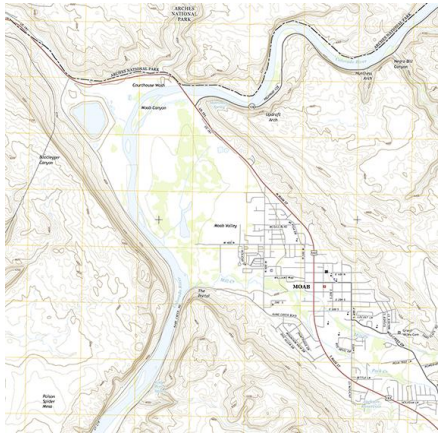
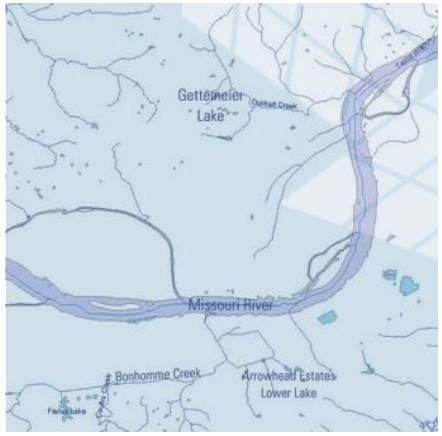
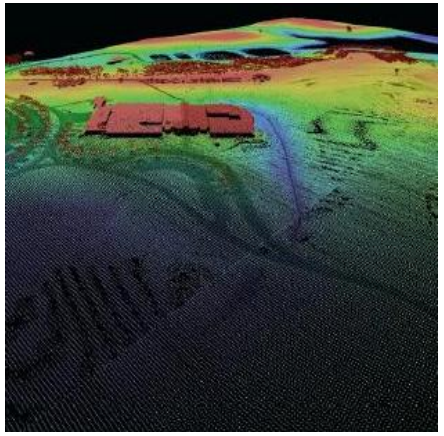
3D Elevation Program (3DEP)







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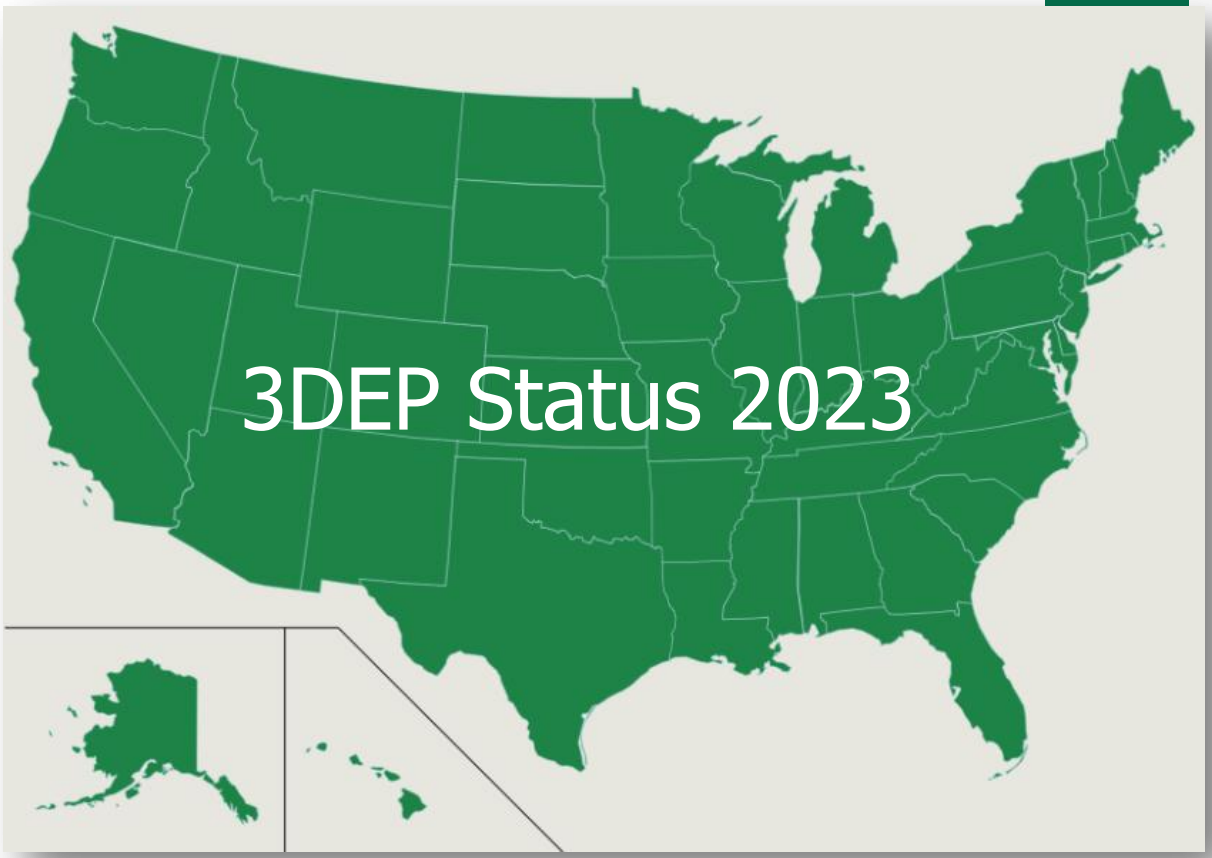
February 13, 2018

