


TRANSPORTATION RESEARCH BOARD

Emergency events and their damage to assets

**Thursday, February 27, 2020
1:00-3:00 PM ET**



The Transportation Research Board has met the standards and requirements of the Registered Continuing Education Providers Program. Credit earned on completion of this program will be reported to RCEP. A certificate of completion will be issued to participants that have registered and attended the entire session. As such, it does not include content that may be deemed or construed to be an approval or endorsement by RCEP.



REGISTERED CONTINUING EDUCATION PROGRAM




Purpose


Explore how state departments of transportation can conduct statewide evaluations of assets that have been damaged due to emergency events.

Learning Objectives

At the end of this webinar, you will be able to:

- Determine whether or not repair and reconstruction alternatives for assets can be used and identify what alternative(s) may be used
 - Identify locations where highway assets have been repeatedly damaged and determine how to mitigate risk of recurring damage of assets in those areas
- 

PDH Certificate Information

- This webinar is valued at 1.5 Professional Development Hours (PDH)
 - Instructions on retrieving your certificate will be found in your webinar reminder and follow-up emails
 - You must register and attend as an individual to receive a PDH certificate
 - Certificates of Completion will be issued only to individuals who register for and attend the entire webinar session – this includes Q&A
 - TRB will report your hours within one week
 - Questions? Contact Reggie Gillum at RGillum@nas.edu
- 

Synthesis 50-15

**Asset Management Approaches to Identifying and
Evaluating Assets Damaged Due to Emergency
Events**

Project Panel

- **Jo Allen Gause, TRB**
- **Dr. Margaret Akofio-Sowah, PhD, WSP, Inc.**
- **Dr. Silvana Croope, University of Alabama**
- **Shannon Foss, Minnesota DOT**
- **Matthew Haubrich, Iowa DOT**
- **Dr. Jenny Li, Texas DOT**
- **Dr. Massoud Nasrollahi, P.E., Virginia DOT**
- **Dr. Pramen Shrestha, P.E., University of Nevada Las Vegas**
- **Greg Wolf, FHWA**
- **Dr. Matthew Hardy, AASHTO**

23 CFR 667 Periodic Evaluation of Facilities Repeatedly Requiring Repair and Reconstruction to Emergency Events

- **Requires DOTs to conduct statewide reviews**
- **Identify roads, highways, and bridges that have been damaged two or more times since 1997**
- **Evaluate damaged facilities to determine whether there are reasonable repair and reconstruction alternatives**
- **Summarize results in the TAMP**
- **Incorporate alternative strategies into agency asset management and project development practices.**

23 CFR 667 Deadlines

- **November 23, 2018 – Review and evaluation of NHS**
- **November 23, 2020 – Review and evaluation of ALL public roads, highways, and bridges**

Synthesis Objectives



- Document practices by state DOTs to comply with 23 CFR 667
- Highlight efforts to incorporate results in agency practices

Report Organization



- **Literature search: the past**
 - Background & History
 - Context
- **Survey of practice results: the present**
 - Practices and tools
 - Degrees of completion
 - Areas of need
- **Case studies: moving forward**
 - Successful practices
 - Ways to incorporate results
 - Improvement efforts

42 Agencies Responded to the Survey

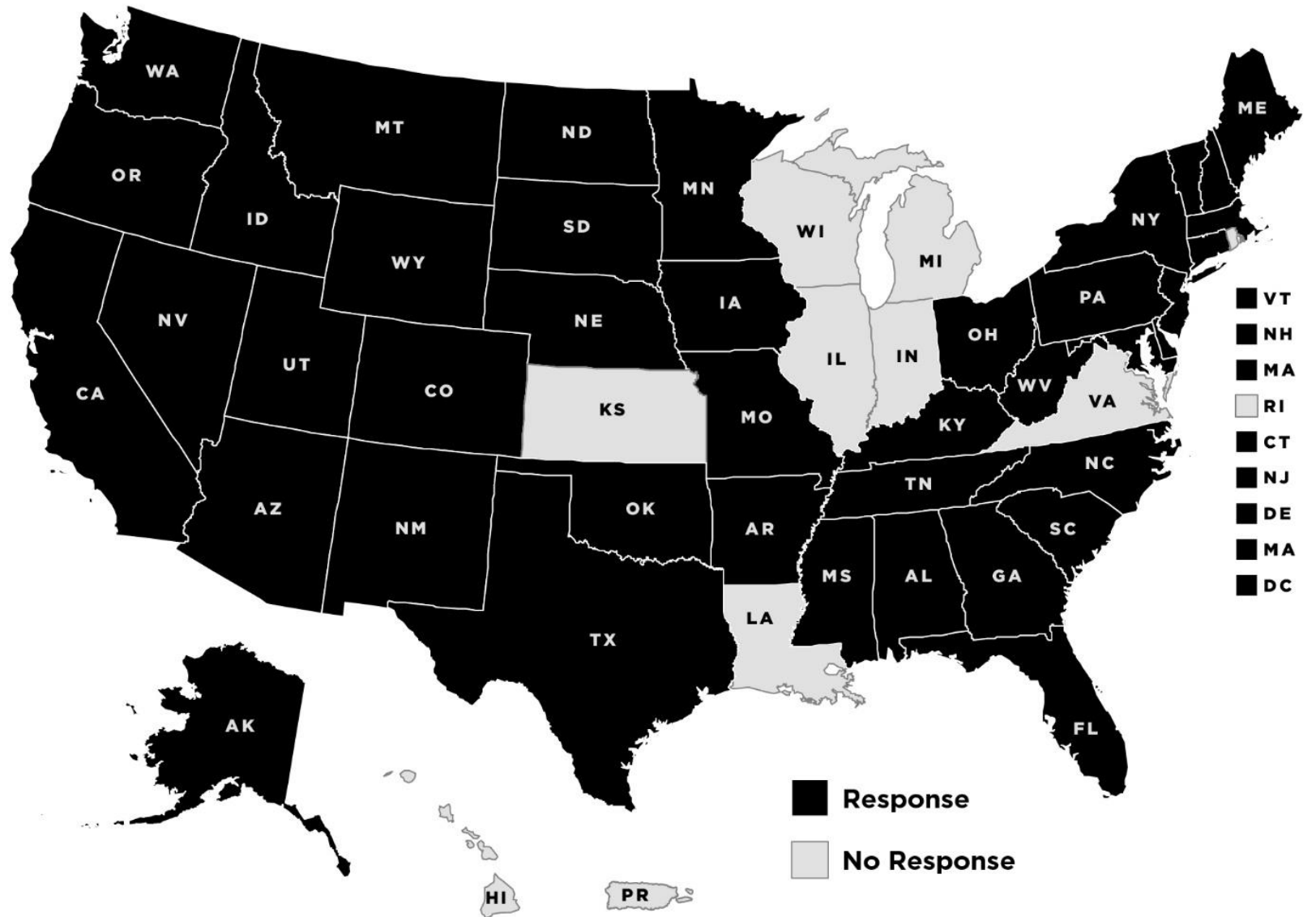


Figure 3-1. NCHRP 50-15 agency survey participants.

Most Agencies Complied with the 11/23/18 Deadline

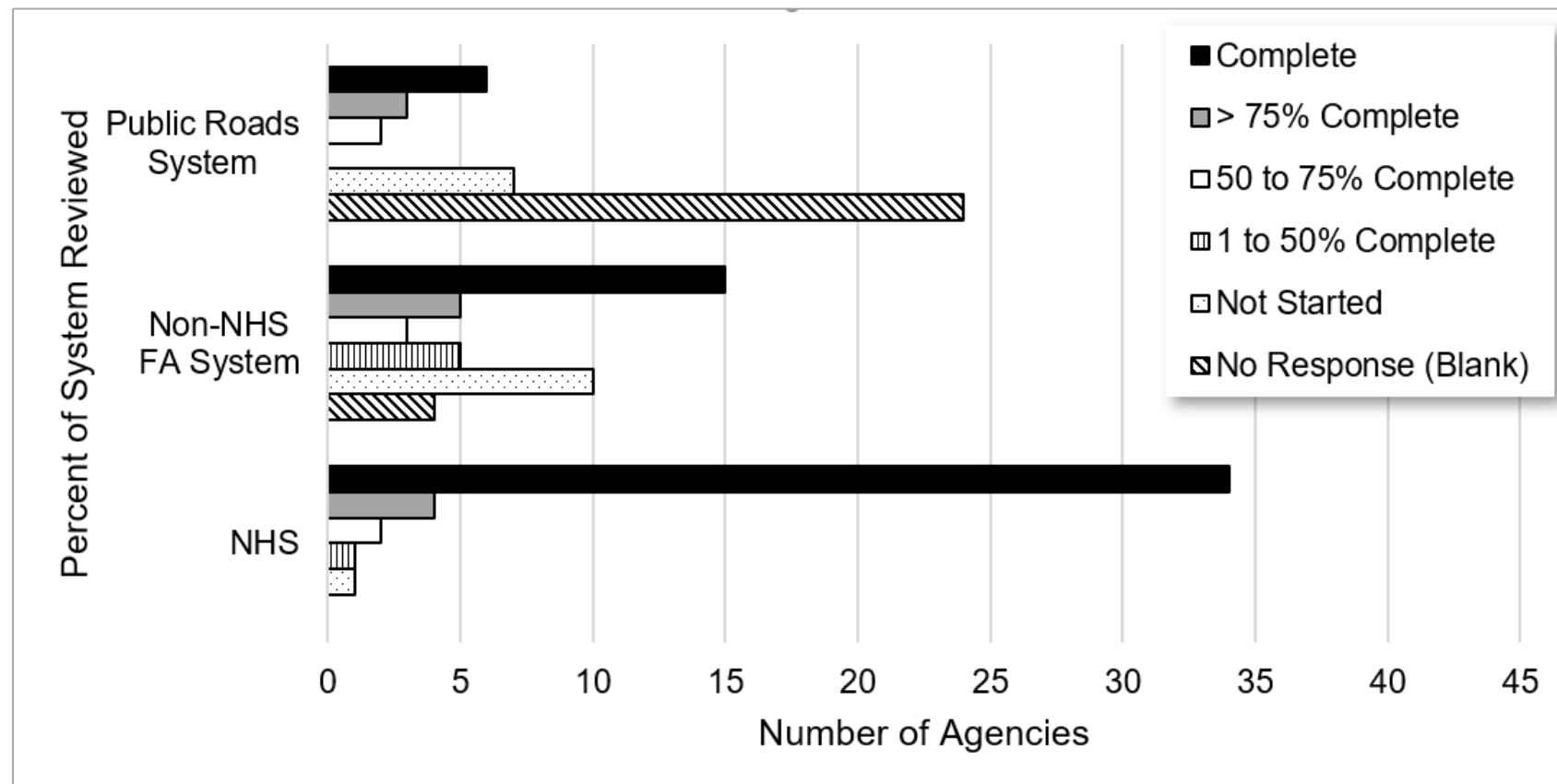


Figure 3-3. Percentage of highway system reviewed for multiple emergency events.

Agencies Struggled to Find Historic Data

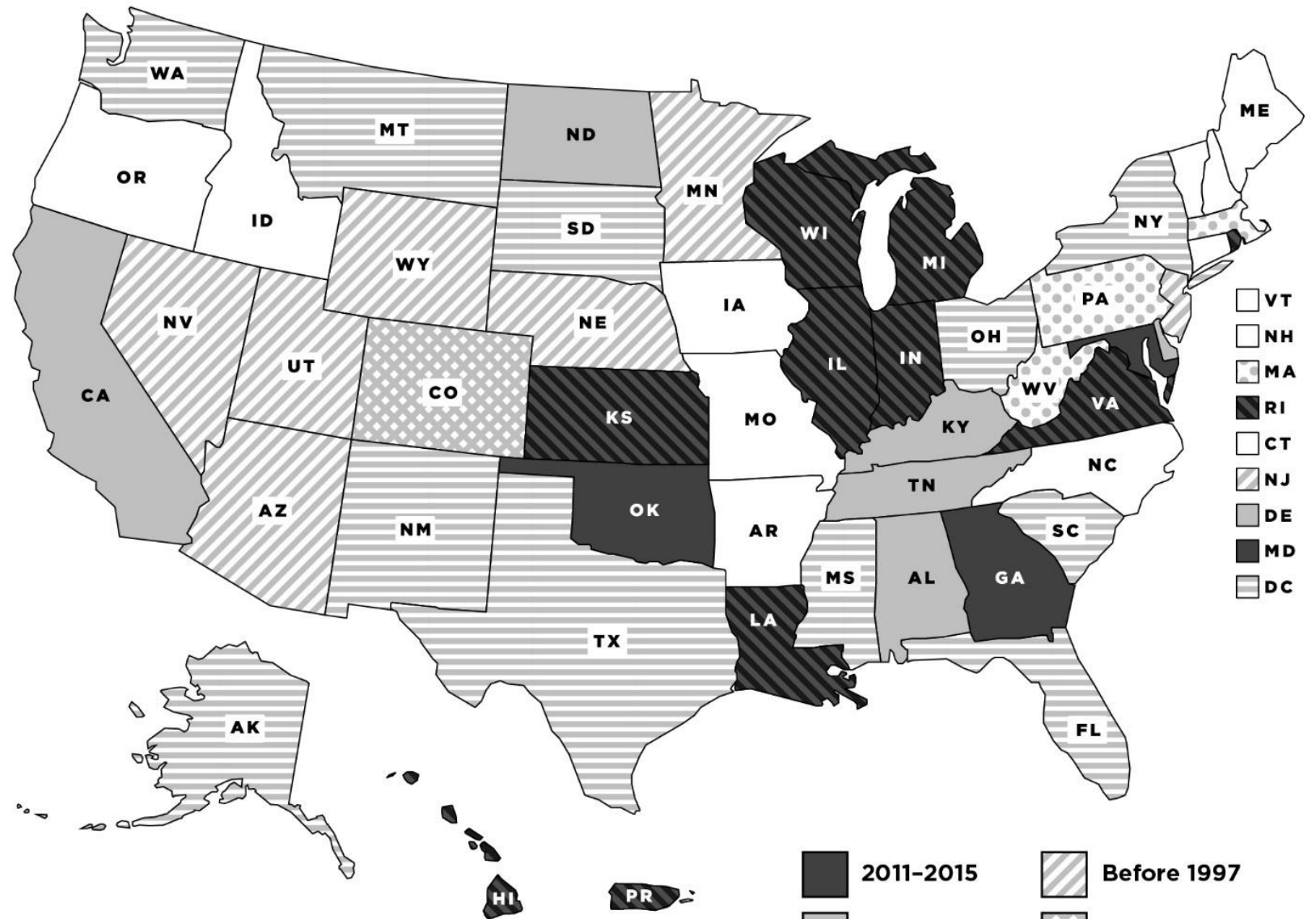
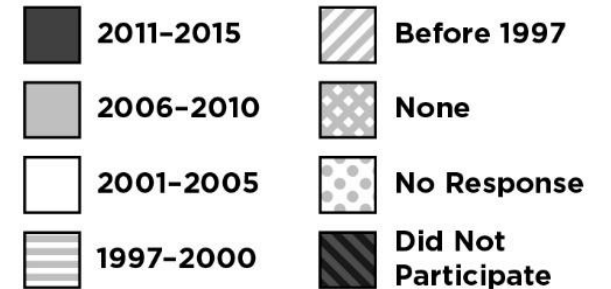


Figure 3-13. Earliest year the agency had complete records.



