July-September 2025

BOSQUE

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CHELYDRA SERPENTINA

Friends of the Rio Grande Nature Center ● Rio Grande Nature Center State Park
2901 Candelaria NW ● Albuquerque, NM 87107 ● Tel: (505) 343-1373
Web: rgnc.org ● E-mail: friends@rgnc.org

TRACKS

Administration

Levi Dean, Park Superintendent

My favorite season at the Rio Grande Nature Center is summer. I love the heat and the smell of the dry forest floor. Witnessing the aquatic turtles burying their eggs with a backdrop of cotton swirling through the sky is truly a magical experience which only happens in the summer.

The summer also brings new and exciting education programming at the park. This season, we have a full gamut of program offerings. Nature Discovery summer camp that lasts the month of June has been a huge success. Summer Saturdays at the park offer families a free drop-in program of varying topics on Saturday mornings throughout the summer. Lastly, through the month of July, Explora Museum will be holding their summer camps at RGNC.

In other news, we have worked with the Friends group volunteers to put in a variety of plants this spring. We are grateful that the Friends have been working hard in the garden and restoration areas to keep the new plants alive through the heat of summer. Also, volunteer Lindsey Evans recently reconstructed the Ground Water exhibit. It looks amazing! If you haven't seen it already, please take a look. Thank you again to the Friends for your continued support!

Greta Roskom, 2025-2026 President of the Friends

As the newly elected president of the board, I want to express my sincere appreciation to all of my fellow board members, both past and present, many of whom have dedicated years and, in some cases, decades to the cause of supporting our state park.

I would also like to recognize the tremendous commitment and effort put forth by our team of volunteers. These dedicated volunteers invest countless hours each week to maintain our gardens and natural areas, protect the park's ecosystem, feed the birds, and educate the community about this invaluable resource we all cherish: the Rio Grande Nature Center.

To our Friends' members, I invite you to become a part of our team. We are particularly needing more volunteers to assist with our educational programs for children and youth. Volunteering is not only fulfilling and enjoyable but also provides a chance to connect with some truly amazing individuals. Each workday brings new opportunities to learn and grow. We encourage you to consider completing an application and joining us as a volunteer at the RGNC.

Friends of the Rio Grande Nature Center

Bosque Tracks

Published quarterly by the Friends of the Rio Grande Nature Center State Park

Friends of the Rio Grande Nature Center

Rio Grande Nature Center State Park

2901 Candelaria NW
Albuquerque, NM 87107
Park Phone: (505) 344-7240
Fax: (505) 344-4505
Park e-mail:
Levi.Dean@emnrd.nm.gov

Nature Center hours: Open daily
Gates 8-4, Building 9-4
Closed
Thanksgiving, Christmas, and New Year's Day

Nature Shop 10-2 (M-Th), 10-4 (F-M)

Masks encouraged inside buildings, social distancing outside

Nature Center Staff

Superintendent .....Levi Dean
Park Manager.....Dylan Frentzel
Instructional Coordinator .. Karen Herzenberg
Instructional Coordinator.....Sivan Gordon-Buxbaum
Park Seasonal .....Chan Dreyer
Park Technician.....Mark Leyba
Park Technician..... Shannon Campbell
Entrance for Friends' members and those with displayed applicable annual permit: Free. Non-member day use: $5/vehicle, $15/bus, $50 bus.

Cover, *Chelydra serpentina*:
Unchanged over 90 million years since its North American origin in the Cretaceous period, the common snapping turtle is likely a native of the Rio Grande since at least the 17th century and lives mud-deep in the Nature Center's Observation Pond today. Though it is quick to flee and hide when underwater, its powerful, beak-like jaws and snake-swinging head swipe wide to attack when on land.

Autumn Wings

A Festival of Flight

Saturday, September 20

Featuring BioBlitz

BioBlitz surveys aim to create a snapshot of biodiversity in a location, helping observers understand what lives there, where, and how. At the Rio Grande Nature Center State Park, tours, talks, and one-on-one investigation reveal nature's connective tissue uniting life forces throughout the bosque ecosystem. Bernalillo County Master naturalists will assist in leading BioBlitz-themed walks.

BioBlitz Bits

--Bird walks led by master naturalists
--Mariposaville Garden walk: explore plants and their pollinators aided by naturalist guides.
--Tour the nearby Candelaria Nature Preserve to see creation and restoration of new habitats.
--Special for kids: BioBlitz walk led by staff from the Museum of Natural History and Science
--Explore the bosque down to the Rio Grande with Nature Center volunteer naturalists.
--Join a special track and sign excursion with expert guides.

Presentations

--"Bring Back the Pollinators" by Elliott Gordon from the Xerces Society for Invertebrate Conservation
--"Aldo Leopold and the Evolution of the Land Ethic" by Dr. Lisa Gerber, UNM Department of Philosophy
After the talk enjoy a walk along the Aldo Leopold Trail through the bosque.
--"Damsels and Dragons: Meet the Ancient Insects" by Karen Gaines, Wildlife Biologist

Also

Head down to the Discovery Pond for expert-guided close inspection of dragonflies, damselflies, snails and other aquatic creatures.
Chat with NM Bird Alliance volunteers.
Meet Wildlife Rescue Inc. education birds and talk to their handlers.

