



Navigating Rural Safety

Mid-Colonial District ITE Annual Meeting

April 25, 2025

1

Navigating Rural Safety



Urban vs. Rural



Rural Concerns



Solutions



Next Steps

Mead & Hunt

2

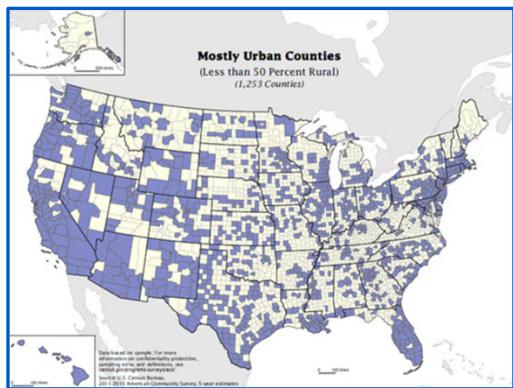
Get Ready to Shift Gears!



Donna Hardy, PE, RSP 1

3

Why Does Rural Safety Matter to MCDITE?



What MCDITE Area is considered rural?

- 75% of Pennsylvania
- 75% of Maryland
- 64% of West Virginia
- 58% of Central & South New Jersey
- 37% of Delaware
- 0% of Washington DC

20% of Americans live in rural areas but 68% of our roadways are classified as rural

40% of all highway fatalities occur on rural roads

Rural interstate volume grew 14% in from 2000-2022 but declined 3% in urban areas

4

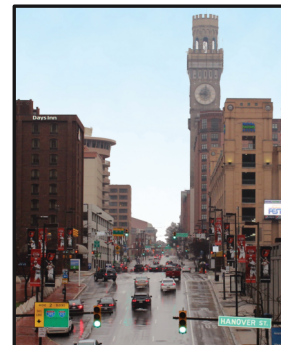
Urban vs Rural

5

Urban Safety

Characteristics of Urban Driving

- Planned Communities
- Grid Patterns
- Intersections
- Focused on the Destination
- Information Overload
- Short Burst of Driving
- Stopping/Starting



Urban Collisions

- Rear-End
- Angle
- T-Bone
- Pedestrian
- Bicyclist

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d. GOVERNMENT OF THE DISTRICT OF COLUMBIA
D.C. MURIEL BOWSER, MAYOR

6

Rural Safety

Characteristics of Rural Driving

- Remote Unplanned Settlements
- Roadway Geometry is Dictated by Contours
- Limited Intersections
- Focused on Journey
- No Information for Driver to Anticipate Issues
- Speeding



Rural Collisions

- Road Departure
- Single Vehicle
- High Speed Intersection



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Perception of Rural Safety

Rural Interstates/Expressways are the most dangerous routes

Site Conditions mimic testing conditions

Rural residents want their area to have urban characteristics

Focusing on intersection improvements only will improve safety of corridor

Rural DOTs aren't as sophisticated as Urban



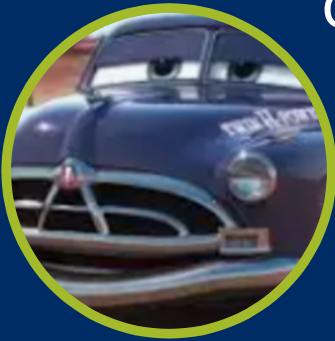
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8

“

You're not behind in life,
your journey is just
different

”



Doc Hudson - CARS

9



10

The Journey is as Memorable as the Destination

The Constraints of the Environment Play a Major Role:

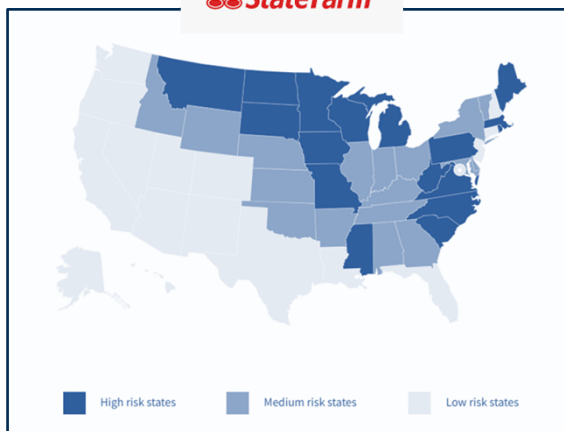
- Wildlife
- Weather
- Fog
- FEMA declared emergency
- Limited Power along rural routes
- Insufficient Sunlight to power solar devices
- Communication
- Lack of Detour Routes
- Limited Services

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11

Wildlife



Risk of Collision involving an Animal

Where are animal collisions most likely?

The top 10 states for animal collision, with their odds for an animal collision, are:

- 1 . West Virginia – 1 in 40
- 2 . Montana – 1 in 54
- 3 . Michigan – 1 in 59
- 4 . Pennsylvania – 1 in 61
- 5 . Wisconsin – 1 in 63
- 6 . Mississippi – 1 in 65
- 7 . Iowa – 1 in 68
- 8 . South Dakota – 1 in 69
- 9 . Virginia – 1 in 73
- 10 . Rhode Island – 1 in 75



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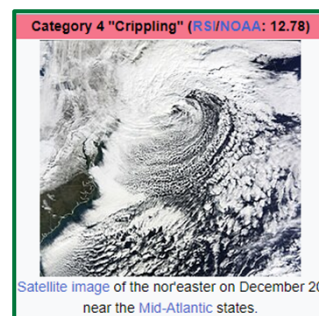
12

CC0

Weather – All 4 Seasons are Equally Dangerous

Case Study: December 2009 WV Turnpike

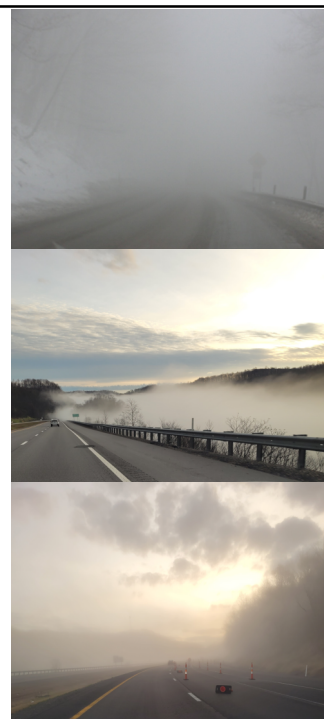
- 26" of Snow fell faster than predicted.
- Heavy Vehicle Crashes on WV Turnpike hindered snow removal.
- Thousands of motorists were stranded for up to 18 hours due to impassable roads.
- The interstate was closed for 15 hours.
- No communication
- No field devices
- No detours
- Permanent barrier down median with no breaks
- WVDOH dedicated resources to remedy deficiencies.

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Fog

- Upslope Fog – *Most Common in WV*
 - Occurs when moist air is forced up the side of the mountains by southeasterly wind.
- Valley Fog
 - Found in valleys when the soil is moist from rainfall. As the skies clear, the temperature cools forming the dense fog.
- Steam Fog
 - Occurs when cold air moves over warm water. It appears as wisps of smoke rising from the water's surface
- Ice Fog
 - Also called Freezing Fog. Is composed of ice crystals instead of water droplets.

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14

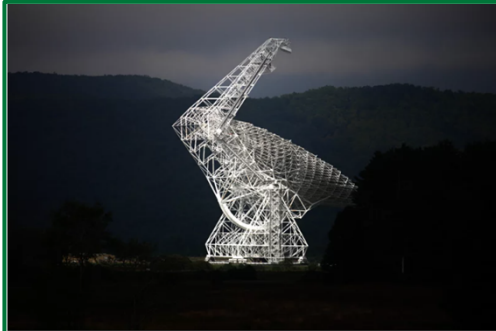
Slide 13

CCO Do you want to add that it occurred during Friday evening commute (it might be surprising to them that people commute from Beckley to Chas daily) and that our SHE was caught in it. Also, may be interesting to mention that the Greenbrier had a promotion where many were on their way to visit...perfect storm.

