



The Klamath Kaleidoscope

Newsletter of the Klamath Inventory & Monitoring Network

Spring/Summer 2021

Protecting Bats from COVID-19

While the novel coronavirus (COVID-19) may have originated in Old World bats, there is a twist to the story. Scientists have found a small but credible risk that infected humans may be able to transmit COVID-19 to our North American bats. It is not yet known whether bats infected with COVID-19 from humans could then infect other bats, and if so, how lethal the infection might prove to be. This matters for a couple of reasons. First, it's unknown which, if any, bat species are naturally immune to COVID-19. With White-Nose Syndrome already devastating many North American bat populations, bats don't need another major stressor. Second, if COVID-19 can spread among bats, then bats could possibly be a source of new infections in humans, domesticated animals, or other wild animals.

Based on these concerns and the guidance of bat experts, the National Park Service and other agencies issued a stand down on handling bats as a precautionary measure soon after the COVID-19 pandemic began. These precautions follow guidance by the [World Conservation Union \(IUCN\) Bat Specialist Group](#). They focus on three areas: 1) minimizing nonessential activities with bats, 2) assessing the researcher's likelihood of being currently infected with COVID-19, and 3) protecting against transmission by using face coverings, avoiding direct contact, and other safety measures.

Exceptions to this guidance are allowed for necessary activities, like White-Nose Syndrome surveillance in critical areas. The Klamath Network holds one of the few state permits to handle bats. This is because we are

tracking the potential spread of White-Nose Syndrome in California, where the first suspected occurrence of the fungus was reported in 2018. Unfortunately, new critical areas are emerging. White-Nose Syndrome has recently been detected for the first time in bats in New Mexico, Wyoming, and Montana, adding more states to the westward expansion of the disease.

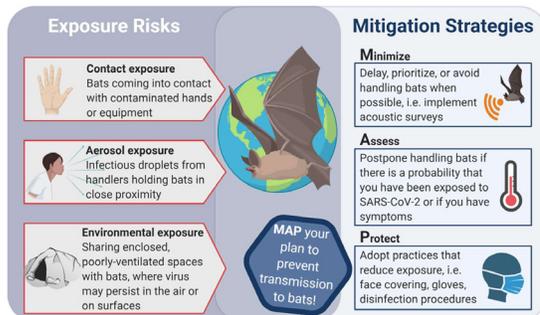


Alice Chung-MacCoubrey

Profile of Alice Chung-MacCoubrey

How did our Klamath Network program manager, Alice Chung-MacCoubrey, leave her biochemistry degree behind to become a wildlife biologist focused on bat conservation? You can learn about her passions and professional journey in this recent [scientist profile](#).

Preventing human-to-bat transmission of SARS-CoV-2



Graphic by IUCN SSC Bat Specialist Group

In This Issue

Protecting Bats from COVID-19... 1
Alice Chung-MacCoubrey..... 1
All Clear for Fieldwork.....2
IMD Leadership Changes.....2
Newsletter Going Digital.....2
Kasey Rolih.....3
Winter Bat Counts5
Recent Publications.....8
Where Are They Now?.....9
Field Schedule..... 10

All Clear for Fieldwork, with COVID Precautions

All systems are a “go” for summer fieldwork. Thanks to careful planning and COVID safety protocols developed last year, the Klamath Network is moving forward with all of its regularly scheduled vital signs monitoring this summer. For the monitoring that was canceled last year (streams, vegetation, and landbirds), that means visiting the parks that were originally scheduled for 2020. We may be able to double up on the parks we visit next year to get back on schedule with at least landbird monitoring. Field crews will still observe COVID safety protocols, though this time around, we’ve had much more time to plan!



In May, the Klamath Network vegetation crew set up a plot containing this flowering Oregon white oak (*Quercus garryana*) in the Cascade-Siskiyou National Monument, as part of our partnership with the monument to begin long-term vegetation monitoring following the network protocol.

IMD Leadership Changes

After leading the Inventory and Monitoring Division for 12 years, Kirsten Gallo is stepping down. Kirsten initiated the new Conservation Initiative, which is crafting our vision of success for the next 20 years.

We will miss her. Other changes are afloat in IMD leadership, including positions for the national data manager and lead science communicator.



