THE ROOST

NOVEMBER 2019 - VOLUME 23
Annual Newsletter of the Owl Research Institute

Northern Hawk Owl publication - see page 3
Photo © Kurt Lindsay

Message from the President

Greetings from the Owl Research Institute (ORI) Field Station! We survived our 30 year anniversary and, as usual, it's been a busy year. Our many research projects are stronger than ever: longer-running studies (>20 years) earn more authority with time; younger ones (8-10 years) gain relevance.

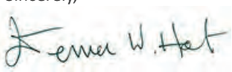
I still feel like I just got back from nine weeks on our Snowy Owl and Brown Lemming project where, amazingly, we reached our 28th continuous year of research in the Alaskan Arctic. Unfortunately, it was another low lemming and owl population year. A bright spot, however, was establishing a live Snowy Owl cam. This was only the second Snowy Owl cam in the world; we did the first one in 2014. The live stream was spectacular and all five chicks fledged. We were also joined in the field by award-winning photographer and author, Mark Wilson, for most of the season. Mark became part of the team as he chronicled our work, Snowy Owls, and more.

Back in Montana, it was difficult year for most species of owls. The 2018/19 winter was brutal. Record deep snow and extreme cold contributed to high mortality among owls, eagles, and hawks. Wildlife officials and citizens found many dead and dying birds. Starvation was the leading culprit, although those that hunted along plowed roadsides were often hit by cars. The difficult winter, no doubt, contributed to some of the low breeding numbers we reported this spring.

In other news, after 12 great years with the Owl Research Institute, lead researcher Matt Larson is moving on. While Matt is irreplaceable, the door has opened for new opportunity, including bringing raptor biologist Beth Mendelsohn on board. Read more about all the topics I touched on here, as well as highlighted species and projects, in the pages that follow.

Lastly, I want to thank you for your support. Many of you have been with us since our beginning; some have just come on board. Either way, thanks to your generosity, our work for owls is possible. We are proud to be the most active owl research group in the world and remain passionate about field research and long-term, year-round studies. Only by working together, and through your contributions, can we continue this important work. I hope you donate today. And when you're done reading this newsletter, please pass it on to a friend.

Sincerely,



Denver W. Holt
ORI Senior Researcher and Founder

Photo above: ORI offices and field station, Charlo, Montana. While ORI has been in operation since 1988, this house, barn, and outbuildings have served as home-base since 1998. ORI is located on the Flathead Indian Reservation in the Mission Valley, and surrounded by a diverse landscape that contains habitat for most of Montana's 15 owl species. Important neighbors are the National Bison Range, FWP state conservation lands, and Ninepipe Wildlife Refuge.

THE ORI

Denver Holt bands Snowy Owl chicks that are around three weeks of age. All seven chicks fledged from this nest during the 2018 breeding season (one is hiding behind Denver). Don't miss the helicopter sized mosquito!

ORI WISH LIST FOR 2020

People like to give in different ways to support causes and organizations they believe in. In each newsletter, we provide our readers a list of items that will help us with our research projects and facility maintenance – also known as a Wish List. And each year, we are fortunate enough to be granted some of these wishes. In addition to donations and grants, ORI is in need of the following items:

- Tractor, for field station road maintenance and winter plowing
- Riding lawn mower, for field station lawn
- Snow blower, for field station clearing
- Binoculars and scopes
- Camper trailer to serve as a mobile banding station
- Flatbed trailer to haul ATVs
- Snowmobiles and trailer
- Grant for new graphing software
- SUV (large GMC, Suburban or pickup truck to haul campers and trailers)
- New laptops
- Down parkas for Snowy Owl project
- Outdoor gear - boots, jackets, etc.

FACTS ABOUT ORI

ORI conducts long-term research and monitoring (in varying degrees) on:

- Barn Owl
- Flammulated Owl
- W. Screech Owl
- Great Horned Owl
- Snowy Owl
- Great Gray Owl
- N. Pygmy Owl
- Boreal Owl
- N. Saw-whet Owl
- N.Hawk Owl
- Long-eared Owl
- Short-eared Owl
- Brown Lemming
- Collared Lemming

ORI is dedicated to owl conservation through research and education:

- Comprised of 3 researchers, 1 admin/development staff
- Responsible for many of the longest running research projects of their kind
- Operate year-round, full-time research in MT; Alaska in breeding season
- Featured in Smithsonian, Nat'l Geographic

ORI operates conservation projects and collaborative work:

- N. Saw-whet Migration Project
- Live-cams with explore.org
- Project WAfLS
- Great Gray snag conservation
- Effects of wind farms on owls
- Snowy Owls & climate change
- Cavity nester snag conservation

Northern Hawk Owl Study Published

While our 22 year study on Northern Hawk Owls, primarily based in post-burned forests of Glacier National Park, concluded in 2015, the results of this research were recently published in the February 2019 *Journal of Raptor Research.*

This nest characteristic study remains one of our most challenging and rewarding projects to date. Working in the incredible landscape of Glacier National Park and interacting with these charismatic, feisty owls is something none of us will ever forget. We are proud to have made important contributions to what is understood about Northern Hawk Owls and its implications to snag conservation in forest management. The abstract and data table are published below; full manuscript available with journal subscription, or by contacting us.

Matt D. Larson, Jessica C. Larson, Denver W. Holt, Steve Gniadek and Adam Eckert, **"The Northern Hawk Owl in Montana: A Summary of Breeding Biology, Diet, Habitat Association, and Records (1994–2015),"** *Journal of Raptor Research* 53(1), (25 February 2019). https://doi.org/10.3356/JRR-17-87

Top left photo: an adult male Northern Hawk Owl delivers a starling to the nest, Glacier National Park. Left: paper authors at work, from left: Jessica Larson, Denver Holt, and Matt Larson.

ABSTRACT — We studied Northern Hawk Owls in Montana from 1994 through 2015. We report 36 breeding records, 18 of which included a known nest location. Owls reused one nest in subsequent years, but this nest was included only once in our analysis of nest-site characteristics. All nests were in moderate to severely burned forests from 1–11 yr post-burn. Nests were found in black cottonwood (*Populus trichocarpa*; n=6), quaking aspen (*P. tremuloides*; n=6), Engelmann's spruce (*Picea engelmannii*; n=3), and western larch (*Larix occidentalis*; n=2). Average nest tree height was 19.66 ± 3.4m (95% CI, n=17), average nest height was 14.1 ± 61.6 m (95% CI, n=17), and average diameter at breast height was 43 ± 4 cm (95% CI, n=17). Average measurements of nest tree height and nest height were larger than those reported from elsewhere in North America. Diet, based on 274 prey identified from pellets, was 88% voles, most frequently *Microtus pennsylvanicus* (51%, n=140). Only 1 of 72 banded owls was recaptured or recovered over the course of this 22 year study, suggesting a non-sedentary or nomadic population with low site fidelity. The lone recapture represents the first report of a philopatric Northern Hawk Owl in North America. Although this owl is still considered a rare breeder in the conterminous United States, we documented breeding records in 11 of the last 12 year of this study. All but four known breeding records in Montana occurred within Glacier National Park.

NORTHERN HAWK OWL

A medium-sized owl with a broad head, yellow eyes, yellow beak, and a long, tapered tail resembling a hawk; back is dark brown with white spotting; chest and belly white with dark barring.

Other names: Hawk Owl
Closest relative: Northern Pygmy Owl

Class: Aves
Order: Strigiformes
Family: Strigidae
Genus: *Surnia*
Species: *ulula*

Height, both: 36-39 cm (14.1-15.3 in)
Weight, males: 270-314g (9.5-11.0 oz)
females: 320-345g (11.3-12.2 oz)
Wingspan, both: 74-81cm (29.1-31.9 in)

Feeds on: Mostly voles; sometimes other mammals and birds; occasionally reptiles, amphibians, and fish

North American population: 100,000 +/- *Partners in Flight*

An adult male watches over his young on the branches of an old snag, Glacier.