Day-use only; no festival charge. For times and more information about events, Check rgnc.org closer to the event date.

Photos: Mason

Summertime Fun For You

Kids ages five to ten with their adult companion meet in the Native Plant Garden's outdoor classroom for an informative hour of natural history, multicultural tales, and join-in participation with ECO storyteller and master naturalist Dianne Rossbach (left). The program continues the third Saturday of the month, weather permitting. No charge beyond park day-use fee; please display receipt along with Friends' membership.

Here's the July-September list:

July - **Humming in the Summer...**

- Stories, songs, & games about hummingbirds. Does anything else in the bosque hum?

August - **Are These Really "Lazy, Hazy, Crazy Days"?**

- It's the warmest time of the year, but our creatures are not taking it all that easy... what's up?

September - **Where Have all the Flowers Gone ?**

- How many flowers can you name? What's the difference between a flower and a weed?

No Advance Registration Required !

- Guided bird walks Saturday and Sunday at 8:30 a.m.
- Guided nature walks the second Saturday of every month at 10:30 a.m. year-round.

The Friends and staff of the Rio Grande Nature Center grieve the death of Judy Appenzeller on March 29. A native of Australia and a physician, Judy was deeply rooted in the Nature Center gardens, working to maintain and develop them. She created *The Native Plant Scrapbook*, made over 250 plant labels, assisted with the BudBurst Monitoring Program, and researched plants to acquire. Committed to maintaining natural resources, Judy was a natural resource herself.

Interview Time

Love What You Do:

Jo Fairbanks on Leadership, Legacy, and the Land We Protect

By Julie Henry, FRGNC Volunteer Coordinator

After more than 20 years of tireless service, Jo Fairbanks is stepping aside as treasurer of Friends of the Rio Grande Nature Center. Her leadership transformed the organization into a sustainable, community-rooted force for conservation, environmental education, and land preservation. Jo brought not only financial skill but a deep sense of purpose, care, and direction. Her story isn't just about environmental stewardship, it's also about what women bring to leadership when experience, empathy, and backbone come together.

Long before Jo found her way to the Rio Grande Nature Center, she was a force in the world of education and public health. She began her career as a speech pathologist and worked with Indian Health Service for 15 years across New Mexico's pueblos. "I totally fell in love with public health," she said. Jo also taught graduate courses at UNM for 17 years. Her academic background and experience writing federal grants gave her the tools she would later apply at the Nature Center. "You have to know what you're doing," she said. "You get X amount of dollars because the donors liked your proposal. Then you had to do exactly what you said you were going to do." That experience turned out to be crucial. "I had all that background that really worked from the university to come in here. I could just do it."

Photo: Henry

I asked Jo what it was that first brought her to the Nature Center. "I started bringing my granddaughter here when she was about two years old. I wanted her to see the birds and I thought she'd love the observation room, and that it was safe." "She got big eyes, and she just ran over there and laid down. She kept saying, 'Gamma, bird, bird, bird.' And the little ducks were out there floating around. She just went bonkers." That experience wasn't just touching for Jo, it was transformative. "When I retired at the university, it was the logical place to come; I'd been coming for about 20 years already with her."

Jo began volunteering in 2005. "The Friends group had overspent and were in the red." Within a month, she was asked to be Vice President. "I knew they were in trouble and that I could fix that part. I started the budget here and turned the whole thing around." She also pushed for new ways to connect the organization to its mission: "From now on, any board member to be eligible has got to be a volunteer here for at least a year. You need a connection. You need to be able to care about the place." She worked to "cultivate serious volunteers who loved the park and wanted to be here, and who understood the center's mission at a gut level." Jo also has seen firsthand the power of collective action. "We voted every single time for the purchase of more land, and we never said no."

Her belief in open space and public land as a community's lifeblood is deeply rooted. "This place is an oasis in the middle of this city," she said. "And I wanted to protect it no matter what."

This work is even more important now, as public lands across the country are being threatened. Jo's work feels especially urgent. "People just take our parks for granted," she said. "Once it's gone, it's gone. Recognize the value of preserving the land," she added. "Trust it and work hard for it."

When I asked her to sum up her 30 years of volunteerism, "Love what you do, "she said. In a time when our wild lands and public trust feel more fragile than ever, Jo Fairbanks' legacy reminds us that leadership rooted in care, clarity, and community cannot only preserve what matters, it can grow it.
If I had only one word to describe Jo Fairbanks, it would be FORTITUDE.

The Light Eaters:

How the Unseen World of Plant Intelligence Offers a New Understanding of Life on Earth

By Zoë Schlanger **Reviewed by Ruth Salvaggio**

Describing herself as an "environmental reporter with a problem," Zoë Schlanger became increasingly depressed as she wrote about "humanity's unrelenting death plod" toward "environmental cataclysm." She began to search for a different story about the earth, "something in the natural sciences that felt wonderful and alive." She liked plants, so took a dive into volumes of botanical research. What she found was not simply something that felt "alive;" she found is an understanding of life itself, communicated by the very creatures who brought life into being.