3D Elevation Program (3DEP) Goals

- Complete acquisition in 8 years
- Address Federal, state and other mission-critical requirements
- Realize ROI 5:1 and potential to generate $13 billion/year
- Leverage the capability and capacity of private mapping firms
- Achieve a 25% cost efficiency gain
- Completely refresh national data holdings



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3DEP for Flood Risk Management

Conservative annual benefits estimated at $502M

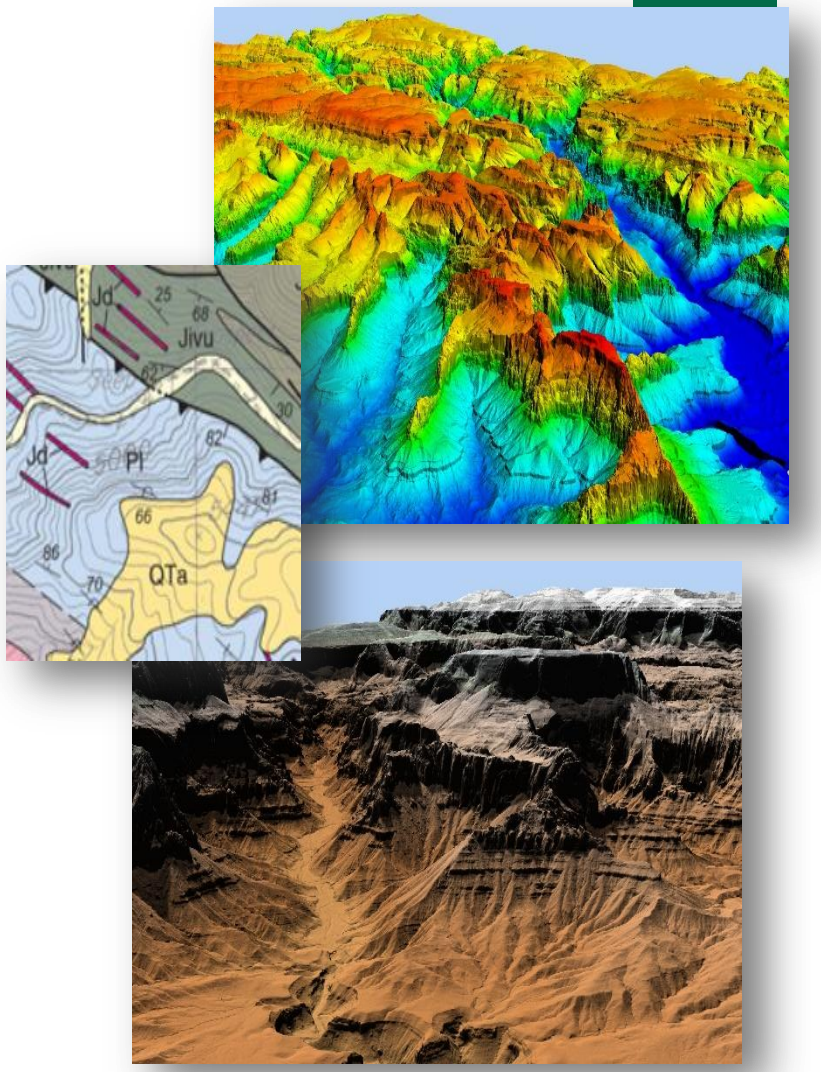
- Produce higher quality flood maps, including Flood Insurance Rate Maps
- Manage dam and levee safety programs to reduce flood risks
- Improve hydrologic modeling and flood forecasting
- Improve State and local flood risk management and response
- Improve storm water facilities and dam design
- Extract building footprints and identify the finished floor elevation to quantify potential damages based on flooding depths