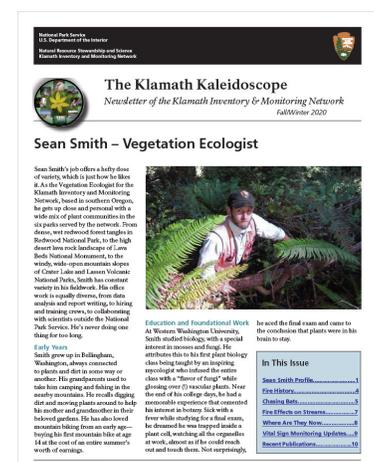
Kirsten Gallo

Kaleidoscope Going Digital—Feedback Welcome

To extend the reach of our biannual newsletters, we are aiming to shift the Klamath Network Kaleidoscope from a printable hard-copy pdf to HTML (digital) only. Other networks, such as the [Sierra Nevada Network](#) and the [Sonoran Desert Network](#) have moved in this direction. We would house the newsletter on a page of our website, with each edition as a shared content article. In-depth articles

within a newsletter would be their own separate articles. This makes the content more easily findable and shareable on nps.gov. We welcome feedback from park staff about this change. Would you miss having a printable hard-copy or does all digital sound appealing?

Contact Sonya_Daw@nps.gov





Klamath Network Inventory & Monitoring Program

The National Park Service has implemented natural resource inventory and monitoring on a servicewide basis to ensure all park units possess the resource information needed for effective, science-based management, decision-making, and resource protection.

Parks in the Klamath I&M Network:

- Crater Lake National Park
- Lassen Volcanic National Park
- Lava Beds National Monument
- Oregon Caves National Monument and Preserve
- Redwood National and State Parks
- Whiskeytown National Recreation Area
- Tule Lake National Monument

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<https://www.nps.gov/im/klmn/index.htm>

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Newsletter writing, editing, and design
by Sonya Daw

Kasey Rolih—Biologist and Science Communicator

Kasey Rolih is a biologist and science communicator who works part-time with the Klamath Network through a partnership with Southern Oregon University. Her diverse skill set is invaluable to the network team.

Childhood Influences

“I grew up, mostly, on the lower end of the San Francisco Peninsula in the Bay Area (California), in Portola Valley, a beautiful rural community no one in my family can afford to live in anymore! As a kid, I had a lot of interests and hobbies—reading, baseball, drawing horses and trees, sewing (my maternal grandmother sewed most of my clothes), but my favorite activity was exploring. No matter where I was, in rural or urban environments, I loved to hike and observe my surroundings. What I would have done with a pair of binoculars! We had horses when I was young, and a favorite pastime in junior and high school was to take a book and my pup and ride my horse into the hills, let him go to graze, lie on my back in the grass and alternately read and watch the sky. I no longer have a horse but still love to lie on the ground and watch the sky.

“Another favorite past time, when out by myself in the woods was to play at being different animals, usually a wolf or a deer. Perhaps that inclination was an early sign that I would end up as a field biologist.

“I also have always loved maps. One brief but formative experience was when my family (2 adults, 2 teens, 3 youngsters, 2 dogs, a cat, and a canary) crammed into a Chrysler sedan to drive across the country to Maryland for my dad’s new job. My dad let me be the navigator (9 years old), using our road atlas to guide us on our way on interstates and



Kasey Rolih

backroads to our destination.”

Education

“I have a B.S. in soil science and environmental studies (Univ Massachusetts-Amherst), and an M.A. in biology (Smith College). Positive experiences with 2 high school science teachers led me to choose science as a field of study. Though obviously you can ask questions in any field of study, I loved the scientific method and its organized and logical approach to query. Because I love being outdoors more than anything field biology seemed the perfect fit.”

A Love of Lichens

Rolih is a lichen expert, and has written about [tree lungwort](#) and [dragon cladonia](#) for the network’s Featured Creature article series. She became hooked on lichens in college:

“As an undergrad at UMass-Amherst I worked for a professor of forestry during the school year, and in summers I was on field crews with the USFS cruising timber and doing botanical surveys. One year, they brought in these two lichen ecologists to train the field crews. That



Rolih leaning against tree with her favorite macrolichen, *Lobaria pulmonaria*, during a survey in western Massachusetts in 1997.

