UNIVERSITY OF WYOMING
Wyoming Reclamation and Restoration Center (WRRC)
From the College of Agriculture and Natural Resources
1 OCTOBER 2012

[Pursuant to W.S. 21-16-1603(a)(v)]

To Governor Mead and Members of the Joint Appropriations Interim Committee
and Joint Education Interim Committee

Background

The Wyoming Reclamation and Restoration Center (WRRC) is an interdisciplinary program housed at the University of Wyoming that was initially established in the early 1980's. Its mission is to develop, collect, and disseminate impartial, scientifically-based information related to the reclamation, rehabilitation, and restoration of disturbed lands in high-altitude, arid regions of Wyoming and western U.S. Activities of the WRRC involve training students about reclamation ecology, research into best practices in reclamation of disturbed lands, and extension and outreach for practitioners of reclamation ecology in the energy industry, state, and other interested agencies and businesses. In 2009, Governor Dave Freudenthal and the Wyoming State Legislature approved $500,000 in Abandoned Mine Land (AML) funds to the University of Wyoming College's of Agriculture for reclamation ecology purposes. In that same year, $1,500,000 in AML funds was also designated for the College of Agriculture and Natural Resources to provide the seed money for an endowment match. In 2010, an additional $666,000 in AML funds was allocated to the WRRC by the state. Effective July 1, 2011, the Legislature amended the appropriation for $1.5 million in matching funds to allow for matching of a strategic investment fund in which the corpus could be expended, in addition to endowments. Under the appropriations language, the AML operational funds must all be expended before July, 2012.

The existence of the Wyoming Reclamation and Restoration Center has increased the number of students seeking both undergraduate minors and graduate certificates in reclamation. Workshops have been conducted throughout the state with corporate, state, and agency partners. In addition, collaborative research about reclamation topics is underway and yielding outcomes that can be applied in the field.

Expenditures

The Center has funded several new graduate research projects this year. It currently has three staff members - an office manager, a research scientist and the director. Salary costs are $112,112.22, but the single largest budget item is funding for graduate assistantships (with tuition and fees) currently at $212,238.48 per year.

WRRC Expenditures January 2011 – July 2012 (2010 Award)

Original Award Amount			$666,000.00
Expenditures			
• Salaries (including benefits)	Staff/AP	112,112.22	
	GA's	148,582.66	
• Tuition & Fees		63,655.82	
• Supplies		49,656.48	
• Travel		23,153.60	
• Equipment		75,012.15	
• Other Contractual work (printing, analysis, etc.		116,872.21	
Total Expenditures		$589,045.14	
Remaining Balance 7/1/12			$76,954.86

Outreach

Outreach Programs include the Regional Wyoming Reclamation Schools held across the state in four locations this past summer; a General Reclamation Workshop presented by request to the BLM and reclamation community in Vernal Utah; Reclamation Research and Demonstration Plots in Laramie and Wyarno; the WRRC Limitations to Successful Reclamation Working Group, Special Topics Workshops (Wyoming Sagebrush Reestablishment Workshop, Casper, March, 2011); and Wyoming Seed Issues Workshop, Casper, April 2012. WRRC is still working on implementing a Reclamation Certification Program for non-students by administering the first qualifying examination later this fall.

WRRC is working closely with the Wyoming state office and the field offices of the Bureau of Land Management on issues related to reclamation process milestones and release of acres as well as other issues of interest to the state and agricultural industry. The WRRC Director will again be making a presentation at the BLM Resource Advisory Board Meeting in Gillette in

October, 2012. WRRC is collaborating with the BLM on sage-grouse restoration in the Powder River Basin.

Two graduate students funded by WRRC will be making presentations at the annual Petroleum Association of Wyoming (PAW) Reclamation Meeting in Casper in December to report on a Reclamation Database project on which the program undertaking is part of the British Petroleum-WRRC-Conservation Seeding & Restoration Inc. Reclamation partnership. The Director of WRRC will also be speaking at the PAW Reclamation Meeting.

WRRC Director, Pete Stahl, is a member of the Interagency Sage Grouse Core Area Strategy Implementation Team that won the Team of the Year Award from the Wyoming Game and Fish Department.

Finally, WRRC is currently planning the 2nd Wyoming Reclamation and Restoration Symposium to be held in Laramie during the first week of June, 2013 along with the 30th Annual Meeting of the American Society of Mining and Reclamation which will be held jointly at the Hilton Garden Inn.

Teaching and Training

The Center is currently supporting six graduate students in the Departments of Ecosystem Science and Management, Plant Sciences, Agricultural Economics, and Geography. So far in 2012, seven undergraduates have graduated with minors in Reclamation Science and four graduate students have earned M.S. degrees with certificates in Reclamation Science.

Research

WRRC has also developed a number of collaborative research projects with the extractive industries addressing problematic issues in reclamation, such as irrigation strategies, soil amendments to address salts and sodium, and use of sterile forage plants to stabilize problematic sites. In part through the contributions of WRRC, the University of Wyoming is recognized nationally as one of the nation's leading institutions of higher learning in the field of Land Reclamation.

