

Managing an Extreme Weather Event of Prolonged Duration

May 22, 2013



MISSOURI RIVER FLOOD OF 2011

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IOWA DEPARTMENT OF TRANSPORTATION**

Missouri River Basin



Missouri River Basin



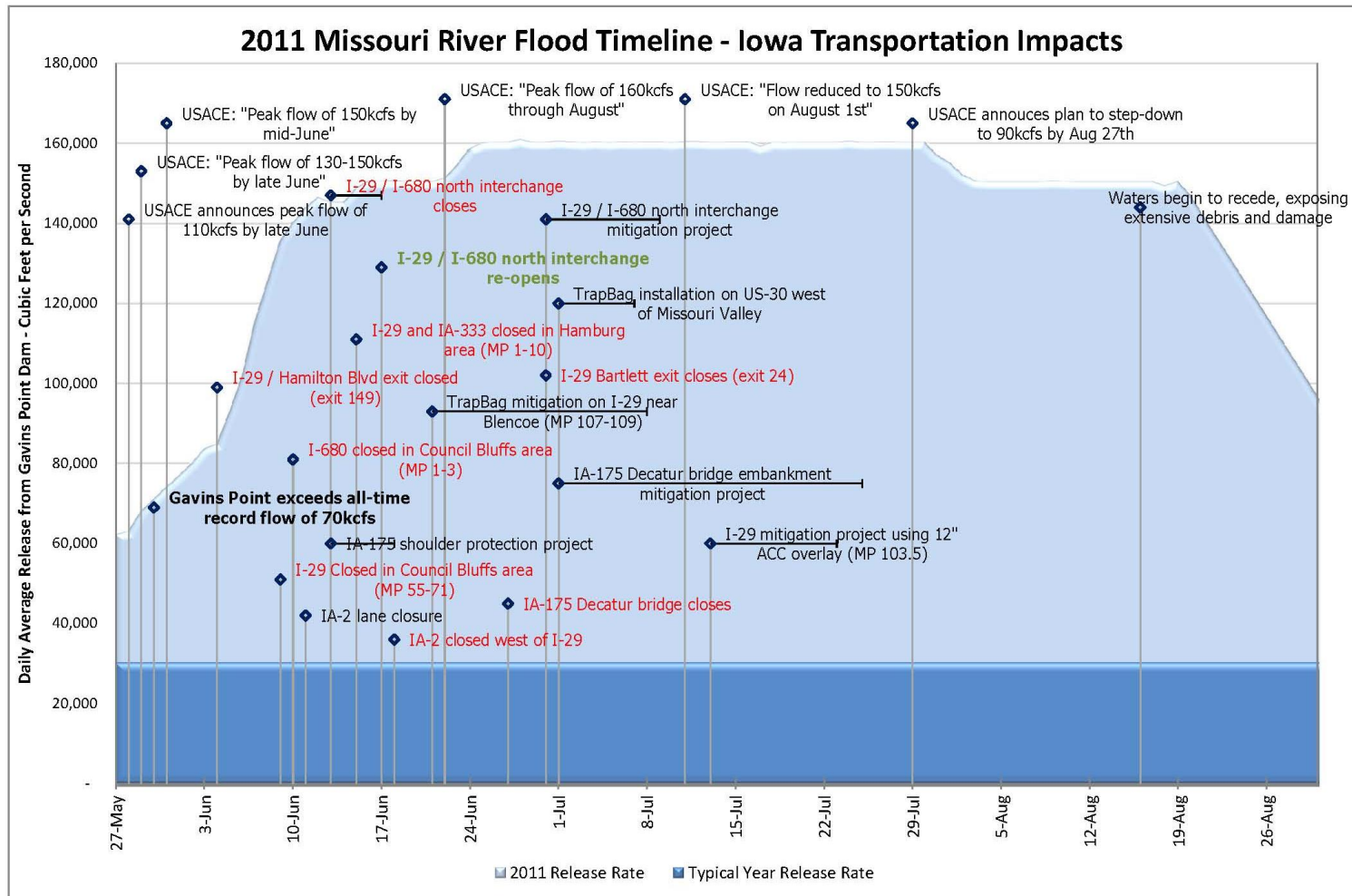
Overview of the Event



- Snowpack in Northern Rockies was 212% above normal.
- One year's worth of rain fell in the Upper Missouri Basin the last two weeks of May.
- Water released from Gavins Point Dam June 25 exceeded twice the previous record and did not decrease until July 31.
- The Missouri River in Sioux City was above flood stage from June 5 to August 26 (82 days).
- Longest duration flood event in U.S. history.