Various Techniques Were Used to Find Sites

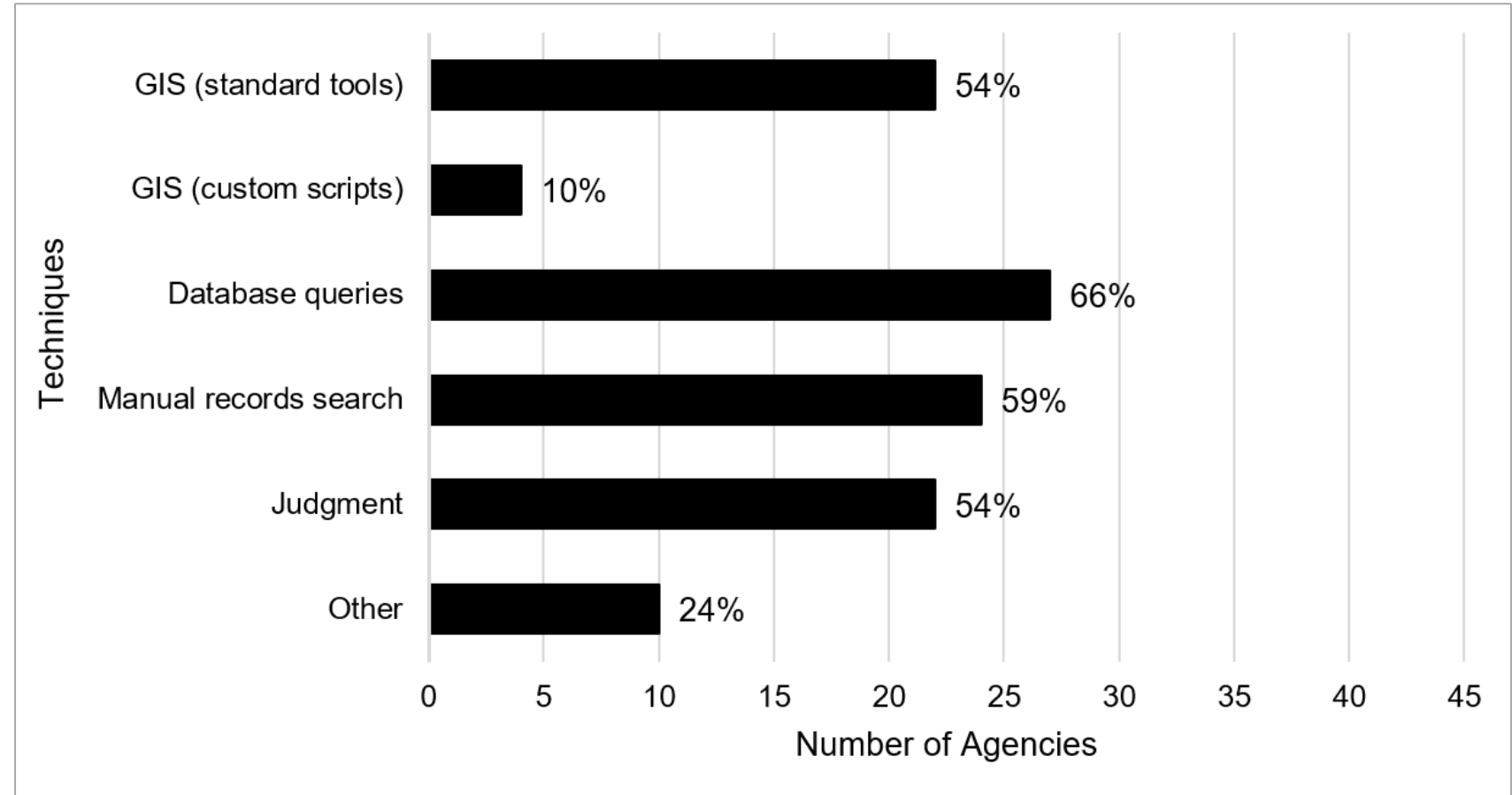


Figure 3-24. Techniques used to identify locations damaged more than once.

Locations Identified to Have Been Damaged by More than One Emergency Event



Network Type	Asset Owner	Number of Damaged Locations to Date						
		0	1-5	6-10	11-15	16-20	21-25	> 25
NHS	State DOT	20	11	0	2	1	3	2
	Toll Authority	11	1	0	0	0	0	0
	Municipal/County	14	1	0	0	0	0	0
Non-NHS Federal Aid	State DOT	15	4	0	0	0	0	2
	Toll Authority	8	1	0	0	0	0	0
	Municipal/County	11	0	0	1	0	0	0
Public Roads	State DOT	15	1	0	0	0	0	0
	Toll Authority	8	0	0	0	0	0	0
	Municipal/County	11	1	0	0	0	0	0

Incorporation of Results in the TAMP

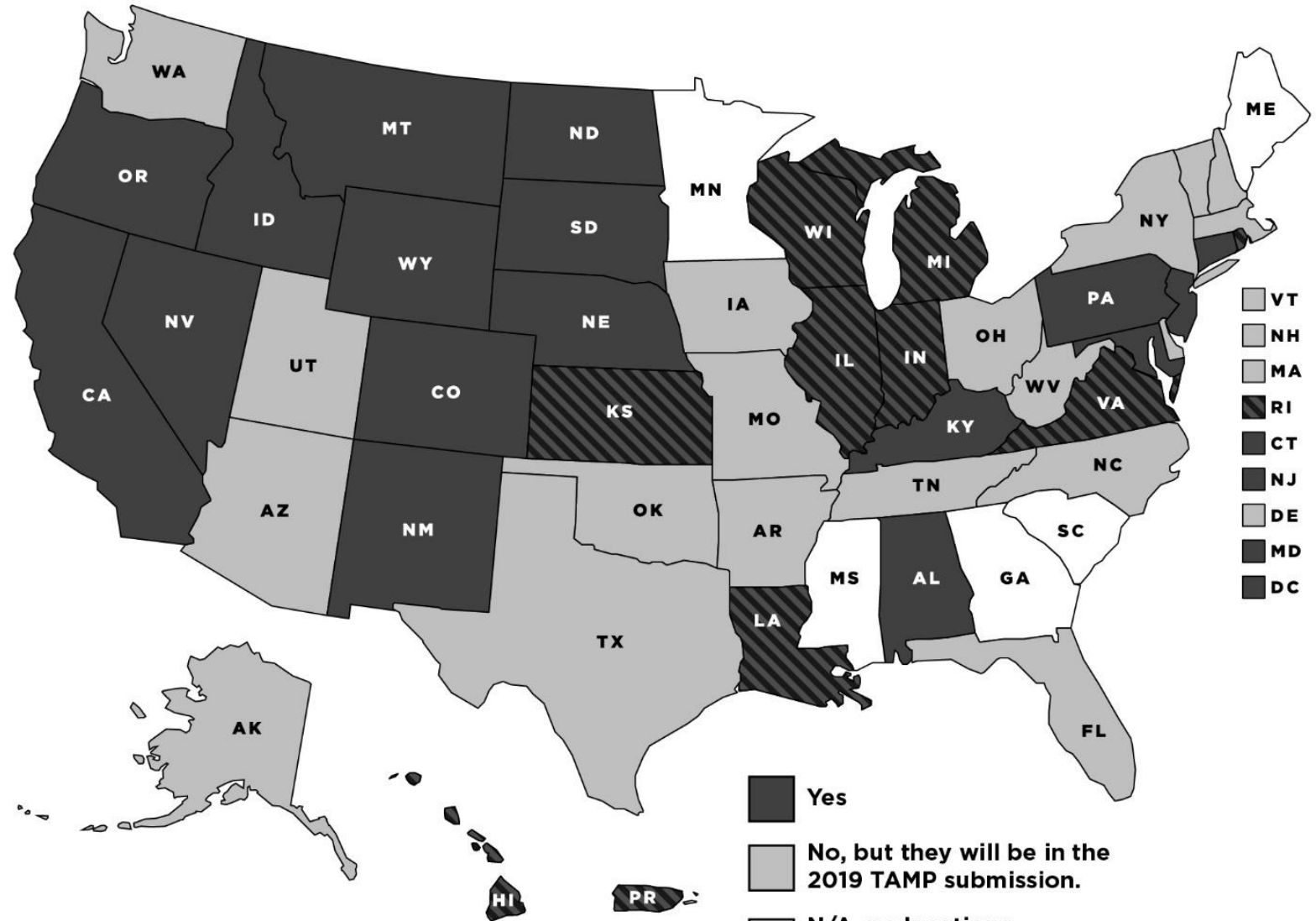


Figure 3-26. Agencies that incorporated evaluation procedures in the initial or final TAMP.

Case Examples



California DOT:
Integration of Multiple
Assessments into a
Statewide Highway
Strategic Management
Plan



Oregon DOT:
Incorporating Assessment
of Sites Damaged by
Multiple Events into
Managing Unstable
Slopes



Iowa DOT:
Developing Tools to
Better Track Damage
Assessment and Inform
Project Planning



**New York
State DOT:**
Integrating Data to
Support Investment
Decisions

Greatest Challenges Moving Forward

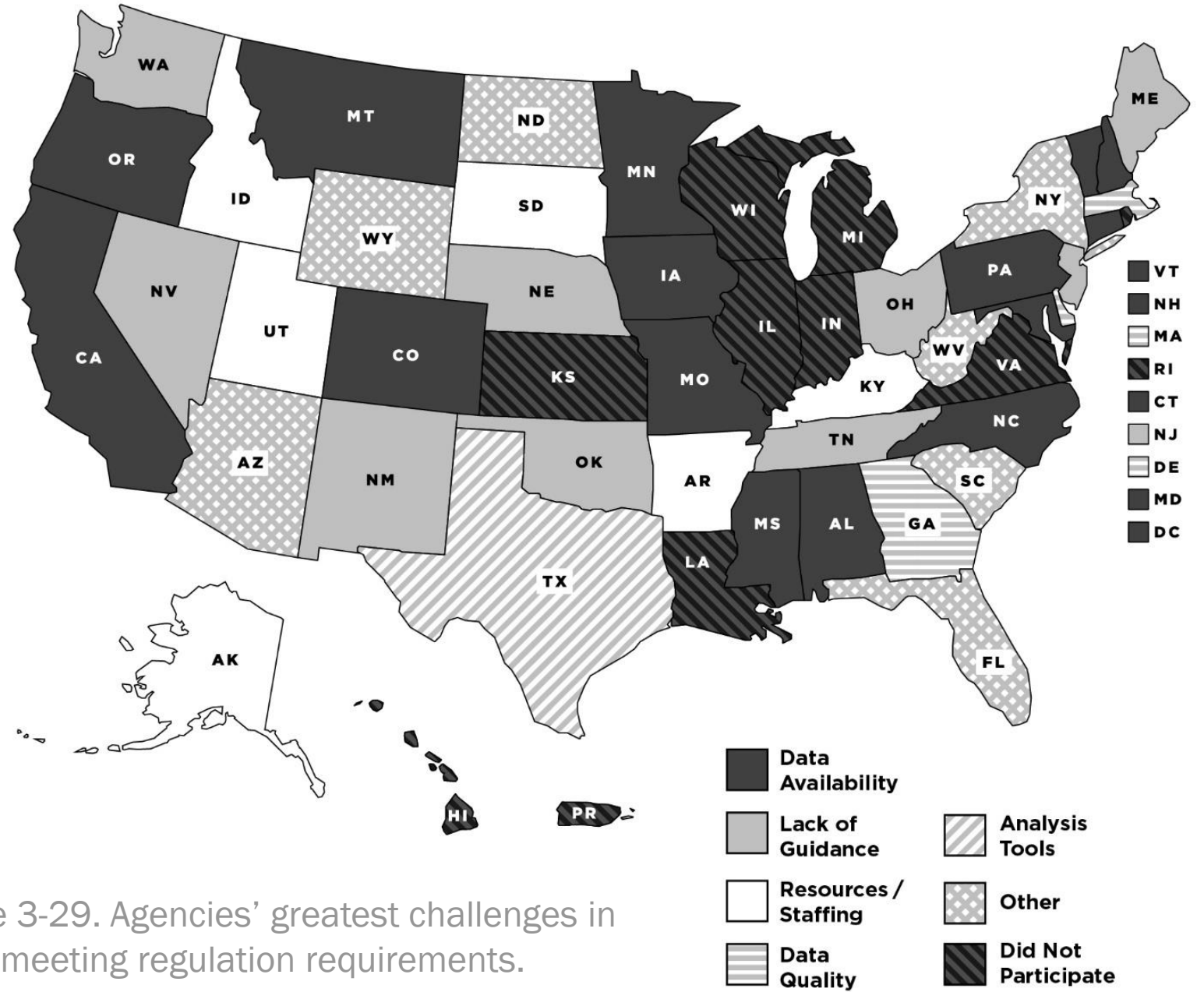
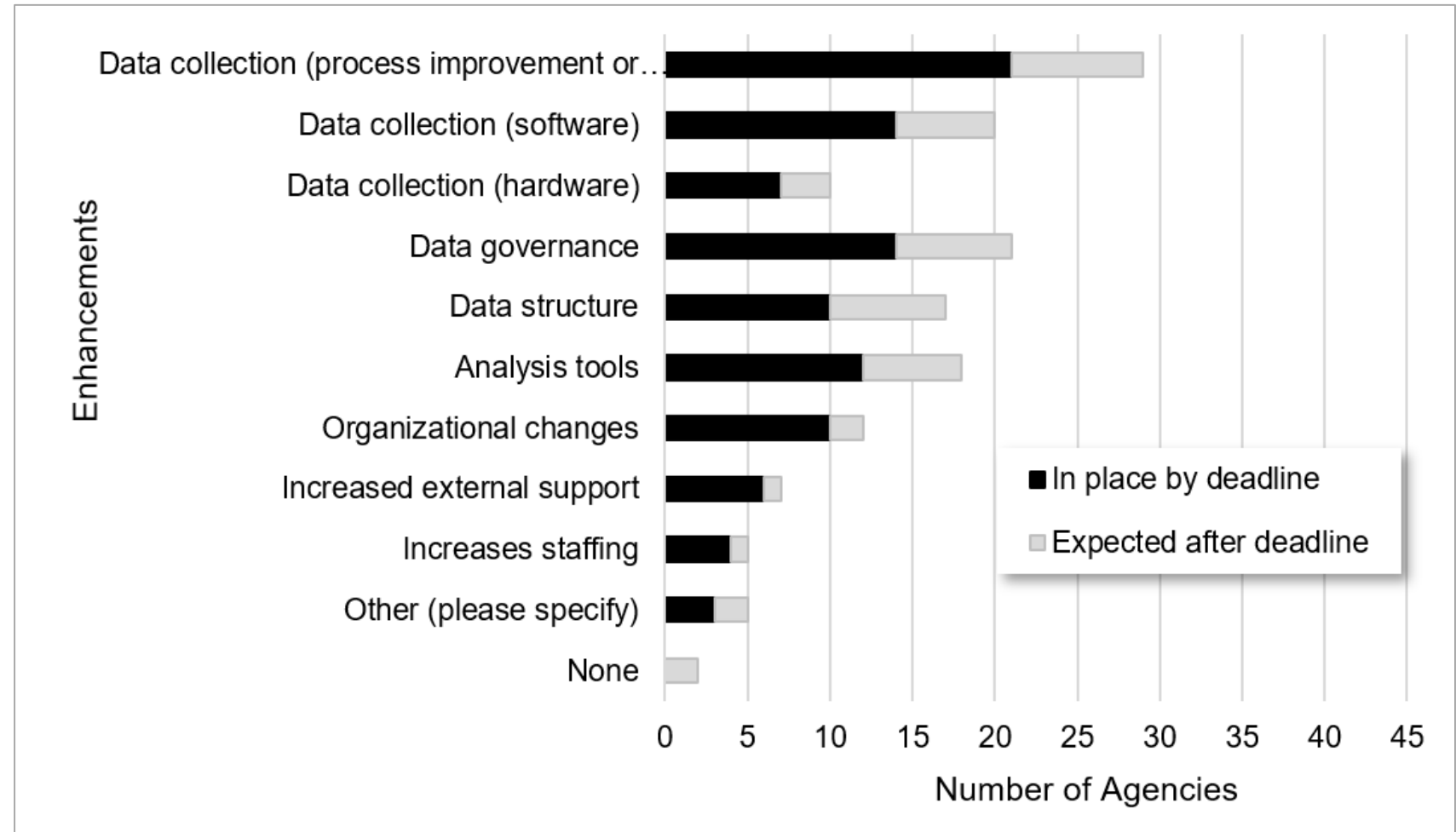


Figure 3-29. Agencies' greatest challenges in meeting regulation requirements.

