Transportation Performance Management Webinar Series

Case Studies: The Next Generation of Continuous Improvement Methodologies

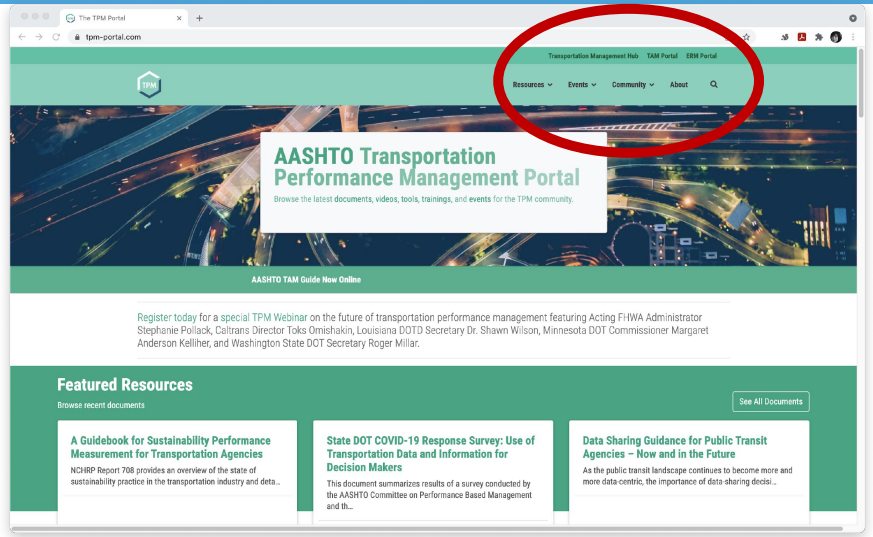
Sponsored by AASHTO and FHWA

Wednesday, July 17, 2024

TPM Webinar 23

Transportation Performance Management Webinar Series

- Our TPM webinar series is held every two months, on topics such as communications, system performance management, data sources, and many more to come!
- Today is the 23rd webinar in our bi-monthly series
- We welcome ideas for future webinar topics and presentations
- Use the webinar chat panel during the webinar
  - Submit questions for today's presenters
  - Submit ideas for future webinar topics



Find us on the AASHTO TPM Portal
https://www.tpm-portal.com

Webinar Agenda

2:00 Introduction & Agenda

- Gary Vansuch, Colorado DOT, Chair, AASHTO CPBM Subcommittee on Organizational Management.

2:05 FHWA Perspective

- Mshadoni Smith-Jackson.

2:10 AASHTO Perspective

- Anna McLaughlin, AASHTO.

2:15 CPBM Issues Survey: Initial Findings

- David Putz, Iowa DOT, Co-Chair, AASHTO CPBM Subcommittee on Organizational Management.

2:25 The Next Generation of Continuous Improvement Methodologies and Introduction of National Focus Innovations from AASHTO Innovation Management

- Gary Vansuch, Colorado DOT, Chair, AASHTO CPBM Subcommittee on Organizational Management

Webinar Agenda

2:30 State DOT Case Studies

- Kalli Wegren, Colorado DOT – GIS Potholes Field Map & GeoHub Layer (2:30-2:45)
- John Kronholm, Colorado DOT – Wildlife Underpass Sizing (2:45-3:00)
- Mark Kilian, Arizona DOT – Remote-Controlled Skid Steer (3:00-3:15)

3:20 Audience Q&A.

- Moderated by Gary Vansuch, Colorado DOT.

3:25 Wrap-Up.

- Gary Vansuch, Colorado DOT, Chair CPBM Subcommittee on Organizational Management.

FHWA Perspective

Mshadoni Smith-Jackson

FHWA

AASHTO Perspective

Anna McLaughlin

AASHTO

AASHTO 2024 Conference on Data Management & Analytics, Planning, and Performance-Based Management

September 17-20, 2024

Hyatt Regency St Louis at The Arch | St Louis, Missouri

Registration: https://cvent.me/ZBGm3r

Conference site:

https://web.cvent.com/event/0d0ef108-bca4-4f5c-acbf-f7565de48825/websitePage:33bb36ed-69a1-42a4-85e6-6b25fb660a71

CPBM Issues Survey: Initial Findings

Dave Putz

Iowa DOT

Co-Chair, AASHTO CPBM Subcommittee on Organizational Management

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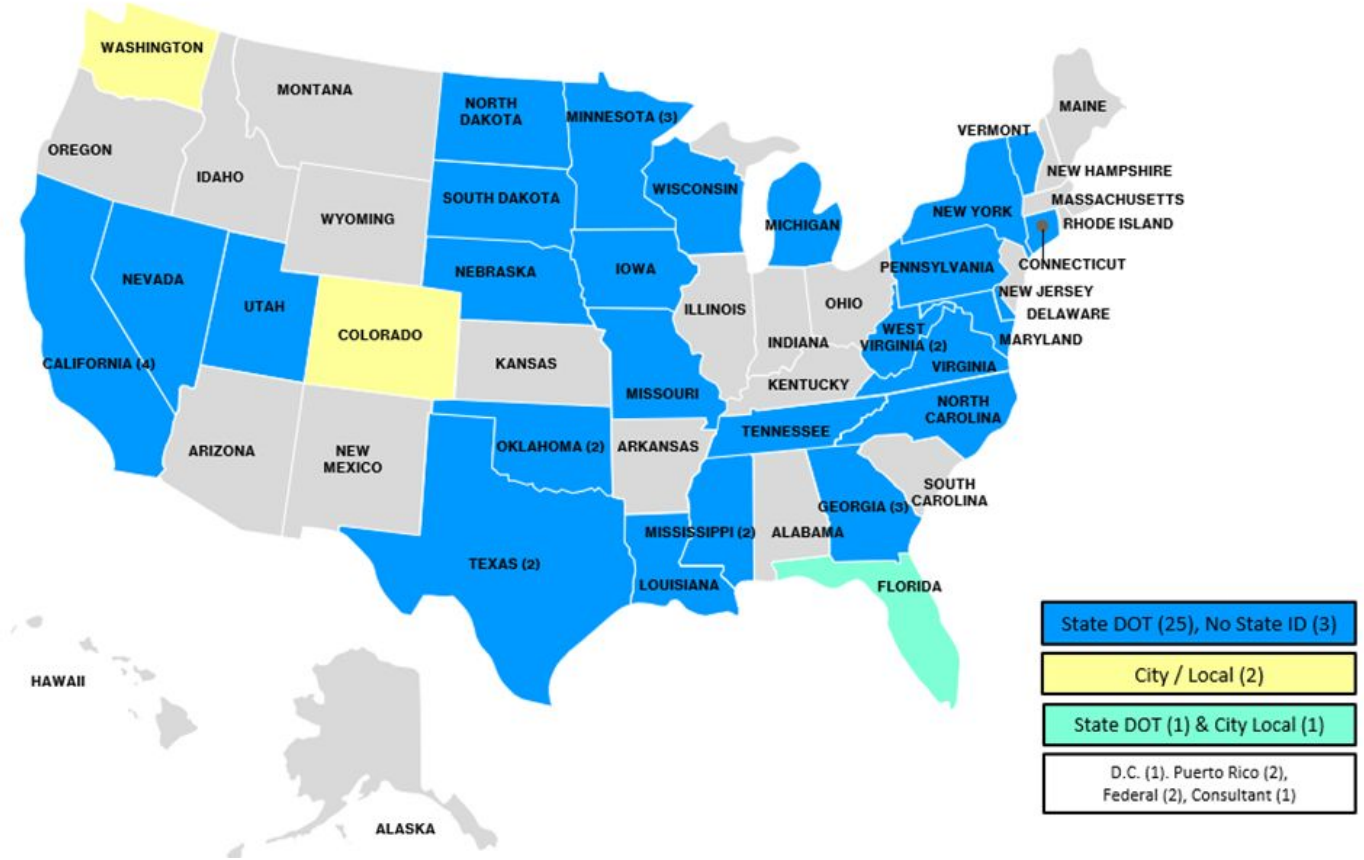
CPBM Issues Survey

Presentation of Initial Findings

Conducted by AASHTO‘s

Committee on Performance Based Management

2024 CPBM Issues Survey Respondents

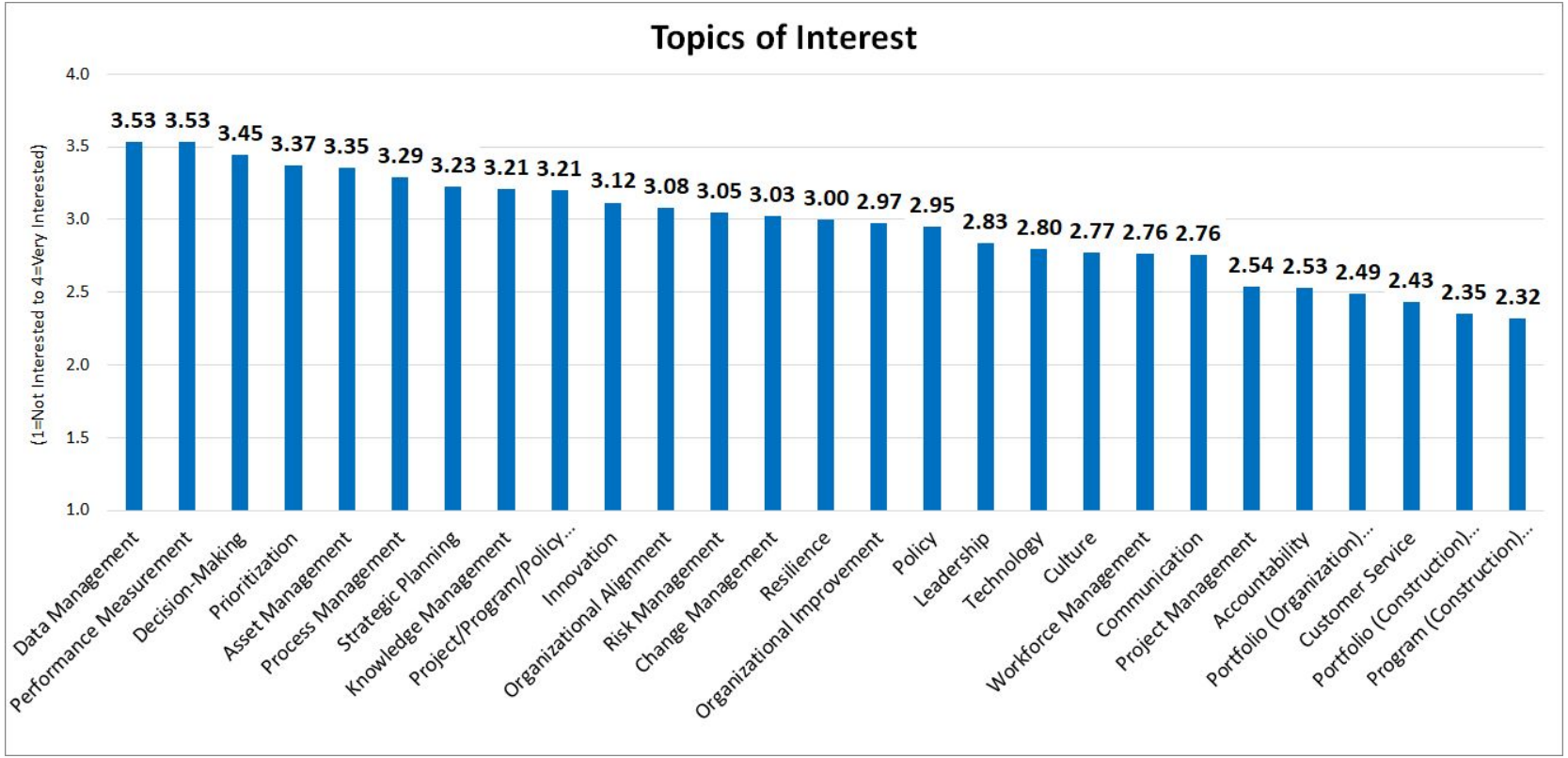


Scope of Responsibilities

TOPICS TO CHOOSE FROM

- Accountability
- Asset Management
- Change Management
- Communication
- Culture
- Customer Service
- Data Management
- Decision-Making
- Innovation
- Knowledge Management
- Leadership
- Organizational Alignment
- Organizational Improvement
- Performance Management
- Policy
- Portfolio (Construction) Management
- Portfolio (Organization) Management
- Prioritization
- Process Management
- Program (Construction) Management
- Project Management
- Project/Program /Policy Strategy & Evaluation
- Resilience
- Risk Management
- Strategic Planning
- Technology
- Workforce Management

