

A male snowy owl carries a brown lemming to his nest, where one of his chicks will eagerly consume it.



THE SNOWY OWL SCIENTIST

**TEXT AND PHOTOS BY
MARK WILSON**

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**For my parents, Faith and Frank, who
instilled in me a love for wild places and
the plants and animals who live there**

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First Edition



This young snowy owl will soon migrate southward, perhaps reaching Washington State or Montana, where she will overwinter.



Polar bear



Caribou



Arctic fox



Brown lemming



Snowy owl, male



Snowy owl chick



Collared lemming



Short-eared owl



Rough-legged hawk



Musk ox



Pomarine jaeger



Parasitic jaeger



Long-tailed duck



Spectacled eider and young



Arctic tern



Pacific loon



Sabine's gull



Tundra swan



Peregrine falcon



Rock ptarmigan



Western sandpiper



Semipalmated sandpiper



Red phalarope



Red-necked phalarope



Snow bunting



Midges on arctic poppy



Lapland longspur



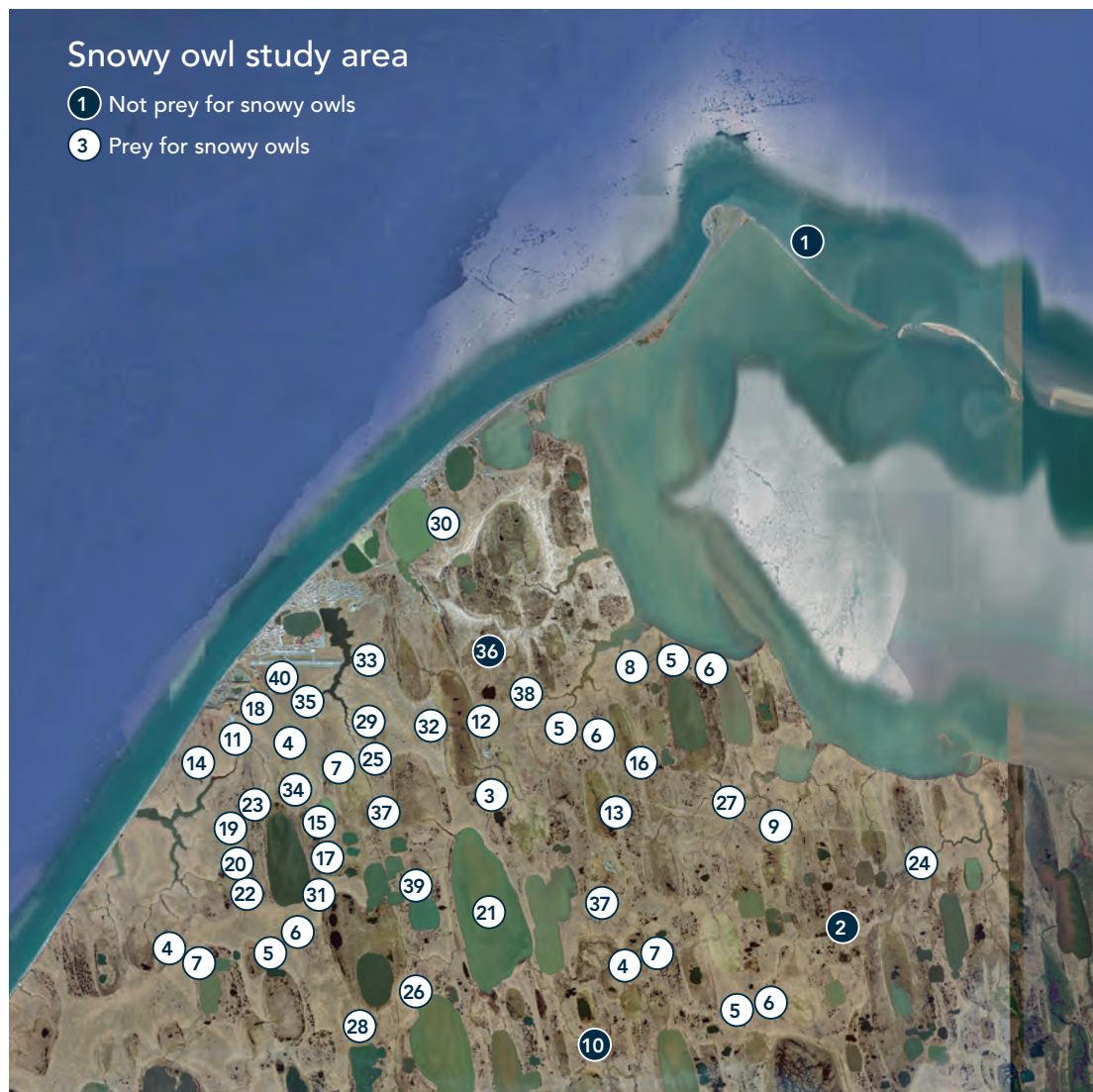
Long-billed dowitcher



Dunlin



Buff-breasted sandpiper



Long-tailed jaeger



Glaucous gull



King eider



Steller's eider



Yellow-billed loon with chicks



Red-throated loon



Pectoral sandpiper chick



Sandhill crane chick



American golden plover



Semipalmated plover



Denver Holt,
dressed warmly for
driving an ATV into a far
corner of his study area
in the Arctic.

