Emerging Approaches for Economic Impact Assessments

October 29, 2014

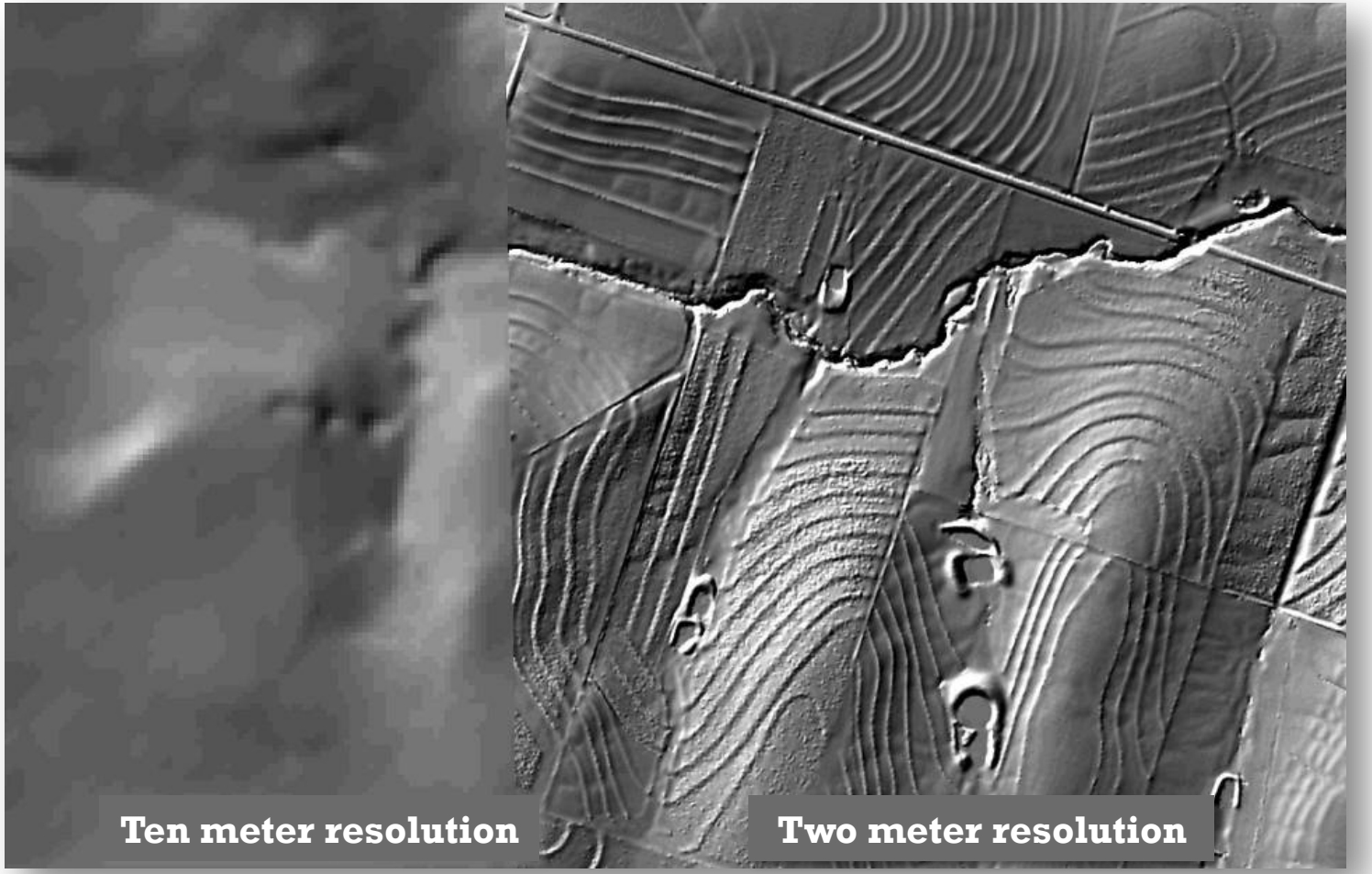
USGS

The National Map

+ Three Case Studies

- Monitor joint output of agricultural production and environmental quality.
- Evaluation of earthquake hazards and housing mitigation strategies.
- Cap and trade for ecosystem services monitoring using remote sensing techniques.

