# IFC UPDATE

THE UNIVERSITY OF IOWA

Iowa Flood Center

## IFC Testimonials

"The high quality of the flood inundation data products allowed MidAmerican Energy to better refine response activities and to significantly reduce customer impacts as a result."

■ Jesse Leckband,
*MidAmerican Official*

"The information provided by the Iowa Flood Center has been critical in our decision making process."

■ Kip Ladage,
*Bremer County Emergency Management Coordinator*

"The IFC provides critical mapping and flood forecast data… All of the tools managed by the IFC are used by the City of Coralville to lessen future flooding events as well as prepare for immediate upcoming floods."

■ Dan Holderness,
*City Engineer, Coralville*

# Iowa Watershed Approach Ramps Up for Year Two



## The five-year $96.9M Iowa

Watershed Approach (IWA) project awarded in 2016 is now in its second year. The program, led and developed by the Iowa Flood Center (IFC), has received statewide support and recognition for its innovative approach to addressing flood challenges and improving flood resiliency at the watershed scale. Grassroots efforts that engage local watershed management authorities (WMAs) are driving the momentum behind the IWA. Many partners are contributing expertise and resources to the WMAs to inform planning and decision-making; this broad collaboration will ultimately lead to successful outcomes for the IWA project.

Using the latest data, research, and advanced technologies, IFC researchers are providing critical information to allow each watershed to make informed decisions and develop a plan to address flooding and other natural resource concerns well into the future. The IFC provides IWA coordinators, local stakeholders, and volunteer landowners with information about how conservation practices could be implemented in the watershed to meet flood reduction goals.

By strategically placing conservation practices such as ponds, terraces, and wetlands, the IWA will restore some of Iowa's natural resiliency to heavy rainfall, which will protect vulnerable populations and infrastructure downstream. Conservation practice construction will begin in 2018.

For more information about the Iowa Watershed Approach, visit:

**www.iowawatershedapproach.org**

**ABOVE:** The Soap Creek Watershed is the site of some 135 farm ponds and other conservation practices for flood control.
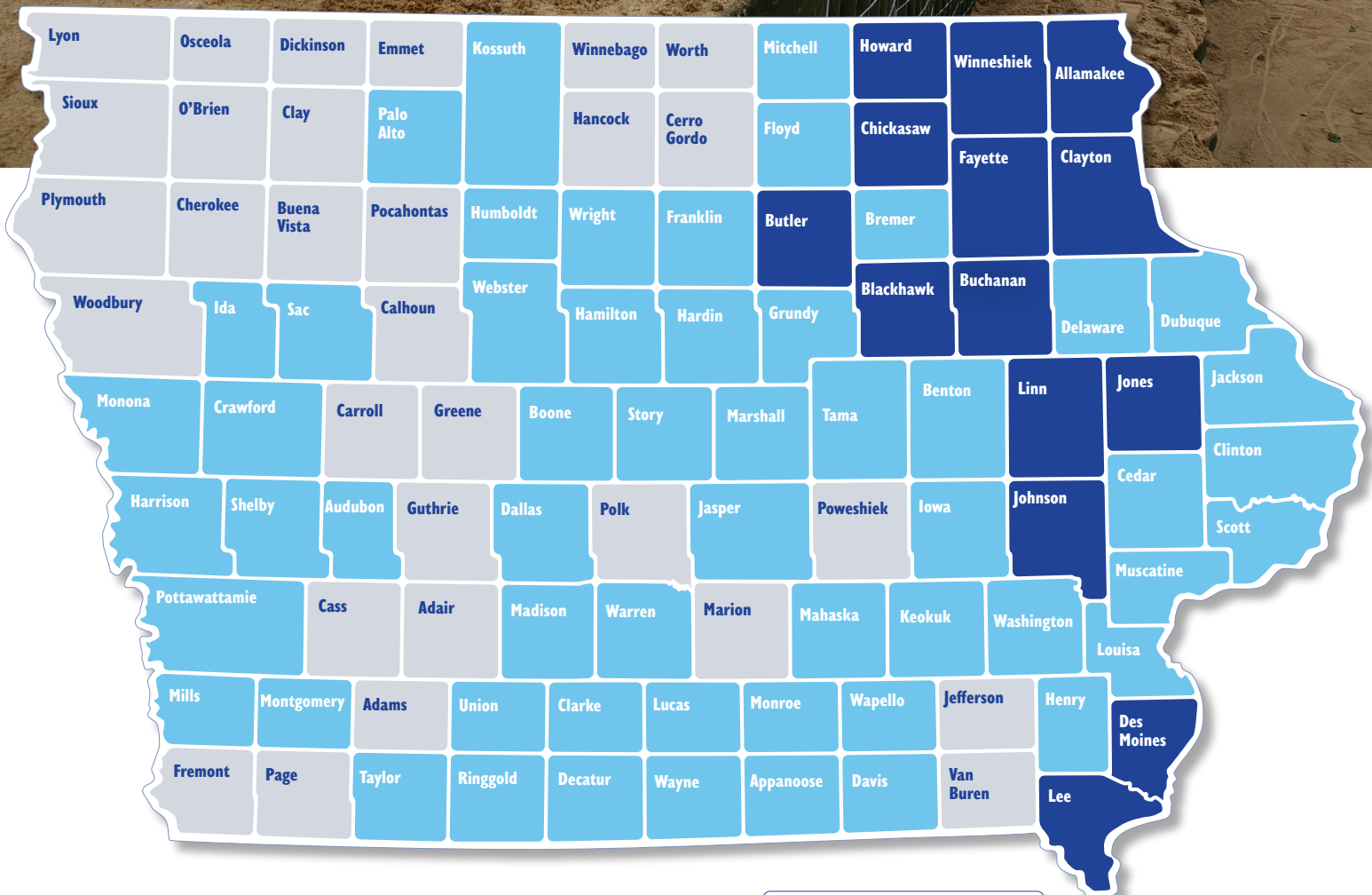
**BELOW:** With local partners, the IFC co-sponsored a tour of the Soap Creek Watershed on Sept. 12, 2017.