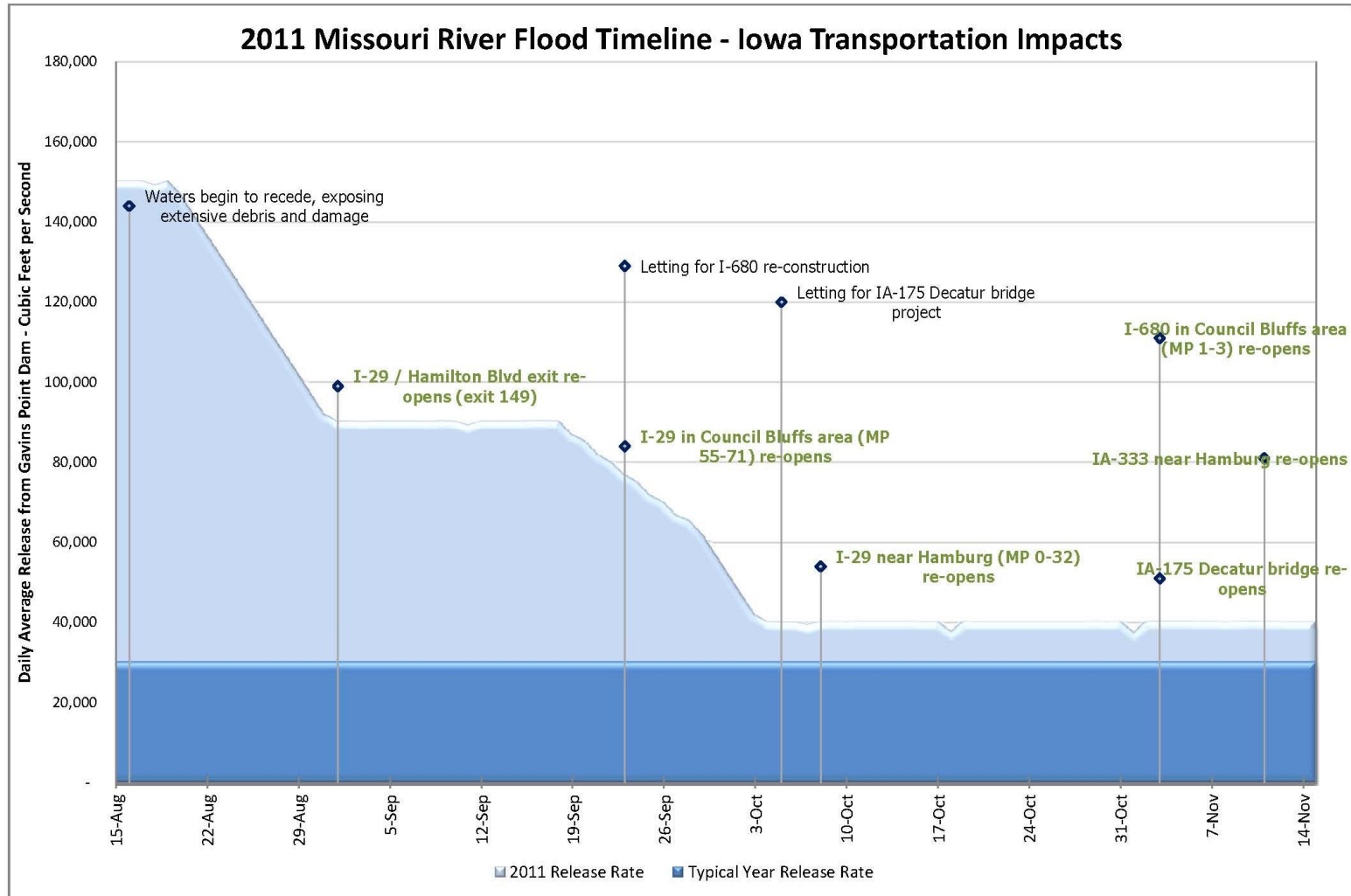
Impact of the Flooding

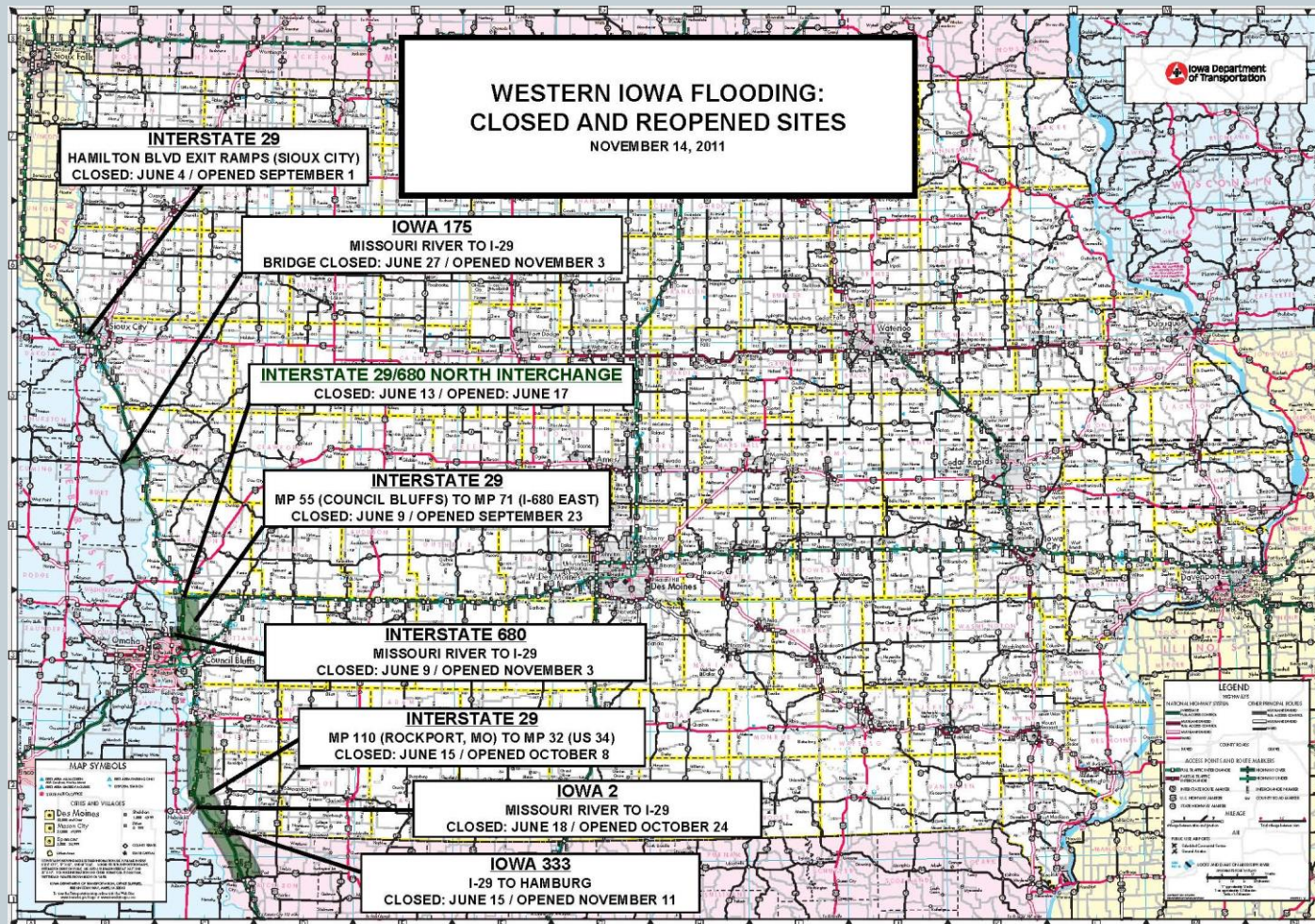
Timeline of the Event



Impact of the Flooding

Timeline of the Event





Impact of the Flooding



- Over 60 miles of Iowa's Primary Highway System, including 50 miles of Interstate Highways I-29, and I-680 were close for nearly 5 months.
- Three of the 11 Western Iowa Missouri River crossings were closed (I-680, IA 2, and IA 175)
- There were no open river crossing along a 75 mile stretch between St Joseph, Missouri and Pacific Junction, Iowa which is approximately 20 miles south of Omaha\Council Bluffs.
- Decreased mobility impacted the flow of goods and services and resulted in economic displacement in affected communities. Each of the 3 closed river crossings were part major commuter route.
- The detour for the closure of I-29 in southwest Iowa resulted in an additional 150 miles for the trip from Kansas City to Sioux Falls, SD

