



Selvi Viswanathan

PumaGuard: Using AI to Protect Both Livestock and Mountain Lions

By Celia Pesiri, LAHS Senior (with input from PEEC Nature Youth Group Members)

On the Pajarito Plateau, mountain lions have roamed far longer than the town of Los Alamos has existed. These powerful predators, often called pumas, are not just symbols of wild New Mexico, they are essential to healthy ecosystems. As a keystone species, they regulate deer populations, support biodiversity, and even influence soil health.

As climate change intensifies wildfires across Northern New Mexico, wildlife habitat is shifting. With burned forests and shrinking prey ranges, pumas are moving closer to human spaces. At the Los Alamos North Mesa stables, goats and other livestock have become easy targets. In recent years, one or two pumas per year have been killed after livestock attacks. Although that number may seem small, it has a significant impact on a sensitive predator population. Removing adult pumas can also worsen the problem, as younger and less experienced lions move into vacant territory and are more likely to prey on livestock.

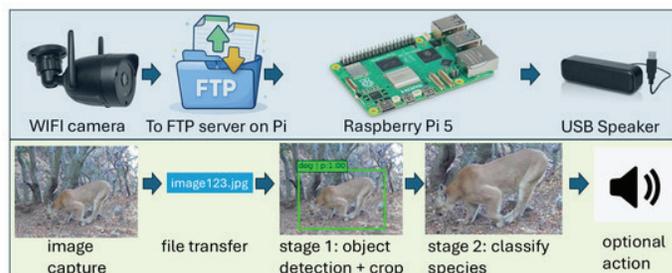
Our club, the PEEC Nature Youth Group, began asking a simple question: Is there a way to prevent this conflict before it happens?

The result is PumaGuard, an Artificial Intelligence (AI) powered wildlife deterrence system designed to protect both livestock and mountain lions. Through our work with experts from the Mountain Lion Foundation and LANL, we learned that most deterrent methods are either too broad or ineffective. Constant lights or noise can disturb horses and nearby residents, and predators often become accustomed to continuous stimuli.

We needed something species specific. Our idea was to use AI to identify a puma in real time and trigger a deterrent only when necessary. If the system misjudges a situation, no harm is done. The response simply plays a sound or activates a light.

With the help of local puma researcher Mark Peyton, we accessed more than one thousand images of pumas in their habitats collected near Bandelier National Monument and Valles Caldera National Preserve. These landscapes share similar terrain and vegetation with the stables, which made the data especially useful. We then trained a machine-learning image classification model to recognize pumas in these trail camera photos.

We submitted our project to the NeurIPS International High School Competition in 2024 and were one of the four winning projects. A few members of PEEC Nature Youth Group then were given the opportunity to present our project later that year at the NeurIPS Conference Awards Ceremony in Vancouver, Canada.



PNYG PumaGuard System
Photo Courtesy: PNYG



After this remarkable recognition, we continued to refine PumaGuard. We developed a two-stage classification system to improve puma identification. First, a motion-activated camera captures an image and identifies possible objects within the frame. The system then crops those images and sends them to a second stage, where they are classified as puma or not puma. If a puma is detected, a randomized deterrent is triggered. This may include recorded human voices, flashing lights, or a combination of both.

The PEEC Nature Youth Group is now working alongside a research team at UC Davis, where PumaGuard is currently being deployed and tested at puma-frequent wildlife sites in California. So far, collaborators have reported successful puma detection. Specifically, out of about 800 photos at a puma deer cache site, PumaGuard correctly identified 92% of all photos with a puma. The next step will be for the UC Davis team to activate the sound deterrents of PumaGuard to determine if sound scares pumas and keeps them away from the deer.

This year, a peer-reviewed article was published by Multidisciplinary Digital Publishing Institute (MDPI) Journal outlining the AI advancements developed for PumaGuard. The article was written by current and former members of the PEEC Nature Youth Group and acknowledges contributions made by all in the group, with special thanks to Hari Viswanathan and Nick Bock for their support to make PumaGuard successful.

While PumaGuard is being developed with pumas and livestock in mind, the ultimate goal is to expand the scope to include detection of a variety of species and provide non-lethal deterrents in a cost-effective and easily applicable manner. PumaGuard represents what can happen when students, scientists, and community members work together. Thank you to the PEEC staff for helping us achieve this goal.

