RURAL SAFETY EVALUATION PROGRAM IN THE STATE OF WYOMING

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Funding

- WYDOT research Committee
- Mountain-Plains Consortium (MPC)

Project Objectives:

- The main objective of this study is to develop and evaluate transportation safety techniques that can help Local Wyoming agencies in reducing crashes and fatalities on rural roads state wide.

How can we eliminate this kind of Crashes?

Wyoming 2005 Crash Statistics

- Total Traffic Crashes - 15,882 (43.5 crashes per day)
- Fatal - 147 (1 Fatal crash in 2.5 days)
- Injury - 3,977
- Property Damage Only - 11,758
- Total average crash cost = $ 416,728,600

Rural Roads

Length in miles

Principal Arterial – Interstate	827
Principal arterial –Other	1984
Minor Arterial	1069
Major Collector	2043
Minor Collector	252
Local	282

Facts on Rural Roads

- **More than half - 52 percent - of traffic fatalities in the United States between 1999 and 2003 have occurred on rural, non-Interstate roads and highways, even though vehicle travel on these roads only accounted for 28 percent of travel during that period.**

Facts on Rural Roads

- **The traffic fatality rate on non-Interstate rural roads in 2003 was *2.72* deaths for every 100 million vehicle miles of travel, compared to a traffic fatality rate on all other roads in 2003 of *0.99* deaths per 100 million vehicle miles of travel.**

Facts on Rural Roads

- **Rural roads are more likely than urban roads to have two-lanes, and to have poor roadway design, including narrow lanes, limited shoulders, sharp curves, exposed hazards, pavement drop-offs, steep slopes and limited clear zones along roadsides.**

Rural Roads Management

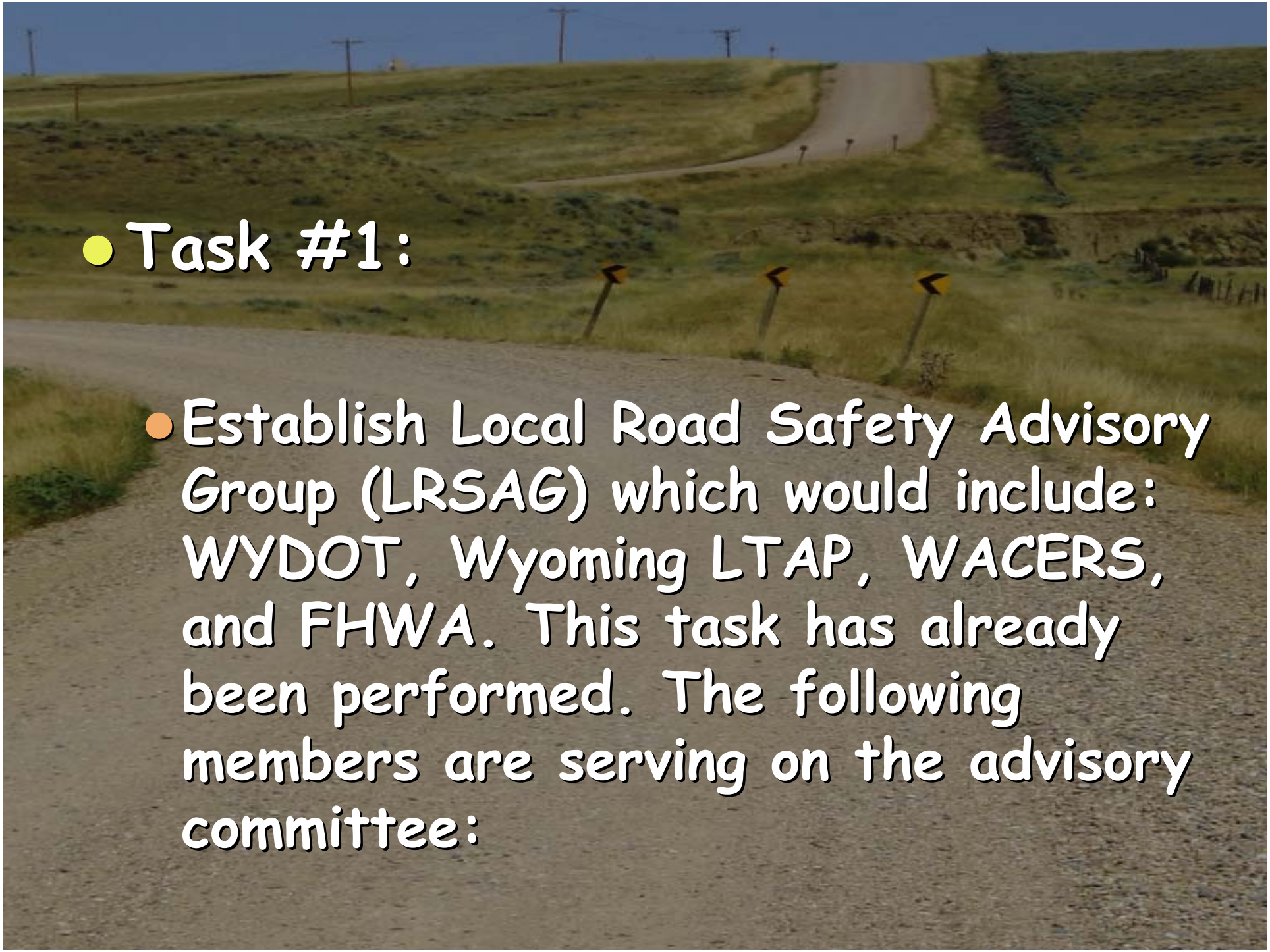
- **Rural roads are being managed by WYDOT, Counties, and cities in Wyoming.**
- **Coordinating the efforts among various agencies will result in reducing fatalities and crash rates state wide.**

Uniqueness of this Project

- This is a unique project due to the high percentage of gravel roads at the local level.
- The evaluation procedure developed will be based on roadway classification as well as surface type (paved versus unpaved).