NEST CHARACTERISTICS TABLE

Table 1. Northern Hawk Owl (Surnia ulula) nest characteristics from North America and northwestern Montana

Variable	North America[a]	*n*	SD	Montana[b]	*n*	SE
Tree height (m)	7.5	14	4.5	19.6	17	1.6
Nest height (m)	7.4	41	4.5	14.1	17	0.8
DBH (cm)	50.2	9	30.2	43.3	17	1.9
Nest type						
Cavity (%)	33	58		53	17	
Bowl (%)	60	58		47	17	
Stick (%)	7	58		0	17	

a. Duncan and Duncan 2014. b. This study, Owl Research Institute. n = sample size. SD: Standard Deviation. SE: Standard Error.

FACTS ABOUT *SURNIA ULULA*

- In N. America ranges throughout Alaska and Canada; usually non-migratory; often winters in northern U.S.
- Considered nomadic, dispersing from their normal range when local vole populations crash; erupting in response to high vole numbers.
- Habitat: taiga, spruce forests, burned areas.
- Cavity nester; also nests in stump tops, abandoned crow and raptor nests, will utilize nest boxes.
- Eggs: 6-10 smooth, white spherical eggs; incubation: 25-30 days.
- Usually quiet, except during nesting; males: fast, burbling trills; females: short, high-pitched trills.
- Diurnal; perch and pounce hunter; frequently hovers; can seize prey in flight, will also plunge into snow.
- Flies with a mix of slow wing beats and long glides, like hawks.
- Often seen perching like hawks - on the tops of tall trees, often near clearings, watching for small mammals, mostly voles.
- Tend to inhabit remote areas far from cities and towns.

SHORT-EARED OWL

A medium-sized owl with a large round head, very small ear tufts, yellow eyes, black beak, and long, broad wings with black patches on “wrists.”

Other names: Grass Owl
Closest relative: Long-eared Owl

Class: Aves
Order: Strigiformes
Family: Strigidae
Genus: *Asio*
Species: *flammeus*

Height, both: 37-38cm (14.6-15 in)
Weight, males: 200-450g (7.1-15.9 oz)
females: 280-500g (9.9-17.6 oz)
Wingspan, both: 106cm (41.7 in)

Feeds on: Mostly small mammals like voles, moles, mice and rabbits; sometimes bats, weasels, shrews, or birds

North American Population:
660,000 +/-
Estimated 65% decline since 1970.
Partners in Flight

Hunting for a growing family during breeding season, Ninepipes Wildlife Refuge, 2019.

Photo © Mel Geer

Project WA*f*LS Update: Year Two

In 2018, we entered into a collaborative project with a number of agencies and organizations to coordinate Short-eared Owl surveys across the Intermountain and Pacific Northwest titled the Western Asio flammeus Landscape Study (WAfLS). This study is funded through 2020 by a grant from the U.S. Fish and Wildlife Service and relies heavily on volunteer citizen-scientist to conduct surveys across eight western states. Short-eared Owls are known to be nomadic and irruptive which makes it hard to monitor their populations across space and time. It is also suspected that, like many other open-country species, their populations have declined considerably in North America over the last 50 years.

In 2019, 605 people participated in Project WAfLS surveys and contributed over 5,200 hours while completing surveys in 365 grids. Here in Montana, 65 participants completed surveys in 42 grids across the state. Owls were detected in 63 grids study wide – 21 of which were located in Montana. The success of this survey is made possible through the huge effort and support of the many folks who volunteered. This project is believed to be the largest species-specific survey of Short-eared Owls in the world and is helping us gain valuable baseline population and habitat-use data needed to direct conservation and management of Short-eared Owls in the West.

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Left: Matt Larson, Project WAfLS Montana State Coordinator, logs results from a Short-eared Owl survey in the Mission Valley - a beautiful spring evening where we observed countless sky dances against the backdrop of the Mission Mountains.
Larson designated this particular route a ‘hot-spot’ grid: a non-randomly selected grid with historic Short-eared Owl populations. These grids look at relative abundance among sites from year to year but are not included in the habitat or abundance analyses as they would bias results.

2019 DETECTIONS

The table below shows the total number of regular grids surveyed and grids with detections of owls, broken out by which visit, whether the grid was a random grid (regular) or hotspot grid, and by state. See the full report at www.avianknowledgenorthwest.net or contact Matt Larson at owlinstitute@outlook.com for information or to find out about volunteering. Table from Project WAfLS 2019 Report.

State	Regular Grids	Regular w/ Owls	Regular Round 1	Regular Round 2	Hotspot Round 1	Hotspot Round 2
California	43	1	1/44	0/35	2/6	0/5
Idaho	53	10	8/52	4/47	1/3	0/3
Montana	**42**	**21**	**18/43**	**14/36**	**1/1**	**1/1**
Nevada	43	3	1/44	2/31	0/0	0/0
Oregon	35	3	2/34	1/19	1/2	1/2
Utah	42	5	2/42	4/37	1/5	1/4
Washington	43	10	7/41	5/37	0/3	0/2
Wyoming	43	4	1/40	3/31	0/1	0/1
TOTAL	344	57	40/340	33/273	6/21	3/18

FACTS ABOUT *ASIO FLAMMEUS*

- Open country range: tundra, marshes, grasslands, savannas.
- Partially migratory, nomadic.
- Usually nocturnal, sometimes crepuscular; flies low over the ground in search of prey; very agile in flight.
- Usually silent, except during breeding season, or when warning intruders.
- Females usually darker; colors resemble dry grass and aid in camouflage.
- Males perform elaborate ‘sky dances’ during mating season with dramatic dives, hooting, and wing clapping, commonly at dusk.
- Nests on the ground; scratches out a bowl-shaped nest.
- Lays 5-6 eggs on average; sometimes up to 10.
- Will feign a broken wing to lure potential threats from nest.
- One of the most widespread owls in the world.
- Can be found on every continent except Australia and Antarctica.
- Has many subspecies; most notably one native to Hawaii.
- Flight described as “moth-like” with high and floppy wing beats.
- Sometimes polygamous - one male with two nests.

HAPPY TRAILS TO ORI’S MATT LARSON

After 12 years with the ORI, Matt Larson is moving on. He first volunteered for us as the boyfriend of Jessica Crowley, later Jessica Larson, who also worked for us. As often happens, priorities change, and Matt has decided to take on a role in his family’s business and spend more time raising their daughters.
I remember when Matt started volunteering. He was exceptionally quiet and shy. He was reluctant to speak to groups when we held field classes. But I continuously put him on the spot. I vividly recall his first professional talk; he was clearly uncomfortable in the spotlight.
Fast forward 5-6 years. Matt became a master lecturer and speaker. Using his dry sense of humor, and a master of his domain, people now wanted hear Matt speak. He rose quickly as one the more experienced owl field researchers in North America - writing professional papers and reviewing manuscripts and books for professional journals. Watching Matt grow from a 20-something with little experience, to a true owl expert, has been a rewarding journey.
I will miss his expertise and his ability to figure anything out. But more, I will miss him as a great friend. He is a true gentleman: polite, kind, thoughtful, trustworthy. Thanks for all your efforts Matt. - *Denver*

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LONG-EARED OWL

A medium-sized owl; buff colored facial disks, yellow eyes, white eyebrows, black beak, and conspicuous, upright ear tufts; females tend to be more dark brown than males.

Other names:
Northern Long-eared Owl
Common Long-eared Owl

Closest relative:
Short-eared Owl

Class: Aves
Order: Strigiformes
Family: Strigidae
Genus: *Asio*
Species: *otus*

Height, males: 35-38 cm (13.8-15.0 in)
females: 37-40 cm (14.6-15.7 in)
Weight, males: 220-305g (7.8-10.8 oz)
females: 260-435g (9.1-15.3 oz)
Wingspan, both: 90-100 cm (35.4-39.4 in)

Feeds on: small mammals such as voles and mice, sometimes birds; swallows prey whole

North American population: 140,00 +/- Estimated 91% decline since 1970.
Partners in Flight

A Season of Highs and Lows

When highs and lows are reported among populations, it's easy to assume that these markers are indicative of a species' overall health. Sometimes, of course, they are; but it's important to remember that annual variations in numbers are a natural occurrence for some animals. This is especially true for open country species of owls, which often show dramatic annual variation in breeding numbers within a given area. Until data from any one season can be contextualized among many years, we don't know if the findings are part of a larger trend, or an anomaly.

