This report highlights some of the activities at the Lockeford Plant Materials Center (CAPMC) during 2017. Our major Resource Concern Areas are Soil Health and Water Quality and the studies conducted at the CAPMC during 2017 develop and disseminate plant materials based information to support conservation in California.

The extreme drought affecting California for 4 years broke in 2017 with double the annual rainfall. The CAPMC is adjacent to the Lower Mokelumne River, and river flows were consistently high with approximately half the CAPMC fields flooded due to the high water-table. Severe erosion occurred in one portion of the levee, which fortunately did not breach, and was repaired under an Agreement with the Lockeford Protection District in August 2017 (Figure 1).

Erosion along the levee on May 8, 2017: Mokelumne River flows were very high, consistently at 5,000 cubic feet per second for most of the winter and spring.  

Levee repaired, September 13, 2017: Note the river flow much reduced.

Figure 1. Damage to the levee along the Mokelumne River caused by high river flows over the winter and spring and following levee repair in September.

Studies

The CAPMC continued to work on several multi-year studies during 2017 including the second year of the National Adaptation Cover Crop Trial (Figures 2 and 3), the Degraded Cropland (Range) Compost Trial, and a Warm Season Cover Crop Trial (Figure 2). Due to flooding in parts of the CAPMC no data could be collected from two planted trials: a Single Species Cover Crop Demonstration or the Drought Tolerant Cover Crop Trial, both planted in the fall of 2016. Two new studies were planted in the fall of 2017 in collaboration with Xerces Society. An Insectary Cover Crop Trial that includes several mixes for almonds, vineyards and walnuts to assess cover crop survival and soil health under management regimes of mowing, disking and herbicide use, as well as a Milkweed Establishment Trial with three milkweed species, established from seed, plugs and rhizomes.
Field Plantings

Field Plantings are an opportunity for the CAPMC to collaborate with NRCS field offices (FO) on a study or demonstration with the aim of providing information that is directly applicable to their situation. Field office planting projects for 2017 included: increasing infiltration in a walnut orchard in San Joaquin County with the Stockton FO, monitoring drought resilience in walnut and almond orchards in Tulare County with the Visalia FO, and monitoring soil health properties in a prune orchard in Sutter County with the Yuba City FO (Figure 3). Other field plantings with the University of California (UC) Cooperative Extension included a perennial grass seeding trial at Yanci Ranch and a UC Division of Agriculture and Natural Resources study at the UC Sierra Foothill Research and Extension Center evaluating California grass species response to climate change stressors.

These field plantings are organized with approval from the State Plant Materials Committee and Area Resource Conservationists. Initial data from the Sutter County prune orchard planting indicate increased aggregate stability and water infiltration in cover cropped middles compared to tilled soil and resident vegetation. For more information on these field planting projects please contact Valerie Bullard, PMC Agronomist.
Soil health assessment with Sonya Miller from the Stockton Field Office in a walnut orchard in San Joaquin County, August 2017.

Drilling a cover crop mix for a field planting in a walnut orchard in San Joaquin County, December 2017.

Cover crop field planting in a prune orchard in Sutter County, March 2017.

Cover crop field planting in an almond orchard in Tulare County, November 2017.

Figure 3. Field Plantings in 2017 with thanks to the Stockton, Yuba City and Visalia Field Offices.
Trainings

- Plant Materials training and tours were held on 2/16/17 and 3/16/17 as part of Orientation for New Employees.
- Plant Materials Regional Workshop and Training for staff from all PMCs in the Western Region was held on 3/6 -3/9/2017.
- A Cover Crop Training for NRCS staff featuring the CAPMC studies and plantings, and a grower panel was held on 3/15/2017 (Figure 4).
- A NEDC Soil Health Training was held in Lodi with field time at the PMC on 10/31- 11/1/2017 looking at the effects of different management practices on various aspects of soil health.
- Sacramento Valley Range and Pasture Seeding Workshop was held for Area 1 employees at the PMC on 11/14/2017 (Figure 4).

