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## Bridger Plant Materials Center

### Year 2016 Progress Report of Activities



United States  
Department of  
Agriculture

Issued January 2017

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**AERIAL VIEW OF THE BRIDGER PLANT MATERIALS CENTER**

The Natural Resources Conservation Service (NRCS) Bridger Plant Materials Center (BPMC) is one of 25 Centers nationwide using plants to solve natural resource problems. These problems include soil erosion and degradation, water quality deterioration, invasive species, native habitat disturbance, mining and logging impacts, wildlife habitat loss, wetlands damage, and other conservation issues. Our work reflects the current needs identified by our field staff in a needs assessment. The development of new conservation technologies, training, plant testing and selection, and Foundation seed production are the primary products of the plant materials program. The BPMC serves Montana and Wyoming.

This document presents an overview of Year 2016 activities at the BPMC. For detailed information, contact the BPMC staff or Montana-Wyoming Plant Materials Specialist. All photos in this Progress Report are USDA-NRCS unless noted otherwise.

#### **Program Emphasis**

Although the BPMC addresses many resource issues, our current program emphasis is in the following areas:

- rangeland health
- cover crops and soil health

- technology transfer, training, and outreach
- pollinator and wildlife-friendly plantings
- woody plant establishment and selection
- native habitat restoration
- critical area revegetation

In 2016, on-going scientific collaboration and partnerships with Montana NRCS field staff, the Agricultural Research Service, National Park Service, Conservation Districts, and university staff continued. Several new studies were also initiated, including six cover crop trials, a pollinator establishment study, and a bluebunch wheatgrass Initial Evaluation Planting.

#### **Rangeland Health**

With vast expanses of range in Montana and Wyoming, rangeland health has always been at the forefront of the Montana-Wyoming Plant Materials program. Most of our current studies and projects address rangeland to some degree,



**RANGELAND FIELD PLANTING**

including pollinator planting establishment research, salt-affected site reclamation, riparian restoration studies with Agricultural Research Service (ARS), and acid and heavy metal impacted land restoration at Anaconda, Montana.

The main focus of our current rangeland health efforts involves renewed efforts collecting, evaluating, and field testing native plants for use in a variety of range applications. In 2016, the BPMC maintained or installed 14 seed increase fields of promising conservation species. The species in the most advanced stage of testing is silverleaf phacelia (*Phacelia hastata*), a product of the Anaconda project and an excellent pollinator and restoration species.

A study installed in 2014 examining the effects of seed age on field establishment and seed production of thickspike wheatgrass, slender wheatgrass, basin wildrye, western wheatgrass, bluebunch wheatgrass, and Nevada bluegrass was completed in 2016. The goal of the study is to determine whether or not seed age plays a factor in field establishment and seed production. Data from the study is currently being summarized and analyzed for a final report.



**SEED AGE STUDY**

A forb Initial Evaluation Planting was again evaluated in 2016. The goal of this study is to identify potential pollinator-friendly species for rangeland applications and which lend themselves to commercial production.

In addition, a bluebunch wheatgrass Initial Evaluation Planting installed in the spring was evaluated with hopes of identifying a local seed source(s) well-adapted to Montana and Wyoming climatic and environmental conditions.

## **Cover Crops and Soil Health**

Cover crop research continued in 2016 at the BPMC with the initiation of several new studies. Montana NRCS State and Area Agronomists installed replicated and garden trial studies testing various annual and perennial covers



**MUNG BEAN AND COW PEA VARIETAL TRIAL AT THE BPMC**

under various cropping systems. Varietal trials included cow pea, mung bean, and fava bean for use in Montana and Wyoming. Various annual and perennial legumes are also being trialed.



**SMALL-SEEDED FAVA BEAN STUDY**

The goal of these studies is to better understand which cover crops and varieties work well in Montana and Wyoming, and how to best integrate them into existing cropping systems.





**SEEDING FAVA BEAN AND PERENNIAL LEGUME STUDIES**

Results of non-replicated studies in 2015 testing various upland gamebird mixes for salt-affected sites were summarized in a final project report in 2016. The goal of this preliminary study, conducted in conjunction with Pheasants Forever, is to determine if cover crop mixes can be used to create suitable wildlife cover and food on marginal sites.



**TESTING UPLAND GAMEBIRD COVER CROP MIXES ON SALT-AFFECTED SOILS**

Dr. Emily Glunk with Montana State University continued her work at the Center testing cover

crops and alfalfa varietal trials which she established at Bridger in 2015.



**MONTANA STATE UNIVERSITY ALFALFA VARIETAL STUDY**

## **Technology Transfer, Training, and Outreach**

Publications such as Technical Notes and study reports are important methods of technology transfer for the BPMC, and represent a significant product and measure of our program. In 2016, six Technical Notes were completed by the BPMC with useful information for field staff, landowners, and the public.

