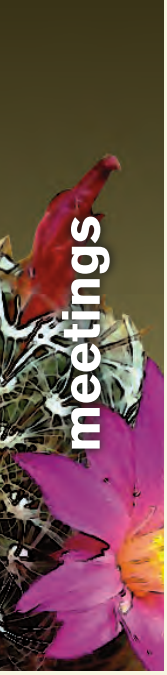
MARICOPA AUDUBON SOCIETY

The Cactus Wren•dition

Volume LXXI No. 1 Spring - 2019

Harris's Antelope Squirrel
by Vicki Hire



MAS holds meetings (membership is not required) on the first Tuesday of the month from September through April at Papago Buttes Church of the Brethren, 2450 N. 64th Street, Scottsdale (north of Oak Street on the west side, between Thomas and McDowell roads). If southbound, turn right from 64th Street, ½ mile south of Thomas. If northbound, turn left (west) at Oak Street, ½ mile north of McDowell, and then right at the Elks Lodge. Continue past the lodge and turn right into the church parking lot. Look for the "Audubon" signs. Pre-meeting dinners (September through April) are held at 6:00 pm at Noodles Ranch Vietnamese Cuisine, 2765 N. Scottsdale Road at the southeast corner of Scottsdale Road and Thomas in the south part of Scottsdale Crossing Plaza. The May meeting is our annual banquet. Please check the Spring *Wren•dition* or our website for details.

Committees/Support

Arizona Audubon Council Rep
Position Open

Bookstore
Sochetra Ly
602 860-0370

Poet Laureate
David Chorlton
480 705-3227

Website
Laurie Nessel
602 391-4303
laurienessel@gmail.com

Maricopa Audubon Website
http://www.maricopaaudubon.org

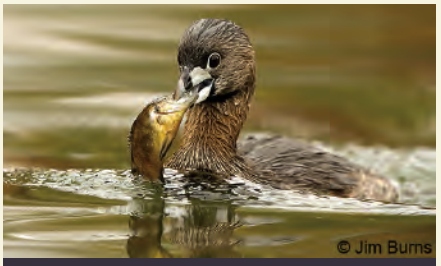
The clearest way into the Universe is through a forest wilderness.

John Muir

An Investment in the Future

Bequests are an important source of support for the Maricopa Audubon Society. Your chapter has dedicated itself to the protection of the natural world through public education and advocacy for the wiser use and preservation of our land, water, air and other irreplaceable natural resources.

You can invest in the future of our natural world by making a bequest in your will to the Maricopa Audubon Society. Talk to your attorney for more information on how this can be accomplished.



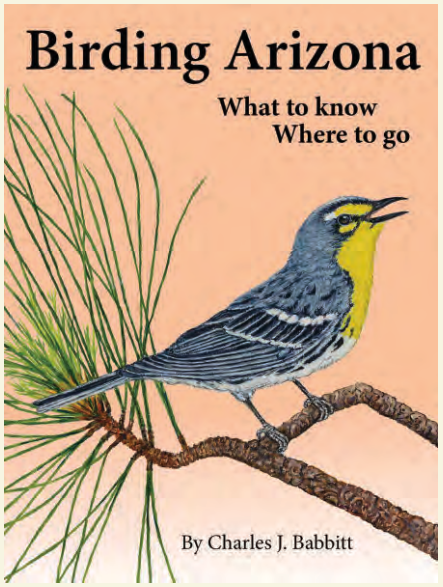
Pied-billed Grebe with Sunfish. Photo by Jim Burns

March 5, 2019

Jim Burns
Local Patch: Treasures Nearby
Many birders see a bird, ask "What?", put a checkmark on a list, and move on to the next bird. Jim Burns sees a bird, asks "Why?" and "How?" then turns on the camera and tries to melt into the background to observe the answers. The last time Jim Burns gave a MAS program he went exotic and took us to Costa Rica. This time he's going local and taking us just a few miles from his front door for a peek behind the curtain into the lives of common Valley birds with which we're all familiar. Come with Jim for a visit to his local patch. At the meeting members can buy a signed copy of Jim's book, *Jim Burns' Arizona Birds*, at a 10% discount.

April 2, 2019

Charles J. Babbitt
Special Book Signing! Birding Arizona: What to know, Where to go
This program will take you on a tour around Arizona to some of the state's most productive and interesting birding spots including a number of lesser known areas as highlighted in Charles Babbitt's new book *Birding Arizona: What to know, Where to go*. Along the way we will explore a variety of different habitats and learn about multiple facets of Arizona bird migration including the summer influx of birds from the Gulf of California, fall hawk and shorebird migrations, and great places to watch spring and fall passerine migration. Charles will remain after the meeting to sign copies of his book.



Charles Babbitt is a past president of MAS and a past member of the Arizona Bird Committee. He enjoys leading field trips for MAS and bird walks at Boyce Thompson Arboretum.

May 7, 2019

65th Annual MAS Banquet and Meeting
Location: Franciscan Renewal Center, 5802 East Lincoln Drive, Scottsdale, AZ 85252-4124
6:00 pm BYOB social hour, raffle, and silent auction.
7:00 pm Buffet Dinner (includes vegetarian option).
Cost: $30.00 per person ($28.00 for Friends of Maricopa Audubon. To become a Friend, please see back page of this issue).

Reservations required. No-shows will be billed. You may pay at the door (cash or check) or mail checks payable to Maricopa Audubon Society to MAS Banquet, c/o Vicki Hire, PO Box 603, Chandler, AZ 85244. Our agenda will include induction of our new Board and presentation of the Tenth Annual Herb Fibel Award for Distinguished Service to Maricopa Audubon Society.

Banquet Speaker: Rich Hoyer
Mimicry in Birds
While birding at Oregon's Finley National Wildlife Refuge in his teens, Rich Hoyer heard the most amazing thing - a Purple Finch incorporating sounds of a California Scrub-Jay in its jumbled song - and thought he had discovered something new, since such

The Northern Mockingbird might be the first species a North American birder might think of when asked about mimics. But not only are there many other species that mimic, the "Mocker" is not even close to being the best in the avian world. Photo by Rich Hoyer

behavior wasn't mentioned in any field guide. Since then he's been fascinated and intrigued by mimicry in birds, collecting personal observations and recordings of this phenomenon. Rich will present examples of mimicry in songbirds from throughout the Americas and share his enthusiasm for this curious and often entertaining behavior.

Born and raised in Oregon, Rich Hoyer earned bachelor's degrees in German and Zoology at Oregon State University. Following a few years as an itinerant biologist and summer guide on Saint Paul Island, Alaska, he moved to Tucson and has worked as a professional birding tour leader for WINGS for 19 years. He leads tours to exciting locations like Brazil, Bolivia, Peru, Costa Rica, Mexico, Belize, and Jamaica, but he also looks forward to his annual tours that explore the beauty and diversity of his home state of Arizona.

On the Cover: Harris's Antelope Squirrel
Nikon D5100, Lens: 300 mm, 1/640 sec, f/6.3 210 mm, ISO 200, Desert Botanical Garden, May 25, 2014, by Vicki Hire.

Vicki says: I was visiting the Desert Botanical Garden with my friend Gillian Rice when we observed this Harris's Antelope Squirrel scurry up a cholla cactus to feast on new growth at the top. The squirrel seemed oblivious to the cactus spines, and instead used them as a ladder. (To learn more about squirrels, see page 12 – Ed.)

President's Message

Mark W. Larson

I write this on a dreary, rainy day in January—not the sort of weather those of us who appreciate bright, sunny days enjoy very much. Unless, that is, we realize that such weather holds the promise of a spring full of desert wildflowers, abundant and colorful!

This is an optimistic view and a hopeful one. Despite all the negative events happening in the world around us, especially those in Washington, DC, I believe that we all need to maintain a positive attitude about the world we can leave behind. But that means that we have an obligation to do what we can to address those issues of concern to us. This point of view drives the environmental conservation and the environmental education efforts of the Maricopa Audubon Society and always has.

We will not passively endure the threats to our treasured natural systems. Threats that seem to multiply daily, threats that include environmental ignorance about the value and importance of Nature in our lives.

If you share these views, and I hope that you do, I urge you to get involved in the organization in some way. We need your ideas and your energy. We are filling some Board positions with members who will help us power forward toward an improved future, for us as well as our community and our environment. There's a place for you, too.

Mark W. Larson
President

Letter from the Editor

by Gillian Rice

Gillian Rice

Once a birder, always a birder – everywhere! I can't help myself. I just returned from a couple of weeks visiting my parents in England and spent every day on the lookout. Walking into town had me looking skyward at Pied Wagtails chirping as they flew over the shops trailing their long tails. Gazing out of Schiphol airport terminal (Amsterdam), I saw a Magpie in the distance flying to and fro under the planes. A Jackdaw caught my eye, perched right below the window. What could the birds find to eat in such a sea of concrete and equipment I wondered. Ah, one of the ground staff close by was enjoying a large sandwich as he worked. The opportunistic Jackdaw hoped for crumbs. I must admit I hoped the human would share but he didn't and then the Jackdaw flew up to the roof edge.

At home my parents and I spent much time watching garden birds. My brother took us, armed with binoculars, for a car trip along quiet narrow country lanes. How much you can spot from a vehicle! My mother is housebound and such excursions are precious, even in the chill of an English winter. Our sightings included Roe Deer grazing on crops (an overpopulation of deer is problematic in England just as in parts of the US), a Brown Hare bounding across a field, several elegant colorful Red Kites (a reintroduced raptor), Common Buzzard, Kestrel, Goldfinch, Greenfinch, and Tree Sparrow.

I am eager to get out and about in the Phoenix area to take advantage of spring, which arrives early here. And you just never know what you will find. Do write to me and share your story for Tales from the Field. Duane Morse's article (p. 14) surprised me with his experiences birding from a cruise ship. But then I bet he is like many of us – always watching nature. Always alert. And learning about fascinating behavior. In this issue we find out more about blind snakes and screech owls (p. 9), tortoises that eat rocks (p. 16), bobcat and coyote water use (p. 18), and relationships between plants and creatures (p. 22).

Even though many species have adapted well to our urban sprawl, it's essential to be vigilant about protecting natural and wild places. In this context, Gail Cochrane (p. 10) briefs us on the role of land trusts.

A huge thank you to all contributors! Now, what's that bird singing outside my window…

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ANNOUNCEMENTS

INTRODUCTION TO BIRDING CLASS MARCH 2019

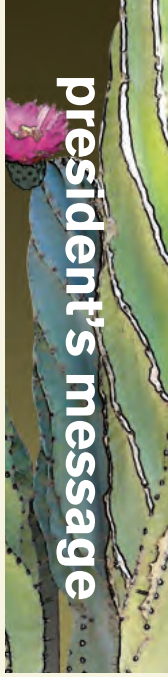
For the second year, President Mark Larson will conduct a birding class at the Appaloosa Library in north Scottsdale. This is an introductory class geared to beginners and will cover birding techniques, equipment, recommended reference materials, birding ethics, and related topics. The birding class will meet every Wednesday evening in March at the Appaloosa Library in Scottsdale concluding with a field trip on the first weekend in April. Maricopa Audubon members who are new birders or those who wish to add to their knowledge and sharpen their skills, are encouraged to attend. This class will be advertised in the City of Scottsdale Library System's Online offerings or you may contact Mark to express your interest.