Kasey Rolih *(continued)*

experience of working with them, it just opened up a whole new world for me. Their excitement and interest was contagious. I just loved it. And that's how I got started. Eventually I specialized in lichen ecology through the USFS Forest Health Monitoring Program (now FIA, the Forest Inventory Analysis) and worked for many years teaching forestry crews about epiphytic lichens and how to survey for them."

Worm Stomping Turtles

A favorite story from the field:

"I worked back East on a radio telemetry wood turtle study in northern Maine. I had heard about a behavior that wood turtles have called "worm stomping," and one day while tracking a turtle, I witnessed the behavior firsthand. The turtle, a female, looked like she was dancing, or doing pushups: she alternately drummed her front feet, and then thumped her plastron, the lower shell, on the ground, over and over again in a rhythmic pattern. Doesn't it sound unbelievable? It's a well-documented behavior in this species (and some bird species) that drives earthworms to the surface to be fed upon."

Working with the National Park Service

In 2016, Rolih moved back to the West Coast, where she began working with the Klamath Network on the Crater Lake National Park vegetation map.

"My love of maps, my field experiences, and my experience in GIS through a previous job in a spatial ecology lab at UMass were useful on this project. In 2017 I was a field crew lead for the validation stage of the vegetation map and also worked on the GIS spatial analysis. It was a marvelous experience to be able to work in such a beautiful place. At the age of 58, with all my field experiences around the US and in Puerto Rico, it

was my first opportunity to work in a national park. After that project, I remained with the Klamath Network."

Rolih is currently a Program Assistant with the Klamath Network, working part time on a variety of projects.

"The variety of projects I do suits my personality well, and I feel fortunate to be here. I have the pleasure of working with each staff person in the network, assisting them in the office editing reports and writing Featured Creatures [natural history articles], or validating field data. I might also be decontaminating water quality sampling equipment in the lab, or heading to the field for bat telemetry and mist-netting on the White-nose Syndrome surveillance crew.

"What gets me most excited is the anticipation of learning something new and the process of discovery. It's wonderful to meet a new species, and recently on the bat study, I met and handled several! One night in Whiskeytown NRA we caught a single pallid bat in our nets. What a cool-looking animal, with its golden fur, big eyes and ears, and its dog-like face.

"Like most people in this work I am motivated by a love of nature and an enduring curiosity. I enjoy working alone but am happiest working with others who share a passion for asking questions and seeking answers. I love collaboration but it does not have to be fieldwork! Last year I helped scientists at the Pacific Island Network develop resource briefs highlighting results from years of field work. That was challenging and rewarding!"

Fun

"I spend a lot of time with my family, and that is usually fun! I love jumping in pristine, cold water anywhere I find it, hiking the backcountry with my pup and friends, white-water rafting, sewing, strumming a banjo, and wine-



Examining a bat during WNS surveillance.

tasting at Upper Five Vineyards in Talent, Oregon."

Advice for Aspiring Scientists

"Get a good pair of binoculars, a camera, a notebook, and a hand lens. Volunteer at an early age on field studies in your area. Take as many college courses as possible in botany, comparative anatomy, entomology, wildlife ecology, etc., and get experience working in these fields while in college if not high school or sooner. Know how to use a map and compass!"



Picking grapes for the local winery.

Winter Bat Counts on the Upswing at Oregon Caves

Every winter for the past 14 years Ivan Yates gears up to count hibernating bats at the main cave (“The Cave”) in Oregon Caves National Monument and Preserve. And every time, he feels the same mix of excitement and dread. Will he find bats? Fortunately, this past winter of 2021 yielded a good count – 80 bats – which is the second highest total since counting began in the early 2000s. He’s excited about the slow but steady increase in number of bats detected over the past 20 years during The Cave’s winter count. Though not a statistically confirmed trend, it’s encouraging. Based on his experience as a biologist with Oregon Caves since 2012, and a volunteer since 2008, Yates shares his unique perspective on how the park has been learning about its bats and protecting them over the years:

The Winter Bat Count

“The winter count is a quiet but thrilling affair. Researchers are allowed a single trip in the middle of winter to check for bats, when bats are in their deepest sleep. During these trips, utmost care is taken to be quick, thorough, and quiet, as disturbances to bats can rouse them from sleep, reducing the limited resources they carefully use until spring arrives. When searching, every nook and cranny is carefully checked as we walk slowly through the dark cave. It’s a quiet and determined atmosphere, broken only by excited pointing and shared grins when we find a bat. *Myotis* species, like the little brown bat (*Myotis lucifugus*), are especially hard to find as they’re known to wedge themselves into tiny crevices. There’s always a competitive spirit to find them, and those that do seem to wear a badge of honor. We sometimes need binoculars to spot bats in the highest parts of The Cave, and we frequently photograph large clusters so they may be counted

later more easily without prolonging the disturbance. There’s a lot of anticipation when first entering a cave to look for bats, since we never know how many we’ll find. We always hope for huge numbers, but there’s a chance there won’t be any. My heart really sinks if I’m going through The Cave for a while and not seeing them, but when I find that first bat, and then another and another, it’s always a huge relief for me to see that nothing happened to them.”

Bat Hibernation

“When conditions are poor, like they are in winter, animals have 3 options to survive; avoid the condition, stay active and struggle through it, or become dormant and wait it out. Since bats in North America that experience winter conditions are insectivorous (for the most part), they don’t have the option of struggling through it since the insects they eat are not around in winter. This means our bats need to either migrate away or become dormant and wait it out, which is what hibernation is. Many larger bats or those that can fly quickly will make the journey south each winter to warmer locations where they can still feed on flying insects. Other bats that might find the journey too difficult will choose to lower their body temperature and enter a state of torpor so they can hibernate and wait for the insects to come back.”

Finding the “sweet spot”

“Bats sometimes move around in winter to stay in their climate sweet spot. Last year, we experienced an interesting event during the February bat count. It’s normally at or somewhat below freezing outside of The Cave in winter, but just before the bat count, temperatures dropped to the teens. Townsend’s big-eared bats (*Corynorhinus townsendii*) typically



Ivan Yates conducting the winter bat count (pre-COVID-19) in The Cave. NPS/Katie Qualls

roost in areas just above freezing, but the temperature dropped to the 20s and froze where the bats normally roosted. We found them further into The Cave than where we saw them earlier in the previous fall, sitting again right at that sweet spot that is colder than the rest of the cave, but not freezing. I thought it illustrated really well how bats search for a specific microclimate and won’t let themselves become icicles if temperatures drop during hibernation.

“The sweet spot does vary by species. All hibernating bats are looking for cool temperatures over the winter, but there is a preference for how close to freezing some species like to be, or how humid or windy the location is. Townsend’s big-eared bats make up most of our hibernating bats, and in our cave, they really prefer areas next to entrances that are just above freezing, dry, and often windy. In those areas we almost never see *Myotis* bats. (The genus *Myotis*, meaning “mouse-eared,” includes many species of small bats.) We usually find *Myotis* bats farther from the entrances, where it’s a little warmer, and also more humid and without wind. Interestingly, I’ve heard this pattern is not always true in other caves where bats are monitored, so the reasons

Bat Counts *(continued)*

behind where local bats find their sweet spot may be more nuanced than we understand.”

Protecting Bats from Disturbance

“It’s always tricky to explain why bats roost in particular areas and not in others. I think we have figured out that it is very difficult to predict where they will be, but very easy to predict where they won’t be. I like to think of it as places bats will not be, and places bats could be. Of course, once you find a location with bats somewhere, it’s almost certain you will continue to find them there. Bats are extremely faithful to roosting locations and return to them year after year. But, if those numbers begin to decline, can we understand why? We have a pretty good idea of conditions bats do not like, and what might bother them.”

Light

“In a bat’s world, light means sunlight, and sunlight means some kind of daily fluctuation in temperature. Bats try to stay at a very constant temperature when hibernating, and therefore avoid areas with sunlight. At Oregon Caves we have found that a room of viewed bats that had tour lights left on overnight will have no bats in it the following day. Indeed, bats avoided a hibernacula room where lights were left on accidentally over one winter and moved into adjacent dark rooms instead. Because of bats’ sensitivity to light, tour lights are shut off between tours, at night, and when The Cave is closed to reduce the amount of light reaching locations where bats roost. Additionally, flash photography is prohibited by visitors during tours when a bat is known to be present.”