Plant Materials TN MT-112. *The Salinity Tolerance of 18 Trees and Shrubs Tested on a Heavy-Textured Soil in South-Central Montana* summarizes the results of a long-term study at the BPMC, and correlates woody plant salinity tolerance with the USDA Soil Salinity Classification System.



**EM-38 SOIL SALINITY METER**

Plant Materials TN MT-113. *Lacey phacelia* *Phacelia tanacetifolia*, A Native Annual Forb for Conservation Use in Montana and Wyoming provides a general description and uses



**LACY PHACELIA IN A COVER CROP MIX**

for this honey bee, pollinator-friendly forb with soil health enhancement applications. Some preliminary performance results for this species are also described.

Plant Materials TN MT-114. *Sandberg bluegrass* *Poa secunda*, A Native Grass for Conservation Use in Montana and Wyoming describes the range, conservation uses, planting rates, stand establishment characteristics, limitations, and performance of Sandberg bluegrass, as well as describing adapted releases for Montana and Wyoming.



**SANDBERG BLUEGRASS SEED PRODUCTION FIELD**

Plant Materials TN MT-115. *Effect of Seedling Root Length on the Survival and Establishment of Plains Cottonwood* *Populus deltoides* in a

*Riparian Planting in Eastern Montana*. Results of this multi-year study in collaboration with the ARS



**PLAINS COTTONWOOD IN DEEP POTS**

station at Ft. Keogh in Miles City are presented. Results support the use of deep pots to increase seedling survival, and the importance of site selection for establishment and growth.

Plant Materials TN MT-116 *Sideoats grama* *Bouteloua curtipendula*. A Native Perennial Warm Season Grass for Conservation Use in Montana and Wyoming. This paper describes the range, conservation uses, planting rates, stand establishment characteristics, limitations, and performance of sideoats grama, as well as describing adapted releases for Montana and Wyoming.

Plant Materials TN MT-117. *Heavy Metal Analysis of Plants Tested in the Stucky Ridge Comparative Evaluation Planting*. This Technical Note describes the results of several years of



**BIOMASS SAMPLING AT STUCKY RIDGE, ANACONDA, MONTANA.**



plant tissue testing for heavy metal content and notes the potential implications of using the tested species for grazing applications. Look for these on the Montana NRCS homepage and Plant Materials websites.

There were numerous on- and off-Center tours, talks, and workshops in 2016. Staff gave presentations on a variety of subjects including developing a rangeland seeding plan (Miles City, MT), designing and establishing pollinator plantings (Worland, WY), establishing grasses for pasture and rangeland (Worland, WY), reclamation seeding (Cheyenne, WY), soil health and cover crops (Bridger, MT), and plains cottonwood deep pot study results and proper tree planting (Miles City, MT). Staff traveled to Glacier National Park in May to provide plant propagation training for Glacier Park staff, and to Yellowstone Park to provide seed collecting training. On October 18 through 20, the BPMC and Denver Service Center hosted a plant materials training workshop for National Park Service employees at Bridger with Park Service staff from Yellowstone, Glacier, and Grand Teton Parks attending.



**NATIONAL PARK SERVICE PARTICIPANTS FOR THE MATERIALS TRAINING IN 2016**

In Outreach activities, BPMC staff hosted a field trip to the Pryor Mountain area followed by a tour of the Center for the local 4<sup>th</sup> grade students. Staff participated in an annual high school career fair, a conservation district sponsored conservation day, and Arbor Day activities.



**BRIDGER ELEMENTARY SCHOOL FIELD TRIP**

Additional Outreach involved seed cleaning and vegetative plant propagation in collaboration with the Special K Ranch, a vocational facility in Columbus, Montana for special needs adults.



**SPECIAL K ROOTED CUTTINGS**

The staff also continued working with Dorj (Dorjderem Sukhragchaa), a Mongolian Fulbright Scholar attending Montana State University as he completed his Master's program testing the performance of several BPMC releases from our Anaconda project.





**DORJ (FAR LEFT) AND HIS EXTENDED FAMILY**

### **Pollinator- and Wildlife-Friendly Plantings**

Enhancement and establishment of pollinator-friendly plantings is an important NRCS conservation concern, and a high priority study area at Bridger.

In 2016 extensive evaluation and data collection of three pollinator studies was completed. In one study testing the proportion of grass used in pollinator plantings and the effect of seed carriers, new insight was gained on the



**HIGH RATE OF SLENDER WHEATGRASS PLOT AT THE BRIDGER PLANT MATERIALS CENTER**

appropriate amount of slender wheatgrass to use in a mix without inhibiting forb establishment. In the spring- and fall-seeded pollinator studies, species stability and persistence differences by season were identified.