In the end, conservation is not just about protecting wildlife. It is about finding ways for people and wild

creatures to coexist on the same landscape. 🦋

*Want to hear more? The PEEC Nature Youth Group will be presenting about PumaGuard on **Wednesday, April 29, 2026 at 7pm** at Los Alamos Nature Center.*

County Launches Wildfire Prevention and Preparedness Campaign

By Los Alamos County Emergency Management and Los Alamos Fire Department

With wildfire season approaching, the Los Alamos Fire Department (LAFD) and County Office of Emergency Management (OEM) are launching a community-wide wildfire prevention and preparedness campaign encouraging residents to follow the **Ready, Set, Go!** wildfire action plan and take steps now to protect their homes and families.

LAFD emphasizes that the community should always be in the **“Ready”** stage—taking proactive steps long before a wildfire threatens the area.

The Ready, Set, Go! program provides a simple framework to help residents prepare and respond during wildfire emergencies.



READY – Be Prepared:

Residents should always remain in the Ready stage by preparing their homes and families for wildfire risk. This includes creating defensible space, removing flammable vegetation near structures, cleaning leaves and debris from roofs and gutters, and preparing emergency supply kits. LAFD offers free home assessments to help homeowners evaluate defensible space and identify ways to reduce wildfire risk around their property.

Residents are also encouraged to develop a family

evacuation plan, identify multiple evacuation routes, and register for Everbridge emergency alerts to receive important notifications during emergencies.

SET – Be Alert: When wildfire conditions increase or a fire is reported nearby, residents should be ready to leave quickly. During this stage, families should monitor emergency alerts, ensure vehicles are fueled, gather emergency supplies, and stay aware of changing conditions.

GO – Evacuate Immediately: If evacuation orders are issued, residents should leave immediately and follow instructions from emergency officials. Early evacuation helps keep families safe and allows firefighters to focus on protecting lives and property.

“The Ready, Set, Go! framework helps residents understand exactly what to do before and during a wildfire,” said Emergency Management Commander Beverley Simpson. “We want people thinking about preparedness now—before a fire starts.”

Upcoming Community Events: The community is invited to attend the **annual Wildfire Day on April 4 at Ashley Pond Park**, hosted by the Los Alamos Fire Department, the Elks Lodge and Freedom Church.

Residents can find more information about the Ready, Set, Go! program, register for Everbridge emergency alerts, sign up for a home assessment, and view any current fire restrictions from the Fire Marshal by visiting the Los Alamos County website.

Emergency Alerts: The community is encouraged to sign up for emergency alerts with Everbridge by texting **LOSALAMOS** to **888777**. This is the primary route of communication Los Alamos County will use to push any emergency communications. 📶

Water Conservation in Los Alamos

By Abbey Hayward, Los Alamos County Department of Public Utilities Water & Energy Conservation Coordinator

I have been in water conservation for my entire career—nearly 20 years. For some of you, that hasn't been that long, but it's been long enough to witness some major changes in the world of water. I started out sampling water for the USGS on Grand Lake St. Marys, Ohio's largest inland lake. I'll never forget that early morning I pulled up to a beach with my sampling

Los Alamos County has launched a new emergency notification system powered by Everbridge. With fire season right around the corner, this is an opportune time to sign up to receive critical safety notifications.

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gear and stood at the edge of the water, gawking, at what I can only describe as foul-smelling crusty paint lapped at my waders.

I was looking at a harmful algal bloom that changed everything overnight. Eventually, I became the watershed coordinator for that lake and all of its tangled threads of agriculture, tourism, and bureaucracy. Fast forward. Next, I'm in the Captina Creek watershed of Appalachia, a pristine creek supporting the hellbender, a giant, slimy, solo salamander at the mercy of the (re) actions of the oil and gas industry flowing through that watershed. Flash forward and now I'm here, in the wild west of water.

Santa Fe has a robust water conservation program (savewatersantafe.com). They are currently under a “Severe Outdoor Water Restrictions Water Crisis – Red” and it's only March. I'll save you the anxiety of reading the description here, but let's be thankful we don't depend on surface water supplies, especially after looking at those barren mountains all winter.

This doesn't mean we're in the clear. We're in a state of constant groundwater mining, meaning we are depleting resources faster than they can recharge. Our groundwater aquifers are stable, but not forever. We do have summer watering restrictions—explore *Water Wait* on the Los Alamos Department of Public Utilities website—but we don't have the staff to collect water misuse reports or to investigate violations like surrounding communities. So, it's a collective effort when it comes to water conservation. DPU acts quickly to fix leaks on our side of the system, but we also depend on you, the consumer, to conserve this

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AT LOS ALAMOS NATURE CENTER

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fun-filled day of food,
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activities, and more!