Research projects in which WRRC is involved through funding or other mechanisms are presented in Table 1. That table also lists Graduate Assistants (students) funded by WRRC.

Table 1. Research projects in which WRRC is participating.

Impacts of Gasfield Soil Management practices on soil properties and plant establishment. Jay Norton, Calvin Strom, Gary Austin, Ralph Swift, Pete Guernsey, PIs. Calley Hudlow, M.S student, Funded by Encana, QEP, and BP. Still in Progress.

Improving sagebrush reclamation technologies in bentonite minelands of the Bighorn Basin, Pete Stahl & Lyle King, PIs. Zack Liesenfeld, M.S. Student. Funded by BLM. Completing in Fall 2012.

Improving forb reclamation technologies in bentonite minelands of the Bighorn Basin. Pete Stahl and Lyle King, PIs. Dylan Bergmand, M.S. Student. Project initiated Summer, 2012.

Reclaiming Halogeton invasions of salt-desert shrub lands in the Wyoming Basin, Ann Hild, PI. Funded by WRRC and USDA. Megan Taylor, M.S. Student. Completed Summer, 2012.

Energy development and wildlife habitat database organization, Pete Stahl, John Tanaka, PIs. Hillary Jones, M.S. Student. Data from BLM Field Office, Buffalo, WY, Funded by WY Game& Fish and WRRC. Completed Fall, 2012.

Economics of native seed production for reclamation and restoration activities, Roger Coupal, Kristiana Hansen & Kristina Hufford, PIs. Betsy Mock, M.S. Student. Funded by WRRC.

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

Innovative remediation strategies for radium in soil, Lisa Cox, M.S. Student, and Pete Stahl, PIs. Conducted in central Wyoming. Funded by WMA and UWSER. Completed Summer, 2012.

Best Management Practices for Reclamation of Natural Gas Well Pads in South Central Wyoming (Database Project). Gary Austin, Steve Paulsen and Pete Stahl, PIs. Michael Curran and Benjamin Wolff, M.S. Students. Funded by BP and WRRC. In Progress, Fall, 2012.

Coal bed Natural Gas Co-produced Water Impacts on Soils, George Vance, PI, Kyle Lilly, M.S. student.

Constructing a GIS based pollutant emission inventory. Dr. Robert Field, PI. Funded by UW School of Energy Resources and WRRC. In Progress, Fall, 2012.

Supplemental Irrigation on Jonah Field Well pads. Ralph Swift, Calvin Strom, and Pete Stahl, PIs. Funded by Encana and WRRC. Completed Fall, 2012.

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

Use of sterile triticale to immobilize N (nitrogen) 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, PIs. Jen Faulkner M.S. Student. Funded by UW Agricultural Experiment Station., Encana, QEP, and 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. Matthew Jolivet, M.S. Student. Funded by GA Program WRRC. Research Initiated Fall, 2011.

What potential reclamation and enhancement sites have the most potential benefit to Sage Grouse? Melanie Murphy. PI; Beth Fitzpatrick, PhD Student. Started Spring, 2012. Funded by WRRC.

Improving marginal habitat restoration in western rangelands: ecological genetic and landscape approaches to Mountain Mahogany shrub land reclamation. Kristina Hufford and Peter Stahl. Funded by the University of Wyoming Agricultural Experiment Station. Started Spring, 2012

Phytoremediation and Bioremediation of Selenium Contaminated Soil at the Smoth Ranch/Highland Operation. P.D. Stahl, PI. Rachana Giri, M.S. Student. Funded by Cameco Resources. Research Initiated Fall, 2012.

Cheat grass Distribution in Wyoming: Management Prioritization. Brian Mealor, PI. Cara Noseworthy, M.S. Student. Funded by Wyoming Weed and Pest, WRRC. Initiated Fall, 2012.

Microcosm Study to examine potential for bioremediation of in-situ uranium well field aquifers. Kevin Chamberlain, John D. Willford, Peter Stahl, David Williams, Craig Cook, PIs. Funded by Cameco Resources. Research Initiated Summer, 2012.

Amending Soils for Successful Reclamation: Effects of Gypsum, Compost, Cover Crops and Other Amendments on Soil Physical and Biotic Properties. Funded by the School of Energy Resources and the WRRC.

Matching Funds

Private fundraising for an endowment has been ongoing for two years. However, donors were resistant to funding an endowment and were more interested in funding operational programs. Thus, effective July 1, 2011, the Legislature modified the endowment to permit matching of a strategic investment fund that would allow the WRRC to spend the dollars, including the corpus, as needed and based on input from involved stakeholders. The goal of placing the program on a solid base of public and private funding would be to attract seven pledges of $100,000 per year for five years. Corporate fundraising is already beginning to bear fruit. The WRRC began operating on funding provided by energy companies and state matching funds this summer. To date, the program has received corporate support of $375,000 which has accessed an equal amount of state matching funds. The program has over $200,000 in additional corporate support pledged for the coming fiscal year.

Status of Steering Committee

The WRRC Steering Committee is in place and has met twice. Members include those entities that have contributed to the operation of the center. A Technical Advisory Committee has also been formed to review research and other proposals that are requesting the center's support.