



Refuge Update

January 2024

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Board meetings are held the third Tuesday of every month; all are welcome. The next regular Board meeting is February 20th, 2:00PM at the Visitor Center. To attend via Zoom, please contact the [Amigos](#). (Our 2024 Annual Meeting is January 20th, see p. 6)

Refuge Manager's Update

Jeff Sanchez

As a lot of you know, we are in the process of building our refuge team. This includes an Administrative Officer and Wildlife Refuge Specialist, both of which should be listed on USA Jobs within the year. We will also be starting the process of hiring a new Visitor Services Specialist. Even better news, I am very excited to announce that our new Refuge Biologist, Samuel Vassallo started December 18th here at the refuge. Samuel comes from Audubon NWR located in North Dakota, where he served as the Wildlife Refuge Specialist after working his way through the Directorate Fellowship Program. Samuel brings a great personality and passion for biology. He has experience working with cattle grazing permits, volunteers, and everything it takes to run a refuge. The only bad thing about Samuel is that he is a Dallas Cowboys fan... YUK!!! Seriously, we are super excited to have Samuel join the team, so please come say hello when you get a chance.

On a different note, the Sevilleta NWR and New Mexico Invasive Species Strike Team staffs have

submitted a grant proposal to receive \$1.5 million to eradicate feral horses and trespass cattle from the refuge. If the grant is accepted, we will have the opportunity to enhance our problem fence areas, build water gap fences designed to handle high water events, implement protection measures around sensitive springs/seeps and drinkers, conduct arial monitoring efforts, and



implement non-lethal methods of removing feral horses.

Some of you may wonder why we would want to remove horses and cattle from the landscape. Here are a few facts that have led to this approach. The refuge harbors a sensitive desert system that is not adapted to intensive grazing herbivores for



extended duration. The plant community within this sensitive desert system is adapted to minimal seasonal grazing by elk, deer, rabbits, etc. As the horse and cattle populations increase, so does the impact to plants and native animals, which we are obligated to protect/enhance under our establishing criteria written within our Warranty Deed.

In addition, horses and cattle tend to congregate around springs, seeps, and drinkers due to



availability of needed resources to survive. When these non-native animals along with native large-bodied mammals occupy these sites, the negative impacts to the vegetative community and ground compaction are greatly increased. On top of that, horses tend to feed on vegetation by grabbing the plants with their mouths instead of cutting the plants with teeth, thus, they pull and uproot the plants. As you can imagine, this can be detrimental to a desert plant that is adapted to being clipped and not pulled. Restoration for such disturbances can take up to 65 years in most desert systems! Also, thanks to a water quality investigation put in place by one of UNM's REU students last summer, we found that one of our wildlife drinkers was reaching the threshold to be unsafe for wildlife consumption due to water quality as a result of feces and urine contributions



associated with horses and cattle. Hence, the reason we intend on placing protection infrastructure around these sensitive springs, seeps, and drinkers to deter non-native animals from entering these areas, but still allow native wildlife to visit un-impeded. Stay tuned for future discussion about infrastructure designs.

Lastly, we have noticed in recent years that some of the horses are in visibly poor condition, with issues pertaining to their hooves and/or obvious

dietary needs. While at the same time, we see them with young of year animals and no indication of predators that would serve as their biological population checks in their natural setting.

We really hope to get this grant so that we can begin this effort with a plethora of resources and focused efforts. We intend to move forward with this approach regardless of whether the grant

application is approved or not, however, it will take much longer to accomplish the goals.

Unfortunately, this funding will not help me eradicate Dallas Cowboys fans from New Mexico, but it will help me feel better, knowing that we're doing the right thing for the refuge and my favorite football teams' mascot. GO BRONCOS! Happy Holidays Everyone! ❖

President's Message

Colin Barnett

As many of you know, Sevilleta is the site of the NSF-funded Long Term Ecological Research project (LTER). Scientists from UNM, NM Tech, and other institutions conduct, as the name implies, long-term research projects at the refuge. I recently helped a group of researchers adjust the "Mean-Variance Experiment" that is designed to measure the effect of annual variance in rainfall on plant growth and species composition. To do this, equal

area plots in a remote area of the refuge are defined. Some of the plots have transparent strips of plastic arranged over them to catch and funnel water away from the ground, whilst still letting light through. The water that is intercepted is captured and sprayed on an adjacent plot. There are also control plots that have plastic strips over them but these strips do not intercept the water; their purpose is to account for the effect of plastic