**SEASONAL POLLINATOR STUDY**

### **Woody Plant Selection and Establishment**

Tree and shrub testing continued at the BPMC in 2016 with the maintenance of seed orchards of released selections, and the development and testing of new establishment techniques. The plains cottonwood deep pot study installed in 2011 at the Agricultural Research Service (ARS), Livestock and Range Research Laboratory



**COTTONWOOD DEEP POT STUDY AT AGRICULTURAL RESEARCH SERVICE, MILES CITY, MONTANA**

at Fort Keogh in Miles City, Montana, was completed and results published in a Technical Note. The study determined the survival of plants in conventional pots was substantially less than the deep pots, and that planting location also influenced seedling survival. Although growth of plants in conventional pots was initially slower, plant growth, size, and vigor in all pot sizes was similar after five years. Staff at the ARS station continue to collect soil moisture tension data at the study site in order to determine the seasonal and annual fluctuations in soil moisture with depth. Similar studies with bur oak and plains cottonwood installed at the BPMC in 2012 were evaluated again in 2016.



**BRIDGER PLANT MATERIALS CENTER COTTONWOOD DEEP  
POT SEEDLING STUDY**

A plant selection study comparing numerous seed sources of native riverbank grape was again evaluated in 2016 with the ultimate goal of releasing an additional species for riparian restoration.



**RIVERBANK GRAPE CUTTINGS**

## **Native Habitat Restoration and Enhancement**

Habitat restoration involves the reclamation of disturbed sites with an emphasis on increasing species diversity and the development of healthy plant communities. Many of the previously described aspects of the BPMC program contribute to native habitat restoration. Collaborative efforts with the National Park



**SEED INCREASE FOR GLACIER NATIONAL PARK**

Service have involved the collection, propagation, and re-establishment of native indigenous plant materials along re-constructed roadsides. This work has resulted in the development of many new propagation, planting, seed increase, and restoration strategies. Many of these new techniques lend themselves to other conservation practices useful to landowners. Parks utilize native plants to reduce soil erosion, compete with invasive plants, and improve the aesthetics on these disturbed sites. The BPMC collaborated with three national parks in 2016, including Yellowstone, Glacier, and Grand Teton.

## **Critical Area Re-vegetation**

### **A. Anaconda (DATR) Project**

Since 1995, the BPMC has been partnering with the Deer Lodge Valley Conservation District and the State of Montana to collect, test, increase, and release plant materials adapted to the acid and heavy metal contamination resulting from historic smelting operations in the Anaconda and Butte areas. To date, six accessions collected at the Anaconda Smelter Superfund Site in western Montana have been released to the commercial seed market.

In 2016, Joe LeFebvre, the DATR Project Leader, continued his focus on analyzing and summarizing DATR data and results. He also conducted research, completing an important Technical Note on the uptake of heavy metals by





**HARVESTING SILVERLEAF PHACELIA**

plants tested at Sticky Ridge Comparative Evaluation Planting. He conducted additional greenhouse experiments on breaking seed dormancy in silverleaf phacelia, and its tolerance to metal-affected soils. He also began developing the release documentation for silverleaf phacelia with hopes of a commercial release in the near future.



**SILVERLEAF PHACELIA GREENHOUSE STUDY**

## **B. Revegetation After Russian Olive Removal**

Data analysis of the extensive data collected from the post Russian olive removal study at the ARS Fort Keogh Livestock and Range Research Laboratory in Miles City, Montana, was completed in 2016. This ARS, NRCS Miles City Area Office, and Custer County Conservation District collaborative effort investigates strategies to establish both herbaceous and woody cover after Russian olive removal. All trees and shrubs were again for survival, height, and vigor in 2016, year five of the study.



**NATIVE PLANT COMMUNITY RESTORATION AT THE RUSSIAN OLIVE REMOVAL AND RESTORATION STUDY AT FORT KEOGH**

## **Seed Production**

Maintaining Foundation seed for use by commercial seed growers to establish fields of certified seed for retail is a large part of every PMC program, and is especially true for the BPMC since we maintain 31 releases. Maintaining a steady seed supply, equitably allotted, regardless of market demand, ensures commercial growers can quickly increase end-user supplies should demand spike, such as after a severe wildfire season. The seed harvest season at the BPMC extends from mid-June with alpine bluegrass until late December with Rocky Mountain juniper. Potential future releases include silverleaf phacelia and Woods' rose. Foundation seed is distributed through the Montana and Wyoming Seed Certification



**HARVESTING FOUNDATION SEED**

programs, with proceeds supporting graduate research at Montana State University and the University of Wyoming. A large portion of our cooperative efforts with the National Park



Service, Bureau of Land Management (BLM) and Deer Lodge Valley Conservation District (acid/heavy metal-tolerant project) involves seed increase and associated research.

### **Need More Information?**

There are several ways to obtain plant materials assistance and information in Montana and Wyoming. Begin by calling your local NRCS field

or area offices, or the Plant Materials Specialist in Bozeman, Montana. For project specific, Foundation seed, or other Center information, call (406)-662-3579. BPMC and Montana-Wyoming Plant Materials program information is available on-line. Access the BPMC links at the Montana NRCS homepage at <http://www.mt.nrcs.usda.gov/> or the national Plant Materials Program website at <http://plant-materials.nrcs.usda.gov/>.

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