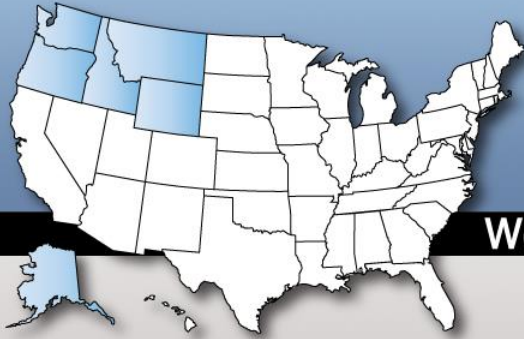


Unstable Slope Management Program for FLMAs

Western Federal Lands



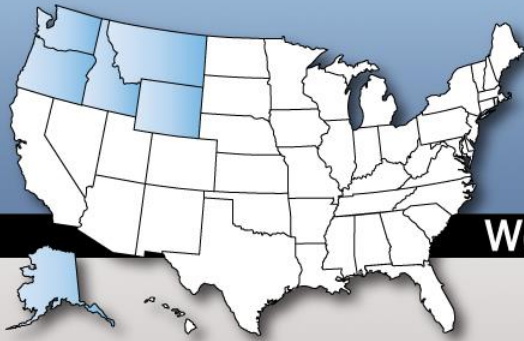
Presented by: Nicholas J. Farny, LEG, LG
FHWA - WFL - Engineering Geologist

Eric Bilderback, PhD, LG
NPS - Geomorphologist



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Federal Highway Administration





Project Conducted by:

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Principal Investigators



FLMA Stakeholders



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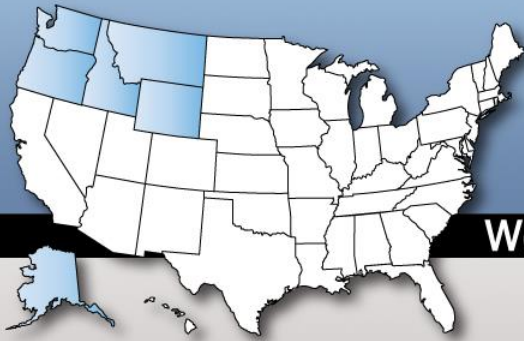


Overview of USMP for FLMAs

Western Federal Lands

- Slope rating system that can be applied to landslides, rockfall, and thaw-unstable slopes. The USMP utilizes existing, proven unstable slope systems (RHRS, WSDOT USMS, ADOT&PF USMP).
- Includes low to very low AADT's and has a rural context for hazard and risk ratings.
- Rates slopes (landslides, rockfall, and thaw-unstable slopes) based on site information, slope hazard, and risk. The higher the score, the higher the hazard/risk.
- Allows for Federal Land Management Agencies to proactively manage unstable slopes on roads and trails.
- Provides both a condition survey tool of unstable slopes and methods to monitor and track deterioration to effectively schedule beneficial, prioritized, preventative maintenance.
- Data can be collected by personnel with minimal training or experience





USMP Website

Western Federal Lands

Unstable Slope Management Program^{BETA}

For Federal Highway Administration Partners

[Map](#) [Slope Rating Form](#) [New Slope Event Form](#) [Maintenance Form](#) [QRA](#) [Account](#) [About](#) [Logout](#)

USMP Website: <http://usmp.info/client.php>

Username: level1@email.com

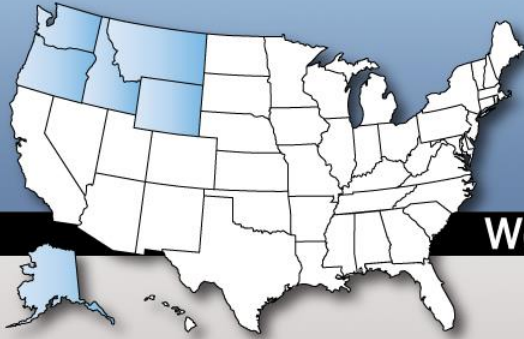
Password: level1





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USMP for FLMA Website Map Functionality



