

Road-Related Erosion Issues on BLM-Administered Lands in Northwestern New Mexico

*National Fluid Minerals Conference
Cheyenne
June 22-24, 2004*

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Operated by The University of Chicago
for the U.S. Department of Energy



Acknowledgments

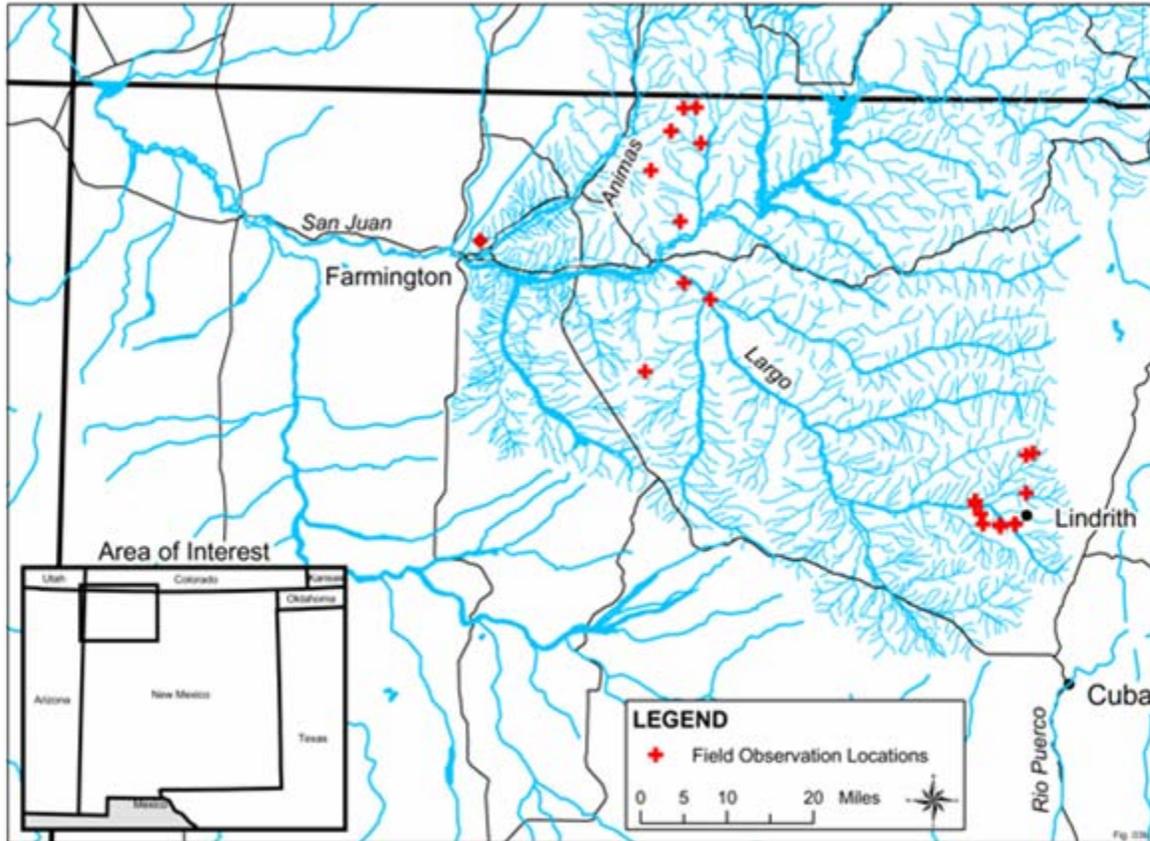
- **Work funded through the DOE/BLM Federal Lands Technology Partnership**
- **Effort supported by**
 - Tom Hare
 - Patricia Hester
 - Brett O'Haver
 - Dale Wirth
 - Terry Johnson

Highly Erodible Soils Have Resulted in Significant Road-Related Erosion Problems



- **BLM actively working to define and address known problems**
 - Farmington Field Office road maintenance program
 - USGS erosion study in Largo Cañon watershed
- **Argonne funded to conduct programmatic and engineering review**
 - Identify, characterize, and prioritize issues
 - Assess adequacy of existing road design standards and construction practices
 - Identify potential solutions
 - Recommend follow-on actions

Study Area Encompassed Large Geographic Region in Northwestern New Mexico



- Over 400 mi²
- Largo Canon, Animas River, and Rio Puerco watersheds
- Two BLM Field Offices