Lidar aids hydraulic modeling to determine flood-inundation on the Saluda River, near Greenville, SC

3DEP for Critical Mineral Independence

Lidar is essential for Geologic Resource Assessment

- Critical for mapping young deposits and landforms, which are those most essential to understanding earth resources
- Underpins geologic mapping that guides assessment and development of solid-Earth resources: base and precious metals, sand and gravel, coal, oil, and natural gas
- Supports site-specific engineering studies by the geotechnical industry
- Improves the efficiency of geologic mapping, dramatically improves the spatial precision of geologic maps, and increases the number of units that can be mapped, in some cases doubling them



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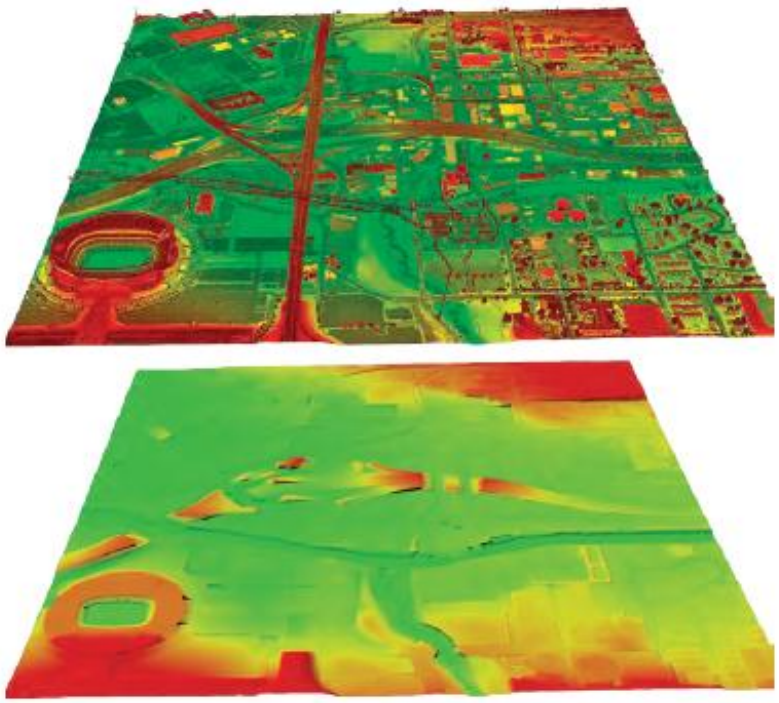
3DEP For America's Infrastructure

The significant challenge of improving the Nation's infrastructure depends on high-quality elevation data



Lidar point cloud (top) and a derived bare-earth digital elevation model (bottom) for Denver, CO

Conservative annual benefits estimated at $170M

- Route, grade, line-of-sight, and utility surveys and corridor mapping
- Terrain and other obstruction identification for aviation
- Dam, levee, and coastal-structure failure modeling and mitigation
- Hydraulic and hydrologic modeling
- Evaluations of geologic, coastal, and other natural hazards, and geotechnical evaluations
- Permit application and construction plan development and evaluation
- Drainage issues and cut-and-fill estimate requirements
- Vegetation, topographic, and geomorphologic feature analysis
- As-built model development
- Preliminary engineering, estimate development, and quantity estimation activities
- Bridge site selection
- Base-map and elevation model creation