Agencies' Expected Enhancements



What Comes Next?

- **23 CFR 667 Deadlines**
 - **November 23, 2020 – Complete evaluations for all public roads.**
- **23 CFR 515 - Transportation Asset Management Plans**
 - **Updates due by June 30, 2022**
 - **Updates to NHS evaluations need to be included in TAMP updates**
 - » **Risk**
 - » **Performance gap analysis**

Opportunities for Future Research


- **Build on prior efforts regarding the consideration of resilience in project design to incorporate resiliency into programmatic and strategic practices and processes.**
- **Identify the potential benefits of expanding the definition of “event” and “same location” beyond the requirements of 23 CFR 667.**
- **Research could determine the types and formats of data elements that can be efficiently collected to support the identification of and evaluation of sites damaged by multiple events.**
- **Identify the connection, if any, between damage caused by emergency events and disruption of service caused by the events.**
- **Establish best practices for:**
 - **The collection and retention of data on damage and related repairs resulting from emergency events.**
 - **Software for collecting and storing data on damage from emergency events.**

Opportunities for Future Research

- **Identify appropriate alternative strategies:**
 - **To repair damaged assets during recovery from emergency events.**
 - **For incorporation into the environmental review process during project development.**
 - **To inform the planning and project selection processes.**
 - **To support LCP and other TAM practices.**



TRB 13th National Conference on Transportation Asset Management



13th National Conference on
Transportation Asset Management

ADVANCE PROGRAM

JULY 11-14, 2020
Boston, Massachusetts

Convened by
Transportation Research Board
<http://trb.org/conferences/AssetMgt2020.aspx>

A large, dark, irregular ink blot with splatters on a white background. The blot is roughly circular but has jagged, feathered edges. The center is a solid dark grey, while the edges are lighter and more diffuse, with many small, dark droplets scattered around. The overall effect is that of a fresh ink spill or a heavy brushstroke.

Questions?

Identifying and Evaluating Assets Repeatedly Damaged due to Declared Disasters (23 CFR Part 667)

NYSDOT Approach
2/27/2020

Elisabeth Lennon
NYSDOT Statewide Policy and Performance Bureau
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NYSDOT Background


- Resilience to climate change, extreme weather by
 - NYSDOT Leadership
 - Program Areas
 - CCEE Teams included Adaptation
 - Sustainability Asset Management Team
 - NYSDOT TAMP
 - Climate/extreme weather = high risk.
- Resiliency activities include:
- NYSDOT Statewide Vulnerability Assessment (2014, 2018)
 - Debris-Prone Structures/culverts Initiative
 - Flood Watch Bridge Program
 - Scour Critical Bridge Program (FEMA)
 - Weather Hardening Program



NEW YORK
STATE OF OPPORTUNITY.

Department of
Transportation

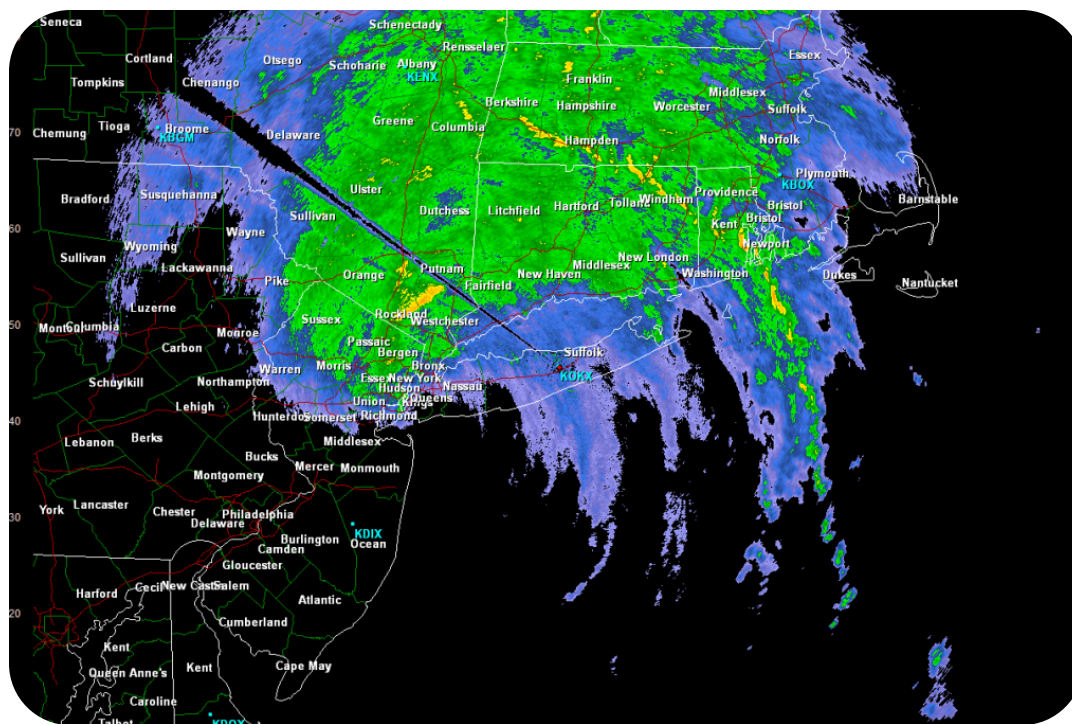
Transportation Asset Management Plan



June 2019

Marie Therese Dominguez, Commissioner

Higher frequency and intensity of extreme weather in NYS



There has been a 71% increase in the number of 2-inch rainfall events occurring over a 48-hour period since the 1950s.

NY ER Events 2010-2014

Event	Description	Program of Projects Total	FHWA Approved	Revision
NY 10-01	January 2010 flooding	\$ 1,265,364	\$ 1,097,029	Rev 4 FHWA
NY 10-02	February 2010 heavy/wet snow (debris event)	\$ 1,664,717	\$ 1,624,882	Rev 3 FHWA
NY 10-03	March 2010 Nor'easter	\$ 920,007	\$ 813,493	Rev 2 FHWA
NY 11-01	April-May 2011 flooding	\$ 11,596,829	\$ 9,010,884	Rev 5 draft
NY 11-02	August 2011 Hurricane Irene	\$ 119,374,201	\$ 97,975,734	Rev 13 draft
NY 11-03	September 2011 Tropical Storm Lee	\$ 23,854,910	\$ 17,792,304	Rev 6 FHWA
NY 12-01	October 2011 heavy/wet snow (debris event)	\$ 3,853,395	\$ 3,853,395	Rev 1 FHWA
NY 13-01	October 2012 Hurricane Sandy	\$ 470,901,175	\$ 368,700,258	Rev 11 FHWA
NY 13-02	June-July 2013 flooding	\$ 19,819,430	\$ 10,122,634	Rev 7 draft
NY 14-01	May 2014 flooding	\$ 3,331,067	\$ 2,841,169	Rev 4 draft

23 CFR Part 667-Timelines

November 23, 2018:

- Complete evaluations for all NHS 1/1997 onwards.
- Update
 - After new events
 - Every 4 years.

November 23, 2020:

- Evaluations for all... prior to including any project affecting such facility in the STIP.



April 2005 Flood SR 209 Ulster County, NY

Approach Part 667 Analysis

Initial Questions

- Which repair types?
- What sources of information are available?
- How should data be displayed?

Findings

- Emergency Relief Program captures repairs due to declared disasters.
 - Federal-Aid eligible assets
- NYSDOT Local Programs Group tracks repair information
 - Basic information captured on Excel spreadsheets:
 - Location descriptions
 - Damage descriptions and
 - Proposed Repairs etc.
- NYS: 40 Declared Emergencies with FHWA ER submissions since 1997
 - 30 out of 40 related to flooding



Approach Part 667 Analysis

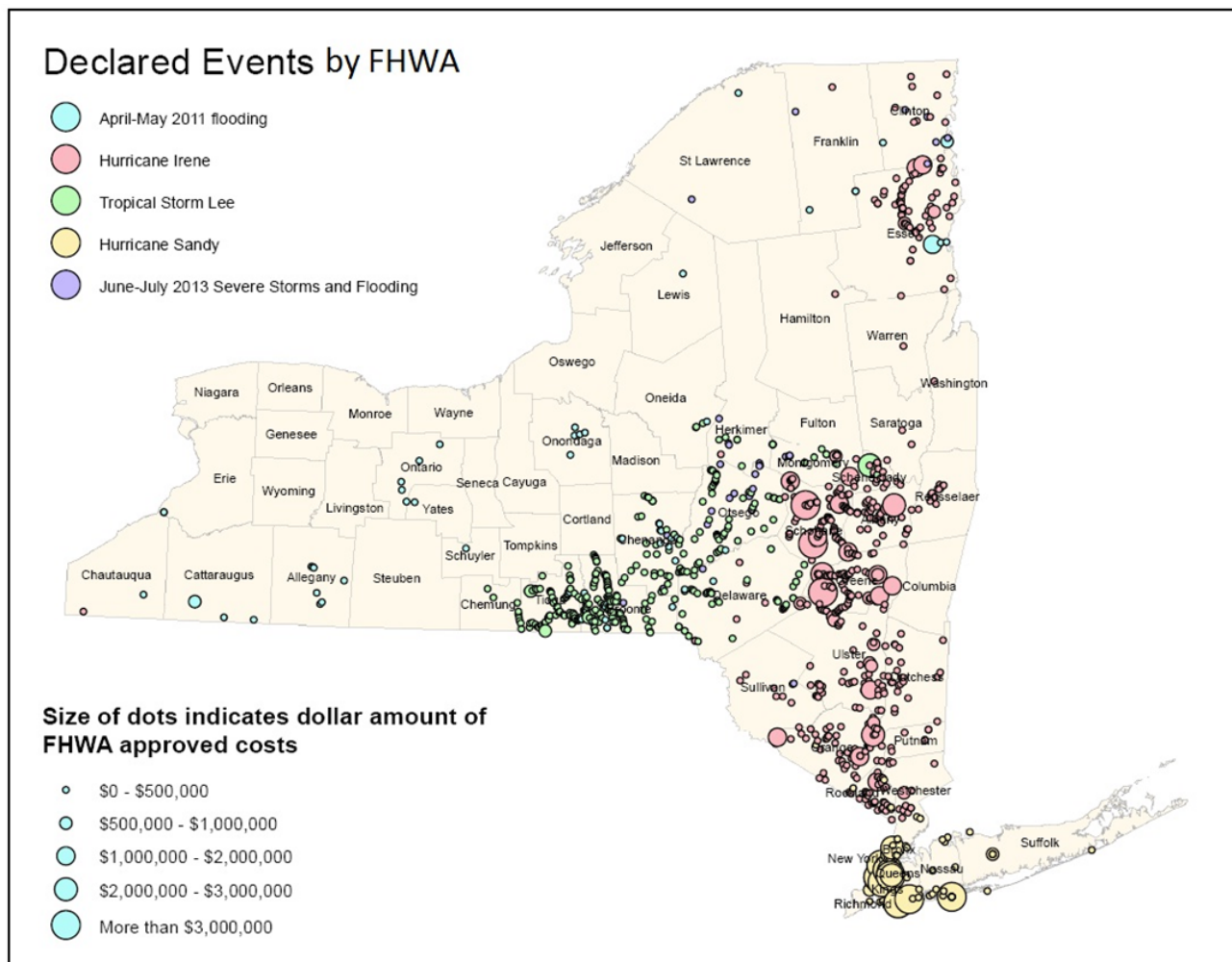
- Identify FHWA ER Events 1997 to present
- Obtain ER PoP spreadsheets with repair data
- Decide what is mappable.
 - Bridge/culvert losses
 - Slope failures
 - Shoulder, significant ditch losses, etc.
- Examples of assets “not mapped”:
 - Non-Permanent (emergency repairs)
 - Example: Debris on roadways
 - Non-location specific, broad descriptions, “county-wide washouts”, etc.
 - Terror attack (9/11) area wide damage to subways and adjacent infrastructure



Hurricane Irene Damage, 2011

Build on Past Effort

Earlier mapping effort: ER repairs 2011-2014 to help identify vulnerable areas and potential future vulnerabilities