Sound

“This is a tricky one, because we know that bats are shockingly tolerant of sounds they are accustomed to. Studies have shown that bats can

roost in very loud locations, such as bridges and buildings, where the noise from cars, generators, or the hum of lights and machinery is constant. But just a slight disturbance in a quiet location can send bats scattering. At Oregon Caves we limit the amount of loud work to periods when bats are vacant. Also, during tours or hibernacula counts, people remain as quiet as possible, without whispering. Whispering actually produces lots of high frequency sounds, which bats are especially sensitive to. If you’ve ever been near a bat and tried talking or whispering, you will see it immediately focus on you if you whisper. How can you tell? You watch their ears! Bats, and especially our Townsend’s big eared bats, can rotate their ears, much like a cat can, and they focus them like satellite dishes!”

Environmental stability

“Although different species prefer different roosting conditions, they all prefer stable environments. Wherever they choose to hibernate, they want conditions to remain the same—that includes temperature, humidity, wind, light, sound, and anything else affecting the environment, such as human visitation. To this end we try to disturb them as little as possible. The simple act of walking by a hibernating bat just for a few minutes can bring it out of torpor. You may not notice it at first, but soon its body starts to rock back and forth as it breathes faster and begins to warm up. Within 30 minutes it can be fully aware and flying. Because of this long delay, people may not realize they’ve caused a disturbance.”

Bat gates

“Installing bat gates to cave openings is one way to protect bats. But restricting access to caves for people often had dramatic or tragic results for bats before we understood their



A bat-friendly gate at the 110 Exit, which is the halfway point through The Cave and one of the more active entrances for bats. NPS/Yates

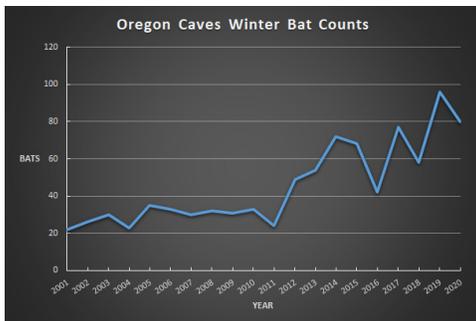
needs. Oftentimes caves were closed with no thought of how the bats would enter or exit, excluding bats or trapping them within. Other efforts to retain access for bats have failed when gates were installed that bats would not fly through. For example, culverts negatively affect bat echolocation, and some caves where a small culvert was left for them to travel through were abandoned. Modern gates now have horizontal rungs at optimal spacing that allow them to fly unimpeded while restricting human access. All of the gates at Oregon Caves use this modern, bat-friendly design.”

Changes in the Winter Bat Count

“Our numbers have been on a steady increase in the last 10 years. It is extremely exciting to see that happen and to think about the numbers we might soon be getting. But bats have experienced a lot of change at Oregon Caves over the past several decades. I believe we have a good understanding of why their numbers have gone up and down, and much of it is related to management decisions.

“Historical numbers for hibernating bats are difficult to track down at Oregon Caves. Hibernacula counts were not conducted until the early

Bat Counts *(continued)*



Maximum winter bat count. Consistent winter bat counts began in the early 2000s and have shown an increase during the past decade.

2000s, and so the only evidence we have are anecdotal accounts prior to the 1990s. What we do know is that Townsend's big-eared bats could be found here for as long as people have been visiting, with some claiming that thousands of bats could be observed in The Cave. It's not known if this was during hibernation or not, or if someone merely meant that there were many bats seen flying about. An old photograph shows a significant cluster of those bats in The Cave, which dwarfs any cluster seen in the past 30 years, giving some credence to those claims.