Impact of the Flooding

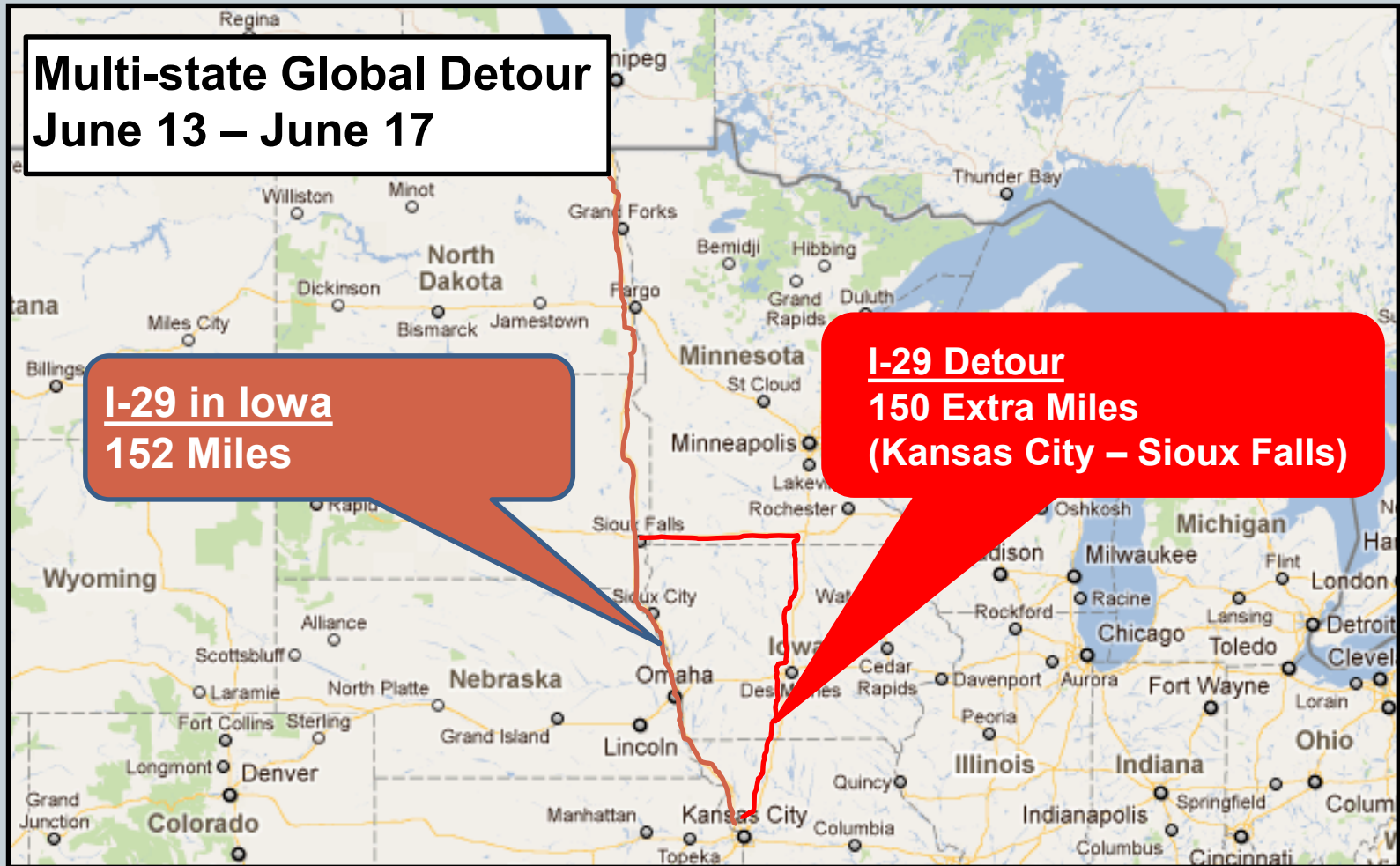
I-29 Multi-State Detour



**Multi-state Global Detour
June 13 – June 17**

**I-29 in Iowa
152 Miles**

**I-29 Detour
150 Extra Miles
(Kansas City – Sioux Falls)**



Impact of the Flooding

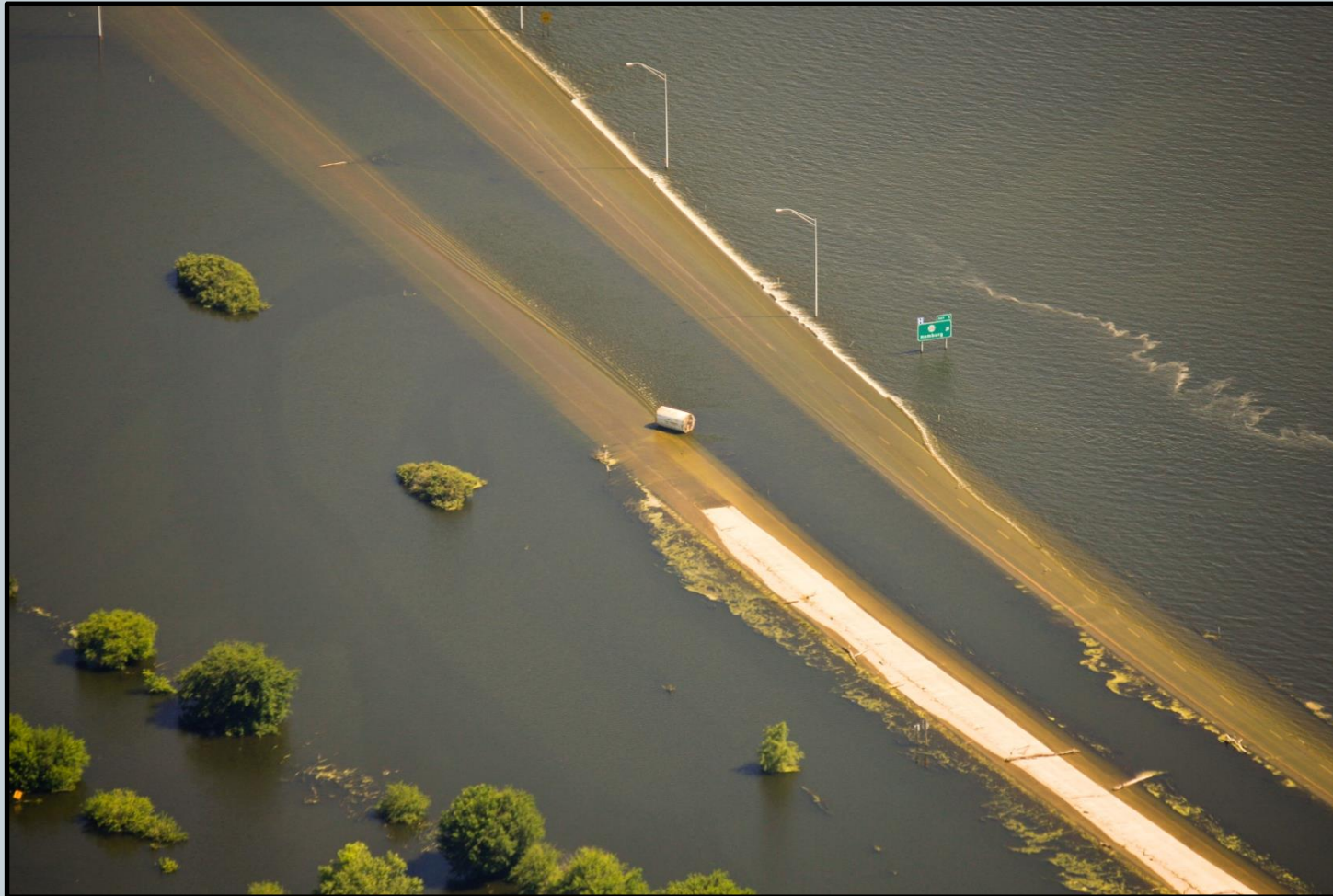
I-29 in Fremont County approximately 15 miles north of Missouri Border



I-29 looking north.

