group on Ocean and Coastal Mapping | NOAA

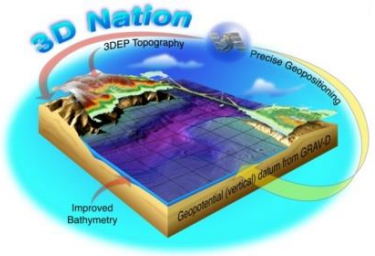
U.S. Federal Mapping Coordination Site

- IWG-OCM and 3DEP agencies are using Seasketch tool to share info on acquisition plans, data needs, coordination
- Additional tools available for use – forums, sketching



Focus Areas for 2018

- Ocean and Coastal Mapping Strategy 2.0
- National Ocean Policy
- Critical Minerals Executive Order
- Seabed 2030
- 3D Nation Requirements and Benefits Study
- Hurricane Supplemental projects
- Lidar Base Specification 1.3
- Geiger mode and single photon lidar testing
- Inland bathymetry



Questions?

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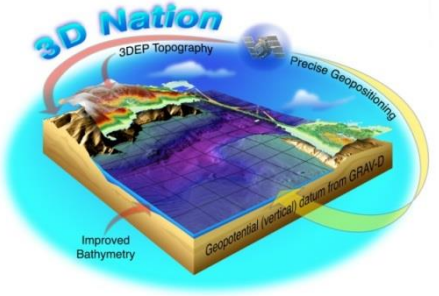
deldridge@usgs.gov



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