TOPICS OF INTEREST



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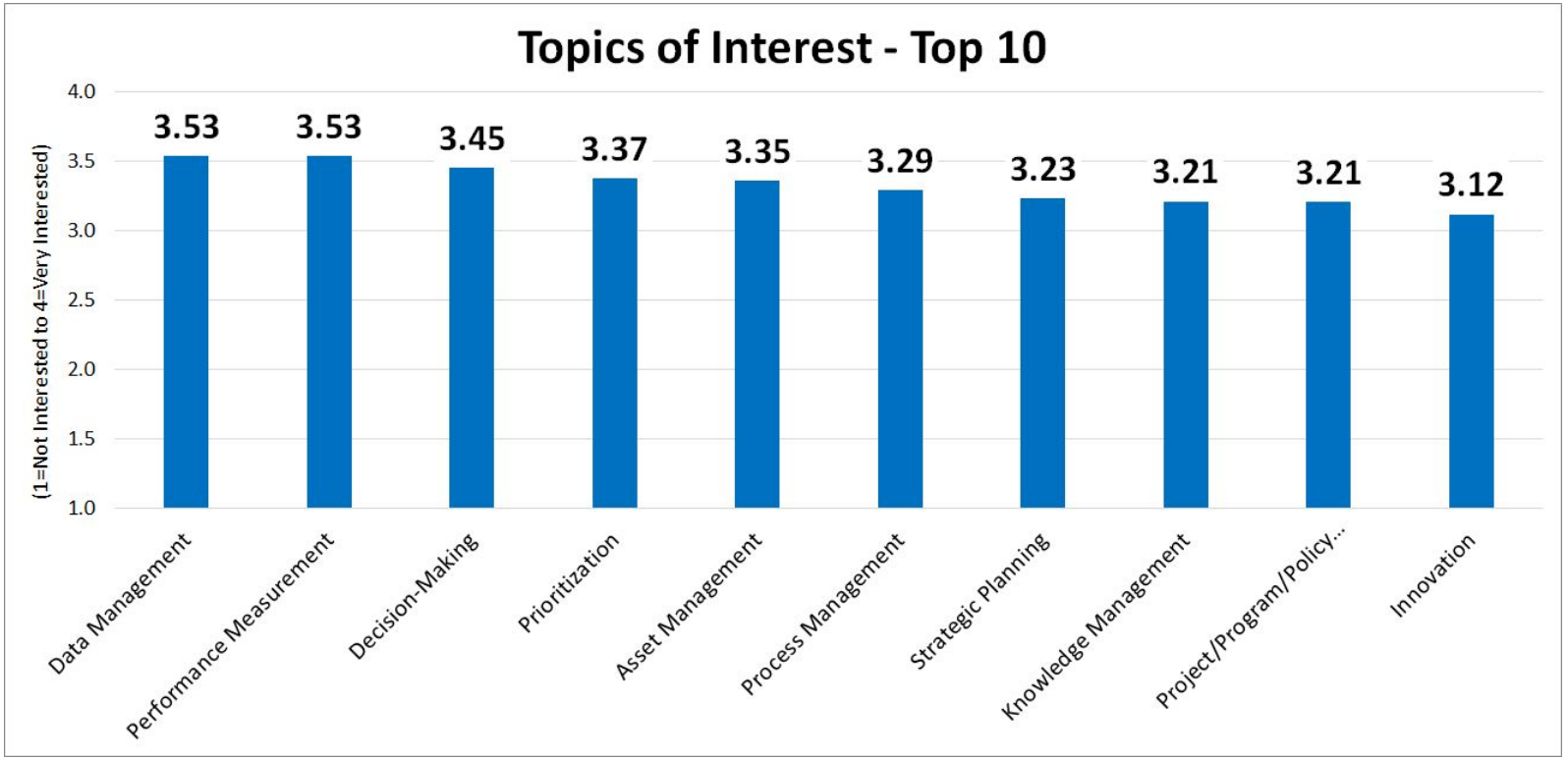
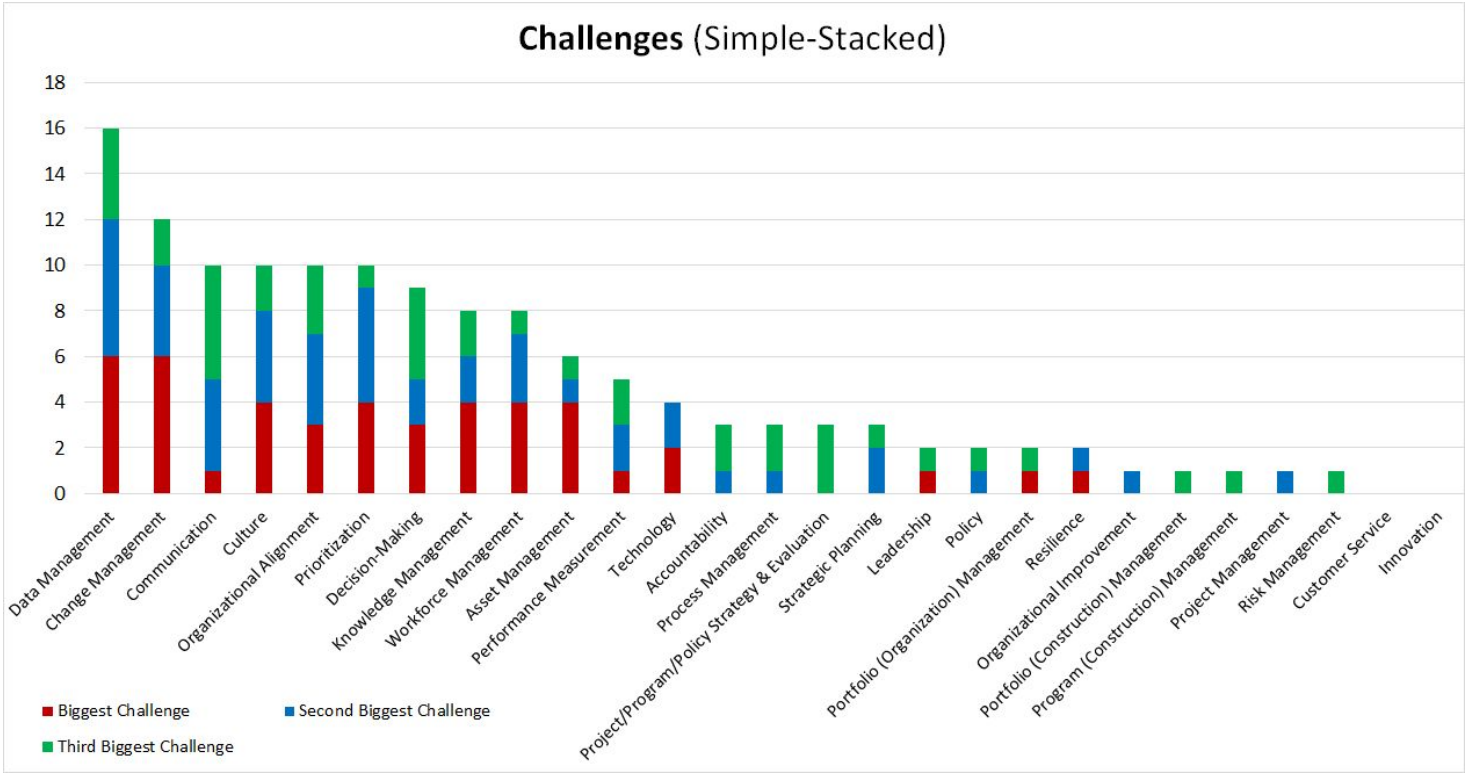
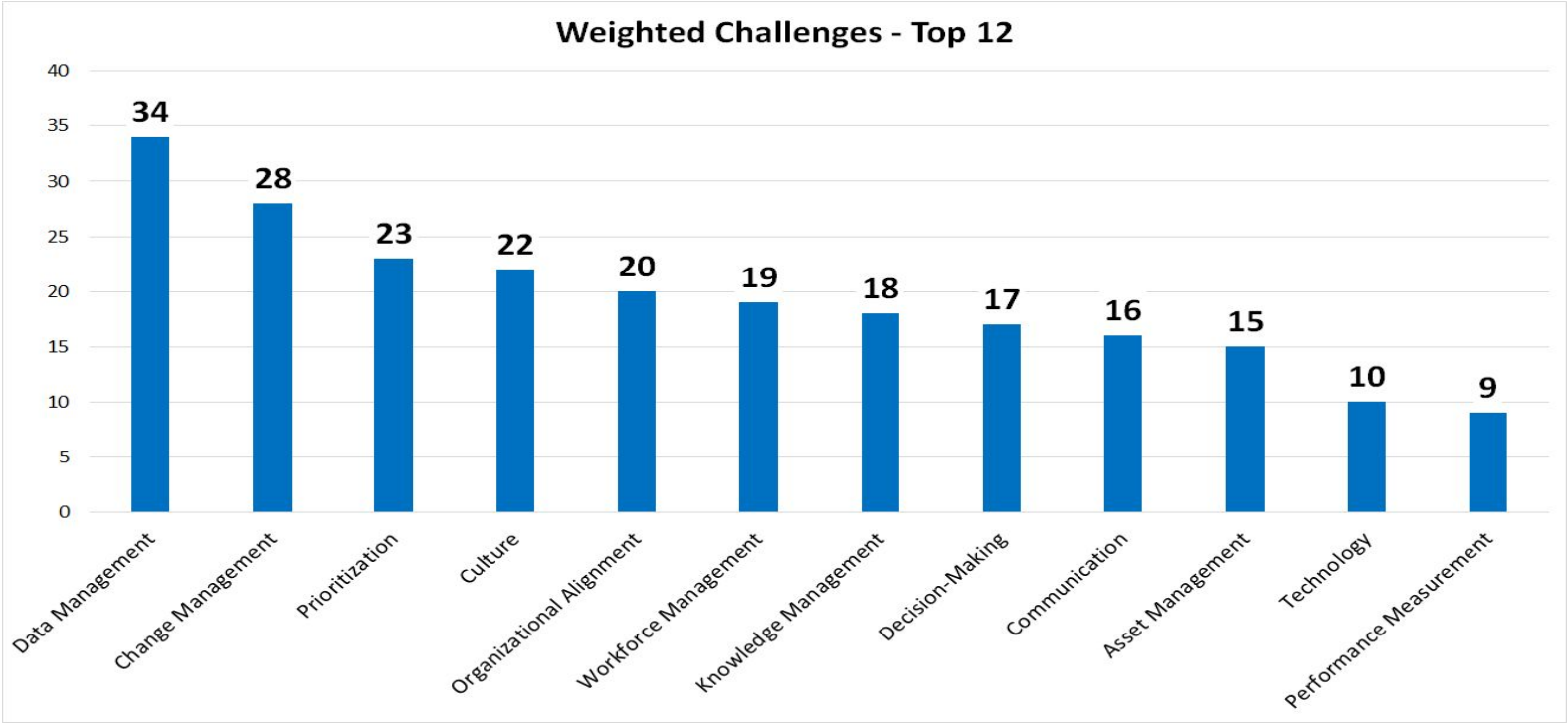