The black container stores water from one plot to be pumped to another plot. Solar panels provide power. Photo: Mariah Patton

strips independently of water. Thus, there are a few different conditions these plots account for: 50% less rainfall, 50% more rainfall, 75% less rainfall, 25% more rainfall, and control plots which maintain ambient rainfall and variance. Part of the protocol for this experiment requires that a randomly selected set of plots subjected to one of

these conditions be switched to another condition after 6 months. Switching is done by detaching the tent-like structure holding the plastic strips and swapping it with another structure in a different plot. In October I volunteered to lend a hand with this. I'm very pleased that Sevilleta is available for this type of long-term research. ❖



Left: plastic strips catch water and release it into a pipe which fills a reservoir container. Right: inverted plastic strips let water fall to the ground. Photos: Mariah Patton

New Refuge Biologist

Rex Myers

Samuel Vassallo is the new face at Sevilleta NWR starting in December as refuge biologist. A Los Angeles native, he attended California's Humboldt State University and spent the last three years at Audubon NWR in North Dakota, along the Missouri River. Samuel is delighted to have moved to the Rio Grande. He enjoys volunteer activities, rock climbing, bird watching, as well as learning about new plants and animals. He's already birded on the refuge as part of the Christmas Bird Count and is waiting for spring when desert lizards reappear and he can get acquainted. On behalf of Amigos (and all refuge plants and animals) Welcome to Sevilleta. ❖

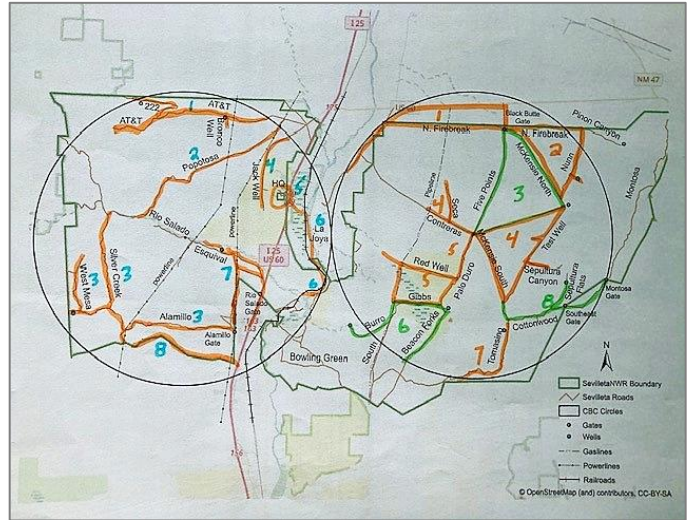


Christmas Bird Count 2023

Rex Meyers

Eighteen staff, former staff, and volunteers participated in Sevilleta's annual Christmas Bird Counts December 15 and 21. There are two bird count circles, each 15 miles in diameter – one on the east side of the refuge, the other on the west side. Binoculars in hand, counters start at day break and count types of birds and total numbers seen. The international count began in 1900 and is

one of the largest citizen science projects in the world. Since 1973, 266 bird species have been seen on the refuge. Christmas bird count totals are more modest, between 50 and 100 species, per circle, at best. For bird watchers, the count is both fun and rewarding. If you are interested in participating in future counts, contact the refuge. ❖





Sevilleta NWR has been selected by the US Fish & Wildlife Service to establish a self-sustaining population of Bolson Tortoises, the largest and rarest of the tortoises native to North America. Learn how this will be done with Dr. Chris Wiese, Senior Biologist with the Turner Endangered Species Fund, and leader of the highly successful Bolson Tortoise Project on the Armendaris and Ladder Ranches.

This talk will take place at the annual meeting of Amigos de la Sevilleta. Members and non-members are invited.



January 20, 2024 2-4 pm
Sevilleta National
Wildlife Refuge
(Exit 169 off of I-25)

Free, no reservations required
Refreshments provided



REU Students

Colin Barnett

In the [last issue](#) of the newsletter, I profiled seven of the students who participated in the Research Experience for Undergraduates at the UNM facility on the refuge. Here are profiles of the other eight.

Taeya Boi-Doku

Drought Legacy & Cyanobacteria Recovery Under Variable Watering

Taeya majors in Environmental Analysis at Pitzer College in Philadelphia. She is a member of Energy Rights, which is devoted to “understanding and influencing the way people think about and consume energy to develop more



sustainable energy systems.” The focus is on more vulnerable energy users who experience inadequate access to affordable and reliable energy services, and also may have less financial and material resources to buffer harm.

In 2024, Taeya, who is fluent in French, will work on critical infrastructure in a village in Mankrong, Ghana. This will include building earthbag cottages

and developing an agroforestry regenerative garden.