azolla filiculoides, Wikipedia

No wonder she begins with a tiny plant, one of earth's smallest ferns, that can fit atop your fingernail: *azolla filiculoides.* Some fifty million years ago, on a very warm planet, azolla took to the sea and began growing all across the Arctic Ocean. Then for another million years or so, azolla absorbed so much carbon dioxide "that paleobotanists believe they played a crucial role in cooling the planet," Schlanger explains, "and some researchers are looking into whether they could help do that again." There's much more to the magic of azolla, but it is enough to say for now that azolla set in motion the writing of this book. Plants thrive all around us, and have existed for millions of years. We, of course, adapted to eat plants for our survival. But long, long before that, plants ate light, and that has made all the difference. Consuming light, after all, is the primary work of photosynthesis, the process of transforming light energy into oxygen and organic material. It's impossible to imagine life on earth without this fundamental work of plants. How can we late-comers begin to comprehend this crucial exchange without coming to terms with plants themselves? Should we invest purely in our own intelligence and all its mental rules and regulations? Or might we turn to the intelligence of plants that have not only lived on earth since the beginnings of what we call "life," but are responsible for its very emergence and sustenance over a billion years?

Schlanger takes on this task by turning to those who opened the question of plant consciousness and intelligence, a comparatively recent inquiry stretching over a few thousand years. Before ancient philosophers approached the subject, indigenous cultures across the globe had an intimate and empathetic relationship with plants. Modern science is a different story, and has struggled to use the word "intelligence," in its human sense, to describe plants. But as Schlanger shows in her opening chapter, science has been changing its mind. Subsequent chapters turn to the specific ways that plants engage in what we call intelligent behavior, or forms of behavior that exceed our fairly strict definition of intelligence. How plants communicate seems more grounded — through roots and fungal extensions, or maybe more poetic — through chemicals "wafting off sagebrush" and interpreted "by nearby wild tobacco." Is plant pollination, by way of insects or wind, itself communication? We humans speak to each other, we write; plants have "an ear to the ground." Both humans and animals respond to flows of electric current coordinated in a brain; plants have no such singular organism, yet the whole plant functions like a brain. Do plants possess memory? We might ponder, how does a garlic remember winter? Could a plant possess cellular memory? Does it resemble human bodily memory?

The most interesting chapters for me address the distinctive importance of how plants *embody* intelligence, and how their fully embodied sense of knowing thrives on mutuality rather than on a mental quest. Schlanger's chapter on certain vines that morph themselves into becoming indistinguishable from the plants they surround offers a fascinating example of "interpenetrating forms of life" by exchanging and interpreting phenomena. Intelligence is less an accomplishment and more a flow of interchange. Her chapters on the social life of plants build on their shared "rhizosphere" with its billions of organisms that inhabit air, soil, and water. They inform crucial questions about human interaction: What is a contained self? Do we really exist untouched by the ground below us and microbial clouds surrounding us?

At the beginning of her book, Schlanger writes, "In this ruined global moment, plants offer a window into a verdant way of thinking." At the end, she describes this greening of intelligence: "Plants remind us that we are contiguous with our environment, impacted by its every fluctuation…. We inherit their environment in bodily form. One could say we inherit the earth."

CHYTRID: A FEARFUL FUNGUS

Jean Mason –
An editorial Review

After a springtime rain,

A fading glance of sunset picks out the white line dividing the lumpy back of a four-inch Woodhouse toad. He's on the move. Marching with determination through sandy riparian brush, he and some companions have scented a freshly filled side channel of the Rio Grande, now a site newly primed for breeding. The toads sound a nasal bawling-calf "w-a-a-a" chorus and wade in to greet females already present. After underwater mating, single long strings of eggs in jelly-like envelopes appear, attached to vegetation. Tadpoles, called pollywogs, will soon be followed by toadlets, tiny images of their parents. Achieving sexual maturity, a new Woodhouse generation will continue the cycle. Perhaps.

Robust and well-adapted to varied habitats throughout their wide range in the U.S., *Bufo woodhousii* swims and digs in watery lands down the Atlantic coast, from Washington and Utah to California in the West, and from Montana south to Mexico. They live high and wide in New Mexico, burrowing into soft ground near watersheds in the state. Their grey-green form, bumpy-rich with a protective poison to ward off predatory snakes, raccoons, and skunks, is a familiar amphibian sight to visitors at the Nature Center.

Bd, and Bsal*, two chytrid fungi in the Class *Chytridiomycetes,* are some of the most primitive of the true fungi. They have had a devastating impact on amphibians in Europe, Africa, Australia, and in Central and South America; Bd has also surfaced in North America. Could this killer fungus find the Nature Center's Woodhouse toad and other anurans? Could Bsal be a future danger to tiger salamanders in the Middle Rio Grande Valley?

The extinct golden toad of Costa Rica. Wikimedia photo.

THE GATHERING STORM

The wide-ranging class of chytrid fungi contains some 800 species that live in freshwater, saline estuaries, and in wet soils. Most are decomposers of organic matter and consumers of algae. Chytrids are unique among fungi in having a motile zoospore for exploring small volumes of water; Bd and Bsal are unusual chytrids as parasites of amphibians, using their infective zoospore to penetrate its host's skin.

First noted but misunderstood in the 1970's, Bd was firmly identified as an alien parasite in 1999 as the cause of massive frog and toad dieoffs, the plague peaking in Central and South America and in Australia. After the Bd genome was decoded in 2013, and its origin, which may date back 100,000 years, was traced to the Korean Peninsula, scientists found considerable complexity and diversity in its makeup predating amphibian declines. That diversity perhaps found an echo in the some-die some-survive variability of fungal strains that observers would later record.