CHALLENGES - Biggest, 2nd Biggest, 3rd Biggest



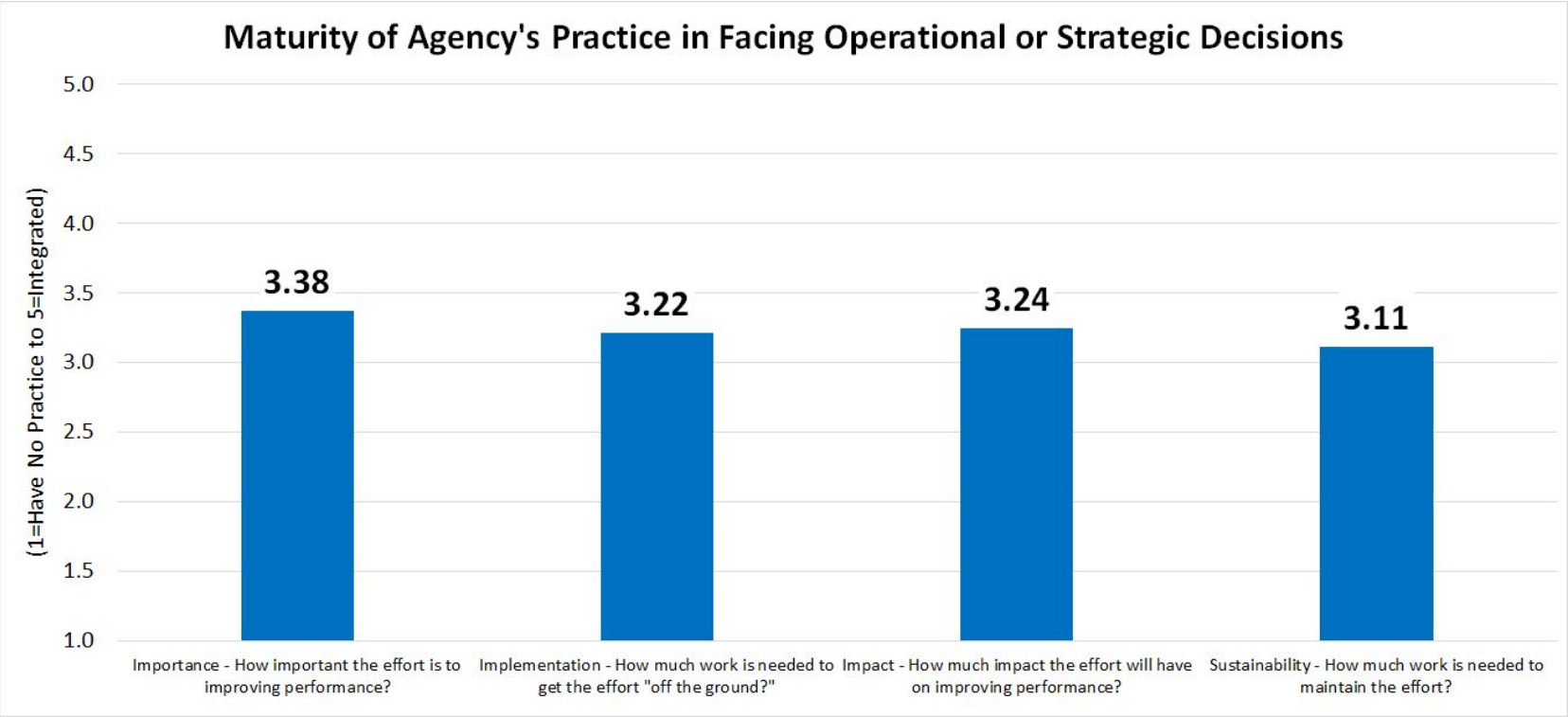
CHALLENGES - Biggest, 2nd Biggest, 3rd Biggest



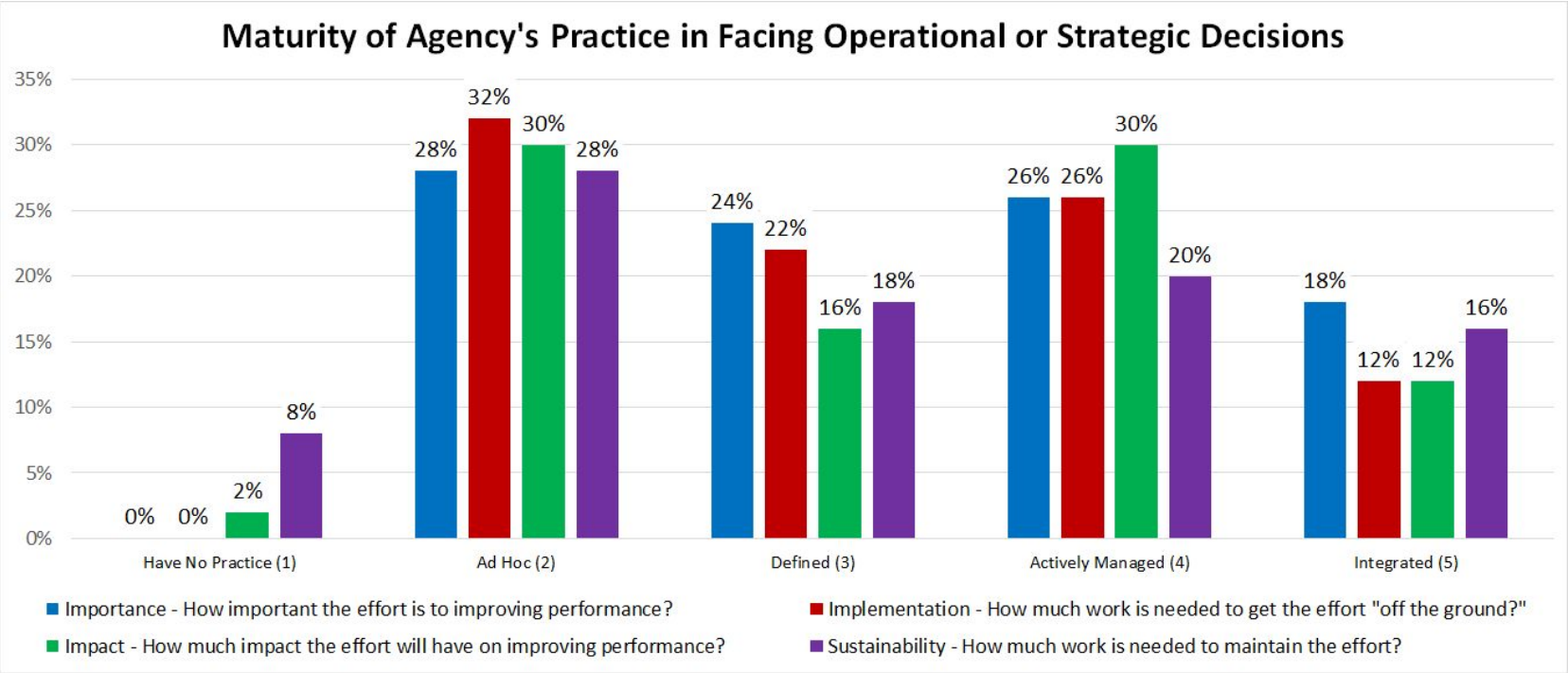
Why is the Issue Pressing for Your Agency?

- **Organizational Resource Constraints/Issues** - Staffing (people and skills), workforce turnover, and funding/available resources were constraints impacting performance management efforts.
- **Organizational Response** - Technology, ever evolving, needed to be understood and used - often requiring leadership to champion performance management efforts.
- **Organizational Function** - Change management as well as prioritization are needed to identify, focus, and carry efforts from development through implementation.
- **Culture** - It will take a shift in culture and mindsets to be open to the innovation and new approaches needed.
- **Data** - Both management and integration of data were needed to better leverage as much value as possible.

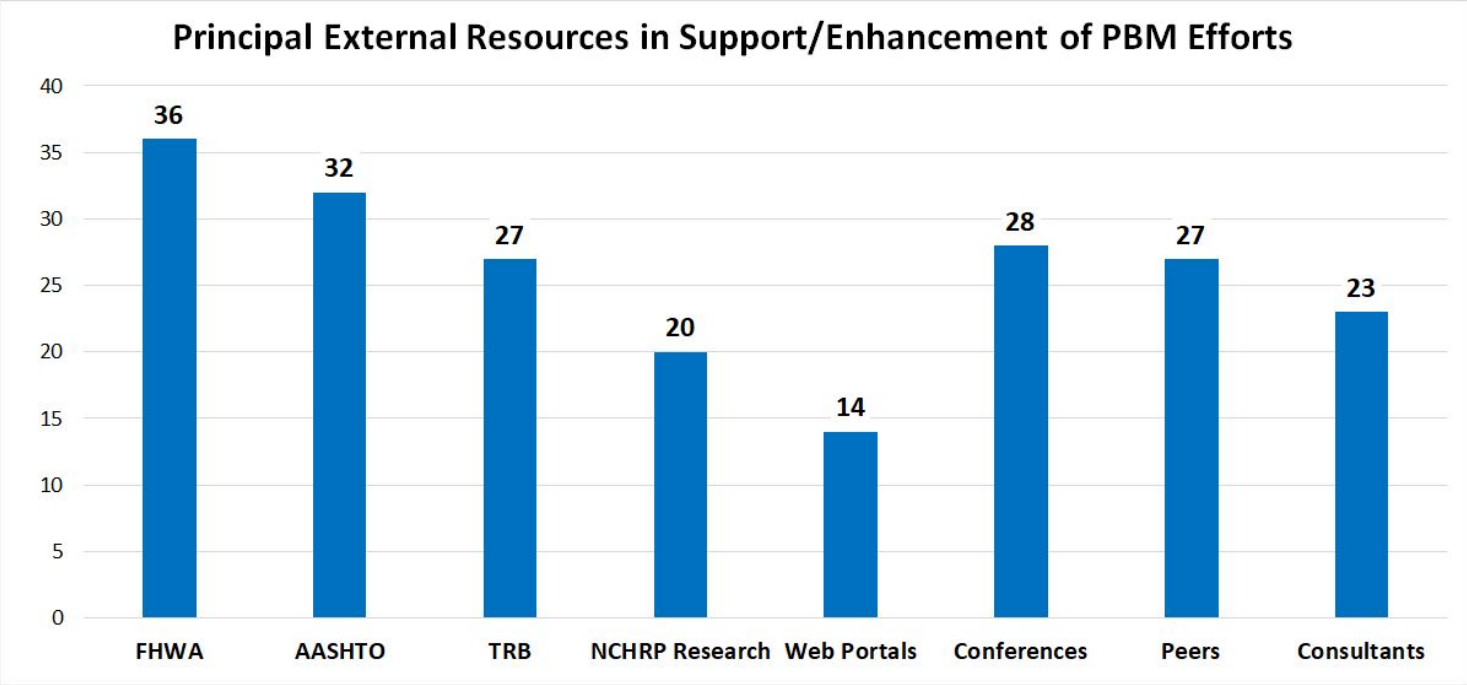
Maturity – Operational/Strategic Decisions



Maturity – Operational/Strategic Decisions



External Resources



Future Performance Management Practices

- **Technology and Automation** - Leveraging technology will enhance data-driven decisions and improve efficiency.
- **Maturing of Practice** - Maturity of practice will lead to a growing body of best practices across agencies.
- **Improved Data Practices** - Data collection, management, and analysis will support more effective performance management practices.
- **Shift in Focus** - Improved practices will lead to an expansion of performance management focus: long-range planning, resilience, equity, customer, and other societal outcomes.