At Sevilleta, Taeya studied the recovery of cyanobacteria in grasslands that had experienced 7 years of drought and delayed monsoons through experimental manipulation. She watered some plots at a high frequency and some at a low frequency. Low frequency watering yielded greater concentrations of cyanobacteria. In addition, delayed monsoon and drought resulted in more unstable soil. However, her 5-week study was not long enough to yield definitive conclusions.

Alex Cottrell

Ecological Effects of Non-Native Ungulates near Water Sources



Alex is a senior at Southern Illinois University. He is a Zoology major, with a specialization in Wildlife Biology and Conservation, and a Philosophy minor. (He may in fact pursue philosophy in graduate school.) Alex was a King Scholar at the Brookfield Zoo in Chicago, plays the classical guitar, and enjoys landscape and wildlife photography. Before joining the REU program, Alex conducted surveys on the New Mexico Jumping Mouse.

50 years ago, Sevilleta National Wildlife Refuge was a working ranch. Although efforts have been made to remove cattle and horses, both still have a presence on the refuge and contribute to environmental degradation. Alex's project measured this degradation around water sources that these ungulates use. He correlated the

amount of pugging (compacting the soil) and plant coverage (area taken up by plants) with the number of non-ungulate tracks (as a measure of ungulate presence).

Sites with the lowest plant coverage and most severe pugging had the highest presence of cattle and/or feral horses. However, in some sites, low plant coverage could also be due to dry soil and lack of underground water. Although these results were predicted based on the known effects of cattle and horse grazing in other locations, it is useful to have a quantitative measurement of these effects on the refuge to assist with future wildlife management.

Ellen Fritz

What Lives Underground: Material Exploration of Sevilleta Organisms

Ellen is a junior at the Rhode Island School of Design. She is one of the two artists in this year's crop of REU students. Not only is she an artist, but also a kayaker and a mushroom forager.

For her project at Sevilleta, she gathered cacti, fungi, insects, soil, and plant material, then extracted pigments using different solutions to create various shades of color. She experimented with the resulting dyes to create books, paintings, and material swatches. She wanted to demonstrate that natural elements can be practically and artistically utilized, even in the era of industrial manufacturing.





Swatches, bas-relief, and painting made with natural dyes, including dyes made from prickly pear and cochineal beetles.



Plant material embedded in bioplastic.

Kathy Nash

Examination of *Castilleja integra*: Impacts on Community Composition, Fitness, and Herbarium Collections

Kathy is a home-schooled senior at the University of the Ozarks (Arkansas). She is an avid kayaker and photographer, specializing in “conceptual self-portraits.”

Kathy studied the orange paintbrush (*Castilleja integra*). (Appropriately, this plant was first scientifically observed in the Organ Mountains of southern New Mexico.) *C. integra* is a hemiparasite, combining parasitism of other species (to acquire carbon) with their own photosynthesis.

Looking at plants growing on the refuge, Kathy found that there were no differences in species composition in quadrats with and without *C. integra*. Using herbarium collections, she also



determined that there was no difference in the numbers of fruits and flowers in preserved specimens regardless of the region where the specimen was collected (Colorado, New Mexico, Texas).

Leila N'Diaye

Lizard Project Reloaded: Disturbance and Distribution at the Sevilleleta NWR

Leila is a senior at Bryn Mawr College (Pennsylvania), where she majors in Biology. Her mother was a Peace Corp volunteer in Mali, where Leila lived for 4 years, then moved to Ghana for 3 years. Leila has a pet rabbit, and is learning to play ice hockey.



For her project at Sevilleleta, Leila surveyed lizard populations living on the grounds of the UNM Research facility. She wanted to find out which species are best able to thrive in environments with humans and other disturbances (building, lighting, trash) in the middle of a relatively undisturbed environment (the refuge.)

Leila walked a 1.5 km path along sidewalks, arroyos, and trails, collecting (then releasing) lizards to record sex, age, and species. She also clipped 5mm from the end of the tail for carbon isotope analysis. (Large differences in Carbon-13 indicates that species have different food sources

or that their food webs are based on different primary producers [plants]).

Leila found that different lizard families have different isotopic niches. The most abundant lizards at the field station have diets of insects that eat primarily plants.

Erica Seguin

Competition or Coexistence? Dietary adaptations of two sympatric woodrat species

Erica is a senior at Weber State University (Ogden, UT). She is the vice president of the Multicultural Advancement in Science (MAS) club at Weber state. The club reaches out to minority students in the school districts surrounding Weber state. The goal is to help students see that they can go to college regardless of their race or background. Erica also enjoys cooking, making bead jewelry (which she is wearing in the picture) and crochets.