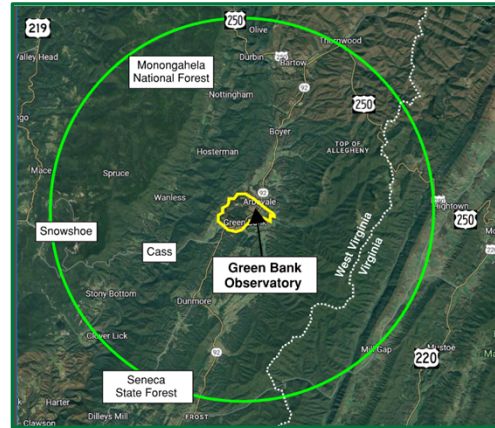
Cindy Cramer, 2025-04-21T11:25:59.612

Communication

The National Radio Quiet Zone was established by the FCC in 1958. It encompasses roughly 13,000 square miles near the border of West Virginia and Virginia.



The Green Bank telescope is the largest fully steerable radio telescope in the world.
John W. Poole/NPR



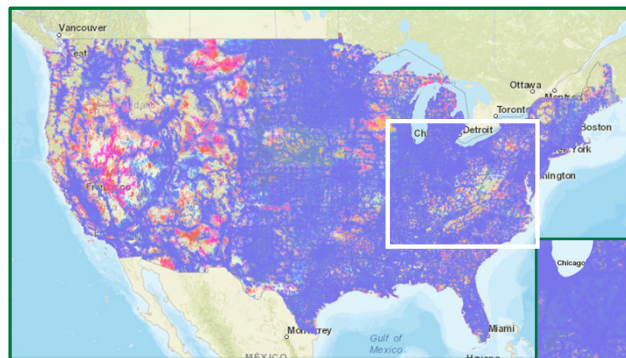
NRQZ is protected by Federal and State Codes. No wireless communication is allowed within a 10-mile radius to avoid electromagnetic interference.

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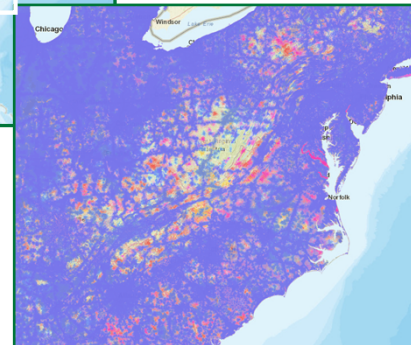
15

FCC Coverage Map

AT&T Mobility LTE Data
AT&T Mobility LTE Voice
T-Mobile LTE Data
T-Mobile LTE Voice
UScellular LTE Data
UScellular LTE Voice
Verizon LTE Data
Verizon LTE Voice



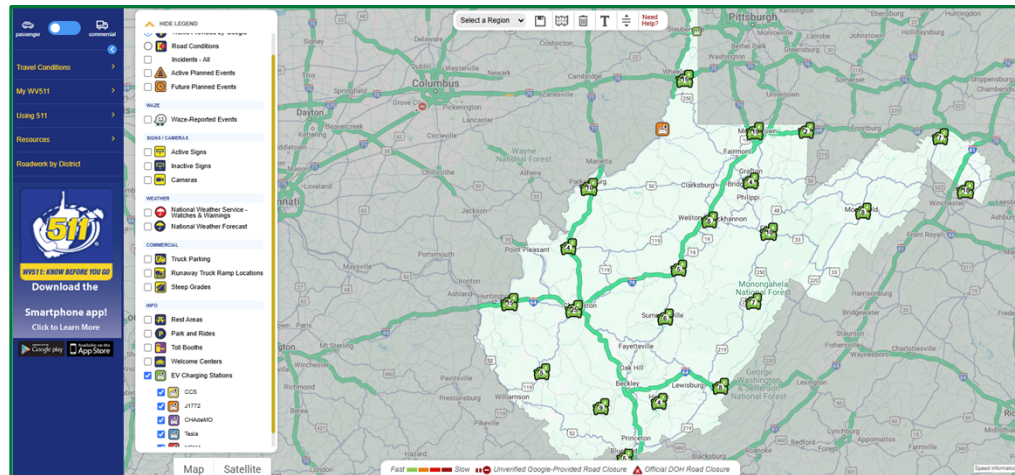
90% cell edge probability, 50% cell loading factor, maximum resolution of 100 meters