"This Iowa Watershed Approach is about everybody coming in and lifting a little bit for the benefit of the greater all."

■ Larry Weber, *IWA project lead*

# Are Iowans Safe from Flooding?



## Flood-related Presidential Disaster Declarations
### 1988—2016 (*total:* 951)

Legend:
- 4–8
- 9–12
- 13–17

> "State support for the Iowa Flood Center costs Iowans only about 50 cents per person each year … The IFC is a proactive investment that repays Iowans many, many times over."
> ■ Witold Krajewski, *IFC Director*

## FEMA data show that Iowa is near the top

nationally in flood-related presidential disaster declarations.

The IFC's Antonio Arenas has been studying Federal Emergency Management Agency (FEMA) data, which reveal that the impact of floods in Iowa is even more serious than it is nationwide. Between 1988 and 2016, about 80 percent of federal disaster declarations in Iowa were related to flooding. In the last 30 years, no Iowa county has escaped with fewer than four flood-related presidential disasters. And Arenas says this trend is only increasing.

Iowa's financial losses due to flooding are huge. Estimates from a University of South Carolina database (SHELDUS) report $13.5B in direct flood-related property losses in Iowa from 1988–2015. Seven of the 10 Iowa counties bordering the Mississippi River sustained property losses of more than $100M.

Iowa also suffered direct crop losses; Marshall County has the highest crop losses (about $300M) in the state (1988–2015). The average direct crop losses in Iowa counties during this time period was $41M.

Flood control and mitigation are expensive, but reacting to disasters after they occur is even more costly—in dollars (think billions), lost economic potential, and even lives. Taxpayers ultimately foot the bill. Iowans are fortunate to have the nation's only academic center devoted solely to flooding, the Iowa Flood Center. The IFC provides services and tools that help Iowans prepare for and mitigate flood damages.

**ABOVE LEFT:** Advance information from the Iowa Flood Center allowed Cedar Rapids to prepare for flooding in September 2016 by erecting more than 10 miles of sand and earthen barriers. Although the magnitude of the flooding was second only to the 2008 flood, damages were far less, due in large part to improved preparedness. Photo by David Herwaldt

**ABOVE:** The 1916 flood in Marquette, Iowa.

**ABOVE RIGHT:** Plainfield, Iowa, was pummeled by floodwaters in September 2016. Photo by Kip Ladage

## Little Town, Big Flooding

Floodwaters poured into Plainfield, Iowa, from all directions during rare fall flooding in 2016. The IFC's Dan Gilles is helping the tiny Northeast Iowa town find solutions for its water problems.

"For these small towns, it's a lot to take on," Gilles says. Fortunately, the IFC is committed to serving Iowans. In response to Plainfield's request for assistance, the IFC sent Gilles to model the flow of water through the community. Gilles made recommendations for flood mitigation projects in Plainfield, and his report will help city officials secure the necessary funding.

Plainfield is only one of the small towns that have benefited from IFC expertise. IFC engineers have also worked with officials from Kalona, Clarksville, and others to solve complex water issues.



## Modeling the Costs of Flood Damage

In May 2017, the Iowa Flood Information System (IFIS) added data from the web tool HAZUS, which allows users to estimate the cost of flood damages to buildings and other structures under various flooding scenarios.