Population declines came quickly. Infected amphibian carriers had entered the international wildlife trade as food, pets, and research animals in large numbers, travelling on human boots and even bird wings. These invading carriers included bullfrogs which quickly escaped homes and science labs along with African clawed frogs, imported in large numbers for use in "The Frog Test" to determine pregnancy. Some native amphibians, though naïve to Bd, have proved less susceptible to its effects and do recover. Others are helped by a symbiotic agent, a Violacein-producing bacteria with antifungal components that inhibits the fungus. Many of the luckier amphibian groups seem well supplied with this symbiont. Still other survivors may have received a milder strain of Bd and escaped. But many notable frogs and toads are lost: the gastric brooding frogs of Australia, the golden toad of Costa Rica, the golden frog of Panama, and harlequin toads of Central America. In the U.S., the Cascade frog of California is gone from 95% of its former range and the yellow-legged frog of the state's Sierra Nevada mountains faces elimination.

In 2019, a survey by an international consortium of scientists led by herpetologists at the National University of Australia developed an epidemiological analysis integrating the

**Batrachochytrium dendrobatidis,* known as Bd, attacks frogs and toads. Bsal, *Batrachochytrium salamandrivorans,* is a parisidic killer of salamanders.

data to determine severity, timing, and geological distribution of the plague. The data showed a global decline of 501 amphibians over the last 50 years, with 90 animals extinct and 25% sampled at less than 10% of their previous numbers. The researchers found Bd present in 56 of 82 countries and in 42% of species sampled in a dataset of 36,000 species. Hardest hit were the largest, slow-moving species, the slowest to reach maturity, and those living more isolated lives at higher altitudes.

Wikimedia Commons Photo

Declining Chiricahua leopard frog in NM

How about salamanders?

Bsal, a pathogen of salamanders and newts, was first described in 2013, based on studies of fire salamanders in the Netherlands which had suffered a significant decline. Mortality of other salamanders in Europe has climbed to 96% with Bsal detected in the UK and Germany; the pet trade proved to be the deciding factor spreading the infection.

Host to nearly 50% of all salamander species, North America ranks first in the world for salamander diversity. Although the fungus is as yet undetected in the U.S., discovery would not be a surprise: between 2011 and 2014, research labs and pet fanciers imported 750,000 of them. A USGS risk assessment now predicts that the amphibian will appear on the Pacific Coast, in the southern Appalachians, and along the mid-Atlantic Coast. In 2016, the Fish and Wildlife Service issued an order prohibiting import of salamanders.

Bd and their hosts

Adult amphibians rely on their skin for respiration, for maintaining water balance, and for transport of electrolytes. When fungi invade adult skin, they disrupt all of these. Although mouthparts of the young may be affected, tadpoles are less dependent on skin respiration since they live in water and breathe through gills. The fungi aims for adults.

Launching a two-stage life cycle in cool, moist environments, the fungus employs chemical agents to send out zoospores moved by a single flagella; they seek proteins in the keratinized skin of adult amphibians transitioned to land. If they find no place to sink in, spores can live in damp soil for several months. Successful, the spores then attach and encyst in the skin. Second stage begins with the production of new spore cases carrying zoospores for further gestation that will re-infect the host or travel to new victims through breeding or other one-on-one contact. The fungi are active at a temperature range of 63° to 77° F. and die above about 85°.

Called Chytridmycosis, the disease causes the skin of stricken adults to thicken and redden; the epidermis sloughs off and hindlimbs convulse and extend. Ulcers and bleeding follow with lethargy and loss of reflexes. Finally, heart failure leads to death.

Fighting back

Although individual animals can be bathed in an anti-fungal solution and survive, researchers admit that there is now no way to treat entire populations in the wild. There is also no way to stop the spread of the disease once it's established in a population. As of now, conservationists must focus on regulating and reducing the global trade in amphibians and promoting biosecurity policies. Experience clearly shows one fact: most animals affected in a group will die while a few do survive. Therefore, it's critical to know the threshold of Bd in a community. Crossed early, some get help. Too late, extinction is inevitable.

A new study at Penn State has proved that a vaccine against chytrid in frogs was able to shift the microbiome – an animal's collection of often beneficial organisms including bacteria and fungi that live in or on an animal host. Researchers applied a non-lethal dose of a metabolic product created by Bd to tadpoles, then observed how their microbiome composition had changed. The finding: a higher proportion of bacteria producing anti-chytrid fight-back substances in the tads, creating a microbiome "memory" that might help when they become adults.

In 2024, UC Riverside scientists announced discovery of a single strand DNA virus that infects Bd, already present in a few Bd strains, a virus genetically engineered to kill it. They will clone the virus and infect Bd with the clone to check its strength.