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16

Available Charging Stations for EV



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17

Solutions

18

Low Tech Solutions

- Wide Stripes/Visible Signs
- Height Detection System (DE - Clankers)
- Rumble Strips/Stripes
- Windssocks as a visual indicator wind conditions for high-sided vehicles
- Lighting at Intersections/Interchanges
- Permanent Signed Detour Routes
- Communication
 - Low Band (Radios between 1st Responders)
 - Early Communication before entering area



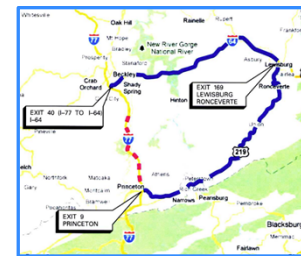
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19

Go the EXTRA Mile

WV Turnpike Permanent Detours

- Detour A: I-77 Between MP 59-48
 - Detour Length: 130 miles
 - Detour Time: **2 hours 15 min**
- Detour B: I-77 Between MP 96-85
 - Detour Length: 10 miles
 - Detour Time: 13 min
- Detour C: I-77 Between MP 48-40
 - Detour Length: 12 miles
 - Detour Time: 18 min
- Detour D: I-77 Between MP 40-28
 - Detour Length: 18 miles
 - Detour Time: 21 min
- Detour E: I-77 Between MP 40-9
 - Detour Length: 112 miles
 - Detour Time: **2 hours 5 min**

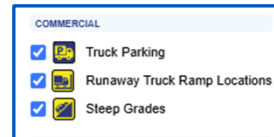


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20

High Tech Solutions

- Over Height Detection Systems
- Intersection Conflict Warning Systems
- Fog Alert Systems
- Truck Parking/Monitoring
- Steep Grade Alerts
- Runaway Truck Ramp Alerts
- In Vehicle Communication
- Restricted Crossing U-Turn (R-Cut)



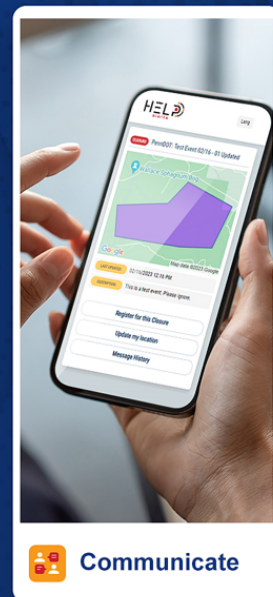
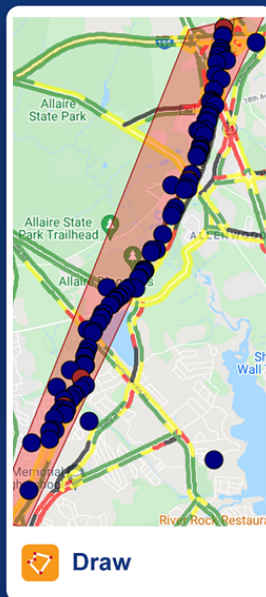
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21

HELP
alerts

How does it work?

1. Draw
2. Alert
3. Communicate



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22



THANK YOU!

Donna J. Hardy, PE, RSP 1