Task Description:

- 2-year project:
  - It will concentrate on three counties only
  - State wide implementation is expected

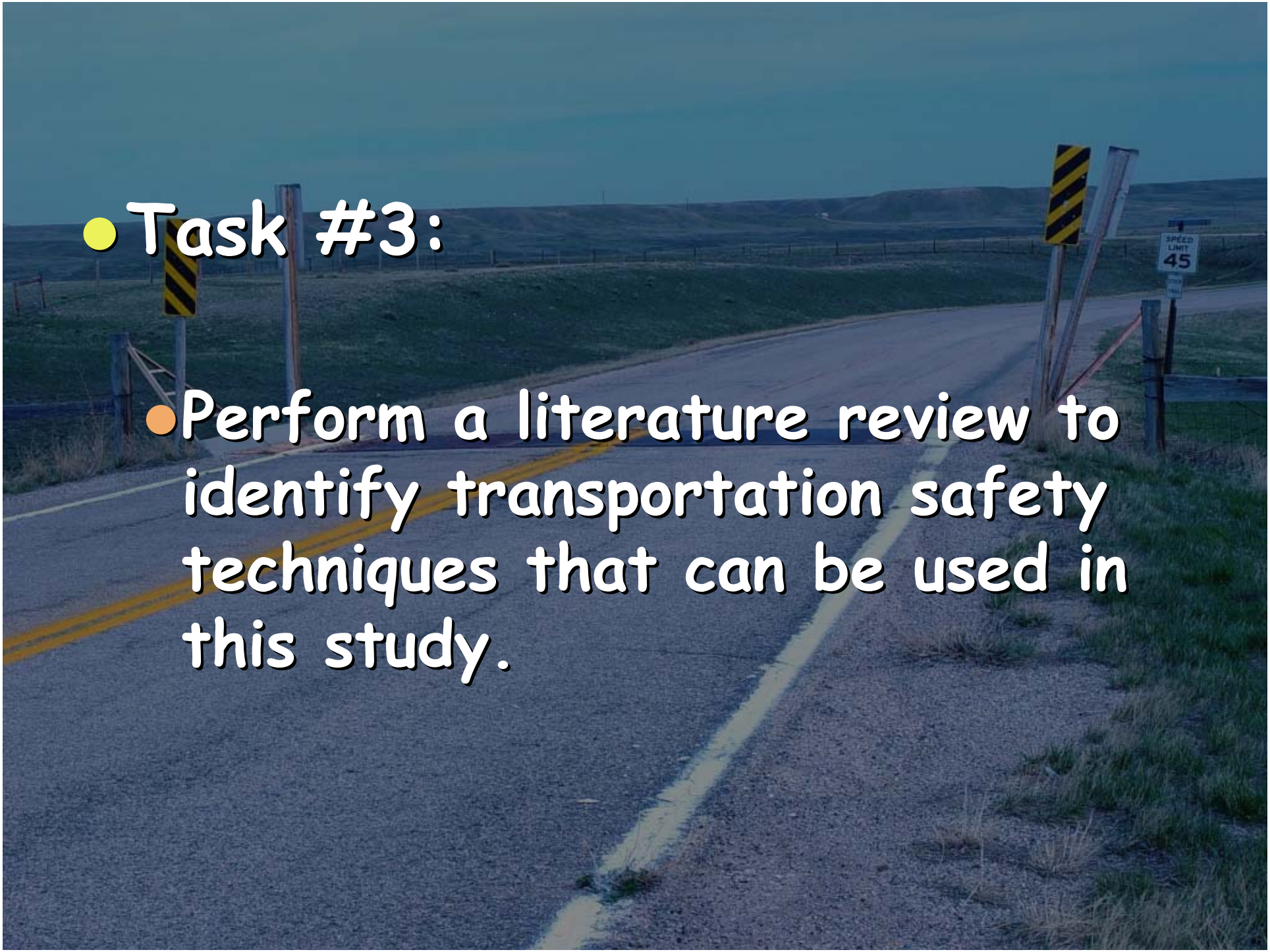


- Task #1:
  - Establish Local Road Safety Advisory Group (LRSAG) which would include: WYDOT, Wyoming LTAP, WACERS, and FHWA. This task has already been performed. The following members are serving on the advisory committee:

Advisory Board Members

- Leonard Anderson
  Town of Pine Bluffs
- Nathan Beauheim
  City of Cheyenne
- Matt Carlson
  WYDOT
- Mike Gostovich
  WYDOT
- Paul Harker
  FHWA – WY Division
- Martin Kidner
  WYDOT
- Bill Nation
  Carbon Co. Road & Bridge
- Frank Page
  HKM Engineering