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CPBM Issues Survey

Presentation of Initial Findings

THANK YOU!

The Next Generation of Continuous Improvement Methodologies & Introduction of National Focus Innovations from AASHTO Innovation Management

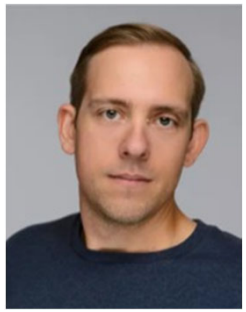
Gary Vansuch
Colorado DOT
Chair, AASHTO CPBM Subcommittee on Organizational Management

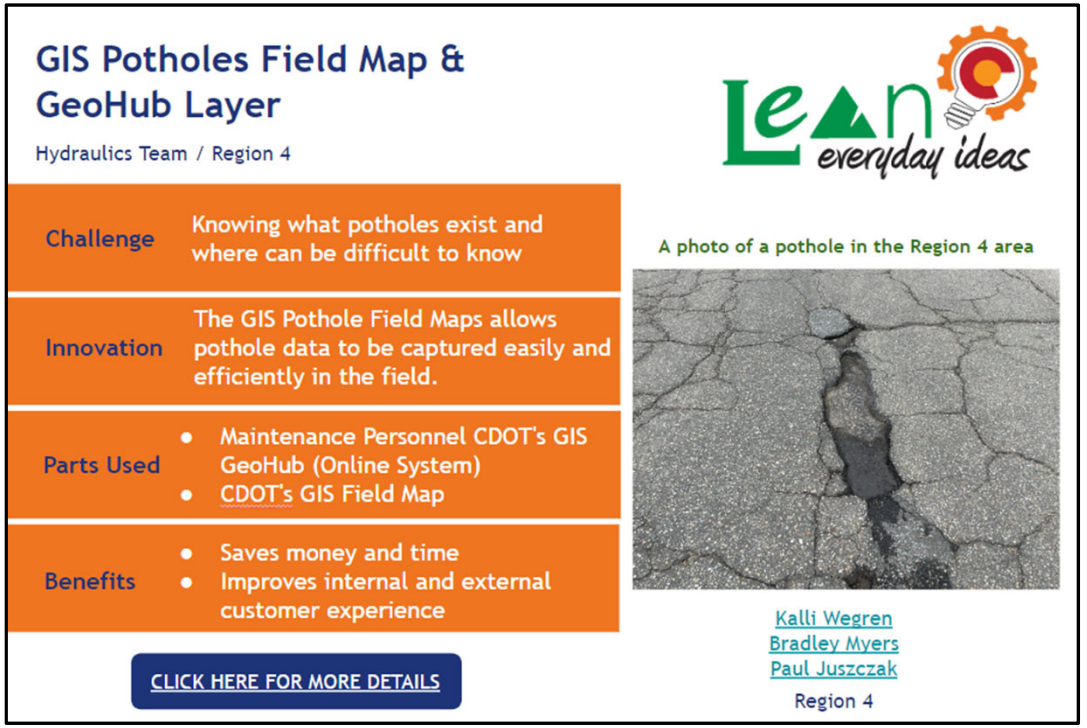
AASHTO Organizational Management Subcommittee

Mission: Help transportation agencies achieve **organizational excellence** and advance the practice of **performance excellence** by identifying, analyzing and sharing information to improve organizational performance at the strategic, tactical and operational levels of the organization!

GIS Potholes Fieldmap & GEOHUB Layer Improvement
AASHTO/FHWA TPM Webinar

Bradley Myers, Paul Juszczak, and Kalli Wegren
Region 4

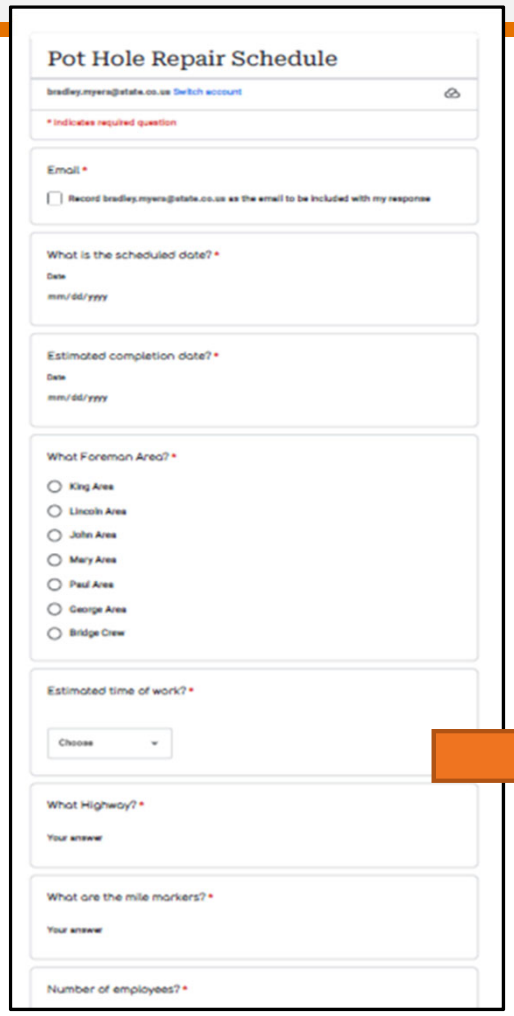



Pothole Tracking Needs

- Bad winter with a wet spring = significant rise in potholes
- Data needed for local area meetings
- Internal Accountability
- Bridge the gap between maintenance and engineering

Pothole Tracking Evolution



Pot Hole Repair Schedule

bradley.myers@state.co.us Switch account

* Indicates required question

Email *

Record bradley.myers@state.co.us as the email to be included with my response

What is the scheduled date? *

Date

mm/dd/yyyy

Estimated completion date? *

Date

mm/dd/yyyy

What Foreman Area? *

- King Area
- Lincoln Area
- John Area
- Mary Area
- Paul Area
- George Area
- Bridge Crew

Estimated time of work? *

Choose

What Highway? *

Your answer

What are the mile markers? *

Your answer

Number of employees? *

- Started as a Google Form informed spreadsheet
- Maintenance would input data back in office
- Spreadsheet required significant cleaning & updates

What is the sche	Estimated compl	What Foreman A	Estimated time c	What Highway?	What are the mil	Number of empl	Cold Mix, Hot Mi	Is this a tempora	If the repair is tei	Are the employe	If overtime was s	****After work is completed******
6/13/2023	6/15/2023	John Area	8 hours	076-076A	47.000-44.000	8	Hot mix	Permanent		Regular time		Section completed, pothole free
6/13/2023	6/15/2023	John Area	8 hours	257	14-18	4	Hot mix	Permanent		Regular time		Section completed, pothole free
6/13/2023	6/15/2023	John Area	2 days	14	150-170	3	Hot mix	Permanent		Regular time		Section completed, pothole free
6/13/2023	6/14/2023	George Area	8 hours	I70	329 to 340	3	Cold mix	Temp	6/23/2025	Regular time		Section completed, pothole free
6/13/2023	6/13/2023	King Area	2 hours	I25	270-271	3	Cold mix	Temp	7/18/2023	Regular time		Section completed, pothole free
6/12/2023	6/12/2023	King Area	1 hour	392	97-98	3	Cold mix	Temp	9/5/2023	Regular time		Section completed, pothole free
6/12/2023	6/12/2023	King Area	1 hour	I25	291	2	Cold mix	Temp	7/18/2023	Regular time		Section completed, pothole free
6/12/2023	6/12/2023	King Area	1 hour	I25	281	2	Cold mix	Temp	7/18/2023	Regular time		Section completed, pothole free
/12/2023	6/12/2023	King Area	1 hour	I25 frontage	276	2	Cold mix	Permanent		Regular time		Section completed, pothole free
/12/2023	6/12/2023	King Area	1 hour	I25 W frontage	277	2	Cold mix	Temp	7/18/2023	Regular time		Section completed, pothole free
6/12/2023	6/12/2023	King Area	1 hour	I25 E frontage	271	2	Cold mix	Temp	7/19/2023	Regular time		Section completed, pothole free
6/12/2023	6/12/2023	King Area	1 hour	CR 52	272	2	Cold mix	Temp	7/18/2023	Regular time		Section completed, pothole free
6/14/2023	6/14/2023	Paul Area	6 hours	006J	454.3-454.4	10	Hot mix	Permanent		Regular time		Work completed, need to return to complete potholes
6/14/2023	6/14/2023	George Area	8 hours	070A	394.390-419.311	4	Cold mix	Permanent		Regular time		Section completed, pothole free
6/15/2023	6/15/2023	Lincoln Area	4 hours	119	62.9-63	2	Cold mix	Permanent		Regular time		Section completed, pothole free
6/15/2023	6/15/2023	Lincoln Area	4 hours	025A frontage	231-233	2	Cold mix	Permanent		Regular time		Section completed, pothole free
6/15/2023	6/15/2023	Paul Area	5 hours	076A	148-149	5	Mastic	Permanent		Regular time		Work completed, need to return to complete potholes
6/20/2023	6/22/2023	John Area	3 days	076-076A	45.000-41.000	7	Hot mix	Permanent		Regular time		Work completed, need to return to complete potholes