Western Federal Lands

- Shows an overview of rated sites
 - Landslides 
 - Rockfalls 
 - Color separates good, fair, and poor scores



Low score

High score

- Users can zoom and pan around to different management areas

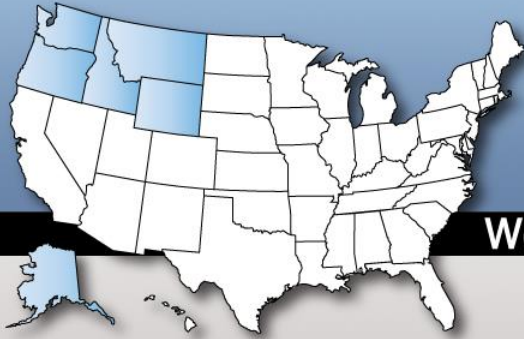
A screenshot of the USMP for FLMA Website Map Functionality. The page title is "Stable Slope Management Program". The navigation menu includes "Map", "Slope Rating Form", "New Slope Event Form", "Maintenance Form", "QRA", "Account", and "Logout". The map shows a series of rated sites along a road, with a legend indicating the rating and type of event. The legend includes: Rockfall-Good (green), Rockfall-Fair (yellow), Rockfall-Poor (red), Landslide-Good (green), Landslide-Fair (yellow), Landslide-Poor (red), Preliminary rating fair to poor (yellow circle), and Preliminary rating Good (green circle). The map also shows various geographical features like Icicle Ridge, Leavenworth Ski Hill, and Stuart And Colchuck Lake Trailheads.



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NPS Current Usage



Western Federal Lands

- DENA, ZION, YOSE, YELL, GRSM, OLYM, COLM, TICA, CORO, and CHIR have significant slope rating work completed (tens to hundreds of slopes)
- Over 2,200 total slopes rated in NPS units representing over 1,800 hrs of work.
- DENA and CRLA are using USMP data for programming risk reduction work.
- ZION received a FHWA authored conceptual design and cost estimate report for highly rated slopes in early FY21.
- BLRI, MORA, and LAVO, are all planning for corridor slope rating work in the future.



Why are National Parks using the USMP?

Western Federal Lands

- Unstable slope events are expensive and disruptive (3-5 times more expensive as an emergency, than planned mitigation)
- Move toward cost effective proactive management away from expensive reactive practices.
- Condition assessment and inventory work is cost effective with temporary workforce, thanks to USMP features.
- Standardized rating systems across park units allow for project prioritization.
- Current and future USMP evaluated corridors can add value and risk reduction to Great American Outdoors Act transportation projects.



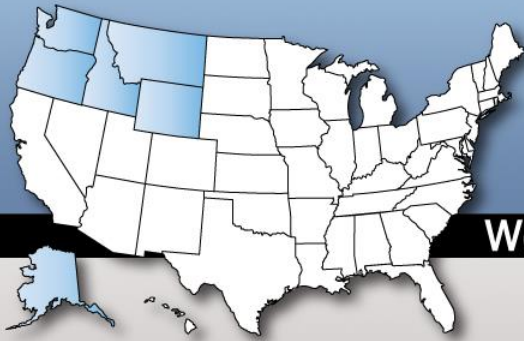
Broad alignment with NPS policies



Western Federal Lands

- Parks strive “to devise effective geologic hazard identification and management strategies”
- Parks “should strive to minimize the frequency and severity of visitor incidents by developing a range of appropriate prevention strategies and implementing risk reduction mitigation plans.”
- Aligns with NPS National Long Range Transportation Plan Goals and Objectives, specifically, asset management, transportation finance, and, safety.