"Through the history of Oregon Caves, a great deal of disturbance occurred that altered the environmental conditions in The Cave. In hindsight it is easy to see why bat populations may have fluctuated over time. Several tunnels were blasted to connect portions of The Cave, which created a drastic



Townsend's big-eared bat cluster in the 1970s.

change in airflow, drying or freezing portions of The Cave. To address this problem, airlock doors have been installed which help maintain stable conditions, especially in areas where our bats roost. In the early 1990s, trail and infrastructure improvement work occurred during the winter off-season for tours, and in that time no bats were seen hibernating. Bats began to return in the late 1990s, and routine winter counts began in the early 2000s. Winter visits for maintenance or research were still frequent, and bat counts occurred twice monthly. Winter counts at that time remained between 20 and 30 bats. Around 2010, we restricted winter visitation to The Cave to a single bat count, and maintenance visits were eliminated. Shortly after, bat numbers began an upward trend, with a record number of 96 bats found in 2020. We also began implementing the Klamath Network's long-term monitoring protocol for winter bat counts in the park in 2012, continuing consistent count methods, which will help us analyze and identify trends.

"It's difficult to speculate about exactly why numbers are increasing since bats are very cryptic and their reasons for choosing locations are not always obvious. Some locations that may seem excellent simply will not have bats, and then I've seen others that offhand look terrible but will have a few bats. The steady rise we've seen could simply be juvenile bats following their mothers and deciding our cave is a good place to hibernate. Changing climate conditions could be altering existing hibernacula to a point that our cave is more suitable; the large extent of The Cave buffers changing temperatures and humidity. I would say that our efforts are certainly not discouraging the bats. We make every attempt to follow best practices and use the latest research to continually

update our methods to encourage bats to use our cave. Bats choose locations for complex reasons, and we want to make The Cave as suitable as possible."

White-Nose Syndrome

"Oregon Caves does not currently have White-Nose Syndrome (WNS), the devastating disease that is killing millions of bats. Nonetheless, we routinely work with partners to swab bats and the environment for signs of the fungus, *Pseudogymnoascus destructans*, or Pd, that causes WNS. If WNS reaches this region, Oregon Caves will try to reduce the possibility of spreading the fungus to other caves by humans visiting the park. To do this, Oregon Caves screens and educates all visitors to reduce, as much as possible, the spread of Pd spores on contaminated clothing and material. In the larger picture, researchers nationwide are studying treatment options, such as vaccines, microbiota therapies, UV light treatments, and others that may provide hope for a solution. Oregon Caves has collaborated with many researchers working on such projects. We've applied considerable effort to documenting our bat populations and we now have a good understanding of species present, their numbers, and their health. We've also collected acoustic profiles from different locations. If WNS has a drastic impact on our bats, the park will be ready to clearly demonstrate and document it."

**Note that hibernating bats are one of two major bat populations that use The Cave. The other population is bats that congregate in the fall to mate – the fall swarm. Those numbers have remained roughly stable, between 700 and 1000 bats using The Cave nightly.*

Learn more about cave monitoring in Klamath Network parks: <https://www.nps.gov/im/klmn/caves.htm>

Recent Publications

Available from the Klamath Network website: <https://www.nps.gov/im/klmn/reports-publications.htm>

Natural Resource Reports

Whitebark Pine

- Reilly, Matthew J., J. C. B. Nesmith, S. B. Smith, D. S. Stucki, and E. S. Jules. 2021. [Status of white pines across five western national park units: Initial assessment of stand structure and condition](#). Natural Resource Report NPS/KLMN/NRR—2021/2232. National Park Service, Fort Collins, Colorado.

Terrestrial Vegetation

- Smith, S. B., P. J. van Mantgem, and D. Odion. 2021. [Vegetation community monitoring: Species composition and biophysical gradients in Klamath Network parks](#). Natural Resource Report NPS/KLMN/NRR—2021/2236. National Park Service, Fort Collins, Colorado.

Natural Resource Data Series

Landbirds

- Stephens, J. L., and C. R. Gillespie. 2021. [Landbird monitoring: 2019 results from Crater Lake National Park and Oregon Caves National Monument and Preserve](#). Natural Resource Data Series NPS/KLMN/NRDS—2021/1313. National Park Service, Fort Collins, Colorado.
- Stephens, J. L., and E. E. Armstrong. 2021. [Landbird monitoring: 2018 results from Lassen Volcanic National Park, Oregon Caves National Monument and Preserve, and Whiskeytown National Recreation Area](#). Natural Resource Data Series NPS/KLMN/NRDS—2021/1312. National Park Service, Fort Collins, Colorado.