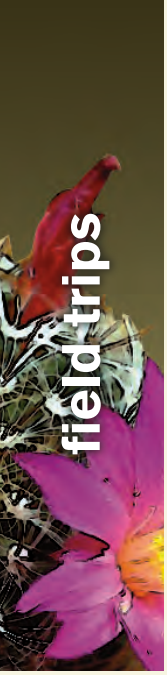
NOMINATING COMMITTEE

The Maricopa Audubon Society's annual elections of officers and the Board of Directors will take place at the April monthly meeting. Our bylaws require a Nominating Committee of members take phone calls from members who express interest in joining the Board of Directors. Those keen to join the Board should call a member of the Nominating Committee and indicate which position is of interest. The Nominating Committee for 2019 is: Mel Bramley, Chair (480) 969-9893, Lisa Fitzner (480) 223-3784, and Brian Ison (602) 909-0541.

AMAZONSMILE

Maricopa Audubon Society is now registered on Amazon as a charitable organization. Go to MAS Facebook page for details or use the following AmazonSmile link for Maricopa Audubon Society:
https://smile.amazon.com/ch/86-6040458
Log onto your Amazon account and a percentage of your purchase will go to MAS!





Maricopa Audubon Society Field Trips & Workshops

Car Pooling: Please make every effort to organize your own car pool, consolidate vehicles at meeting places and/or contact leaders for car pooling assistance. Be courteous to the trip leaders and help cover their gas costs. We recommend that passengers reimburse drivers 10 cents per mile each.

Reminders:

- Avoid wearing bright colors. Wear neutral-colored clothing and sturdy walking shoes.
- Bring sunscreen, sunglasses, head protection, and water.
- Always bring your binoculars. Bring a scope if recommended.
- Submit trip and leader suggestions to the Field Trip Chair, Larry Langstaff.
- Unless stated otherwise, reservations are required.

Day Passes: Many locations in the National Forests require Day Use Passes. For details, see http://www.fs.usda.gov/main/tonto/passes-permits

Saturday, March 16

Flagstaff Area Lakes
Meet 8:00 am in Flagstaff. Bring lunch and warm clothing. Look for waterfowl on the lakes. Possible species include Bald Eagle, Red Crossbill, Cassin's Finch, Pinyon Jay, and Rough-legged Hawk. Minimum of 6 people required.
Leader: Charles Babbitt, 602 840-1772 or cjbabbitt@cox.net

Monday, March 18

Mt. Ord
Mt. Ord (7,100 ft), in the Mazatzal mountains, is one of Maricopa County's few choices for high elevation bird habitat. An early start could grace us with one of the premier sunrises in the county. See Western Bluebird, White-breasted and Pygmy Nuthatches, Hairy and Acorn Woodpeckers, Woodhouse's Scrub-Jay, Bridled Titmouse, Hutton's Vireo, and Spotted Towhee. Potential sightings include: Painted Redstart, Olive Warbler, Cassin's Finch, and Red Crossbill. Difficulty: 2. Uneven rock surfaces and short travel down moderately steep drainage. Meet at 5:00 am. Return at about 1:00 pm. Bring snacks, water, hat, sturdy walking shoes, hiking poles if necessary for drainage, and lunch. Limit: 8.
Leader: Dara Vasquez. To reserve, send cell # to Larry Langstaff, larrylangstaff1@gmail.com

Friday, March 29

Pinal Mountains
Early spring migrants and resident species will be active. Cover four main habitats, each with its own community of birds: mesquite (3,500 ft), chaparral, Ponderosa Pine, and Douglas Fir-Aspen near the peak (7,890 ft). Sunrise is 6:20 am; temperatures will be 10 to 20 degrees cooler at the top than in Phoenix. Bring water and lunch. Trip includes two or three short walks into mesquite and Ponderosa Pine habitats, but trails are level and easy. Bring a walking stick if you will feel more comfortable. Most birding from the road and near the cars. Receive a bird checklist two weeks before trip. Leave Tempe 5:00 am. The drive to Globe takes about one hour and 20 minutes. Return 3:00 pm. Limit: 11 plus leader in three cars.
Leader: Dave Pearson. To reserve, send cell # to Larry Langstaff, larrylangstaff1@gmail.com

Saturday, April 6

Lopiano Bosque near Tempe Town Lake
Mid-morning hike with additional possibility to explore Evelyn Hallman Canal Park. Birds expected include Cooper's Hawk, Great Horned Owl, warblers and other migrants, as well as desert birds such as Greater Roadrunner. Bring water and snacks. (Optional picnic at park after hike.) Limit: 6.
Leader: Myron Scott. To reserve, send cell # to Larry Langstaff, larrylangstaff1@gmail.com

Sunday, April 7

Tempe Town Lake
Great-tailed Grackle mating rituals and family nesting site survey. Enjoy sites along the north shore of the lake where nests abound, elaborate wooing rituals are often seen and learn about the life cycle of this common but fascinating year-round resident. Limit: 8
Leader: Roberta Taber, mindfulbirding@protonmail.com

Monday, April 15

Bushnell Tanks
An under-birded area off SR87 near Sunflower. Variety of habitats including a sycamore-lined creek, some open fields and nearby high desert/transition zone, with great potential for lingering winter species as well as early migrants. Possible American Robin and Townsend's Solitaire, along with Lucy's Warbler, Common Black Hawk and Bell's Vireo, plus typical resident species. Start about 5:45 am in Fountain Hills, and finish about 10:30 in a Fountain Hills coffee shop. Difficulty: 2. Limit: 8.
Leader: Kathe Anderson, kathe.coot@cox.net

Saturday, April 27

Sunflower-Mt. Ord
See many nesting species like Gray Vireo, Black-chinned Sparrow, Hooded Oriole, Scott's Oriole, Black Hawk, and Zone-tailed Hawk. Going up Mt. Ord we will look for the six "Arizona warblers" as well as migrating Hermit Warbler and Townsend's Warbler. Bring lunch. Difficulty: 2-3. Limit 8.
Leader: Charles Babbitt 602 840-1772, cjbabbitt@cox.net

Saturday, May 4

Jones Water Primitive Campground northeast of Globe
Depart Globe 6:30 am, carpool to campground. Small stream riparian area with Lucy's Warbler and possible late warblers, Northern Cardinal, Black-headed Grosbeak, Brown-crested Flycatcher, Juniper Titmouse, Common Raven, Woodhouse's Scrub-Jay, and Bullock's Oriole. End at 10:00 am and return to Globe. Difficulty: 1. Bring water and snacks. Wear closed-toed shoes. Limit: 5.
Leader: Myron Scott. To reserve, send cell # to Larry Langstaff, larrylangstaff1@gmail.com

Saturday May 11

Tempe Town Lake (east side).
In search of warblers! Spring brings a variety of colorful plumages on warblers, and many fly through riparian areas like Tempe Town Lake Marsh. Join in an informal, fun, and fluttery warbler count as we watch these busy little beauties in Tempe. Limit: 8.
Leader: Roberta Taber, mindfulbirding@protonmail.com

Saturday, May 18

Papago Park Dragonflies and Butterflies.
Learn to identify local butterflies including Painted Lady, Queen, and Fiery Skipper as well as common dragonflies and damselflies such as Blue Dasher, Flame Skimmer, Blue-ringed Dancer, and Familiar Bluet. Easy, one to one and a half hour stroll around the lakes. Children welcome. Bring binoculars (close-focus preferred), water, and hat. Meet 7:00 am at Lake 2. No reservations needed.
Leaders: Janet Witzeman, Pete Moulton, and Laurie Nessel, laurienessel@gmail.com

Sunday, May 19 and Monday, May 27

Stewart Mountain Desert Tortoise Quest
Hardy souls willing to trek in the early morning heat of May with a slight chance of finding a desert tortoise can join Laurie Nessel traverse steep, rocky hillsides searching for tortoises that emerge during the arid fore-summer. Just about all tortoises surface to replenish their water reserves after an iconic monsoon storm. But some tortoises, notably females and juveniles, will emerge in late spring, or even during winter rain days, to feed, bask, and drink if possible. These are the first spring tortoise trips for MAS. Learn about the behavior, life cycle, and status of this keystone species. Difficulty: 4 (steep, rocky terrain, and hot weather). Bring snacks, sun protection, hat, sturdy hiking shoes, a high power flashlight or mirror and plenty of water. Start near daybreak and return by noon. No limit.
Leader: Laurie Nessel, laurienessel@gmail.com, 602 391-4303.

Monday-Wednesday, May 20-22

Fairbanks/St. David area
Explore new spots highlighted in the guide, *Finding Birds in Southeast Arizona*. The loop at Fairbanks is a couple of miles long, and relatively flat but sandy. The trail at St. David is shorter and easy going. See colorful neotropical migrants such as chats, flycatchers, grosbeaks, vireos, tanagers, and buntings, along with possible Gray Hawk and Common Ground-Dove. Perhaps a Mississippi Kite at St. David. Start early on May 20 to hit some hotspots on the way south. Concentrate on Fairbanks the next day, and visit St. David. Back in Phoenix on May 22 about 6:00 pm. Benson will probably be our place to stay. Moderate hiking. Difficulty: 2-3. Costs will include two nights of lodging at moderate hotels, meals, and gas. Limit: 8.
Leader: Kathe Anderson, kathe.coot@cox.net

Sunday, June 9

Tonto Natural Bridge State Park
See swifts, swallows, jays, wrens and other residents in this refreshingly cool, riparian habitat northwest of Payson. Adult entry fee is $7.00. Limit: 8.
Leaders: Roberta Taber and Joy Bell. To reserve, email mindfulbirding@protonmail.com

Saturday, June 15

Pinal County Dragonflies and Damselflies
Pierre Deviche, ASU's School of Life Sciences professor and odonate expert, will be your guide. Eighty-eight odonate species have been recorded in Pinal county. Visit (tentatively) Oak Flat, the Gila River at Kelvin Bridge, Kearny Lake, and/or the Dudleyville fishing ponds. All these locations are easily accessible. Wear hat, sunscreen, long sleeves and pants, hiking shoes, bug repellent, and bring food and water for the day. Close-focus binoculars are helpful to observe the small species. Difficulty: 2. Limit: about 10 to allow for good viewing and photography. Leave Gilbert at 8:30 am and return mid-afternoon.
To reserve, send cell # to Larry Langstaff, larrylangstaff1@gmail.com

Wednesday-Friday, June 26-28

White Mountains
Leave early Wednesday morning, bird on the way to the White Mountains, check out areas highlighted in *Arizona Wildlife Viewing Guide*, and return by Friday evening. Key sites include Christopher Creek, Woodland Lake, Luna Lake, Nelson Reservoir, Greer area, and Sipe White Mountain Wildlife Area. Find warblers, tanagers, nuthatches, woodpeckers, and jays mixed in with waterfowl at the lakes. Difficulty: 1-2. No strenuous hikes, but elevations can top 9,000 ft. Costs include two nights of lodging at moderate hotels, meals, and gas. Limit: 8.
Leader: Kathe Anderson, kathe.coot@cox.net

Conservation Update

by Mark Horlings

VIGNETO DEVELOPMENT

The Vigneto Developers propose to add 28,000 homes and 70,000 people to Benson. Hydrologists predict the project's water needs, even though supplied by groundwater, will further impair the Saint David Cienega and the San Pedro River watershed. If Vigneto proceeds, critical and endangered species, including the Yellow-billed Cuckoo and Southwestern Willow Flycatcher, will lose habitat and their migration corridor.