GIS & Pothole Data Integration

CDOT utilizes ESRI Tools

- GEOHUB! = Online GIS

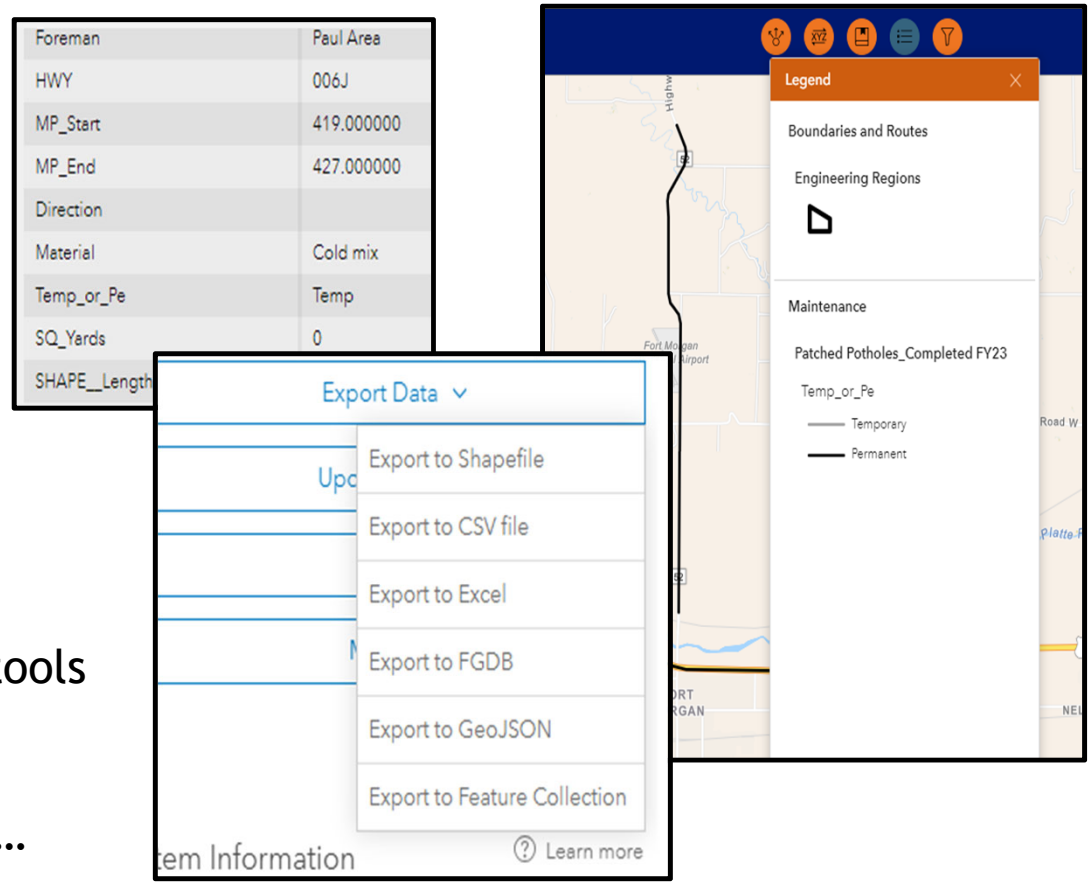
Patched Potholes data layer

- Mapped known pothole repairs

GeoHub

- Spatially mapped data
- Store important information
- Integrate data into other maps & tools
- Generate reports

How to capture pothole data in real-time…

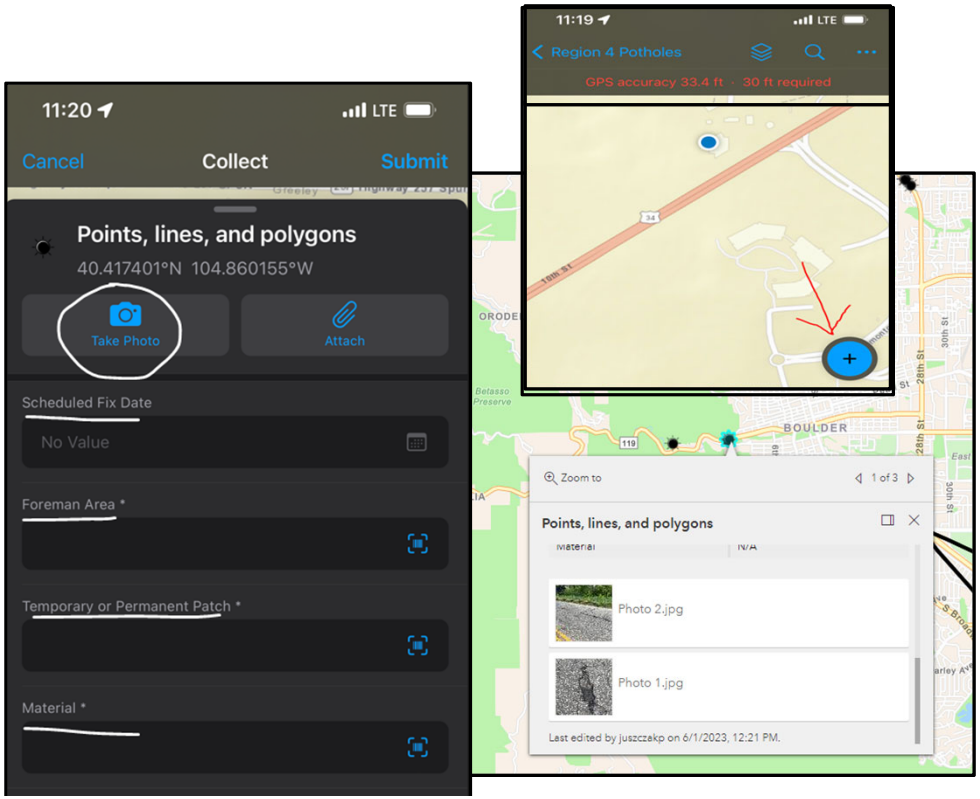


GIS Potholes Field Maps App Advantages

FIELD MAP APP

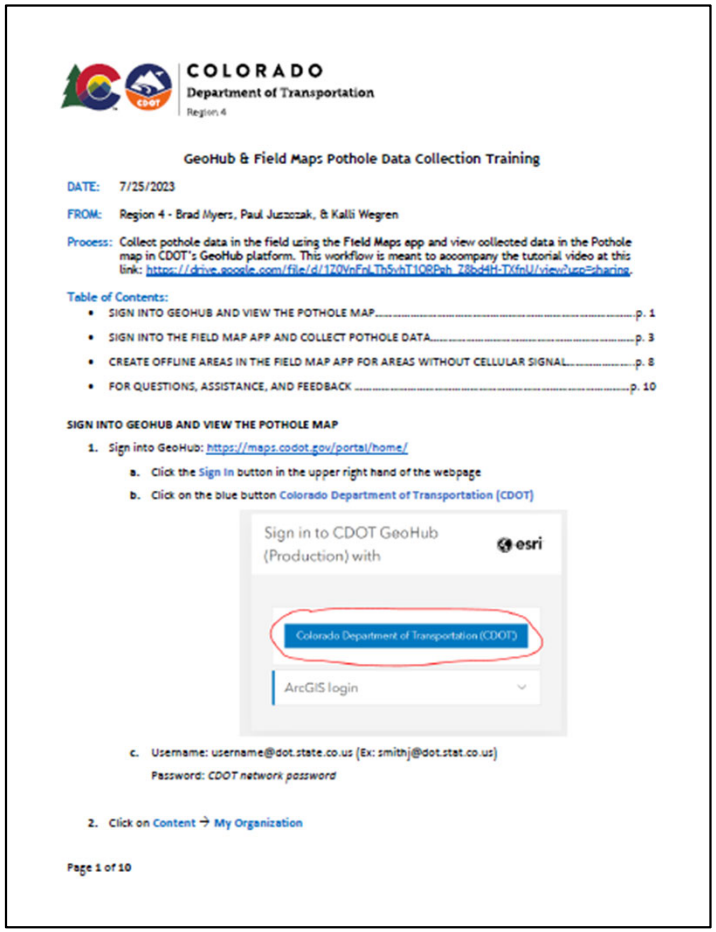
- Collects REAL-TIME data
- Offline areas (mountains) no longer an issue!
- Data & pictures
- Syncs to GeoHub for maintenance, leadership, and others to pull data any time
- Problem areas and lower ADT roads get increased visibility by engineers and leadership
- Additional funding for problem areas

Download on the App Store



GIS Field Maps Rollout

- Training!
- Initial Difficulties:
  - Promoting to Foreman area's leadership
  - Presenting benefits
- Gained momentum when one particular area had higher visibility by engineers
- Recognition for the creation of the app
- Division of Maintenance looking to utilize for funding disbursement of project money provided by traffic commission.



COLORADO
Department of Transportation
Region 4

GeoHub & Field Maps Pothole Data Collection Training

DATE: 7/25/2023

FROM: Region 4 - Brad Myers, Paul Juszczak, & Kalli Wegren

Process: Collect pothole data in the field using the Field Maps app and view collected data in the Pothole map in CDOT's GeoHub platform. This workflow is meant to accompany the tutorial video at this link: https://drive.google.com/file/d/170VnFxLTh5vhT1OBPsh_Z8bd4H-TXfnU/view?usp=sharing.

Table of Contents:

SIGN INTO GEOHUB AND VIEW THE POTHOLE MAP

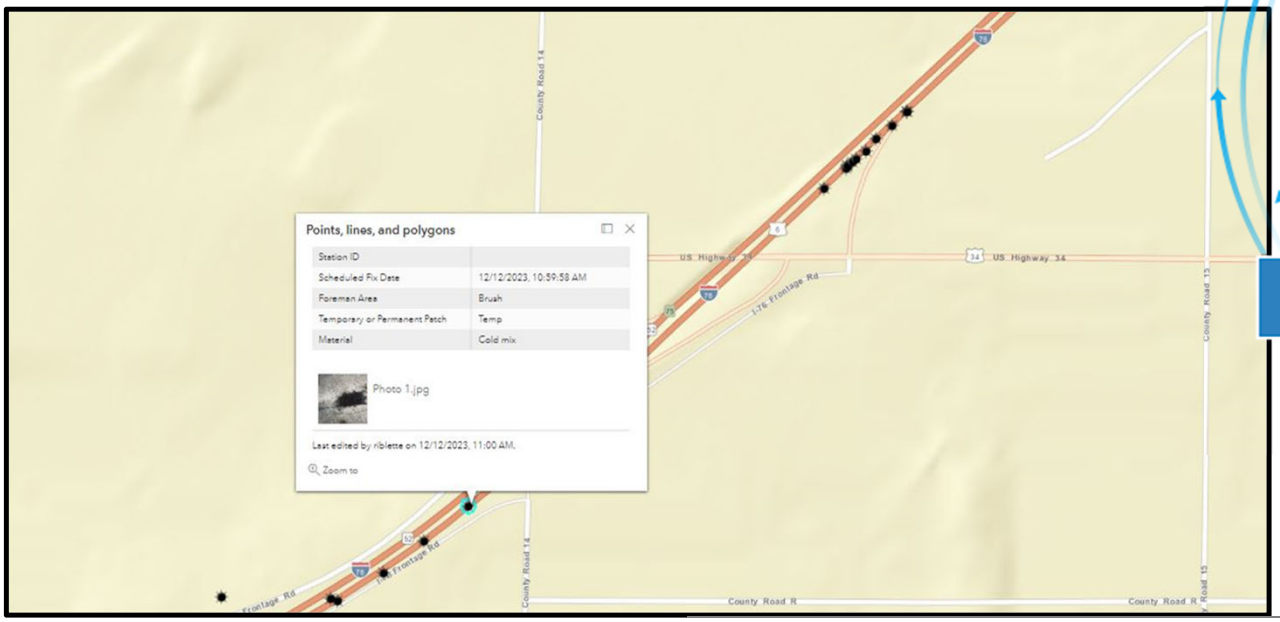
1. Sign into GeoHub: https://maps.codot.gov/portal/home/
   a. Click the Sign In button in the upper right hand of the webpage
   b. Click on the blue button Colorado Department of Transportation (CDOT)

   c. Username: username@dot.state.co.us (Ex: smithj@dot.stat.co.us)
   Password: *CDOT network password*

2. Click on Content → My Organization

Current Status

- Potholes are marked before patching operations
- Rollout is gaining traction within our region
- Data and historical data sets are growing
- The first engineer project is being planned



Hopeful Future of the Pothole App

- Gain evidence of the value from Region 4
- The app goes statewide
- Linked to COTrip to identify pothole areas

Thank You!