Denali NP Example

Western Federal Lands

- 92 mile Denali Park Road
- Significant Park Asset
- 141 USMP sites rated
- Ratings done by term employees
- Ratings range from 164 to 948 with a mean value of 328.
- Top 2 highest rated slopes are currently being designed for mitigation / risk reduction by FHWA

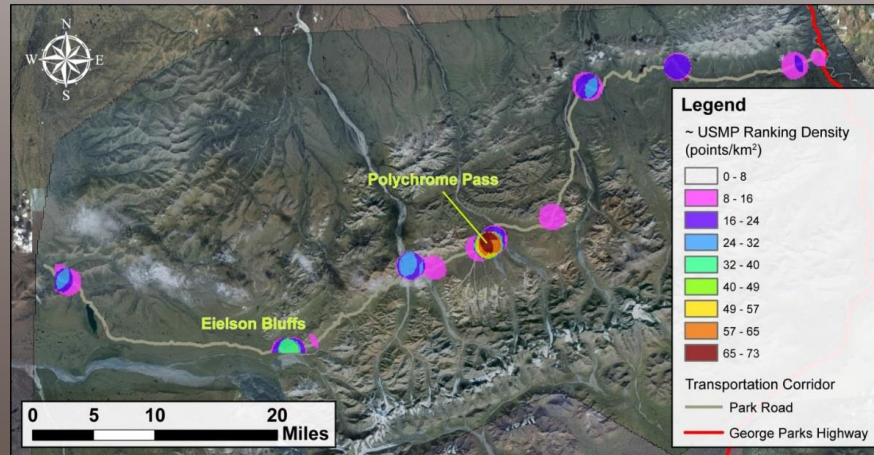
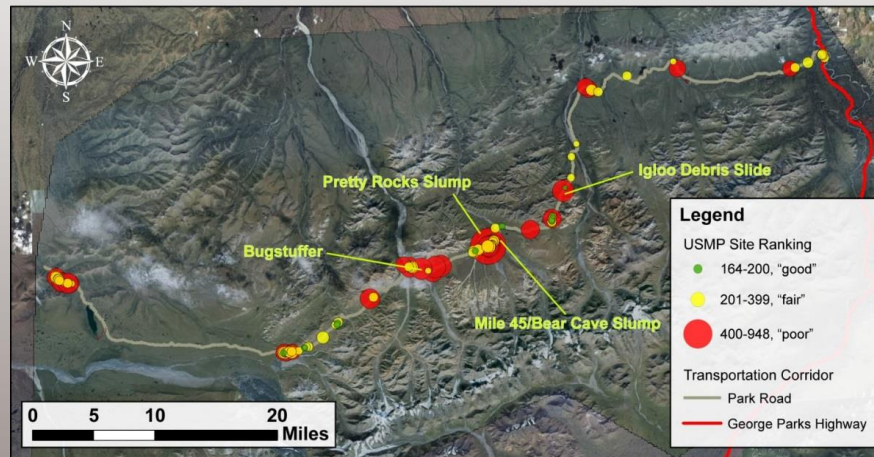
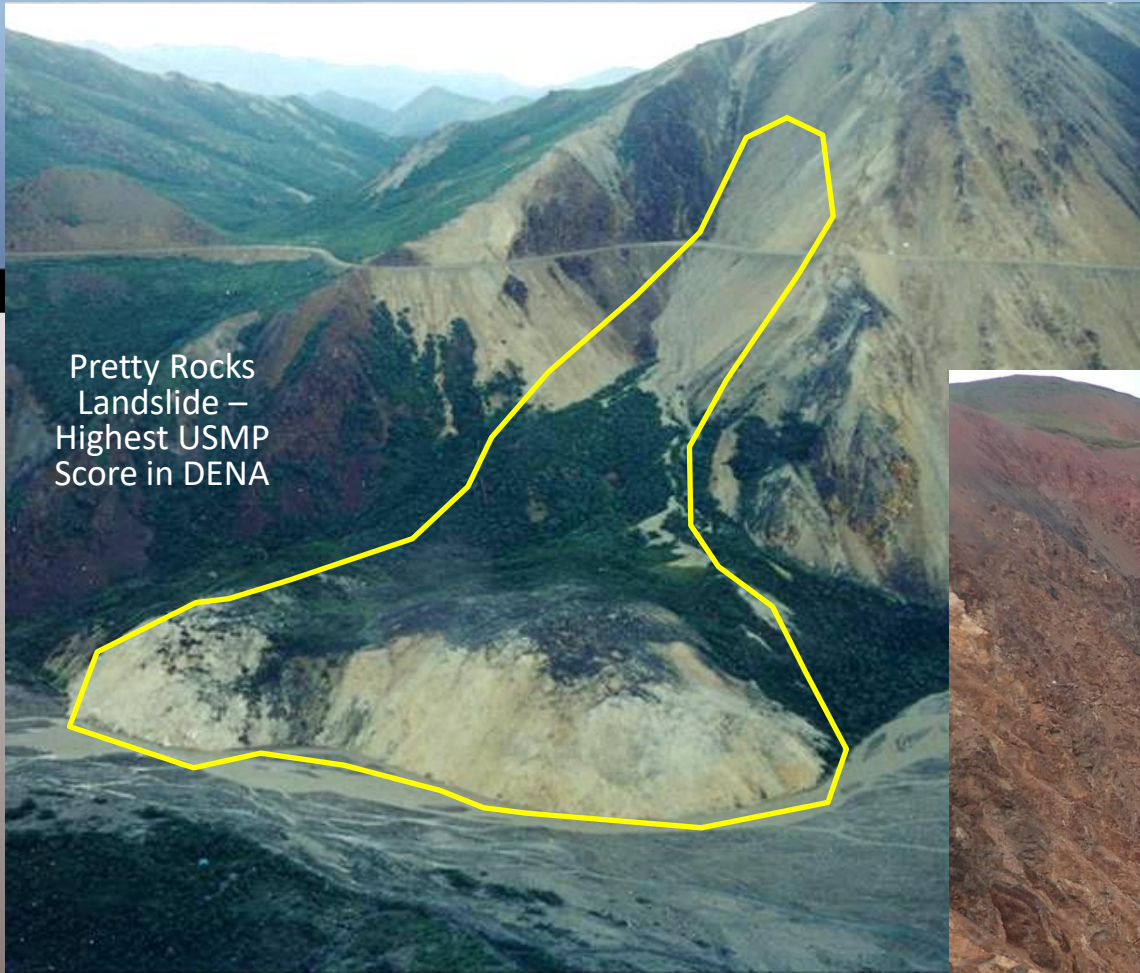