The hydrology is complex. The developer suggests a clay barrier separates the San Pedro and its shallow aquifer from a deeper aquifer, and that digging deep wells will not drain the upper aquifer. Other studies – and gravity – suggest otherwise.

The Army Corps of Engineers (USCOE) recently approved Vigneto's application for a permit under Section 404 of the Clean Water Act. The permit would allow 350 washes to be filled to accommodate roads and houses. MAS and others, including Tucson Audubon and the Center for Biological Diversity, have given notice of intent to sue.

SECTION 404 PERMITS

The Clean Water Act allows states to apply to administer some permit programs. The Arizona Department of Environmental Quality (ADEQ) hopes to assume the Section 404 wetlands permitting program. Thus, for example, a future Vigneto proposal would be reviewed by ADEQ, not the Army Corps of Engineers.

Stakeholder groups are preparing separate reports to ADEQ advising about fees, tribal consultation, endangered species, jurisdiction, and improving the permit process. Reports originally due in December 2018 have been delayed. The issues can get complex, and the federal government shutdown left federal employees unable to meet.

Enthusiasm for the changeover is rare. Business interests hate to pay fees for a service the federal government now provides for free. They also fear the inefficiencies of dual systems, because USCOE will still administer wetlands dredge and fill permits for the Colorado River and all tribal lands. Conservation groups worry that the Endangered Species Act and the National Environmental Policy Act (NEPA) will not apply, since a federal agency will no longer be taking action when permits are issued.

MOUNT GRAHAM RED SQUIRRELS:

Last summer's fires changed the game at Mount Graham. Only about 35 squirrels remain in the wild. After the fire, the surviving squirrels abandoned the higher elevations of Mount Graham, the area previously designated as critical habitat by the US Fish and Wildlife Service (USFWS). MAS and its allies notified USFWS that conditions on the ground require a new designation of critical habitat. USFWS seems unwilling to act. MAS and others have served notice of intent to sue.

Sign up for the e-newsletter!

To receive updates and supplements to *The Cactus Wren•dition*, sign up for the monthly (September to May) e-newsletter. It includes meeting and field trip reminders, special events, and citizen science projects. To subscribe, contact laurienessel@gmail.com
Note: We do not use the email list for anything other than the described purpose.

Green Kingfisher

by Marceline VandeWater

Green Kingfisher at Patagonia Lake. Photo by Marceline VandeWater

My husband and I spent a few days kayaking and camping out at Patagonia Lake in Santa Cruz County. At the far east end of the lake, we stopped briefly for a picnic break at the shore. Here I found a Green Kingfisher right at the lake's edge, and I wasn't even birding! Even more exciting was that later, after some research on eBird, I realized that several birders over that same weekend had seen and photographed a female Green Kingfisher about a mile upstream along Sonoita Creek, but my bird was a male, with a rufous breast! I really hope they will find each other and form a pair.

A small kingfisher with a large bill, the Green Kingfisher is present from the southern US through Central and South America to Argentina. According to *The Birds of North America*, in south Texas and Arizona, the only locations it is found in the US, the Green Kingfisher appears to need clear-water habitats and can use very small streams to forage. The species declined because of urban development, damming, irrigation, and the muddying of freshwater systems. *The Birds of North America* also reports that the creation of the San Pedro National Riparian Conservation Area by the Bureau of Land Management was associated with increased breeding by Green Kingfisher there.

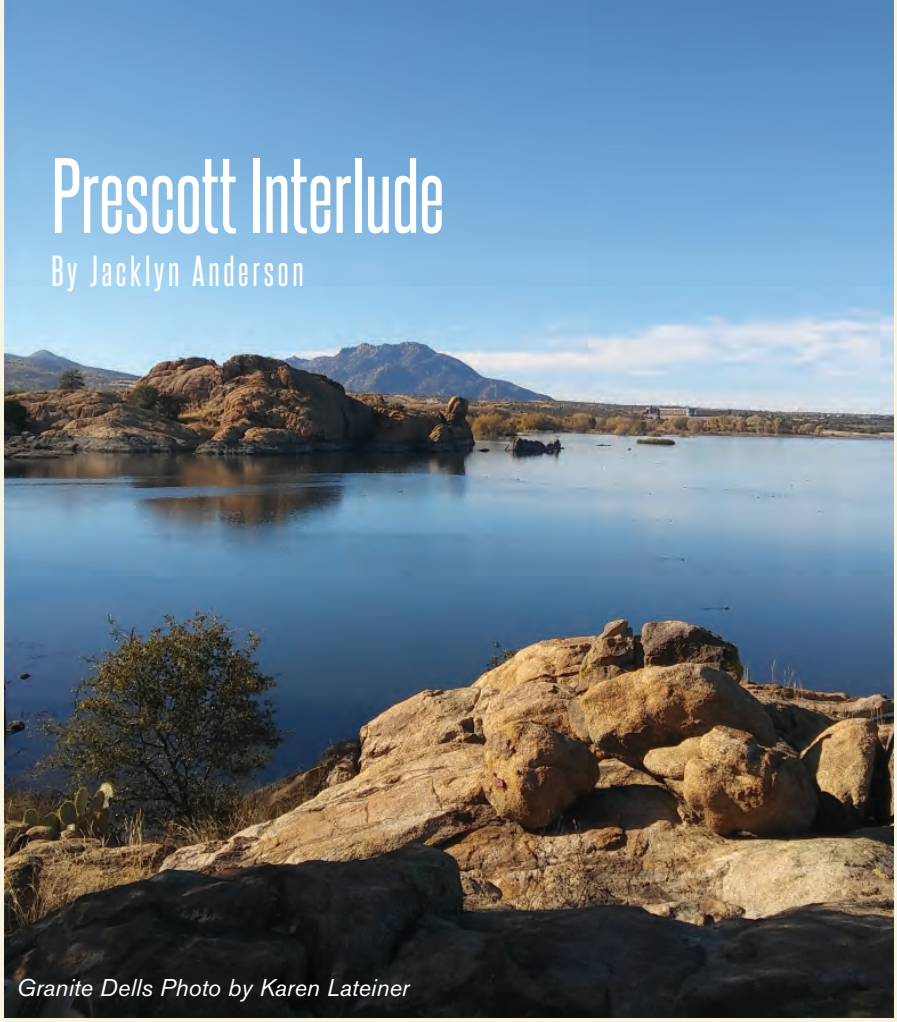
A keen naturalist, botanical illustrator, and photographer, Dutch-born Marceline VandeWater leads bird and butterfly walks for Audubon and Arizona State Parks.

Reference:

Moskoff, W. 2002. Green Kingfisher (*Chloroceryle americana*), version 2.0. In *The Birds of North America* (A. F. Poole and F. B. Gill, Eds). Cornell Lab of Ornithology, Ithaca, NY. https://doi.org/10.2173/bna.621

Prescott Interlude

By Jacklyn Anderson



Granite Dells Photo by Karen Lateiner

I belong to a group of artists and writers who get together each week to hike and write. We meet in the morning and hike for an hour or so in the desert where we look for inspiration from nature. Our senses are opened to the natural world which stimulates the creativity in our minds. We end our hikes with quiet contemplation before we come together to write and share. One member has published a book, others have been inspired to begin writing their memoirs, while the artists go home with new inspirations for their paintings.

Last fall, our group spent a few days in Prescott in a writing retreat. We all had different goals but each of us was looking for inspiration in our creative endeavors. Just coming together in nature has been proven to have a positive effect on health, and happiness. In Japan they call this forest-bathing. This type of interaction with nature means using all five senses to interact with nature. It doesn't matter if you get anywhere, or if you go very far.

On our first walk through Granite Dells in Prescott, I noticed how the backlit sky outlined the dry flower stalks and smelled the earthy smell of the mud as it oozed around my shoes. I felt the wind as it caressed my face and tasted the dryness of the air on my tongue. I heard the birds, calling in the breeze. This retreat was not about birding, but since I am a birder, I knew birds would find me. The walk through the Dells took us on a path through boulders guided by white painted dots. It was an enjoyable game following the dots and feeling lost until the next dot was spotted. On the way back, I took the path up over the top of the boulders and met the others at the bottom. I stopped to rest before I descended to the lake bed. I heard a twitter in the tree next to me. I looked and saw a group of Dark-eyed Juncos had found a haven in the lone tree that jutted up from the boulders.

The next afternoon, I challenged a couple of friends to hike up Thumb Butte with me. I cheered them along as we ascended through the switchbacks. This was not about being in a hurry, but about experiencing the trees, the rocks, and the birds. At the top a Red-tailed Hawk floated over our heads. No binoculars were needed to see his red tail glowing in the afternoon sunlight.

The last morning, I went out on the balcony to look at the hill behind the condo. It had been calling to me ever since I arrived. I decided to try to make it to the top. "You'll get covered with stickers," I heard as I left the walkway and landed in the middle of a patch of dry grass. I was quickly covered with stickers from the seed stalks. I didn't care. This reminded me of my childhood, running in fields and playing in cow pastures. I headed up the hill, climbed over a few boulders, and found myself in a thicket of scratchy ivy. I couldn't see a way up to the top. I looked around and saw two American Robins perched on a leafless tree just above me. They are a sign, I thought, and I made my way to the top toward them. The birds were gone, finished with their guiding duties that morning. At the top of the hill, I felt a contentment and peace I only feel when I am immersed in nature.

Jacklyn Anderson is a naturalist who enjoys birding, writing, and photography.

Hike and Write meets every Friday at North Mountain Visitor Center, 12950 N 7th St, Phoenix. For more information, contact Karen at kslateiner@gmail.com

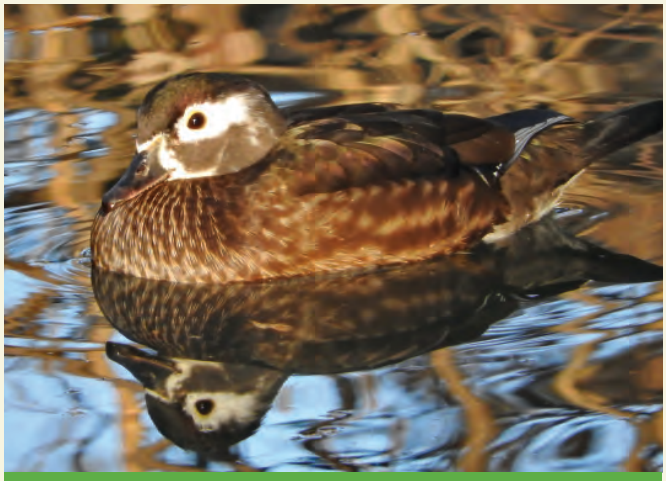
Granite Creek: Prescott's Riparian Riches

By Walt Anderson

Hooded Merganser, drake

Hooded Merganser, hen

Wood Duck, drake



Wood Duck, hen

All photos by Walt Anderson

The City of Prescott lies in a bowl formed by the Bradshaw Mountains and Sierra Prieta. A half dozen small creeks running through the city converge into Granite Creek as it leaves the rugged peaks of Granite Dells and descends into the alluvium until it reappears at the surface just above its confluence with the headwaters of the Verde River.