In North America, open country species are: Barn Owls, Snowy Owls, Burrowing Owls, Long-eared Owls, and Short-eared Owls. They rely on a variety of expansive habitats to hunt small mammals, ranging from the Arctic tundra, to prairie, to shrub-steppe. The dramatic highs and lows of Snowy Owl populations in response to lemming abundance are perhaps most well known - yet this boom and bust phenomenon is not unique to Snowy Owls. 2019 has seen extremes in two closely related species at our study sites in western Montana: Long-eared Owls and Short-eared Owls.

For Long-eared Owls, it has been an unusually poor breeding season, producing just two nests. One nest failed during incubation (cause unknown); the second nest saw only one chick (from five eggs) disperse from the nest, although it did not survive to fledging. For perspective, these same study sites have seen up to 12 nests in a season and only a few other times in 32 years have no chicks survived to fledge.

While it appears to be a bust year for Long-eared Owls, Short-eared Owls seem to have had a boom year. Survey results from our Project WAfLS involvement detected Short-eareds across much of the state and in larger numbers than last year. At a route we've formally surveyed since 2008, we detected 50 Short-eared Owls - more than double our previous high.

While comparing nest success of one species to survey results of another is a bit like comparing apples to oranges, the point is simply this: it takes many years - through several natural peaks and valleys - to begin to accurately detect population trends. It's natural to want to draw conclusions from a couple years of data, but the truth is, these data are a perfect example of the need for long-term research and monitoring. It's the principle the Owl Research Institute was founded on, and we remain as committed to this approach today as we did over 30 years ago.

Our Long-eared Owl study is the longest running study of its kind in North America - research and monitoring that takes place year-round. Over 32 years, we have banded almost 2,000 birds, located over 235 natural nests, and published numerous papers on the species. Watch for our Long-eared Owl roost camera this winter and nest camera in the spring! Visit explore.org and click the ORI tab at the top of the page, or find links on our website. Right: ORI reseachers and volunteer Angie Marbais band a Long-eared Owl at a Missoula study site.

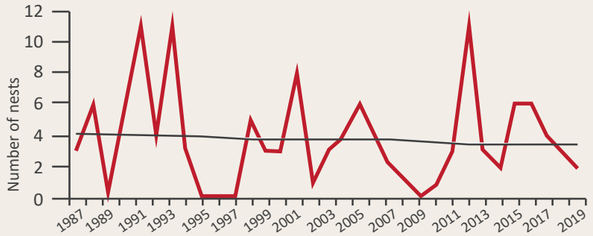
FACTS ABOUT *ASIO OTUS*

- North American ranges from Southern Canada through most of U.S., south to New Mexico; migratory.
- Do not build their own nests but use abandoned stick nests built by other species, such as magpies or, rarely, on the ground; lay 5-7 eggs.
- Young jump from the nest and climb to safety by pulling themselves up trunks and bushes with beak, wings, or talons.
- Roost communally in the winter where non-familial (typically) groups of 2-20 owls (in N. America) group together among thick branches.
- Relies on a variety of habitats from dense vegetation to open forests, usually near open land, such as meadows or farm fields.
- Primarily nocturnal, occasionally crepuscular.
- Locates and catches mice in darkness due to asymmetrical ear openings which pinpoint sound.
- Vulnerable to larger, more aggressive owls and hawks.
- Don't have 'long-ears;' instead, the feathered tufts atop their head stand-up when alarmed to resemble sticks and aid in camouflage.

LONG-EARED OWL POPULATION DATA

Long-eared Owl Nests from Missoula Study Areas, 1987 - present

It is estimated that Long-eared Owls are declining faster than any other North American owl species. While this graph illustrates the highs and lows typical of open country species, a slight downward trend can be seen. The decline of the Missoula population is not as drastic as in some other areas of the country, or even other areas in Montana, yet we are working to understand the causes behind these declines.



2019 Snowy Owl Breeding Season

ORI's Snowy Owl study site is a 100-square-mile area in, and around, the town of Utqiaġvik, Alaska. Located more than 300 miles above the Arctic Circle, it is the northern-most point in the United States, the only region in the U.S. where Snowy Owls breed and raise young. Over the span of our 28-year study here, we've recorded years that produced over 50 nests, and years when the owls do not nest at all. And while dramatic highs and lows are a natural part of Snowy Owl breeding biology, overall our trend line is downward for both the owls and lemmings. See graph below.

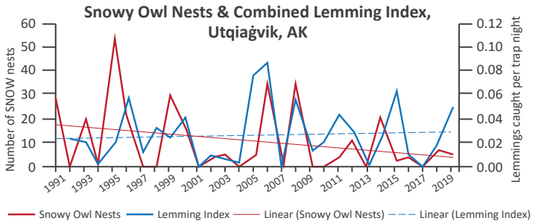
Comparatively, the 2019 breeding season was on the low end of nesting occurrence; although, those nests we monitored saw strong fledge rates. In total, we monitored five nests. One, with seven eggs, failed during incubation when the male died for unknown reasons. Fortunately, the other four nests were successful with each producing four to five fledglings. All these chicks were banded at the nest and, as with all owl species we band, their individual information is registered with the U.S.G.S. Bird Banding Lab in Maryland.

We made strides on our climate change analysis with initial results not revealing correlations between June temperature and the downward population trend of Snowy Owls and lemmings. We now look to understand the impacts to lemmings from snow quantity and quality. This statistical analysis is in partnership with the Max Planck Institute for Ornithology in Seewiesen, Germany.

ORI's Snowy Owl Project is the longest running study of its kind in North America, and perhaps the world, and represents the definitive record of Snowy Owl breeding population trends for this region. Each year we locate and monitor nests from incubation to fledging – documenting growth and development, behavior, success rates, and seasonal trends. We also conduct three lemming trapping sessions over the course of a season - one of the most extensive of its kind in the U.S. Worldwide interest in lemmings continues to grow as their role in Arctic health is better understood. This year, numbers were low to moderate. We recorded an up-tick at one site, although this has not proven to be a reliable indicator of how lemming numbers will follow in spring.

All of this work - the data that is generated and the insights which are gained - helps create the very foundation of Arctic conservation. From our research, efforts to protect Snowy Owls find focus and earn legitimacy - we learn how to best impact their future.

Our data does not support the theory of lemming cycles: the interval between peaks is highly variable and the amplitude and density are never the same from year to year. Nonetheless, our data documents the relationship between Snowy Owls and lemmings.



SNOWY OWL

A large, white owl with bright yellow eyes, dark beak, and thickly feathered feet.

Other names: Ukpik (Inupiaq), Snow Owl, White Owl, Ookpik

Closest relative: Great Horned Owl

Class: Aves
Order: Strigiformes
Family: Strigidae
Genus: *Bubo*
Species: *scandiacus*

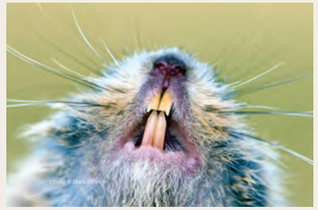
Height:
males: 55-64 cm (21-23 in)
females: 60-75 cm (22-26 in)
Weight:
males: average 1635g (3-4 lbs)
females: average 2109g (4-5 lbs)
Wingspan, both: 125-150 cm (49-59 in)

Feeds on: mostly lemmings, voles, other rodents; often birds, sometimes rabbits, other small mammals

North American population: <30,000 +/-
Estimated 64% decline since 1970
Partners in Flight

© Mark Wilson

MASTER OF CEREMONIES - THE BROWN LEMMING



© Mark Wilson

It all begins with lemmings. When lemmings are abundant, the entire tundra comes alive. For Snowy Owls, this food source represents 90% of their breeding season diet (based on our analysis of 43,000 prey items from pellets). Yet lemming populations fluctuate widely from season to season and, as a result, so do Snowy Owl nesting rates. Snowy Owls are so dependant on this food source that in low lemming years, the owls may move on, or not nest at all. What drives these highs and lows? According to ORI's Denver Holt, "we look at various things, one at a time, but none of them give us a clear answer. So it has to be a combination of factors. But in every case, the success of Snowy Owls is directly related to lemmings. What's interesting is how quickly the owls can assess lemming numbers and respond. They just don't miss."

