

# 2017 Mojave Desert Adventure!

Participate in a cool ongoing research project funded by the [California Energy Commission](#), run out of Dr. Rebecca Hernandez's [AridLab](#) at University of California, Davis. *Have fun and gain valuable field skills and experience that will look great on your resume!*



## **Trip leader: Karen E. Tanner**

I am a collaborator of [Dr. Hernandez's](#), and a PhD student in [Ingrid Parker's](#) lab at University of California, Santa Cruz. I don't require students to have special skills or knowledge in order to go on this trip – just curiosity, a willingness to work, and a desire to see a cool desert ecosystem! I will train you on all the details you need to know. Please check out [www.karetanner.com](http://www.karetanner.com) for more details on my work! In particular, check out the Volunteer page: <http://www.karetanner.com/index.php/volunteer/>.

## **Trip dates:**

Start: Friday March 24th (or Saturday March 25th, depending on participant exam schedules)

End: Sunday April 2 (returning to Santa Cruz in the afternoon or early evening)

The trip dates are firm for anyone that travels in my vehicle, but if you have your own car and are willing to drive, then you can participate on the dates of your choosing – however, I ask each person to commit to working at least 3 days, so we can balance the time it takes to train volunteers against the benefit of having extra people. If you do drive down on your own, I can reimburse you for gas (keep your receipts!)

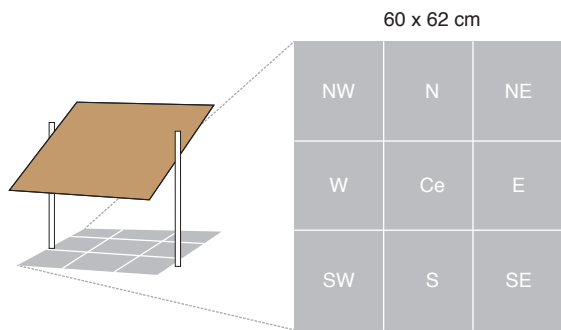
## **Destination:**

Barstow, California in the Mojave Desert



## **Study details:**

Funded by the California Energy Commission in 2010 and again in 2016 to investigate impacts of solar development on desert plants, we have also been supported by grants from the [Jill Barrett Research Program](#), [California Native Plant Society](#), UCSC, [Northern California Botanists](#), and [Southern California Botanists](#). From 2011 to the present, we have focused on two small, closely related winter annual plants and their community. This year, we will also be collecting data on an exotic invasive species (*Brassica tournefortii*, Sahara mustard) at a third site. We collect empirical data on focal plant density and performance (the proportion of young plants surviving to reproduce, and the number of seeds produced by reproductive individuals). We use these data to parameterize matrix models that generate estimates of population growth rates under different weather



conditions and in response to shading at experimental populations. At experimental populations, half of the plots have scaled-down solar panels installed to alter the natural light and water regime. In addition to individual plant metrics, we also collect data on species richness and abundance of the annual community in shade and control plots. An illustration of a shade plot is shown at left, with the 9 subplots within each plot footprint indicated (named for cardinal and ordinal directions). We collect data in each subplot.



ERIWAL (*Eriophyllum wallacei*) site



BRATOU (*Brassica tournefortii*) site

### Focal species

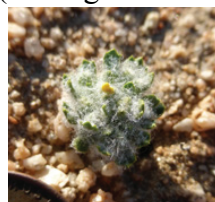
Both native focal species are small annuals in the Asteraceae (sunflower) family. The Barstow woolly sunflower (*Eriophyllum mohavense*, ERIMOH) is a very cool plant that occupies a very particular habitat; it is a California endemic species with a narrow geographical range. It is a special-status species, holding the California Rare Plant Rank of 1B.2 (endangered in California).



Emergent



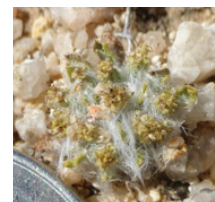
Juvenile



Budding



Flowering



Fruiting

<http://www.calflora.org/cgi-bin/specieslist.cgi?countylist=any&namesoup=eriophyllum+mohavense&plantcomm=any&format=photos&orderby=taxon>

Wallace's woolly daisy (*Eriophyllum wallacei*, ERIWAL) is a common species in the Mojave Desert.



Emergent



Juvenile



Budding



Flowering



Fruiting

<http://www.calflora.org/cgi-bin/specieslist.cgi?countylist=any&namesoup=eriophyllum+wallacei&plantcomm=any&format=photos&orderby=taxon>

The exotic invader species is also an annual, in the Brassicaceae (mustard) family. Sahara mustard (*Brassica tournefortii*) can exhibit a huge range in size, with flowering plants shorter than 2cm to waist-high.



Emergent



Juvenile



Juvenile



Flowering

### **Field conditions:**

You will have the chance to work in a really beautiful place, and with the rains this year we should see a gorgeous desert bloom! Our spring break trip should coincide with peak flowering season for many annual plants in the area. I have three field sites, two of which are adjacent to BLM roads – one in the Newberry Mountains outside Barstow, and the other near the intersection of highways 58 and 395 (Kramer Junction). The third site is just north of Barstow proper. We usually work for a few days at each site. The Wallace's woolly daisy site is particularly lovely, in an area well known for its botanical richness. If we have time we can visit populations of two other rare plants in the vicinity. It is also likely that you will see the federally endangered desert tortoise – I see them nearly every year on the spring break trip, and last year one even visited us at one of the sites. Kit fox are also in the area.