As was typical during early settlement days, the creeks became the dumping grounds, industrial sites, and sewage drains, but gradually, the perceived value of the creeks rose with better understanding of both health/safety issues and aesthetics. In 1995 the City of Prescott and the non-profit Prescott Creeks established a 126-acre preserve known as Watson Woods in what had been a highly altered floodplain used for gravel extractions and garbage-dumping just upstream and south of Watson Lake (reservoir). Passive and active restoration efforts have resulted in amazing recovery of riparian woodland and marshland, and in 2011, this area was recognized as part of the Watson and Willow Lakes Ecosystem Important Bird Area (IBA). It is an impressive example of how a highly degraded area can become a prized "natural area" benefitting people and wildlife alike.

Downstream from Watson Woods, the large reservoir provides abundant outdoor recreation and waterfowl habitat. The abundance of water birds and introduced fish attracts species high on the food web, including Bald Eagle, Peregrine Falcon, Osprey, and American White Pelican.

Two of the region's most colorful duck species occur here: the Wood Duck and the Hooded Merganser. The intensely colorful Wood Duck is a rare breeder in Arizona, mainly nesting here on Granite Creek above and below Watson Dam and in parts of the Verde Valley. It is a year-round resident, at times gathering in small flocks of up to 50 birds but often in small parties along the creek. At times the birds move to Watson or Willow Lakes, but most of the time, they occur in the wooded riparian areas.

The Hooded Merganser is a wintering migrant, spending time here between October and April, then nesting in northern states and southern Canada. They are more likely to be seen on open lake waters, but they frequent Granite Creek at times, their own colorful patterns rivalling those of the Wood Ducks.
Both species are typically wary of human approach, so the photos shared here are products of patience, knowledge of bird behavior, and some dumb luck. Enjoy the portraits, and head to Granite Creek in Prescott if you want to see these spectacular birds in the wild.

Walt Anderson is a naturalist, artist, and photographer who leads ecotours around the world. See: www.geolobo.com

Blind Snakes and Screech-Owls

By Tom Gatz

DBG researcher Steve Blackwell took this close-up photo of a threadsnake's eye.

Some species of snake spend almost all of their time underground hunting for ants, termites and other small invertebrates by scent, so they have no need for acute vision. Their vestigial eyes can only sense light. Originally called blind snakes, their new name is threadsnake, although they look more like a long (up to 15 inches), shiny earthworm than a piece of thread. The species occurring in central Arizona is the Western Threadsnake. Although not uncommon, they rarely come above ground, typically only during rains or when areas are irrigated, but also sometimes on cool, overcast days.

A dead specimen was found at the Desert Botanical Garden (DBG) a few years ago with bite marks suggesting that it was killed but dropped by a predator, perhaps by one of the resident Western Screech-Owls. Threadsnakes have an interesting 'relationship' with screech-owls. Although small snakes are normally brought to the screech-owl nest as dead prey, sometimes the threadsnakes are delivered to the nest cavity alive. If they escape, they burrow down in the nest litter and can survive for up to two weeks by feeding upon insect larvae that are living in the nest. Baylor University researchers Frederick Gehlbach and Robert Baldridge found that Eastern Screech-Owl nestlings in nest cavities with live-in Texas Threadsnakes grew faster and had better survivorship than did cavities without threadsnakes. They surmised that consumption of insect larvae by threadsnakes may reduce larval parasitism on owl nestlings or larval competition with nestlings for food stored in the nest material. Pest-controlling threadsnakes are common guests of at least four owl species, says Gehlbach.

By hiding its real head and exposing its blunt, head-like, spine-tipped tail, this threadsnake may better survive an encounter with a predator. The smooth, tightly overlapping glossy scales facilitate burrowing and may provide protection against bites of ants, one of its favorite prey. Photo by Shannon Michaud.

Early in their research, they wondered if the threadsnakes were intentionally brought to the owl nests alive as an evolutionary adaption to increase productivity. More research did not support that hypothesis. Threadsnakes were more likely brought in as prey items and some inadvertently escaped into the nest debris. Gehlbach concluded that there was no evidence to support intentional deposition of living snakes by the owls. Unfortunately, the original hypothesis was so appealing that inaccurate online and published references suggest that the owls intentionally deliver live snakes to benefit their young. As Gehlbach writes in his book, The *Eastern Screech Owl*, "These snakes are delivered as food but mostly uninjured, so they burrow in nest debris… there is no evidence that stocking live blind snakes in nests is anything more than accidental."

So why do some threadsnakes survive the journey to the nest in screech-owl beaks, while most snake species do not? According to Gehlbach, threadsnakes remained uneaten because of their "writhing defensive behavior and smooth cylindrical body, smeared with repellent secretions." When attacked by ants, threadsnakes excrete a pungent, slippery musk and roll around in it to coat their body like a suit of smelly armor. This may help protect them from ant bites. Because this slippery substance also makes the snake difficult for an owl to handle, the ensuing parent-chick handoff often ends in a fumble, and the snake quickly burrows into the nest. Threadsnakes may also jab an attacker with their spine-tipped tail. The baby owls may lose a meal but they get free nest pest-control as a trade-off.

Gehlbach says that when the prey deliveries to the nest cease after the nestling owls fledge, the threadsnake "boarder" crawls out of the cavity and back to life in the ground.

References:

Gehlbach, F.R. 2009. *The Eastern Screech Owl: Life History, Ecology and Behavior in the Suburbs and Countryside*. Texas A&M University Press. 324 pp.

Gehlbach, F.R. and R. Baldridge. 1987. Live blind snakes (*Leptotyphlops dulcis*) in eastern screech owl (*Otus asio*) nests: a novel commensalism. *Oecologia*. 71(4):560-563.

Thanks to Jim Rorabaugh for helping me with this article.

Tom Gatz has been a MAS member since 1981.

All photos by Matt Van Wallene

Land Trusts Protect Last Best Lands

By Gail Cochrane

Central Arizona Land Trust's current For the Birds campaign seeks funds to establish an easement on the Coldwater Farm located on the Agua Fria River. The landowner's generous donation will preserve habitat for the threatened Yellow-billed Cuckoo (pictured above) and the endangered Southwestern Willow Flycatcher.

Arizona became the fourth fastest growing state in the nation this past year, according to new census figures, with 122,000 additional residents. More people bring more development, which provides increased impetus to protect natural areas from urban sprawl. It is commonly accepted that natural habitat and waterways are critical for wildlife and for humanity.

Land trusts are private, non-profit corporations, 501(c)(3) entities set up to protect land for natural, historic, recreational or scenic value. More than 1500 land trusts have been created across the US to protect landscapes threatened by development. These organizations work with willing landowners, municipalities, and other organizations to protect land through acquisition and donation. Nationally, land trusts

guard approximately 2.7 million acres.

Eight local land trusts operate in Arizona, preserving land, water, and history. The Nature Conservancy also has a strong presence in the state with eleven separate land trusts. The Land Trust Alliance in Washington DC provides policy, standards, education, and training to support land trusts across the country.

Mexican Spotted Owl (fledgling) photographed in an area protected by a land trust just north of Sycamore Canyon.

One of the state's oldest trusts, Arizona Land and Water Trust, has worked out of Tucson for 40 years. Partnering largely with ranchers and farmers of southern Arizona, the organization provides support for private landowners interested in voluntarily conserving their lands. On the other side, the trust works with public and private entities to develop funding for partnerships that mesh with local and community-based plans and goals. Over the years Arizona Land and Water Trust has protected nearly 49,000 acres.

Arizona Land and Water Trust's partnership with the Sands Ranch owners adds 5,040 acres of conserved lands, providing critical wildlife movement corridors between the Santa Rita Mountains and the Whetstone Mountains, and conserving a direct connection between significant riparian areas.

The lands safeguarded by Arizona Land and Water Trust include a number of historic ranches that span critical conservation corridors, rich plant and wildlife habitats, streams, springs, and desert rivers. The trust partners with communities to save open spaces while allowing ranch and farm owners to stay on their land. One of its most important tools is a conservation easement – a legal agreement that a property owner enters to restrict the types of development that may happen on the property. This limits real estate development while allowing farming and ranching to continue. In a conservation easement the land remains in private ownership and public access is not a requirement. Landowners retain all land rights to sell, convey, and pass on to heirs. Tax benefits are available to a partner when the easement is conveyed on land with significant conservation value.

The Central Arizona Land Trust has preserved nearly 5000 acres over the past 28 years, including public and open spaces as well as ranch land. Its service area covers six counties through Central Arizona encompassing the headwaters of the Verde, Salt, Bill Williams, Agua Fria and Little Colorado Rivers. Lands the trust has protected can be found on Thumb Butte, along Granite Creek, and on a working ranch in Skull Valley.

Typically, when a land trust agreement has been requested by a landowner, Central Arizona Land Trust launches a fundraising campaign. The donated funds cover the due diligence to accept the easement and the costs of perpetual stewardship. In most cases, the Central Arizona Land Trust invests the stewardship funds with the Arizona Community Foundation to ensure long-term protection of the easement. The Prescott Audubon Society, the Highlands Center for Natural History, the Citizens Water Advocacy Group, the Sierra Club Yavapai Group, the Prescott chapter of the Arizona Native Plant Society, as well as the Arizona Riparian Council and the Friends of the Agua Fria National Monument have worked to advance Central Arizona Land Trust partnerships.

The Desert Foothills Land Trust was formed in 1991 by citizens concerned about the loss of natural places in their communities of Anthem, Carefree, Cave Creek, North Phoenix, and North Scottsdale. The organization has protected 680 acres on 23 preserves, open spaces to be protected by Desert Foothills Land Trust in perpetuity. The non-profit further hosts a variety of outreach programs and projects to engage supporters and the community in conservation.

The Nature Conservancy is perhaps the best-known national land trust organization. It has protected 1.5 million acres in Arizona, including six preserves open to the public. Preserves at Ramsey Canyon, Hassayampa, San Pedro River and Aravaipa Canyon are some of their best-known projects.

Gail Cochrane writes to inspire wonder of our native lands, wildlife, water and plants.

Connecting with nature makes Arizona a fun and better place to live!

Compiled by Vicki Hire All photos by Vicki Hire

Harris's Antelope Squirrel

Rock Squirrel

Round-tailed Ground Squirrel

We're NUTS about SQUIRRELS of the Arizona-Sonoran Desert!

