Year 2007
Lockeford Plant Materals Center
Progress Report of Activities

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PMC Research, Studies & Activities

The Lockeford Plant Materials Center is addressing the following priority issues:

- Determine through field trials establishment methods of native plants
- Promote studies which result in increased storage of carbon in soils
- Research Giant Wildrye and Tall Wheatgrass for use as an alternate energy source
- Assist in restoration of native habitats
- Produce and establish endangered species
- Encourage the use of the NRCS field planting program to test plant materials
- Establish methods of restoration on land after invasive species removal
- Conduct rangeland variety trials to improve forage availability
- Research mycorrhizae seed coatings
- Promote hedgerow establishment of culturally significant plants with Native Americans
- Establish a California Brome study with contract assistance
- Provide plant materials training to NRCS staff

The mission of the California plant materials program and the Lockeford Plant Materials Center (PMC) is to develop and transfer effective state-of-the art plant science technology to meet customer and resource needs. There are 26 PMCs nationwide, each serving a particular geographic area. The Lockeford PMC serves the Mediterranean climate portions of California.

The Lockeford PMC was established in 1972, to develop promising plants and test their performance under a variety of soil, climatic and use conditions. Over the past 50 years, 30 plants have been released for commercial seed production to solve soil and water conservation problems.

Left: *Dave Dyer, Lockeford PMC Manager, planting the seeded plot treatments at the Arundo CFT site.*

Below: *Arundo donax removal demonstration Conservation Field Trial (CFT) project on Callegusas Creek, Ventura County, California. Replicated re-vegetation plots were established to determine the best methods. Casey Burns, NRCS Biologist, Somis, has provided key leadership in this effort and is available to provide information to NRCS field offices interested in learning about the process for establishing a CFT. The Lockeford PMC staff and Resource Technology Section staff in Davis can also help if you have CFT questions.*

Left: *New release of Select Class LK 621e Germplasm, Western Needlegrass, Achnatherum occidentale, which was collected at an elevation of 4600 feet in Modoc County, California. Western Needlegrass is a California native, cool season, perennial bunchgrass that is suitable for erosion control and quick, self-perpetuating cover. It is also considered fair to good forage for cattle, horses, sheep and deer.*

Most of the following studies and Conservation Field Trials were requested from NRCS field office staff. NRCS field office staff and other agencies worked closely with Dave Dyer, PMC Manager, in developing these projects, and in many locations, the field office staff took the lead. Many landowners helped with site preparation, plot lay out, fencing, planting and application of treatment materials and management treatments. Also, due to NRCS field office and Lockeford PMC staff networking efforts, many NRCS partners, such as the UC Cooperative Extension and Resource Conservation Districts helped make these studies happen.

Republic of Congo International Assignment

Embassy Science Fellow Dave Dyer provided agronomic, soil science and agriculture development assistance, along with technical assistance in soil erosion, watershed protection and conservation planning. An additional purpose was to provide assistance to the Congo School Gardens Program, which has the goal of improving in-country food security. The assignment took place October 27 to November 24, 2007.

The Republic of Congo (RoC) has great potential regarding agriculture development. The natural resource base can support a large increase in food production. RoC has ample water supplies for dry season irrigation, a good climate, in country fertilizer resources and soils that can be managed for optimum output. There is a need to aggressively promote private sector credit, fertilizer and seed supply and distribution. There is great opportunity in RoC to promote rural growth which will greatly reduce poverty. Roads and railways are targeted for improvement which will allow faster rural growth and modernized agriculture methods to be utilized. Agriculture research and extension needs to be expanded and narrow effective priorities established.

Above: *Dave Dyer, Lockeford PMC Manager, obtaining soil samples in the Republic of Congo.*

Bureau of Reclamation Project

The PMC just completed a $100,000 project with the Bureau of Reclamation (BOR) that provided a means to augment the limited supply of native San Joaquin Valley plant materials for use in the large-scale restoration efforts on 200,000 acres of retired agricultural land. The project involved working with BOR, the Bureau of Land Management (BLM) and the Endangered Species Recovery Program (ESRP).

Left: *Jim Hutson, Former PMC Seed Specialist, provides seed cleaning information to BOR staff.*

NRCS Natural Resources Conservation Service

Yellow Larkspur Project

Endangered Delphinuim luteum, Yellow Larkspur was evaluated under an agreement with the U.S. Fish & Wildlife Service for seed production and propagation methods. With one of the flowering plants producing six seeds, it can be concluded that Yellow Larkspur can be grown at the Lockeford PMC. Moreover, seed could be grown in quantities to assist in recovery if seed viability and germination levels could be improved.