Impact of the Flooding

I-29 near Hamburg in Southwest Iowa



Impact of the Flooding

Rail line damage: The line is just east of I-29 north of IA 2 in Fremont County



Impact of the Flooding

This photo was taken two months into the event on I-29 in Southwest Iowa



Impact of the Flooding

I-680



Impact of the Flooding

I-680



Impact of the Flooding

I-680



Impact of the Flooding

I-680



Impact of the Flooding

I-680



Impact of the Flooding

I-680



Impact of the Flooding

Mitigation Sites



There were 5 sites where mitigation measures were taken to insure that travel was maintained on those roadways.

- US 30: A portion of the 9 mile section between I-29 and Blair, Nebraska was maintained through the use of TrapBags placed along the south shoulder.
- I-29 MP 107 to 109: TrapBags were placed along both shoulders of the southbound lanes of I-29 from MP 107 to MP 109.
- I-29 Hamilton Blvd. in Sioux City: A temporary ramp to the Wesley Parkway interchange was placed to provide access across the Veterans Memorial Bridge, as well as patching to repair a damaged storm sewer.
- I-29 MP 103 to 104: We placed a 12 inch HMA overlay in the southbound lanes to raise the elevation of the roadway above the anticipated peak elevation.
- I-29/I-680 north interchange near Loveland: Crews installed a new pipe, sandbags and pumps to prevent the water from closing the road.
- IA 175 near Onawa, Iowa: Contractor was hired to replace shoulders damages by floodwaters along IA 175, and place material along the embankment to the approach to the Missouri River bridge. However the bridge was closed due to concerns resulting from a significant scour hole that developed near the embankment.

Mitigation Strategies

TrapBags on the south side of US 30 West of Missouri Valley



Mitigation Strategies

TrapBags on the south side of US 30 West of Missouri Valley



Mitigation Strategies HESCO Barriers

Near Hamburg on I-29



Communication and Coordination

Incident Management



- Initial coordination between 6 states (South Dakota, Minnesota, Nebraska, Iowa, Missouri and Kansas)
- Iowa DOT hosted a daily partner conference call / webinar starting in June, became weekly in August and lasted into October.
- Included neighboring states, Iowa state agencies, Federal officials and facilitated key decision-making discussions.
- Heavy use of GIS provided partners a common operating picture. Used Google Earth with custom layers (inundation levels, LIDAR, historical imagery, etc...)
- The Air Wing of The Iowa State Patrol provided weekly updates of areas that were inaccessible.

Communication and Coordination

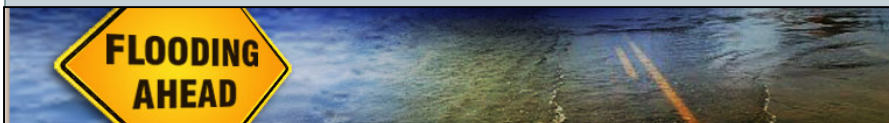
Informing The Public



- Iowa DOT opened a flood call center for the public
 - Open from June 9 - July 12.
 - Anywhere from 2 - 8 operators at any one time, close to 50,000 calls were received from the public.
- A Missouri River Flood Website was hosted by Iowa DOT.
 - It contained press releases, detour maps and other information resources. We had 2.7 million visitors to that site.
- The Iowa 511 site had approximately 650,000 visits during peak flooding in June and July.
- Changeable Message Signs

Communication and Coordination

Web Page and Detour Information



Flood Safety

Iowa DOT flood hotline 866-452-8510

Open the following hours:
Mondays through Fridays 7 a.m. - 4:30 p.m.

For travel information during evening and weekend hours, call 511 (in Iowa) or 800-288-1047 (from anywhere in the U.S.), or visit <http://www.511ia.org/>. Services are free and available any time of the day to keep travelers informed and safe.

- [Flood Safety Home](#)
- [Partners/Links](#)
- [Resources](#)
- [Flood video](#)
- [Floods of 2011 photos](#)
- [Floods of 2010 photos](#)
- [Floods of 2008 photos](#)

Flooded Roads



[Learn more about flood safety](#)



RSS feed

Get the latest flood updates by subscribing to the flood safety RSS feed.

Follow us via [Twitter](#)

2011 Missouri River flooding

- [Iowa flooded roads and detour routes map](#)
- [Emergency proclamations](#)
- [Flood inundation forecast](#)
- [Flood image gallery](#)
- [Flood cam images](#)

Traveler assistance information phone numbers

Iowa

- 866-452-8510, 7 a.m. – 9 p.m. daily (operator-assisted calls)
- 800-288-1047 off hours (recorded 511 message)