Did you know there are about 280 species of squirrels in the world? Three squirrels are common in the Arizona-Sonoran Desert[1]: the Rock Squirrel (*Spermophilus variegatus*) is the largest weighing up to 1.5 pounds; the Round-tailed Ground Squirrel (*Spermophilus tereticaudus*) looks like a miniature prairie dog and weighs only 6-7 ounces; and Harris's Antelope Squirrel (*Ammospermophilus harrisii*) resembles a chipmunk except, unlike the chipmunk, it has a white stripe on its side.

Did you know Arizona-Sonoran Desert squirrels have cheek pouches to store the food they gather? Their four front teeth never stop growing, but are worn down by chomping seeds, trees, nuts, and even rocks. Round-tailed Ground Squirrels are primarily herbivores, eating grass seed, cactus, and other nearby vegetation such as spring flowers. Harris's Antelope Squirrels like to eat cactus fruit, seeds, and mesquite beans, but sometimes they eat insects and mice.

Did you know the Round-tailed Ground Squirrel estivates during the hot summer months?[2] Estivation means the squirrels slow down their activity and metabolism during dry spells until the monsoon rains produce new plant growth in the desert. All three Arizona-Sonoran Desert squirrels are diurnal, which means they are most active during the daytime. Squirrels also practice "heat dumping."[3] When a squirrel's body temperature gets too high, it finds a shady spot to lie down spread-eagled with its belly pressed against the ground to release body heat and cool down.

Did you know Arizona-Sonoran Desert squirrels have sharp, strong claws used for digging? They have four toes on their front feet and five toes on their back feet.[4] Their hind legs are double-jointed which helps them run up and down trees and rocks quickly. Rock Squirrels dig burrows and either live alone or in colonies. Round-tailed Ground Squirrels are very social, living in colonies, and can have an extensive tunnel network with multiple entrances in loose soil, often under mesquite trees and creosote bushes. Harris's Antelope Squirrels dig burrows about three feet deep where conditions allow. Since the desert has very few trees, it is not surprising that these squirrels live in the ground.

Did you know squirrels are born blind? Baby squirrels are called kits and are born without fur. Squirrels are mammals and their babies drink milk from their mothers for three months. A group of squirrels is called a scurry.[5]

Did you know the name squirrel comes from the Greek word "skiouros," which means "shadow tail" because of a squirrel's ability to create its own shade by lifting its tail like an umbrella? Squirrels use their tails in other ways too. A ground squirrel can pump extra blood into its tail to make the tail warmer than its body, thereby fooling a snake into striking at the tail rather than the body. It stamps its feet and waves its tail from side to side while facing a snake. It also tries to flick sand or dirt in the snake's face with its front paws. This behavior is called mobbing. Scientists in California found that Rock Squirrels can distinguish between venomous and non-venomous snakes, and change their mobbing behavior accordingly.[6]

1 http://www.sciencekids.co.nz/sciencefacts/animals/squirrel.html
2 https://www.desertmuseum.org/books/nhsd_squirrels.php
3 https://www.desertmuseum.org/kids/oz/long-fact-sheets/Harris%27s%20Antelope%20ground%20Squirrel.php
4 https://www.thefactsite.com/2014/12/fun-squirrel-facts.html
5 http://animalia.bio/round-tailed-ground-squirrel
6 https://arizonadailyindependent.com/2013/09/22/desert-squirrels-some-eat-rattlesnakes/

Round-tailed Ground Squirrel

Green Scene True or False?

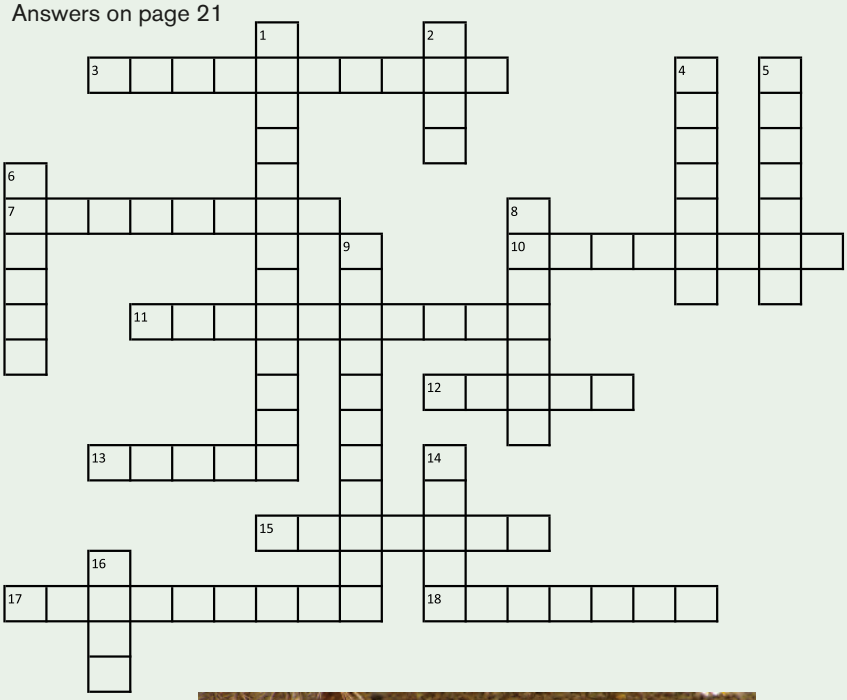
T F 1. Baby squirrels are born blind.
T F 2. About 280 species of squirrel exist in the world.
T F 3. Harris's Antelope Squirrels eat only fruit from cacti.
T F 4. A squirrel's hind legs are double-jointed.
T F 5. A squirrel's front teeth stop growing when the squirrel is a year old.

Guess this Squirrel!

This tree squirrel lives in Arizona's deciduous forests with walnut, sycamore, oak, cottonwood, and pine trees. It is usually found in areas with elevations of 5,000-6,000 feet above sea level.

We're NUTS about SQUIRRELS of the Arizona-Sonoran Desert! Crossword

Answers on page 21



Harris's Antelope Squirrel

Across

3 In Greek, the name squirrel means _____-_____
7 Round-tailed Ground Squirrels are very social and live in _____
10 Squirrels can create their own shade by using their tails as an _____
11 _____ occurs when ground squirrels slow down their activity and metabolism during dry spells
12 Lying spread-eagled, a squirrel presses its _____ against the ground
13 A Round-tailed Ground Squirrel can fool a snake by pumping extra _____ to its tail
15 Squirrels' teeth never stop _____
17 Harris's Antelope Squirrels resemble _____
18 Squirrels are _____, meaning they are most active during the day

Down

1 Squirrels hind legs are _____-_____, allowing them to quickly run up and down trees & rocks
2 Baby squirrels are called _____
4 Squirrels store food they gather inside their cheek _____
5 Squirrel babies are _____ and drink milk from their mothers
6 A group of squirrels is called a _____
8 Round-tailed Ground Squirrels create extensive networks of _____
9 Round-tailed Ground Squirrels look like miniature _____-_____
14 Baby squirrels are born _____
16 Squirrels have _____toes on their back feet

Birding on a Cruise Ship

by Duane Morse

All photos by Duane Morse

On the Santiago to Los Angeles cruise, we saw four species of whale, at least three species of dolphin, sea turtles, flying fish, and quite large jellyfish. When there aren't any birds nearby, it's nice to know that something else might pop into view.

HAVE YOU CONSIDERED BIRDING AT SEA BUT BALK AT THE IDEA OF BOUNCING AROUND ON A SMALL SHIP? HOW ABOUT BIRDING FROM A FULL-SIZED CRUISE SHIP?

A cruise ship is a fine platform for viewing birds at sea, being more stable (due to its size) than vessels used for pelagic birding. You have to depend on a bit on luck though, since the captain won't change course to "chase" interesting birds, and there's no "chumming." On the other hand, you'll have plenty of opportunity to look for birds at sea, because cruise ships often spend one or more entire days at a time traveling between ports, so over half of the daylight hours on a cruise ship may be "at sea."

WHERE TO WATCH FOR BIRDS AT SEA

All cruise ships have an open "promenade deck" for passengers to exercise (the deck usually has signs indicating how many laps make a mile) or merely to lounge. For some ships, the promenade deck will be open all the way around, and the best place to park yourself to look for birds is at or near the bow. You'll have to stay near the railing in order to avoid obstructing foot traffic Be advised that passengers ask you again and again "What are you looking at?" expecting you to answer "whales" or "dolphins."

Sometimes a number of different birds will be visible. You'll be hard-pressed to choose where to look. Even more times you'll find no bird activity at all, though you may see dolphins, whales, and other sea life during otherwise dull periods.

On windy or rainy days, the bow may be closed to passengers, so you'll have to settle for some other location near the front of the ship. In very rough seas, the entire promenade deck may be closed. In those instances, you can try birding from the top of the ship. And if you have a room with a balcony, you can bird from the comfort of your room.

On our cruise ship every day before dawn, the ship's crew collected petrels that had been attracted to the ship's light during the night and had decided to roost under deck chairs, benches, and so on. The crew would then release them. It was indeed pretty neat to see the petrel "in hand." It's hard to get a grasp of the size of the bird when they are always in flight 50 yards or more away. And close up you can finally see the "tube nose."

TO SCOPE OR NOT TO SCOPE

Would it be worthwhile bringing your scope on the cruise? If you're with a professional group, it isn't absolutely necessary: the field trip leaders will have scopes, though you'll obviously not have exclusive access to the devices.

When seas are rough or the wind is high, you won't be able to use a scope, but on relatively calm days, a scope is quite handy. The cruise ship is so large that the up-and-down or sideways movements are gradual, so it isn't as difficult as it might seem to get a good view of a bird that's somewhat distant, and most birds spotted on a cruise are initially rather far away (and they sometimes stay that way). Using a scope could make the difference between identifying the bird group ("it's a shearwater") and identifying the species ("it's a Galapagos Shearwater").

PHOTOGRAPHING BIRDS AT SEA

There aren't any trees or bushes at sea, so aside from the motion of the ship, you'd think it would be easy to photograph birds at sea.

Think again! First, consider the seabird's plumage, typically dark on top, light underneath. When the bird is flying close to the water surface (which is most of the time), you will see the bird when it banks and exposes its white tummy, but then it will bank the other way and completely disappear (dark back against a dark sea = invisible bird). And if the bird is quite close to the water, it will play hide-and-seek between the waves.

It's often the case that the first time you see the bird will be when it flies away from the ship, so your view will be an ever-diminishing outline. Good luck finding that in the viewfinder, let alone getting a shot that captures enough detail to identify the bird!

An additional problem is the effect of the waves on the auto-focus mechanism of the camera. On a moderately choppy day, the constant wave action can make it difficult for the camera to figure out where to focus. Sometimes it never does.

As the ship bobs up and down, so does your camera, so when you try to get a shot of a bird flying close to the water, first you get a picture of just the sea, then you get a partial shot of the bird with the sea below and sky above, then a picture of just the sky. With practice, though, you'll get better (and you will have lots of time to practice). It helps that in the course of a day at sea, you'll usually see the same species many times, so you'll have multiple opportunities to get that perfect (or at least acceptable) shot.