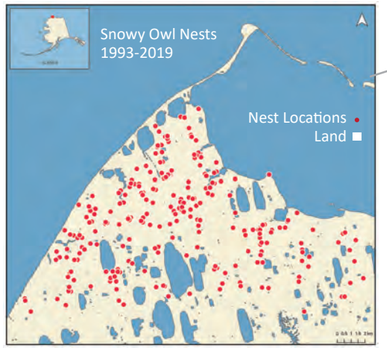
FACTS ABOUT *BUBO SCANDIACUS*

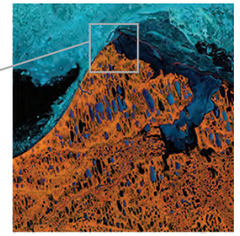
- Circumpolar range: summer in Arctic, often spend winter in southern Canada, northern U.S., and similar latitudes around the world.
- Habitat: tundra, meadows, marshes, dunes.
- Mostly silent, but a wide variety of calls heard around breeding sites Males: loud, booming "hoo, hooo"; Females: whistle, mew, or scream.
- Only adult males, 3+ years, have all white plumage (or nearly so); females retain dark markings throughout their lives.
- Nest on the ground, atop low mounds or other promotories.
- Lays 3-10 round, white eggs, laid asynchronously one every 2-3 days; incubation period: 31-33 days.
- Nests can have chicks that are two weeks apart in age.
- Chicks depart the nest at three weeks and spend about a month toddling around the tundra until fledging.
- Males often aggressively defend the nest.
- Mostly diurnal, but will hunt any time of day in the constant daylight of Arctic summer.

Mapping Nest Distribution

This past year, ORI partnered with Henry Mros III, a Network Design Engineer for 5G wireless systems and Geographic Information System (GIS) analyst for Science and Conservation. His GIS expertise includes remote sensing and processing hyperspectral satellite imagery to gather information about the earth's surface. From there he creates maps.

Henry developed a map that pinpoints all 279 Snowy Owl nests ORI has monitored over the project's 28 years. He used Landsat mission's imagery to create the maps, and spatial statistics to analyze and infer data. Henry's maps and input helps us determine if certain areas in Barrow are important for nesting, as well as nearest neighbor (i.e. another nest) distance estimates.





Left, completed nest map. Above, the satellite image from which Henry's mapping process begins. The corresponding area of the nest map is inside the box.

Snowy Owl Live Cam

Live streaming from the Arctic tundra is difficult, but in early June crews from explore.org met us in Utqiagvik and, with help from Ukpeagvik Inupiat Corp. (UIC), made it a reality. The tundra was still snow covered when the female settled on her nest and it just got better from there. Watch for the next Snowy Owl live cam in June 2020!

Quin's Snowy Owl Birthday Wish

Quin McCormick is not your average 8-year old. This year for his birthday he wanted to help Snowy Owls (Harry Potter may have had something to do with this!). So he and his mom, Alicia, started researching and found ORI. They created a Mighty Cause fundraising page and - in lieu of birthday gifts - Quin asked that donations be made to ORI. Thanks to his birthday wish for Snowy Owls, Quin raised $1,500 for research and conservation. Quin, we think you're awesome!

STEM Series Children's Book Coming Soon!

Houghton Mifflin Harcourt has published a long line-up of children's books in a series called Scientists in the Field. While the series has profiled researchers in many disciplines and various field settings, the series will now focus on a well known owl researcher, Denver Holt.

Wildlife photojournalist and author Mark Wilson spent five weeks this past summer on Alaska's North Slope shadowing and interviewing Denver Holt and his research assistant Liberty DeGrandpre as they went about the daily work of studying Snowy Owls. The results of their efforts will appear in *Studying Ukpik: The Snowy Owl Scientist* (this is the current working title which may change), a hardcover book to be published in 2020.

Though this past summer on the tundra was extremely wet and at times very windy, four nests in Denver's 100 square mile study area fledged multiple Snowy Owl chicks. Mark's book will bring you into the workday of Denver as he slogs on foot and ATV across miles of soggy tundra to count lemmings, monitor Snowy Owl families, and keep human disturbances to nesting owls to a minimum.

Together, Denver and Mark bring you a close and intimate look at the Snowy Owl's nest life, fleet-footed brown lemmings, curious caribou, owl harassing Pomarine jaegers, beach prowling polar bears, skittish Steller's Eiders and always hungry arctic fox pups - and how they all interact in one short summer of intense breeding, feeding and fledging.

Come and explore this far northwest corner of North America where the summer sun doesn't set, the wind always blows, the rain often falls, the Snowy Owls are well fed and the lemmings are nervous. Very nervous. - *Mark Wilson*

Top: a male Snowy Owl delivers a lemming to a female at the nest, illustrating sexual color dimorphism. This pair hatched five eggs and fledged four chicks. The youngest chick did not develop properly and did not survive. We observed this female nest-bound for a period of several days during incubation. Her inability to fly was most likely the result of a heavy molt. Left: Denver Holt and Sergio Vargas take spectral reflectance measurements on a deceased male Snowy Owl in the lab of the National Science Foundation/UIC Science Center in Utqiaġvik.

Why are Snowy Owls White?

It seems like a simple answer. Snowy Owls occur in the Arctic and have evolved the color white to match the snow covered environment in which most of their life occurs. The next question however, is more complicated. Why are adult male Snowy Owls almost pure or fluorescent white, and females a white base color with mottled brown bars and spots? Since my early research began on breeding Snowy Owls in 1992, I have explored this question. Does this sexual color dimorphism have some function?

No other species of owl in the world has such distinct plumage difference between adult males and females. My hypotheses for these differences originates in social function, and my leading conclusion is that they play a role in sexual selection. This idea stems from our data which shows that female Snowy Owls only breed with almost pure white males - coloration which takes at least three years to develop. Younger males, who resemble females in plumage, have brown, spotted and barred marking on their feathers, and do not breed. This bright white coloration could also have functions in social signaling such as male-male competition or territory boundaries.

This year an adult breeding male was found dead at a nest. No injuries were noted and cause of death unknown. This gave us an opportunity to examine the plumage for spectral reflectance. We worked with colleagues Sergio Vargas from University Texas El Paso, and Karl Huemmrich, from NASA, who have specific expertise in this field, and the equipment which measures spectral reflectance.

We used a Spectral Vista Corporation (SVC) HR-1024i spectrometer and score the owls' plumage in laboratory and natural light conditions. We scored several regions of the body, including; face, chest, shoulders, belly, legs, back, and so on. We made over 30 scores.

In short, our results indicate this male Snowy Owl showed variation in spectral reflectance for different areas of the body. For example, the face, upper chest, and shoulder had the highest reflectance scores. The results showed that the Snowy Owls feathers were low in the UVA range, but very high reflectance in ambient light, making them almost as bright - 80% as bright - as fresh snow.

I believe the bright whiteness of these body parts function in social signaling for a variety of reasons including to advertise their relative age and social status to both other males and females; and to advertise genotypic quality to females. - *Denver Holt*

NORTHERN PYGMY OWL

A very tiny owl with short wings and long tail; yellow eyes, yellowish beak, dark, white-ringed “false eyes” on back of head. Females tend to be slightly darker than males.

Other names: Mountain Pygmy Owl, California Pygmy Owl
Closest relative: Cape Pygmy Owl

Class: Aves
Order: Strigiformes
Family: Strigidae
Genus: *Glaucidium*
Species: *gnoma*

Height, both: 16-18 cm (6.3-7.1 in)
Weight, males: 62g (2.2 oz)
females: 72g (2.5 oz)
Wingspan, both: 38cm (15 in)

Feeds on: varied diet inclucing small to medium sized birds, such as waxwings and chickadees; small mammals, such as mice and voles; shrews; sometimes insects, such as beetles and moths; occasionally small reptiles and amphibians

North American Population:
140,000 +/- Estimated 2% decline since 1970.
Partners in Flight

© Daniel J. Cox
NaturalExposures

Snag Conservation & Obligate Cavity Nesters

Thanks to the persistent efforts of Steve Hiro, we were afforded the opportunity to monitor a Northern Pygmy Owl nest again this breeding season, from incubation to fledge. The natural cavity nest was located about 9 feet off the ground in a small larch tree with multiple cavities. The nest held six eggs, five of which hatched. As with our research on all cavity nesting owls, the use of a long-handled boroscope allows us to routinely monitor inside the cavity with minimal disruption to the owls. From here, we can document all stages of nesting: incubation, hatching, growth, development, and fledging. All five chicks fledged the same day, flying directly from the cavity, reconfirming our premise for synchronous hatching and development in Northern Pygmy Owls.