Kansas

- 866-511-KDOT (5368) – calling anywhere in U.S.
- 511 from anywhere in Kansas

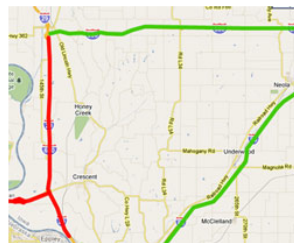
Minnesota

- 800-542-0220

Missouri

- 888-275-6636, toll free customer service hotline available 24/7

Iowa flooded roads map



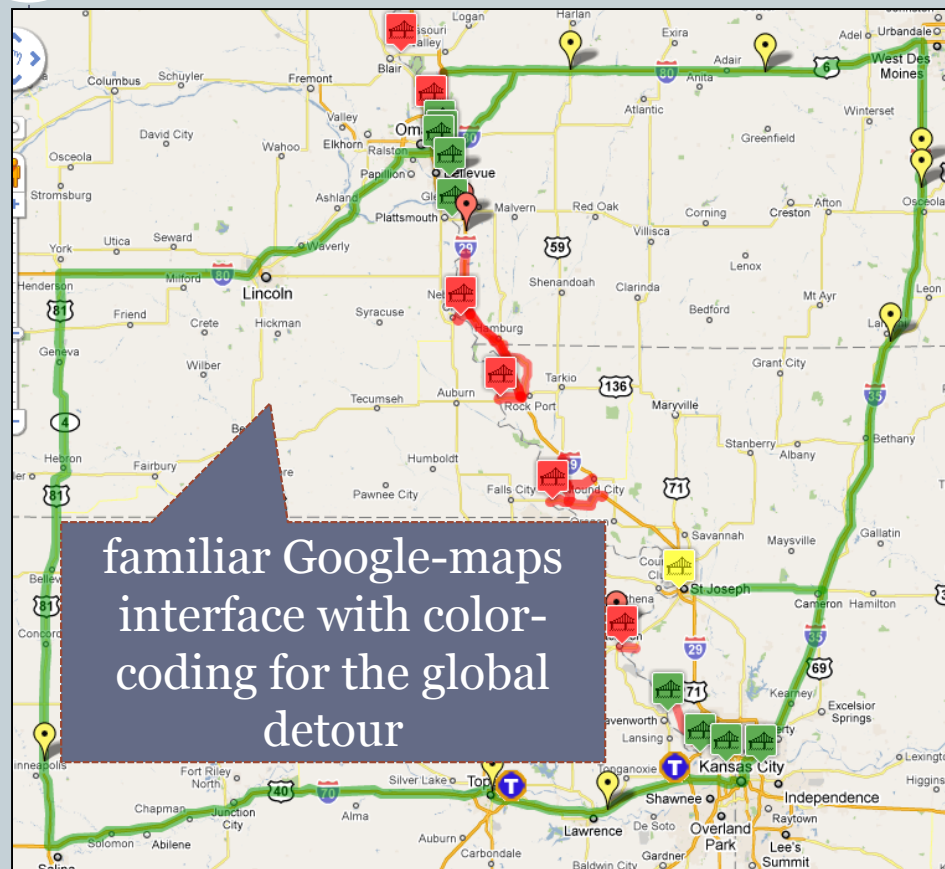
Additional resources

- [View the latest news releases](#)
- Go to www.511ia.org
- [Amtrak service alerts and notices](#)

Other state websites

• Kansas

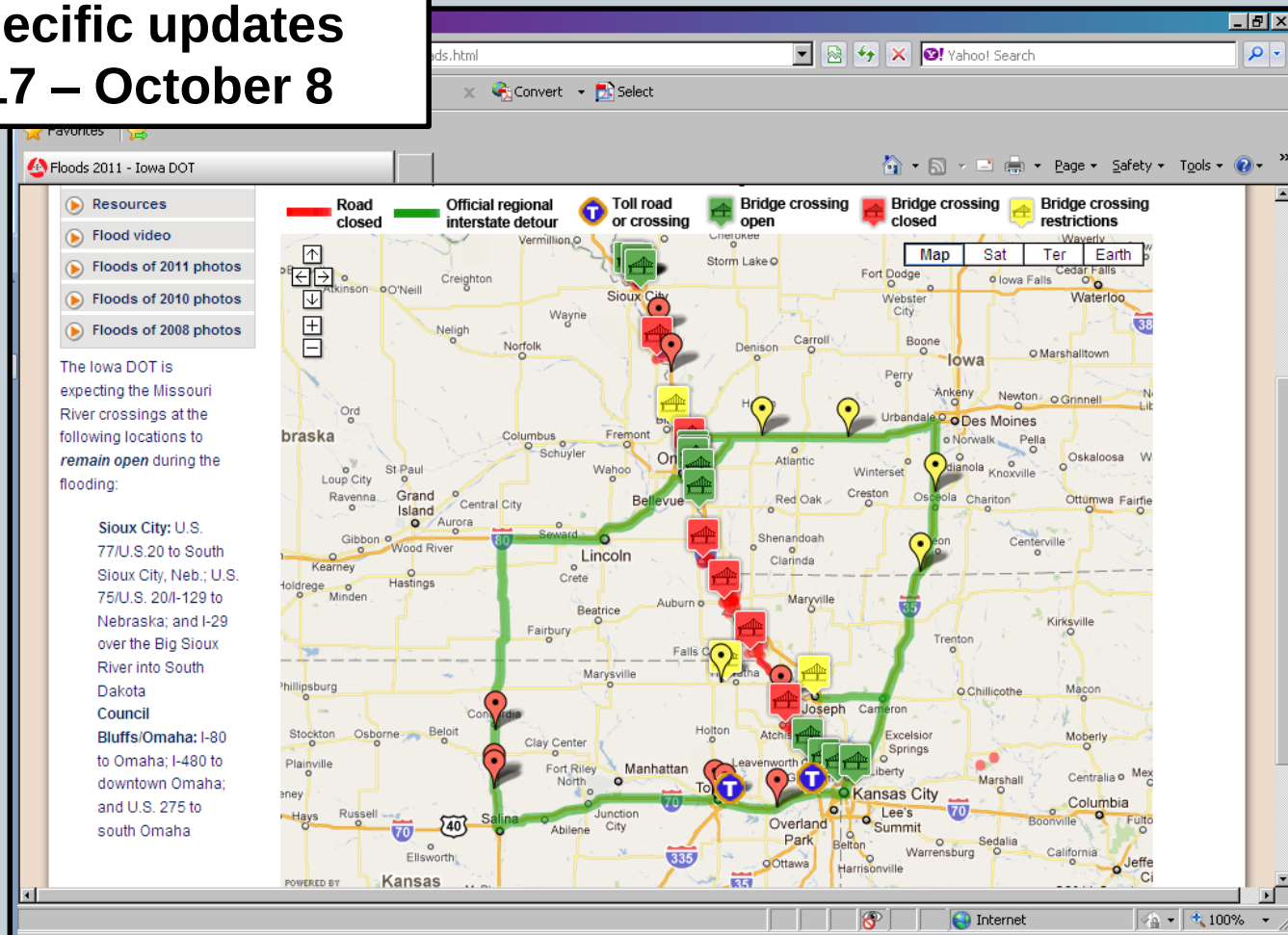
- [KDOT flood page](#)
- [KDOT northeast Kansas roadway and weather conditions page](#)
- [KDOT 511 map](#)
- www.kandrive.org