BIRDING AROUND THE DOCK

Many dock areas are not at all scenic. Due to their size, cruise ships often dock at ports that also handle large container ships, and those ports are typically secure in the sense that passengers cannot walk beyond the immediate area of the cruise ship.

This doesn't mean you won't see any interesting birds around the ship. On one trip, our birding group traveled to the fish harbor in order to see Inca Terns. When we got back to the ship, we found Inca Terns perched on the ropes attaching the ship to the dock! In another port, we saw Neotropic Cormorants nesting on the pier posts next to the ship.

BIRDING AT PORTS-OF-CALL

If you are with a professional birding group, the birding company will have arranged its own birding trip at each port with meals included. Though ships sometimes stay at a port overnight, most of the time they leave by early evening, so the birding expeditions and the cruise-sponsored trips won't go too far from the port.

Some cruise-sponsored excursions go to nature preserves or wildlife areas, or they include a harbor cruise, so even if you aren't with a birding group, you will have a good chance to see some good birds. In addition, some of the trips go to a museum or historic building in or near a city park, which means even more opportunities to see local birds.

The downside of land-birding in this fashion is that you only get the briefest glimpse of local birds, and you'll return to the ship somewhat unsatisfied. To see more, you'll have to schedule a return visit with traditional land birding.

WHAT TO BRING

Dress in layers. It will be windy at the bow of the ship, and correspondingly cooler than anywhere else on the vessel.

Apply sunscreen. If you don't wear UV protective gloves, apply the sunscreen to your hands, too. Apply lip balm and skin lotion to exposed skin in order to combat wind burn.

There usually aren't any lounge chairs at the bow of the promenade deck, so if you don't want to stand for hours at a time, bring along your own portable stool.

Bring a water bottle, just as you would for any other birding trip, and take it to the promenade deck (you might feel compelled to stand watch for hours at a time to avoid missing anything).

Bring a good field guide for pelagic birding. Many pelagic birds look alike to novice and intermediate birders, and some are even difficult for experts to tell apart (think Masked Booby vs. Nazca Booby).

Bon Voyage!

Duane Morse is a retired computer programmer who got interested in birding five years ago thanks to education classes at the Desert Botanical Garden.

Franklin's Gulls at dock

Inca Tern

Nazca Booby resting on sea turtle

Buller's Shearwater

Female Sonoran Desert Tortoises Eat Rocks. . . But Only In June

By Brian K. Sullivan

All photos by Brian K. Sullivan

A female desert tortoise presses her snout against a caliche fragment, apparently assessing its suitability for consumption.

Sonoran Desert Tortoises are well known for their many adaptations to the arid landscape of southern Arizona. They emerge from over-wintering sites in the cold winter to harvest rainfall even when temperatures are near freezing; then, they store surplus water in their bladders, a feat unmatched by any bird or mammal. Immediately prior to the summer monsoon, in the hottest and driest period of the year, females produce large, calcium laden shelled eggs. Given the dramatic costs of egg-laying, some females skip reproduction in some years. As adults, they have few natural predators, but the harsh desert landscape limits their average lifespan to roughly 40 years.

Since 2010, my colleagues and I have radio-tracked 15–25 adult tortoises each year, gathering detailed observations on annual variation in activity. We opportunistically record feeding behavior, and have data on hundreds of feeding episodes. We have observed purposeful consumption of small bits of caliche and other mineral deposits by female but not male tortoises. Although consumption of calcium rich items, including bone, rocks, and soil layers, has been documented in tortoises of the Mohave Desert, our observations are some of the first for the Sonoran Desert Tortoise. In addition, our data suggest female tortoises only consume caliche and other mineral deposits during a relatively brief period in late spring and very early summer, when conditions are especially harsh with respect to water balance. Finding that female Sonoran Desert Tortoises consume hard, dry bits of caliche when they are otherwise largely inactive (June), and have had no access to free-standing water for months, suggests these minerals are indeed critical at this time.

Our study site is in the Union Hills, a relatively low-elevation series of hills in a region of transition from creosote-bursage flats to saguaro-palo verde dominated uplands. The hills rise to approximately 2100 ft elevation from a surrounding plain of about 1150 ft; geologically, they comprise metavolcanic rocks with basaltic protoliths and various granitic rocks in lesser quantity. Within this site, we rarely encounter tortoises away from the slopes and the incised arroyos draining the hills, which are dominated by plants associated with the Arizona Upland Subdivision of the Sonoran Desert. The arroyos have numerous exposed caliche formations into which tortoises and other animals have excavated burrows used by tortoises during both winter and summer. We consistently observe both male and female Sonoran Desert Tortoises using deep, north facing caliche tunnels during May and June, the hot and dry portion of late spring and early summer in the Sonoran Desert.

Our observations of feeding bouts reveal that consumption of caliche fragments or catchment minerals occurred on ten occasions between May 26 and June 27, over five years (2014–2018), by four different females. Over these same five years we recorded detailed observations on 190 feeding bouts (plant material only) between February 1 and October 31 by ten females and six males. To determine if caliche consumption events were distributed randomly, we grouped the number of foraging and caliche consumption bouts observed into three seasonal periods of activity as noted by Sullivan et al. (2016): spring (February-April, 48 feeding bouts, 0 caliche consumption events), hot/dry spring (May-June, 31 feeding bouts, 10 caliche), and monsoon/fall (July-October, 113 feeding bouts, 0 caliche). By contrast to feeding events, caliche consumption observations were restricted to the latter half of the hot/dry period. All but one of the caliche consumption events were within 10 meters of the female's deep refuge tunnel along a wash bank; the lone exception was a female some distance from her refuge (40 meters from refuge).

The female Sonoran Desert Tortoises we observed consuming caliche fragments walked slowly forward, touching their snouts to the ground regularly while swinging their heads from side to side, similar to typical foraging behavior. Immediately prior to consuming caliche fragments, a female Sonoran Desert Tortoise repeatedly pressed her snout against an individual caliche fragment, as if ascertaining the suitability of the fragment for consumption. Often, a fragment was

A female tortoise bites a rock covered in salt residue following evaporation.

passed over after a few apparent (closed mouth) sampling efforts, but others were grasped and bitten, with audible scraping and crunching sounds produced. On multiple occasions pea-sized bits were consumed after 5–10 seconds of mastication; female Sonoran Desert Tortoises never appeared to swallow the small fragment whole. On a few occasions, female Sonoran Desert Tortoises consumed bits of dry grass and other vegetation over a 5–10 minute period of walking slowly forward, with repeated consumption of caliche fragments interspersed among those events. On one occasion, a female tortoise sampled dry, white powder lining the surface of a small (three ft diameter) depression in a wash where water regularly evaporated, leaving behind the salt residue. While pressing her snout against the substrate she repeatedly grasped and bit small rocks coated with white mineral deposits.

We assessed the chemical composition of caliche fragments consumed by tortoises by gathering samples on three pathways near caliche caves along which two female Sonoran Desert Tortoises were observed consuming small white fragments or actual portions of a large caliche formation on at least two occasions. We picked up five caliche fragments (one every eight inches) approximately equal to

A female tortoise consumes a caliche fragment.

the dimensions in size and color to those we observed consumed by female Sonoran Desert Tortoises previously along the pathways used by the subject females. Samples were combined for each female tortoise. We also collected five nonwhite, parent rock samples over the same distance to compare to the caliche for the routes taken by females.

Our chemical analysis indicates that by ingesting caliche fragments near refuges, female Sonoran Desert Tortoises obtain considerable calcium. The average calcium concentrations in the samples associated with two female Sonoran Desert Tortoises were 22.1% and 25.6% which contrasts with parent rock that averaged 1.14% calcium. Caliche is generally considered a soft, carbonate rock that forms cement with sand, gravel and mud; interestingly, our caliche samples lacked the alkali elements of sodium and potassium. These elements are water soluble when paired with carbonates, and therefore less likely to condense from an aqueous solution. The parent rock, granitic in appearance, apparently avoided by our female Sonoran Desert Tortoises, was richer in aluminum and silicates. Although some have suggested that consumption of small stones might aid in the maceration of ingested plant materials, the acidic foregut of desert tortoises would likely render easily decomposed caliche fragments ineffective in this capacity. The parent rock, ignored by the female Sonoran Desert Tortoises we observed, would have been a more suitable choice should the tortoises have been eating rocks to help digest plant material.

Researchers observed female Mohave Desert Tortoises in southwestern Utah ingesting small white stones, apparently composed of calcium carbonate. Female Mohave Desert Tortoises will move significant distances to mine minerals in soil and will consume bones of various vertebrates. Our observations reveal that at least within a caliche rich wash system, female Sonoran Desert Tortoises may not need to move far to obtain calcium (but not necessarily phosphorus) sources, and that these consumption events are clustered close to the reproductive period typically followed by egg laying. We hypothesize that female Sonoran Desert Tortoises consume caliche to replenish calcium expended during egg production.

Our observations are limited by the relatively small sample size of observations, and an even lower number of individual female Sonoran Desert Tortoises, but are suggestive of a relationship between egg-laying and ingestion of minerals, at least for a population of Sonoran Desert Tortoises in a caliche lined wash. Some researchers argue the herbivorous diet of desert tortoises should provide considerable calcium, rendering active consumption unnecessary. Nonetheless, the consistency with which female Sonoran Desert Tortoises actively seek out calcium rich materials provides compelling evidence of a linkage between this behavior and egg production. In our population of Sonoran Desert Tortoises 40% of females under observation for feeding bouts ingested caliche fragments on at least one occasion. Additional study, however, will be necessary to ascertain a temporal link between caliche consumption and egg production in Sonoran Desert Tortoises.