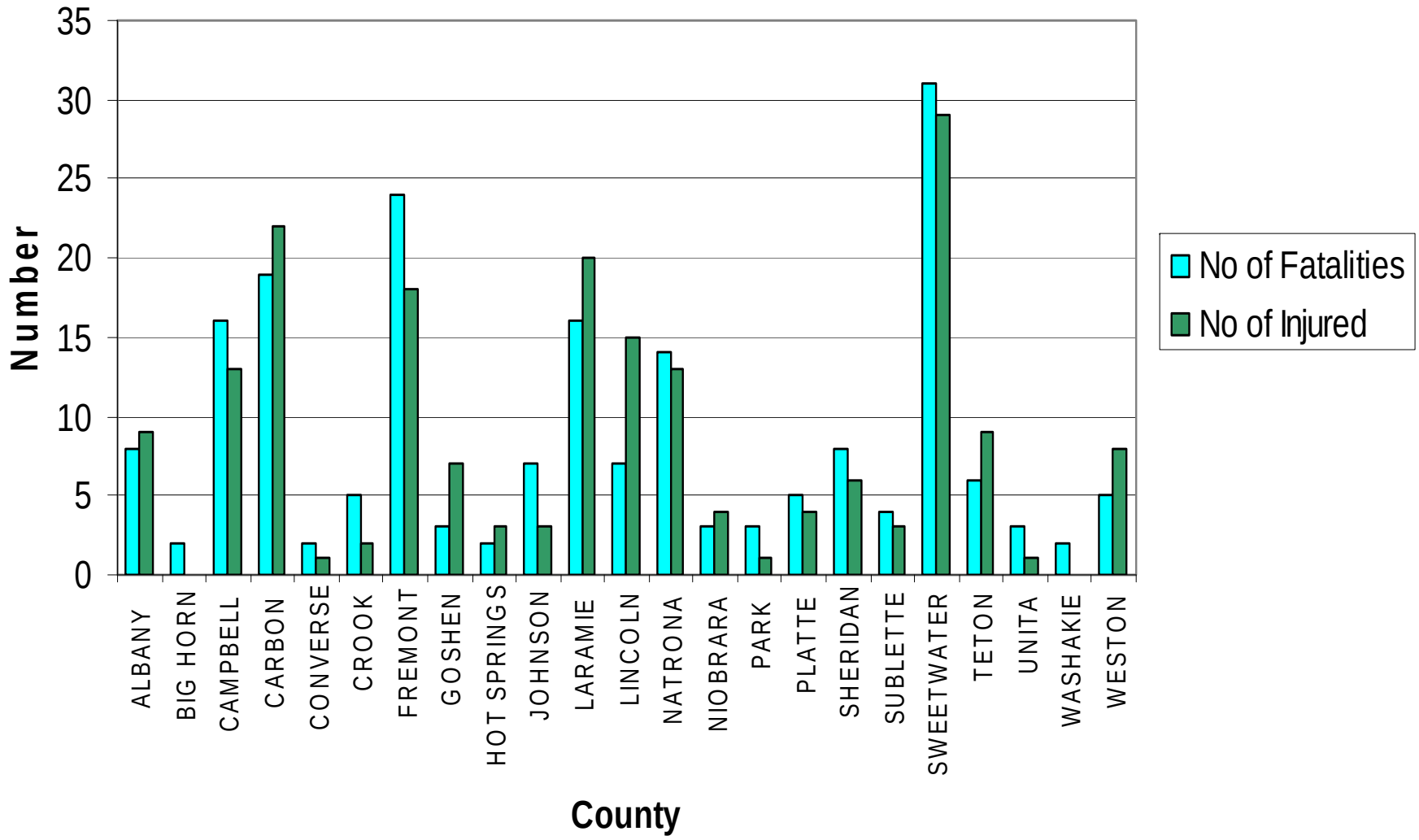
- Task #2:
  - Hire a transportation safety expert to perform the tasks described in this study.



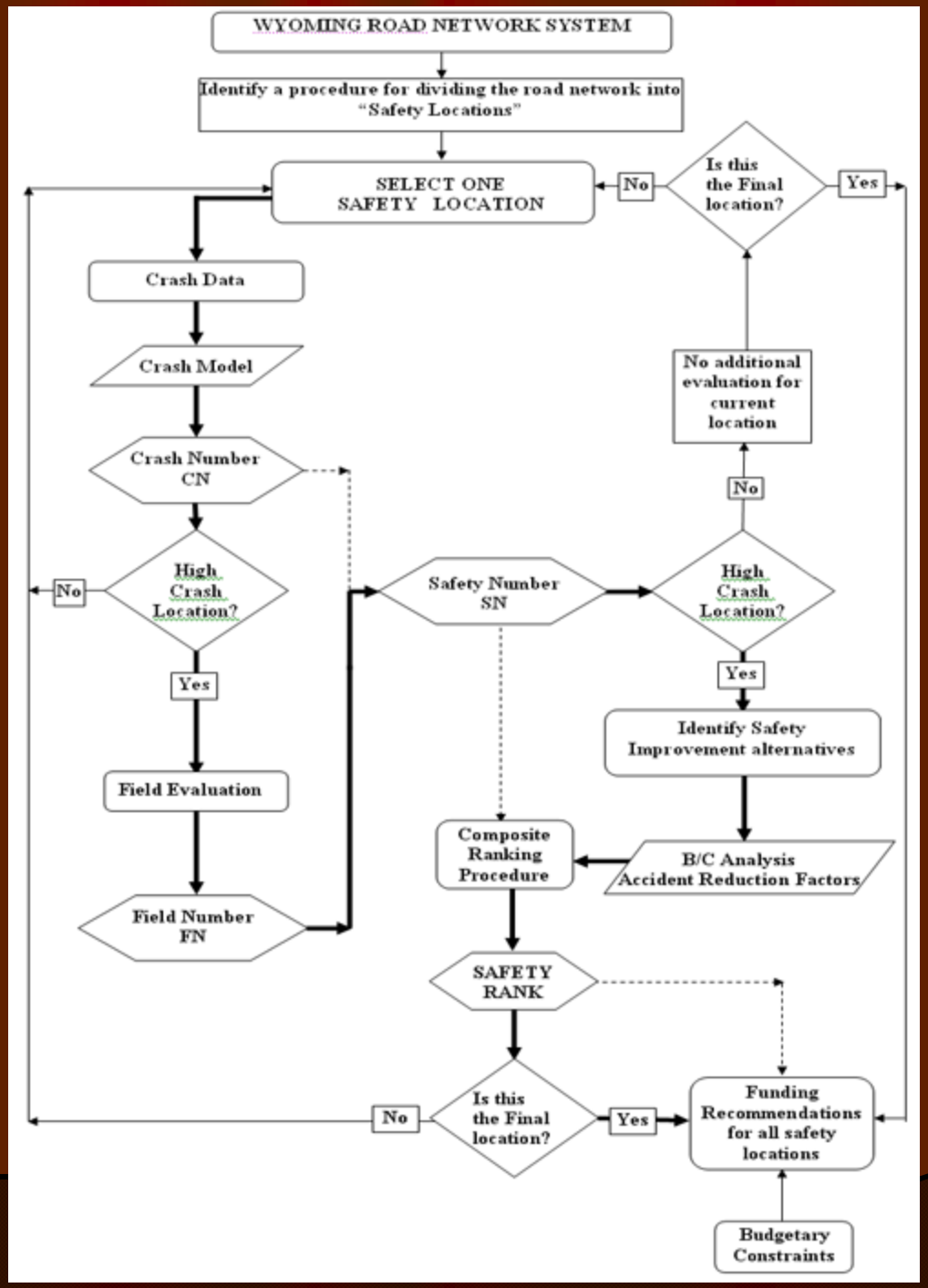
- Task #3:
  - Perform a literature review to identify transportation safety techniques that can be used in this study.