Vital Sign Update Briefs

- [Vital Sign Update: 2017 Results for Streams Monitoring at Whiskeytown National Recreation Area](#)

Science Communication

- Featured Creature natural history articles on [Sculpins](#), [Electrified Cat's Tail Moss](#), [Douglas's Squirrel](#), [Dragon Cladonia](#), [Bigleaf Maple](#), [Vaux's Swift](#)
- [Checking Crater Lake's Vital Signs](#). 2-page brief describing natural resource vital signs monitored at Crater Lake NP
- [Research Specimen Collection and Preservation: Help Us Make the Most of Your Science](#). 2-page brief highlighting key steps to follow during specimen collection in national parks.



NPS/Sonya Daw

Lave Beds National Monument

Where Are They Now?

The Klamath Network works with a variety of interns to support our program and to offer educational experiences. Interns may find themselves sampling water quality, monitoring whitebark pine, identifying native plants, mist-netting bats, or writing about our science. Here, we highlight where our interns have landed professionally or educationally.

Reese Crebbin

Klamath Network position:
Whitebark Pine Intern, 2018

Current job:
Vegetation Monitoring Technician
Klamath Network
Ashland, Oregon

“My current job is a Vegetation Monitoring Technician at KLMN. This year we’re completing plots in Lava Beds National Monument and Redwood National Park, though before our real sampling season starts in those parks, we are conducting work with the BLM to look at first year plots in the Cascade-Siskiyou National Monument. Concurrently, I’m doing an online graduate certificate through Oregon State University in Geographic Information Science that I expect to complete next spring.

“I love the experience of being able to work outside every day. Though some days are hot and miserable, it’s really exciting nonetheless to be searching on your hands and knees in shrubs, trying to ID every species you can find, and always encountering new species. In terms of the graduate certificate, I love that I’m honing other skills besides field work and will have more options available to me in terms of job opportunities in natural resources.



Reese Crebbin

“I think that I owe most of my professional journey thus far to the Klamath Network. Even though I was unable to find a field position last year, I found myself practicing the skills I’d learned during my KLMN internship while I was working in a vineyard and at a nursery instead. If not for what I’d learned in the field my intern year, I would have absolutely roasted alive and been very underprepared for agricultural field work. And during my time at a local plant nursery, I tested myself on families and genera, many of which I had learned during my whitebark pine monitoring internship.”



2021 Field Schedule at Klamath Network Parks

Vital Signs Monitoring	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Landbirds—Mist Netting (KBO) (KLMN contact—A. Chung)			ORCA						
Landbirds—Point Counts (KBO) (KLMN contact—A. Chung)			LABE						
			RNSP						
			WHIS						
Invasive Species (KLMN—S. Smith)			LABE						
				ORCA					
				RNSP					
Vegetation (KLMN—S. Smith)					CRLA				
					LAVO				
			LABE						
Whitebark Pine (KLMN—S. Smith)					RNSP				
					LAVO				
Streams (KLMN—E. Dinger)					CRLA				
			WHIS						
Lakes (KLMN—E. Dinger)					LAVO				
Rocky Intertidal (UCSC) (KLMN contact—E. Dinger)									
Caves (Park staff)			RNSP						
			LABE - Ongoing data collection by park staff						
		ORCA - Ongoing data collection by park staff							
Other Projects									
Bats—White-nose Syndrome Surveillance (KLMN—A. Chung-Macoubrey)			WHIS						
			LABE						

Park acronyms

Crater Lake National Park (CRLA), Lassen Volcanic National Park (LAVO), Lava Beds National Monument (LABE), Oregon Caves National Monument and Preserve (ORCA), Redwood National and State Parks (RNSP), Whiskeytown National Recreation Area (WHIS)

Cooperator acronyms

Klamath Bird Observatory (KBO), University of California at Santa Cruz (UCSC), Southern Oregon University (SOU)

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- Rocky Intertidal Zone

Allison Snyder · 541-552-8576

- Land Cover and Land Use
- Alice Chung-MacCoubrey · 541-552-8575
- Landbird Communities, Caves, Bats

Sean Smith (541)-552-8570

- Terrestrial Vegetation
- Exotic, Invasive Plants
- Whitebark Pine



Redwood National and State Parks