Lidar Improves Data Quality



Courtesy of NRCS

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National Enhanced Elevation Assessment

At a Glance

- Sponsored by the National Digital Elevation Program (NDEP) and funded by USGS, NGA,FEMA, NRCS and NOAA to:
  - Document national requirements for lidar and ifsar data
  - Estimate the benefits and costs of meeting these requirements
  - Evaluate multiple national program scenarios considering data quality, update frequency, geographic coverage and to optimize benefits
- 602 mission-critical activities that require enhanced elevation data were identified by:
  - 34 Federal agencies and 50 states
  - A sampling of local governments, tribes, private and not-for profit organizations
- **A national program has the potential to generate $1.2 billion to $13 billion in new benefits each year**

Example: USGS Geologic Resource Assessment and Hazards Mitigation

Mission critical use: Identify areas, level of activity and risk associated with earth hazards to reduce losses and increase public safety

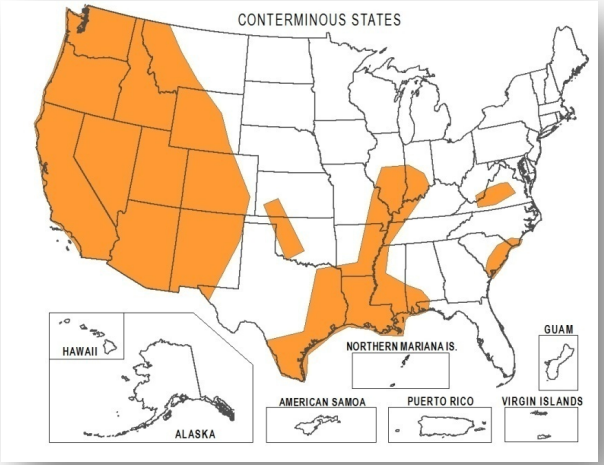
Data requirement: Predominantly quality level 1

Update frequencies: 4-10 years

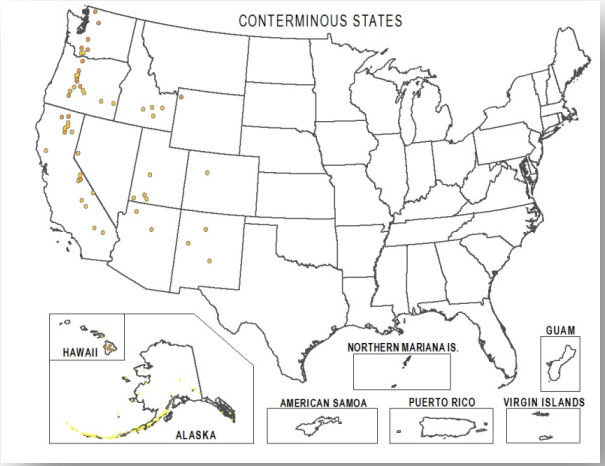
Expected combined benefits: $31.25M/year

Example applications:

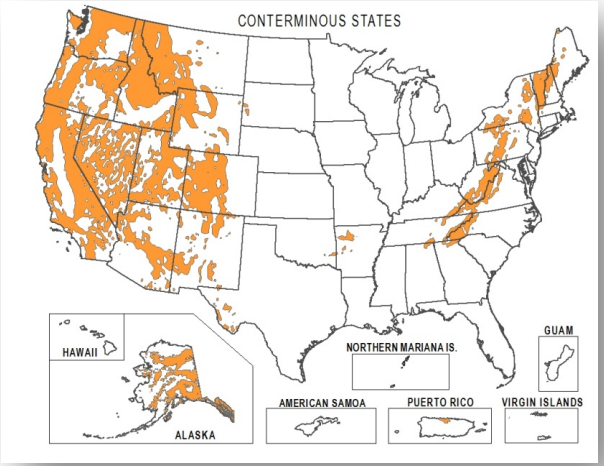
- Identify faults/landslides under thick vegetation
- Enhance infrastructure engineering design
- Estimate size, speed and effects of landslides
- Create loss mitigation strategies
- Provide maps and models to emergency planners



Seismic



Volcanos



Landslides

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Benefits for Top Business Uses