- Task #4:
  - Identify three counties for inclusion in a pilot study.
    - Carbon, Laramie, And Johnson counties.

Fatalities & Injuries Per County

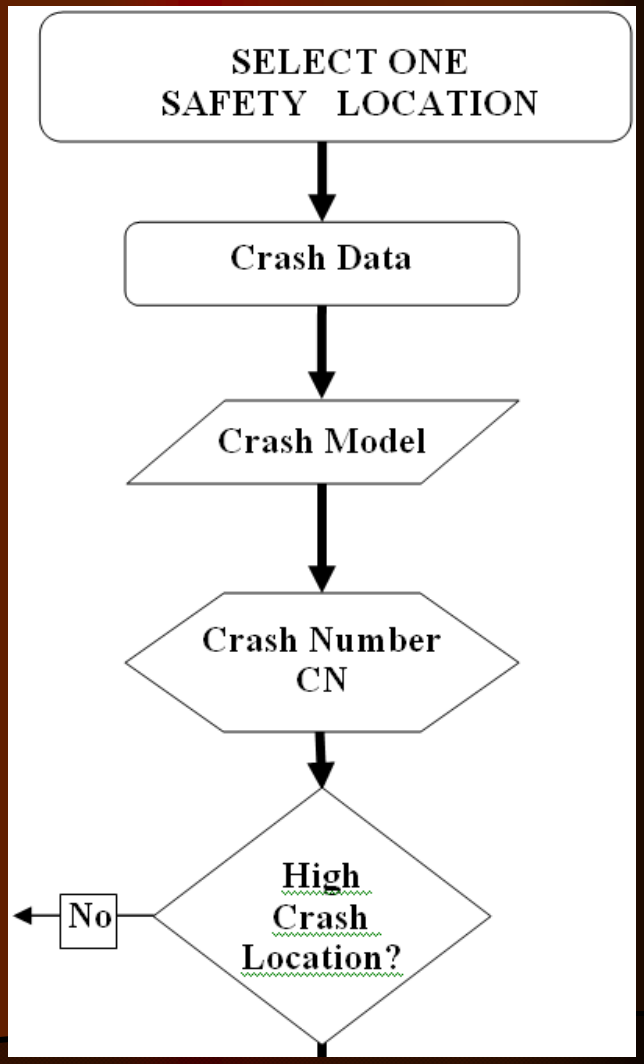


- Task #5:
  - Determine general data needs, collection methods and options for data management in priority areas.
  - Develop standardized methodologies for road safety programs, data collection and management.


WYOMING ROAD NETWORK SYSTEM
Identify a procedure for dividing the road network into "Safety Locations"
SELECT ONE SAFETY LOCATION
No
Is this the Final location?
Yes
Crash Data
Crash Model
Crash Number CN
No
High Crash Location?
Yes
Field Evaluation
Field Number FN
Safety Number SN
High Crash Location?
No
No additional evaluation for current location
Yes
Identify Safety Improvement alternatives
Composite Ranking Procedure
B/C Analysis Accident Reduction Factors
SAFETY RANK
No
Is this the Final location?
Yes
Funding Recommendations for all safety locations
Budgetary Constraints

Crash Data Evaluation

- WYDOT has 10-year worth of data on all rural roads in the state.
- The Wyoming T2 Center will analyze the data to identify high risk locations in the three counties.
- The center will look for general trends in the crash data.
- The developed procedure should be adaptable by the BLM, Park Service, and the Forest Service.



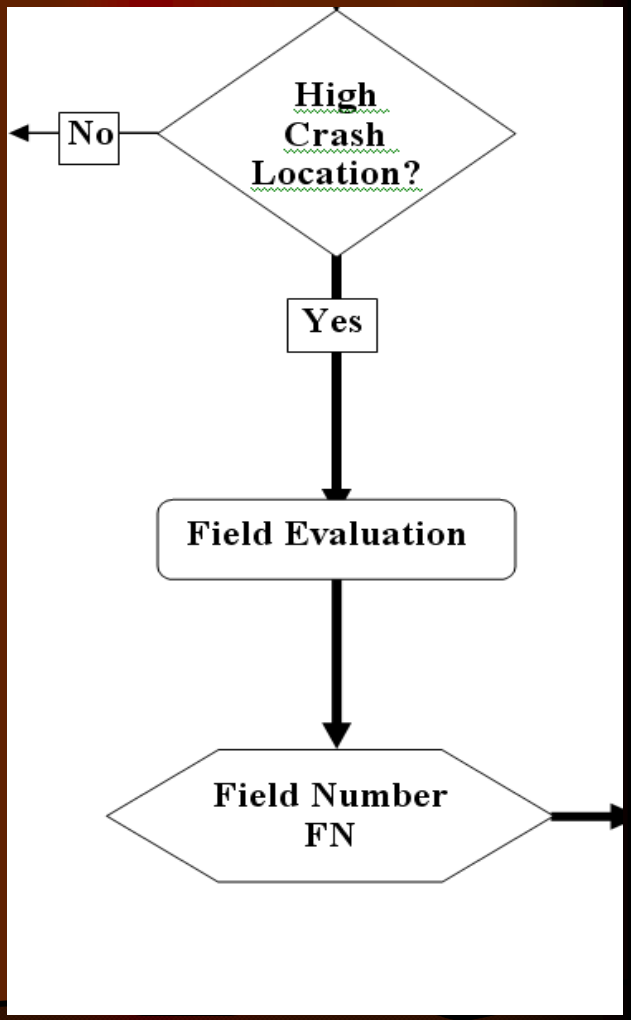
Crash Methods selected for analysis

- Total number of crashes
- Total number of crashes/mile
- Fatal and injury crashes/mile
- Equivalent Property Damage Only (EPDO)/mile
- Three year moving average
- Crash rate methods