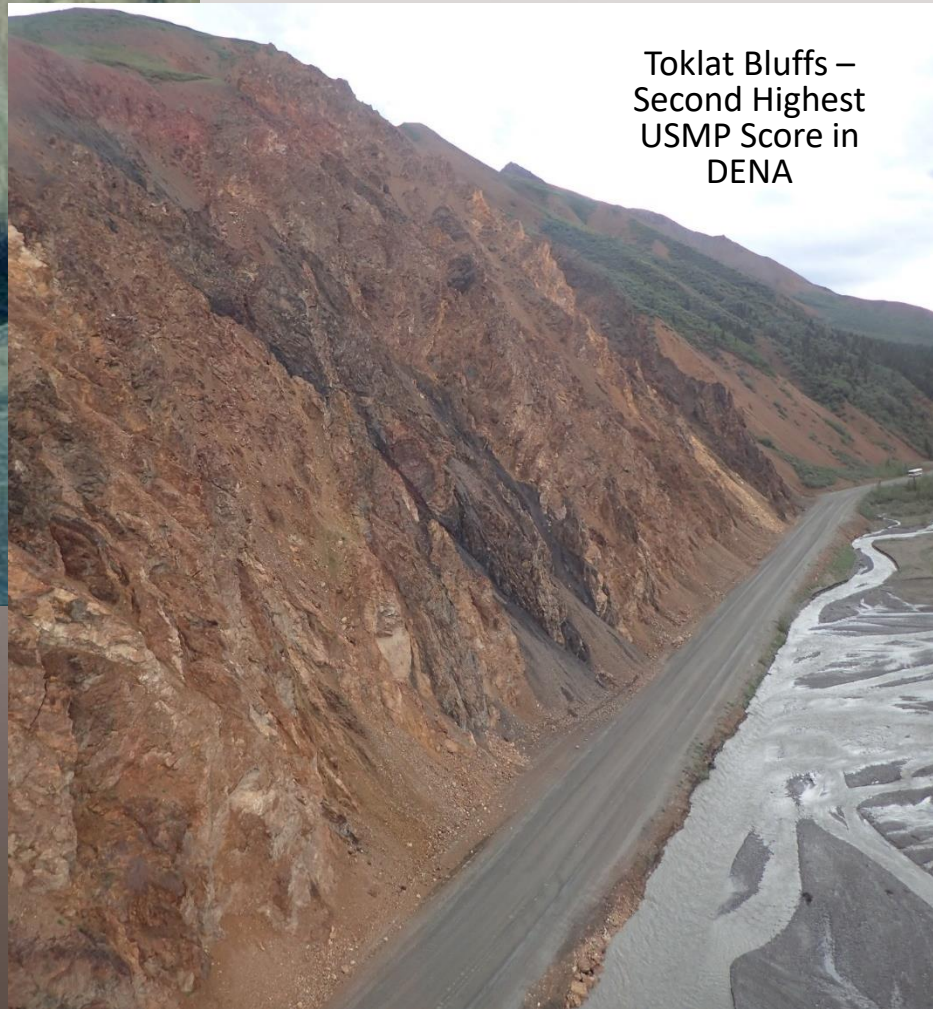
Figure Credit
Russell Rosenberg,
M.Sc. Physical Science
Technician (Geologic
Hazards)