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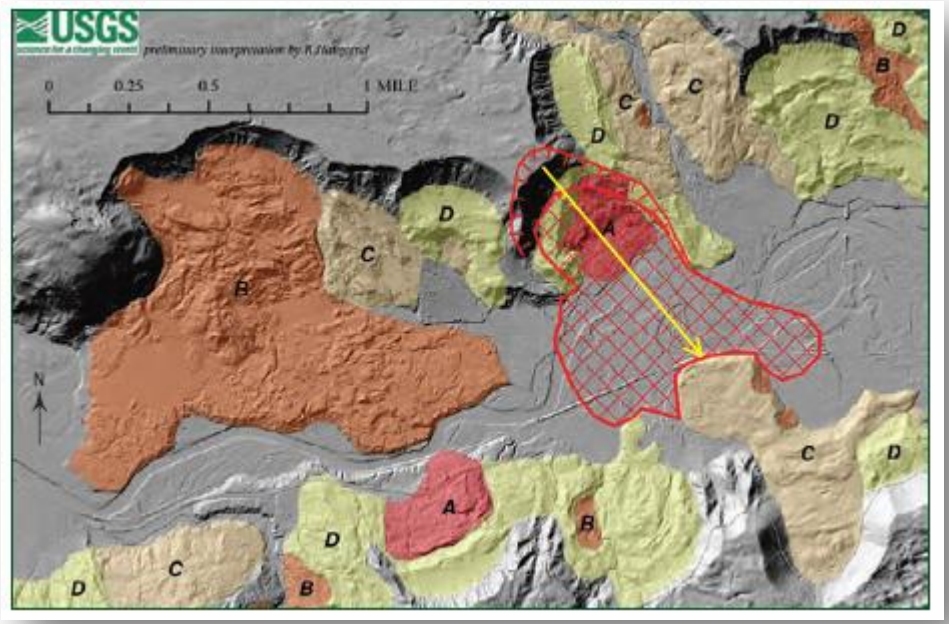
3DEP for Landslides Recognition, Hazard Assessment, and Mitigation Support

Conservative annual benefits estimated at $20.2 M

- Input to slope-stability models used to identify where shallow landslides may mobilize into fast-moving, potentially damaging and deadly debris flows
- Determine boundary and conditions for landslide initiation
- Plan for evacuations and staging areas
- Create accurate landslide inventory and deposits maps
- Estimate the shape and activity of landslides
- Provide baseline information for change-detection comparisons

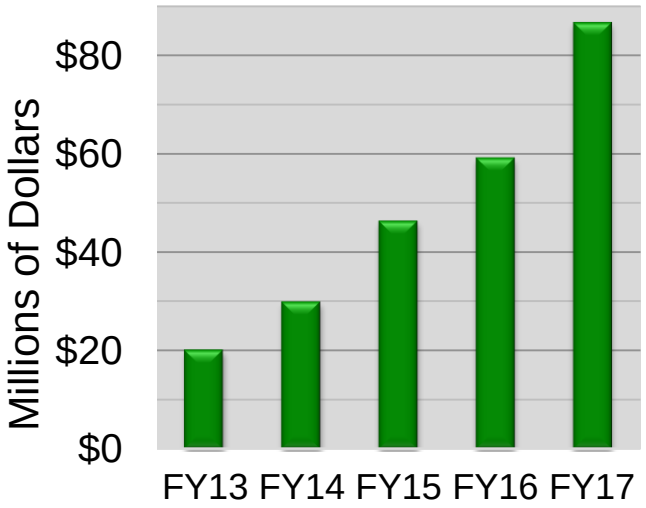


Red cross-hatched area marks the approximate extent of deposits from the 2014 Oso landslide. Colored areas show older landslide deposits by their relative age: ***A***, youngest, to ***D***, oldest. Modified from Haugerud (2014). Yellow arrow shows the direction of material flow