2014 Mapping Effort, NYSDOT

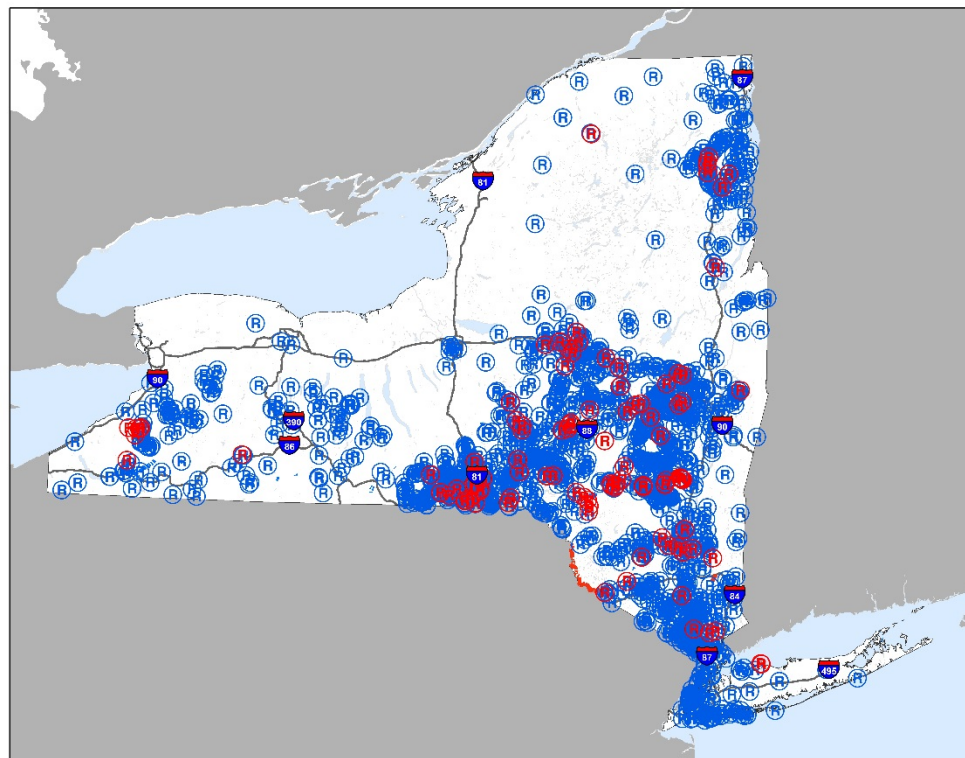
Steps for Part 667 Analysis

Analysis - Results

- Mapped over 2,000 ER repairs
- Identified 90 Repetitive Damage Areas (clusters)
 - Script located assets within 500 feet of each other
 - Confirmed all locations

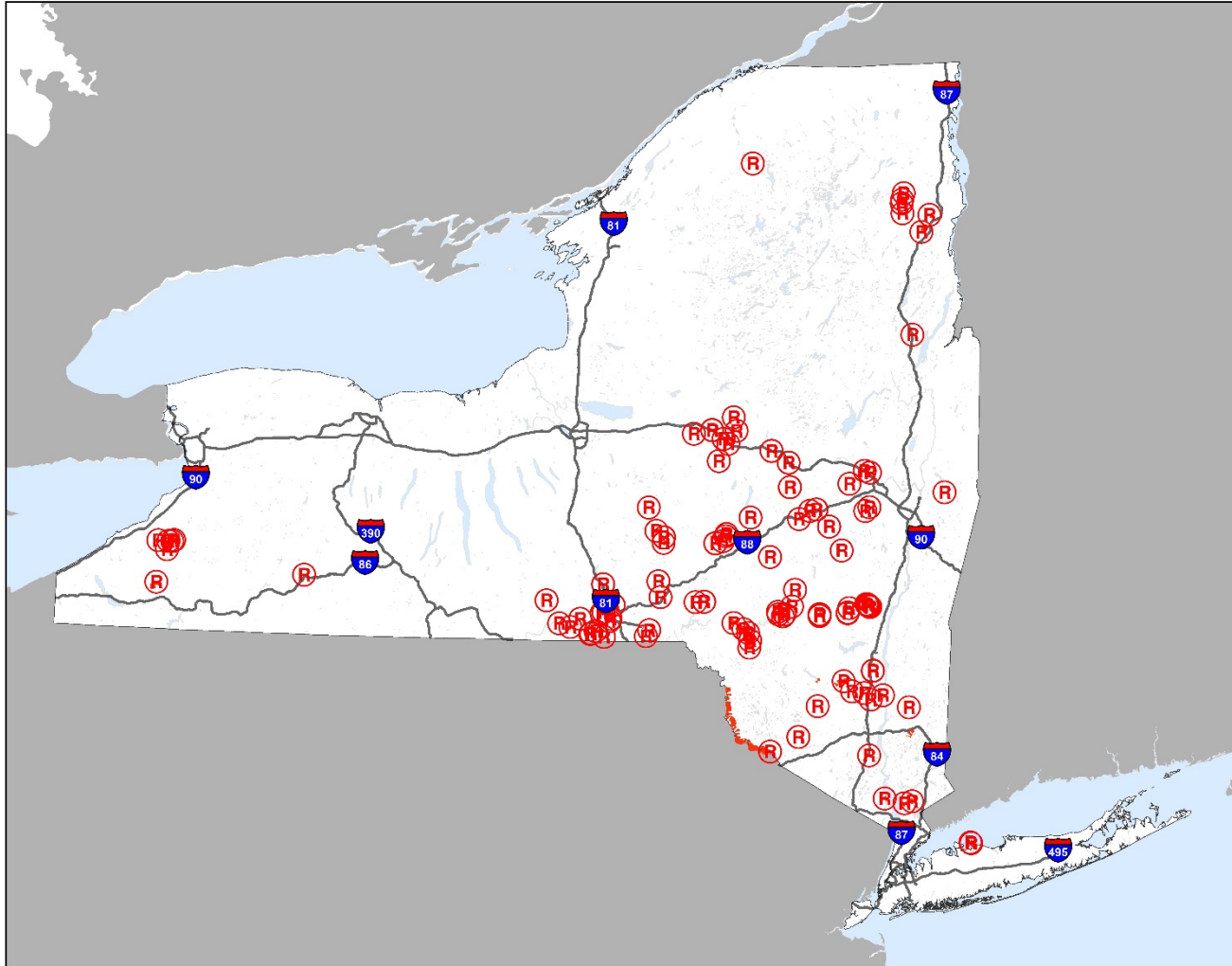
Future Events

- Identify repetitive damage sites in damage assessments.
- Update database.



NYSDOT, 2020
ER Repairs and Repetitive Damage Areas

Repetitive Damage Areas



Source: NYSDOT, 2020

Post Event Repairs/Reconstruction

- Follow established design procedures (extensive)
- Build to current standards
- If repetitive, may have applied for betterments under ER.



April 2005 Flood SR 209 Ulster Cty, NY

Betterments approved under the FHWA Emergency Relief Program:

□ Duanesburg Churches Road, County of Schenectady

- Existing culvert destroyed by storm of April 2007 (NY 07-01) - replaced in kind
- Newly replaced culvert severely damaged by storm of July 2008 (NY 08-01)
- Culvert destroyed by Hurricane Irene (NY 11-02)
- Betterment approved to replace the previous corrugated pipe arch with a concrete arch, to prevent future ER eligible damage

□ Powderhouse Road, Town of Vestal, Broome County

- Damaged by flash flood of November 2006 (NY06-01) - Repaired with large stone
- Repaired by town 3 times between 1996 and 2011 (non-ER eligible events)
- Damaged by Tropical Storm Lee (NY11-03)
- Betterment approved to install sheet piling with stone backfill, to prevent future ER eligible damage

Betterments rejected under the FHWA ER Program:

❑ Ocean Parkway, NYSDOT, Nassau and Suffolk Counties

- Severely damaged by Superstorm Sandy (NY13-01)
- Cost of repairs to pre-storm condition (to current engineering standards) estimated at ≈\$35 million
- Betterment proposed to harden dunes against future storms: Total cost ≈\$71 million
- Resiliency portion not approved by FHWA.



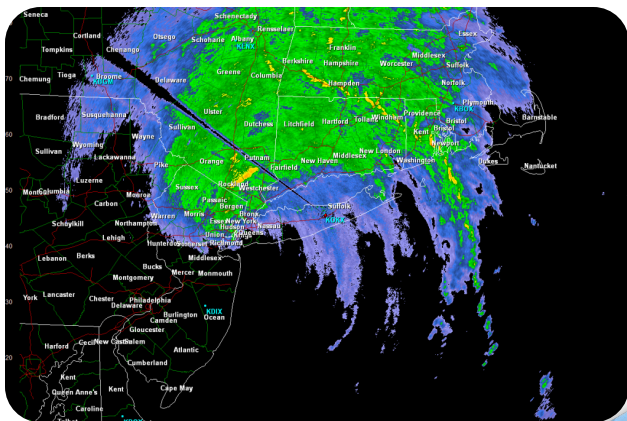
Going Forward Part 667

- **Future Declared Disasters**
 - Identify repetitively damaged assets
 - Add to database.
 - Address repairs as appropriate

- **Projects in STIP 11/2020**
 - Regions will evaluate projects affecting repetitive damage facilities accordingly.



Questions?



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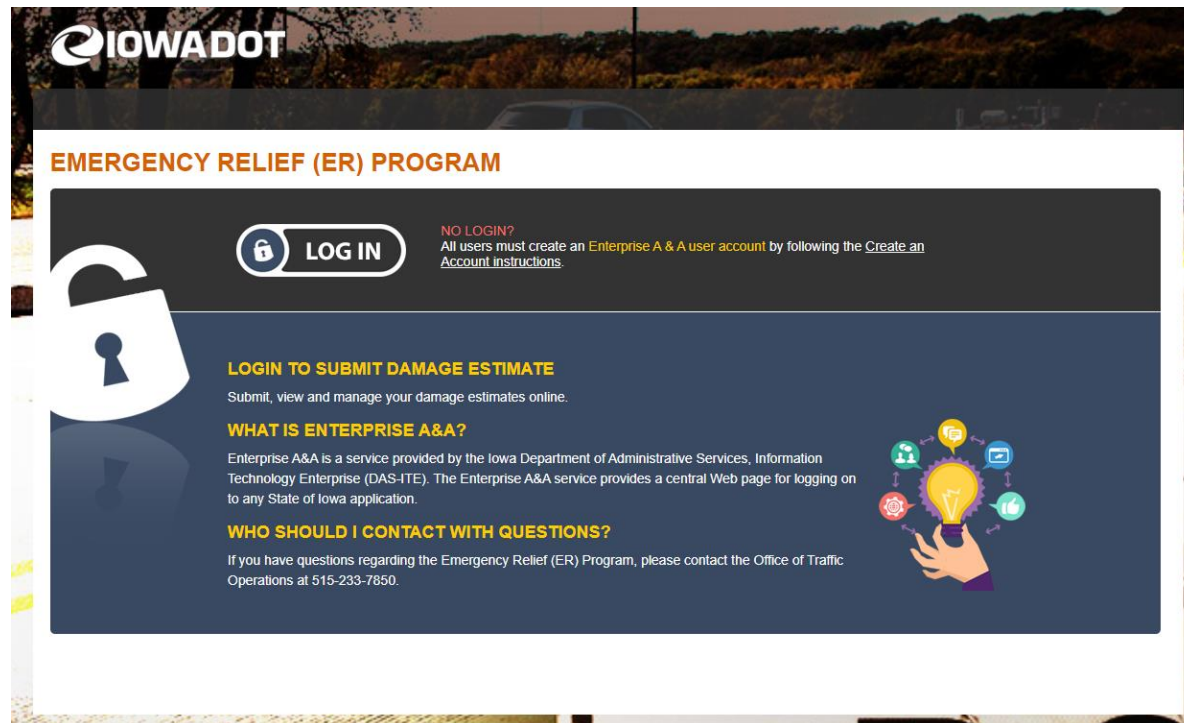
Collecting and Using Damage Data at Iowa DOT

DEVELOPING TOOLS TO BETTER TRACK DAMAGE
ASSESSMENT AND INFORM PROJECT PLANNING

Emergency Relief Program Data Collection Tool


New System to Support ER

Iowa DOT's ER program manager worked with our IT support to develop a new web-based system to collect information about damage caused to public roads during disasters.



IOWA DOT

EMERGENCY RELIEF (ER) PROGRAM


 **LOG IN**

NO LOGIN?
All users must create an [Enterprise A & A user account](#) by following the [Create an Account Instructions](#).

LOGIN TO SUBMIT DAMAGE ESTIMATE
Submit, view and manage your damage estimates online.

WHAT IS ENTERPRISE A&A?
Enterprise A&A is a service provided by the Iowa Department of Administrative Services, Information Technology Enterprise (DAS-ITE). The Enterprise A&A service provides a central Web page for logging on to any State of Iowa application.

WHO SHOULD I CONTACT WITH QUESTIONS?
If you have questions regarding the Emergency Relief (ER) Program, please contact the Office of Traffic Operations at 515-233-7850.



ER System Benefits

This new system has a number of important benefits:

- Provides a single portal for all damage repairs to be captured
 - Accessible to all parties – state, local, federal
- Agencies are encouraged to capture all damage repairs, regardless of whether or not a disaster has been declared
 - Helps to determine the extent of damage & help support decisions to declare an emergency
 - If an emergency is proclaimed, users can quickly associate damage with the event to expedite processing and improve data quality
- Manages workflows –laid out to be “friendly” to those who might not use it every day and help navigate the ER process
- GIS-based – allows the location of all damage to be captured to support analysis of locations that might be damage-prone



STEP 1 | An emergency event occurs

The Iowa DOT Emergency Relief (ER) Administrator tracks severe weather events by various public information sources such as local weather/news reports and information from Iowa Department of Transportation (Iowa DOT) staff including the Traffic Management Center, local jurisdictions-city/county staff, and Iowa Homeland Security and Emergency Management Department (Iowa HSEMD). Iowa DOT Emergency Relief (ER) Administrator considers type, severity, and impact of severe weather damages as to the likelihood ER funds will be requested for the event.



STEP 2 | A maintenance project number is created

Based on available information, Iowa DOT Emergency Relief (ER) Administrator staff initiates a maintenance project number (see page 7) through Office of Maintenance and Office of Finance for use by Iowa DOT field maintenance staff to track costs related to current damages and responses. This project number information will be distributed to Iowa DOT staff and placed on the home screen of the Resource Management System. The project number should be used for all equipment, labor, and material expenditures incurred responding to emergency work by Iowa DOT staff.



STEP 3 | Damage estimates from district staff and public agencies are put into the online system

Specific damage estimates by site and county (both current and updates) will be submitted online at <https://secure.iowadot.gov/emergencyrelief>. A confirmation email will be sent to the user upon completion of the damage estimate.



STEP 4 | Event area is verified as covered by Governor's Proclamation

Iowa DOT Emergency Relief (ER) Administrator verifies that damage estimates are within counties covered by a Governor's Proclamation of Emergency and requests those counties not covered be added to the proclamation through Iowa HSEMD.



STEP 5 | Event eligibility is verified

Iowa DOT Emergency Relief (ER) Administrator and FHWA determine event eligibility based on the current information. The following criteria must be met:

- Governors Proclamation or Presidential Declaration of county that incurs damage, **and**,
- Damage is on Federal aid routes-major collector and above, **and**,
- Each specific eligible site estimate must exceed \$5,000 in damage, **and**,
- Statewide combined estimate of damage must exceed \$1,000,000.

Process Flow

System

Location is key

- Uses our all-public-roads LRS
- Users can select location on a map if they don't know the segment ID

Captures

- Description
- Cost Estimate
- Relevant emergency event
- Comments
- Photos
- Documents
- Project type (e.g. DOT, railroad, county, city)
- Related assets (e.g. bridges, RR crossings, etc.)

How it Works

Services Agencies Social

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Search Iowa DOT Go

IOWADOT

ER HOME GUIDANCE DOCUMENTS REVIEWER ADMIN LOGOFF

EMERGENCY RELIEF (ER) PROGRAM

[View Map of Damages](#)

OPEN FHWA DISASTER EVENTS

FEDERAL FISCAL YEAR OCT 1-SEPT 30	FHWA DISASTER NUMBER	FHWA DISASTER START DATE	DDIR SUBMISSION DEADLINE	PROCLAMATION OF DISASTER EMERGENCY
2019	IA-19-01	03/12/2019	03/12/2021	Proclamation

"Emergency repairs can and should begin immediately to restore essential traffic and to protect remaining facilities. Documented costs for these emergency repairs will be reimbursed if the FHWA approves the application for an ER declaration and the cost are determined to be eligible"

DO YOU HAVE DAMAGE ON A FEDERAL-AID ROUTE?