Bd in New Mexico

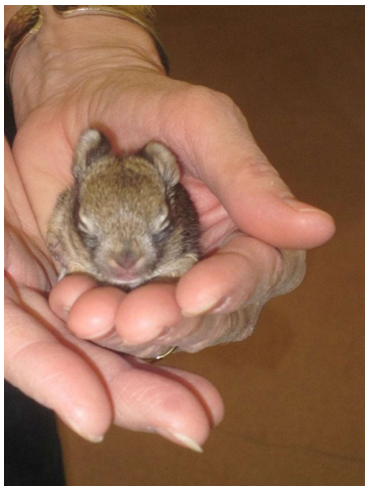
One example: the state has seen a sharp decline in localities of the Chiricahua leopard frog, from 250 down to 20 today; Bd is the likely culprit. Herpetologists are now compiling all known records of the presence or absence of the fungus into a single data set that will be mapped across the state. To date, they have compiled over 1,800 data points for 21 of the 27 amphibian species known in New Mexico and have identified several watersheds in north central and southwestern areas where Bd is present.

In another survey, the Bosque School community has tracked the fungus at state sites, aiming for reintroduction of the boreal toad at fungus-free sites. This toad, a native of the southern Rockies and a NM-listed endangered amphibian, has seen its population drop 80% to 90% in Colorado and Wyoming. The group's data found Bd in a boreal toad in Rio Arriba County. Closer to home, a Woodhouse toad tested at the Nature Center was Bd-free.

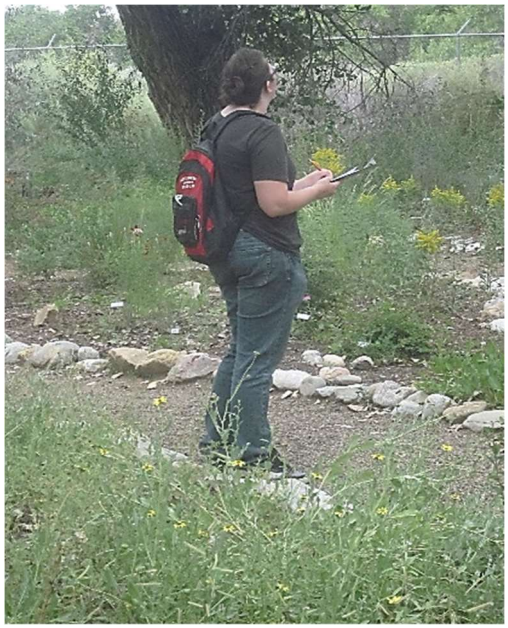
Sources: p.13.

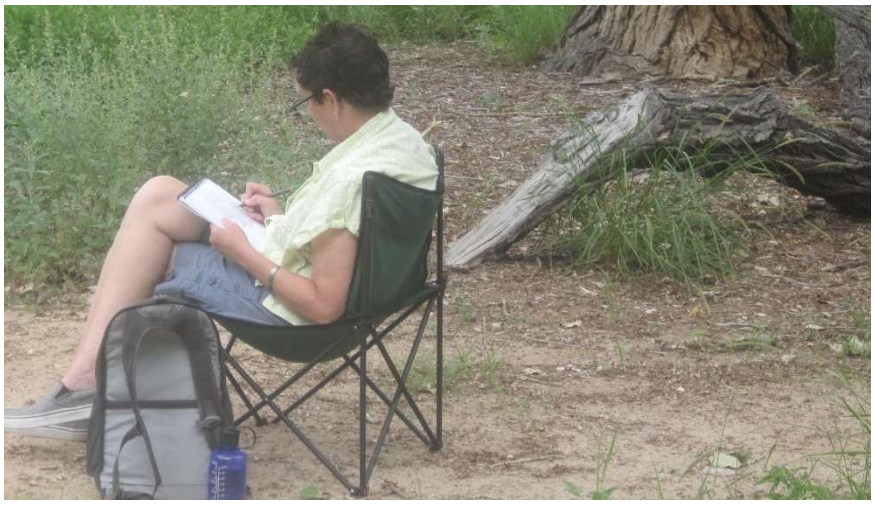
Spring Garden Festival: May 10 – 11, 2025

Photos: Mason



At the welcome table: Volunteers Ray Blankenship and Molly Madden





Hyles lineata and Family: Behemoths !

--Jean Mason

Like trumpets sounding a fanfare, the deepening black of night impels a startling white to emerge: sacred datura flowers, each one standing alone. Pungent and lavender-hued with toothed trumpets eight inches across, they are opalescent against dark green leaves, white with hope and rich with nectar.

On a zip tour across sandy New Mexico rangeland, a pair of white-lined sphinx moths appear and disappear as they weave through the spreading datura thicket – small, plump, furry probers swing-hovering and side-tilting like hummingbirds to avoid hidden predatory spiders. Powered by three-inch wings and directed by paired antennae that constantly calibrate course correction, the moths move in and flare their pink hindwings to hover-feed. Deploying three vision receptors sensitive to blue, green, or UV light, they unroll rubber-like tongues of resilin, sinking them deep into hooked flower corollas for thin but generous nectar. Sugar-mellow, the moths now have pollen-covered tongues, rolled up and ready for their long outbound flight at up to 30 miles per hour. Shivering muscles to warm up, they sail away,

The Searchers

One of the most abundant moths in North America, the white-lines sphinx moth *Hyles lineata* is a wide-ranging cosmopolitan with a restless gene. At home in multiple habitats from Canada through the U.S. and south into Central America, these moths have turned up in the West Indies, in Pakistan, and in Europe and Africa. Low deserts, gardens, and suburbs* are all home to them where colorful columbines, lilac, bee balm, honeysuckle, phlox and petunia flowers offer daytime feeds. Mid-level conifer forests up to the highest mountains of Colorado are also welcome territory, particularly those that offer patches of evening primrose, datura, or penstemon flowers for evening fill ups. (Finding fragrant flowers in the dark is a breeze.) These distance fliers are known as more efficient in moving pollen further than birds and bees do. Like other pollen carriers, the moths exploit static electricity built up during flight that causes pollen to jump unto them.

