
Bridger Plant Materials Center

Year 2015 Progress Report of Activities



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VIEW FROM THE BRIDGER PLANT MATERIALS CENTER (BPMC)

The Natural Resources Conservation Service (NRCS) Bridger Plant Materials Center (BPMC) is one of 26 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 program. The BPMC serves Montana and Wyoming.

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

This document presents an overview of Year 2015 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.

Research

Research is a significant component of the Montana-Wyoming Plant Materials program. In 2015, an effort to increase the amount of quantitative information garnered from our studies was initiated, which resulted in the collection of extensive data on stand establishment, species composition, shoot and root biomass production, soil salinity tolerance, and more.



FORAGE SAMPLES DRYING AT THE BRIDGER PLANT MATERIALS CENTER (BPMC)

Soil Health and Cover Crops

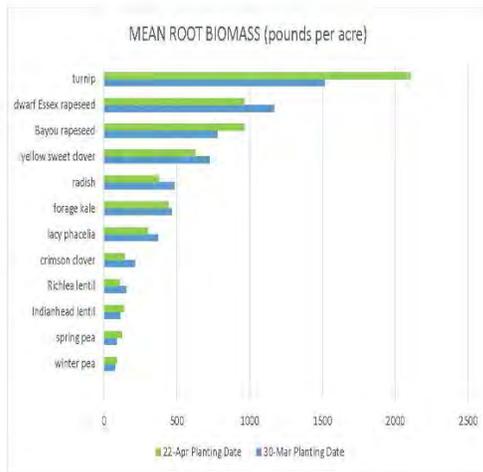
Cover crop research continued in 2015 at the BPMC with several new studies. A January frost seeding study comparing several mixes and individual species was established in 2015 in

order to determine if very early planting of cover crops is feasible or even beneficial. A second



LACY PHACELIA COVER CROP WITH HONEYBEE VISITOR

study investigating spring planting dates was also installed, comparing the performance of 12 species or varieties of cover crops. In conjunction



COVER CROP ROOT BIOMASS RESULTS

with Pheasants Forever, the Center trialed five different upland gamebird and two warm-season cover crop mixes on salt-affected soils. Data was collected on shoot and root biomass, soil salinity, and species establishment. This preliminary information will help BPMC staff design better cover crop mixes for salt-affected sites and perhaps improve utilization of these marginally productive lands for wildlife habitat purposes.



TESTING UPLAND GAMEBIRD COVER CROP MIXES ON SALT-AFFECTED SOILS

In addition, the Center collaborated with Dr. Emily Glunk from Montana State University on cover crop and alfalfa varietal trials which were established at Bridger in 2015.



MONTANA STATE UNIVERSITY ALFALFA AND COVER CROP VARIETAL STUDY

Training, Technology Transfer, and Outreach

After an extremely busy and proactive training effort in 2014, as well as the retirement of both science staff, the Plant Materials Center staff decided it would be prudent to offer select training in 2015. Staff participated in the National Employee Development Service (NEDS) salinity training held in Billings, and hosted the field laboratory portion of the course at Bridger with on-site training on tree and shrub salinity tolerance, salinity meter use, and more.

On June 11, the Center hosted its bi-annual field day, which was attended by about 70 participants. Participants toured the facilities and studies and were provided demonstrations on a variety of conservation topics.



FIELD DAY AT THE PLANT MATERIALS CENTER IN 2015

Mark Majerus, Earth Team volunteer, and former BMC manager, provided salt-affected site training in Havre and Highwood, Montana to an audience totaling approximately 100 people.



SALINITY TRAINING IN HAVRE, MONTANA

Written technology transfer, summarizing studies and other information into forms useable for NRCS field staff and other audiences, is an important function of all PMCs. In 2015 at Bridger, the staff produced four quarterly

newsletters with articles on a variety of subjects including cover crops and soil health, silverleaf phacelia, Russian olive seed burial depth study, snow deposition, cleaning Rocky Mountain juniper seeds, seasonal tree and shrub stresses, inoculating legumes, seed age study, proportion of grass in pollinator mixes study, and more. In addition, Technical Notes on sunflower, radish, New England aster, seeding depth of Russian olive seed study, restoring perennial grass structure and composition to cheatgrass-infested rangeland and pastures in western Montana, reducing silverleaf phacelia seed dormancy, and results from the Stucky Ridge Comparative Evaluation study on acid and heavy metal affected soils were developed and posted on the Montana NRCS and Plant Materials web sites.