Denny Capps, Ph.D.
Park Geologist

Heather Rogers, M.Sc.
Physical Science
Technician (Geologic
Hazards)



Pretty Rocks
Landslide –
Highest USMP
Score in DENA



Toklat Bluffs –
Second Highest
USMP Score in
DENA

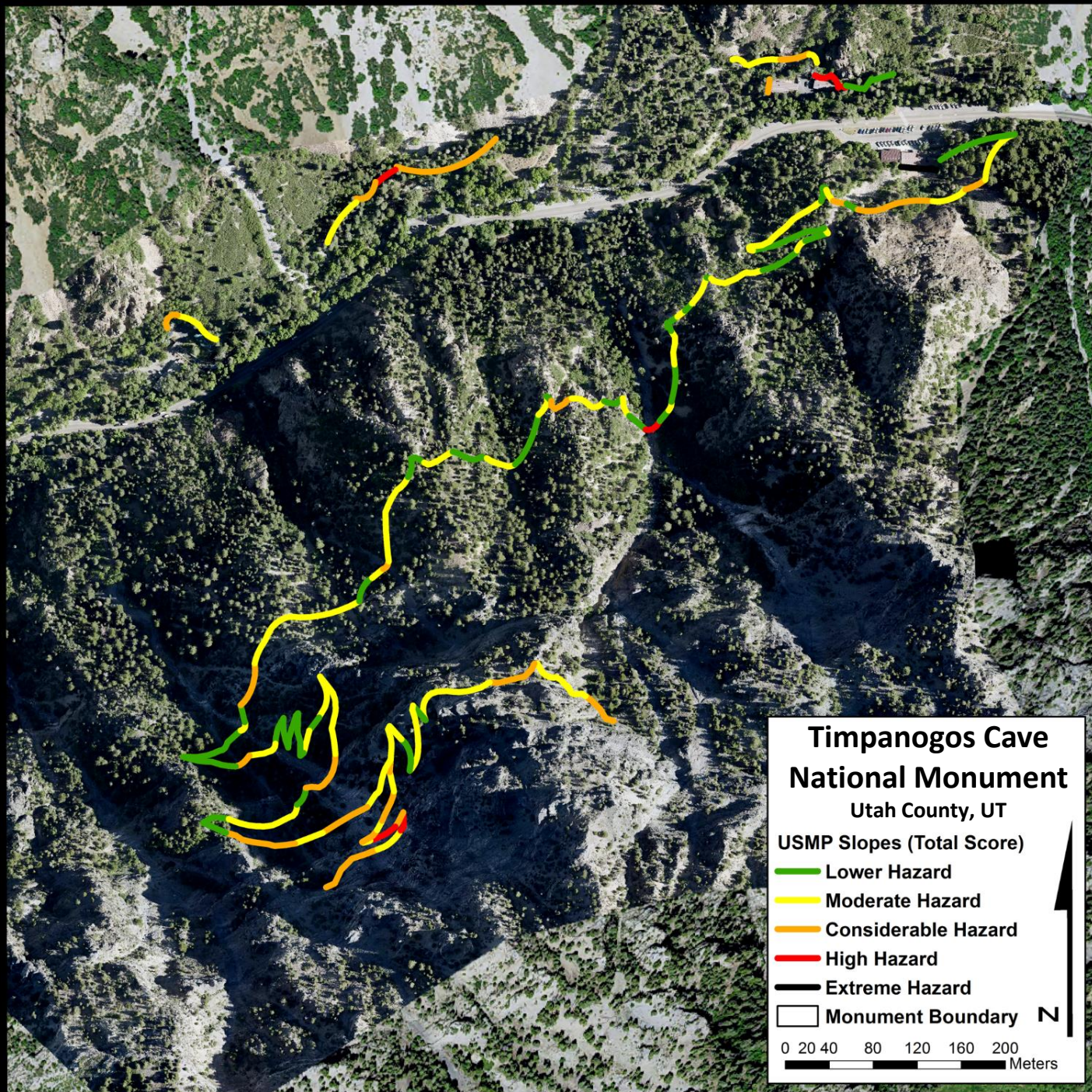


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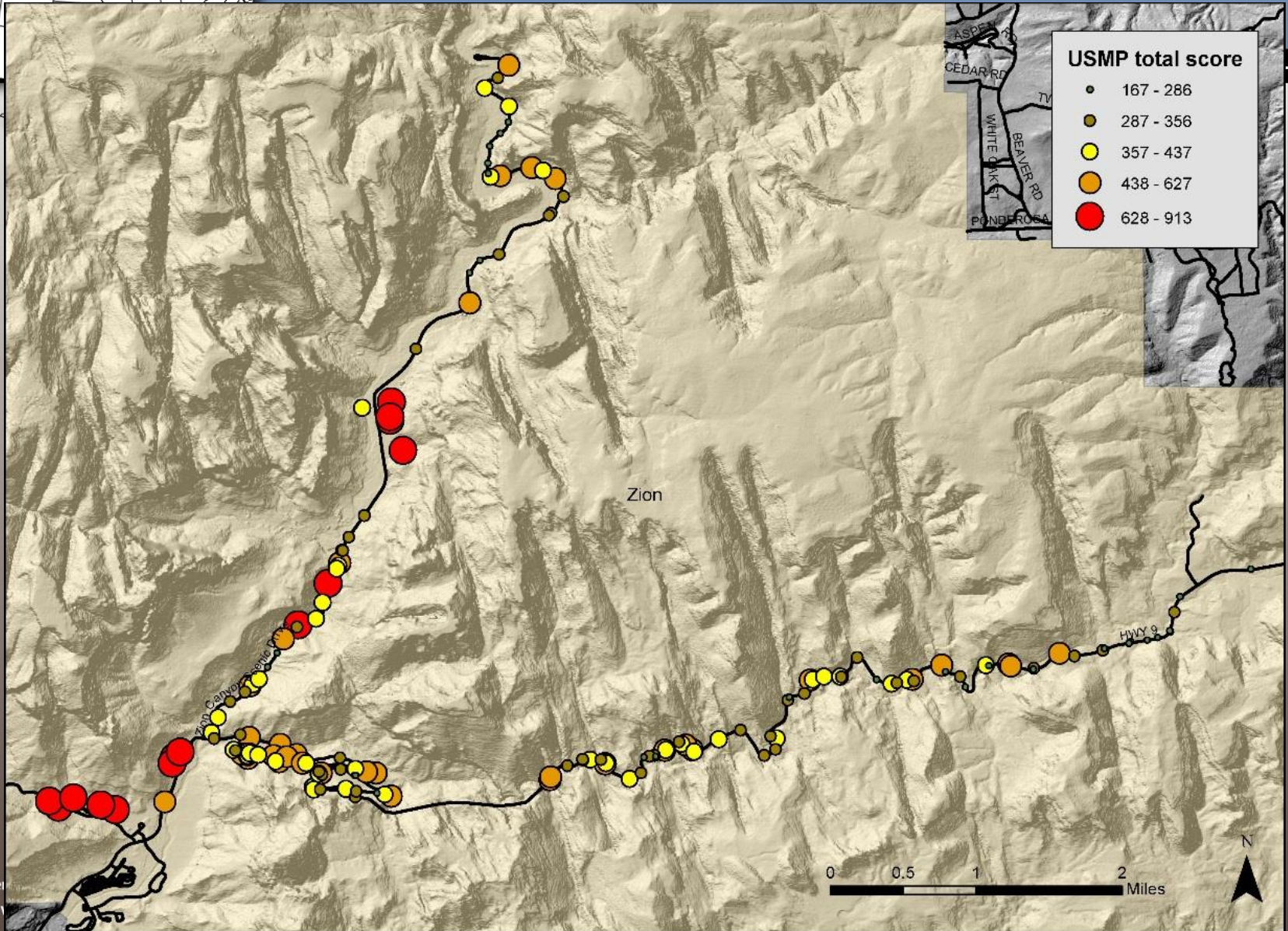
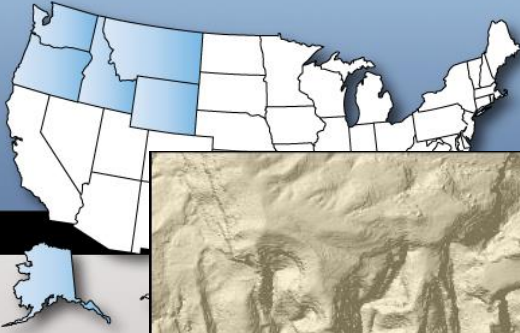