BLM Administers Road Design, Location, Construction, and Maintenance

- **BLM has jurisdiction over oil and gas exploration and development activities wherever there are federal subsurface mineral rights, regardless of surface ownership.**
- **The “Gold Book” provides policies and standards related to oil and gas activities, including road construction:**
 - Road classification
 - Design specifications per class – width, gradient, curve radii, turnouts, drainage
 - Design criteria – culverts, ditches, relief ditches, rolling dip spacing
- **Gold Book guidance is relevant to conditions in study area – although it can be improved upon.**

Two Areas with Distinct Conditions and Problems Were Identified

Farmington Area

- Within Farmington Field Office boundary
- Largo Canon and Animas River watersheds
- Greater current level of oil and gas activity
- Coarse-grained borrow material available
- 80% federal surface ownership
- Road maintenance program in place since 2001

Lindrith Area

- Within Albuquerque Field Office boundary
- Rio Puerco watershed and eastern portion of Largo Canon watershed
- Soils more fine grained and erodible
- Coarse-grained borrow material not readily available
- 80% private surface ownership

Erosion Problems Can Be Organized into Several Different Categories

- **Categories**
 - Transportation demands
 - Road system planning
 - Road design
 - Road maintenance
 - Quality assurance, implementation, and enforcement
- **Typically, a complex set of causes can be identified**
- **Single-source problems are rare**
- **The full range of problem categories needs to be addressed**

Transportation Demands



- Primary demand – oil and gas development and production activities
- Private landowners and other users place fewer demands on roads
- Some portion of the roads was not adequately designed or constructed for large, heavy vehicles

Route Planning

Inadequate planning results in roads that are prone to excessive erosion:

- **Straight line routes**
- **Overly steep grades**
- **Ad hoc shortcuts**
- **Property boundaries dictate pathway**

Road Design

Improper design results in roads that are prone to excessive erosion:

- **Poor route selection**
- **Overly steep grades**
- **Improper use of aggregate on road surfaces**
- **Roads installed too close to pipelines**
- **Improper culvert spacing and design**
- **Inadequate compaction**

Road Design, cont.



Poor culvert design has resulted in excessive erosion downgradient

Road Design, cont.



Inadequate compaction following installation of cable has resulted in excessive erosion along this roadway.

Road Maintenance and Monitoring

- **Significant portion of erosion problems related to this category**
- **Failure to**
 - Monitor
 - Implement corrective actions
 - Require routine maintenance
 - Ensure maintenance actions are effective
- **Too often, nothing is done to mitigate a problem or the action taken is inappropriate.**

Road Maintenance and Monitoring, cont.



Flat blading eliminates road crown, lowers road surface, and creates a channel for run-off.

Road Maintenance and Monitoring, cont.



Poor maintenance can result in blocking of culverts (left) or of relief ditches (right). Surface water runoff is not properly managed as a result.

Road Maintenance and Monitoring, cont.



Inadequate monitoring (or poor design): road bed is lower than adjacent drainage channel.

Farmington Field Office Road Maintenance Program Is Bringing Improvement to the Region



For more information: contact Terry Johnson or Dale Wirth, FFO

- Initiated in 2001
- 13 road maintenance units
- Industry representation and participation
- Focus on adequate design for new roads as well as maintenance of existing roads
- 95% of costs covered by industry
- BLM contributions: 5% of costs plus other resources (e.g., aggregate, culverts, engineering consultation, cultural survey data)

Recommendations

1. Supplement the Gold Book standards

- Apply shorter culvert spacings
- Tie road grade limits to road surfacing materials
- Limit travel on wet roads
- Require crowning or outsloping to minimize standing water
- Require stabilization of cut slope using indigenous plants
- Require roads to follow topographic contours
- Require adequate maintenance programs

Recommendations, cont.

- 2. Implement and enforce supplemented design criteria**
- 3. Continue and expand FFO road maintenance program**
- 4. Conduct resource assessment for suitable aggregate materials in Lindrith area**
- 5. Implement road closure program**
- 6. Evaluate current road design vs. use/demand**

Recommendations, cont.

- 7. Implement transportation planning**
- 8. Provide training to contractors**
- 9. Modify permit process to hold operators accountable for performance**
- 10. Undertake wet season road survey**
- 11. Limit roadways parallel to pipelines**