Over the past 30 years, we have documented natural nest sites for five species of small cavity nesting owls: Northern Pygmy, Northern Saw-whet, Boreal, Western Screech, and Flammulated owls. We have found over 100 natural nest sites for these species - some of the largest sample sizes for North America. Our data indicate that several of these species have unique and specific nest site needs, demonstrating the importance, not only of snag retention, but of retaining a diversity of snags and cavities in forest management. If we only conduct studies at nest boxes, we overlook natural nest tree characteristics that are essential to our understanding of these obligate cavity nesting owls. Our nest tree data helps provide information necessary to manage for these critical elements of their breeding biology - to help plan for their future success. Additionally, small cavity nesting owls serve as important indicators of healthy forests and adequate snag density, and diversity, for all wildlife species who are ecologically dependent on them. See figure on opposite page.

Photos © Melissa Groo

Main photo at left: a female N. Pygmy Owl peers out from her natural cavity nest. Above left: Matt Larson climbs a ladder and - with the help of a boroscope mounted to a long handle - projects the image inside the nest to a screen below. Middle: Boroscopes allow for minimally invasive checks to incubation, growth, and development. Right: Steve Hiro examines the tiny flight feathers of a Northern Pygmy Owl for wear and age. Photo below: while Steve focuses most of his energy on Pygmy Owls, he finds time for all our projects - here, scoping for Snowy Owls on the tundra, 2019.

FACTS ABOUT *GLAUCIDIUM GNOMA*

- Range: western North America, from southeastern Alaska and British Columbia south to California, Arizona, and northern Mexico.
- Habitat is mostly coniferous and deciduous forest edges.
- Primary song is a series of evenly spaced high pitched “toots”, but a variety of trills, twitters, and chirps can be heard, especially by nest.
- Known to take prey more than twice their size.
- Cavity nester; nests in small holes made by woodpeckers or decay; will occasionally use nest boxes where the female lays 5-7 eggs.
- Lacks asymmetrical ear openings & facial disks of nocturnal species.
- Diurnal - hunts during day but also during crepuscular period. Primarily a perch and pounce hunter, also known to raid bird nest.
- Safer in nest cavities than some other owls because the small diameter of entrances keep predators out.
- Have feathered “eye spots” on the back of their heads. Researchers believe these spots confuse both predators and songbirds that might mob them.
- Incubate and hatch eggs synchronously - very unusual among owls. Chicks fledge - or fly - directly from the nest nearly synchronously.

MORE THAN A VOLUNTEER - STEVE HIRO

We first met Steve through our Day-in-the-Field program. In 1995, ORI donated this experience to a local fundraiser and Steve was the winning bidder. He booked his trip. And it turned out he really liked owls. And the crew. And the process of field research. As a busy heart surgeon, tracking owls all over the countryside offered a welcome change from the sterile life of the operating room. From that first day in the field, Steve’s involvement with ORI just grew and grew.
Now, a quarter of a century later, Steve is an integral part of our team. Retiring from medicine simply opened the door for a second career in owl research. His early interest in N. Pygmy Owls led him to focus his energies here: tracking, observing, and recording the behavior of these unique owls. Every year he logs in hundreds of hours searching forests for Pygmy nests, now leading the project. Today, Steve is one of the foremost experts in the U.S. on the breeding biology of this elusive little species.

GREAT GRAY OWL

A large owl with a big, round head; grayish-brown with darker mottling and barring; face is light gray with several dark rings on the facial disks; bright yellow eyes and beak

Other names: Dark Wood Owl, Lapland Owl

Closest relative:
Ural Owl, Barred Owl

Class: Aves
Order: Strigiformes
Family: Strigidae
Genus: *Strix*
Species: *nebulosa*

Height, both:
61-84cm (24-33 in)
Weight, males: 890g (2 lb)
females: 1267g (2.8 lb)
Wingspan, both:
137-153 cm (53.9-60.2 in)

Feeds on: Small mammals such as voles and mice; shrews; rarely birds

North American population estimate:
95,000 +/-
Partners in Flight

Early season prey delivery (pocket gopher) at a nest outside of Bozeman, MT.

Daniel J. Cox
NaturalExposures.com

FACTS ABOUT *STRIX NEBULOSA*

- A northern owl; ranges throughout interior Alaska, Canada, northern U.S. Rockies, a few scattered locations further south.
- Relies on dense boreal and coniferous forests, often adjoining open areas like bogs, muskegs, or meadows.
- Nests in broken tops of snags, abandoned nests of raptors or other large birds, or artificial nest platforms.
- Female lays 3-5 eggs, depending on availability of food, which hatch asynchronously; incubation is 28 - 36 days.
- Has deep, booming hoots; during breeding males give a series of evenly spaced, low pitched "hoos;" Female's voice is higher pitched.
- Usually hunts from a perch where it listens and watches for prey.
- Will dive through deep snow crusts or dirt to catch prey.
- Despite its massive wingspan, it flies silently through the forest thanks to velvety feathers and fringed edges to absorb wind sound.
- Tallest North American owl, but not the heaviest; they are generally outweighed by Great Horned and Snowy owls.

A Tough Winter for Owls

Owl species who live in northern climates have adapted to withstand cold and hunt in snow. This past year in western Montana, however – a late winter with deep snowpack and prolonged cold – tested the limits of some. So what are the impacts of a hard winter to owls? Well, that depends on the species.

In general, owls are more impacted by the deep snow than the cold, and larger owls are more resilient than smaller owls. For example, Snowy Owls wintering in Montana are well-adapted to the cold and can maintain normal body function down to -40° F. They are also very capable predators. Although they show a preference for small rodents, they will eat a variety of prey, including larger birds and mammals when deep snow makes hunting small mammals more difficult.

The same is true of Great Horned and Great Gray owls. Their large size and insulative, downy feathers combat the cold, and both are known to be able to detect and capture prey through the snow. However, even the most resilient of species can be affected. Throughout the winter, but especially late in the season, we received many reports of dead owls. Some were found without obvious injury and starvation was the likely culprit, while others were hit by cars. The deep snow drove the owls to 'road-hunt' where the snow was not such a barrier.

The small to medium-sized owls, however, are most impacted. Long-eared and Northern Saw-whet owls were seen hunting during the day near houses, perhaps an indication that they were hungry and desperately trying to make a meal out of small birds or mammals attracted to bird feeders. Barn Owls, Northern Saw-whet Owls, Long-eared Owls, and Short-eared Owls all had a hard time of it.

But who do you suppose often tolerates these conditions just fine? Rodents! Beneath the protection and insulation of snow – in what's known as the subnivean zone – food supplies are right underfoot, the air remains a consistently warmer temperature, and the snow affords a barrier of protection against predators like owls.

Unfortunately, the spring of 2019 that followed did not see the strong small mammal numbers we were hoping for, and breeding season numbers were low for several species (we are not currently trapping small mammals in our Montana study sites).

Above: a Great Gray hunts a snow field. Right: a female Great Gray eats an eggshell after one of her four chicks hatched. This moment was captured on our first Great Gray live-cam where a pair raised four chicks, three of which fledged. Infrared technology allows the cam to stream, even in total darkness, with no disruption to the birds. Table right: our explore.org live-cams garnered 6,561,297 total views in 2019. Now that's reaching a wide audience!

Great Gray Owl Behavior Analysis

It was a low breeding year for Great Gray Owls in our study areas. In fact, our observations suggest that several pairs did not breed at all. And while there was encouraging behavior seen at several nests early in the season, along with reports of nesting in other areas, we did not record any fledglings in 2019.

As part of our Great Gray research, we're currently in the process of analyzing over 1,000 hours of footage from incubation through fledging taken from our two live-cam nest sites. Especially helpful is the catalog of video created by the dedicated viewers who expertly document events at the nests. This documentation, along with the close-up views enabled from the cameras, allows us to break-down nesting behaviors with remarkable detail for the first time. This includes frequency of prey deliveries, vocalization usage, nest maintenance, preening, feeding the young, nestling interactions, fledging timing, sleep, and more.

