Watershed by Watershed
Mapping your Flood Risk

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WHAT IS LIDAR?

Light Detection and Ranging (LiDAR) technology collects high-accuracy elevation data (better than 1-foot accuracy) for large areas quickly and at lower cost than traditional methods.

LiDAR systems use lasers that pulse tens of thousands of times a second. To convert a laser-determined distance into the elevation of a point on the ground requires sophisticated hardware and software.

When it comes to floodplain mapping, computerized modeling techniques can simulate floods over the entire floodplain, rather than for just a few dozen cross-sections. In the past, elevation data was collected manually in the field, and due to costs, only cross-sections were measured.

With elevation data available for the entire floodplain, flooded areas can be determined at any location. Combining LiDAR data with floodplain depths results in accessible, web-based floodplain maps that anyone can use.

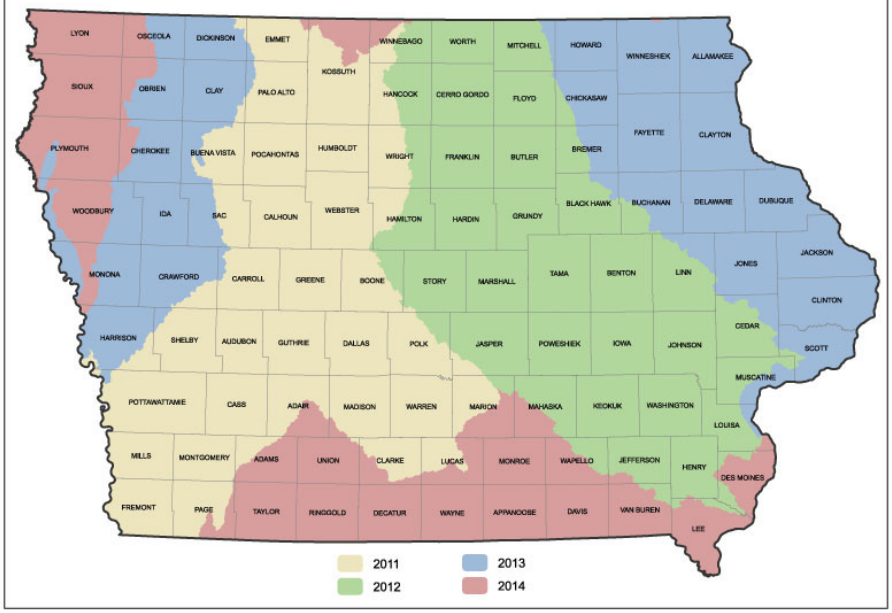
Like many states, Iowa has never had comprehensive, accurate floodplain maps. Despite ambitious plans and decades of nominal funding, federal and state efforts to provide statewide floodplain maps have fallen short. The Federal Emergency Management Agency (FEMA) has identified and mapped flood hazard areas in hundreds of flood-prone communities. Its efforts are providing flood insurance maps for more than half of Iowa's counties.

A FOUR-YEAR EFFORT

The positive side of the devastating floods of 2008 is that the U.S. Department of Housing and Urban Development (HUD) provided a $15 million grant to Iowa for floodplain mapping in 85 counties that received presidential disaster declarations after the 2008 floods. The HUD grant funding is being used to update existing maps and provide first-time maps in those disaster-declared counties. Additional funding will be sought to provide updated floodplain mapping in the 14 counties that were not disaster-declared. Starting in 2011, many Iowans will know if their property is at risk from flooding for the first time. This significant mapping effort will take approximately four years.

While the "work maps" being developed cannot be used for flood insurance purposes, they will show the boundaries of flooded areas for the 1 percent annual chance (100-year) and 0.2 percent annual chance (500-year) floods.

IOWA FLOODPLAIN MAPPING SEQUENCE



"This plan took a lot of deliberation, coordination and compromise, but we think it will be the most efficient, cost-effective way to map the state and to provide Iowans the most accurate measure of risk evaluation they've ever had."

– Bill Ehm,
DNR water coordinator

As the work maps become available, individuals and local governments can better determine flooding risks to protect their properties. Eventually, the Iowa Department of Natural Resources (DNR) will work with FEMA to develop the work maps into official flood insurance rate maps.

CREATING THE MAPS

The DNR, the Iowa Flood Center at the University of Iowa, FEMA and other partners are using a cutting-edge technology, LiDAR, to create new and precise floodplain maps. Data from the statewide LiDAR project has resulted in elevations accurate to within 7 or 8 inches – compared to historic topographic maps with 5- or 10-foot accuracy.

Floodplain experts will use the accurate elevation data — coupled with state-of-the art geographic information systems software and hydraulic modeling — to determine the height and extent of flood waters across the state.

Producing floodplain maps is still a laborious process. It involves performing flood studies along individual streams in 57 Iowa watersheds. The watersheds vary in size from 175 to 3,419 square miles, averaging about 1,500 square miles. In each watershed, experts in hydrology and hydraulics will determine peak stream flows and flood water depths.

BENEFITS OF MORE ACCURATE MAPS

Communities can use the new maps to pinpoint flood boundaries and depths giving better protection to citizens and property. Planners, zoning officials and emergency response staffers can use the work maps to establish zoning, to flood-proof critical facilities and to evacuate people when needed.

MAPPING SEQUENCE

Many factors have to be considered: technical, risk-related, financial, regulatory and logistical. So it took much discussion and coordination between stakeholders and funders to determine the order of statewide floodplain mapping. The DNR, FEMA and other members of the Iowa Floodplain Mapping Advisory Board developed a plan for the mapping sequence after carefully considering the following factors:

- leveraging of federal funding sources,
- challenges in data collection,
- relative flooding risks and
- coordination with ongoing FEMA mapping efforts.

This advisory board meets regularly and is comprised of city, county, state and federal planners, engineers and scientists. The board members concluded that mapping should begin in 2011 in southwest Iowa where funding from FEMA is available. The first work maps will be created in four Iowa counties, keeping the scope of work manageable in the first stage of the statewide project. The mapping effort would move north and east over the next two years, concluding in June 2014 with watersheds on the periphery of the state.

In the end, the floodplain work maps will allow Iowans and Iowa communities to know their risks, protect people, be better prepared to prevent damages and respond to flooding when the waters inevitably rise. Unfortunately with flooding, history shows that if you're in a flood zone, it's not if you'll flood, but when.

FOR MORE INFORMATION

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