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most precious resource.

Water conservation looks different to everyone. Here are some ways to help:

- Addressing water leaks (toilets, irrigation, faucets) immediately
- Taking shorter showers and lower baths
- Running full loads of laundry and dishes
- Enjoying a browner landscape by watering less
- Embracing “If it’s yellow, let it mellow. If it’s brown, flush it down.”
- Expanding outdoor water reuse with rain barrels or graywater harvesting
- Following *Water Wait* and only watering on your days of the week
- Being cognizant of additional water needs for battling wildfires 🌪️

Plants in New Mexico

By Teralene "Terry" Foxx †

Spring is on the way! Get ready to work on your gardens!

Here in Albuquerque, we have a myriad of plants that originate from the Mediterranean. As a botanist, I’ve had to learn many new plants. The usual pine forests are found: ponderosa, pinon, etc. but the Mediterranean is well represented here in New Mexico.

One of my favorite shrubs is rosemary (*Salvia rosmarinus*), which blooms in the Fall and early Spring. It has evergreen needle-like leaves. The plant has been used as a symbol for remembrance during World War II in Europe and Australia. It has been used as a flavoring in many Mediterranean homes. The shrubs are large and often take over a place.

Another shrub often found locally is photina, in the Rosaceae family, sometimes called Christmas Berry. It has bright red leaves at the tip and beautiful white blossoms—a very striking plant.

Did you know the petunia was from Mexico or the common snapdragon is from southeastern France or Dianthus is native to Europe and Asia? And the



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Aztecs grew the Dahlia for a food crop for its very starchy food tuber? Did you know henbit is a species common in Europe, Asia, and northern Africa? In Albuquerque, it's often found in sidewalk cracks.

It's amazing how species from other parts of the world were introduced to New Mexico by Spanish settlers and have since become part of our landscape. They're often more hardy and give gardens beauty throughout the spring and summer! 🐝

† This article was submitted in the Spring of 2025 by, and included in memory of, Teralene "Terry" Foxx, who was a dedicated long-time PEEC volunteer, board member, and an advocate for trail accessibility. Terry Foxx, 86, passed away peacefully, surrounded by her family, on January 5, 2026. We are grateful for all her contributions in making PEEC what it is today.



Terry Foxx and Natali Steinberg at PEEC's 25th Anniversary Earth Day Festival in 2025
Photo Credit: Casey Lundberg

Book Review: Raising Hare

By Ed Santiago, PEEC Board Member

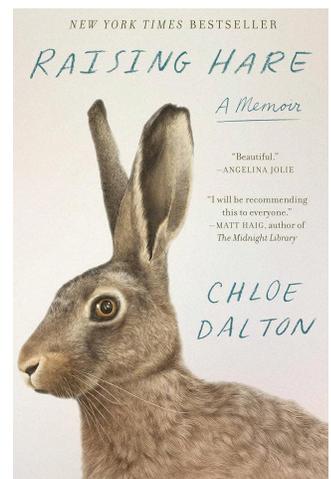
"Found an injured, orphaned, or sick wild animal? Call us," reads the New Mexico Wildlife Center's home page, and I'll bet a nickel that you or someone close to you has done just that at some point. Aren't we fortunate to have them so near?

Chloe Dalton did not call the Wildlife Center when she found a leveret—a baby hare—in the middle of a lonely country road one gray February day. Although she feared for its safety, exposed as it was to raptors

and vehicles, she prudently left it alone in hopes that its mother would rescue it. Hours later, returning on the same road, she found the leveret in the same place. She now has a difficult decision to make. *Raising Hare: A Memoir* tells the story of that day, her decision, and its surprising consequences.

She soon learned that hares seldom survive in human care: "You have to accept that it will probably die of hunger, or shock," one conservationist gently told her. A friend tentatively asked, "Wouldn't it be better if you gave it to someone else—someone who actually knows about animals?" Stubborn streak thus dialed to eleven, Dalton sets out to find all existing literature on hares... which turns out to be not much. Nevertheless—this is not a major spoiler if you've seen the title—the leveret makes it. How, and through what trials, is for Dalton to tell. She's a gifted writer with an exquisite sense of pacing and remarkably keen powers of observation. She gets the reader to care, laugh, worry, and share in her daily discoveries and dilemmas. Her voice is graceful, filled with quiet wonder.