- Single Miles Crash Analysis

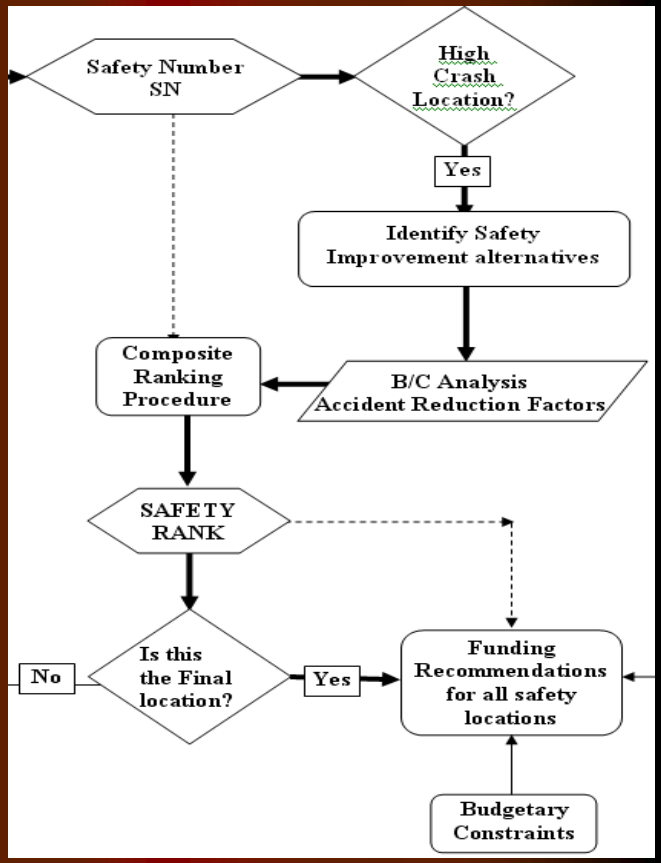
Field Data Evaluation

- **Level I**
  - •High risk locations based on crashes
  - •Quick
  - •Five categories
  - •GPS/GIS or paper forms
  - •Lower scores reflect higher risk
- **Level II**
  - •High risk locations based on crashes and level I evaluation
  - •Detailed
  - •It will identify specific safety problems and fixes



WYDOT Safety Program and the HRRR

- Counties will submit their safety requests based on the developed procedure to WYDOT.
- WYDOT will be able to compare the requests and fund the most cost effective ones.



ANALYSIS AND IDENTIFICATION OF HIGH RISK RURAL LOCATIONS IN CARBON COUNTY

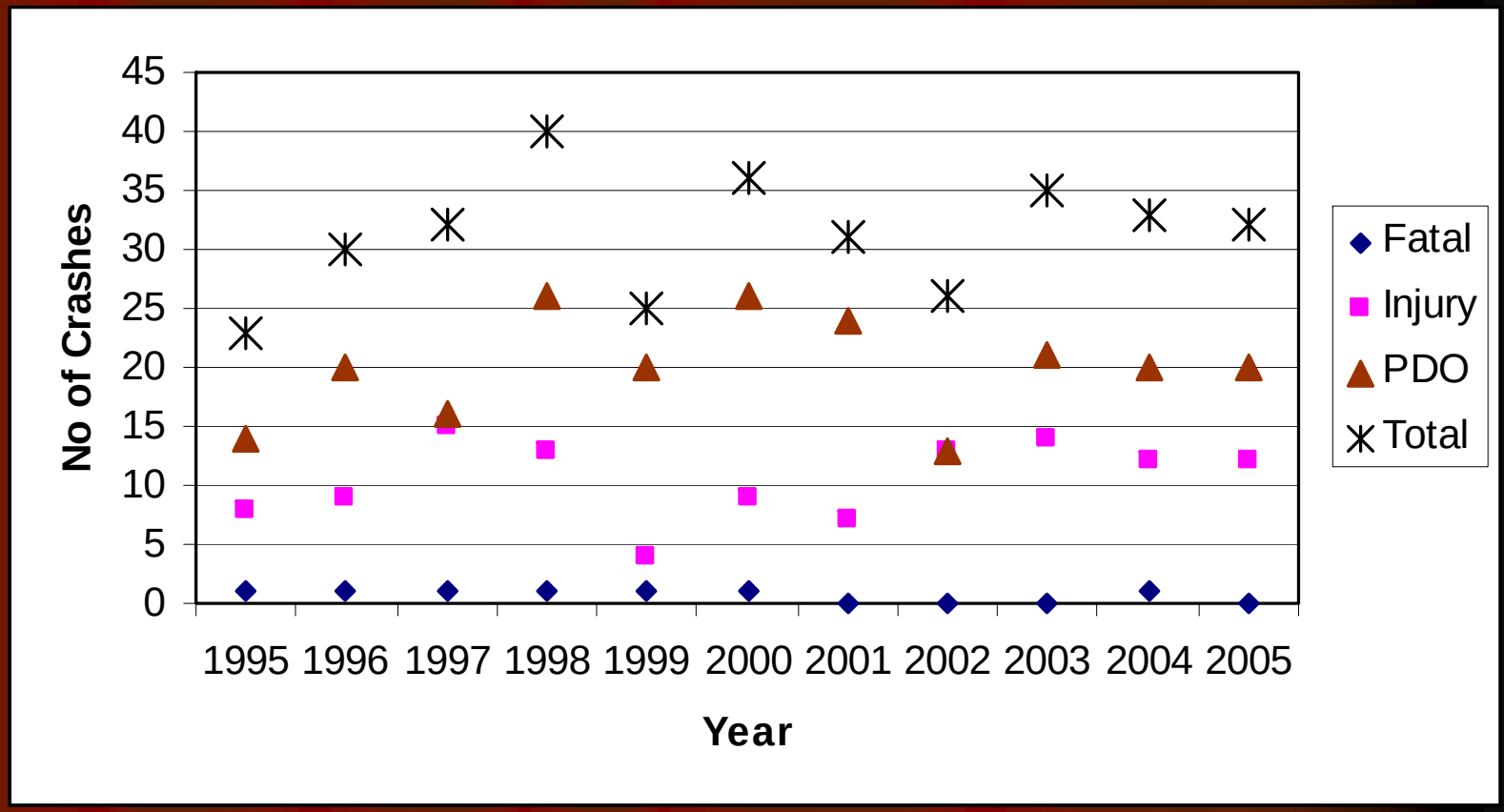
Road Classifications in Carbon County

- Bureau of Land Management (BLM) Roads
- City Streets
- County Roads (Rural & Urban)
- Federally Aided Urban roads within Municipality (FAU M)
- Forest Service Roads
- Interstate
- Park Roads
- Primary Roads
- Secondary Roads
- State Highways