START HERE

SUBMIT DAMAGE ESTIMATE

Completing and submitting your damage estimation is the single most important thing you can do to help determine whether there is enough damage to request funding under the FHWA's Emergency Relief program.

ESTIMATES / DETAILED DAMAGE INSPECTION REPORTS (DDIR)

ADVANCED SEARCH

	STATUS	FINAL ESTIMATE COMPLETED	ESTIMATE ID	DDIR REPORT NUMBER	INSPECTION DATE	FEDERAL-AID ROUTE NUMBER	COUNTY	DESCRIPTION OF DAMAGE	CITY
Max Cost Summary Review	Pending Reviewer Approval	07/29/2019	CO-88-2410H-10174	IA-19-01-88-45	07/05/2019	COUNTY OF UNION, WARBLER AVENUE, N	Union	40"x52" RCB undermined outlet end E side of road causing washout into shoulder. Downstream ditch S of outlet cutting into foreslope causing sloughing. Add rip rap under outlet and into plunge pool and shape downstream foreslope to set ditch back away from road	N/A
Max Cost Summary Review	Pending Reviewer Approval	08/16/2019	DOT-36-00295-10178	IA-19-01-36-29-2.5	07/02/2019	STATE OF IOWA, I 29 S	Fremont	Damage to outside shoulder and foreslope.	N/A
Max Cost Summary Review	Pending Reviewer Approval	08/16/2019	DOT-36-00295-10179	IA-19-01-36-29-22.1	07/02/2019	STATE OF IOWA, I 29 S	Fremont	Damaged shoulder and foreslope on Southbound outside lane.	N/A
Max Cost Summary Review	Pending Reviewer Approval	08/16/2019	DOT-36-0029H-10181	IA-19-01-36-29-24.3	07/02/2019	STATE OF IOWA, I 29 N	Fremont	Fore slope damage on outside NB lane of I-29	N/A
Max Cost Summary Review	Pending Reviewer Approval	08/16/2019	DOT-36-0029H-10182	IA-19-01-36-29-1.0	07/02/2019	N/A	Fremont	Fore slope damage on the outside shoulder of ramp	N/A

1 2 3 4 5 6 7 8 9 10 ...

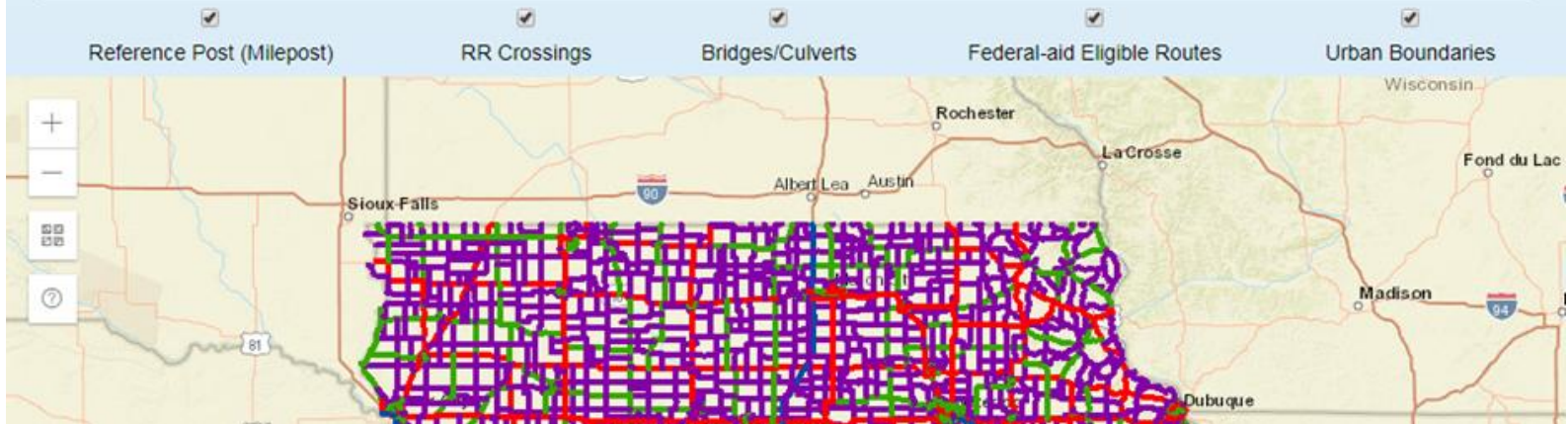
SELECT A TAB, ENTER YOUR INFORMATION, AND CLICK THE LOCATE ON THE MAP BUTTON

-OR-

CLICK ON A HIGHLIGHTED FEDERAL-AID ELIGIBLE ROUTE* ON THE MAP

*For additional route information [click here](#).

Reference Post (Milepost)	Latitude/Longitude	Bridges	Railroad
County Allamakee	FRA Number 376210E		
LOCATE ON THE MAP		RESET	



How it Works

System

Simple Navigation

- Just four screens – Home, Map, Cost Estimate, and Summary

Cost Estimate

- Uses drop-down menus to select materials, and is pre-populated with unit costs from DOT maintenance records

Summary Form

- Looks like FHWA's DDIR Form
- Allows the agency filling it out to see a preview prior to submission
- Workflow for approvals

Cost Estimate

[HOME](#) | [ONLINE SERVICES](#) | [TRAVEL](#) | [DRIVERS/VEHICLES](#) | [BUSINESS](#) | [FORMS](#) | [ABOUT](#)

[ER HOME](#) | [GUIDANCE DOCUMENTS](#) | [REVIEWER](#) | [ADMIN](#) | [LOGOFF](#)

EMERGENCY RELIEF (ER) PROGRAM

Your Damage Estimate is: DOT-11-0007E-10175

[MAP](#)

EMERGENCY REPAIR

Description of Work to Date (Equipment, Labor, and Materials)	Units	Unit	Unit Price	Quantity	Completed Cost	Pending Cost
Tractor	No	Hour	\$22.00	12	\$264.00	\$0.00
Crawler Loader	No	Hour	\$77.81	12	\$933.72	\$0.00
Pickup	No	Hour	\$17.46	17	\$296.82	\$0.00
Tractor	No	Hour	\$64.00	16	\$1,024.00	\$0.00
Wheel Loader	No	Hour	\$48.49	4	\$193.96	\$0.00
Tandem Axle Dump Truck	No	Hour	\$51.72	7	\$362.04	\$0.00
Track Tractor	No	Hour	\$76.45	7	\$575.15	\$0.00
Motor Grader	No	Hour	\$76.11	16	\$1,217.76	\$0.00
Single Axle Dump Truck	No	Hour	\$48.88	100	\$4,888.00	\$0.00
Labor	No	Lump Sum	\$7,341.86	1	\$7,341.86	\$0.00
Broken Concrete	No	Ton	\$14.00	\$24	\$12,960.00	\$0.00
1" Roadbed	No	Ton	\$10.00	\$61	\$12,360.00	\$0.00
Subtotal					\$41,000.00	\$0.00
PEICE					\$243.04	\$608.00
Emergency Repair Total					\$41,243.04	\$608.00

WHO WILL PERFORM THE EMERGENCY REPAIRS / RESPONSES?

Local Forces (City, County, or Railroad agencies)
 State Forces (Iowa DOT or Iowa DNR)
 Contract Forces (Work performed by contractors)

PERMANENT RESTORATION

Description of Work to Date (Equipment, Labor, and Materials)	Unit	Unit Price	Quantity	Cost
Structural Concrete	Cubic Yard	\$150.00	177	\$15,375.00
Excavation Class 10	Cubic Yard	\$14.00	428	\$5,992.00
Embankment in Place	Cubic Yard	\$26.00	848	\$22,048.00
Steel Beam Guardrail tangent End Terminal	Each	\$3,300.00	1	\$3,300.00
Reinforcing Steel	Pound	\$1.20	28488	\$3,418.56
Steel Beam Guardrail	Linear Foot	\$30.00	24	\$720.00
Shoulder Construction, Earth	Station	\$30.00	92	\$2,760.00
Patch, Full Depth	Square Yard	\$100.00	1023	\$102,300.00
Revestment	Square Yard	\$0.00	428	\$0.00
Gravel Shoulder	Ton	\$26.00	1888	\$49,168.00
Patch, Full Depth	Square Yard	\$200.00	5	\$1,000.00
Subtotal				\$374,911.56
PEICE				\$300.00
Right-of-Way				\$400.00
Permanent Repair Total				\$375,611.56
Estimated Total				\$417,173.91

3. ATTACH SUPPORTING FILES

No records found

[SUMMARY](#)

Cost Estimate

ER HOME GUIDANCE DOCUMENTS REVIEWER ADMIN LOGOFF

EMERGENCY RELIEF (ER) PROGRAM

Your Damage Estimate id: DOT-11-0007E-10175

MAP

EMERGENCY REPAIR

Description of Work to Date (Equipment, Labor, and Materials)	Debris? <input type="checkbox"/> /Yes	Unit	Unit Price	Quantity	Completed Cost	Remaining Cost
Tractor	No	Hour	\$22.08	12	\$264.96	\$0.00
Crawler Loader	No	Hour	\$77.81	12	\$933.72	\$0.00
Pickup	No	Hour	\$17.46	17	\$296.82	\$0.00
Trackhoe	No	Hour	\$64.56	16	\$1,032.96	\$0.00
Wheel Loader	No	Hour	\$46.49	4	\$193.96	\$0.00
Tandem Axle Dump Truck	No	Hour	\$51.72	7	\$362.04	\$0.00
Track Tractor	No	Hour	\$76.45	7	\$535.15	\$0.00
Motor Grader	No	Hour	\$70.11	16	\$1,261.96	\$0.00
Single Axle Dump Truck	No	Hour	\$40.56	102	\$4,137.12	\$0.00
Labor	No	Lump Sum	\$7,341.98	1	\$7,341.98	\$0.00
Broken Concrete	No	Ton	\$14.00	324	\$12,936.00	\$0.00
1" Road road	No	Ton	\$13.00	951	\$12,363.00	\$0.00
Subtotal					\$41,889.89	\$0.00
PEICE					\$245.64	\$658.00
Emergency Repair Total						\$42,555.33

WHO WILL PERFORM THE EMERGENCY REPAIRS / RESPONSES?

Local Forces
(City, County, or Railroad agencies)

State Forces
(Iowa DOT or Iowa DNR)

Contract Forces
(Work performed by contractors)

Cost Estimate

PERMANENT RESTORATION

Description of Work to Date (Equipment, Labor, and Materials)	Unit	Unit Price	Quantity	Cost
Structural Concrete	Cubic Yard	\$750.00	177	\$132,750.00
Excavation Class 10	Cubic Yard	\$14.00	420	\$5,880.00
Embankment in Place	Cubic Yard	\$25.00	840	\$21,000.00
Steel Beam Guardrail tangent End Terminal	Each	\$3,300.00	1	\$3,300.00
Reinforcing Steel	Pound	\$1.20	20488	\$24,585.60
Steel Beam Guardrail	Linear Foot	\$30.00	24	\$720.00
Shoulder Construction, Earth	Station	\$350.00	92	\$32,200.00
Patch, Full Depth	Square Yard	\$100.00	1023	\$102,300.00
Revetment	Square Yard	\$69.00	120	\$8,280.00
Granular Shoulders.	Ton	\$25.00	1680	\$42,000.00
Patch, Full Depth	Square Yard	\$200.00	5	\$1,000.00
Subtotal				\$374,815.60
PE/CE				\$200.00
Right-of-Way				\$400.00
Permanent Repair Total				\$374,815.60
Estimated Total				\$417,170.93

3. ATTACH SUPPORTING FILES



ATTACHMENT NAME	UPLOADED
No records found	

SUMMARY

Summary (DDIR Form)

IOWA DOT
HOME | ONLINE SERVICES | TRAVEL | DRIVERS/VEHICLES | BUSINESS | FORMS | ABOUT

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EMERGENCY RELIEF (ER) PROGRAM

SUMMARY

Your Damage Estimate Id: DOT-11-0007E-19176

<p style="text-align: center;">DETAILED DAMAGE INSPECTION REPORT (For 23 Federal-Aid Highways)</p> <p>Location: Closure of Road and Material: M 71 East Entrance at MP 22.5, 0.5 miles S of L22</p> <p>Description of Damage: Heavy work and material caused a backhoe able. Repair of 200 long x 20 high backhoe side curbs on the existing lower cut and retaining with subbase cuts as well as retaining on the ditch to provide roadside drainage.</p>	<p>Report Number: IA-16-01-11-18-D</p> <p>Sheet: 1 of 2</p> <p>Project Disaster Number: IA-19-01</p> <p>Inspection Date: 06/12/2019</p> <p>Federal Aid Road Number: STATE OF IOWA, 447 E</p> <p>Date: County: Boone, Iowa</p>
---	---

Cost Estimate					
Emergency Number	Description of Work to Date (Equipment, Labor, and Materials)	Unit	Unit Price	Quantity	
	Tractor	Hour	\$33.00	12	
	Grader Loader	Hour	\$77.81	12	
	Plow	Hour	\$17.48	17	
	Tractor	Hour	\$44.58	16	
	Wheel Loader	Hour	\$48.49	4	
	Tandem Axle Dump Truck	Hour	\$91.72	7	
	Truck Tractor	Hour	\$76.43	7	
	Motor Grader	Hour	\$72.11	16	
	Single Axle Dump Truck	Hour	\$40.86	102	
	Loader	Lump Sum	\$7,341.88	1	
	Broken Concrete	Ton	\$14.00	324	
	1" Road base	Ton	\$13.00	361	
				SubTotal	\$41,859.69
<input checked="" type="checkbox"/> Local Forces <input type="checkbox"/> State Forces <input type="checkbox"/> Contract				P&CE	\$246.64
				Emergency Repair Total	\$42,106.33

Permanent Restoration	Description of Work to Date (Equipment, Labor, and Materials)	Unit	Unit Price	Quantity	
	Structural Concrete	Cubic Yard	\$780.00	177	
	Erosion Class 10	Cubic Yard	\$14.00	420	
	Embankment in Place	Cubic Yard	\$25.00	840	
	Steel Beam Guarded Inlet End Terminal	Each	\$3,300.00	1	
	Manufacturing Steel	Pound	\$1.20	20,488.40	
	Steel Beam Guardrail	Linear Foot	\$10.00	24	
	Shoulder Construction, Earth	Section	\$350.00	92	
	Patch, Full Depth	Square Yard	\$100.00	1,023	
	Resurfacing	Square Yard	\$69.00	120	
	Gravel Shoulders	Ton	\$25.00	1,680	
	Patch, Full Depth	Square Yard	\$200.00	6	
				SubTotal	\$374,618.60
<input type="checkbox"/> Local Forces <input type="checkbox"/> State Forces <input type="checkbox"/> Contract				P&CE	\$201.00
				Regional Fee	\$401.00
				Permanent Repair Total	\$375,220.60

Environmental Assessment/Recommendation <input type="checkbox"/> Complete Excision <input type="checkbox"/> EAC/S	Estimate Total \$417,195.10
Recommendation <input type="checkbox"/> Eligible <input type="checkbox"/> Ineligible	Field Engineer Date
Concurrence <input type="checkbox"/> Yes <input type="checkbox"/> No	State Engineer Date
Concurrence <input type="checkbox"/> Yes <input type="checkbox"/> No	Local Agency Representative Date

APPROVALS

Status
Your DDIR has been submitted for review. No more action is required at this time.