A few interesting things noted so far: the female can go up to 14 hours without a prey delivery; the female generally leaves the nest two times per 24 hours for a few minutes; the male calls to female before delivering food; and the pair utilizes a series of calls at each prey delivery using up to 6 different vocalizations.

As with all our live-cams, we hope they increase the public's scientific knowledge about owls and inspire conservation-interest. While our Great Gray cam-partnership with explore.org provides endless hours of enjoyment, its benefits to research are many.

CAM ANALYTICS

SPECIES CAM	PAGE VIEWS	YOUTUBE VIEWS
Osprey	2,521,140	970,829
Snowy Owl	744,915	272,192
Long-eared Owl	699,060	319,617
Great Gray Owl EF	275,567	140,282
Great Gray Owl JP	153,553	93,173
Great Horned Owl	247,604	123,365
TOTALS	4,641,839	1,919,458

Top: Beth and volunteer Adam Potts take wing measurements. Middle: nest box with cached prey. Bottom: female Saw-whet found in nest box.

Northern Saw-whet Owl Migration

Northern Saw-whet Owls are known to be highly migratory with numbers that fluctuate widely from year to year and place to place. Whether these fluctuations are irruptive migrations in response to prey densities is currently unknown, but banding efforts across the country, like ours, help understand patterns in movement, identify important habitats, and map migration routes.

It was a comparatively high year for Saw-Whet Owl migration in the western United States and at our banding station near the confluence of the Bitterroot and Clark Fork Rivers in Missoula. We banded 158 Saw-whet Owls and one Barred Owl in 22 nights of trapping – averaging 2 owls/hour. Our highest numbers were in 2011, when we banded 518 owls between two sites. Our low was 2018 when we banded fewer than 50 owls. In the project's ten years, we've banded over 1,500 Northern Saw-whet Owls during migration. Most captures (around 80%) are birds that hatched the previous spring; however, a few individuals are in their second year of life and beyond. Further, most captures are female. This may be because the females are more attracted to the male territorial hoots we use as a lure, or it may indicate that females are more migratory than males.

This year, a young bird we banded on September 24 was recaptured 17 days later on October 11 at Lucky Peak, Idaho, the Intermountain Bird Observatory's research station. This female owl was just a few months old and flew a distance of 240 miles in about two weeks, or 14 miles a day. Back in 2012, another Saw-whet Owl we banded made the same journey in 11 days. We also re-captured a second-year female on October 15, which was 18 days after we banded it in the same location on September 27, indicating this bird may be a resident or wintering resident. While recaptures are rare, we have had banded birds encountered as far as N. California, and recaptured birds from Alberta and Saskatchewan.

Saw-whet Owl Breeding Season

June finds us hiking in high elevation forests during our annual search for nesting Boreal Owls. While no Boreal nests were located this year - likely the result of deep snow at their nesting elevation - finding an incubating Saw-whet in one of our nest boxes was an interesting surprise. In 28 years, this is the latest Saw-whet nest we have ever recorded with the first of five chicks hatching on July 16th. Whether this nest is a second clutch after a failed first attempt, or simply a late season nest in response to weather conditions, is unknown.

Since 1981, we've located over 57 natural nest-sites and a handful of nests in nest boxes, the largest sample of natural nest sites in North America. Our study has documented nests from elevations of 3-7,000' and occur in all forest types we survey. Our cavity nest data is part of our snag conservation efforts for Saw-whet Owls, see p. 13 for table.

NORTHERN SAW-WHET OWL

A small reddish-brown owl with a large, round head, yellow eyes, black beak, and feathered feet.

Other names: Saw-whet Owl, Queen Charlotte Owl

Closest relative: Boreal Owl

Class: Aves
Order: Strigiformes
Family: Strigidae
Genus: *Aegolius*
Species: *acadicus*

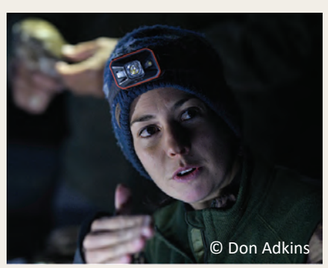
Height, both: 17-21cm (6.7-8.3 in)
Weight, males: 75g (2.6 oz)
females: 100g (3.5 oz)
Wingspan, both: 46-56cm (18.1-22 in)

Feeds on: mostly deer mice; commonly voles; sometimes small birds and insects

N. American Population: 2,000,000 +/- Estimated 200% increase since 1970. Partners in Flight

A Northern Saw-whet at ORI banding station this fall. © Don Adkins

ORI WELCOMES BETH MENDELSOHN


© Don Adkins

The ORI welcomes Beth Mendelsohn to our research staff! Beth has a long history of working with birds of prey. She has worked with the Teton Science Center in Wyoming, Raptor View Research Institute in Montana, and has helped out on several of ORI's projects throughout the years. Beth recently received her Master's Degree from the University of Wyoming studying population genetics of Great Gray Owls. In addition, she assisted in the field with the Teton Science Center's Great Gray Owl research project.

Beth came aboard this summer and got right to work analyzing behavior from our Great Gray cams. Additionally, she managed the 2019 Saw-whet banding station - coordinating volunteers and working into the wee hours. Now, she will be assisting with current projects and establishing her own research. Welcome Beth - we are happy to have your energy and expertise on board! Left: Beth explains the banding process at Public Education night.

FACTS ABOUT *AEGOLIUS ACADICUS*

- Inhabits much of North America; from southeast Alaska and Queen Charlotte Islands in the west, to Newfoundland in the east, south to Arizona and North Carolina; mountainous regions in central Mexico.
- Preferred habitat is coniferous forests; sometimes wooded riparian areas, swamps, and bogs; appear to be habitat generalists.
- Heard mostly during breeding season
- Males make a monotonous series of whistles, all on the same pitch, like a truck backing up; or often compared to the back and forth sound made when filing a saw.
- Females voice is softer and less consistent than males.
- Cavity nester; often nests in holes made by woodpeckers; will also use nest boxes. Females lay 4-7 eggs.
- Mostly nocturnal, occasionally diurnal; eats prey in chunks, starting with the head.
- Young Saw-whets have a dark brown head and chest, reddish belly; and a conspicuous Y-shaped white marking above and between eyes.
- Will thaw frozen food through incubation before consuming.
- A highly migratory species; only migrates at night.

A Walk in the Woods with ORI

By Kellen Beck, ORI Volunteer - seen here releasing a Northern Pygmy Owl after data collection & banding

© Melissa Groo

© Jeremy Lurgio

© Jeremy Lurgio

Walking through the woods with Denver Holt means experiencing a different forest than I have ever known. Where most people hear a cacophony of birds, Denver hears each specific species. He often mimics the call under his breath, reminding himself how to call to it in the future, and who it belongs to.

I grew up with a forester for a father, so categorizing trees and being quizzed on their species was how I learned to feel at home among them. I felt closer to them when I could call them by name. Denver knows the whole forest this way, flora and fauna. Each flower is categorized; he knows each by name. Those he doesn't know are immediately looked up in the traveling library of natural history which occupies two seats in his old, white suburban.

Once, mid-sentence and enroute to a study site, he suddenly pulled over, looked at me eyes-a-glint and said, "this is going to be a colorful stop for you." There, within the thick brush to the side of the road, I saw my first Lazuli Bunting and a Bullock's Oriole. He had heard each separate call while we were talking, while driving. I'm not sure what that says about my conversation skills, but it says a great deal about his wealth of knowledge and connection to the natural world.

The first owl I ever caught was with Denver and Matt. It was a humid summer day and we spent an enormous amount of time and effort clearing hawthorn branches to make a clear flight path - a path intended to direct the owls into our mist nets. Neither of them showed any frustration or boredom, despite having done this drill a thousand times before. Both in their element, they laughed, bantered, and explained each step of the process as we methodically combed the area they had already surveyed for Long-eared Owls.

Capturing a flying animal is more trial and error than scientific method. Each owl is unique and requires something different. I once watched Matt catch a Pygmy Owl by putting a live mouse on a stump and hiding behind the tree next to it with a large butterfly net. They've devised some creative methods over the years.

