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Edition 46:2

Desert Tortoise
Preserve Committee, Inc.

Tortoise Tracks

Newsletter

EXPERIMENTAL ROCKET CRASHES AT THE DTRNA

It wasn't a failure to launch, but it was a failure to land – at least in one piece. Literally while the DTPC board was meeting on Zoom this past April 11th, we received notice from our naturalists, Nadia and Madison, that a 26-foot, roughly 300-pound rocket originating from the Friends of Amateur Rocketry (FAR) launch facility near Koehn Lake had crashed in a remote area of the Desert Tortoise Research Natural Area. The rocket, built by students from the Georgia Tech Yellow Jacket Space Program, lifted off successfully, but its recovery chute failed to deploy, causing it to veer off course and fall inside the DTRNA.

The students, unsure of the crash area landowner and not wanting to trespass, fortunately located Nadia and asked permission to retrieve the remains. BLM ranger Melissa Brown was quickly on scene, and the wreckage was soon located and cleaned up. Obviously, fire was the biggest worry, but two lucky facts kept one from starting. First, the rocket had used all its fuel before coming down (although it still contained potentially flammable lithium batteries); second, the crash site was not badly infested with invasive grasses, which can be dangerous fire accelerants. As it was, one creosote bush was burned, but the flames did not spread beyond that; we are grateful that a potentially disastrous outcome was avoided.

It should be noted that the students were diligent about helping clean up, and were quite worried about any environmental damage. They were also upset by the flight outcome, because their rocket, which they'd worked on for over three years, actually set an altitude record for a liquid-fuel collegiate rocket, reaching 56,000 feet at apogee – all for naught, because the record did not count due to the crash landing.

Despite the scare for us at the DTPC and the students' disappointment, the accident wasn't a total loss. Madison invited the students back to the DTRNA the next day for a tour, which reportedly everyone enjoyed. Not only that, over the two days they found one previously-unknown adult tortoise and, even more exciting, two 2.5”-3" juveniles – Melissa Brown spotted one on Saturday near the crash site, and Madison found the other on Sunday's naturalist walk.

Juvenile tortoise near the rocket crash site Photo: Madison Eklund

FIRE AT THE DTRNA

On Tuesday, May 12, a fire started along Neuralia Road not far from the northwest boundary of the DTRNA, just south of the solar farm. The Neuralia Fire, as it was soon named, reportedly had two ignition points along the road and within a few hours strong winds had spread it to nearly 1,200 acres, roughly 500 of which were inside the DTRNA boundaries. It was the first major fire inside the DTRNA in its history.

Smoke from the Neuralia Fire visible from the DTRNA parking area Photo: Nadia Mendieta-Roberts

Retardant drops and a fast response from Kern County fire crews, in coordination with the BLM Ridgecrest Office, helped keep the flames from advancing more quickly; after its initial rapid growth, the fire slowed and was contained in under two days.

Post-fire surveys by the BLM and Jun Lee, the DTPC's Director of Land Acquisition, revealed approximately six hundred feet of burned fencing, virtually all of which coincidentally had been previously damaged by the past season's floods. BLM Ranger Melissa Brown installed several temporary, high visibility "Closed To Motor Vehicles" posts as a short-term measure until permanent fencing can be installed.

Harm to plants and animals is not yet clear, although no tortoises are thought to have been injured or killed. Several tortoise burrows were within the burn area, but it is not known if they were occupied. Also not known are habitat effects from the fire retardant; it is a phosphorus-based chemical that breaks down in rain, but it can then act as fertilizer for new plants, including fast-colonizing invasives.

Wildfires can cause harm beyond the initial, visible destruction from the flames themselves. Fire can damage the desert soil's seed bank and leave the post-fire area vulnerable to colonization by invasive plants, such as red brome and *Schismus* grasses, which not only out-compete native plants, but pose an elevated burn risk when dry, creating the unfortunate possibility of repeat fires.