Delphinuim luteum

National Park Service Projects

Above: *Purple Needlegrass will be used to restore new road cut and fill slopes in the Golden Gate National Park.*

Golden Gate National Park

During FY07, Nassella pulchra was grown at the Lockeford PMC for maximum seed production. A total of 160 grams of pure live seed (PLS) was produced at the PMC. The first year seed production was expected to be low. This project started in FY07 and will be completed in FY08. The overall goal of the project is to produce a minimum of 150 PLS pounds. This goal was adjusted to 90 PLS pounds due to the .60 acre field size.

All initial seed collection was accomplished by the park staff. The seed was then cleaned by PMC staff and tested by a seed laboratory. The initial cleaned seed was then used to direct seed one species, Nassella pulchra, on 30 inch rows. The area planted was .60 acre. The agreement goal was to direct seed one acre. However, all seed cleaned was used to plant the .60 acre field. The 160 grams of seed grown, harvested and cleaned at the PMC in FY07 was not enough to plant the additional .40 acre in FY08, (Oct. 2007). The field area was harvested using a FlailVac harvester. All seed was cleaned and tested.

Sequoia/Kings Canyon National Park

During FY07, four different species were grown at the Lockeford PMC for maximum seed production. A total of 45.8 pounds of pure live seed (PLS) was produced at the PMC. This project started in FY07 and will be completed in FY08. The overall goal of the project is to produce a minimum of 27 PLS pounds.

All initial seed collection was accomplished by the park staff. The seed was then cleaned by PMC staff and tested by a seed laboratory. The initial cleaned seed was then used to direct seed two species (two accessions each, Elymus glaucus and Bromus carinatus) on 30 inch rows, 1/4 acre each for a total of one acre. The four field areas were harvested using a FlailVac or combine harvester. All seed was cleaned and tested. Also, a number of small seed collections were cleaned for later use in park restoration seeding.

Left: *Elymus glaucus*
Right: *Bromus carinatus*

Yosemite National Park

During FY07, two different species were grown at the Lockeford PMC for maximum seed production. A total of 37.61 pounds of pure live seed (PLS) was produced at the PMC. The PMC propagated 8,000 plugs for transplanting on an area which was covered with weed control fabric. The fabric allowed shattered seed to be vacuumed up with no soil.

This project started in FY07 and will be completed in FY09. The overall goal of the project is to produce 140 PLS pounds of seed.

All initial seed collection was accomplished by the park staff. The seed was then cleaned by PMC staff and tested by a seed laboratory. The initial cleaned seed was then used to propagate plants for placement on fabric (5,000 sq. ft. area) of two species (Lupinus grayi - LUGR 9083072 and Lotus crassifolius LOCR - 9083071). The PMC propagated 1,200 Lupinus and had enough plants to plant 2,500 sq. ft. Thirty percent died in the field and the rest had poor seedling vigor. PMC used all of the seed and the park will need to collect more. This species did not produce seed in FY07.

The PMC propagated 8,000 Lotus plugs, the seed lot from the park had 0% germination, 25% hard seed, so the PMC seeded heavy. Very few plants came up (131 plants) after trying three seed treatments (hot water and scarification). The plants that did come up had poor seedling vigor but did improve when they were planted on the fabric. There was 500 sq. ft. planted. This species did not produce seed in FY07, and the park will need to collect more seed. The PMC will plant additional species on the fabric area in FY08.

Direct seed two species (Poa secunda - .25 acre and Bromus carinatus - .75 acre) on 30 inch rows, one acre total. The two species planted in the fabric area did not produce seed the first year. The two direct seeded species were harvested using a FlailVac or combine harvester. All seed was cleaned and tested. The Poa was a poor seed producer.

Meetings, Tours & Trainings

Dennis Frommelt, Lockeford PMC Farmer, providing pesticide use training to new NRCS staff.

California NRCS Plant Materials Committee reviewing plant material issues in the Moss Landing area.

Natural resources and agricultural awareness training being given to school teachers.

Field Plantings

Field plantings are used to insure particular plants are suitable to a given site and set of conditions. Seed or plants will be purchased for field office use on a case by case basis, so please contact the Lockeford PMC to determine availability. The majority of seeds purchased are California natives, but the PMC also has introduced species available. The field-planting program allows NRCS to get a better understanding of the seeding rates, establishment and maintenance of native plants. This information will be used to update the vegetative guides.

Field plantings address many resource problems and help field offices determine the best plant for various practices. Some of the field planting purposes are for range, weed control, erosion control, wildlife restoration/nesting and bank stabilization. Now is the time to request shrubs to be propagated so they will be ready this fall. As with any field planting, a PM-9 (field planting request form) must be submitted.

New PMC Staff

Christina Smith was hired under a term appointment in November 2007, as a PMC Agronomist. Her goal is to provide as much plant materials assistance as possible to NRCS field office staff.

Plant Materials Program Web Site

If you are looking for information on vegetative solutions to conservation problems or would like copies of the Lockeford PMC technical notes, please go to the Plant Materials Program Web site at http://plant-materials.nrcs.usda.gov.

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