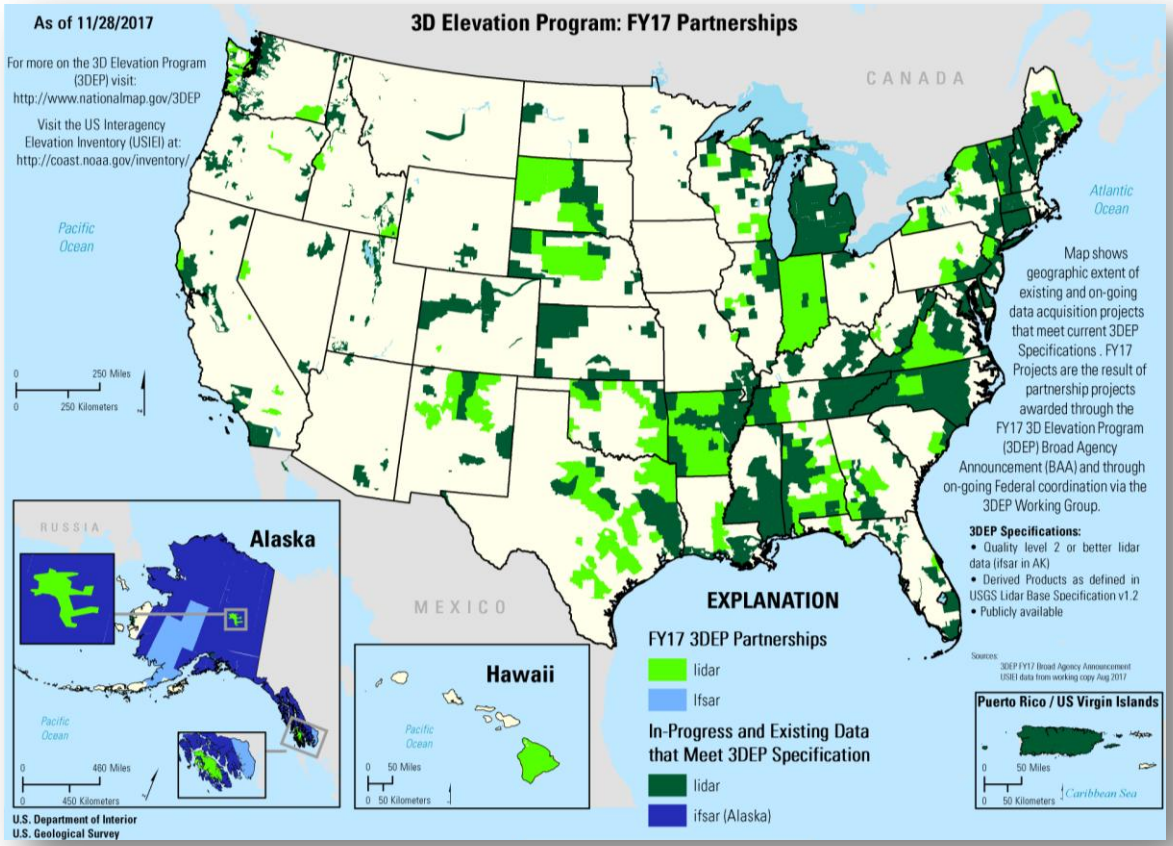
3DEP FY17

11.9% * of the Nation contracted in FY17

*includes lidar and AK IfSAR



- Including FY17, 3DEP data have been contracted for 37% of the entire US
- Alaska IfSAR – 92% available or in work to date in FY17



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3DEP Data Contracted in FY17

Investments Increased from FY16

	Total Project Value	Square Miles
Lidar	$76.9 M	335 K
AK IfSAR	$9.6 M	91 K
Total	$86.5 M	426 K