Bradley Myers
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Environmental PWQ & GIS, Region 4 CDOT
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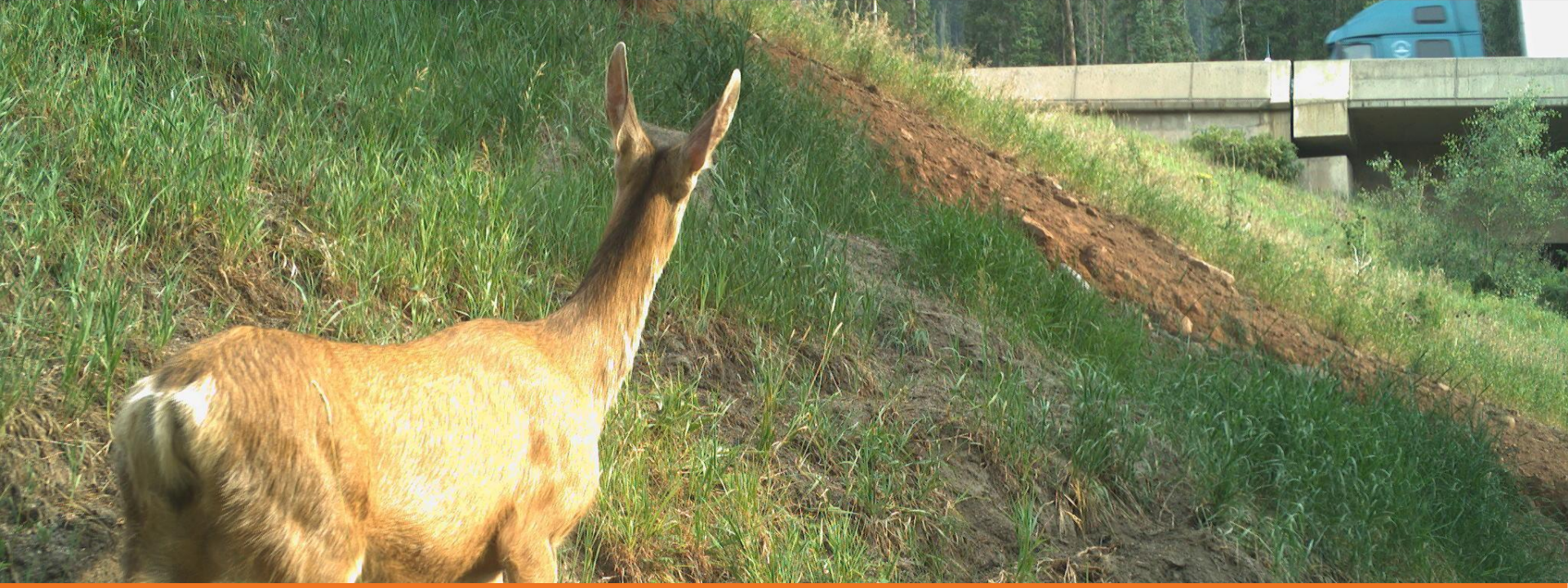
Kalli Wegren, PE, CFM
Project Manager, Region 4 CDOT
kalli.wegren@state.co.us

I-70, Utah & CDOT Region 3



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Department of Transportation

Use of Statistical Analysis When Sizing Wildlife Underpasses (for Large Mammals)

July 17, 2024

How do I size my wildlife underpass?

Wildlife Passages Sizes for Large Mammal Underpasses: Existing research

- **Stakeholders:** "you should just make it 80' wide" – Vail Pass Environmental Assessment
- Patricia Cramer: Kept shorter then 120', can be as low as 10', height is not as important, can get 80% success (one study didn't have wildlife fence…)
- Reed: Muddy Springs 10'x10'x100'…. 61% effective (but deer are frightened as they exit)
- Tony Clevenger: Banff Study averaged 76.4% success rate @187.6' L x 23.8' W x 11.8' H
- Bill Ruediger: 10'-12'h x 20'-23'w (or bigger, length?)
- FHWA Crossing Handbook: min: 23'w x 13't recommended: 32'w x 13't (bigger is better)
- Julia Kintsch SH 9: overall 96% success rate 42'w x 14't x 66'l

Nothing definitive, but all generally agree that the shorter and wider, the better.

What about length?

Concept of openness ratio?

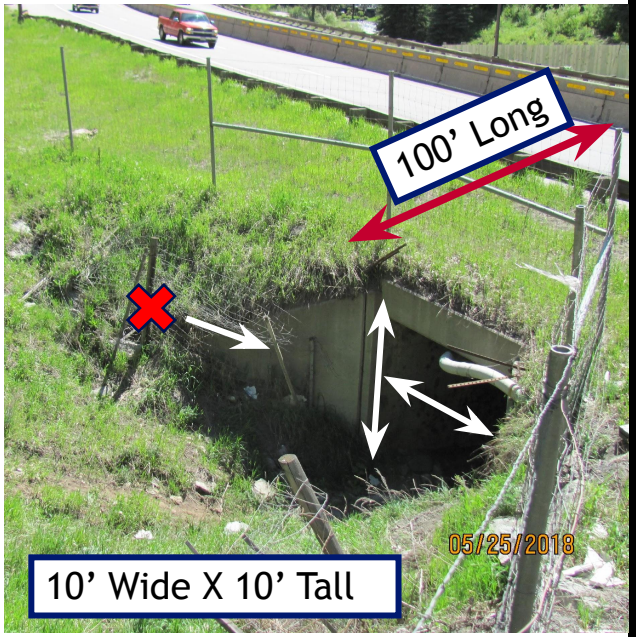
"height" x "width" divided by "length" – not reliable index*

Openness Ratio? Questionable*

*Publication No. FHWA-CFL/TD-11-003 March 2011

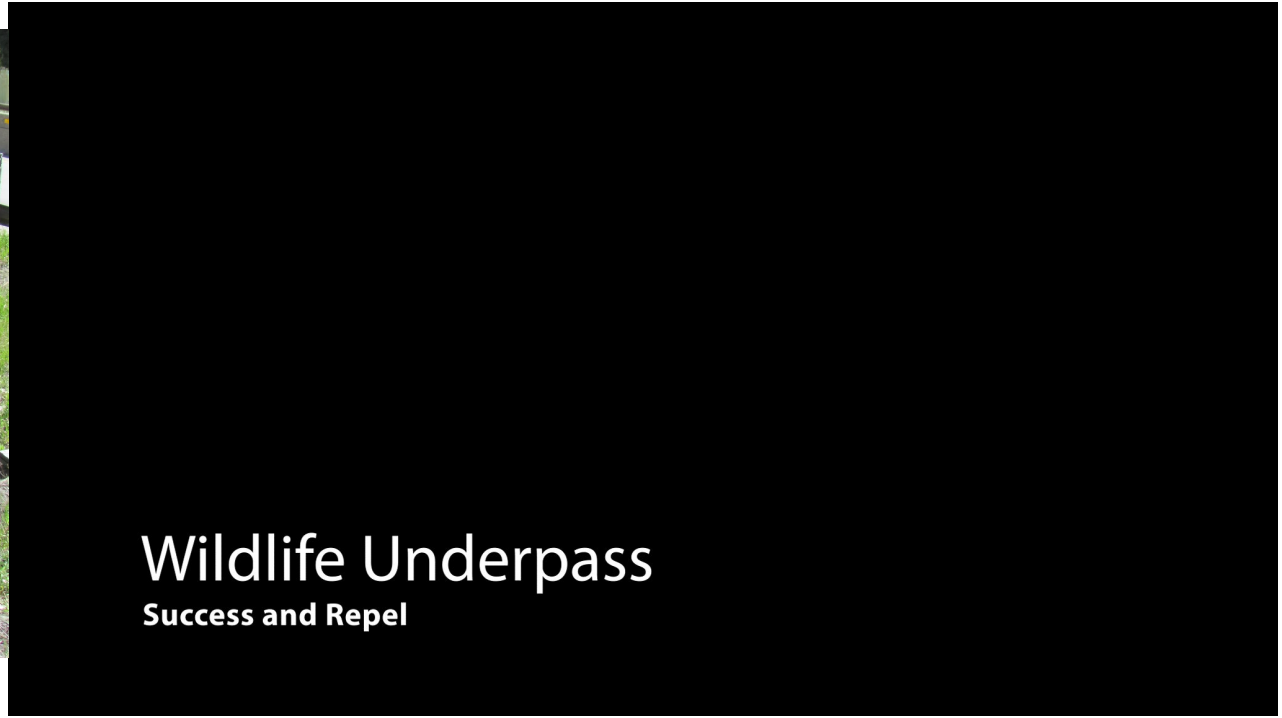
Measuring Success Rates

Muddy Springs Wildlife Underpass, Vail CO



= Camera Location

Wildlife Underpasses effectiveness can be measured



What if the wildlife never show up?

Measuring Success Rates (from video)

Combining Multiple Success Rates

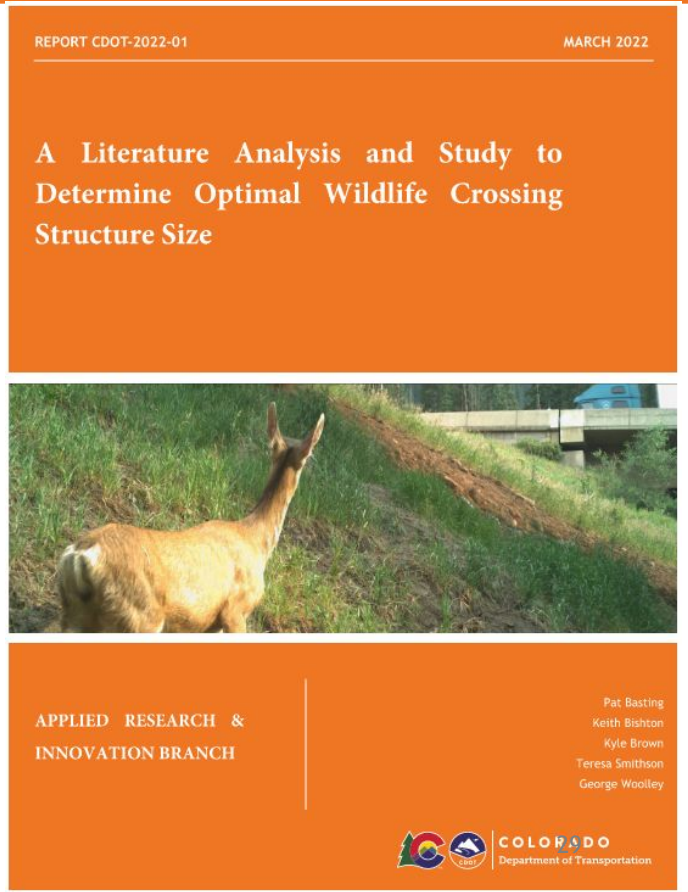
Hypothesis [paraphrased]: Can success rates of wildlife underpasses be predicted using “length” x “width” x “height”?