When it comes to catching owls, first, you've got to find them. A task made more difficult by the impeccable camouflage of their feather patterns. Once we located the Long-eared Owl, we split up and flushed it towards the flight path we had cleared. The net I was monitoring caught the first owl. Denver retrieved it, gently untangling it from the veiled net. He emerged from the thicket holding a bewildered and rather angry owl. As he handed it to me, showing me how to weave my fingers through the legs, he said smiling, "Once you hold your first owl, we have you for life." He was entirely correct.

We brought the owl to a clearing where a group of birders were waiting. As Denver gave a lively presentation on this magnificent animal, Matt coolly and quietly took down its information; size, likely sex, relative age, and banded him with a thin metal band marked with this bird's new ID number. Data will be configured and more will be learned about this species, which will help to understand behavior and population. You cannot protect that which you do not understand.

It has been an honor watching this organization in action and learning from them; a gift to see Steve's passion for Pygmy's, Beth's unflappable response to an injured bird, or Liberty's enthusiasm when a donation comes in, knowing that it keeps their work going. The natural world needs stewards like them. People who not only care, but purely enjoy the time they spend doing this work, each moment spent in the company of owls. I cherish each day I spend volunteering with ORI because, in the words of Denver, "not everyone's doing this today."

For years we have recorded the eye color of Long-eared Owls and have documented just two subtle variants: yellow and lemon. We have not, however, found a relationship between eye color and sex, age, health, or anything else. It might simply be variations between individuals, much like us. Right: while yellow eyes are the most common color we see, this Long-eared Owl has lemon eyes. Yellow is deeper like the sun or an old school # 2 pencil.

Owl Eyes

When identifying owls in the field, we listen for songs, calls and, of course, observe physical characteristics. For example, do they have ear-tufts or are they round-headed? What is the bill color? Eye color?

Curious about the frequency of some of these physical traits, in the 1990's Denver began to break them down. Among the currently recognized 268 species of the world's owl species, he assessed for eye color, bill color, and tufted versus round headed owls for each Genus. He derived his categorizations from photographs and descriptions from many field guides, and most recently *Mikkola's Photographic Guide to Owls of the World* (1st & 2nd Eds.). Here are the eye color results for all 268 species:

	Yellow	Brown	Orange	Red	Whitish
268 spp. (% total)	155 (58%)	94 (35%)	17 (6%)	1 (<1%)	1 (<1%)

As you can see, the eyes of owls primarily come in three colors, however, slight variation within each color occurs. Why do some owls have yellow eyes and some orange? We're not sure, yet. Here are some things we do know about owl eyes.

Some species that live in North America have bright yellow eyes, while the same species or cousin in European species have orange eyes. For example, Long-eared Owls (*Asio otus*) in North America have yellow eyes and Long-eared Owls (*Asio otus*) in Europe have orang-ish eyes. All Barn Owls (Genus *Tyto*) have brown eyes; all New World Pygmy owls (*Genus Glaucidium*) have yellow eyes; while members of the Genus Strix in United States have both brown and yellow eyes.

Like humans, owls have front facing eyes which gives them binocular vision – a rare trait among birds. But while humans can look to the side just by shifting our eyes, owls cannot. They must turn their entire head to look left or right. Indeed, each eyeball is locked in one position within bony plates called the sclerotic ring. They can, however, rotate their head about 270° in both directions to more than compensate for eyeball immobility.

Unlike humans, it is believed owls do not see color very well. In fact, the photo-receptor cells in owls' eyes are packed with more rods (which help to see in dim light or night), than cones (what enables color vision during day). As a result, most species probably see very well in the dark. Because light enhances color, and most species hunt in low light levels or at night, what humans see in color looks mostly black and white to owls.

It was once thought that owls were blind during the day, yet diurnal species hunt in broad daylight. Indeed, even the most nocturnal species maneuver through thick vegetation without hitting branches in daylight.

A New Face on the Snowy Owl Project

Liberty DeGrandpre is our dedicated, behind-the-scenes manager of many things at ORI. While most of her workdays are spent at a computer, this year she joined Denver in the Arctic to help with the Snowy Owl and lemming project. Working on the tundra proved to be a steep learning curve. Here are a few of her take-aways from what she describes as "one of the coolest experiences of my life."

- Watch your back. Male Snowy Owls attack silently from behind.
- Always wear a backpack. It's a much needed barrier between you and the talons.
- Look ahead. Pomarine jaegers come at your face.
- It's always colder than you think.
- Trail mix never tastes as good as it does when hiking the tundra.
- Unbelievably, Snowy Owl chicks are even softer than they look.

© Mark Wilson

Liberty ducks under the hit of a male Snowy Owl whose performance scores a perfect 10!

Searching for nests across a 100 sq-mile study site is exhausting, but the rewards of finding one are exhilarating!

In Memory - Corky Vance

Father, husband, doctor, veteran, birder, gardener, golfer, mentor, life-long learner, and so much more, James Corwin Vance, MD, was loved and respected by all who knew him.

At ORI, we had the pleasure of getting to know Corky and his wife, Karen, when they participated in the Victor Emmanuel Nature Tours (VENT) Owl Workshop in the spring of 2019. Avid travelers and naturalists, sadly, this was the last of many exploratory trips they took together. Upon meeting Corky, it was hard to imagine that he was in the advanced stages of pancreatic cancer. He readily absorbed owl facts (though knew most of them already) and was anxious to check another species off his life-list. He was sharp, present, warm, and energetic. Corky notoriously dove head first into all of his life's passions; we got to experience him living this way until the end.

Not long after the workshop we received an email from Karen. Our hearts sank knowing the news it would bring. We were so sad, but deeply honored, when she told us that she and their children were naming ORI for memorial donations. In addition to his interest in owls, Corky has deep roots in the state of Montana and it remained a very special place for him. What followed Karen's email was incredible - over 100 donations came pouring in from around the country, all in honor of a man who meant so much to so many. Donations and notes from patients, friends, family, colleagues – even a few who didn't know Corky personally but were moved to give in his name when they read about his life and impacts.

Thanks to the generosity of the Vance Family - and an incredible testament to the man Corky was - over $15,000 was raised for owl research, education, and conservation. At the ORI, we are deeply honored to continue his memory and legacy in our year-round work for owls.

A very special thanks to Karen, Chardonnay, Karl, and everyone who contributed.

Photo courtesy of the Vance Family: Karen and Corky in the Serengeti, November 2016 with VENT, during his remission.

Education

Although the ORI is primarily focused on research, our commitment to education runs deep. Every year we host a number of experiential learning opportunities for a wide variety of people from kindergarten classrooms to senior citizen groups, and more. We are dedicated to disseminating our research through scientific journals, but the value of presenting our findings to the public cannot be overstated. It is a main tenet of our mission.

Right: Debbie Rathbun from Montana Wild Wings Raptor Recovery with a Short-eared Owl they rehabbed, we banded, and it was happily released near ORI's field station.

Below: Public Education Night at our Northern Saw-whet banding station invites the public to observe research in action and owls up-close. This September's event was a chilly affair, although 30 interested owl lovers came out and watched as we banded these tiny, highly nocturnal owls.

CLASSES, WORKSHOPS, AND LECTURES

This year we presented at: the Vermont Institute of Natural Science (VINS), Mission Valley Back Country Horseman, Glacier Institute, Barrow Arctic Research Center (BARC) Science Fair, Space Coast Birding Festival, Mission Mountain Audubon Society, Hot Springs Elementary, Clark Fork School, Garden City Montessori, Antonia Crater Elementary, Montana Chapter of the Wildlife Society, Grizzly Peak Independent Living, Montana Natural History Center, Florida Birding & Nature Festival, Couer D'Alene Audubon, Public Education Night at banding station, Sussex School, REI, Draught Works Brewery, National Wildlife Federation.

Photo: Victor Emanuel Nature Tours (VENT) 2019 Owl Workshop participants. See ventbird.com or wildplanetnaturetours.com for 2020 dates.