We sleep in tents (please let me know ASAP if you need to borrow any camping gear) near our sites on BLM land. I expect the temperature to be anywhere from the low eighties to the high nineties during the day, and probably in the 40's or lower in the evening. I recommend a sleeping bag rated for 20° or lower. The biggest physical challenge is actually the wind, which can be very strong in the spring. While it is annoying to deal with when working, the real aggravation comes at night, when the sound of wind whipping your nylon tent can make sleeping difficult. I recommend a good set of earplugs and some over-the-counter sleeping medication, melatonin, or whatever makes you sleep when conditions aren't especially conducive. The way that the winds cycle in the Mojave, on an 8-day trip we are almost certainly going to have a 2 or 3- day period when the wind is aggravating. It builds character! ;)

There are some hazards inherent to the desert– the biggest is dehydration. Even when conditions are cool you lose a lot of moisture just by breathing. I require everyone who comes on the trip to have a hydration pack (e.g. CamelBak or similar). If you don't own one, and want to save money, you can just buy a bladder and put it in a regular backpack. If even that is a financial obstacle for you, talk to me and we'll come up with a solution. It is also possible to encounter scorpions or snakes (though honestly I see more snakes hiking in the South Bay Area than I do in the desert). You will want to keep an eye peeled, however. I have personally seen both Mojave Greens and sidewinders (MG shown below).



### Work we do

1. Collect data on marked plants of each species (size, phenology) in observational and experimental populations (I mark young plants on a survey in early February)
2. Plant counts in each plot to calculate density
3. Community diversity surveys (counting and identifying all annuals present) at experimental populations
4. Collection of mature fruiting individuals for seed counts
5. Scouting for additional rare plant occurrences across the landscape

I hope to have at least 6 people on our crew, allowing us to work in three teams of two (once everyone is trained on plant ID and data collection/recording procedures). Expect to get up around 7am, usually starting to work by 7:30. We work fairly long days, finishing around 6pm. We eat breakfast and lunch from a cooler, and often go into town in the evenings to resupply, get a hot meal, and/or work on data entry, check email, etc. Restaurant options are pretty limited, especially in Kramer Junction – really the choices are Subway and the Roadhouse Diner. If you are vegan, gluten-free, or have any other strict dietary needs the trip might be sort of rough. Let me know if you find yourself in this boat and we can talk further. You may wish to bring some money for showers – refreshing at the end of the day. We use the shower facilities at a Pilot truck stop (they are actually quite nice, believe it or not). Towels, soap, shampoo are provided but it's not extremely cheap at \$12. It is however the only option. Totally up to you.

### **Logistics:**

We will drive to the field in two cars – my personal vehicle, and a rental car or van (most likely driven by me, while someone else drives my Subaru). The drive takes about 6.5 hours. Food and gas costs will be paid by me. We'll have to figure out how to get everyone from Santa Cruz to San Jose, where I live; I may come over and pick everyone up. We'll figure it out at our meeting, once we know everyone's exam schedule.

Word to the wise: if it's warm during the day, and it probably will be, your apparel will make a big difference to your comfort. If you have the funds, I recommend buying a pair of Sahara style quick-drying pants. If you're limited on funds, you can get lightweight pants and men's collared shirts at a thrift store for cheap. Wearing long-sleeved shirts and pants might sound unintuitive in a hot place, but the sun is intense. Not only will the coverage keep you from burning, it will keep you cooler. Also – there are many sharp items in the desert just waiting around for a chance to poke or scratch you! So cover up!

#### Essential stuff to pack:

- a brimmed sun hat with a chin strap
- CamelBak or similar (2 liters minimum)
- Sunglasses
- Sunblock and chapstick
- Sturdy shoes or boots
- Second pair of shoes with soft (no lug) soles; e.g. Crocs, tennis shoes
- Long sleeved, lightweight shirts, with collars
- Lightweight pants, quick-drying are best
- Tent, sleeping bag, sleeping pad, etc
- Tent stakes!
- Warm jacket (I bring a light down coat)
- Underlayers (e.g. long johns)
- Water bottle for the car
- Clean clothes for evening or post-shower wear

- Flashlight (a headlamp is best)

- knee pads
- earplugs
- lotion (it's dry!)
- baby wipes

#### Other stuff to bring if you have it:

- Bandanas
- Shade gloves
- Shoes that can get wet (for showering)
- Camera
- GPS unit if you have one
- Hand lens
- laptop
- car adaptors for charging electronics

There will be limited opportunities to charge electronics, except via car chargers, so plan accordingly. There is decent cell coverage at our Barstow woolly sunflower site and the mustard site, and usually no coverage at the Wallace's woolly daisy site – but since we go into town many nights there is a chance to check in with family or friends. If you have a laptop it would be great if you could bring it to help out with data entry in the evening.

Looking forward to working with you all in the field! Please let me know if you have any immediate questions.