Mapped Floodplain Requirements

Jon Simonsen – DNR
October 2018
(Tab 10)
Special Flood Hazard Areas (SFHA’s)
100 Year (1% probability) Flood Event

Zone A - approximate
Special Flood Hazard Areas (SFHA’s)

Zone AE – detailed study
Goals of Floodplain Management

• Protect life, health and property
• Reduce flood damage costs & impacts to local businesses
• Prevent increased flooding caused by development in the floodplain
National Flood Insurance Program (NFIP)

Federally backed flood insurance is available to communities.

Walker requests FEMA flood aid

Sunday, September 16, 2018 5 p.m. CDT

Flooding

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Floodplain development – transportation projects

- Culvert/ bridge replacements
- Floodplain fill
- Road resurfacing
Project coordination

- Floodplain regulations are administered and enforced by the municipality.

- Effective coordination is important.

- DOT projects are exempt from a physical permit.
  - The project still needs to meet local floodplain ordinance standards.
Questions?

“Something on a floodplain, preferably.”
What is the challenge?

3,213 miles of local road are “failed, very poor or poor” — need reconstruction (12%)

6,962 miles of local roads are “fair” — need repair (26%)

Counties of Columbia, Crawford, Dane, Dodge, Grant, Green, Iowa, Jefferson, Juneau, La Crosse, Lafayette, Monroe, Richland, Rock, Sauk and Vernon. Total miles of local road: 26,776
Culvert cost

Initial replacement & construction

+ annual maintenance

+ lifespan

+ added cost of emergency repairs
Cost-savings lessons learned

• New York and Vermont- Tropical Storm Irene
  – Link between flood resiliency & ecological connectivity
  – In many cases, municipality spends LESS $ and LESS TIME over the long term (50 to 75 years)

• Massachusetts
  – Culvert upgrades studies at 3 problem sites
  – The upgrades were ~38% less expensive than in kind replacement and maintenance over 30 years

• Maine culvert cost study
  – Annual cost at 4 culvert replacements over a 50 year timespan.
  – 2 sites with cost savings, 2 sites with cost increase
Cost-savings lessons learned

- **Wisconsin- Green Bay (2016)**
  - Studied 461 culverts that were about ½ of the bankfull stream width.
  - The total culvert lifetime savings of stream spanning culverts ~ $13,000 at each crossing.
  - This savings offset the initial improvement cost at 49% of sites.
Cost-saving strategies

- Long term thinking
- Maximize the culvert service life to avoid cost of multiple replacements

Undersized culvert lifespan ~ 35 years
Stream spanning culvert lifespan ~ 75 years
Cost-saving strategies

• Reduce maintenance costs

• Avoid added costs of flood failure
  – Project costs during a major flood are generally higher than planned replacement costs.
  – Added costs to repair streams, property, and delayed travel
  – Public safety
Cost savings = Minimizing stream impact to roads!

- Hydraulic risk factors
- Structure durability
- Geomorphic risk factors
Hydraulic factors

Ability of the culvert to convey water during a wide range of flows (including floods)
Lifespan of culvert (to minimize long term costs) has a 53% - 63% chance of experiencing a 100 year storm event.

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<th>Length of Service (years)</th>
<th>Frequency - Recurrence Interval</th>
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Study finds Midwest flooding more frequent

Research covered more than 50 years of data in 14 states

This aerial view of a flooded Midwestern farm has been all too common during four severe floods that have affected the region since 2008. Photo courtesy of Aneta Goska.

BY: GARY GALLUZZO | 2015.02.09 | 09:37 AM

The U.S. Midwest and surrounding states have endured increasingly more frequent flood episodes over the past half-century, according to a study from the University of Iowa.

