Wyoming Reclamation and Restoration Center: Promoting Natural Resource Development and Healthy Ecosystems

Peter D. Stahl, Director

WYOMING RECLAMATION & RESTORATION CENTER

UNIVERSITY OF WYOMING

OBJECTIVE OF NATURAL RESOURCE MANAGEMENT

(We must provide) the natural resources essential to the Nation's energy requirements, and to its economic and social well-being…. and strike a balance between protection of the environment and the Nation's need for essential sources of energy;

Extracted from the Surface Mine Control and Reclamation Act of 1977

MISSION OF THE
WYOMING RECLAMATION AND RESTORATION CENTER

EDUCATION, OUTREACH, RESEARCH

Train students and practitioners in land reclamation and restoration ecology.

Develop, collect, and disseminate impartial scientifically based information related to the reclamation, restoration, and remediation of disturbed lands in Wyoming and the western United States

Assist, through research, in the development of best management practices and effective technologies that avoid, mitigate, reclaim and/or restore land, air, water and wildlife disturbances caused by natural resource development.

Extracted from the WRRC mission statement

WRRC STRUCTURE

Based in the UW School of Energy Resources and
the College of Agriculture and Natural Resources,
WRRC draws on the expertise of UW Faculty from the entire campus.

Department of Agricultural and Applied Economics
Department of Plant Sciences
Civil and Architectural Engineering
Department of Atmospheric Sciences
Department of Botany
Department of Renewable Resources
Wyoming Geographical Information Science Center (WyGISC)
Haub School and Ruckleshaus Institute of
Environment and Natural Resources
School of Energy Resources

WRRC STRUCTURE:

Outreach and Extension Activities are supported by the University of Wyoming Cooperative Extension Service. These duties are performed by both Extension Specialists and Extension Educators as well as other affiliated faculty and the Director.

Research Projects are conducted by affiliated UW Faculty Members and their students as well as Research Scientists working at WRRC. Much of this research is conducted in collaboration with operators and agencies working in Wyoming.

A Student Organization known as ROaR (Restoration Outreach and Research) has been formed by undergraduate and graduate students studying Land Reclamation at the University of Wyoming.

WRRC FUNDING:

The Wyoming Reclamation and Restoration Center is currently funded by the state government using Abandoned Mine Land Funds generated by a tax on coal mined in Wyoming.

WRRC OUTREACH:

WRRC affiliated Faculty and Research Scientists are producing a series of Reclamation related Extension Bulletins:

Successful restoration of severely disturbed lands: Overview of critical components
B-1202

Successful restoration of severely disturbed land: Seeding essentials for reclamation
B-1204

Plant species available for revegetation/restoration
B-1206

WRRC OUTREACH:

WRRC affiliated Faculty and Research Scientists are available <u>to address any reclamation related questions.</u>

- Provide referrals to experts with experience in particular aspects of reclamation, i.e. sagebrush reestablishment, soil amendments, wildlife habitat improvements, topsoil replacement depths, laws and regulations.

- Provide referrals to scientific literature and available data on particular reclamation issues, topics or questions, i.e. how does stockpiling affect soil bulk density OR how does application of gypsum affect the osmotic potential of arid land soils.

- Provide comments on reclamation documents.