Rank		Annual Benefits	
		Conservative	Potential
1	Flood Risk Management	$295M	$502M
2	Infrastructure and Construction Management	$206M	$942M
3	Natural Resources Conservation	$159M	$335M
4	Agriculture and Precision Farming	$122M	$2,011M
5	Water Supply and Quality	$85M	$156M
6	Wildfire Management, Planning and Response	$76M	$159M
7	Geologic Resource Assessment and Hazard Mitigation	$52M	$1,067M
8	Forest Resources Management	$44M	$62M
9	River and Stream Resource Management	$38M	$87M
10	Aviation Navigation and Safety	$35M	$56M
:			
20	Land Navigation and Safety	$0.2M	$7,125M
	Total for all Business Uses (1 – 27)	**$1.2B**	**$13B**

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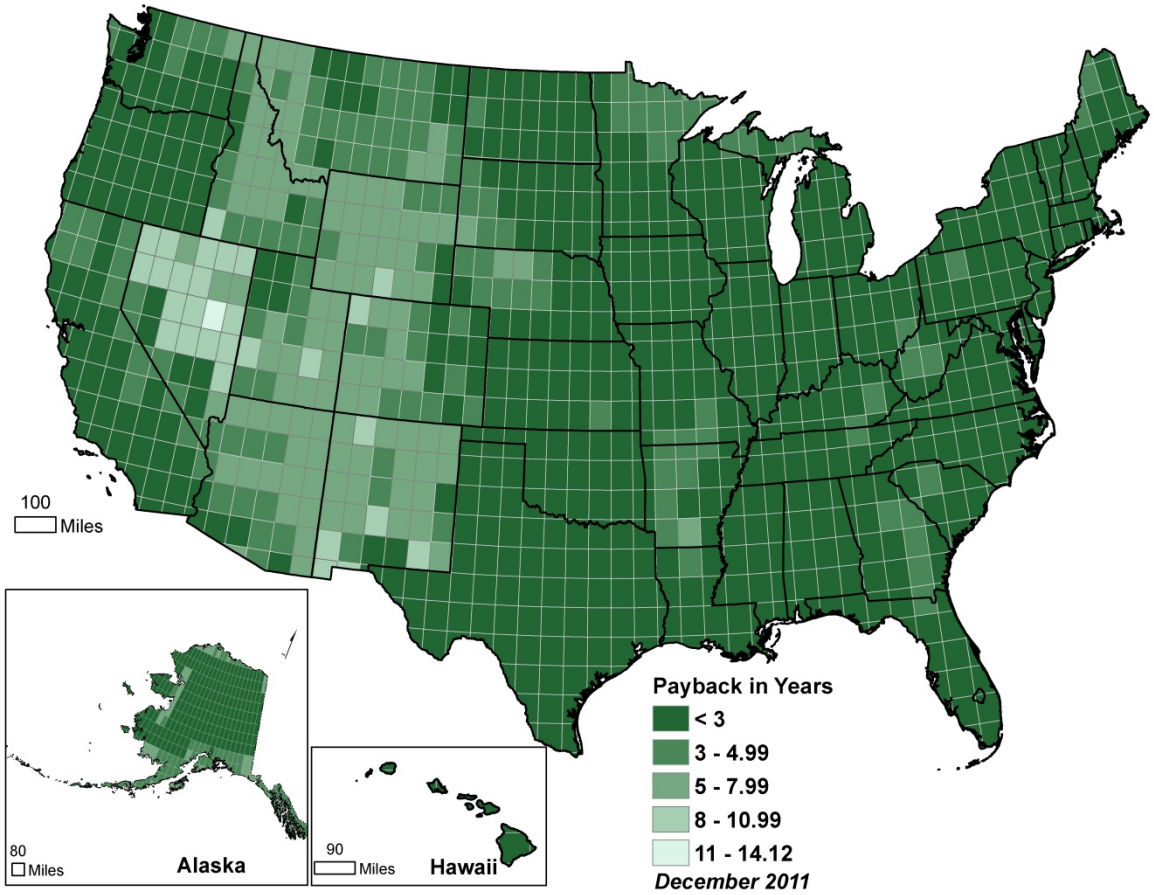
Lidar Return on Investment