Erica studied food preferences in two woodrat species. She offered both species choices among cholla, club, creosote, juniper, oak, opuntia, pinyon and yucca plants. She found that, when the two species shared the same area (sympatric), *Neotoma micropus* ate more cholla than when it did not share the habitat, and *Neotoma albigula* ate more yucca than when it did not share the

habitat. In other words, the two species shifted their diets to reduce competition when living sympatrically. Using a micro-CT scanner, she identified differences in dental morphology between the two species, presumably adaptations to their different dietary regimes. The dental characteristics that Erica identified were also used to distinguish *Neotoma* species in the fossil record.

Raul Valencia

How is Experimental Water Availability Affecting Soil Respiration in Dryland Ecosystems?

Raul is a senior at the University of Texas, El Paso, concentrating on environmental science. He hopes to pursue graduate studies next year.

Raul took advantage of the Mean Variance Experiment, which varied the levels of rainfall on experimental plots (see the President's Message in this newsletter). He measured soil respiration in plots that contained black gama grasses. (Soil respiration refers to the production of carbon dioxide when soil organisms respire. This includes respiration of plant roots, the rhizosphere, microbes, and fauna. Soil respiration releases carbon from the soil in the form of CO₂, which can be measured as CO₂ flux.)

Raul found that there was no difference in CO₂ flux among the various plots, regardless of whether they received ambient rainfall, less rainfall than ambient, or more rainfall than ambient.



Clara Zhou de Magalhaes

Investigating the Relationship between Flora Fungi and Pollinators of *Larrea tridentata*

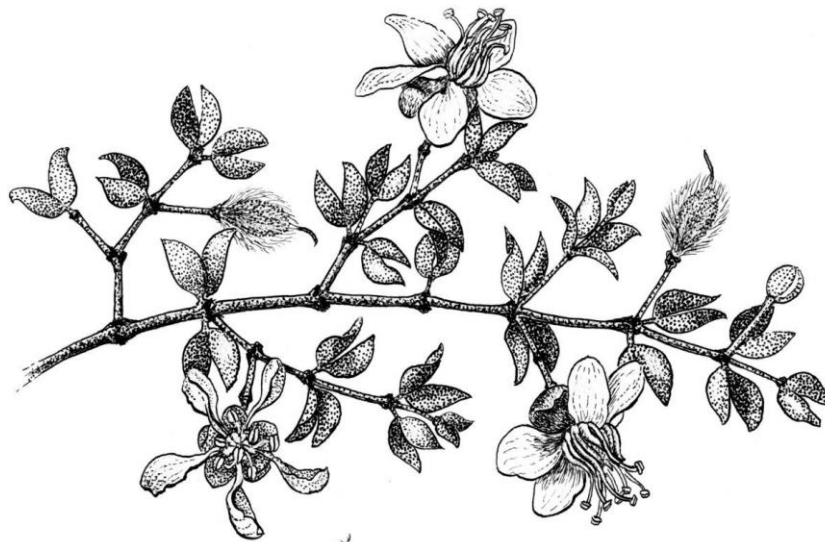
Clara is a senior at Hamilton College in upstate New York. In addition to her studies in biology, she has two pastimes that require attention to exact placement: rock climbing and origami.

Clara studied how fungi that inhabit creosote bushes affects creosote pollinators. When insects pollinate the creosote bush, fungal microorganisms are transferred to the pollinator. These microorganisms can have both negative and positive consequences for the survival and reproduction of the pollinators.

Clara set up insect traps baited with different fungal species cultured from creosote flowers onto agar plates. Control traps contained agar only. Coleoptera (beetles) and Diptera (flies) were the most commonly caught insect. Coleoptera



were attracted to the agar controls more than to a fungal species. Diptera were attracted to two fungal species. (Insects were only identified down to Order.) The experiment was conducted only for one week during the dry season, so results are preliminary. ❖



Creosote Bush aka Greasewood
Larrea tridentata



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Support the Refuge

- New Hat Design
- Stainless Steel Hot/Cold Tumblers
- Bolson Tortoise Magnets
- Beautiful Notecards
- Animal Magnets

Contacts

Amigos web site: <https://www.amigosdelasevilleta.org>

Amigos on Facebook: <https://ww.facebook.com/amigossevilleta>

Refuge web Site: <http://www.fws.gov/refuge/sevilleta>

Editor's Note

Items for consideration in the *Refuge Update* are encouraged.

Please email your submission in Word format to sdrandl72@gmail.com.

Past editions of this Newsletter are available at the Amigos website:

<https://www.amigosdelasevilleta.org/contacts>