This is not a fluffy-cutesy fable: it's Nature and it's real. There's frank acknowledgment of predators, of accidents and injuries and uncertainty. Dalton goes to extreme lengths to respect the hare's wildness, never treating it as a pet nor naming it, honoring its boundaries and needs. She tries so hard not to anthropomorphize and mostly succeeds. She increasingly rearranges her life, routines, and home to an extent some people might not understand; indeed, to an extent she herself could not have imagined in her life before. And she is rewarded: with a relationship that very few humans will ever experience, with humility, and with wisdom. Dalton is transformed by the process, and so is the reader.



Please don't try this at home, though. This is a unique story, an improbable confluence of many, many circumstances working out Just Right. So the next time you find a baby skunk on the trail, or a wombat or a heffalump, remember that the New Mexico Wildlife Center is only a phone call away: 505-753-9505. 📞

The One Los Alamos Book Club meets every other month at Los Alamos Nature Center.

<https://linktr.ee/OneLosAlamos>



Wetland Maintenance: Small and Simple Impact

By Aislinn Marshall, Los Alamos Girl Scout

As we enter wildfire season, the most pressing concern on many people's minds is whether we'll be evacuated and what might burn. However, it's also important to consider what happens in a post-fire landscape: extreme fires result in fewer healthy or living plants in the soil, reducing the root structures that normally keep topsoil in place. With the increasing frequency of large, violent storms and the prevalence of paved roads (which increase run off), large amounts of water do not soak into the soil—and instead carry the top soil with it—as it runs downhill into the canyons and eventually to the Rio Grande. This erodes the edges of canyons and trails, and ultimately much of that water does nothing for the immediate surrounding landscape. Hanging gardens, a type of wetland clinging to the edge of cliffs and containing a high level of plant diversity, can help fix that.

Hanging gardens trap water as it runs downhill and let it sit, eventually soaking into the landscape, and in doing so, prevent further erosion and allow the water to benefit the plants and earth where it falls. As a result, hanging gardens and wetlands in general are extremely important to the ecosystem. I've done maintenance work on a wetland in Los Alamos by Ridgeway Playlot, specifically



One Rock Dam Example



Media Lunae Example

Photo Courtesy: Aislinn Marshall

installing berms, one rock dam, and media lunae to redirect and slow down water as it passes into the hanging garden. **This maintenance is very important but can be done on a small scale by members of the community.** Even small tweaks can have a large impact on the area.

Maintenance on wetlands can be of varying complexity and can take differing amounts of time. If you have five minutes and notice a spot where the tracks of runoff are eroding a trail, it's easy to scuff a bit of a path across the trail and slightly downhill, redirecting the water off the trail. You can also reposition downed trees across eroded channels above and below a trail. If you have more time or tools with you, you could build a berm, a mound of dirt which redirects water, across a steep trail.

One rock dams and media lunae are also fairly easy to build, though they take more time and practice. A one rock dam is a patch of rocks sunk into the ground the height of one rock—hence the name—where water needs to be slowed down. All that is needed for one rock dams are some large rocks, a shovel, and some time. Media lunae are much the same, except a media luna is in the shape of a crescent moon placed to catch or redirect water, depending on where the horns are facing. It tends to be about one rock tall, sunk into the ground, and two or three rocks wide.

Because they involve digging, it's best to get land-owner permission before building one rock dams, media lunae, and berms.

No matter how much time you have to spend on wetland maintenance, any amount of improvement can make a difference, be it scuffing a track or spending hours on one rock dams and media lunae. With the increasing frequency of both wildfires and violent storms, wetlands are ever more important, helping the landscape adapt to our changing climate without it being devastated first. 📞

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Questions?

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Volunteers at PEEC's 25th Anniversary Earth Day Festival in 2025
Photo Credit: Casey Lundberg

Our Mission: Enriching people's lives by strengthening their connections to our canyons, mesas, mountains, and skies.

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— Los Alamos Nature Center Visitor

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*2025 Earth Day Festival Attendees Learning about Wildlife
Photo Credit: Casey Lundberg*

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UPCOMING EVENTS

Discovering the Wild Bees of NNM **APR 14**

Earth Day Festival **APR 18**

Fire, Forests, and the Future of the Jemez **APR 22**

Native Plant Adaptations **MAY 11**

Bumblebee Season Author Event **MAY 18**

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