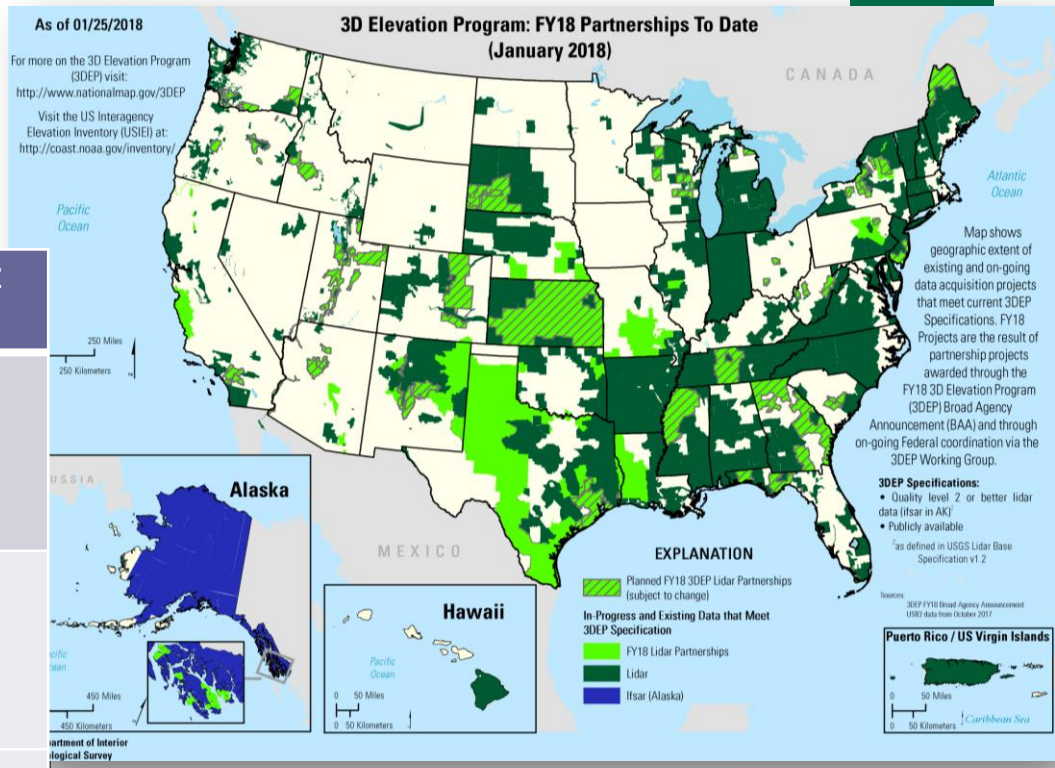
When compared to FY16 acquisition of $59.2M and 303,979 square miles:

FY17 is a 46% increase in total value and 40% increase in square miles

FY18 3DEP Partnerships to Date

Oct 2017– Jan 2018

Status	Description	Sq Miles	Project Costs
Awarded	**FY17 Federal investments to support FY18 projects**	**205K**	**$40.0M**
Planned / Funded	Broad Agency Announcement – 22 projects in 18 states	175K	$27.2M
	Federal partnerships	50K	$10.5M
	Total planned	**225K**	**$37.7M**
TOTAL		**430K**	**$77.7M**



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USGS 3DEP Base Budget

	FY15 enacted	FY16 enacted	FY17 enacted	FY18 President's Budget
USGS Base budget (includes acquisition and operations)	$15.2M	$20.4 M	$24.7M	$29.2M
Increase/decrease	+$5.2M	+$4.3 M	+$4.5 M	-$10.1M
Total USGS 3DEP budget	$20.4M	$24.7M	$29.2 M	$19.1M

3DEP Budget FY19 Rebasline

- The National Geospatial Program budget was re-baselined in FY19 using a full cost accounting method.
- While the FY19 3DEP budget will appear to be larger than the FY17 enacted baseline, it does not represent a change or additional resources, but rather an accounting method that represents all activities associated with 3DEP.

	FY17 Enacted – before rebaslining	FY17 Enacted – after rebaslining
Elevation Program Area (3DEP)	$29.2M	$34.7M

USGS 3DEP FY19 President's Budget

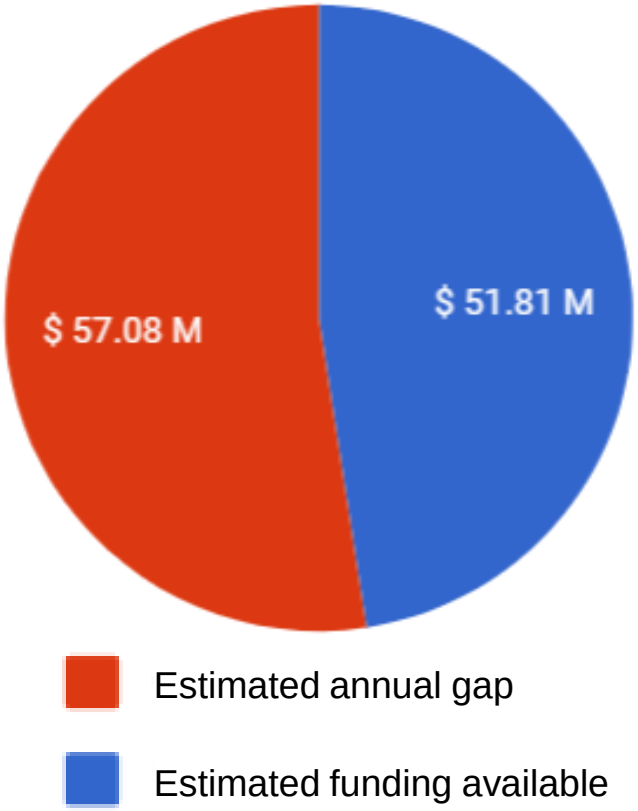
(dollar amounts in thousands)	2017 Actual	2018 CR	2019 Request	Change
National Geospatial Program	67,354	66,897	50,878	-16,019