Combine results from 16 different studies:

Species	Animal Count	Percent of Total Animal Count	Number of Underpasses Used by Each Species
Deer	270,020	98.5%	75
Elk	3,810	1.4%	33
Bighorn Sheep & Pronghorn	127	>0.1%	5
Lynx	6	>0.1%	5
Moose	68	>0.1%	5
Wild Horse	unknown	-	3

Average Results of all studies:
Success Rate = 65%
Length = 138’
Width = 46’
Height = 14’

https://www.codot.gov/programs/research/pdfs/2022/2022

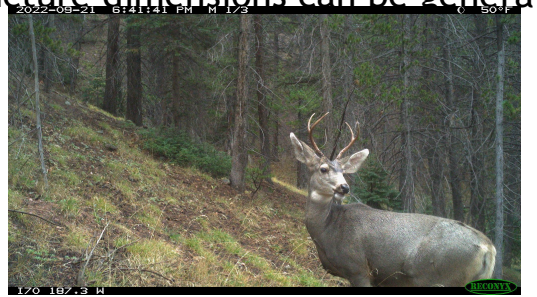


Valid Study Results

Inform on Sizes: This Study's results, using regression modeling, may inform development and sizing of highway wildlife passages relative to defining success criteria for larger wildlife and reducing wildlife-related vehicle collisions across Colorado.

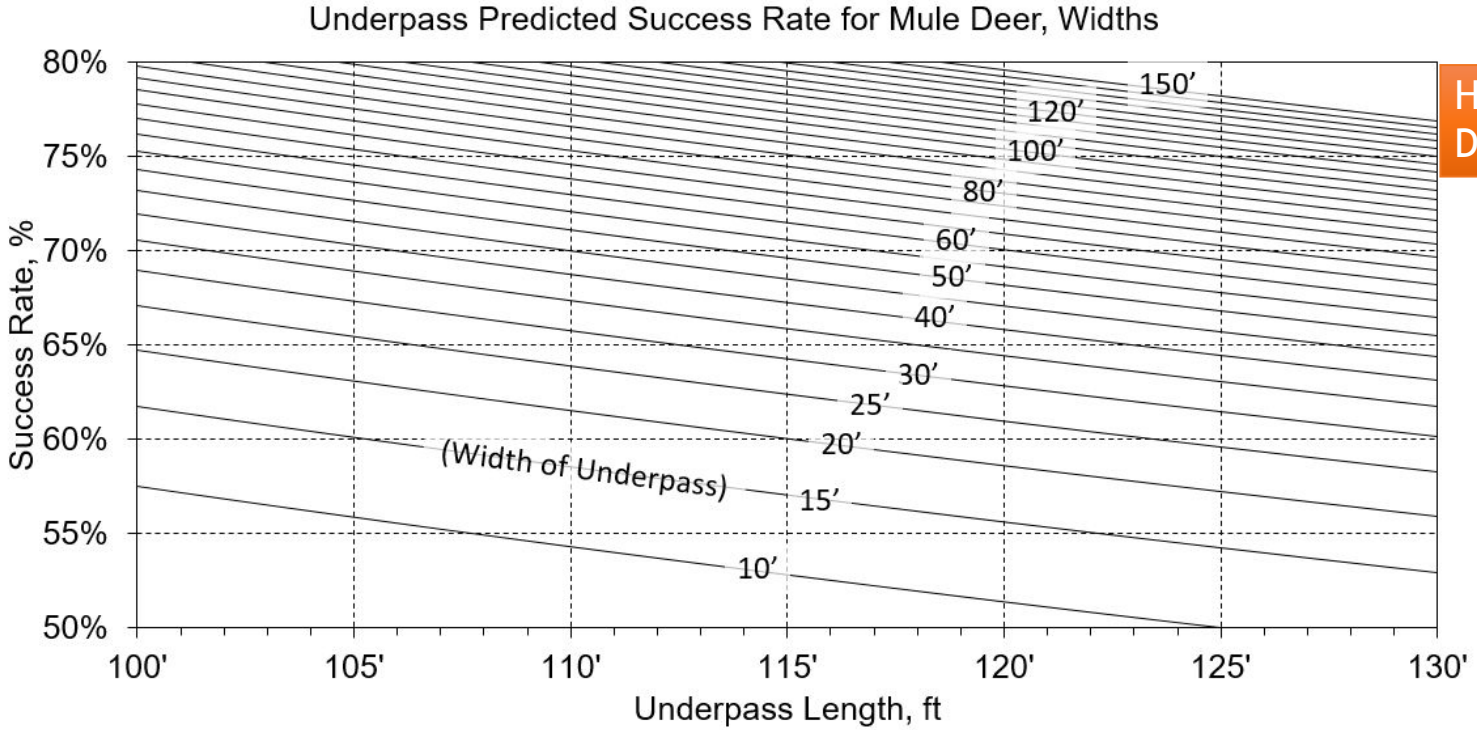
Modeling is Valid of (L)x(W)x(H): The results indicate that, given a statistically valid sample size, modeling can be done to determine which structure dimensions (length, width, and height) most strongly influence a species' (such as mule deer) success rate through wildlife underpass crossing structures.

Predictable Success Rates: Given this analysis, modeling to predict success rates for a given species and a range of structure dimensions can be generated.



Model 4 Study Results: Deer Underpasses

MODEL 4: UNDERPASS PREDICTED SUCCESS RATES FOR MULE DEER



Height?
Diminishing Return?

Model 4 Results: Deer Success Rate = 188.528 - (33.663*ln(length)) + (10.428*ln(width))

Real World Practical Application

REAL WORLD PRACTICAL APPLICATION SAVES MONEY $$$

Model 4 for mule deer was used to assist in sizing a wildlife underpass on Vail Pass I-70 Colorado, resulting in a **$1.7M+** savings. Final underpass was more efficient (higher success rate) than original dimensions.

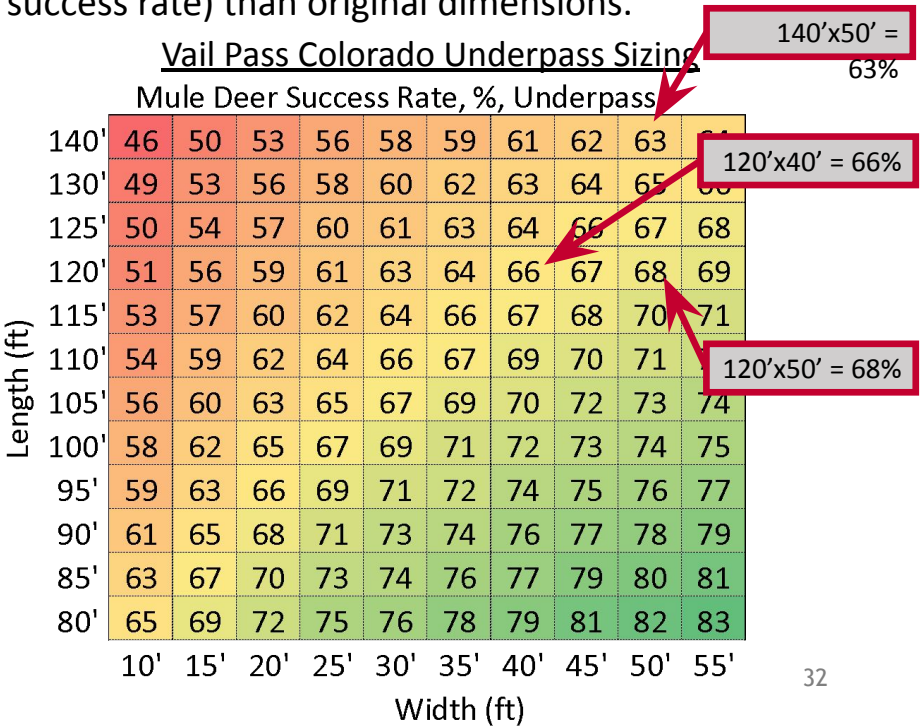
Model was just a part of the evaluation:

1) FHWA Guidance in sizing wildlife underpasses
2) Similar sizes used successfully elsewhere in Colorado
3) The Statistical Model
4) Camera traps
   - Developed Wildlife Movement in Corridor
   - Determined Target Species to be Mule Deer
   - (Elk prefer different crossing location)
5) Cost Savings to Project ($1.7M Total)

Original Dimensions: 140’x50’x14’ – 63% Success Rate

Final: 120’x40’x13’ – 66% Success Rate @ $10.4M

(120’x50’x14’ would be a 68% Success Rate)



COLORADO
Department of Transpo

Thank you for your time!

If the underpass is 10’ wider there’s only a 2% additional chance I will use it!

Questions?

John W. Kronholm, PE

John.Kronholm@state.co.us
(970) 306-5395

Remote Control Skid Steer and Box Culvert Drainage Maintenance

Keeping water under our roads and not over them

Mark Kilian
ADOT Highway Operations Maintenance Supervisor
Avondale Yard

What are some of the issues we face with Box Culverts?

Historical Cleaning Options

Air replacement system required

High noise levels

Extensive confined space training

Potential for Life saving operation within confined space

Claustrophobic conditions / Anxiety

Historical Cleaning Options

Expensive!

- Hiring of Contractor
- High amounts of water needed
- Slow process / Extended working time
- Traffic control needed at times
- Dump site needed for wet material
- Travel time to dump site

Historical Cleaning Options

Difficult!

- Significant room needed on each side
- Multiple large pieces of equipment
- Precise teamwork
- Have to get cable/chain through box somehow
- Not feasible for Box Culverts with bends

Historical Cleaning Options

What the H***?

Your not serious!

I QUIT!!

ADOT's Answer to Box Culvert Maintenance

Lifting capacity	2000 lbs
Max travel speed (high range)	9.2 mph
Operating weight	4920 lbs
Height on Stock wheels	43.375”
Height on Tracks	44”
Standard bucket size	62”