→ A pomarine jaeger calls a shrill warning to humans walking through its nesting territory.



↑ Snowy owl researcher Denver Holt gets buzzed by a defensive pomarine jaeger.



A male snowy owl
barks warnings to us as
we approach the nest.



A newly hatched snowy owl chick rests its head on eggs in the nest. Note that the egg closest to the camera has a small web of cracks in it—evidence that a chick inside the egg is working to smash its way out.

Because their nesting territories abutted, this male snowy owl often tangled with a defensive male pomarine jaeger. Each bird views the other as a potential predator of their eggs and chicks. Additionally, both birds potentially compete for the same lemmings, an important staple in their summer diet.



The Utqiagvik community comes together in late June, celebrating the end of the spring whaling season with a traditional blanket toss. Using a blanket made from walrus hide, the toss originally was used to loft a hunter so he could spot game on the distant horizon.



→ Carved from walrus tusk ivory, this snowy owl was recovered from an Inupiat grave that archaeologists raced to save from eroding ocean surf. It's between four hundred and six hundred years old.



A male snowy owl checks out researchers traversing his nesting territory.

↓ Utqiagvik sits like an island, the northernmost town in the United States.





↑ A male long-billed dowitcher flies over tundra where his chicks are hiding. Snowy owls prey on shorebirds, particularly their downy chicks.



↑ An adult American golden plover is a strikingly beautiful shorebird that nests on the dry tundra around Utqiagvik.



↑ The gold-spangled feathers of American golden plover chicks keeps them well camouflaged at their tundra nest.



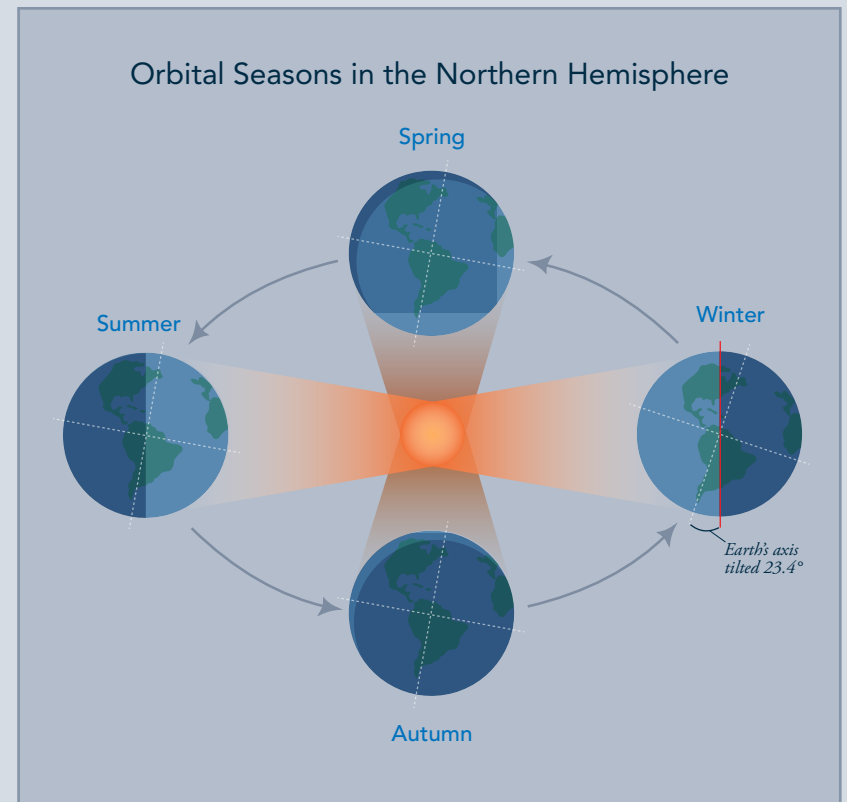
↑ A semipalmated sandpiper chick stays hidden in tundra grasses to avoid predation by a snowy owl or pomarine jaeger.

Tilting Toward the Seasons

The earth currently tilts 23.4 degrees from its orbital plane around the sun. That tilt is slowly decreasing. The tilt changes over time because the earth wobbles on its axis, pulled by gravity from the sun, moon, and other planets.