- The USGS FY19 budget would fund 3DEP at a level approximately equivalent to the USGS FY15 enacted budget.
- The USGS will continue to leverage funding from other Federal, State and Local sources to maximize the lidar coverage through the 3DEP Program.

3DEP Budget Estimate

PRELIMINARY funding needed to complete 8 year goal of data acquisition by 2023

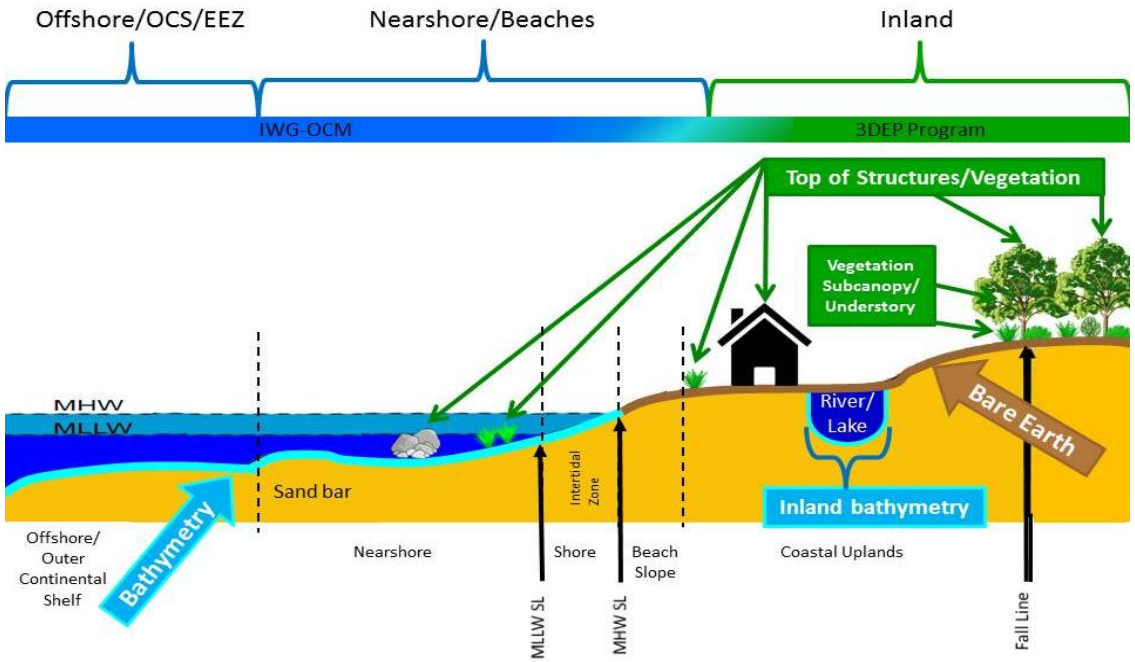
- The overall annual gap in FY19 for achieving the 8 year goal is estimated at approximately $60M
- Includes USGS and partner funding for lidar and AK IfSAR, and USGS operations
- Assumes that a decrease in USGS funding reduces leveraging with partners



3D Nation Elevation

Requirements and Benefits Study - Goals

- Understand inland, nearshore and offshore bathymetric data requirements and benefits
- Understand how requirements and benefits dovetail in the nearshore coastal zone
- Plan for the next round of 3DEP after completion of nationwide coverage
- Gather technology-agnostic user information to be able to assess new technologies against requirements and identify the tradeoffs between different approaches
- Improve our understanding of needs to guide development of the next generation of 3DEP products and services



