## **BEMP Vegetation 2011**

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Each year the BEMP vegetation crew compiles a brief report of field observations. We record significant observations or questions that might be worthy of analysis using the Bosque Ecosystem Monitoring Program's long-term dataset. This year we added some new botanists to the vegetation crew. Molly Padgett, Jeremy McClain, and Matt Gautreaux are pictured above, right to left. Maya Kapoor, not pictured, also contributed to this year's efforts. Kristen Weil also contributed her botanical skills and we were very grateful to have her with us at some sites.

2011 was characterized by drought conditions in the Bosque. Spring precipitation was lacking in much of the state. The National Weather Service reported that in the first four months of the year, both the Albuquerque and Roswell Airports had recorded the driest start to any year since 1900. Winter and spring moisture are critical periods for seed germination and for sustaining perennial plant species. Most of the 25 sites monitored showed major declines in annual cover and some die-off in perennial plant species in 2011. The changes at some sites were remarkable. While the cover photo at the Crawford Site looks fairly lush, there were major reductions in the diversity and cover recorded at this site. Many of the annual species didn't come up and those that did were present in low abundance (e.g., flatsedges, sunflowers and cockle bur, in the genera Cyperus, Helianthus, and Xanthium). The woody perennials are still competing for resources here, and while there have been shifts in native and exotic cover it is not yet clear what the future make-up of the lowered portion of the site will be.

Drought conditions also contributed to extreme fires in the Jemez Mountains this year. The Las Conchas fire burned 244 square miles of this mountain range. Runoff from the fire-scarred mountains washed huge amounts of ash into the Rio Grande which lead to an enormous fish kill in the river. As can be seen in the photos below there was a major change in the river following the fire (compare the 2006 photo at Kewa Pueblo with the photo taken in 2011). It is unclear what effect this will have on vegetation in the Bosque but the impacts on water quality and aquatic life were severe. It will be interesting to see if the changes in nutrients and water chemistry have an influence on the river terrace and floodplain vegetation in the coming years or if those changes can be detected with the current BEMP monitoring design.



Kewa 2006



Kewa 2011

There are also major vegetation shifts taking place in parts of the bosque due to beaver (*Castor canadensis*) activity. If you've visited the Diversion Site lately you will notice it has changed dramatically over the past year. Beavers are herbivorous rodents that are widespread and common in the bosque. They have a specialized digestive system that allows them to digest up to a third of the cellulose from tree bark and other woody material they eat. Beavers also eat leaves, roots and twigs but we primarily see evidence of their presence on tree trunks where they target the cambium for food or logs. The cambium produces new layers of xylem and phloem necessary for maintaining tree health. Beavers eat around the base of trees and often kill the tree above the scar. Starting in 2010, Beaver have taken down many of the Rio Grande cottonwoods (*Populus deltoides* ssp. *wislizeni*) that once dominated the Diversion Site. Beaver have felled many trees in this area, most notably the cottonwoods, but they have also scarred and removed Russian olives (*Elaeagnus angustifolia*). Elsewhere in the bosque we've seen evidence of beavers felling Goodding's willow (*Salix gooddingii*), Siberian elm (*Ulmus pumila*), and coyote willow (*Salix exigua*).



Cottonwoods felled by Beaver(s) at the Diversion Site.



Beaver herbivory of a Rio Grande Cottonwood at the Diversion Site.

In addition to the ecological changes taking place in the bosque, there is always something new to discover and enjoy. Camouflaged and small, the Clouded Crimson Moth (*Schinia gaurae*) spends its days in velvetweed (*Gaura mollis*). This pair caught our eyes at the Crawford site this year. The pinks, whites, and greens of insect and plant blend into one unless you take a closer look. A brief search on the web reveals that *Schinia gaurae* not only feeds, nectars, rests, and lays eggs on species of *Gaura* but is also a suspected pollinator. There's an intimate relationship between insect and plant which likely benefits both species and is worthy of further investigation. Perhaps if we look closer yet again the separation between these organisms will diminish even further.



**life history** (<u>http://www.entomology.ualberta.ca/searching\_species\_details.php?s=282</u>): "Adults are apparently mainly nocturnal and come to lights, but are also diurnal, especially at high population densities. At such times they may be found flying around the blossoms of *Gaura* in the late afternoon. The larvae, which feed exposed on the flowers of the host, are brightly colored yellow, black and whitish and greatly resemble small specimens of the Monarch butterfly."

More web discussion of *Gaura* spp. and *Schinia gaurae*: http://thevasculum.blogspot.com/2008/12/love-affair-of-gaura-biennis-and.html

http://www.jdcf.org/guardians/field/field\_n106.htm

As always it was good to explore the vegetation in the bosque. While there is always a difference from year to year at any given site the stark contrast with wetter years was apparent without analysis at almost every site in 2011. Capturing all of the annual conditions over time should lead to some pretty interesting observations about the river and the bosque. I had hoped to include more about the fish kill but so far I've seen little information about this significant event. This event caused major changes within the river but it would be interesting to know what effect it had on groundwater chemistry and soil chemistry at the BEMP sites. If more information comes to light I'll send out another draft.