Outreach- Presentations, and Tours at the PMC

Activities at the PMC depend upon our partnerships and collaborations with natural resource groups and these continue to expand. Active partners included the East Stanislaus and San Joaquin Resource Conservation Districts, and Non-profit organizations including the Xerces Society, Sustainable Conservation, the Intertribal Agriculture Council and the Lockeford Protection District. Use of the PMC as an outreach site continued with the following events held at the PMC (Figure 5):

- California Rangelands Coalition on 1/12/2017.
- Open House on 4/5/17 had 75 participants including producers, NRCS and RCD employees, and the public. One session focused on Irrigation Water Management and the second examined soil health and cover crop studies (Figure 5). Our lunch sponsor was the San Joaquin RCD.
- Professional Soil Scientists Association of California Field Tour on 4/21/2017.
- Area 3 DC Meetings and All Employee Meetings on 2/7, 8/24, 10/31 and 11/1/2017.
- Visits from 5th and 6th graders from 4 local schools on 3/14, 5/19 and 12/12/2017.
- The Center for Land Based Learning, held a FARMS (Farming, Agriculture and Resource Management for Sustainability) training day at the PMC on 12/4/2017, with mentors and students from local high schools learning about cover crops, planting, and data collection.

Valerie Bullard and Margaret Smither-Kopperl, demonstrating cover crops in the National Adaptation Cover Crop Trial during the Cover Crop Training, March 15, 2017.


Figure 4. Training events held at the PMC during 2017.
International visitors included a Chinese Delegation with the California Crop Improvement Association on 3/21/2017 and Cochran Scholars from Mexico, with the Agricultural Research Service California Climate Hub on 9/28/2017.

Figure 6. Examples of Outreach events held at the PMC during 2017.

Tribal Outreach

The high flows in the Mokelumne River and flooding, meant that there was less gathering by local tribal members at the CAPMC during 2017 than is usual, but the following activities occurred.

- In partnership with the Intertribal Agriculture Council we hosted three undergraduate interns, including Ellen Sanders-Raigosa who worked with elders in their own tribes and on plant propagation of native plants of cultural significance to their tribes.
- UCANR workshop: “Creating Partnerships with Native American Tribes” was held at the PMC on 3/22/2017 (Figure 7).
- American Summer Institute for Native American High School students from California and surrounding states, held at the PMC on 6/26/17.
Tribal elder Jennifer Baker demonstrates basketry for UCANR workshop: “Creating Partnerships with Native American Tribes.” Local tribal members who gather plant materials at the PMC attended the training to provide their insight for the visitors who were mainly extension agents.

Figure 7. Outreach with Indigenous Stewardship Methods and Native American participants at the Lockeford PMC.

Technical Documents

Publications produced during 2017 included the following and are posted with other CAPMC publications to: [https://www.nrcs.usda.gov/wps/portal/nrcs/main/plantmaterials/pmc/west/capmc/](https://www.nrcs.usda.gov/wps/portal/nrcs/main/plantmaterials/pmc/west/capmc/):

- Tech Note 85. Cover Crop Seed and Native Seed Vendors for California.

A revised version of the eVeg Guide (Version 4) [http://www.calflora.org/nrcs/index.html](http://www.calflora.org/nrcs/index.html) was released on November 15, 2017 for initial testing for improvement. This is the result of extensive work by Dr. Ken Lair, with input from Area Offices, State Office Leads and CAPMC staff over the past year.

The Lockeford Plant Materials Center

The Lockeford Plant Materials Center is a 106- acre facility located in the Central Valley of California and is the only PMC within the state. There are 27 PMCs around the country, with each one serving a specific ecological and geographic area. The CAPMC addresses the resource concerns within the Mediterranean climate areas of California. We work with NRCS field offices, public agencies, universities, conservation organizations, tribes, commercial seed producers and nurseries.

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