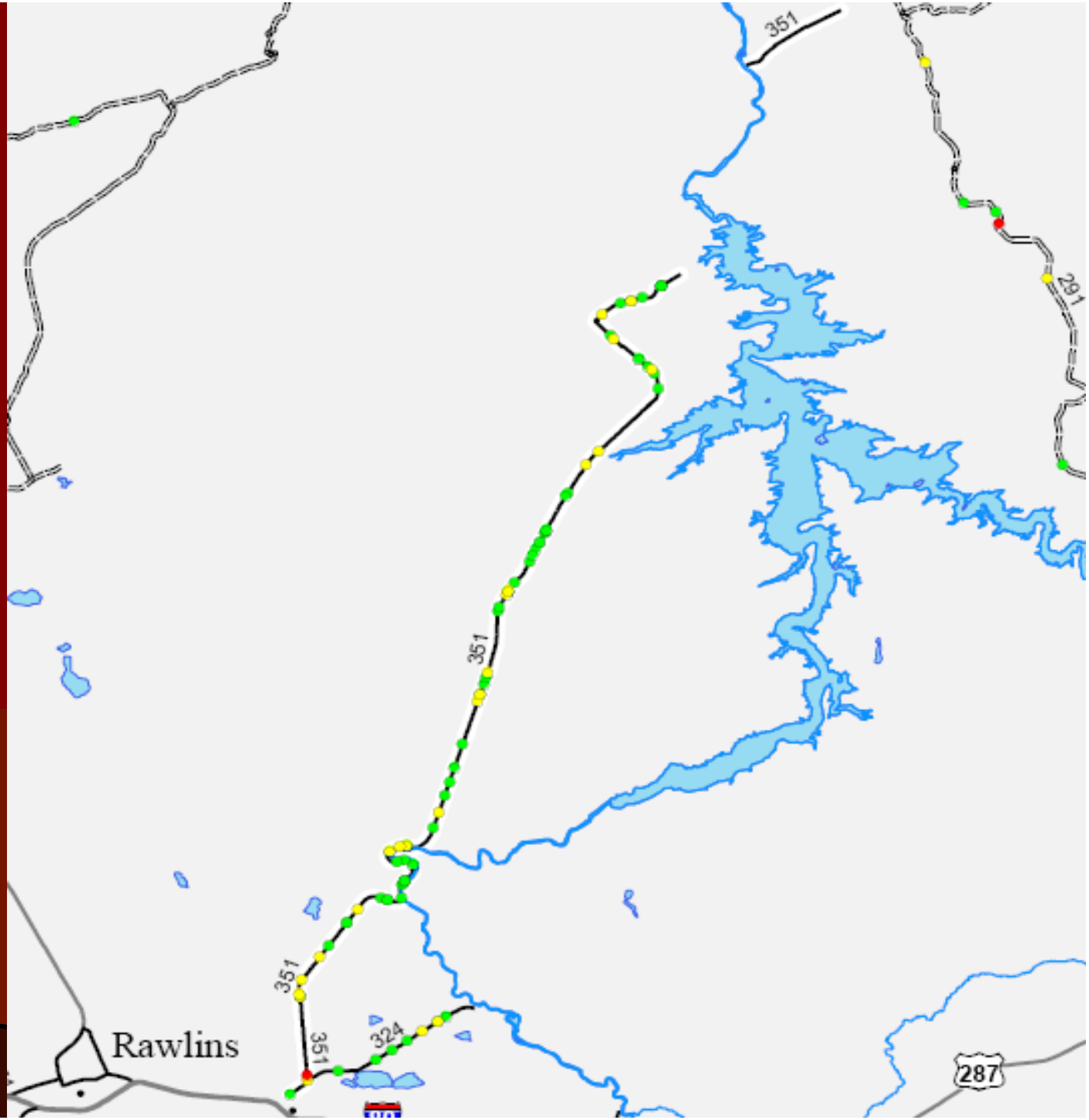
Need for Safety Study on Rural Roads in Carbon County

Road Classification	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
BLM	1	2	4	3	3	4	6	4	2	6	7
County roads	23	30	32	40	25	36	31	26	35	33	32
Forest Service	5	10	11	13	8	11	12	8	5	10	4
Park Road	5	0	1	1	1	0	2	1	3	0	2

