

Activists fear a new threat to biodiversity—renewable energy

To fight climate change, cleaner energy sources are desperately needed, but some experts say more should be done to keep untouched desert ecosystems intact.



Wind turbines and solar arrays produce renewable energy in California's Mojave desert. Renewable energy is critically needed to fight climate change, but some environmentalists worry that rapid buildout without careful siting could endanger threatened species.

Photograph by David Guttenfelder, Nat Geo Image Collection

A small Nevada wildflower named Tiehm's buckwheat might still be living in

obscurity if it had not happened to grow in soil full of lithium. As it is, that could prove its downfall.

Lithium is needed to make the high-powered batteries that are helping the world transition to electric vehicles. [Demand is soaring](#), and mining companies are eager to take it out of the ground at several new sites in Nevada, already home to the only existing lithium mine in the U.S.

But Tiehm's buckwheat is rarer than lithium. It grows only on approximately [10 acres of land](#) at Rhyolite Ridge in southwestern Nevada—right where [one of the new lithium mines](#) is planned.

"One guy on a bulldozer could drive it extinct in one afternoon," says Patrick Donnelly, the Great Basin Director for the Center for Biological Diversity and one of the flower's biggest advocates.

He and some other conservationists see the flower and the mine as emblematic of a broad and disturbing trend: There is a growing conflict, they say, between efforts to address two environmental crises—a rapidly warming climate on the one hand, and a staggering rise in extinction on the other.

Mining isn't the only way the renewable energy revolution is affecting landscapes, in the desert and elsewhere. In the past decade, solar- and wind-powered electricity generation has [quadrupled](#) in the U.S.— and that's just the beginning of what experts say we need to do to transition away from fossil fuels and avoid the worst impacts of climate change. By 2030, Nevada plans to get half its [electricity](#) from renewable energy, in line with the [Biden Administration's](#) goal to decarbonize the economy completely by 2050.

The result is [what some activists describe](#) as a renewable energy land rush putting rare species and untouched desert ecosystems at risk.

Historically, wetlands and grasslands were long treated as valueless; swamps were drained for development, and prairies plowed to plant crops. Now some conservationists see history repeating itself in the desert's largely untouched valleys full of sunshine, lithium-rich soils, and geothermal hot spots.

"We're going to do what we've always done with our environmental problems, push one on to the other," says Dustin Mulvaney, a professor of environmental studies at San José State University and author of the book [Solar Power](#). "We're moving our climate problem onto our biodiversity crisis. It's just more of the same."

Apologizing for a delayed email response, Donnelly says, "I can only explain it by saying that I'm a triage nurse in a desert endangered species emergency room, and we're in the middle of a patient surge."

Renewables head west

Donnelly says he hasn't seen a comprehensive list of all the species at risk from developing renewables. But he keeps his own informal roster of patients in Nevada. Some are listed as threatened by the U.S. Fish and Wildlife Service (FWS), others not—or not yet. They tend to be unfamiliar.

Threatened by lithium mining, according to Donnelly: Tiehm's buckwheat, Tecopa bird's beak (an annual herb), Railroad Valley springfish, Railroad Valley toad, Kings River pyrg (a tiny snail), and Ash Meadows ladies tresses (an orchid).

Threatened by solar energy: desert tortoise, three corner milkvetch, and white-margined beardtongue (a flower).

And by geothermal energy: Dixie Valley toad, Dixie Valley pyrg, Long Valley

speckled dace (a small fish), Steamboat buckwheat, Fish Lake Valley tui chub (another small fish), and bleached sandhill skipper (a butterfly).

“In many cases there is very little information out there about these species—they are all very rare and somewhat obscure,” Donnelly says. “But there’s a potential renewable energy extinction crisis going on in Nevada, and these little creatures and plants are at the forefront.”

He says that while ecosystems have long faced threats from activities such as cattle grazing or gold mining, renewable energy expansion is the latest growing threat.

The U.S. government owns just under half the land across 11 states in the West, including 80 percent of land in Nevada, most of which is managed by the Bureau of Land Management (BLM). In [2012](#) the agency designated 17 sites in six western states as BLM [Solar Energy Zones](#), identified as the best locations to build a solar plant. Five sites are in Nevada.

In determining the sites, the BLM excluded critical species habitat, says Lee Walston, an ecologist for the U.S. Energy Department’s Argonne National Laboratory. Argonne scientists helped BLM map their solar energy zones and helps them prepare environmental impact statements.



Tiny stems of Tiehm's buckwheat grow at the University of Nevada, Reno. The research was funded by Loneer, an Australian mining company that wants to mine lithium from the plant's habitats. Here they study whether Tiehm's can be transplanted to a new habitat.

Photograph by Scott Sonner, AP Images

However, some companies apply for permits outside these zones. "The reasons for applications outside of solar energy zones are varied," says Heidi Hartmann, an expert on energy policy who works with Walston at Argonne. She cites proximity to transmission lines or roads as being an incentive to apply for a permit outside a zone.

In an email, the BLM noted they issue permits by following rules set forth by the National Environmental Protection Act (NEPA), which requires open comment periods for the public and environmental organizations to voice

concerns.

"The BLM is deeply committed to conserving wildlife, ecosystems and imperiled species across the 245 million acres of public lands that we manage," says BLM Director Tracy Stone-Manning, in an emailed statement. "By collaborating with diverse Tribal, state, federal, and local partners, we can achieve this important goal while also tackling climate change and delivering clean energy to American homes through responsibly-sited renewable energy projects."