Communication and Coordination

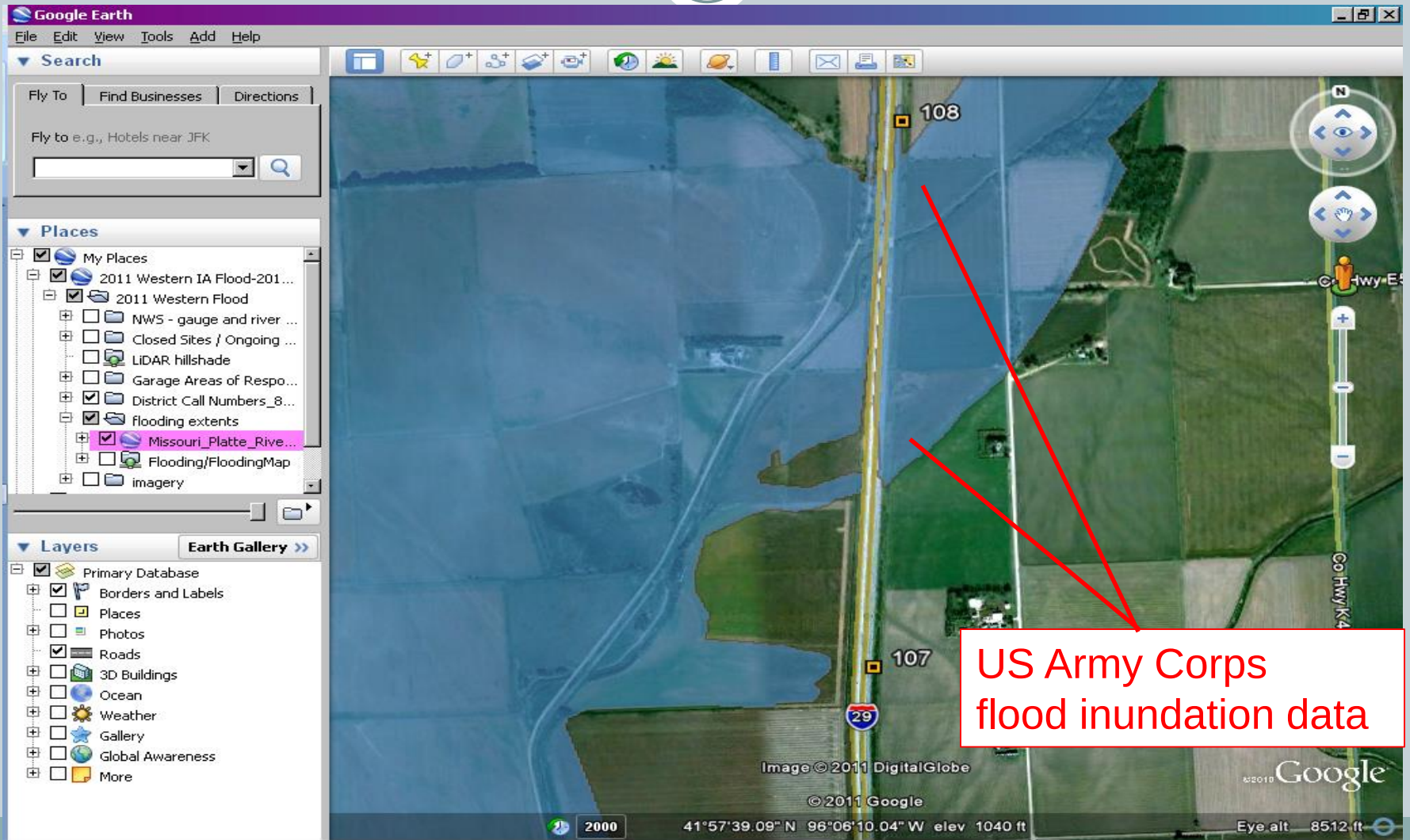
Web Page and Detour Information

**Iowa DOT Website:
Site specific updates
June 17 – October 8**



Communication and Coordination

Utilization of Information from Resource Agencies



Communication and Coordination

Information gathering and Monitoring Techniques (LiDAR)



- LiDAR Imagery of IA 175 near Decatur

Communication and Coordination

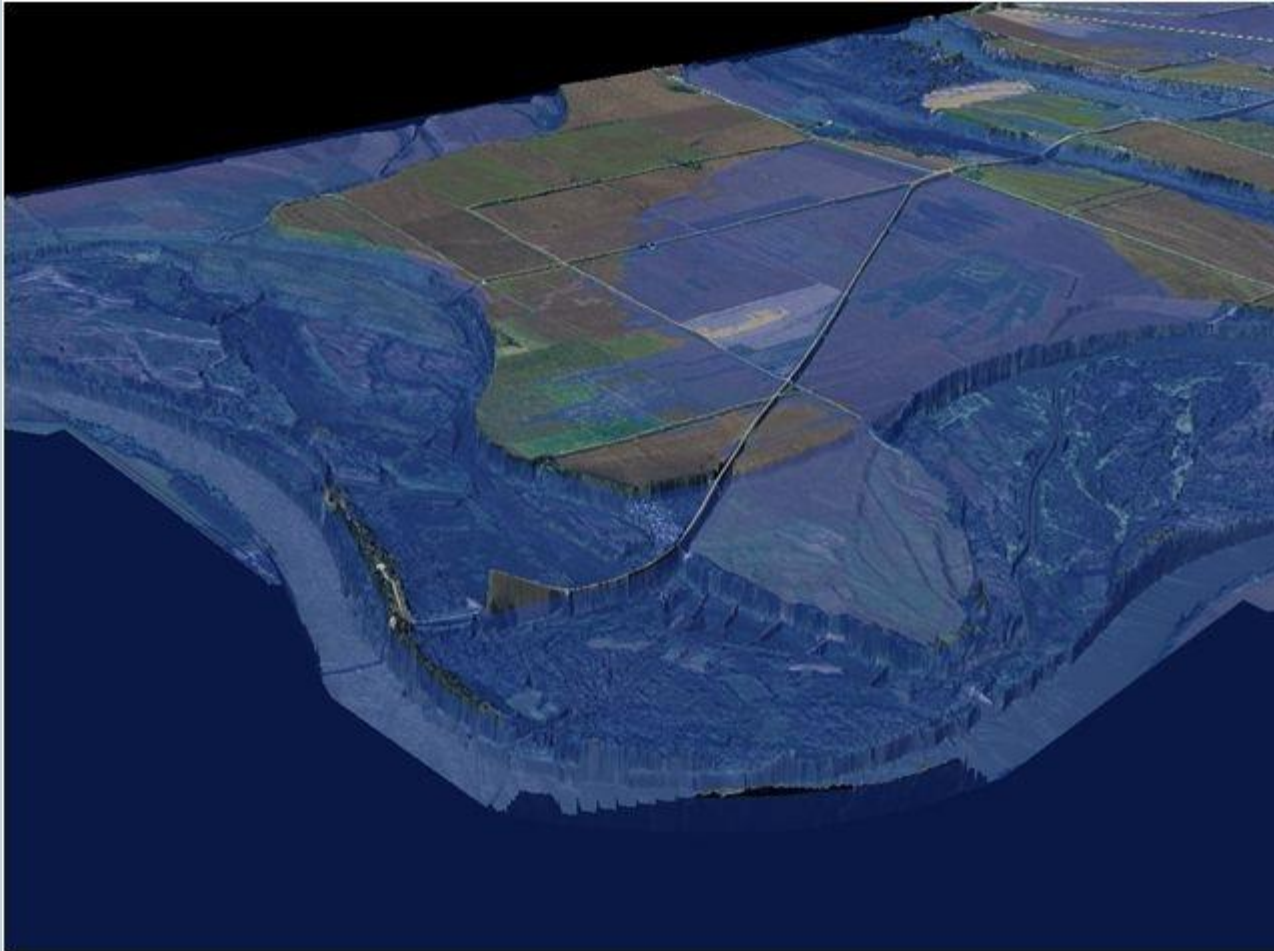
Information gathering and Monitoring Techniques (LiDAR)