HAZUS, developed and distributed by the Federal Emergency Management Agency (FEMA), is a multi-natural hazard analysis tool. HAZUS models the effects of natural hazards on structures in a given area, and then quantifies the total damage in dollars. In 2017, the IFC's Ibrahim Demir and graduate student Enes Yildirim integrated HAZUS datasets into IFIS flood maps.

IFIS currently provides flood loss and damage estimates for seven communities: Cedar Rapids, Des Moines, Iowa City, Independence, Kalona, Rock Rapids, and Rock Valley. After expanding HAZUS to all Iowa communities, Demir and Yildirim plan to add additional analysis layers to include the number of schools, critical structures, and emergency centers affected in the damage estimate.
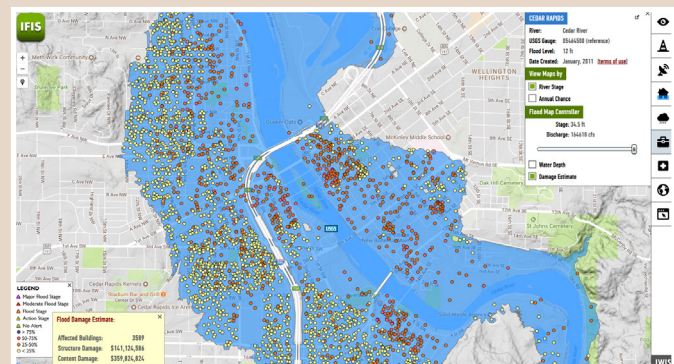
## IFIS

### Iowa Flood Information System

http://ifis.iowafloodcenter.org/ifis/en/

### New Features!

IFIS is a free, easy-to-use online application that helps Iowans prepare for flooding. IFIS displays up-to-the-minute community-specific information on rainfall, stream levels, and more, including:

- Real-time stream levels at nearly 250 locations in Iowa;
- Flood alerts and forecasts for more than 1,000 Iowa communities;
- Weather conditions including current and past rainfall accumulations; and
- Flood inundation maps for many communities
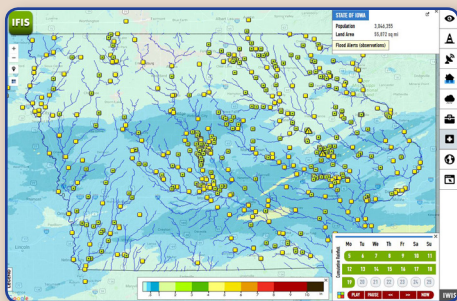


**ABOVE:** IFIS cumulative rainfall display and stream sensor locations.

**BELOW:** IFIS flood inundation map for Humboldt, Iowa, at a stage of 17'.
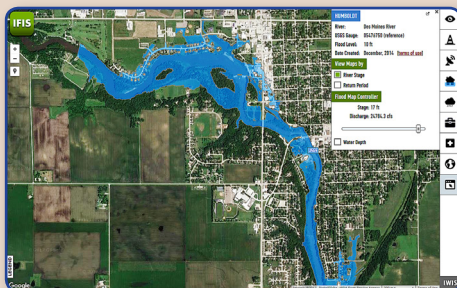


### New And Upcoming:

- IFIS artificial intelligence and voice recognition
- Automatic text alerts for stream sensors
- IFIS mobile phone application
- Damage estimates for buildings in the floodplain
- New IFC website

# IFC on the Road



## Outreach and education is an important component

of the IFC mission. The IFC creates tools and develops strategies that serve Iowans, helping them understand their flood risks and become more resilient to future floods. Each year, IFC researchers and staff hit the road to demonstrate these tools and resources to the public. In 2017, the IFC participated at the Iowa State Fair, attended more than a dozen science and STEM (Science, Technology, Engineering, and Math) festivals, and presented at numerous conferences and meetings, reaching thousands of Iowans and building new partnerships along the way.

In July, more than a dozen IFC students and staff joined Project AWARE (A Watershed Awareness River Expedition) for one day on the Cedar River. The week-long event (celebrating its 15th year) attracted 469 volunteers (ranging in age from 2 to 77) who canoed the river to clean up trash and debris. "It really felt like you were making a difference," said the IFC's Ashlee Johannes. The Iowa Department of Natural Resources organizes the event each year, and the IFC has been a co-sponsor since 2010. We look forward to participating in the 2018 Project AWARE on the Maquoketa River (July 9–13)!

**ABOVE:** Students learn how water moves through the watershed at a recent STEM festival.

**BELOW:** IFC staff and students volunteered with the Iowa Department of Natural Resources' Project AWARE (A Watershed Awareness River Expedition) in July 2017 to remove trash, tires, and debris from the Upper Cedar River.