TICA



Zion Canyon & Mount Carmel Highway





FHWA – WFL use of USMP

Western Federal Lands

- Standardized ratings across a roadway or corridor aids in highlighting areas of relatively high risk due to unstable slopes.
- Provides client with a decision making tool = unstable slope prioritization with the USMP combined with cost estimates for risk reduction / mitigation provides a way to proactively ask for funds.
- Provides estimates of work needed in order to facilitate environmental permitting.
- USMP ratings used to demonstrate proactive management of unstable slopes.



CRLA Cleetwood Cove Trail Example



- Rated by FHWA in 2017; CRLA to use USMP ratings to 1) Aid in planning - NEPA for rock work 2) Demonstrate positive decision making 3) Provide pathways for funding requests
- In 2018, USMP ratings used to prioritize slopes for scaling prior to full rehabilitation



LEGEND

Slope Ide

Mil

USMP Pr

Roc



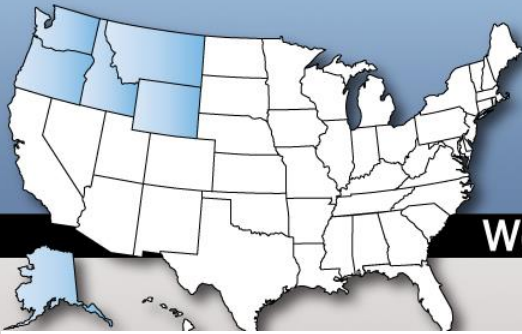
Okanagan-Wenatchee (USFS) Icicle Creek Road Example

- Rated by FHWA in 2017 for planning effort - USFS wanted to use the USMP and estimated costs to compete for FLTP project funds
- In 2019, USFS was awarded FTLP funds for unstable slope work based on USMP ratings – now in design at FHWA



Federal Highway Administration

OLYM Spruce Railroad Trail Seg. B Example



Western Feder

- 1.8 mile long trail segment
- Previously evaluated by Shannon & Wilson (S&W) using USMP
- Project delivery effort - OLYM wanted to use WFLHD to develop conceptual designs for full mitigation of top rated slopes
- 4 slopes selected by OLYM for risk reduction / mitigation
- Construction completed in 2020



Google earth
© 2018 Google





The Future of the USMP and Questions

Western Federal Lands



Website and App:

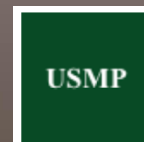
<https://usmp.info/client/map.php>

Username:

level1@email.com

Password:

level1



USMP
Prashanta Saha

★★★★★ FREE



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