- Aerial Photography of IA 175 near Decatur

Communication and Coordination

Information gathering and Monitoring Techniques (LiDAR)



- LiDAR Imagery of IA 175 near Decatur

Communication and Coordination

Photos and Video from Field Personnel



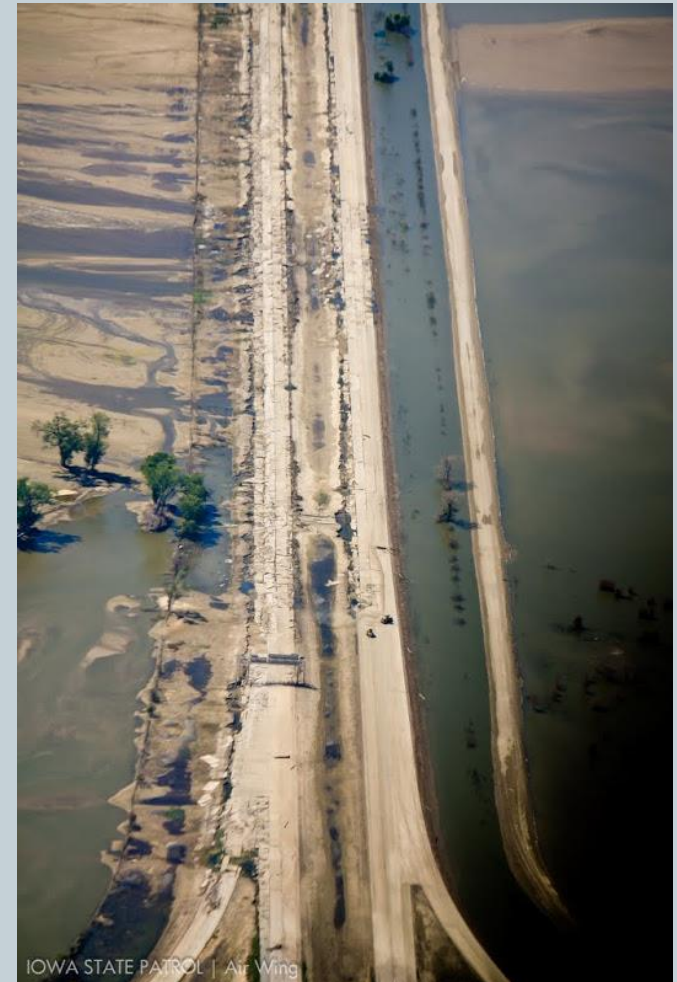
Video of I-29:
Photos and video
taken by field
personnel was an
extremely valuable
tool in both
response and
recovery.

Flood Recovery

Repair\Relink\Recover



- Designated two people to coordinate the flood recovery efforts:
 - Damage Assessment and Plan Development was Coordinated by Michael J. Kennerly PE Director of the Office of Design
 - Project Administration was coordinated by Robert A. Younie PE, Director of the Office of Maintenance.



Flood Recovery

Repair\Relink\Recover



- We hired a consultant to do the damage assessment, and we put them on an accelerated schedule. We gave them 15 calendar days to complete the DDIR's. (22 covering 59 mi)
- We utilized an existing contract to dispose of hazardous material.
- Pavement cleaning and debris removal contract
- Limited Design Concept to rebuild I-680
- Utilized consultant services to supplement on contract administration staff.

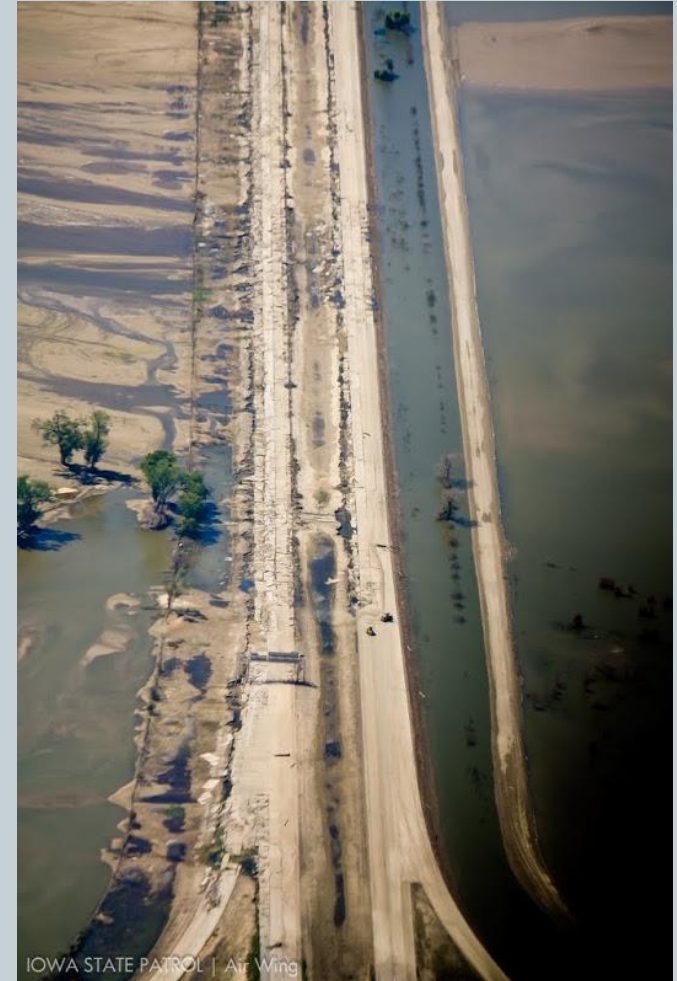


Flood Recovery

Repair\Relink\Recover



- Basic Requirement to Re-opening to traffic
 - Debris removal
 - Checking for voids
 - Inspecting roadway
 - Inspecting culverts
 - Inspecting bridges
- Full recovery
 - Reestablishment of Roadside Vegetation
 - Lighting
 - Other traffic services



Flood Recovery

Repair\Relink\Recover



Flood Recovery

Repair\Relink\Recover



- First road closed June 4th (I-29 SB Hamilton Blvd exit in Sioux City) opened September 1st
- I-29 in Council Bluffs opened September 23rd
- I-29 in Southern Iowa opened October 8th
- I-680 and IA-175 opened November 2nd
- Last road opened November 11th (IA-333)

A total of 42 projects were awarded.

