NATIONAL ASSOCIATION of REALTORS®

William E. Brown
2017 President

Dale A. Stinton
Chief Executive Officer

GOVERNMENT AFFAIRS DIVISION
Jerry Giovaniello, Senior Vice President
Gary Weaver, Vice President
Joe Ventrone, Vice President & Deputy Chief for Regulatory Affairs
Scott Reiter, Vice President
Jamie Gregory, Deputy Chief Lobbyist

500 New Jersey Ave., NW
Washington, DC 20001-2020
Ph. 202-383-1194; Fax 202-383-7580
WWW.NAR.REALTOR

May 24, 2017

The Honorable Ken Calvert
Chairman
Interior, Environment, and Related Agencies Subcommittee
House Committee on Appropriations
2205 Rayburn House Office Building
Washington, DC 20515

The Honorable Betty McCollum
Ranking Member
Interior, Environment, and Related Agencies Subcommittee
House Committee on Appropriations
2256 Rayburn House Office Building
Washington, DC 20515

Dear Chairman Calvert and Ranking Member McCollum:

As you develop FY2018 appropriations, the National Association of REALTORS® (NAR) asks for your support for the U.S. Geological Survey's recommendation to provide $147 million to the 3D Elevation Program (3DEP). While an order-of-magnitude increase over FY2017,[1] this is the minimum necessary to maximize net benefits and obtain high-resolution topographic elevation data for the U.S. by 2023. The Federal Emergency Management Agency (FEMA) requires this data to provide accurate 100-year flood mapping, where flood insurance is required for a federally related mortgage. Without 3DEP, taxpayers could spend hundreds of millions of dollars more on disaster relief for property damage that could have been avoided with 3DEP maps so the owners would not build in high-risk areas in the first place.

Comparison of 3DEP vs Best Available Data

Currently for three-quarters of the country,[2] FEMA uses a patchwork of topographic data to model the 100-year floodplain. The vast majority of this data was collected in the 1960s and 70s and varies in quality depending on the source. At 10-30 meter resolution, [3] this data misses many land features including levees, berms, small streams and drains less than 10-30 meters wide. These features can have a significant impact on the projected shape of the floodplain. As the National Academies of Science have shown, the floodplain can be 20-percent overestimated due to missing features.[4] As a result, homeowners are required to buy and spend more on flood insurance than is justified by the true risk of flooding.

3DEP is a game changer for FEMA maps. 3DEP would provide current, nationwide coverage at 1-meter resolution (0.5 meter spacing) using light detection and ranging

[1] USGS presentation to the 3DEP Coalition dated November 10, 2016. In FY2016, 3DEP received roughly $30 million from three federal agencies (i.e., USGS, USDA and FEMA). FY2017 appropriations added $2 million. At these levels, it will take nearly double the time (11 years vs. 6) in order to complete nationwide coverage.

[2] Email communication with USGS staff dated May 10, 2017. At the end of FY2015, 3DEP covered 24 percent of the U.S., except Alaska.

[3] See Figure A6 for the resolution and A9 for the collection date of the best available topographic data. While USGS points out that 10-meter data covers most of the U.S., note the gaps in Florida where only 30-meter data is available (Figure A6). Florida represents more than one third of NFIP policies. Link: http://www.dewberry.com/docs/default-source/documents/neea-final-report_revised-3-29-12_appendix-a_ned-release-notes.pdf?sfvrsn=0