Step 1: Finalize Estimate.
When you press the Finalize Estimate button, you may no longer make changes to this estimate so that it may be used by the Iowa DOT to request disaster assistance. Once a disaster has been declared, you will receive an email and may proceed to step 2.

FINALIZE ESTIMATE

Step 2: Convert Estimate to DDIR.
Once a disaster number can be associated with a finalized estimate, you may convert an estimate to a DDIR. You will be able to make edits on the cost page again.

CONVERT TO DDIR

Step 3: Approve DDIR for review.
Once all changes to the costs have been made, you may submit the DDIR for final approval. No changes may be made after you submit the DDIR.

SUBMIT DDIR

IOWA DOT | EMPLOYERS | FREELANCE CONTRACTORS | PARTNERS | CONTACT US

Summary (DDIR Form)


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EMERGENCY RELIEF (ER) PROGRAM

COST PRINT

SUMMARY

Your Damage Estimate id: DOT-11-0007E-10175

	DETAILED DAMAGE INSPECTION REPORT (Title 23, Federal-aid Highways)				Report number IL19-01-11-7-1E-D	
					Sheet 1 of 2	
Location (Name of Road and MilePost) IL 71 East backslope at MP 22.6, 0.5 miles S of L22				FHWA District Number IL-19-01		
				Inspection Date 06/12/2019		
Description of Damage Heavy rains and snowmelt caused a backslope slide. Repair of 200' long x 20' high backslope slide consists of removing the existing loose soil and replacing with suitable soil as well as cleaning out the ditch to provide positive drainage.				Federal-aid Route Number STATE OF IOWA, IA 7 E		
				State IA		
				County Boone Wtts		

Cost Estimate							
	Description of Work to Date (Equipment, Labor, and Materials)	Unit	Unit Price	Quantity	Completed Cost	Remaining	
Emergency Repair	Tractor	Hour	\$22.00	12	\$264.00	\$0.00	
	Gravel Loader	Hour	\$77.61	12	\$939.72	\$0.00	
	Pickup	Hour	\$17.48	17	\$296.62	\$0.00	
	Tractor	Hour	\$64.56	16	\$1,032.96	\$0.00	
	Wheel Loader	Hour	\$40.49	4	\$161.96	\$0.00	
	Tandem-Axle Dump Truck	Hour	\$81.72	7	\$662.04	\$0.00	
	Track Tractor	Hour	\$70.43	7	\$493.01	\$0.00	
	Motor Grader	Hour	\$70.11	18	\$1,261.98	\$0.00	
	Single Axle Dump Truck	Hour	\$40.56	102	\$4,137.12	\$0.00	
	Labor	Lump Sum	\$7,341.96	1	\$7,341.96	\$0.00	
	Broken Concrete	Ton	\$14.00	924	\$12,936.00	\$0.00	
	1" Road road	Ton	\$13.00	951	\$12,363.00	\$0.00	
	Method					SubTotal	\$41,859.69
	<input checked="" type="checkbox"/> Local Forces <input type="checkbox"/> State Forces <input type="checkbox"/> Contract					PEICE	\$245.64
					Emergency Repair Total	\$42,105.33	

Summary (DDIR Form)

Steel Beam Guardrail Ingent End Terminal	Each	\$3,300.00	1	\$3,300.00	
Reinforcing Steel	Pound	\$1.20	20486	\$24,583.60	
Steel Beam Guardrail	Linear Foot	\$30.00	24	\$720.00	
Shoulder Construction, Earth	Station	\$350.00	92	\$32,200.00	
Patch, Full Depth	Square Yard	\$100.00	1023	\$102,300.00	
Revetment	Square Yard	\$69.00	120	\$8,280.00	
Granular Shoulders	Ton	\$25.00	1680	\$42,000.00	
Patch, Full Depth	Square Yard	\$200.00	5	\$1,000.00	
Method				SubTotal	\$374,015.60
<input type="checkbox"/> Local Forces <input type="checkbox"/> State Forces <input type="checkbox"/> Contract				PEICE	\$200.00
				Rights-of-Way	\$400.00
				Permanent Repair Total	\$374,615.60
Environmental Assessment Recommendation <input type="checkbox"/> Categorical Exclusion <input type="checkbox"/> EA/EIS				Estimate Total	\$417,170.83
Recommendation <input type="checkbox"/> Eligible <input type="checkbox"/> Ineligible				PHVA Engineer	Date
Concurrence <input type="checkbox"/> Yes <input type="checkbox"/> No				State Engineer	Date
Concurrence <input type="checkbox"/> Yes <input type="checkbox"/> No				Local Agency Representative	Date

APPROVALS

Status
Your DDIR has been submitted for review. No more action is required at this time.

Step 1: Finalize Estimate.
When you press the Finalize Estimate button, you may no longer make changes to this estimate so that it may be used by the Iowa DOT to request disaster assistance. Once a disaster has been declared, you will receive an email and may proceed to step 2.

Step 2: Convert Estimate to DDIR.
Once a disaster number can be associated with a finalized estimate, you may convert an estimate to a DDIR. You will be able to make edits on the cost page again.

Step 3: Approve DDIR for review.
Once all changes to the costs have been made, you may submit the DDIR for final approval. No changes may be made after you submit the DDIR.

Outcomes

Data stored in an enterprise database – accessible to other systems

Location analysis possible to help support required analysis for 23 CFR 667

Beyond Part 667 benefits

- More comprehensive idea of where weather events are causing damage on our roads
- Better data on resource utilization related to events

Project Prioritization and Scoping

BETTER LEVERAGING DATA FOR PROJECT
DEVELOPMENT

A solid red horizontal bar at the bottom of the slide.

Need



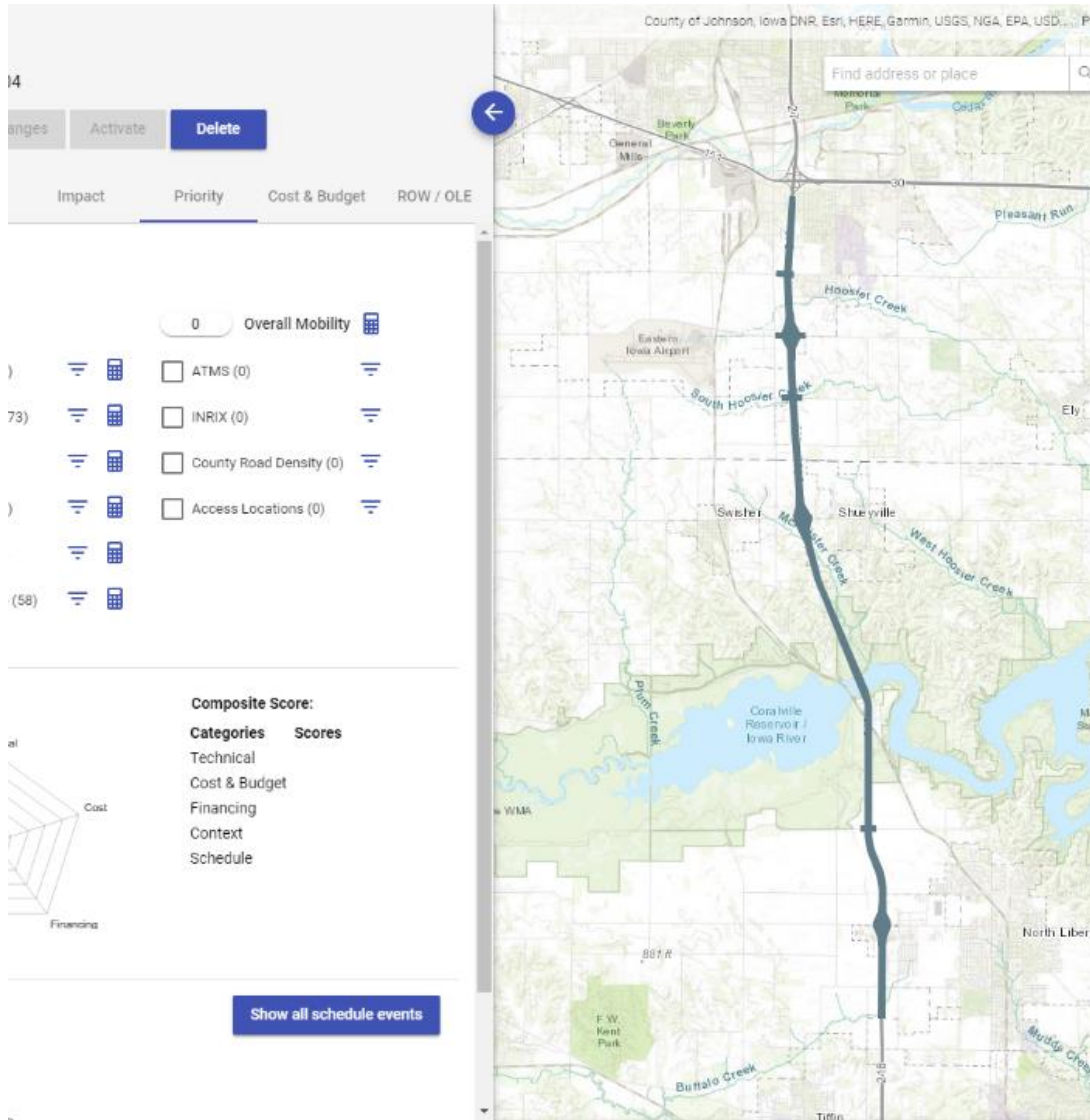
Project development staff needed a single “front door” for all new projects – consistent information & able to see all projects under consideration



Leverage new sources of information, such as our DDIR data



Asset Management efforts led to desire for a transparent and uniform process for prioritizing investments – a data-backed basis for alignment



Response

Investments in LRS and geospatial tools enabled new alternatives

Developed an approach to use consistent data and weighting factors

Prioritization Factors








Currently using seven factors

Able to be generated for any project extent

Weights developed and adopted by Iowa

Transportation Commission

Weightings

	Safety	- 17%
	Road Class	- 10%
	Freight	- 11%
	Pavement	- 15%
	Bridge	- 17%
	Traffic	- 14%
	Mobility	- 16%

Scoping Tool

LRS is the basis for live impact analysis of GIS layers

Each layer's impact total is listed in parentheses

Layers can be turned on in the map and each impacted feature can be viewed for more information

The screenshot displays the 'Project For Scoping' interface. At the top, it shows the 'Project For Scoping' title, a 'Scope ID: S581675418604', and buttons for 'Save', 'Discard Changes', 'Activate', and 'Delete'. Below this is a navigation menu with tabs for 'Project', 'Geometry', 'Impact', 'Priority', 'Cost & Budget', and 'ROW / OLE'. The 'Impact' tab is selected, showing a list of GIS layers categorized into 'Location', 'Environmental', 'Waterway', and 'Route'. Each layer has a checkbox and a count in parentheses. The map on the right shows a project route (a dark blue line) overlaid on a GIS map of a region in Iowa, including features like 'Hooper Creek', 'South Hooper Creek', 'West Hooper Creek', 'Buffalo Creek', 'Mudlick Creek', 'Coraville Reservoir / Iowa River', and 'Lake Macbride'. The map also shows various landmarks like 'Eastern Iowa Airport', 'General Mills', 'Beverly Park', 'Homonka Park', 'Pleasant Rivn', 'Ely', 'Loko Vale OHV Park', 'Macbride Recreation Area', 'North Liberty', and 'Tiffin'. A search bar at the top right of the map says 'Find address or place'.

Project For Scoping
Scope ID: S581675418604

Save Discard Changes Activate Delete

Project Geometry **Impact** Priority Cost & Budget ROW / OLE

Location

- Railroad Crossings (46)
- Park and Ride (2)
- Runways (0)
- Active Rail Lines (176)
- Maintenance Garages (0)
- MPO (3)
- RPA (2)
- Trails (30)
- Abandoned Rail Lines (15)
- Transmission Lines (14)
- Cell Towers (6)
- Maintenance Facilities (0)
- 5 Year Program (2018 Pts) (0)
- 5 Year Program (2018) (0)
- 5 Year Program (2019 Pts) (0)
- 5 Year Program (2019) (0)
- 5 Year Program (2020 Pts) (0)
- 5 Year Program (2020) (0)
- 5 Year Program (2021 Pts) (0)
- 5 Year Program (2021) (0)
- 5 Year Program (2022 Pts) (0)
- 5 Year Program (2022) (0)
- Historic Rail Lines (573)

Waterway

- Topeka Shiner Streams (0)
- Outstanding Iowa Waters (2)
- Paddling Routes (6)
- NRI (0)
- Floodplains (84)
- Public Lakes Watersheds (1)
- Stream Watersheds (4)

Environmental

- Loess Hills (0)
- LUST Sites (70)
- T&E (3)
- Environmental Hotspots (30)
- Conservation & Rec Lands (26)
- Public Lands (2)
- Parks (0)
- WMA (2)
- Wildlife Refuges (0)
- Wetlands (NW) (231)

Route

- Major Pipelines (7)
- LRTP Bridges (4)
- LRTP Capacity (110)
- LRTP Freight (74)
- LRTP Mobility & Safety (0)
- LRTP Operations (996)
- LRTP Park & Ride (76)

Project For Scoping

Scope ID: S581675418604

- Save
- Discard Changes
- Activate
- Delete

Project Geometry **Impact** Priority Cost & Budget ROW / OLE

Location

- Railroad Crossings (46)
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- 5 Year Program (2019) (0)
- 5 Year Program (2020 Pts) (0)
- 5 Year Program (2020) (0)
- 5 Year Program (2021 Pts) (0)
- 5 Year Program (2021) (0)
- 5 Year Program (2022 Pts) (0)
- 5 Year Program (2022) (0)
- Historic Rail Lines (573)