Total Projects Awarded \$42.2 million

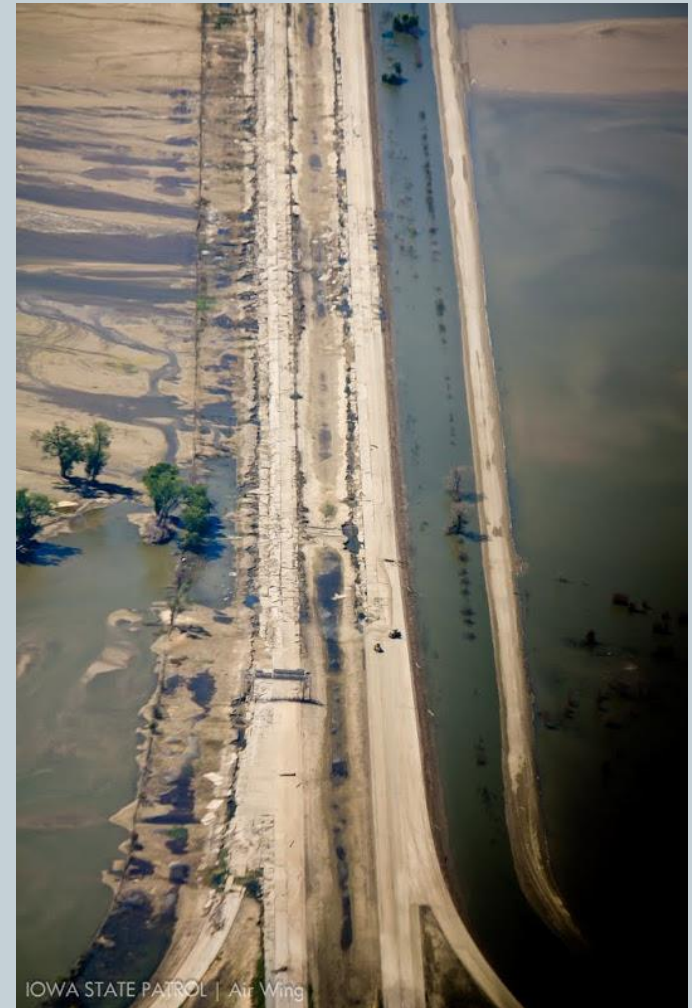
Lessons Learned/Future Considerations

- Understanding and tracking the timing of a presidential Disaster Proclamation.
 - 180 Day clock starts immediately
- Communication is Key;
 - Engage the resource agencies, CORP and FHWA early and throughout the event.
 - Utilize as many media outlets as possible to keep the public informed, including social media.
 - Ensuring that the information is 100 percent accurate 100 percent of the time is key to helping the public, emergency responders, and business make key decisions.
- Begin planning your recovery effort at the onset of the event:
 - Understanding what you need, where to acquire it, and who is responsible for it is key to rapid response.
 - Keep the teams managing the various aspects, flood management, and recovery small.
- Early coordination with emergency responders and keeping them updated on closures and openings throughout the event is extremely important.
- Innovative Contracting: Limited Design Concept



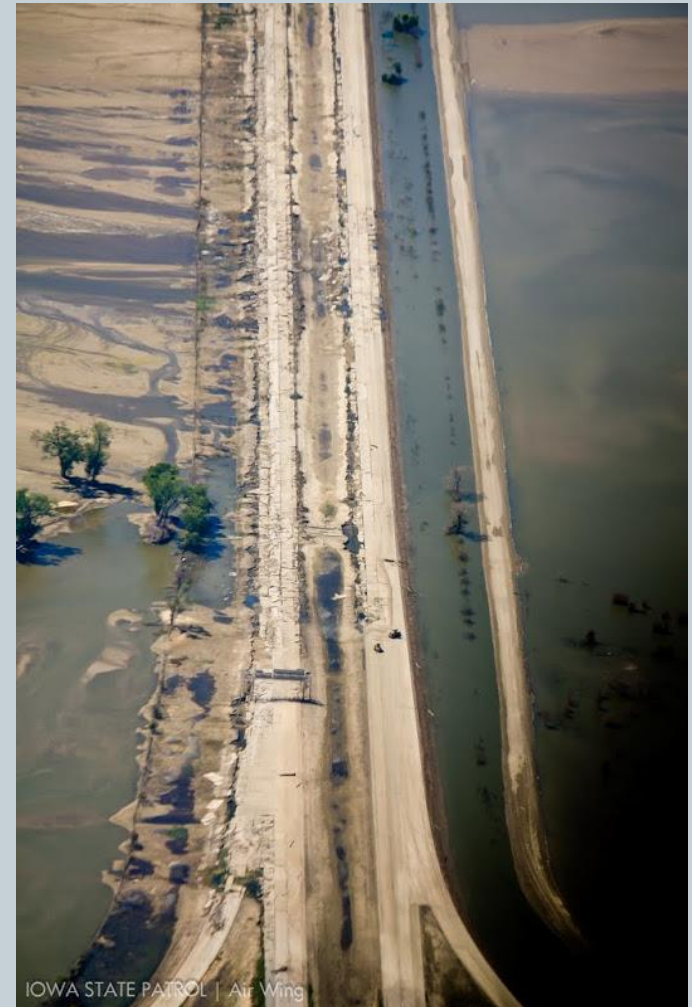
Lessons Learned/Future Considerations

- Keep the team managing the event small
- Development of an Electronic Detailed Damage Inspection Report (DDIR) after the floods of 2008
- Decision making structure needs to be clearly defined and communicated from the onset, simple, and adhered to throughout the process.
- Keep solutions simple, but encourage innovation and taking risks.
- Be aggressive.
- Improve the way information is stored and can be displayed geospatially.
- Electronic As-Builts that utilize survey grade accuracy LiDAR to expedite future plan development (we lost all of our survey control points on I-680 in the flood)



Lessons Learned/Future Considerations

- Consider the use of airborne LiDAR to create the digital terrain models (DTM) used in design.
- An understanding of the levee system, including the heights of the levees, and their location is essential in managing an event of this magnitude.
- Evacuation procedures
 - Temporary housing assistance.
 - Evacuation of care facilities
 - Establishment of evacuation routes
 - Prevention of looting when homes are vacated for a substantial amount of time.
- Establish designated detour routes and where possible have the signing already in place.



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Questions?



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