Places on earth that lie north of the Arctic Circle (an imaginary line that's parallel to the equator and encircles the globe at roughly 66.5608 degrees N) experience twenty-four-hour daylight in the summer because the earth tilts toward the sun.

Come winter, our planet's tilt angles land north of the Arctic Circle away from the sun, resulting in twenty-four-hour darkness. Utqiagvik lies at 71.2906 degrees N, placing it 320 miles (515 kilometers) north of the Arctic Circle.





↑ An arctic fox briefly leaves the ground as he heads out to hunt prey for his pups to eat.



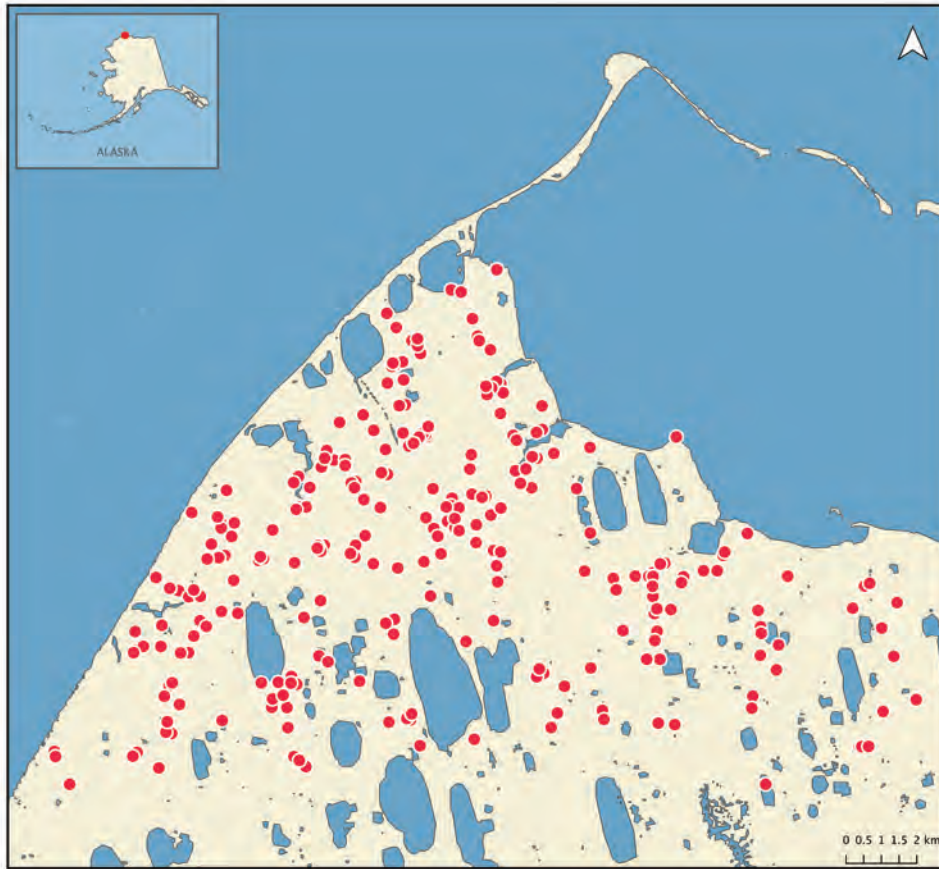
↑ Caribou running on the tundra could potentially trample a snowy owl's nest.



↑ Luckily for Denver Holt and other researchers afoot on inland tundra, polar bears usually stick to the coast, where they scavenge whale and seal carcasses.

Early June on the
tundra finds this melt hole in
the snow where a female
snowy owl has been
incubating her five eggs.





SNOWY OWL NESTS
1993-2019

● Nest Locations
■ Land

↑ Red dots on this map show where Denver Holt has documented snowy owl nests from 1993 to 2020 in his study area.



← This female snowy owl returns to her nest to incubate her six eggs.



← Denver sets up his field office in a different place every summer. Some summers he has to move his field office as he hustles for housing.

→ Denver and Hannah dig the big ATV out from its muddy mire.



↑ A male snow bunting forages on tundra that's sprouting a colorful display of flowers.



↑ Two snow bunting chicks, beaks agape, wait to be fed as they hunker in their insulating ground nest that's lined with caribou hair and white feathers, possibly from a snowy owl.

