University of Wyoming
Wyoming Reclamation and Restoration Center
College of Agriculture and Natural Resources
Annual Report

OCTOBER 2017

[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 1990'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.

Over the years, the legislature has provided two funding streams to support the WRRC. A total of $1,166,000 in AML funds was appropriated in 2009 and 2010 for its general operations. The Center expended all of these funds on activities in conjunction with industry.

Also, in 2009, the legislature provide $1.5 million in AML funds as seed money for a $20 million endowment, of which the earnings from the corpus would provide ongoing support for the WRRC after the initial appropriation had been expended. The legislature later amended this provision to convert the appropriation to matching funds and provided permission to expend the corpus if necessary to fund the Center.

Financial update. To date the WRRC has received private gifts and pledge commitments eligible for State of Wyoming matching funds in the amount of $1,312,500.00. These gifts and commitments have been procured from three companies (Shell, BP, and Chesapeake) and three individuals (Mary Hay; Mary Jo Carson; and L Jean Martinez). Thus, $508,000 in gifts and pledge payments has been received in the past year. There is still $187,500 unclaimed by donors at this time; and there is an additional pledge outstanding of $32,000. Due to the energy industry downturn, fundraising from our key partners as listed above has become more difficult. Despite that, UW is committed to continue working to aggressively seek funds to support this program.

Program Update. The existence of the WRRC 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.

The Center's recent activities are noted below. They have been funded through earnings from the matching funds endowment and contracts with industry.

OUTREACH

- Organized and Hosted Wyoming Wildlife Habitat Restoration Workshop (8-9 September, 2016, Casper Events Center)

- Organized and Presented Modern Vegetation Monitoring Workshop (16 June 2016, Buffalo BLM Field Office and field location)

- Graf, N. and M. Curran. 28 June 2016. Sage-grouse Disturbance and Reclamation Database. WY-BLM Leadership Team Meeting. Lander, WY, USA.

- Curran, M.F and P.D. Stahl. 8 June 2016. Update on Statewide Reclamation and Restoration Efforts in Wyoming. Sage-grouse Initiative Team Meeting. Cheyenne, WY, USA.

- WRRC Director Pete Stahl served as President of the American Society of Mining and Reclamation from July 2016 to July 2017. Currently serving as Past-President on the ASMR National Executive Committee until July 2018.

- WRRC continues to be an important part of the Douglas Core Area Restoration Team in its efforts to restore Sage-Grouse habitat in this area. WRRC is responsible for the majority of long term monitoring occurring on the site.

- WRRC continues its work with WYGISC and WY Game & Fish Department in developing computer mapping tools for sage grouse habitat in the State of Wyoming. The work is funded by Wyoming Wildlife Heritage Trust.

- WRRC hosts and keeps current the Wyoming Reclamation Database which keeps records of all the disturbed and reclaimed lands in Wyoming as well as the status of reclamation/restoration efforts on disturbed lands. This database includes information on over 50,000 acres of reclaimed wellpads, coal mines and other surface disturbances in Wyoming. It is the only database of its kind in the western U.S and houses more data than the BLM reclamation database and the PAPO/JIO Database.

RESEARCH

- WRRC is cooperating with USDA-Agricultural Research Service, The Nature Conservancy, the Bureau of Land Management, and the Douglas Core Area Restoration Team to test a new seed enhancement technology designed to improve the germination and establishment of sagebrush seed. This new methodology, called seed pillows, incorporates sagebrush seed into small pillow-shaped agglomerations of water absorbent clay and organic matter that are designed to break down over the seed and provide suitable environmental conditions for

germination, establishment, and growth. Field tests were initiated in late 2016 and Spring of 2017. Greenhouse test are being planned.

- WRRC is working with Bureau of Land Management Field Offices in Rawlins and Buffalo and BLM officials in Washington, D.C. as well as a private vegetation monitoring company to test and evaluate new technology and methodology for monitoring reestablished vegetation on Oil and Natural Gas Wellpads in the process of reclamation. These new methods for vegetation monitoring have the potential to significantly reduce the amount of time and money spent on monitoring while also providing a permanent visual record of what was seen.

- WRRC is continuing to conduct research funded by the University of Wyoming School of Energy Resources to investigate potential uses of pyrolized coal and other coal products as soil amendments. These soil amendments would be used to in both agricultural and reclamation applications to improve soil physical and chemical properties. This project is one of a number studies included in the Carbon Engineering Initiative at the School of Energy Resources.

- WRRC received funding from the Douglas Core Area Restoration Team to conduct monitoring of sagebrush seedlings planted in 2014-2015 on East Antelope Road and other sites through 2017. Growth and survival for the different methods of sagebrush seed planting will be examined and evaluated. Over 30,000 sagebrush seedlings have been planted in the Douglas Core Sage-grouse conservation area.

- WRRC has been collaborating with the Agricultural Research Service (ARS), The Nature Conservancy (TNC), and Bureau of Land Management to further develop new digital photographic vegetation monitoring methods that are much more time efficient than the methods currently in use.

- WRRC and WYGISC received funding from the Wyoming Game and Fish Department to further develop landscape disturbance/land reclamation mapping tools for the state of Wyoming and add a web viewer to interact the WRRC Database and download PDF maps for users. We have been working to develop a web viewer that is capable of uploading current reclamation data into the WRRC database and statewide disturbance inventory. This on-line tool would enable examination of position, extent and attributes of disturbance and restoration activities proximal to each Sage Grouse Lek in Wyoming.

- WRRC is continuing research on impacts of oil and gas wellpads on ecosystem carbon dynamics. This study is investigating how disturbance associated with natural gas wellpads in western Wyoming is influencing ecosystem carbon fixation, storage and outputs compared to nearby sites not impacted natural gas development. WRRC has obtained additional funding from the Jonah Energy Company to continue this research into 2018.

EDUCATION

- Two graduate students, Taylor Crowe and Curt Smith, both partially funded by the Wyoming Reclamation and Restoration Center completed PhDs in Range Ecology and Watershed Management (Taylor with a certificate in Restoration Ecology) at the end of 2016. Amy Jacobs is finishing her M.S. thesis this fall semester and will obtain an MS in REWM as well as a certificate in Restoration Ecology. Amy was fully supported on funds from the WRRC.

    - Amy Jacobs MS.
    - Taylor Crowe PhD
    - Curt Smith PhD

- Four undergraduate students graduated in May of 2017 with the Reclamation Science Minor bringing the total number of students earning this minor to 93. Graduate certificates in Restoration Ecology have now been awarded to 38 graduate students.

- Amy Jacobs attending the Annual Meeting of the American Society for Mining and Reclamation in Morgantown West Virginia in April of this year and presented an oral talk about her research on sagebrush reestablishment in the Douglas Core Area.

- The student reclamation club, Restoration Outreach and Research (ROaR) is establishing an affiliation with the Society for Ecological Restoration (SER) to become an SER Student Association. ROaR also has a long standing affiliation with the American Society of Mining and Reclamation.

- Faculty affiliated with WRRC continue to receive inquiries regarding opportunities to obtain assistantships to study Restoration Ecology and Land Reclamation Science at the University of Wyoming. Availability of funding limits the number of graduate students in this field of study, not the number of interested students.