Distribution of crashes based on severity



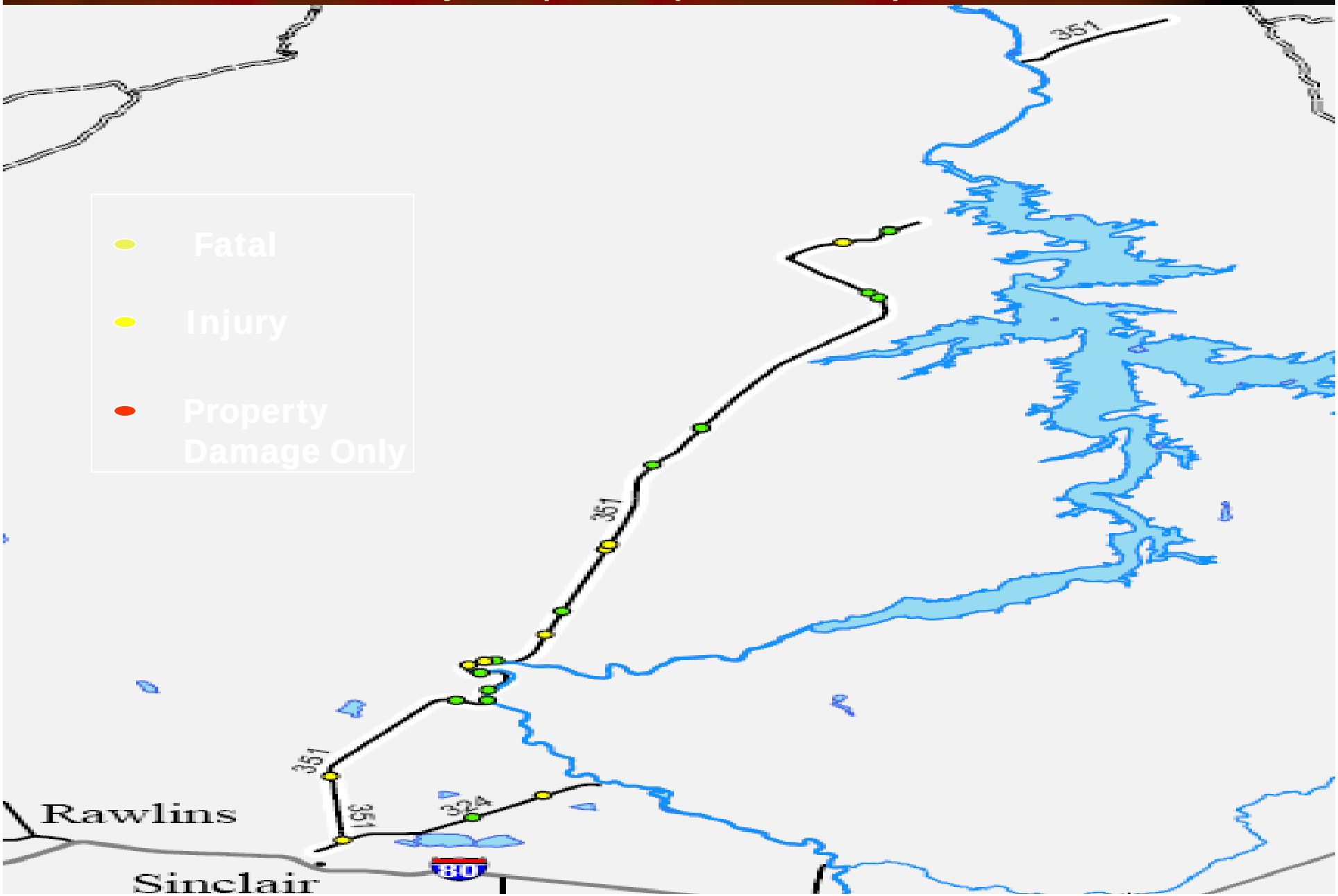
Map showing Road 351- All types of crashes that happened during the analysis period.



Three Year Moving Average

- 10-year crash analysis – difficult to analyze crash pattern (Geometric improvements etc)
- Year wise crash analysis – No. of crashes are affected by several factors that change annually (Weather etc)

Map showing Road 351- All types of crashes that happened during 3 year period(2003-2005).



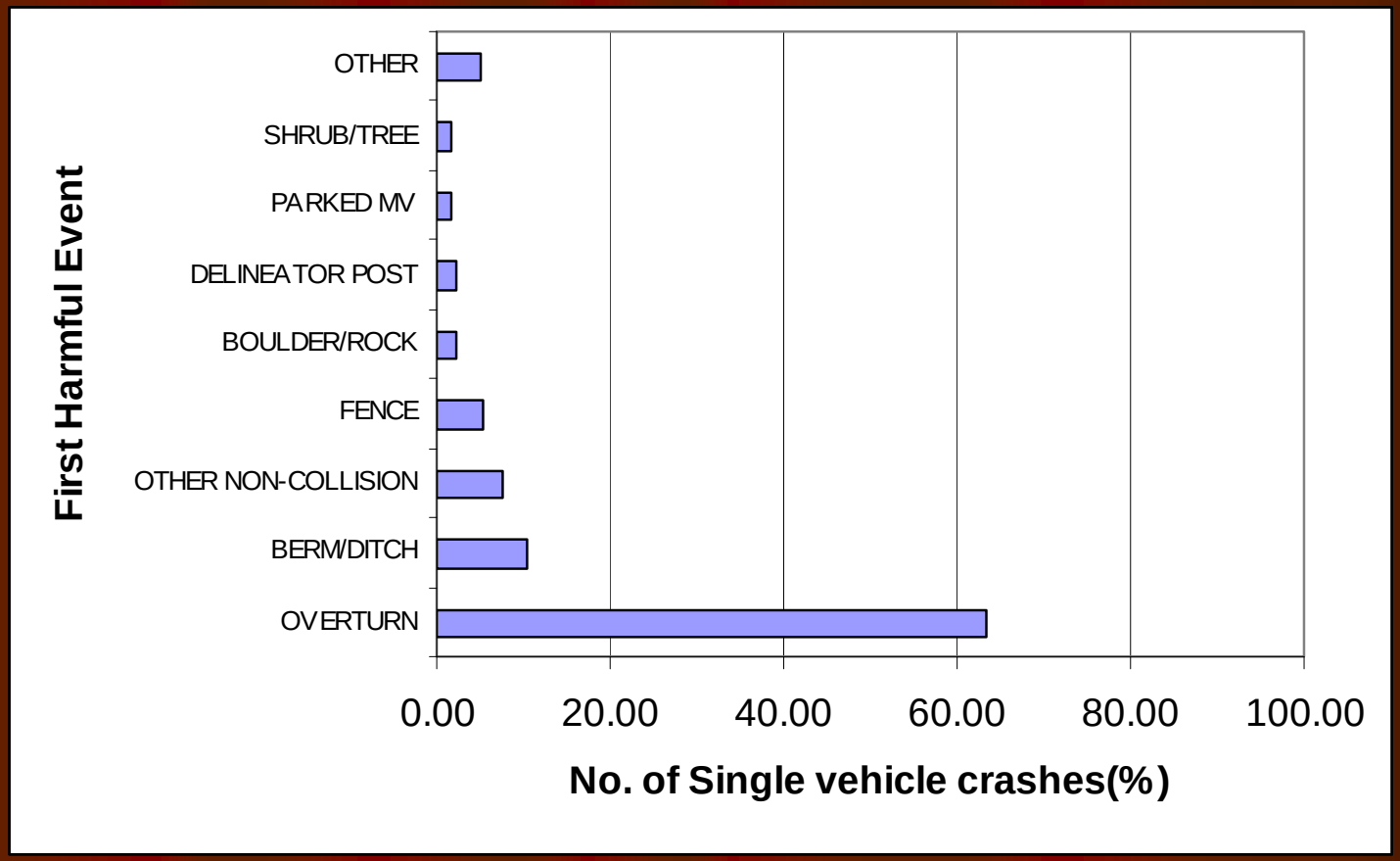
Trend Analysis of Crashes on Rural County Roads (Contd..)