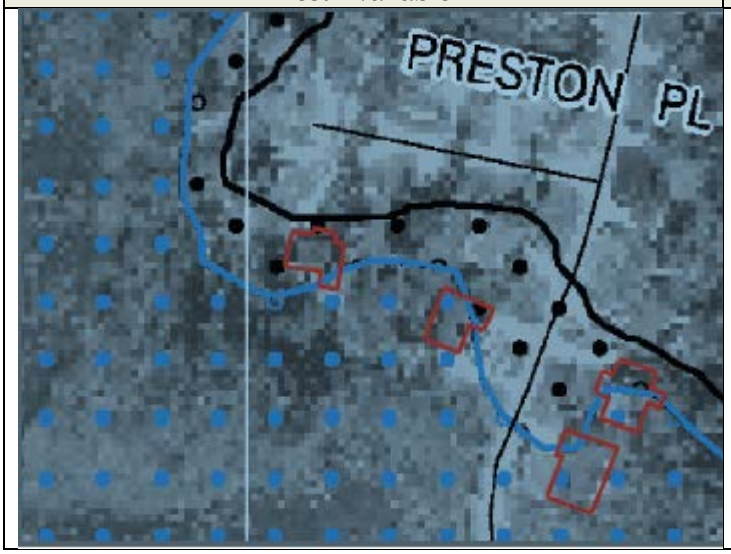
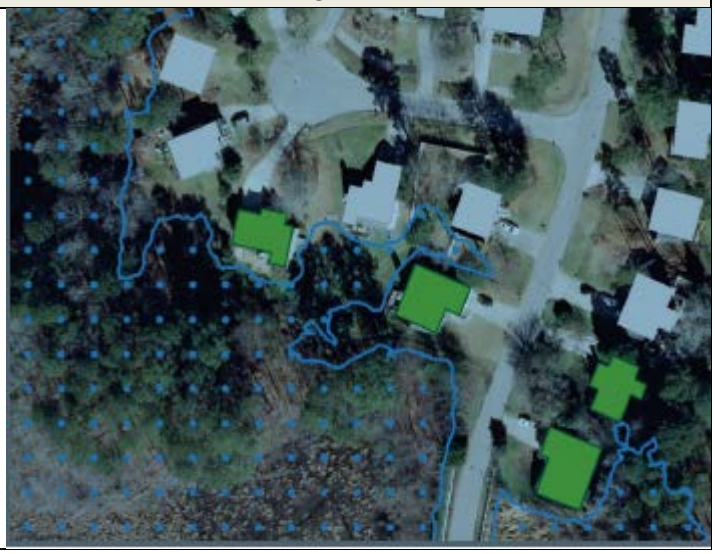
[4] National Research Council. 2009. Mapping the Zone: Improving Flood Map Accuracy. Washington, DC: The National Academies Press, pp. 63-66 but esp. p. 66: "At the third site (Long Creek), the difference between the numbers of acres within the [floodplain based on LiDAR vs. approximate data] is about 20 percent.

(LiDAR) technology. (LiDAR works like radar but uses laser pulses from airplanes.) This translates to 77,000 ground points for a 5-acre parcel – a 1000 percent increase over the 300 points in the 10-meter dataset. In addition, any error would be measured in centimeters rather than meters.[5]

Best Available	3DEP
1 ground point every 10-30 meters (30-90 feet)	1 point every 0.5 meters (1.5 feet)
More than 35 years old on average	Less than 8 years old
Variable quality depending on data source	High quality
Vertical elevation error of 1.5 meters (3 feet)	Error of 9.25cm (0.3 feet)

Implications for Flood Mapping

The North Carolina Floodplain Mapping Program, which uses 3DEP-resolution topographic data, provided four examples of low-risk homes mapped two ways – first using low-resolution data (left) and then using high-resolution data (right).

Best Available	3DEP
	

What is notable about these four homes:

- All four are low flood risks both horizontally and vertically.
- Horizontally, each building is located outside the floodplain (i.e., the blue area does not intersect the building footprints on the right, where high-resolution topographic data is used).
- Vertically, each structure sits on higher ground three feet above the 100-year flood level, but there are no elevation certificates to document this, since all were built before the flood map.
- Yet all four would be incorrectly mapped into the floodplain under the low-resolution data (left).
- As a result, these homeowners would be required to spend thousands of dollars each year on flood insurance, when the true risk actuarial rate is just hundreds of dollars.
- The only alternative would be for each homeowner to buy a $500-$1500 land survey and obtain a letter of map amendment from FEMA.

[5] Id., p. 37.

Net Benefits to the Nation

USGS conducted a National Enhanced Elevation Assessment to estimate the costs and benefits of 3DEP.[6] The Agency documented over 600 uses for 3DEP ranging from agriculture to wildlife but was only able to quantify 66 percent of the benefits.[7] It also varied the resolution of the LiDAR to be collected from 8 points per square meter (quality level 1) to 0.25 points (quality level 3), as well as the amount of time needed to complete nationwide coverage. The assessment showed that the net benefits (i.e., benefits minus costs) were highest when 3DEP invested at least $147 million and collected LiDAR data (mostly at quality level 2) for the entire U.S within 8 years.