Operation of Skid Steer with State of the Art Technology

Before and After

Before and After

Before and After

Before and After

Before and After

Safety Benefits

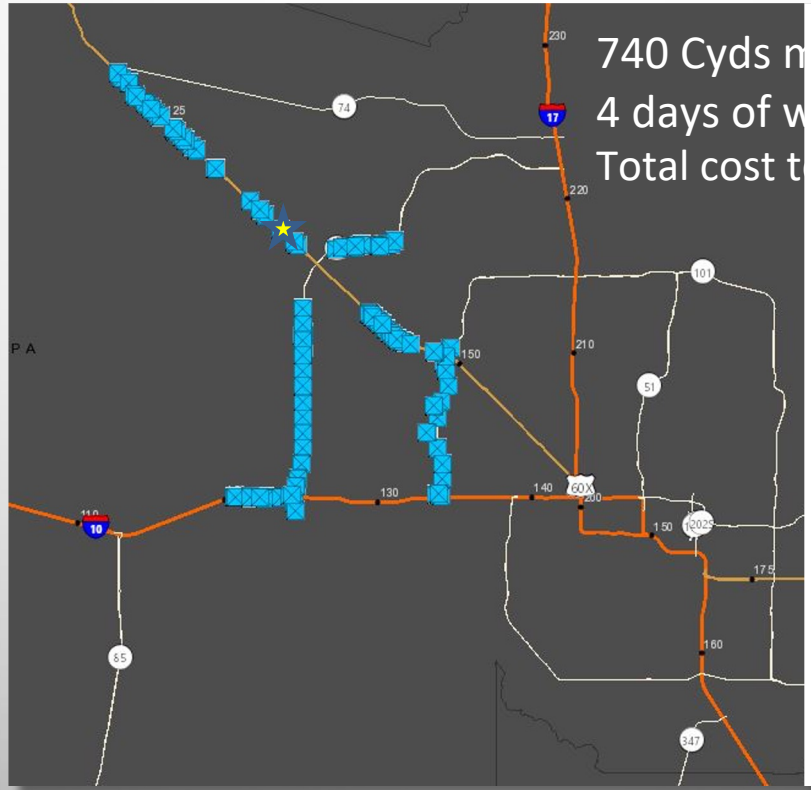
No human working in the Box Culvert

Noise level minimized

No respiratory equipment needed

No life saving situations

Limited physical labor

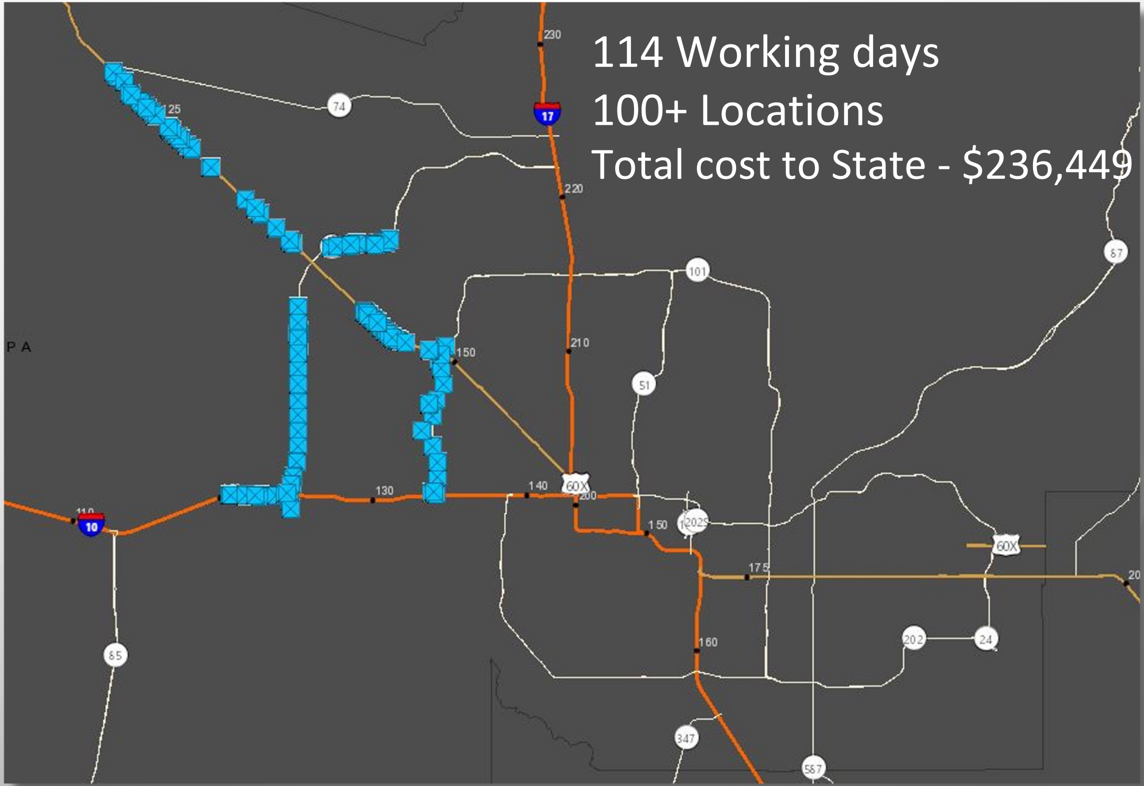


Scope of Work: 4 barrel box culvert (2) 75% full & (2) 25% full. Box culver size is considered to be 10'.5" x 4' x 210' each.

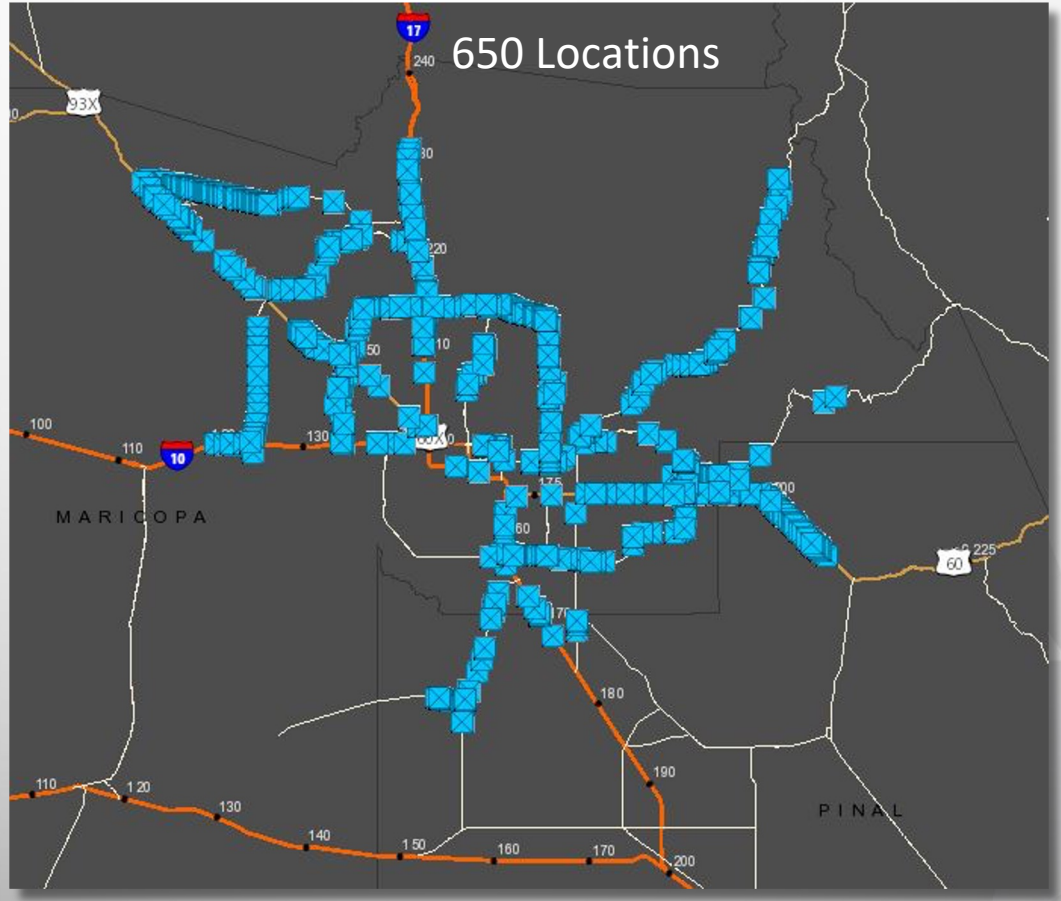
estimates that scope of work can be completed in (63) working days.

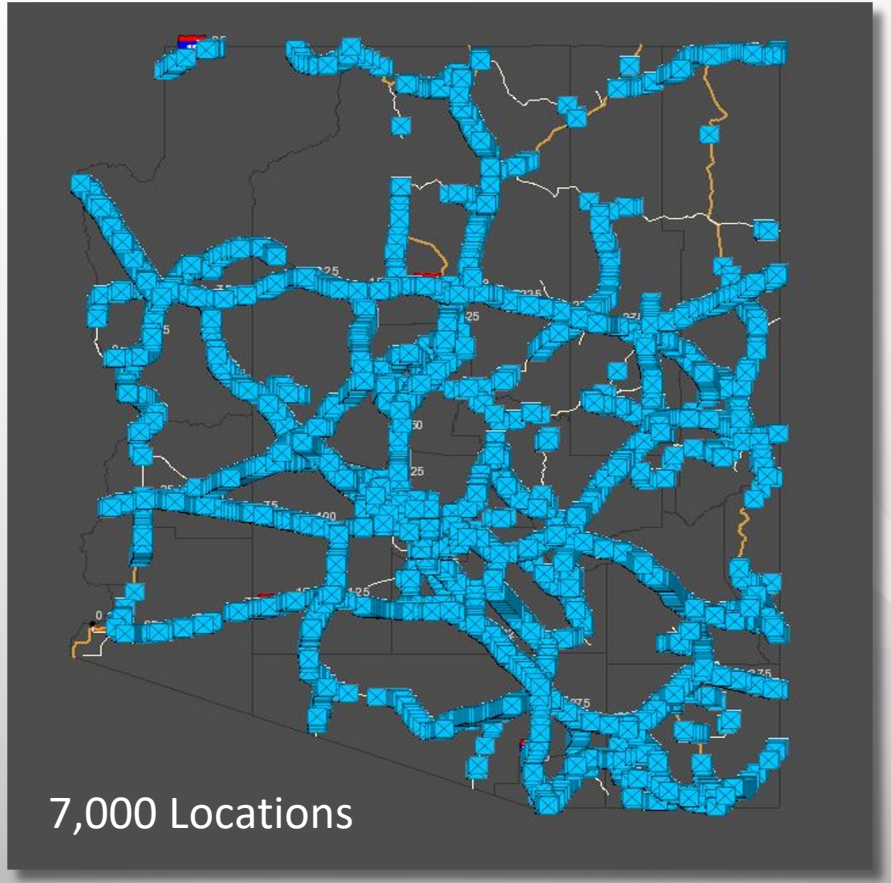
DESCRIPTION	UNIT COST
Hourly Rate $253.00 (882hrs)	$223,146.00
Out of Scope Work (debris greater than 6" in diameter or hard dig areas are considered to be out of scope and will be at additional hourly rate of $253.00.)	$253.00 per hour
Double time Rate	N/A
Travel Charges – MOB or DEMOB (21mi one-way at $3.10 per mile.)	$4,882.50
Water Per Load	Client will provide water
Material Off Loading Fees per Load (109 loads $70.00 per load)	$7,630.00
Coil Heater Charge for Heated Water	N/A
Additional Labor	N/A
Remote Hose per Foot (250' of 6" remote)	No Charge
Per Diem	N/A
Hourly Rate for Chase Truck	N/A
Third Party Services	N/A
Fluctuating Fuel Recovery Fee	N/A

Estimated Total: $235,658.50



114 Working days
100+ Locations
Total cost to State - $236,449


650 Locations
17
240
93X
220
50
10
100
110
10
130
MARICOPA
60
225
180
190
110
120
130
140
150
160
170
200
PINAL


7,000 Locations

Moving Forward

ADOT Central District has purchased second machine to assist with demand

Rental company in Arizona has purchased numerous machines to assist with the demand Statewide for this need

Foreign manufacturer continues to grow output and increase reliability as demand Nationwide and Globally is significantly rising

This new innovative process will bring high cost savings annually for years to come and will ensure our Box Culverts are maintained to the highest levels of reliability

Thank you!

Panel Q&A

Moderated by Gary Vansuch

Colorado DOT

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- TPM Webinar #24 - Best of the Annual Joint Conference, October 2024
- TPM Webinar #25 - Driving Equitable Transportation Outcomes, November 20, 2024
- AASHTO CPBM/TPM TSP Quarterly Meeting (virtual), CEO Roundtable, December 5, 2024

Webinars Typically Begin at 2:00 PM Eastern Time

Federal Highway Administration

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