- The average accident rate for horizontal curves is about three times the average accident rate for highway tangents (Glennon et al., 1983).

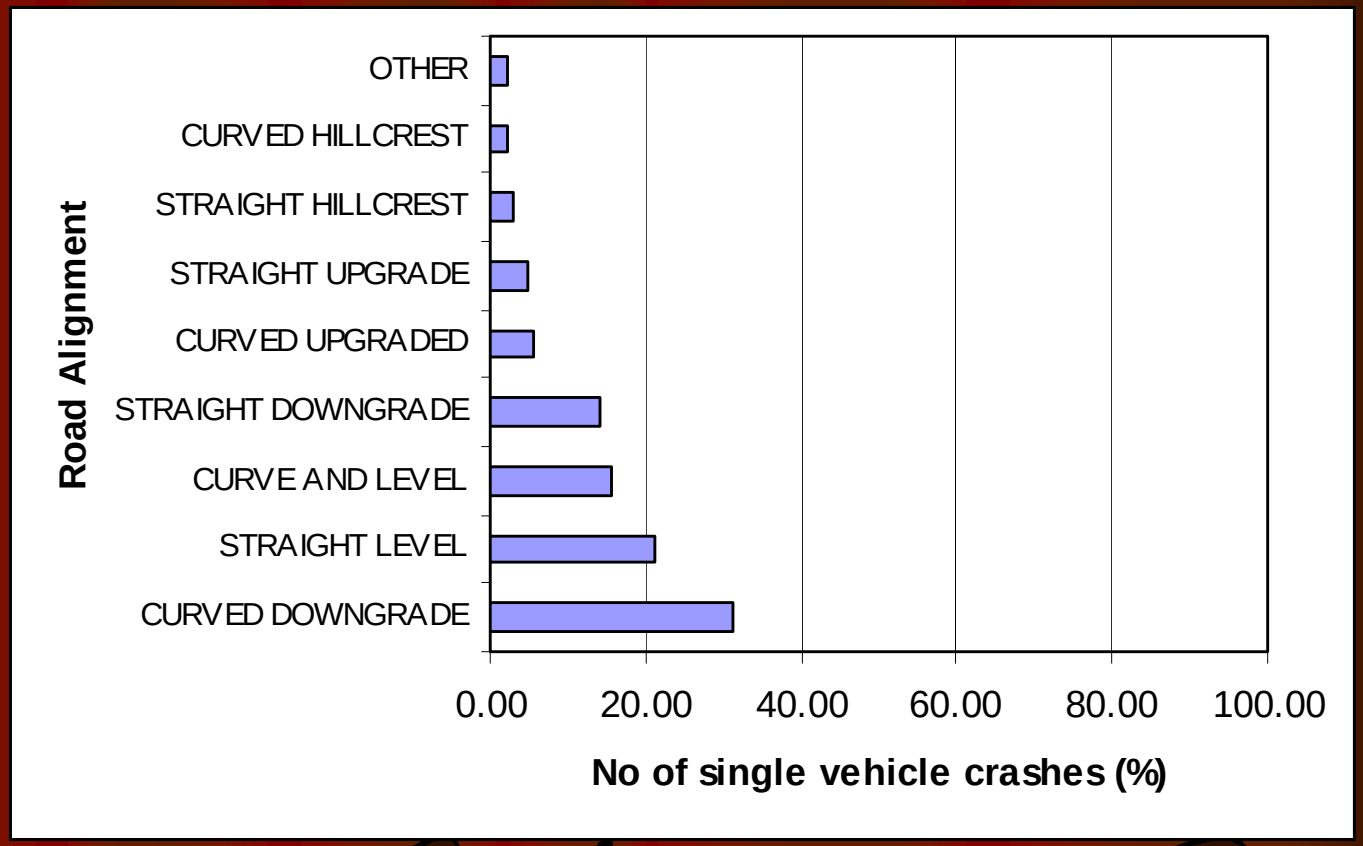
Trend Analysis of Crashes on Rural County Roads (contd...)

- 65% of the total crashes that happened on rural county roads in Carbon County during the analysis period were Single vehicle crashes.
- 64 % of these single vehicle crashes were due to overturning of the vehicle.

Distribution of Single Vehicle Crashes on Rural County Roads



Relation between Road Alignment and Overturn Crashes



Findings

- Lighting is not a major contributing factor in the high number of crashes on county roads since majority of crashes on all selected road sections happened during daylight/lighted conditions.
- Majority of crashes on all selected road sections occurred under clear weather conditions.

Findings (Contd....)

- Road No. 351 also shows an increasing trend in the animal vehicle collisions. Road No. 401 also shows considerable numbers of animal vehicle collisions.
- Roads 504, 385 etc experience highest number of crashes in which FHE is overturning of vehicles.

Findings (Contd....)

- More than 90% of crashes on all road sections happened on road sections where no traffic control devices were present.
- More than 90% of crashes on all road sections occurred at non-junctions.
- Curves and downgrades experience high number of overturn of vehicles.

Technology Transfer and Implementation:

- Simplified Safety packets summarizing the developed methodologies and procedures will be prepared and distributed to all local agencies in the state.
- Efforts will be also made to distribute the packets to other interested states in our region.

Potential Benefits of the Project:

- Local Road and Bridge Departments will benefit from this project.
- Accurate traffic and crash records will be passed to local agencies in the appropriate format.

Potential Benefits of the Project:

- Uniform safety evaluation procedures will be adopted by all agencies in the state.
- The SMS Committee can then use the findings of the study to request/ justify adequate resources to improve safety state wide.

Potential Benefits of the Project:

- The ultimate benefit of the study will be to reduce fatalities and crashs on all rural roads.


The End