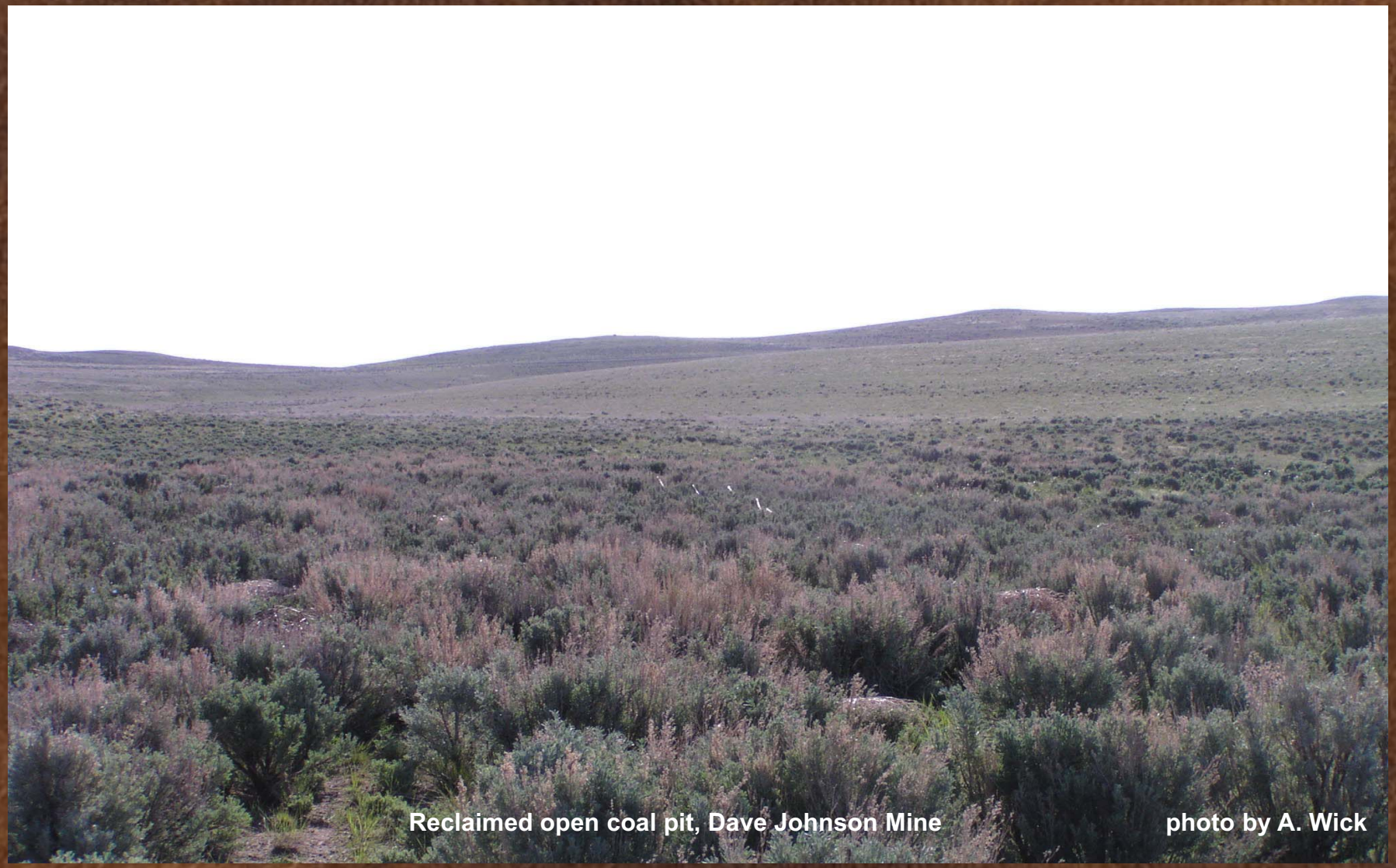
WHY RECLAIM LANDS DISTURBED BY NATURAL RESOURCE EXTRACTION?

1) Protection of traditional land uses and land values.

2) Restore and/or protect environmental quality and ecosystem services.

3) Remove public health and safety hazards.