Conservation

Ultimately, conservation is about land preservation and stewardship. To reach these goals, communication with agencies, as well as the public, is essential. Our partnership with the groups listed below exemplifies our commitment to work collaboratively. Our information is available to groups wherever we work, and to interested parties throughout the world. Agency and institution parters listed on back cover, others include:

PRIVATE LAND OWNERS

A special thanks for allowing our research and education programs to be conducted on your lands. Without permission from these land owners, much of our research could not be conducted. We are especially grateful to Charlie and Nancy Deschamps, Fred Deschamps, Jim Rogers, Montana Academy, and Susan Rivers and family for allowing us to conduct research and/or set cameras on their land.

CONSERVATION PHOTOGRAPHERS

We are grateful to the talented and generous photographers who share their work with us. Their powerful and moving images help us generate interest in owls, our work, and habitat conservation. In 2019 we are extending a special thanks to Daniel J. Cox, Don Adkins, Kurt Lindsay, Ly Dang, Mel Geer, and Melissa Groo. Special recognition to Mark Wilson who spent hundreds of hours on the tundra photographing and helping.

VOLUNTEERS

Volunteers are an integral part of the ORI and contribute thousands of hours to our programs. We are enormously grateful for their support, and could not achieve our goals without them. This year, volunteers include: Romney Dodd (top left, Snowy Owl Project), Adam Potts, Kellen Beck, Hannah Beyl (middle left, Saw-whet Owl migration, w/Barred Owl), and Kaitlyn Okrusch.

A DAY IN THE FIELD

Our Day in the Field is an experience we donate to schools, community groups, and charitable fundraisers. These groups receive the donation and we provide their donors with a day in an outdoor classroom, learning about research, owls, natural history, and wildlife conservation. 2019 recipients include: Clark Fork School, Flathead Land Trust, MT Natural History Center, Ninepipes Museum of Early MT History, FL Wildlife Hospital & Sanctuary. Left: learning about Snowy Owl nesting: Dr. Vanessa Lougheed and son Angus.

ADVISORY

Denver Holt is acting in an advisory role for the BBC's upcoming sequel of *Frozen Planet* planned for 2020. He is also assisting in a study to understand the effects of wind farms on owls.

In Memory - Nan Harris

During my teenage days in Massachusetts, two women influenced my career choice more than any other people. Nancy Claflin and Nan Harris. The Nancy Claflin story has been told and published. Nancy and Nan were neighbors, friends, and bird watchers. I was a high school teenager when I was introduced to them. I saw Nan now and then; she kept apprised of my interest in nature and raptors.

On the advice of these two women, I established the ORI when I was 30. I knew nothing about running a non-profit, but knew I wanted to be a field researcher. Shortly after Nancy's passing, Nan would say, 'well, I guess I've inherited Denver'. She took me under her wing, coached, advised, and befriended me.

Although I was in Montana much of the time, Nan occasionally came out birding, and I would visit her whenever I was home. There was never a time she didn't great me with an enormous smile, and questions of genuine interest. First, how was life? Then, how's the ORI? How's your research going? In fact, Nan read my papers published in peer reviewed journals. She asked about my methods, results, and my interpretation of the results. If she questioned my approach, she did it in a gentle, intellectual manner. She encouraged me to read more and not to dismiss historical research - to think about various methods of avian research and remain objective to all approaches. She even attended a few of my lectures.

Nan was an ardent supporter of me personally, but also a financial supporter of the ORI. She seemed to marvel that the Institute was able to remain field-based and stay connected to nature.

Also gratifying, was that her husband Bill, a noted hip surgeon, researcher and inventor, as well as Nan's entire family, also took an interest in my career. They all became my friends.

Dedicated philanthropists, Nan and Bill supported many important causes. But with me, they took a personal interest – a chance, if you will. I am forever indebted to Nan for helping a young man realize his dreams. And because of Nan and Nancy, the ORI has become the most active field-based owl research group in the world. - *Denver Holt*

Owl Research INSTITUTE

Wildlife conservation through research and education since 1988

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Follow us on **Facebook** and **Instagram** for the very latest ORI news and happenings!

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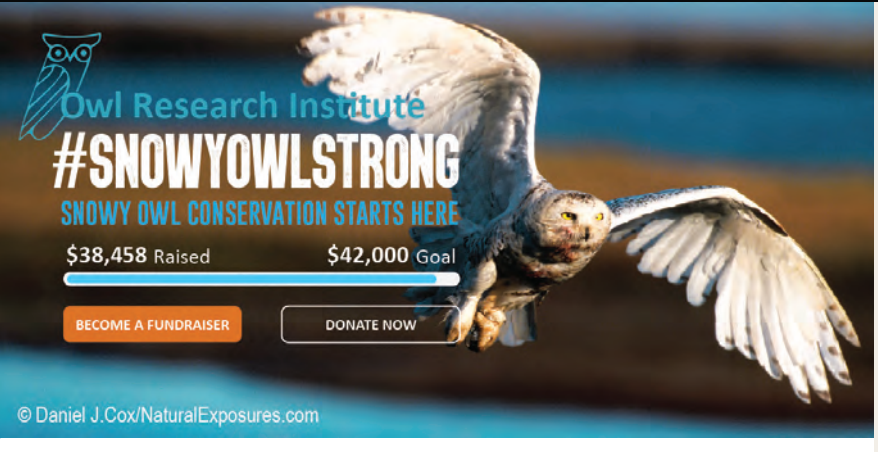
ORI is funded by individual donations, grants from foundations, and occasionally corporations and agency contracts. Please consider us in your estate planning. Donations are tax-deductible to the extent of the law.
Donate on-line at: www.owlresearchinstitute.org. Thank you for your support!



Look What You Made Possible!

As an important voice in Snowy Owl and Arctic conservation, in 2019 we created the first ever Snowy Owl Week to celebrate, educate, and raise awareness around the challenges faced by Snowy Owls. In tandem, we launched our first crowdfunding event: Snowy Owl Strong. Taking place across social media and on the ground, what an incredible success it was! Nearly $40,000 in donations funded the 2019 Snowy Owl research season and allowed us to purchase much needed equipment and supplies. We are so grateful to the generosity of everyone who contributed. THANK YOU!! Watch for Snowy Owl Week the first week of May 2020.

Learn more about the Snowy Owl Project by watching the video on our homepage. A huge thanks to Daniel J. Cox for creating it!

PARTNERS IN CONSERVATION

MONTANA
Confederated Salish & Kootenai Tribes, Flathead Indian Reservation
Five Valley's Audubon
Flathead Lake Biological Station
Glacier Institute
Mission Valley Audubon
Montana Fish, Wildlife and Parks
Montana Natural History Center
Montana Raptor Conservation Center
Montana Wild Wings Recovery Center
National Bison Range Complex
Natural Exposures Photography
Ninepipes Lodge & Great Gray Gifts
Ninepipes Museum of Early Montana History
Polar Bears International
Raptor View Research Institute
Sacajawea Audubon
U.S. Fish and Wildlife Service
U.S. Forest Service: Beaverhead, Bitterroot, Lolo National Forests
Wild Planet Nature Tours
Wild Skies Raptor Center

A big raptor style thanks to our community of Osprey cam viewers for their interest and support!

ALASKA
Alaska Department of Fish and Game
North Slope Borough, Dept of Wildlife
UIC Science and Logistics
Ukpeagvik Inupiat Corporation (UIC)
U.S. Fish and Wildlife Service

OTHER WORKING PARTNERS
Explore.org
Int'l Snowy Owl Working Group (ISOWG)
Henry Mros III
Max Plank Institute of Ornithology
Nat'l Aeronautics & Space Admin (NASA)
Project WAfLS Working Group
University of New Hampshire
University of Texas El Paso
Victor Emanuel Nature Tours (VENT)

A special thanks goes out to Jacob - Nanuq - Calderwood for subletting his Utqiagivk apartment to us! He helps make our Snowy Owl research possible with affordable housing.

Front cover: Northern Hawk Owl with vole, western Montana.
© Kurt Lindsay

"The importance of this work cannot be overstated. Without the support for scientific research, our understanding of the threats to Snowy Owls, and what is needed to protect them, would be impossible. ORI's efforts make a substantial contribution not just to the sustainability of the Snowy Owl, but quite literally to the sustainability of all life on Earth." *Krista Wright, Executive Director, Polar Bears International*