The UI researchers based their findings on daily records collected by the U.S. Geological Survey at 774 stream gauges in 14 states from 1962-2011, a data-collection period in common for all the stations.
Structure durability

• Ability of the culvert & road to safely carry loads

• Structure material based on site water chemistry

• Avoid stream constriction to lower velocity and reduce abrasive energy of water & sediment

• Improve flood resiliency to preserve the integrity of the road core (by reducing erosion, perch, overtopping, piping, etc.)
Woody debris transported during floods is often < BFW in length
Gravel deposits downstream from frequent road failures
Flood Effects on Road-Stream Crossing Infrastructure: Economic and Ecological Benefits of Stream Simulation Designs. (Gillespie et. al. 2014)

An Economic Analysis of Improved Road-Stream Crossings. (Levine 2013)
• http://www.nature.org/ourinitiatives/regions/northamerica/road-stream-crossing-economic-analysis.pdf

Cost-Benefit Analysis of Stream-Simulation Culverts. (Christiansen, et.al. 2015)

Conservation Leverage: Ecological-Design Culverts also Return Fiscal Benefits (O’Shaughnessy, et. al. 2016)
• https://fisheries.org/2016/12/conservation-leverage-ecological-design-culverts-also-return-fiscal-benefits/
Study: Trout fishing generates $952 million for Driftless Area economies, more than double since 2008

CHRIS HUBBUCH chubbuch@lacrossetribune.com
10 hrs ago  📣 0
Some Northern Wisconsin Businesses Feeling Impacts Of Summer Flooding
Some Say Storm Run Off And Washed Out Roads Have Hit Their Bottom Line
Thursday, August 9, 2018, 4:30pm
By Danielle Kaeding

Northern Wisconsin Residents Juggle Tourists and Flood Recovery

Wisconsin Tourism Destinations Feel Impact Of Closed Highway 14
Taliesin, American Players Theatre Worry Road Closure Will Continue To Deter Visitors
Monday, August 27, 2018, 6:30am
By Hope Kirwan
Mission Impossible?

- Average stream crossings per township statewide is ~30 xings.
- Culvert inventories to plan and prioritize
  - Not all sites are major problems
  - Target flood prone and ecologically important crossings
  - Target routes that will minimize disruption of emergency services
Sources of Funding
Where to find information

Funding Sources to Help Fix Road Stream Crossings (May 2018)
This document summarizes funding sources to help improve municipal road crossings with flooding, water quality, and stream connectivity problems.

Road Stream Crossing Inventory Tools (April 2018)
This document summarizes road stream crossing inventory tools to identify the highest priorities for replacement and the most competitive sites for potential cost share assistance.

Flood Damage Funding for Municipal Road Stream Crossings (April 2018)
National Fish Passage Program

• Watershed-based approach to prioritizing projects

• Applications accepted year round

• Required match 1:1
Wisconsin—River Planning & Protection grants

- **Planning grants**
  - $10,000 maximum
  - Planning and assessment
  - December 10th deadline

- **Management grants**
  - $50,000 maximum
  - Restoration and protection
  - February 1st deadline

- WI local gov’ts and non-profits eligible to apply
Wisconsin—LCD & DATCP

• Technical design assistance and cost share
• Needs to be sponsored by the local County Land and Water Conservation Department.
• Requires a water quality concern to reduce sediment loads.
Flood Damage Aid

**WI DOT Flood Disaster Damage Aids:** Financial assistance to local governments to repair any highway that has had significant damage due to a disaster event.

**FEMA:** Funding for roads, culverts, and bridges when a disaster declaration has been issued.

**Hazard Planning Mitigation Grants: FEMA & WI Emergency Management:** Funding is available to plan and fix problems before the flooding occurs.
Great Lakes
Tips for success

• Start with an inventory and assessment
• Early coordination & partnerships to help with all phases of project development
• Cooperative efforts that align the priorities and utilize the expertise of municipalities and resource agencies
• Have a solid preliminary plan and budget
Contact the DNR Transportation Liaison
• Watershed information, biological surveys, partnerships, permitting, etc.
• Can provide assistance training volunteers
• Help develop grants or write project letters of support
Questions?