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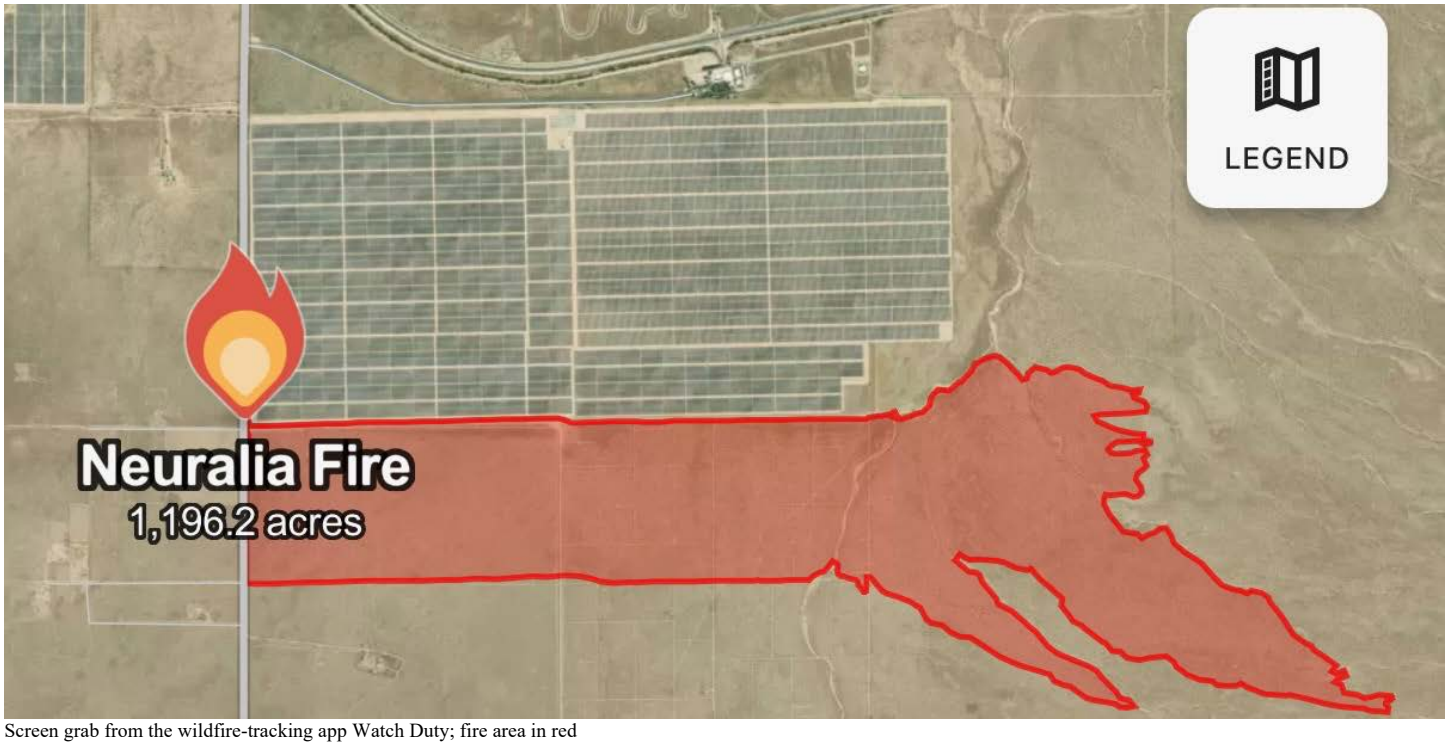
***FIRE AT THE DTRNA* (continued from page 2)**

BLM Ranger Melissa Brown installs temporary "Closed To Motorized Vehicles" posts along a section of burned fencing from the Neuralia Fire Photo: Jun Lee

As of this writing, a cause for the blaze has not been determined, although the lack of thunderstorms at the time and the fact that two ignition points were reported along the road certainly point to the fire being human-caused (whether accidental or intentional). The DTPC and our partners at the BLM are continuing to monitor the post-fire landscape and to plan for whatever restoration may be possible; in the short term, replacing the damaged fencing is the priority. All in all, the fire could have been much worse, and we are thankful to the fire crews and the BLM for their quick response and excellent communication.