POLLINATOR STUDY

BPMC Outreach efforts resulted in the production of nearly 1,000 asexually propagated cuttings of woody species for the Special K Ranch in 2015, whose mission is to provide special needs individuals the opportunity to live, learn, and work in an agriculture setting. The cuttings originated from a variety of sites in Montana and Wyoming, including state record-size "champion" trees, as well as plants from along the Jim Bridger Trail. Residents at the Special K Ranch will care for the plants until they are large enough to transplant in an urban forest or at their original collection site.



ROOTED CUTTINGS FOR THE SPECIAL K RANCH PROJECT

The BPMC also hosted an Outer Mongolian Fulbright scholar and Montana State University graduate student at the Center this summer. Dorj (Dorjderem Sukhragchaa) is interested in mined-land rehabilitation and plant community restoration. Dorj helped the staff with summer operations and learned about the Plant Materials Program, row crop cultivation, Foundation seed production, mined land reclamation, plant testing



DORJ (LEFT) AND JOE LEFEBVRE (RIGHT) AT THE MILL CREEK STUDY, ANACONDA, MONTANA

and selection, seed certification, and more. We traveled to the Miles City Area Office, the ARS Livestock and Range Research Laboratory, Wyoming State Seed Laboratory, Wyoming Seed Certification, commercial seed growers, and reviewed restoration projects in Yellowstone

National Park. Another highlight of the summer was a seed collecting trip to smelter-impacted areas of Anaconda in support of Dorj's graduate thesis. Dorj hopes to use his education and experience to improve reclamation efforts back in his homeland someday.

The Center was also involved in other Outreach activities in 2015, including assistance to the Worland High School with designing and installing a plant demonstration area, a botanizing field trip with Bridger Elementary students, a presentation to the Laurel Rotary Club, assisting the Sunburst High School with project designs, and providing technical support and test seed to several graduate students.

Pollinator- and Wildlife-Friendly Plantings

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

In 2015 extensive evaluation and data collection of three pollinator studies was completed. In a study testing the proportion of grass used in pollinator plantings and the effect of seed carriers, new insight was gained on the



GRASS PROPORTION AND SEED CARRIER POLLINATOR STUDY PLOT AT THE BRIDGER PLANT MATERIALS CENTER

appropriate amount of slender wheatgrass to use 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 2015 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 inspected and plant survival remains steady. This study will again be evaluated in 2016. The study aims at determining if long narrow seedling containers improve the early survival and establishment of this species. After four years, survival of plants in conventional pots was substantially less than the deep pots. Although growth of plants in conventional pots was initially

slower, plant growth, size, and vigor in all pots 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



SOIL POTENTIOMETER DATA FOR THE COTTONWOOD DEEP POT STUDY

BPMC in 2012 were evaluated again in 2015.



BRIDGER PLANT MATERIALS CENTER BUR OAK DEEP POT SEEDLING STUDY

A plant selection study comparing numerous seed sources (lines) of native riverbank grape was again evaluated in 2015 with the ultimate

goal of releasing an additional species for riparian restoration.



RIVERBANK GRAPE STUDY

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



ASTER 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. What began with a single cooperative effort with Yellowstone National Park has expanded to include projects with Glacier, Devils Tower, Craters of the Moon, and Grand Teton National Parks.

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.



SILVERLEAF PHACELIA HEAVY METAL TOLERANCE STUDY

In 2015, Joe LeFebvre, the DATR Project Leader, continued his focus on analyzing and summarizing DATR data and results. He completed Technical Notes on the Stucky Ridge Comparative Evaluation Planting, as well as on breaking seed dormancy in silverleaf phacelia, a promising native forb for use in metal-affected

soils and pollinator plantings. Joe also began other experiments investigating silverleaf phacelia germination and acid and heavy metal tolerance in 2015.



MILL CREEK TEST PLANTING, ANACONDA, MONTANA

B. Re-vegetation After Russian Olive Removal

Data analysis of the extensive data collected from the post Russian olive removal study at the Fort Keogh Livestock and Range Research Laboratory in Miles City, Montana, was initiated in 2015. 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 will again be evaluated for survival, height, and vigor in 2016, year 5 of the study.



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

Plant Cultural Trials

How to grow, culture, and establish plants, from seeds, containers, and cuttings, is an integral part of nearly every aspect of operations at the BPMC.

A study installed in 2014 examining the effects of seed age on field establishment and seed production of four differently-aged seed lots of thickspike wheatgrass, slender wheatgrass, basin wildrye, western wheatgrass, bluebunch wheatgrass, and Nevada bluegrass was again evaluated in 2015. The goal of the study is to determine whether or not seed age plays a factor in field establishment and seed production.