Rare creatures, scarce data

Some experts worry that the environmental concessions made by energy companies don't do enough to conserve wildlife.

"I'm not satisfied with the quality of monitoring and preconstruction investments that go on, that determine what species are there. They can be done in a hurried and incomplete manner," says Rebecca R. Hernandez, a professor of ecology at the University of California, Davis and co-director of the [Wild Energy Initiative](#).

Last year, she and her colleagues published a study in the journal [Biological Conservation](#) that found designated conservation zones inside the [Ivanpah Solar Electric Generating System, a large power plant in California](#), may not effectively conserve species. Untouched patches of land left between solar panels—created to protect threatened plants like [Mojave milkweed](#)—did not harbor the same number of pollinating bugs that existed outside of the solar site.

Without a healthy pollinator population, the milkweed may not be able to successfully reproduce and survive in Ivanpah Solar's conservation zones, says Hernandez. "It begs the question: What's the point [of conservation

zones] if we don't include enough area?" she says.

"We hear a lot that the impacts that unfold after construction are greater than originally anticipated," Argonne's Walston acknowledges. He says he and other biologists assessing the potential environmental impact of energy projects don't always have enough data on what the long term ecological consequences of development might be.

"Rare plants in these environments might skip a year, so you could have an approved survey design that misses some of these species, and the data would then say let's proceed with development. I think there's a need for better data," he says.

Leaving untouched land untouched

To some conservationists, any amount of disturbance of the desert is unwelcome.

"The last thing we should be doing is building solar projects on public land in ecosystems with thriving Mojave Desert biodiversity," says Laura Cunningham, an activist and wildlife technician who lives in the Nevada desert. "Destruction of even a little plant matters, and it should matter because there are better alternatives."

With her husband Kevin Emerich, a retired park ranger, she founded [Basin and Range Watch](#), an organization that tracks and opposes western energy projects on untouched land. In addition to the lithium mines, the BLM is currently considering permits for six different solar energy projects that would span more than 62,000 acres, according to applications [tracked by Basin and Range Watch](#). The projects are all in southwestern Nevada just several miles from Death Valley National Park and outside of the local solar energy zone.

Cunningham and other opponents of building solar on undeveloped land say one answer is to install solar on shaded structures atop the [millions of parking spots](#) found in cities. A [study](#) looking at Connecticut found that solar over parking lots could supply 37 percent of the state's annual electricity.

Another alternative to installing solar facilities on undeveloped land could be agrovoltatics, which combines production of photovoltaic power and crop growth in the same farm fields. A study published in [Nature Sustainability](#) in 2019 found solar panels could provide agricultural benefits such as reducing drought stress on plants by shading the ground.

By 2035, solar energy could provide [40 percent](#) of U.S. energy, and Walston says analysis done by Argonne scientists have shown the U.S. has enough already-developed land to provide enough solar without breaking new ground.

"The disturbed land is there. It's just a matter of convincing the industry [to use them]," he says.

Tale of two crises

Not all environmentalists see the expansion of renewable energy as a major threat to biodiversity.

"I think the scale at which development is happening now is not anywhere near where we're talking about extinction tied to this development," says Helen O'Shea, an expert on sustainably developing renewable energy at the Natural Resources Defense Council. "I would just stress that this is a balancing act and balancing acts are hard."

She notes that building out renewable energy on structures like parking lots or affixing solar panels to homes isn't happening quickly enough to meet

climate change targets.

“The rate at which that’s happening has been shockingly slow,” says O’Shea. “There’s a huge amount of work to be done on distributed generation, but I don’t think that will solve all of our energy needs in the window of time we have to address climate change.”

And while construction on important habitats is a direct threat to biodiversity, it’s also threatened by the changing climate conditions caused by fossil fuel emissions, says Lori Bird, director of the U.S. energy program at the World Resources Institute.

“We’re going to need to clean up the power sector to stop climate change, which has a lot of impacts on biodiversity and drought,” Bird says. “If we don’t address the greenhouse gas emissions we’re going to have more issues.”

But in Nevada, opponents are taking action to protect the untouched desert.

In response to a petition from the Center for Biological Diversity, the FWS has [proposed listing](#) Tiehm’s buckwheat as an endangered species and designating 910 acres of Rhyolite Ridge as critical habitat—the 10 acres where the plant actually lives plus a large buffer zone to sustain its pollinating insects. A final decision is pending. Loneer, the mining company, [said in a statement](#) that the designation would have “no material impact” on its mining activities.

Basin and Range Watch, meanwhile, are suing to stop construction of the [Thacker Pass Lithium Mine](#) in northwestern Nevada. If built, it would be the biggest lithium mine in the U.S.—at a time when the bulk of the world’s lithium comes from Australia, Chile, and China. But opponents say the mine could endanger greater sage-grouse populations.

Cunningham and Emmerich are also trying to rally opposition to the Mojave solar projects, as well as to the Greenlink West—a proposed high-voltage transmission line that would run 350 miles between Reno and Las Vegas and link all of the new projects to the grid.

“We’ve been called oil shills,” says Cunningham of their opposition to putting renewables in the desert.

If the energy projects in their backyards were oil pipelines or coal plants, she says, she and Emmerich would be doing the same. It just so happens the kind of energy they’re protesting helps fight climate change rather than cause it.