Screen grab from the wildfire-tracking app Watch Duty; fire area in red

SPECIES SPOTLIGHT:
Cryptobiotic Crusts (CBCs)

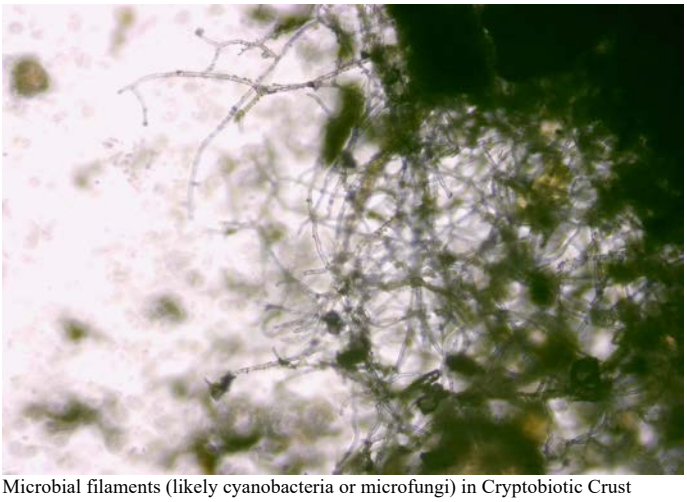
by Madison Eklund

Status: Not federally or state listed as threatened or endangered (*see *listing challenges below*), although many federal, state, and nonprofit organizations hold regional management plans specifically for CBCs.

Cryptobiotic crusts are low-growing masses that are an integral part of the Mojave Desert biome. These crusts may be mistaken for dark lichens, but in fact are made up of many organisms, including cyanobacteria, lichens, bryophytes (liverworts & mosses), algae, microfungi, and bacteria. Their name means “hidden life,” from the Greek and Latin roots “crypto-” meaning hidden, and “-biota” meaning life. They can also be called biological soil crusts, cryptogamic crusts, or microbiotic soil crusts.

Cryptobiotic crusts are found in all dry land regions around the globe, from deserts to polar biomes, and are present across roughly 12% of global land surface. Small fragments of CBCs are able to seed new areas. Cryptobiotic crusts are “*piokilohydric*” organisms, able to temporarily dry out and suspend respiration and life processes until conditions are better for survival.

In other deserts, these crusts can form thick, dense mats that cover the entirety of the desert floor, but here in the Mojave they tend to stay as small pockets of intermittent cryptobiotic soil. Our specific species mix tends to lean heavily on cyanobacteria (Genus *Microcoleus*), nitrogen-fixing lichens (Genus *Collema*), squamulose lichens, and occasionally short mosses. CBCs are recognized “pioneer species," meaning a species that establishes early on in a new, often hostile, environment to draw down nutrients and allow other species to become established. At the DTRNA, the dark patches of these crusts can be spotted in open, rocky areas, often at the tops of hills where the sun’s UV rays are most intense.



Microbial filaments (likely cyanobacteria or microfungi) in Cryptobiotic Crust from the DTRNA under a microscope

Cryptobiotic Crust at the DTRNA Photos: Madison Eklund

Only recently have CBCs been recognized as having a major influence on terrestrial ecosystems. CBCs account for 4% of all global nitrogen fixation, aid in fixing phosphorus to the soil, and the interlocking network of microfungi and cyanobacteria filaments (see photo above left) reduce wind and water erosion and can thereby limit dust storms and flash flood damage. CBC's soil-stabilizing and insulating properties create an environment that helps both soil/burrow-dwelling animals and vascular plants gain a foothold.

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SPECIES SPOTLIGHT ***(continued from page 4)***

Cryptobiotic crusts are extremely fragile. A single footprint can destroy this thin microbial layer, which can take decades to centuries (or more) to recover. They are easily destroyed by all types of transit (hiking, biking, or vehicles of all types) and are threatened by urbanization and development projects (solar, wind, commercial, housing, etc). Grazing activity can adversely impact our local CBCs, which have not developed in the presence of ungulate animals. Wildfires are a newer risk, driven by the invasion of non-native shrubs and grasses that are able to carry and connect the fire across the landscape.

Disturbance of CBCs can increase desert albedo (the fraction of sunlight reflected off the soil surface), causing soil and air temperature fluctuations and, by result, impacts to underground biological processes. Reduction of CBCs can lead to altered photosynthesis rates in plants, reduced nitrogen fixation, reduced microbial activity, lower plant nutrient uptake, delayed seed germination, decreased seedling growth rates, impacts to soil water evaporation and run off, and impacts to foraging times for arthropods and small mammals. These impacts can greatly affect any species that burrow and live close to the surface.