4) Public Image: Protection of Reputation

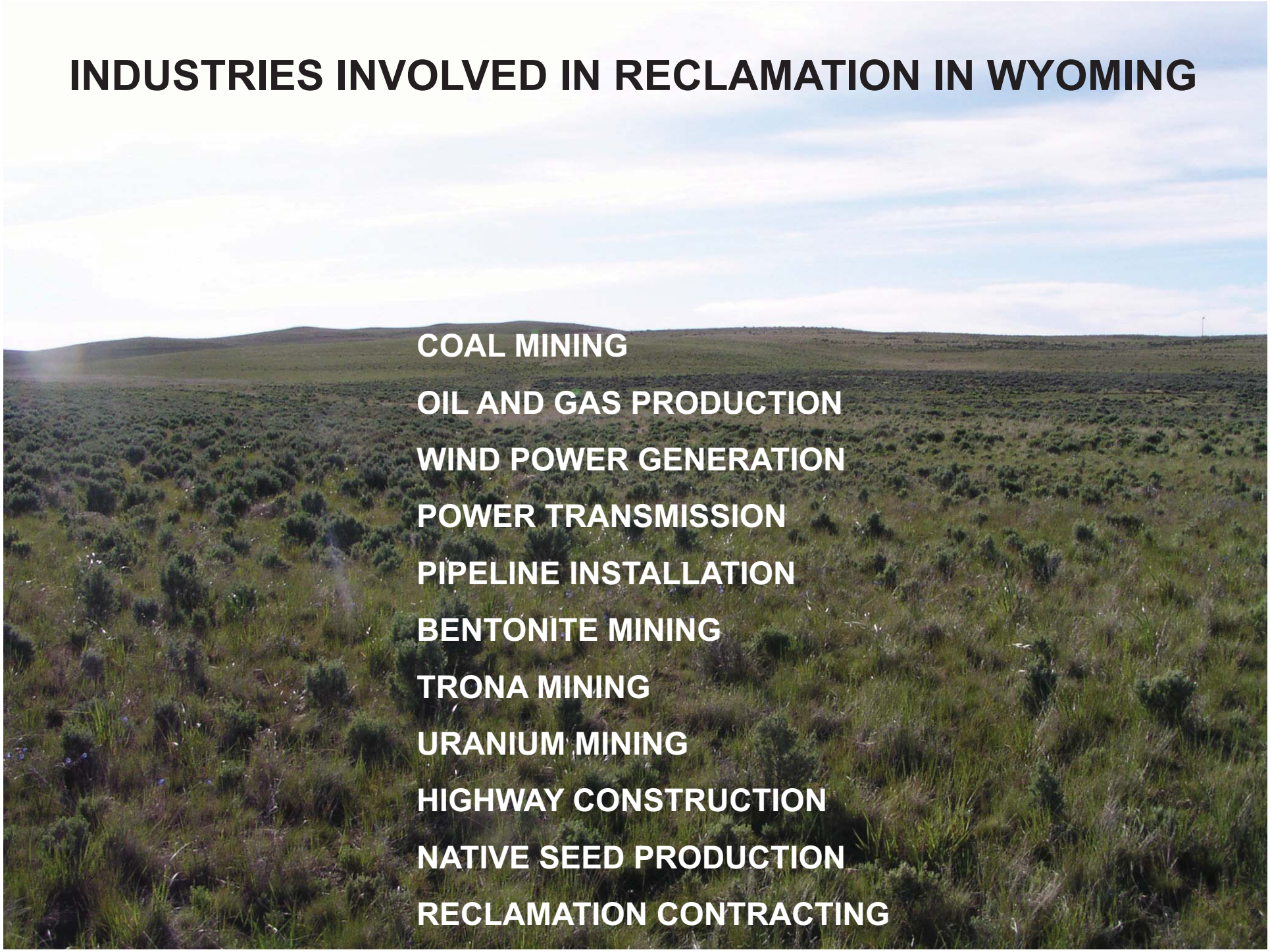


Reclaimed open coal pit, Dave Johnson Mine photo by A. Wick

INDUSTRY NEEDS FOR RESEARCH:

1. Document successful reclamation of steep topographic areas and areas considered to have low reclamation potential.
2. Definition of Low Reclamation potential and No reclamation potential.
3. Methods for control of invasive species (WEEDS).
4. Restoration of Sage Grouse Habitat.
5. Ozone Formation Chemistry: driving forces in the Upper Green River Basin vs. Powder River Basin.
6. Reclamation strategies for produced water reservoirs

INDUSTRIES INVOLVED IN RECLAMATION IN WYOMING



- COAL MINING
- OIL AND GAS PRODUCTION
- WIND POWER GENERATION
- POWER TRANSMISSION
- PIPELINE INSTALLATION
- BENTONITE MINING
- TRONA MINING
- URANIUM MINING
- HIGHWAY CONSTRUCTION
- NATIVE SEED PRODUCTION
- RECLAMATION CONTRACTING

RECLAMATION RESEARCH AT THE WYOMING RECLAMATION AND RESTORATION CENTER

Wildlife Studies

Quantifying sagebrush structure on ecological sites in the Upper Green River Basin. Ginger Paige, Matt Holloran, Ann Hild, PIs. Funded by T. Thorne Sage Grouse Cons Fund.

Identification of Elk Disturbance Risk and Driving Mechanisms in a Natural Gas Development Field (Fortification Creek). Jeff Beck, PI. Funded by the Wyoming Reclamation and Restoration Center.

Identifying habitats for greater sage-grouse population persistence within the Atlantic Rim, Wyoming. Funded by Anadarko Petroleum Corp., BLM, and WY G&F.

RECLAMATION RESEARCH AT THE WYOMING RECLAMATION AND RESTORATION CENTER

Soil Management Studies

Impacts of Gasfield Soil Management practices on soil properties and plant establishment. Jay Norton, Calvin Strom, Gary Austin, Ralph Swift, Pete Guernsey, PIs. Funded by Encana, QEP, and BP.

Municipal Waste Compost as a soil amendment to alleviate soil crusting and salinity. Gary Austin, Calvin Strom, David Marshall, and Pete Stahl, PIs. Funded by BP, KC Harvey, Terra Firma Organics and WRRC.

Supplemental Irrigation on Jonah Field Wellpads. Ralph Swift, Calvin Strom, and Pete Stahl, PIs. Funded by Encana and WRRC.

RECLAMATION RESEARCH AT THE WYOMING RECLAMATION AND RESTORATION CENTER

Weed Management Studies

Developing weed management strategies to improve desirable species Establishment on reclamation sites, Brian Mealor, Andrew Kniss, and Anowar Islam, PIs. Funded by Ucross Foundation and UW School of Energy Resources.