Reference

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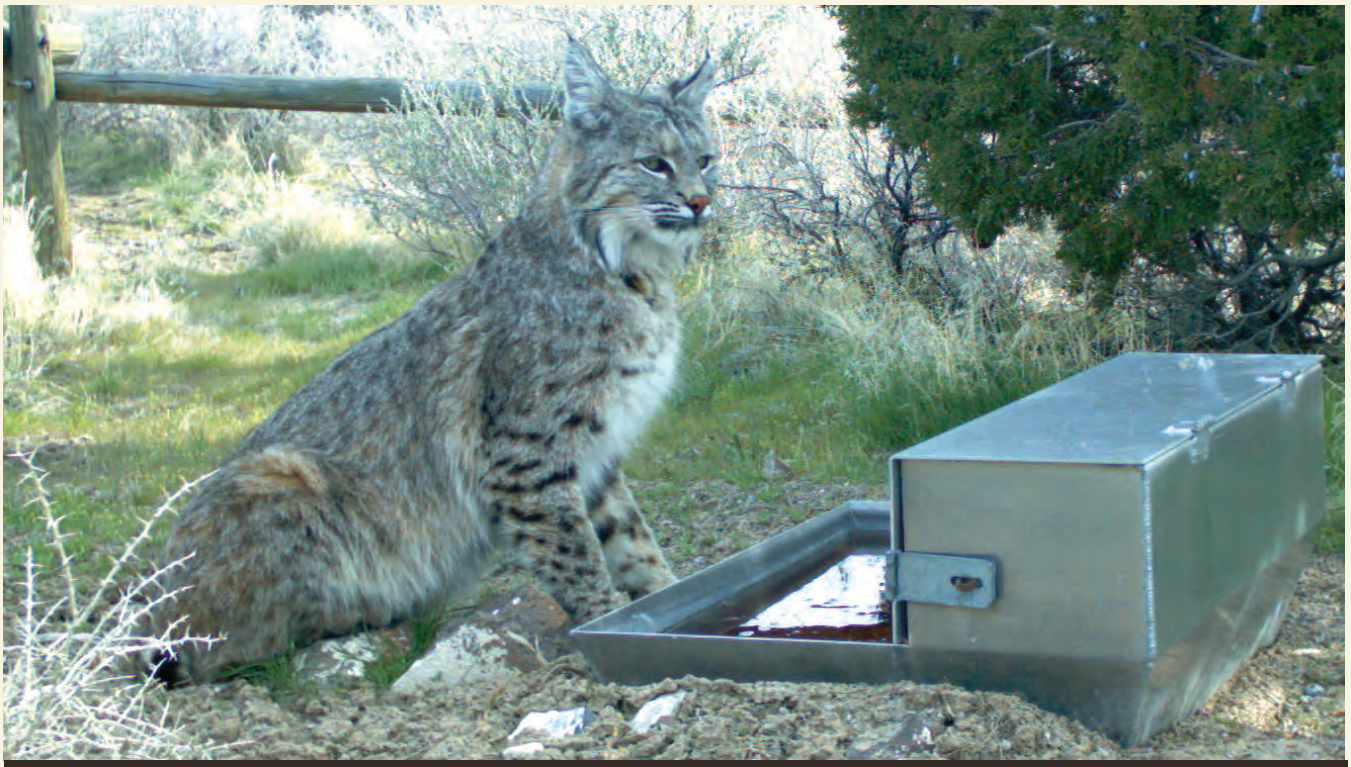
Brian Sullivan is Adjunct Curator, Herpetological Collection, and Professor, Center for Biodiversity Outcomes, Arizona State University

Do Bobcats And Coyotes Fight Like Cats And Dogs Over Water In Deserts?

By Gabriela Ochoa, Peichi Chou, and Lucas Hall



Bobcat

Water is an influential resource in deserts as it shapes the ways species interact with their environment and one another. During hot and dry conditions when water is scarce, desert animals tend to increase their reliance on water. This reliance is accentuated for desert mammals as females lactate in the summer months to provide for their young that were born in late spring or early summer. Increased reliance on water by multiple species can intensify competition for this limited resource (Hall et al. 2018). Moreover, projected changes in climate in the Southwest are expected to result in less water availability in the coming decades (Cook et al. 2015). The predicted loss of water in deserts raises the question: how will wildlife, particularly mammals, get enough of this already limited resource?

Bobcats and coyotes are mammalian predators often at the top of the food chain in deserts. Because bobcats and coyotes tend to occupy the same habitats and eat the same foods, they may compete for resources. However, competition between these two species has likely been rare historically as coyote populations in North America have been relatively low up until the last century. Since wolves were removed in the early 20th century, the number of coyotes has risen dramatically, often outnumbering bobcats. This is potentially concerning, because coyotes can outcompete bobcats for resources (Litvaitis and Harrison 1989). With high populations of coyotes in deserts, we may see coyotes outcompete bobcats for water as it becomes less available because of prolonged droughts due to climate change.

Previous work in the Chihuahuan Desert has suggested that bobcats and coyotes do not compete for water (Atwood et al. 2011). However, the lack of competition might relate to the timing of annual water availability in the Chihuahuan Desert. This desert, on average, receives 65% of its annual precipitation (~200 mm, or almost 8 in) from May to September. This relatively high amount of water available in summer may mean that water is not as limiting or crucial as in other deserts. To better understand how the availability of water in deserts influences competition between species, it would be useful to compare other deserts where water availability is lower in summer. The Great Basin and Mojave Deserts are good examples as they receive nearly as much annual precipitation as the Chihuahuan Desert, but only receive 20% of their annual precipitation during the summer. Comparing the Chihuahuan Desert (high water availability in summer) to the Great Basin and Mojave Deserts (low water availability in summer), we may also better understand how competition in deserts might be influenced by loss of water due to climate change.

In our study, we wanted to determine if bobcats and coyotes compete for water in a water-limited environment. We monitored water sources with trail cameras at two sites in

the Great Basin Desert (Dugway, Thomas-Dugway) and one site in the Mojave Desert over the summers of 2010 to 2012. One way of demonstrating competition is to determine if either species is avoiding the other. Therefore, we evaluated overlap in spatial and temporal visitation to water by each species. While it seems counterintuitive that competing species would avoid each other, avoidance behaviors are thought to reduce the risk of injury due to physical confrontation with a competitor.

Over the course of our three year study, we captured 810 pictures of bobcats and 2,247 pictures of coyotes at water sources. Overall, coyotes were nearly three times more active at water sources than bobcats (Figure 1). Our results showed that bobcats and coyotes mostly frequented the same water sources in each of our three study areas (top panels in Figures, 2, 3, and 4). See page 20 for Figures 3 and 4). In fact, bobcat visitation to a given water source increased as coyote visitation increased. Hourly visitation of both species to water sources was similar as well (bottom panels in Figures 2, 3, and 4).

Our findings indicate that bobcats and coyotes do not compete for water in the Great Basin and Mojave Deserts. We did not observe any evidence of one species avoiding the other throughout the hours of the day (temporal overlap) or across the landscape (spatial overlap). The decrease in water

Coyotes

availability in the summers at the Great Basin and Mojave Deserts relative to the Chihuahuan Desert did not appear to be significant enough to trigger competition between these carnivores. In fact, our results support the research conducted in the Chihuahuan Desert showing that bobcats and coyotes had substantial overlap in use of water sources (Atwood et al. 2011).

Coyotes can pose issues for the conservation of other species, but this was not supported in our current study. The abundance of coyotes was generally higher than bobcats in our study areas; however, the use of water by bobcats was not negatively influenced by coyotes, or vice versa. Both of these species are adaptable as they can inhabit many different types of habitats across the continent. The lack of competition between these two species might speak to their adaptability to their environment as well as other species. Given our current understanding that water availability in the Southwest will likely be affected by climate change in the coming decades, it does not appear that coyotes will pose an added conservation issue for bobcats.

Gabriela Ochoa and Peichi Chou are students at the Claremont Colleges. Lucas Hall is a Visiting Assistant Professor at the Claremont Colleges.

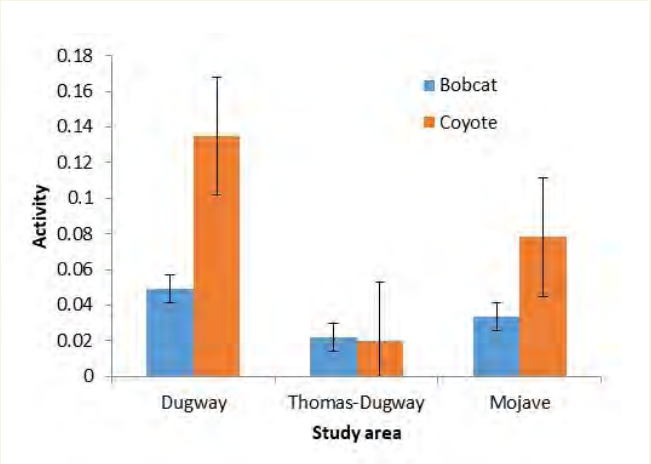


Figure 1. Average activity of bobcats and coyotes at water sources in the Great Basin (Dugway and Thomas-Dugway) and Mojave Deserts

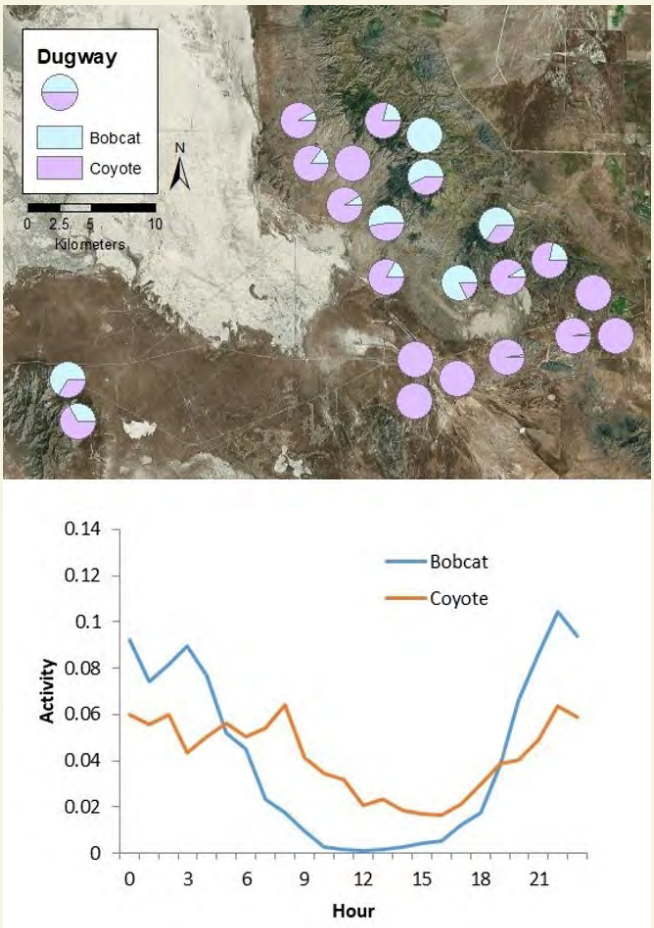
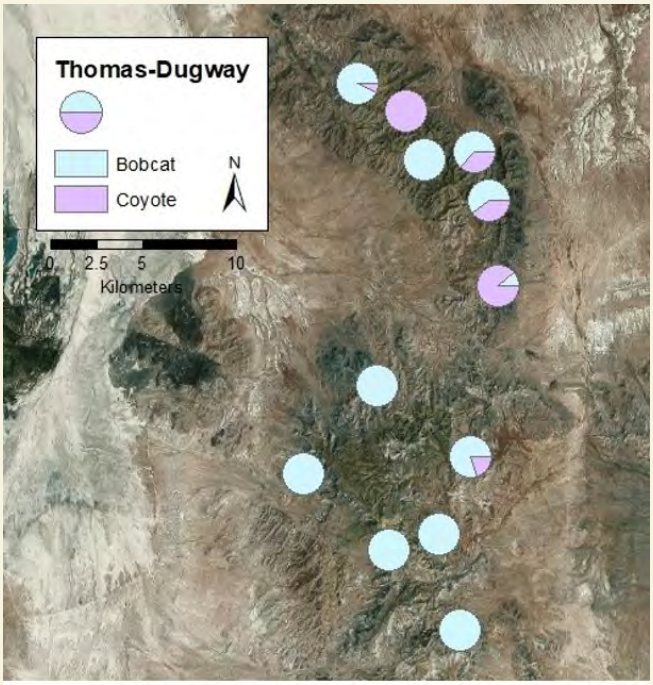


Figure 2. Spatial (top) and temporal (bottom) occurrence of bobcats and coyotes at water sources in our Dugway study area in the Great Basin Desert

Continued on page 20

Do Bobcats And Coyotes Fight Like Cats And Dogs Over Water In Deserts? cont.