Research on solar farms in the US southwest is experimenting with temporarily removing CBCs before development then reintroducing them after project completion, to analyze the impacts to localized erosion. Studies have also found that UV rays do little to no damage to CBCs and their genetic makeup, but high levels of ozone can wipe out entire colonies, making long term storage (“seed” banking) tricky.

Formal protections for CBCs in the Mojave are minimal to nonexistent. Legal protections can be difficult and complex, as CBCs are not one species but an interconnected multi-organism colony. Traditional protection listings, like the Endangered Species Act or the IUCN Red List, are set up with single species in mind. Plus, each unique geographic region will have its own unique crust composition. These issues mean CBCs fall through the gaps in our legal systems that are meant to protect the environment. Because of this, organizations like the National Park Service, Bureau of Land Management, and others, often find it easier to protect CBCs by restricting off-trail activities. “*Don’t Bust The Crust*” is a common campaign saying at parks in Utah and Arizona, where thick mats of cryptobiotic crust are common.

Closeup of Cryptobiotic Crust at the DTRNA; note dense network of soil-stabilizing filaments below the dark upper surface Photo: Tom Astle

SPRING NATURALIST SEASON RECAP

Spring wasn't all conflagrations and spacecraft disasters – the 2026 Naturalist Season was a great success, thanks especially to the efforts of our hardworking and talented naturalists Nadia and Madison. Approximately 650 people visited the DTRNA this season, which wrapped up on May 31. A final report of visitor data and wildlife observations is still being compiled, but suffice it to say this was a banner year.

Especially exciting this season was finding nine previously unknown tortoises, four adults and five juveniles (including the two found after the rocket crash mentioned above). Juvenile tortoises are hard to spot, and as most of our members know, during their first few years they are extremely vulnerable to predators – overpopulated ravens in particular – so finding these youngsters is indeed a hopeful sign.

It bears repeating that we almost didn't have a naturalist season this year. As always, the BLM provided important help with equipment and personnel, but for the first time in thirty-eight consecutive years, they were unable to provide grant funding. We put out a call for donations, and many of you stepped up to help, including a couple of large donors to whom we are incredibly grateful.

We do not yet know whether we will face the same funding challenge next year, but these are uncertain times, which is why we continue to ask not only for general and special-project donations, but gifts to our Donor Endowment, which we aim to build into a reliable source of investment income. The Endowment has grown to over eight hundred thousand dollars, almost a third of the way to our goal of three million. Gifts to the Endowment are a key to our survival in perpetuity – so if you, your estate, or your business would like to donate cash or securities to help us help tortoises for decades to come, please contact our Investment Chair, Greg Lathrop, at 2redgrey@gmail.com or (415) 637-7187.

Finally, a heartfelt thank you to Madison and Nadia, for their dedication and expertise. Our naturalists are the face of the DTPC every spring, and we owe the success of the season to you!

A three-inch Juvenile Tortoise (dubbed "Pippin" by our naturalists) peeks out of a burrow at the DTRNA Photo: Tom Astle

Desert Tortoise Preserve Committee, Inc.

Dedicated to the recovery and conservation of the Desert Tortoise (*Gopherus agassizii*) and other rare and endangered species inhabiting the Mojave and western Sonoran deserts.

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UPCOMING EVENTS AT THE DTRNA

The Naturalist Season may be over, but things are still happening at the DTRNA. Clear skies and cooler after-dark temps willing, we are planning desert night events for moonless nights in July, August, and September.

Come out to peer through a telescope, learn about the night sky from a guest astronomer, or pick up tips on astrophotography. If your interests are more down to earth, we plan to put up a blacklight sheet to attract night-flying insects (aka "mothing") and search for glow-in-the-dark scorpions, crickets, and harvestmen on the trails with UV flashlights.

For up-to-date information and signup links, go to our Eventbrite page https://www.eventbrite.com/o/desert-tortoise-preserve-committee-108284102681, or watch our Facebook page or the "Events" page on our website.

Desert-dwelling cricket fluorescing under ultraviolet light Photo: Tom Astle

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