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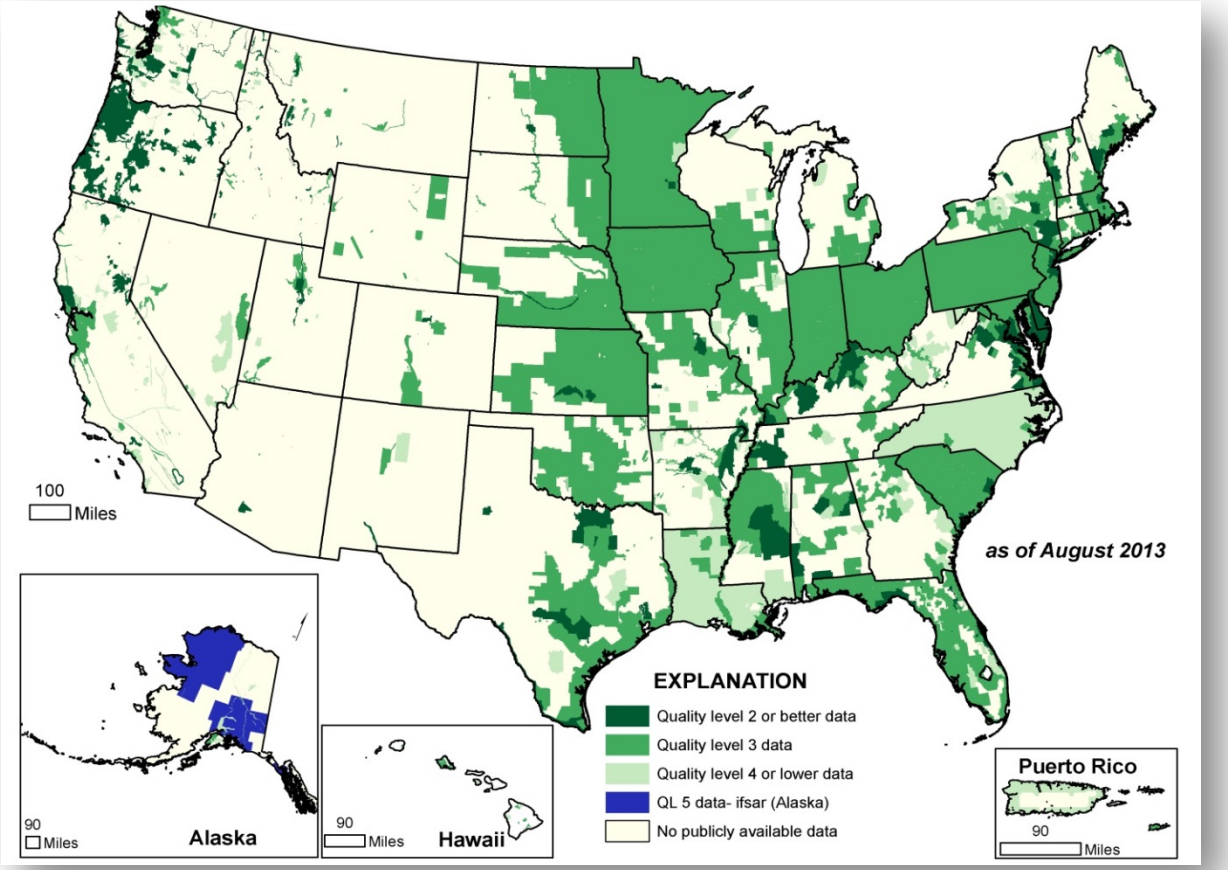
U.S. Interagency Elevation Inventory

2013 Status Map of Publically Available Lidar and Ifsar



Lidar: 38% of the lower 49 states has coverage

- ***Only 4 percent meets the 3DEP goal of QL2 or better***

Ifsar: 43.5% of Alaska has coverage

- ***More than half the State needs ifsar data to complete the 3DEP goal for coverage***

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To view the inventory go to:
www.csc.noaa.gov/inventory

+ Observations

- Many benefits were documented as major but unquantified.
- Ecosystem Services – Identified Major but Unquantified Benefits – Bernknopf and Shapiro paper identifies a useful way for thinking about this problem and relating it to the responsible production of goods and services (which can be quantified).
- Some applications will not emerge if data are not available everywhere.
- Challenge – The collective public value of open data runs counter to the investment model of government agencies where mission needs drive data collection.
  - How will open data influence the investment model if the data collectors are mission focused?
  - How can this be changed?
  - Does it need to be changed?

+ Discussion