Waterway

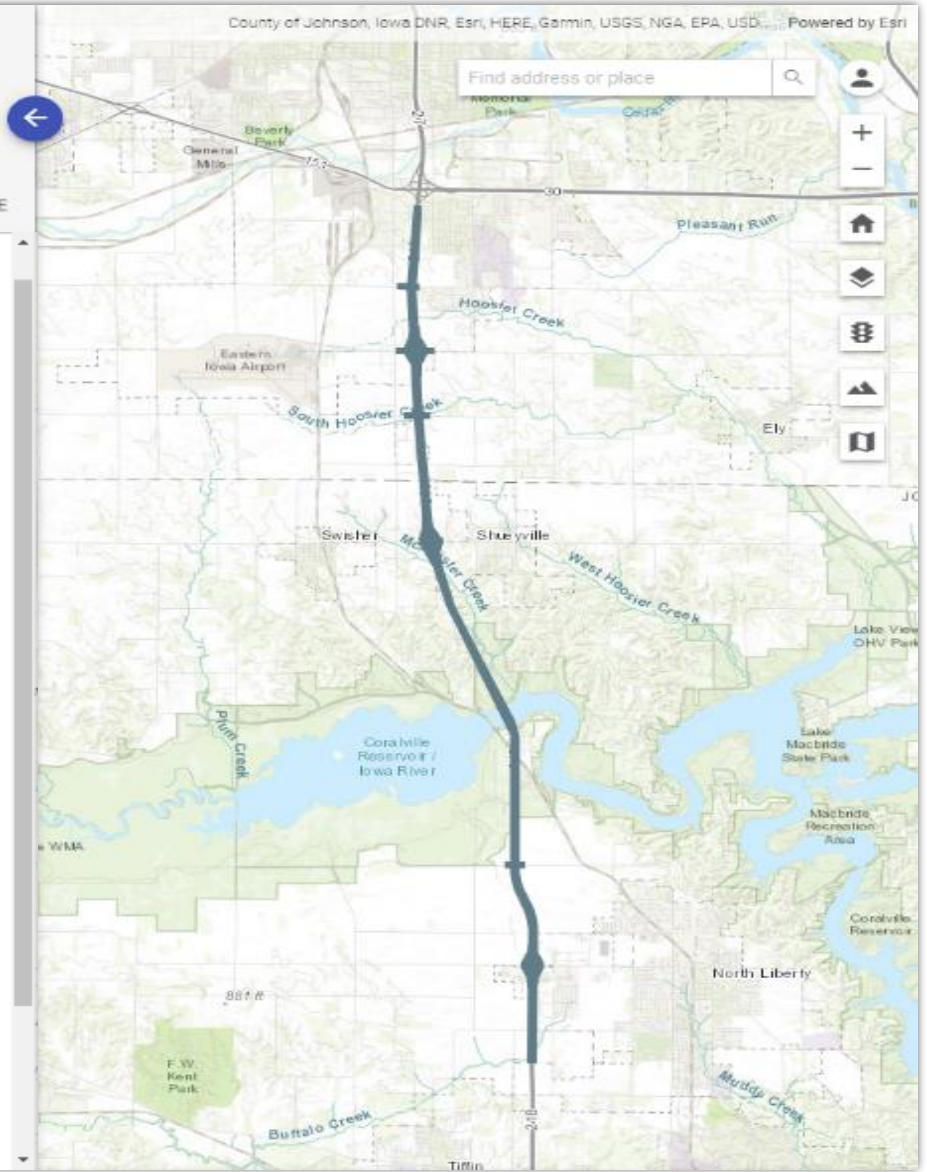
- Topeka Shiner Streams (0)
- Outstanding Iowa Waters (2)
- Paddling Routes (6)
- NRI (0)
- Floodplains (84)
- Public Lakes Watersheds (1)
- Stream Watersheds (4)

Environmental

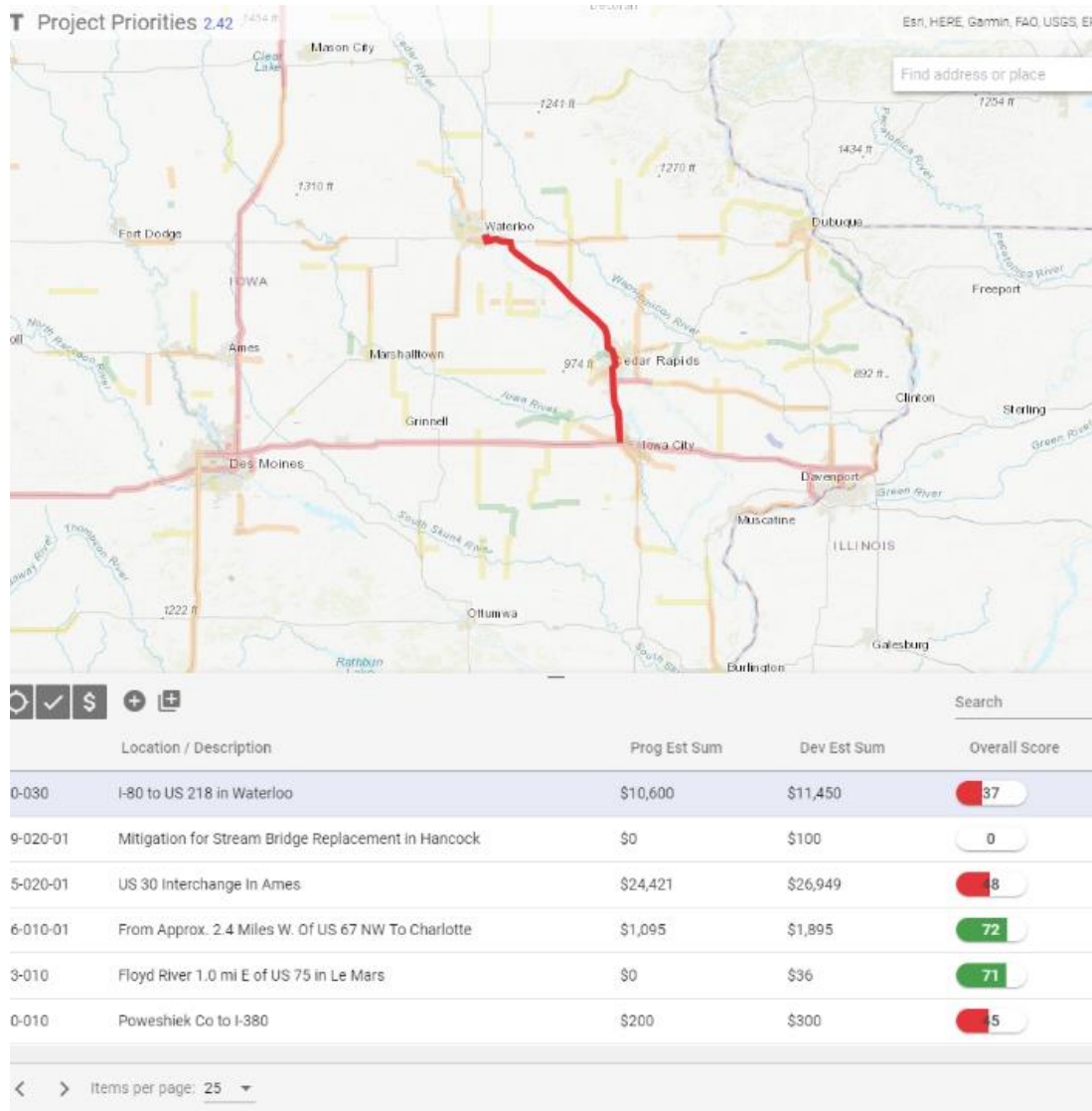
- Loess Hills (0)
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- LRTP Operations (996)
- LRTP Park & Ride (76)



T Project Priorities 2.42



Scoping Tool

Automated processing of a priority algorithm on all projects

Calculates performance scores based on many other DOT-managed business data (bridges, pavement, traffic, etc)

Allows robust filtering and analysis of both project-level and performance-level metrics

Thanks!



Matt Haubrich
Transportation Asset Management Administrator
Matthew.Haubrich@iowadot.us

Oregon Department of Transportation

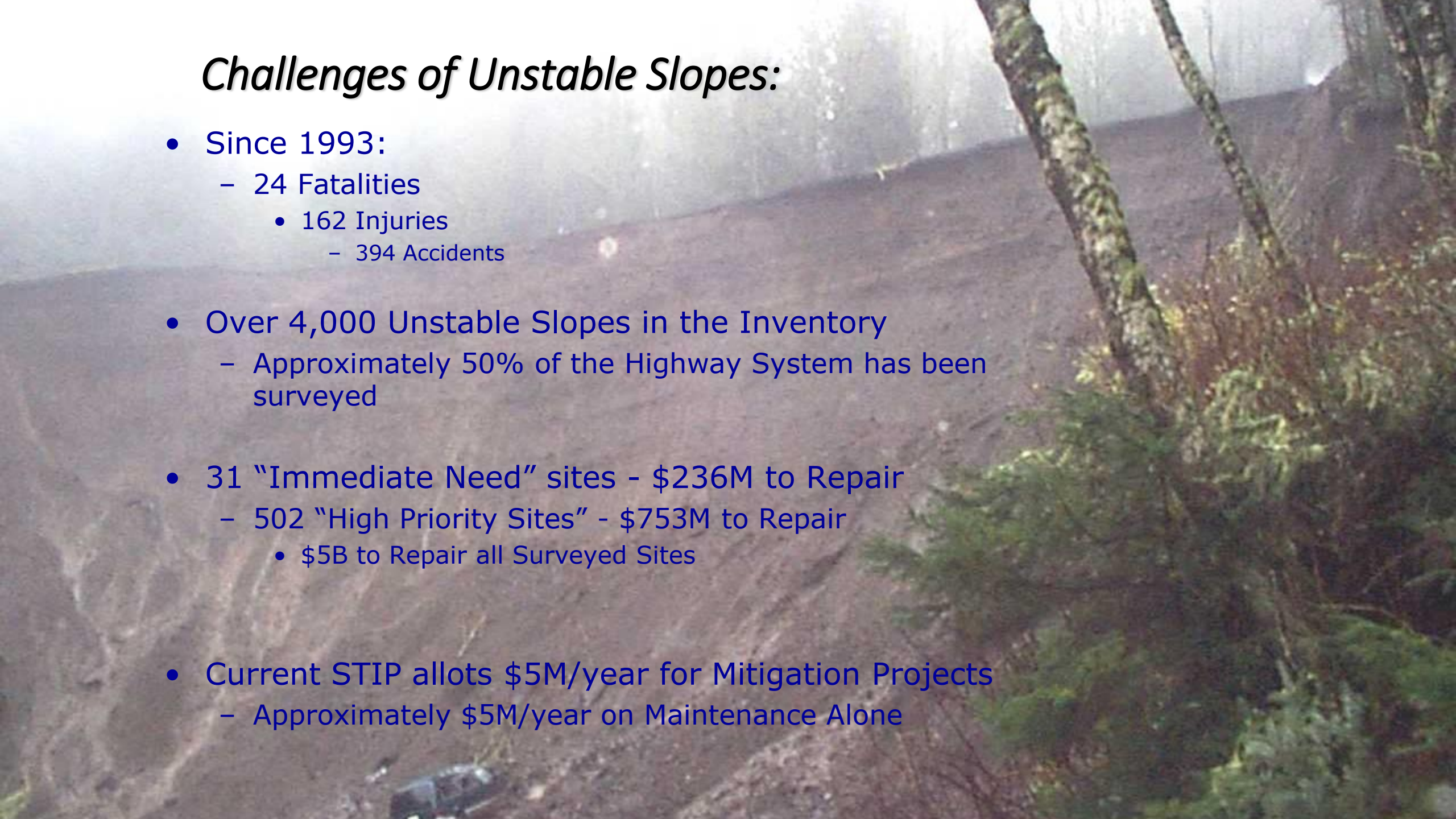
Evaluating Asset Damage Resulting from Emergency Events (Landslides)



Curran Mohney, C.E.G.
Engineering Geology Program Leader
Oregon Department of Transportation

Challenges of Unstable Slopes:

- Since 1993:
 - 24 Fatalities
 - 162 Injuries
 - 394 Accidents
- Over 4,000 Unstable Slopes in the Inventory
 - Approximately 50% of the Highway System has been surveyed
- 31 “Immediate Need” sites - \$236M to Repair
 - 502 “High Priority Sites” - \$753M to Repair
 - \$5B to Repair all Surveyed Sites
- Current STIP allots \$5M/year for Mitigation Projects
 - Approximately \$5M/year on Maintenance Alone



Challenges of Unstable Slopes:

Compliance with CFR 667

- Often occur as clusters of individual sites
- “Mitigated” during emergency response efforts
- May have existed prior to the emergency
- Frequently receive treatment outside the emergency timeline
- Can grow, change position, and have variable cycles of activity
- Suffer from being a “Pre-Existing Condition”
- Some are beyond “repair”



ODOT Unstable Slopes Program Goals:

- Locate and Rank all Unstable Slopes affecting the State's Highways
- Prioritize and Select Projects
- Allocate Funds
- Provide Information to Policy and Decision-Makers
- Integrate Data and Analyses with Internal and External Customers



An aerial photograph of a two-lane road winding through a lush, green forest. A white concrete mixer truck is positioned in the center of the road, surrounded by several orange traffic cones. The road surface appears to be under construction or repair, with visible cracks and uneven patches. The surrounding terrain is steep and covered in dense vegetation, including tall trees and undergrowth. The overall scene suggests a road maintenance or construction project in a rural or wooded area.

Program Criteria:

- Manage all Unstable Slopes Uniformly
- Uniformly manage risk
- Ability to scale higher-order analyses relative to site priority
- Utilize an impact based system
- Rank and prioritize sites in accordance to FHWA asset management principles

Sources of Data:

- GIS
- Corporate Data & Region/District Files
- LiDAR
- Field Collection
- “Human Assets”



Unstable Slopes Rating System:

Hazard Score

X

Maintenance Benefit-Cost Factor

X

Highway Classification Factor

=

Final STIP Score



Unstable Slopes Rating System:

Hazard Score

Failure Hazard	Very small or insignificant failures that do not affect the roadway (Not Scored)	Low Hazard: Slower slides with low potential for causing a road hazard (9 Points)			Medium Hazard: Slides that have not moved suddenly in the past but have the potential to cause a road hazard (27 Points)		High Hazard: Rapid slides that have created road hazards in the past, and all debris flows and rockfalls (81-100 Points based on sight distance)		
Roadway Impact	Landslide:	Would only affect shoulder during major failure (3 Points)	Two-way traffic would remain after a major failure (9 Points)	One-way traffic would remain after a major failure (27 Points)	Total closure in the event of a major failure with 0-3 mile detour (54 Points)	Total closure in the event of a major failure with 3-10 mile detour (70 Points)	Total closure in the event of a major failure with 10-60 mile detour (85 Points)	Total closure in the event of a major failure with >60 mile detour (100 Points)	
	Rockfall:	Rocks are completely contained in the ditch (3 Points)	Rocks fall onto the shoulder (9 Points)	Rocks enter the roadway (27 Points)	No ditch; all rocks enter the roadway (81 Points)	Rocks occasionally fill all or part of a lane (100 Points)			
Annual Maintenance Frequency	Once every 5 years or less (0 Points)	Once every 4 years (13 Points)	Once every 3 years (17 Points)	Once every 2 years (25 Points)	Once every 1 to 2 years (38 Points)	Once a year (50 Points)	1 to 2 times a year (56 Points)		
	2 times a year (63 Points)	2 to 3 times a year (69 Points)	3 times a year (75 Points)	3 to 4 times a year (81 Points)	4 times a year (88 Points)	4 to 5 times a year (94 Points)	5 times a year or more (100 Points)		
Average Daily Traffic	0-499 (11 Points)	500-999 (22 Points)	1,000-2,999 (33 Points)	3,000-5,999 (44 Points)	6,000-11,999 (56 Points)	12,000-23,999 (67 Points)	24,000-47,999 (78 Points)	48,000-95,999 (89 Points)	96,000 and over (100 Points)
Accident History	No accidents (3 Points)		Vehicle or property damage (9 Points)		Injury (27 Points)		Fatality (100 Points)		

total possible: 500 points

Unstable Slopes Rating System:

Maintenance Benefit-Cost Factor

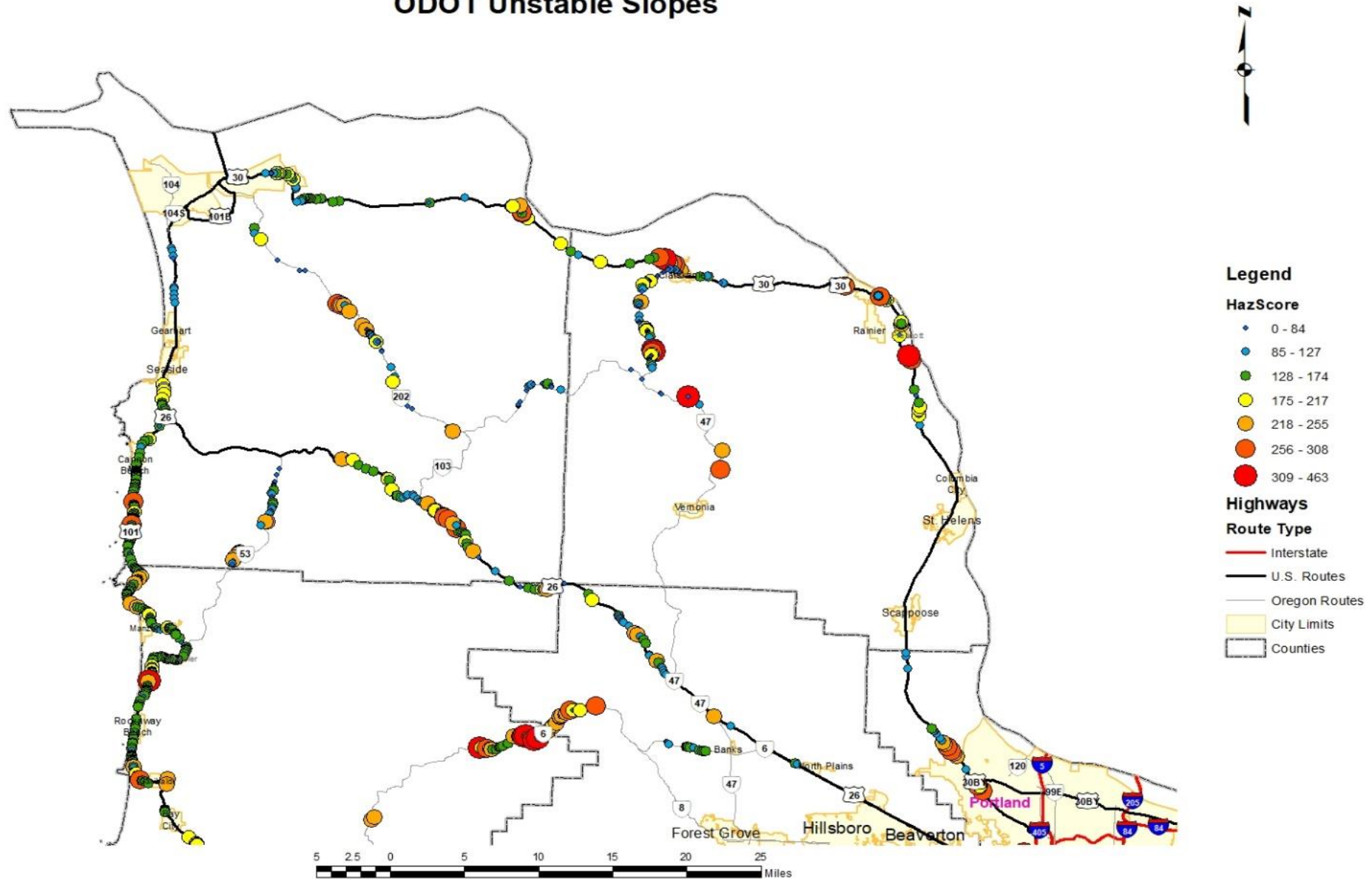
<u>20-Yr Maintenance Cost</u> Repair Cost	Factor
> 0.0 - 0.2	0.5
≥ 0.2 - 0.4	0.75
≥ 0.4 - 0.6	1
≥ 0.6 - 0.8	1.06
≥ 0.8 - 1.0	1.12
≥ 1.0 - 1.2	1.18
≥ 1.2 - 1.4	1.24
≥ 1.4 - 1.6	1.3
≥ 1.6 - 1.8	1.36
≥ 1.8 - 2.0	1.42
≥ 2.0	1.5

Highway Classification Factor

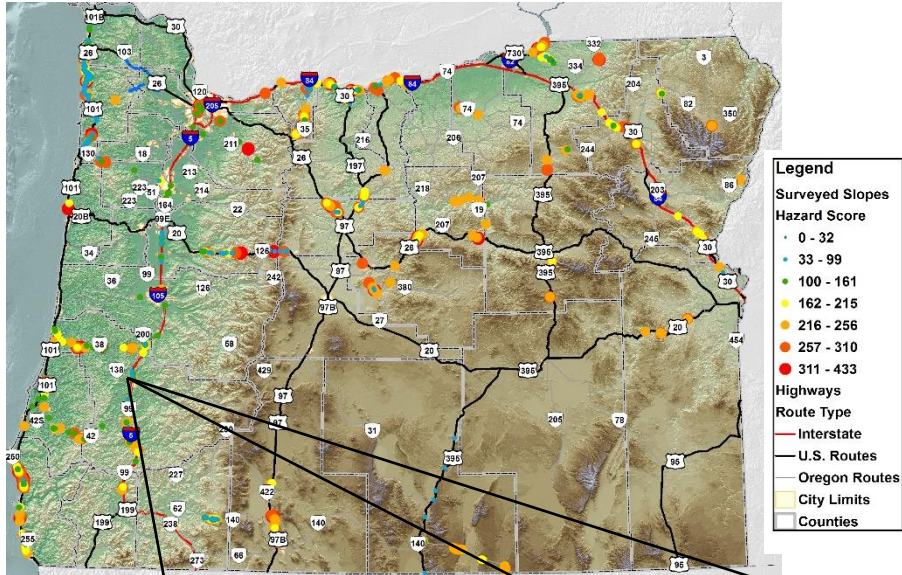
District 1	Regional 1.05	Statewide 1.1	Interstate 1.2
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Segments vs. Individual Sites

ODOT Unstable Slopes



Supporting CFR 667.1 Compliance



Legend
 Surveyed Slopes
 Hazard Score
 • 0 - 32
 • 33 - 99
 • 100 - 161
 • 162 - 215
 • 216 - 256
 • 257 - 310
 • 311 - 433
 Highways
 Route Type
 — Interstate
 — U.S. Routes
 — Oregon Routes
 City Limits
 Counties

Locate, Rank, Prioritize, and Select Sites for Repair

Perform Analyses: Cost-Benefit, Life Cycle Cost, etc.

Table 3 – Relative Risk and Cost Matrix for the US 26 and Jefferson Street Slide Mitigation Options

Option	Relative Risk of Failure	Relative Risk of Traffic Impact	Relative Cost for Construction
1 – Do Nothing	Very High	Very High	\$0
2 – Remove Vegetation, Place Short Rockfall Protection Screen	High	High	Low
3 – Flatten Slope Crest, Place Screen/Slope Mat	Moderate, High in the long-term	High	Moderate
4 – High-Capacity Debris Fence	Very High	Low	Low to Moderate
5 – Limited Fallout Area and Slope Modification	Low	Low	Moderate to High
6 – Stable Slope Geometry and Standard Fallout Configuration	Very Low	Very Low	High
7 – Construct Earth Retention Structure	Extremely Low	Extremely Low	Extremely High

Table 4 – Construction Cost Estimates* for the US 26 and Jefferson Street Mitigation Options

Site Number	Option Number					
	2	3	4	5	6	7
US 26 #1	\$27,639	\$55,855	\$48,714	\$134,163	\$191,606	\$979,452
US 26 #3	\$73,953	\$216,796	\$96,835	\$403,077	\$935,279	\$2,378,222
US 26 #5	\$42,850	\$131,487	\$48,714	\$160,187	\$249,848	\$1,064,956
US 26 #6	\$42,953	\$90,763	\$48,714	\$119,487	\$253,812	\$1,007,531
Jefferson St. #6	\$7,826	\$18,340	\$29,634	\$23,685	\$30,401	\$1,601,634
Jefferson St. #7	\$56,630	\$113,768	\$136,500	\$160,344	\$208,699	\$1,951,681

* Unconservative estimates for Geotechnical and Related Items Only. Excludes design, R/W, Temporary Traffic Control & Protection, and all other associated project costs.
 † Costs may actually be on the order of the emergency repair costs due to the specialized equipment required.

- Identify Events
- Evaluate methods to mitigate or resolve root causes
- Cost vs. Performance
- Risk analysis with respect to current and future conditions

Provide Information to Regions, Districts, Other Agencies, Public, etc.

Hwy 001 | Hwy Name Pacific | MP 161.19

Slope ID: SL001-0161-19LS1 | Failure Type: Rockfall | Name: _____

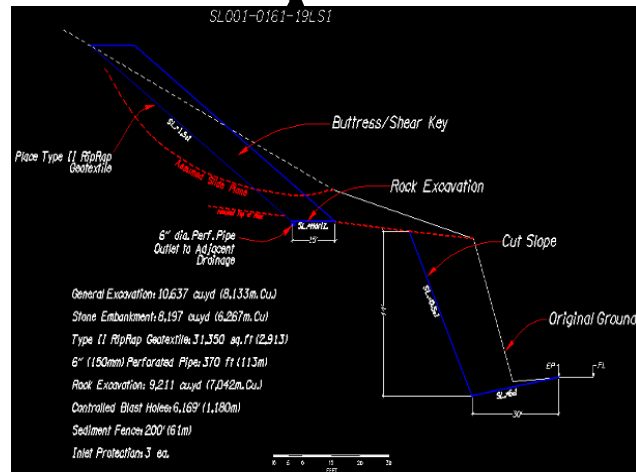
Location Information
 Region: _____ Highway: 001 | Latitude: 43.697332078
 District: _____ Begin MP: 161.16 | Longitude: -123.2062121
 Maint. Section: Boswell Springs | End MP: 161.22 | Elevation (ft): 561.5
 County: Douglas | Mid MP: 161.19 | LRS: 000100100500

Roadway Information
 Speed Limit: 65 | Highway Class: Interstate | Total ADT: 21400
 Decision Sight Distance: 1050 | # Of Lanes: 4 | % Cars ADT (decimal): 0.72
 Measured Sight Distance: 1251 | # Of Lanes Affected: 0 | % Trucks ADT (decimal): 0.28
 Detour Route: Hwy 251 to Hwy 045 | Detour Length (mi): 45 | Est. Closure (hrs): 0

Feature Information
 Failure Hazard: High | Environmental Impact: None
 Roadway Impact: If onto shoulder | Impacted ODOT Facilities:
 Maint. Frequency: every yr | Impacted Private Property:
 Accident History: No Accidents | Impacted Other Agencies:
 Annual Maint. Cost: \$1,106.00 | Impacted Railroad:
 Repair Cost: \$982,659.20 | Impacted Utilities:
 Datum: WGS 84 | Damaged Culverts:
 Collection Method: Trimble GeoXT | Other Impact Info: _____
 Rahr: Katie Castelli | Original Site Visit: 2/9/2005 | Last Site Visit: 2/9/2005 | Date Updated: 2/9/2005

Calculate Scores | Print Page

Failure Hazard Score: 81 | Hazard Score: 210
 Roadway Impact Score: 9 | Maint. Benefit-Cost Factor: 0.5
 Maint. Frequency Score: 50 | Hwy Classification Factor: 1.2
 ADT Score: 67 |
 Accident History Score: 3 | STIP Score: 126



TAMP 667 Requirements

California's Approach

Michael B. Johnson P.E.
State Asset Management Engineer
California Department of Transportation
February 2020



Our View of the 667 Requirements

- Assets that are repeatedly damaged may need more than just rebuilding as is.
- This is a life cycle cost question to evaluate
- In some cases, repairing the damage periodically may be the best approach.
- The presence of a declared emergency is only one trigger to evaluate

Who's Emergency

- The President has the authority to declare a National Emergency
- In California the Governor has the authority to declare an emergency.
- Within Caltrans the Director can authorize emergency contracting provisions – Director's Orders
- The California TAMP evaluated the Director's Orders

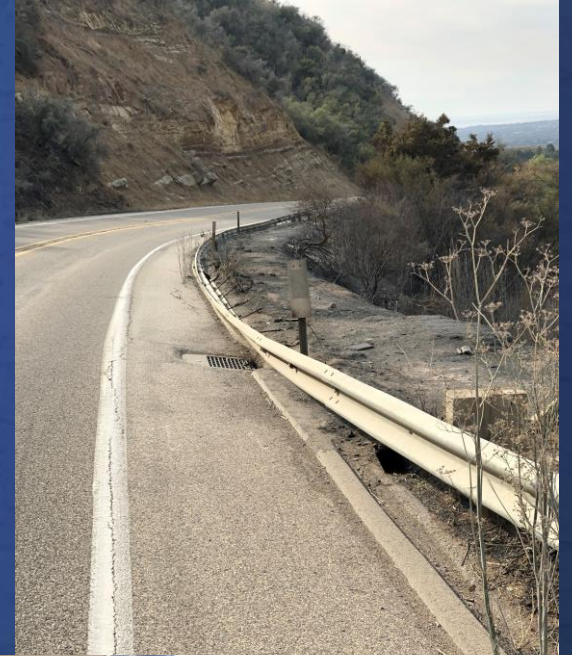
Emergency Tracking

- Sometimes your good and sometimes your just lucky!
- The Caltrans Director's Order Process has been in place for many years... We had history
- The Director's Orders encompass national and state declared emergencies
- Director's Orders are tracked using an Excel Spreadsheet

TAMP Evaluation

- Pair similar locations together over time
- Looked at descriptions of work to verify the work was the same
- Determined counts of incidents for listing in TAMP
- Main types of repeated damage
 - Geotechnical Slides
 - Bridge Hits
 - Floods
 - Fires

Typical Damage Types




Conclusion

- California was lucky to have a tracking process in place
- Tracking spreadsheet is simple but effective
- Scope is much broader than TAMP requirements
- Looking at damage from a Life Cycle perspective makes



Today's Speakers

- Shannon Foss, shannon.foss@state.mn.us
 - Brad Allen, ballen@appliedpavement.com
 - Matthew Haubrich,
Matthew.Haubrich@iowadot.us
 - Elisabeth Lennon,
Elisabeth.Lennon@dot.ny.gov
 - Curran Mohny,
Curran.E.MOHNEY@odot.state.or.us
 - Michael Johnson,
michael.b.johnson@dot.ca.gov
- 

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