Reclaiming Halogeton invasions of salt desert shrublands in the Wyoming Basin. Dr, Ann Hild, PI, Funded by USFS and WRRC.

Use of sterile triticale to immobilize N and prevent weed invasion. Gary Austin, Calvin Strom, David Marshall, Pete Stahl, PIs. Funded by BP, KC Harvey and WRRC.

RECLAMATION RESEARCH AT THE WYOMING RECLAMATION AND RESTORATION CENTER

Other studies

Air Quality Studies in the Upper Green River Basin, Wyoming.
Dr. Derek Montague and Dr. Robert Field. Funded by
WYDEQ, UW SER, WRRC

Innovative soil radium remediation strategies, Lisa Cox and Pete Stahl, PIs.
Conducted in central Wyoming. Funded by WMA and UW SER.

Potential of forage kochia to reclaim steep topographic areas and areas of low reclamation potential used by gas industries. Anowar Islam, Blair Waldron, and Pete Stahl. Funded by WRRC.

RECLAMATION RESEARCH AT THE WYOMING RECLAMATION AND RESTORATION CENTER

- Impacts of Gasfield Soil Management practices on soil properties and plant establishment.
Jay Norton, Calvin Strom, Gary Austin, Ralph Swift, Pete Guernsey, PIs. Funded by Encana, QEP, and BP.

-Improving sagebrush reclamation technologies in bentonite minelands of the Bighorn Basin, Pete Stahl & Lyle King, PIs. Funded by BLM.

-Reclaiming Halogeton invasions of salt-desert shrublands in the Wyoming Basin, Ann Hild, PI. Funded by WRRC.

-Energy development and wildlife habitat database organization, Pete Stahl & John Tanaka, PIs.
Data collected throughout Wyoming, Funded by WY Game& Fish.

-Economics of native seed production for reclamation and restoration activities,
Roger Coupal, Kristiana Hansen & Kristina Hufford, PIs. Funded by WRRC.

-Identification of elk disturbance risk and driving mechanisms in a natural gas development field, Jeff Beck, PI.
Conducted in the Fortification Creek area. Funded by Anardarko Petroleum, Petrol-Canada, Pennaco/Marathon, SER and WRRC.

-Innovative radium pond remediation strategies, Lisa Cox and Pete Stahl, PIs.
Conducted in central Wyoming. Funded by WMA and UWSER.

-Best Management Practices for Reclamation of Natural Gas Well Pads in South Central Wyoming. Gary Austin, Steve Paulsen and Pete Stahl, PIs.
Funded by BP and WRRC.

-Constructing a GIS based pollutant emission inventory. Dr. Robert Field, PI. Funded by UW School of Energy Resources and WRRC.

RECLAMATION RESEARCH AT THE WYOMING RECLAMATION AND RESTORATION CENTER

-Supplemental Irrigation on Jonah Field Wellpads. Ralph Swift, Calvin Strom, and Pete Stahl, PIs. Funded by Encana and WRRC.

-Municipal Waste Compost as a soil amendment to alleviate soil crusting and salinity. Gary Austin, Calvin Strom, David Marshall, and Pete Stahl, PIs. Funded by BP, KC Harvey, Terra Firma Organics and WRRC.

-Use of sterile triticale to immobilize N and prevent weed invasion.
Gary Austin, Calvin Strom, David Marshall, Pete Stahl, PIs. Funded by BP, KC Harvey and WRRC.

-Quantifying sagebrush structure on ecological sites in the Upper Green River Basin.
Ginger Paige, Matt Holloran, Ann Hild, PIs. Funded by T. Thorne Sage Grouse Conservation Fund.

-Carbon rich soil amendments for ecological restoration of drastically disturbed rangeland sites.
Jay Norton, Pete Stahl, Matt Anderson, Jen Faulkner PIs. Funded by UW Ag. Exp. Stat., Encana, QEP, Terra Firma.

- Potential of forage kochia to reclaim steep topographic areas and areas of low reclamation potential used by gas industries.
Anowar Islam, Blair Waldron, and Pete Stahl. Funded by GA Program WRRC.

- What potential reclamation and enhancement sites have the most potential benefit to Sage Grouse?
- Melanie Murphy. Funded by WRRC.

ACKNOWLEDGEMENTS

State of Wyoming
University of Wyoming Faculty
University of Wyoming Graduate Students and ROaR
Bureau of Land Management
Wyoming Department of Game and Fish
Wyoming Mining Association
Anadarko Petroleum
BP
Encana
QEP
Horizon Wind Energy
Ucross foundation
Thomas Thorne Sage-Grouse Conservation Fund