SEED AGE STUDY

Off-Center Field Plantings (FP)

It was a busy year in 2015 for the Plant Materials Specialist and field staff working on field planting studies. The 5-year evaluation of the Bales (Montana) winterfat/forge kochia planting (see MT PM technical note MT-92 for planting details) found for the first time a statistically significant increase in forage kochia density relative to winterfat within the disc and roll seedbed treatment because of a decrease in winterfat density, and not an increase of forage kochia. Forage kochia densities were not different than previous years in any seedbed treatment indicating it is not invasive under the disturbance treatments of this planting. About 60% utilization by cattle was observed on forage kochia but none on winterfat.

The 2-year evaluation of the Antley (Wyoming) pollinator planting on a saline site found

'Stillwater' upright prairie coneflower blooming in the drill rows where slender wheatgrass (used as a bioassay for salinity) had established suggesting that upright prairie coneflower has some tolerance to soil salinity.



'STILLWATER' PRAIRIE CONEFLOWER BLOOMING ON A SALINE SITE

The 2-year evaluation at the Gorst (Wyoming) pollinator planting found well established rows of 'Stillwater' upright prairie coneflower in bloom in a thatch of cheatgrass suggesting this species is competitive with the weed perhaps through niche partitioning. 'Maple Grove' Lewis flax was also in bloom on the plots and establishment of 'Medicine Creek' Maximillian sunflower and small burnet were also good.



'STILLWATER' PRAIRIE CONEFLOWER BLOOMING IN A THATCH OF CHEATGRASS

The 2-year evaluation of the Wheatcroft field planting (Wyoming) found good establishment of 'Anatone', 'Goldar' bluebunch wheatgrasses and 'Secar' and 'Discovery' Snake River wheatgrasses with slightly more vigorous plants in the 'Discovery' and 'Anatone' rows compared to the "Secar" and 'Goldar' rows.

The 2-year evaluation of the Pokorny (Montana) urban pollinator planting found "good" rows of 'Stillwater' upright prairie coneflower and 'Medicine Creek' Maximillian sunflower, "fair" rows of 'Maple Grove' Lewis flax, and "poor" rows of 'Antelope' slender white prairie clover and 'Bismarck' purple prairie clover growing in the smooth broom. 'Goldar' bluebunch wheatgrass and 'Covar' sheep fescue rows were rated "fair" to "good", and both species went to seed. The coneflower flowered in mid-summer and produced seed, only 10% of the sunflower flowered under late season drought, only a few flax flowered, and no prairie clover bloomed under smooth broom competition.



'STILLWATER' PRAIRIE CONEFLOWER BLOOMING IN SMOOTH BROME

The Berry Demonstration (Montana), in its third year, is well established and an excellent demonstration of most of the available conservation species for use to enhance natural resources on a 14-inch precipitation range site. The demonstration is an excellent resource for plant materials training for NRCS personnel and the producers they serve.

The Pinedale Wyoming critical area field planting on a gas exploration well pad had its 10-year

evaluation in 2015 and the results are currently being analyzed. The planting tested native grasses, forbs, and shrubs drilled as monocultures in replicated plots and drilled or broadcast in mixtures.

The Hanna, Wyoming, pollinator field planting had “excellent” stand establishment and vigor of blackeyed Susan, ‘Stillwater’ upright prairie coneflower, ‘Meriwether’ blanketflower, and ‘Medicine Creek’ Maximillian sunflower. ‘Great Northern’ yarrow had “good” stands and vigor, silverleaf phacelia had “fair” stands with “good” vigor, and ‘Maple Grove’ Lewis flax, ‘Old Works’ fuzzytongue penstemon, and New England aster were rated “failures”, however the latter two have seed dormancy requiring fall planting, so they may emerge next year.

The first year evaluation of the Trueck pollinator demonstration near Stanford, Montana, found densities of 5 plants per foot for silverleaf phacelia, 1 plant per foot for ‘Maple Grove’ Lewis flax, and 0.3 or less plants per foot for ‘Medicine Creek’ Maximillian sunflower, ‘Stillwater’ upright prairie coneflower, ‘Great Northern’ yarrow, ‘Meriwether’ blanketflower, and ‘Antelope’ slender white prairie clover. No ‘Bismarck’ purple clover were found.

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



HARVESTED SEED FROM A FOUNDATION SEED PRODUCTION FIELD

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.



SEED PRODUCTION FIELD AT THE BRIDGER PLANT MATERIALS CENTER

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. Much of the 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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