Wikimedia commons photos

***Gardens and surrounding areas at the Nature Center are home to pop-up datura and evening primrose plants that provide nectar to sphinx moths. Though volunteers, they thrive alongside the garden's chosen cultivated species.**

Summer months are their active times in the North while moths in the South are in the air year-round. Sphinx moth irruptions can be spectacular: in 2023, when record rainfall combined with snowpack runoff produced lush wildflower blooms from mountain high to desert low in all areas of California, NPS and USGS observers noted sphinx moths, both caterpillars and adults, in record numbers, dozens appearing in patch after patch everywhere. Since moth populations are known to swing abruptly from very high to near zero year to year, studies point to the moth's influence on plant phenotypes, or their physical features. Noting the moths' preference for white flowers, a 2009 study showed that white was the dominant plant color when moths at any stage of life were around. Looking closely at the nocturnal habit, studies show that bird predation by visually-guided day hunters is sharply reduced for the 80% of butterflies and moths, including *H. lineata,* when they fly at night. Another earlier study identified two different groups of the species, suggesting a tie between tongue length, preferred latitude, and potential as agents of pollination. Tongues, which may be 15-40 mm long, have lengthened in moths flying through extra-tropical zones where food plants are often hidden and energetically demanding to find, where moths must fill up full and fast for long flights, then move on. Their behavior makes this moth group poor pollinators. In northern regions where plants are easier to find, the moths have shorter tongues and feed on many different ones but need less nectar for flights, making them better pollinators.

Moths, Egged on

Xanthopan morganii praedicta: Nesdad photo

Springtime is eggtime for western moths, when male and female, near twins in appearance, meet and mate. A big producer, a female sphinx will lay hundreds of eggs in her relatively long 10-to 30-day lifetime, often two clutches a year. Eggs are translucent, greenish, flat, and smooth; the female lines them up on leaves and stems of her herbaceous host plant. Lifecycle to adult form: egg, one week; caterpillars developing through five instars, four weeks; pupa, one week, then on to adult. Depending on their environment, *H. lineata* caterpillars can vary widely: green with pink stripes in one phase, then black with yellow stripes when populations are dense and high. Caterpillars are called hornworms for a back-curved spine at the tip of the body (it's not a stinger). Stubby legs anchor caterpillar growth through feeding stages although some may choose to wander and sample different plants; larvae may form giant hordes in search of host plants. If one has reached its final instar development late in the year, it will overwinter until the following spring. When the time comes to pupate, the three-inch caterpillar doesn't spin a cocoon on a branch; it digs four inches into the soil. Between February and November, most wriggle out to adulthood.

Wiki commons photo

H.lineata larva

The Family Circle

Commonly called sphinx moths or hawk moths, the family S*phingidae* numbers 1,450 species, most represented in the Tropics but flying in every region on the continent. Some of the world's largest moths belong in the Sphingid family, often with narrow wings and thick bodies. Like *H. lineata,* they are highly aerobatic, hovering in place and flying backward, earning the name "hummingbird moths."

Sphinged caterpillars are of medium size with five pairs of prolegs; cryptic green and brown, they often wear patterns to conceal them from predators while others are brightly colored, typically with white spots or slashes on a dark background. Mimicking snakes is an ability of one species; others regurgitate a sticky toxic mash of leaves from the foregut. Tobacco hornworms of the Manduca genus detoxify and excrete unpleasant nicotine; others feed on the bitter chemicals of nightshade plants, making them unpalatable to enemies. When disturbed, some sphingids are noisemakers: the walnut sphinx moth caterpillar forces air out of its spiracles, producing a whistling hiss; Abbott's sphinx moth of North America mimics bumblebees, buzzing while they feed. Though most sphingids lack tympanic organs, still others can hear: members of the Choerocampine group have hearing organs on their heads.

Though they don't pollinate food crops and are ignored by farmers, sphinx moths are vital to the survival of many endangered plants; some have formed tight partnerships with both their favored nectar sources and with rare plants as well.

A few examples: sphinx moths fly across ocean island chains to reach and pollinate rare Puerto Rican higo chumbo cacti plants; others pollinate Egger's century plant, imperiled in the Virgin Islands. Two different moths, the yucca moth and the senita cactus moth, both pick up pollen and jam balls of it into the stigmas of their chosen flowers in order to assure food. Most notable: a comet orchid of Madagascar was found to store its nectar at the bottom of a twelve-inch tube, puzzling Charles Darwin and Alfred Wallace about the identity of its pollinator companion; the unknown pollinator had to have a tongue capable of extending 10 to 12 inches. Finally, a subspecies of an African moth, was discovered in 1903 and named *Xanthopan morganii praedicta* with a tongue nearly one foot long.