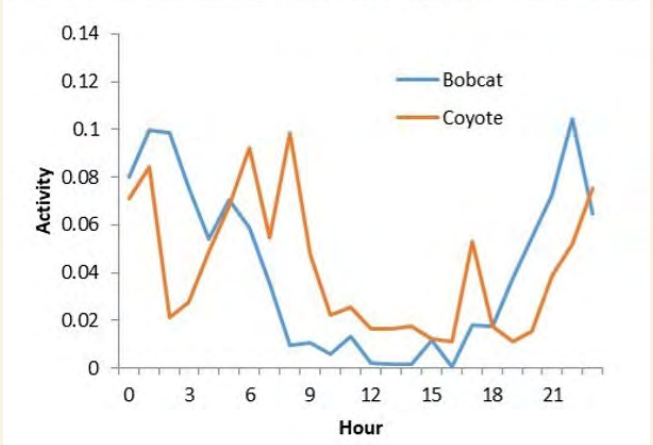
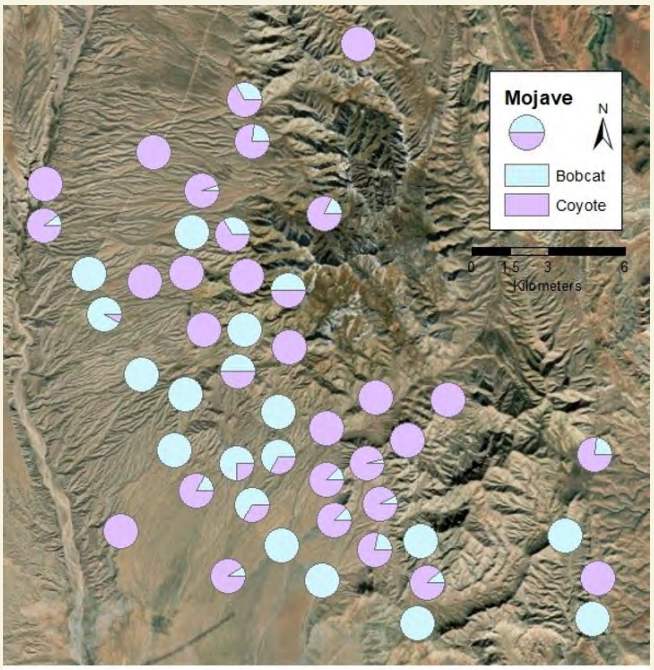


Figure 3. Spatial (top) and temporal (bottom) occurrence of bobcats and coyotes at water sources in our Thomas-Dugway study area in the Great Basin Desert.



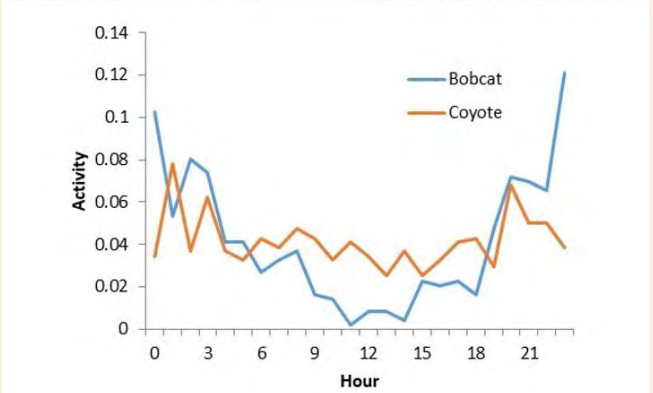


Figure 4. Spatial (top) and temporal (bottom) occurrence of bobcats and coyotes at water sources in our study area in the Mojave Desert.

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Litvaitis, J. A., and D. J. Harrison. 1989. Bobcat-coyote niche relationships during a period of coyote population increase. *Canadian Journal of Zoology* 67:1180-1188.

Poem by David Shorlton

Daybreak

The owl's call floats on a bed of distant
traffic noise. Still dark:
the trees hold on
to the secrets they harbored all night
and the grass
whispers to the trace of wind
passing over it. Slowly, the Earth
settles into position: the mountain
grows back to where it stood
yesterday and washes run down
between the waking houses.
The early riser stirs sugar and anxiety
into his coffee, and listens
for a claw to tear open
the sky. Daylight
spills out. Goldfinches spill
from the daylight. It's bright enough
to see the flicker's gilded wing
as he flies across the space
between now and the Hohokam
who once upon a time
walked toward the sun, setting out
when it was low
and all the air was singing.

Help MAS with an Employer Matching Gift

Many Maricopa Audubon members aren't aware that their employers may include a matching gift program in their benefits package. Programs vary from business to business, but they generally offer a dollar-for-dollar match when an employee makes a personal gift to a nonprofit organization like Maricopa Audubon Society.

Please visit your human resources department or charitable giving department to see if this opportunity is available to you. You usually have to fill out and submit a form, which is sometimes done online. If you have already made a donation to MAS in the past year, you may be able to get a matching gift after the fact from your employer for up to 12 months later.

Green Scene Puzzle Answers

Answer to Guess this Squirrel

The native Arizona Gray Squirrel is threatened by habitat loss. Its diet consists of pine cone seeds, acorns, and other nuts.

Answer to True or False?

1. TRUE Baby squirrels are born blind.
2. TRUE There are about 280 species of squirrel
3. FALSE Harris's Antelope Squirrels like to eat cactus fruit, seeds, and mesquite beans, but sometimes they eat insects and mice.

4 TRUE Double-jointed legs help squirrels run up and down trees and rocks.

5. FALSE A squirrel's front teeth never stop growing.

Answers to We're NUTS about SQUIRRELS Crossword Puzzle

Across

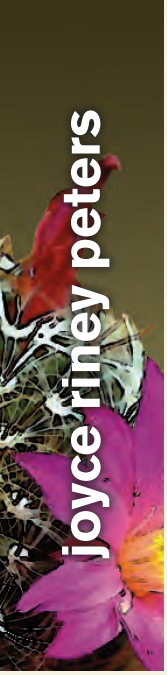
3 shadow tail
7 colonies
10 umbrella
11 estivation
12 belly
13 blood
15 growing
17 chipmunks
18 diurnal

Down

1 double-jointed
2 kits
4 pouches
5 mammals
6 scurry
8 tunnels
9 prairie dogs
14 blind
16 five

Green Scene School Projects

If you would like to apply to the MAS Education committee for funding for a school natural history project or field trip, please contact Mark Larson at larsonwarren@gmail.com



Nature through the Artist's Eye: Joyce Riney Peters

Joyce Riney Peters has always had a special bond with nature and especially plants. Her painting technique is dry-brush, a traditional English form of watercolor, because she appreciates what it offers with respect to the fine detail required for her botanical art and scientific illustration.

While working towards certification as a Botanical Illustrator, her independent study of native plants and their pollinators generated a deeper understanding and passion. Supporting our native pollinators by growing native plants and showing others how to do this using the large diversity of native plants is an important mission for Joyce.

She is a member of the American Society of Botanical Artists, the Southwest Society of Botanical Artists, Arizona Native Plant Society and the Central Arizona Butterfly Association. Joyce is also a University of Arizona certified Master Gardener, a Smartscape graduate and a Watershed Steward.

Website: www.joycesnativescape.com

Contact: nativescape.joyce@yahoo.com
See Joyce's work in the gallery at North Mountain Visitor Center, 12950 N 7th St, Phoenix, AZ 85022.

***Dicliptera resupinata* with Texan Crescent.**
Dicliptera adapts well to many conditions (full sun to shade) and tolerates most soil. It flowers predominantly from spring to fall and attracts many butterflies.

White-lined Sphinx Moth (*Hyles lineata*) on Dune Evening Primrose (*Oenothera deltoides*).
Usually observed at dusk, these large moths (with a wingspan up to five inches) hover and feed on nectar and are sometimes mistaken for hummingbirds.

Ironwood (*Olneya tesota*) with female Digger Bee (*Centris pallida*).
This solitary bee is an important pollinator of trees in the Sonoran Desert. She collects pollen in baskets on her hind legs to fill a brood pot so that when her larvae hatch, they will find food.

Monarch (*Danaus plexippus*) on Mohave Thistle (*Cirsium mohavense*)
The Monarch migration is one of the world's greatest natural wonders, yet it is threatened by habitat loss in North America, at overwintering sites and throughout the spring and summer breeding range as well.

Desert Senna (*Cassia covesii*) and Cloudless Sulphur (*Phoebis sennae*).
Desert Senna is the Cloudless Sulphur's host plant. Butterfly larvae forage on the foliage, buds, flowers, and immature seedpods. When monsoon rains bring new growth on senna plants, Cloudless Sulphurs become common, often flying up to 200 miles from Mexico into Arizona.

Saguaro (*Carnegiea gigantea*) with two daytime pollinators, the "cactus bee" (*Diadasia rinconis*) and a honey bee (*Apis mellifera ligustica*).
Also shown is a disperser of the fruit's seeds, the Cactus Wren (*Heleodytes brunneicapillus couesi*). The Saguaro cactus blossom is Arizona's state flower and the Cactus Wren, Arizona's state bird.

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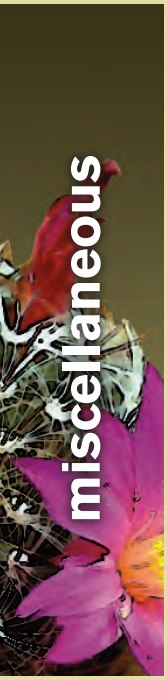

Monthly Meeting

Please see meeting information on page two. Contact a board member if you have questions, or check out our website at www.maricopaaudubon.org

Membership Information and How to Receive *The Cactus Wren•dition*

Two distinct memberships exist: membership of the National Audubon Society (NAS) and membership of the Friends of Maricopa Audubon Society (MAS).

To become a member of the NAS please go to:
www.audubon.org/audubon-near-you

We send *The Cactus Wren•dition* to all current members of NAS if you are assigned to or choose MAS as your local chapter. NAS provides MAS $3.00 per year for each member assigned to us.

To become a Friend of MAS, please pick up a form at the book sales table at our monthly meeting or download the form from our website, http://maricopaaudubon.org

For specific questions please contact our Membership Chair.

Submissions

Copy for *The Cactus Wren•dition* must be received by the editor by e-mail, by January 15, April 1, July 1, and October 1. Articles not received by the deadlines may not appear in the upcoming issue. Email to: *The Cactus Wren•dition* Editor, Gillian Rice: editor.wrendition@yahoo.com

Opinions

The opinions expressed by authors in this newsletter do not necessarily reflect the policy of the National Audubon Society or the Maricopa Audubon Society.

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