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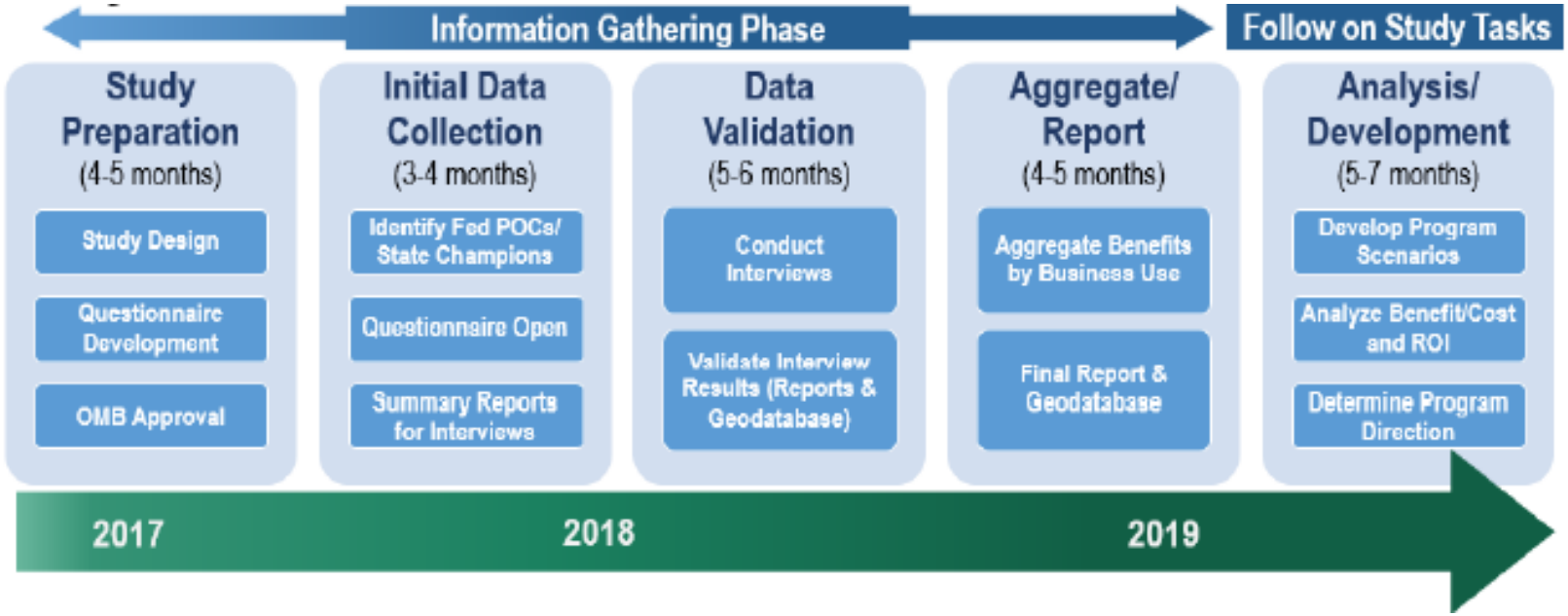
3D Nation Elevation

Requirements and Benefits Study – Preliminary Timeline (subject to change)



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NOAA
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

THANK YOU 3DEP Coalition

Making 3DEP a Reality!

- Guiding principles of the vision include that we recognize and value:
  - The role of public/private partnerships
  - The inherently governmental responsibility of maintaining a lean core competency, while leveraging the expertise and capacity of the private industry
  - The essential USGS role in acquiring critical public domain data that can be accessed, value-added, and underpin a host of new and evolving uses and technologies
  - The role of the private industry in provisioning the data, maintaining the operational expertise and capacity, future sensor development, and increasing new applications
  - The USGS role as the lead Federal agency for elevation to create a National program that results in quality and consistency while reducing/eliminating duplication
- Together we are implementing and communicating a vision that is a model public/private partnership and good government story
- We greatly appreciate the 3DEP Coalition and its members for its role
- We look forward to your continued cooperation and mutual support as we work together to achieve the bold goals of the 3D Elevation Program

Thank you!