Along with the world's other vital but disappearing insects, sphinx moths are threatened by many forces due to urban development. Pesticides kill them, light pollution confuses and blinds them, humans impact and destroy their habitats, and climate change may defeat them. For insects and for ourselves, we must work for change. We can't live without them.

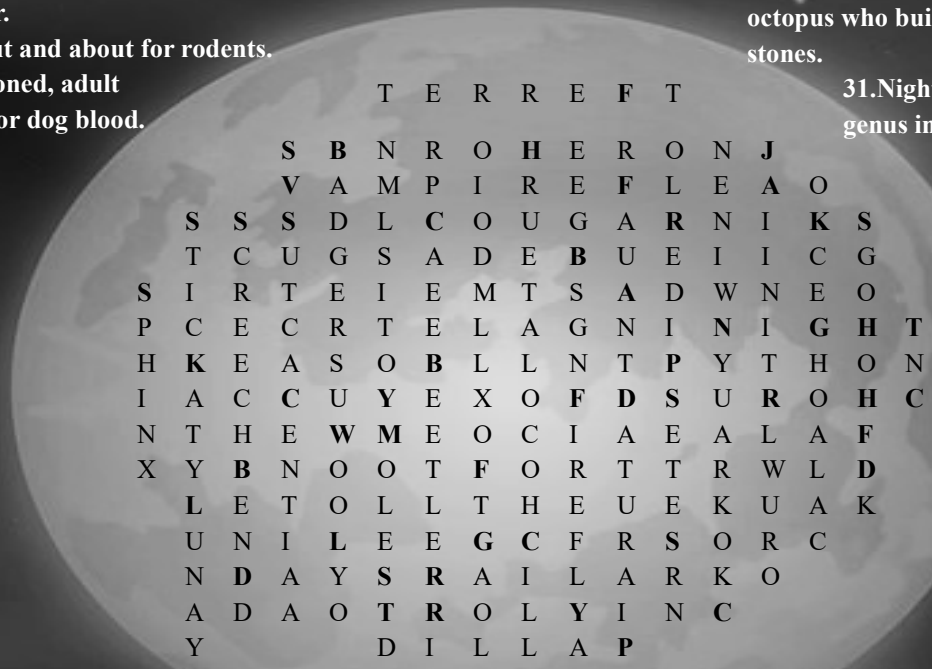
Sources: en.wikipedia.org › wiki › Hyles_lineata; www.nps.gov › articles › 000>White-lined Sphinx Moths Benefit from Abundant Wildflowers; wildernesscenter.org- white-lined sphinx moth;inaturalist; www.arizonensis.org › sonoran › fieldguide; *Wings* fall 2023; Polli Gerstle pers. comm.

Solution p. 13

...And to All, A Good Night

--Jean Mason

1. **G**__worms: female b__ produces light when hunting.
2. NC's night**h**__ fly open-mouthed for insects.
3. Cellar **s**__ (arachnid): lives near black widows, eats them.
4. **R__tail: has night-sharp eyesight for grubs and eggs.**
5. **C__roach: has 3,500 separate eye lenses for nightlife.**
6. **Y__ moth: forms pollen balls at one flower, takes it to a receiver.**
7. **S__ owl: out and about for rodents.**
8. **F__: coccooned, adult jumps out for dog blood.**



				T	E	R	R	E	**F**	T				
			S	**B**	N	R	O	**H**	E	R	O	N	**J**	
			V	A	M	P	I	R	E	**F**	L	E	**A**	O
	S	**S**	**S**	D	L	**C**	O	U	G	A	**R**	N	I	**K**	**S**
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H	**K**	E	A	S	O	**B**	L	L	N	T	**P**	Y	T	H	O	N
I	A	C	**C**	U	**Y**	E	X	O	**F**	**D**	**S**	U	**R**	O	**H**	**C**
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	N	**D**	A	Y	**S**	**R**	A	I	L	A	R	K	O			
	A	D	A	O	**T**	**R**	O	L	**Y**	I	N	**C**				
	Y				D	I	L	L	A	**P**						

27. **All things emit light; total d__ness not possible on Earth.**
28. **Desert c__pede: hunts arthropods at night.**
29. **M__: NC has four different species in bat genus.**
30. **T__-using in deep water: octopus who builds shelter from stones.**
31. **Night-blooming cereus: genus in c__ family**
9. **Y__ and yang: dark and light.**
10. **NC's p__ (pale) bat buzzes just like its insect prey.**
11. **C__: Night-eyed puma will travel 15 miles at night for prey.**
12. **K__ did: male crickets sing at night.**
13. **S__ moths pollinate night-blooming flowers.**
32. **Walking s__: super-thin insect feeds at night.**
33. **NC's h__nose snake night-hunts reptile eggs.**
34. **Virginia r__: secretive wading bird a n__ hunter.**
35. **R__ poly: pill bug lives deep in b__ of leaf litter.**