Table 1.9. Lifecycle Benefit Cost Analysis Comparisons for Elevation Data + IT Costs Combined

All Scenarios include QL5 IFSAR for Alaska	Average Annual Costs	Average Annual Benefits	Average Annual Net Benefits	B/C Ratio	Total Possible Benefits Satisfied
Scenario 4, QL1/2/3/5 data, 8 years, focus on highest combined net benefits for all users	$160.6M	$780.2M	$619.7M	4.858	66.1%
Scenario 2, QL1/2/3 LiDAR, 8 years, focus on federal requirements with highest B/C Ratio	$147.9M	$698.9M	$551.0M	4.726	59.2%
Scenario 3, Uniform QL2 LiDAR, 8 years, focus on nationally uniform data with highest B/C Ratio	$146.4M	$689.9M	$543.5M	4.713	58.5%
Scenario 4A, QL1/2/3/5 data but 15-year update	$85.7M	$394.1M	$308.4M	4.600	33.4%
Scenario 2A, QL1/2/3 LiDAR but 15-year update	$78.9M	$353.2M	$274.3M	4.478	29.9%
Scenario 3A, Uniform QL2 LiDAR but 15-year update	$78.1M	$348.7M	$270.6M	4.471	29.5%
Scenario 1A, Uniform QL3 LiDAR but 15-year update	$58.5M	$261.1M	$202.6M	4.461	22.1%
Scenario 1, Uniform QL3 LiDAR, 25-years, focus on lowest costs	$35.1M	$148.4M	$115.7M	4.226	12.6%

The assessment also showed that most of the benefits came from enhanced flood risk management (conservatively $300 million per year). As illustrated above, 3DEP would enable FEMA to:

- Draw accurate floodplain boundaries so fewer property owners would have to obtain letters of map amendment. Currently, FEMA issues 25,000 of these letters each year.
- Extract building elevations and footprints so homeowners could use that data to support FEMA map amendments. Currently, homeowners must obtain property specific land survey at a cost of $500-$1500 each. 3DEP would collect the same quality data,[8] except the cost would be closer to $15 per property and the data would be collected for whole neighborhoods at once rather than property-by-property like FEMA's current process.[9]

[6] USGS. National Enhanced Elevation Assessment dated March 29, 2012. http://www.dewberry.com/services/geospatial/national-enhanced-elevation-assessment

[7] Id, Table 1.1, which shows that 3DEP can be used for many purposes other than flood mapping, including energy and transportation. Appendix E elaborates on 27 of these uses for the high resolution data.

[8] Id, Table 1.2, which shows that the vertical error (RMSEz) for quality level two LiDAR data is 9.25 cm (0.3 foot). Compare that with error for Elevation Certificates according to the National Research Council (2009, cited in footnote 4) on p. 34: "GPS-derived structural elevation data on Elevation Certificates are estimated to be +/-0.5 foot at the 95 percent confidence level…"

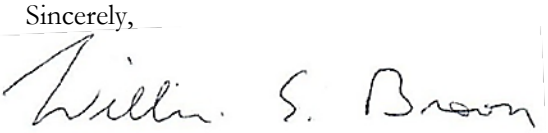
[9] Presentation by the NC Floodplain Mapping Program to NAR's Flood Insurance Working Group dated April 18, 2016.

- Shift the burden of proof from homeowners back to the Federal government where it belongs. Currently, there are no buildings on FEMA's flood maps. Rather, FEMA delineates the 100-year floodplains and assumes that all buildings within those areas are "high risk" – even the ones built on high ground. In other words, now the presumption is the map is correct until the property owner proves otherwise – even though the underlying topographic data is decades old, of variable quality and too low resolution to meet FEMA's mapping standards. 3DEP would put the buildings on the maps so homeowners no longer have to.
- Save taxpayers money. The National Academies have shown how floodplains can be 20 percent over-estimated; floodplains can also be underestimated at the margin. If properties are inadvertently built in these high-risk areas because they were not identified due to the low resolution of the map, it is the taxpayer that pays for disaster relief to repair those structures after major floods. Likewise, if limited mitigation budgets are spent elevating or relocating low risk properties that have been misclassified as high risk, those dollars cannot be reallocated to produce higher benefits to society per dollar spent. In other words, low-resolution flood maps waste scarce taxpayer dollars that could be put to better public use with modest investments in data resolution.

Conclusion

Thank you for considering this modest request for 3DEP funding. NAR's 1.2 million members look forward to working with Congress to improve the accuracy of the flood maps so property owners can make better informed buying and building decisions where it involves the risk of flooding, the most costly and common natural disaster in the U.S.