14. **K**__: New Zealaand's flightless nocturnal bird seeks dense growth.
15. **V**__ bat: Flies, then walks and climbs for blood meals.
16. Ball **p**__: African snake hunts rodents in their burrows.
17. Black-crowned night **h**__ goes fishing after **s**un**s**__ (fine more).
18. Long-**h**__ beetle: eggs and larvae feed deep in cottonwoods.
19. Banded **g**__: NM's lizard is night rock climber for insects.
20. NM's tiger **s**__ (amphibian) burrows for snails and slugs.
21. Night blooms on cacao, or **c**__ flowers pollinated by midges.
22. Isabella tiger moth caterpillars, or **w**__bears, are nighttime plant feeders.
23. Summer **d**__ heat makes the **c**__ frog hunt at night.
24. Bio**f**__escent: **s**__ (epidermis) absorbs and re-emits light.
25. **A**__ lion: Doodlebug larvae dig, hide in insect traps (find 2).
36. **M**__: Dirt diggers have all-body feelers to find insect prey.
37. NC's cotton **r**__ is a nocturnal runway builder.
38. **F**__fire or "faux fire" is luminous fungus from decaying wood (find 2).
39. Digger **b**__: brings pollen to ground burrow.
40. **B**__ (mammal): burrowers dig out ground squirrels.
41. Spadefoot **t**__: night active insect eater.
42. **D**__: Hawkmoths pollinate its white flowers at night.
43. **J**__ cricket night-wanders ground for insects.
44. Black-footed **f**__ hunts prairie dogs.
45. **L**__bug sleeps eyes open at night.
46. **L**__ moth caterpillar hides deep in tree bark.
47. **F**__: Nocturnal beetle makes light to court mate.
48. Big **b**__ slider: pond basker in hot weather, mud

From p 8, Sources for chytrid: siencedaily; cisr.ucr.edu; forbes.com; wildlife.org; arcprotects.org; sciencenews.org; theconversation.com; amphibiaanark.org; fws.gov>story>2020-07; psc.ncbi.nim.nih.gov; cwhl.vetcornell.edu; bosqueschoolshaw.weebly.com; William G. Degenhardt et al. *Amphibians and Reptiles of New Mexico* 1996.

AUTUMN WINGS FESTIVAL

SATURDAY SEPTEMBER 20

Friends of the Rio Grande Nature Center

2901 Candelaria NW, Albuquerque, NM 87107

Name_____
Address_____
City, State, Zip_____
Contact Telephone #_____**email**_____
(Main telephone number that you use home, work, and/or cell)

MEMBERSHIP CATEGORIES (*CHECK ONE*):

□ Regular** $30 □ Donor $50 □ Sponsor $100
□ Special* $20 □ Life Member $1,000

CIRCLE ONE: *Senior (62+), Teacher, Disabled, Student (23 & under)
**Individual, Family

DONATION IN ADDITION TO MEMBERSHIP***
Enclosed is a donation of $_____

***The Friends of the Rio Grande Nature Center Is a non-profit 501(c)(3) corporation

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□ I am a new member
□ I am registering for a class or program
____Enclosed is my check
___Please charge my___VISA ____MasterCard
Exp. Date _____ Amount_____
Card Number_____
Signature._____

☐ Please send information about volunteering

☐ Please email *Bosque Tracks* publication

Office Use Only

Date Received_____ Check #_____
Amount_____ Permit Mailed _____
Permit #_____ Member # _____
Payment Method_____ Sold by_____

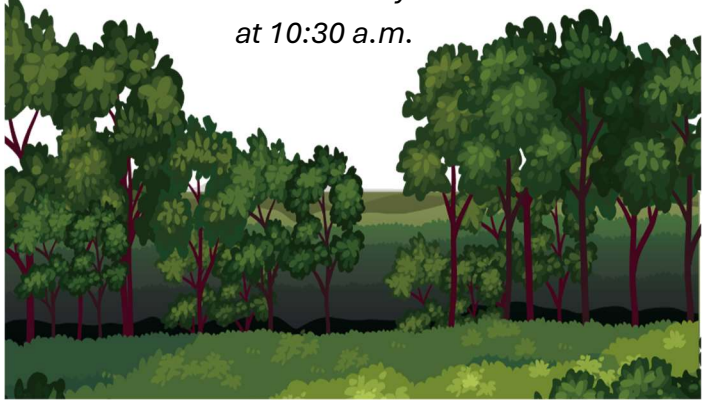
From *...And to All, a Good Night,* p. 12.

1. Glow, beetle
2. hawks
3. spider
4. Ring
5. Cock
6. Yucca
7. Screech
8. Flea
9. Yin
10. pallid
11. Cougar
12. Katy
13. Sphinx
14. Kiwi
15. Vampire
16. python
17. heron, sun
18. horn
19. gecko
20. salamander
21. chocolate
22. Wooly
23. day, chorus
24. fluor, skin
25. Ant
26. ingale
27. dark
28. centi
29. Myotis
30. Tool
31. cactus
32. stick
33. hog
34. Rail, night
35. Roly
36. Moles
37. rat
38. Fox
39. bee
40. Badger
41. toad
42. Datura
43. Jerusalem
44. ferret
45. Lady
46. Luna
47. Firefly
48. bend

Guided Weekend Bird and Nature Walks

Bird walks every Saturday and Sunday at 8:30 a.m.

Nature walks 2nd Saturday of the month at 10:30 a.m.



The mission of the Friends of the Rio Grande Nature Center is to support the Rio Grande Nature Center State Park's mission: To preserve and protect the Rio Grande bosque, educate the public about Rio Grande ecosystems, and foster positive human interactions with those ecosystems.