Sincerely,



William E. Brown
2017 President, National Association of REALTORS®

cc: House Interior, Environment, and Related Agencies Subcommittee

Better Data Results in Better Mapping and Analysis

The State of North Carolina has invested highly in (1) high-resolution, LiDAR-derived topography and imagery; and, (2) model-backed Flood Insurance Studies with published Base Flood Elevations, and (3) a comprehensive inventory of buildings and other vulnerable assets for the entire state. The building inventory includes remote-sensed First Floor Elevation (FFE) collection at +/- 0.5 feet accuracy provided for structures near the floodplain. These integrated sets of data provide a more refined and accurate depiction of flood hazard and vulnerability in North Carolina. In the future, the State of North Carolina is pursuing an even more refined accuracy of +/- 0.3 feet for a structure's FFE, therefore being able to show which structures are out and elevated above the Base Flood Elevation (BFE).

Every building in the state greater than 800 square feet in size is cataloged and has a LiDAR-derived FFE. The NFIP also requires Elevation Certificates (ECs) which provides a high-precision survey grade assessment of the various elevations of a structure on a property. ECs typically cost between $500-$1,500 per survey and is a financial burden that the property owner must pay in order to assess flood risk based on ground elevations related to the floodplain. But North Carolina has found that a more cost-effective way to assess structure elevations is by comparing the LiDAR-derived FFEs to flood risk.

Near 5608 Preston Place, Raleigh, NC 27604

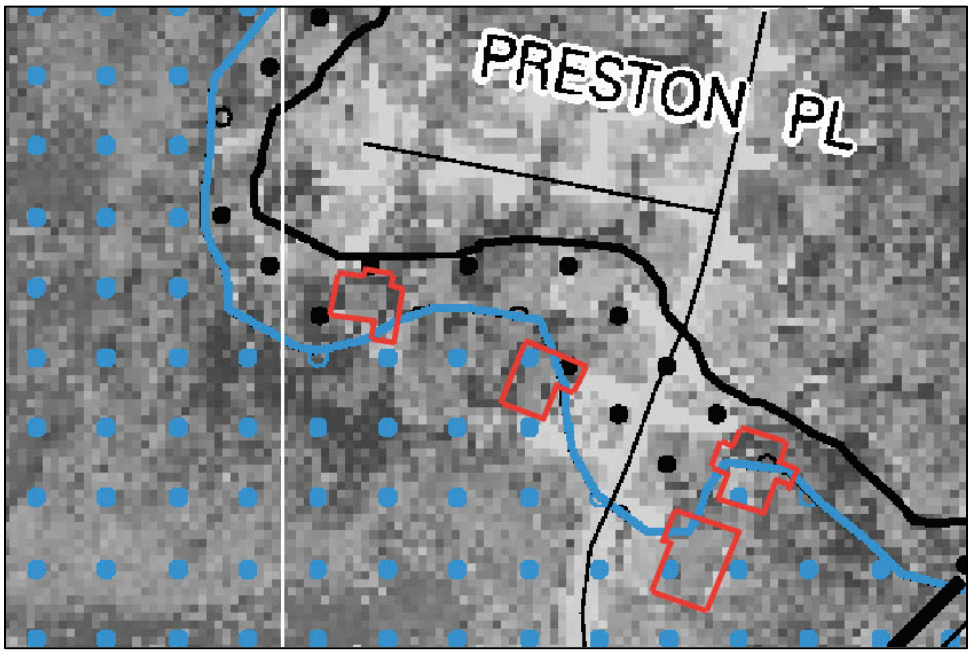


Figure 1: This example shows the mapping displayed on an effective FIRM panel (3720173400J) in Wake County. This floodplain mapping uses coarse topographic data. Notice how the floodplain boundary goes through the buildings (shown in red). The building FFEs are actually 3 feet above the BFE, but the older mapping data does not reflect this and would likely require a LOMA to resolve.

Figure 2: This is the same area shown in Figure 1; however, high-resolution LiDAR topography (2 points per square meter) was used to develop the floodplain shown in this image (black line). Notice how the floodplain boundary does not cross over the buildings (green) but rather goes around them. The new structure FFEs collected by North Carolina have the elevated structure data included, further ensuring that the floodplain does not impact this structure at a 1% annual chance flood event.