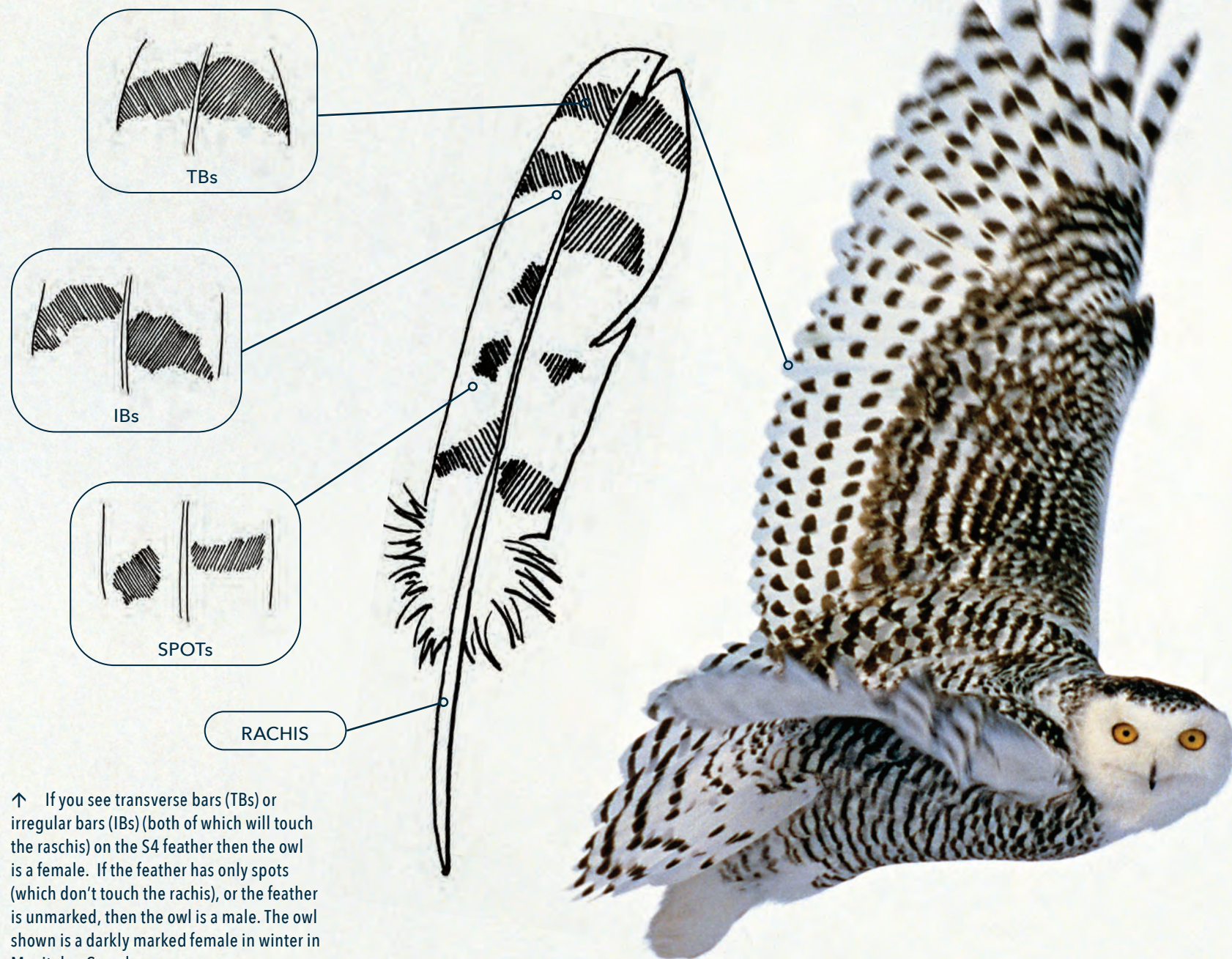


↑ Denver speaks to the webcam audience a ways from a snowy owl nest. The camera streams live video of the nest.



← Denver stops and scans to watch a distant pair of nesting snowy owls.

SEXING AN OWL FROM THE 4TH SECONDARY FEATHER



↑ If you see transverse bars (TBs) or irregular bars (IBs) (both of which will touch the rachis) on the S4 feather then the owl is a female. If the feather has only spots (which don't touch the rachis), or the feather is unmarked, then the owl is a male. The owl shown is a darkly marked female in winter in Manitoba, Canada.

Female or Male?

Migrating young owls have darker markings than their parents. Females are the darkest, with heavy bars marching down their chests, bellies, backs, and upper wings. A young male snowy owl will wear darker markings than its brilliant white father and may look awfully similar to its mother.

Denver always notes the markings on every snowy owl he observes. On the tundra, he would often exclaim, "Look how white that male is. He absolutely glows!" or he would advise, "Watch that female on the nest. She'll get darker markings after she molts and grows new feathers."

Determining gender can be a tricky business with young males looking similar to females. Denver and other ORI researchers developed a near foolproof way to tell the young males apart from females. The catch is that you'll need to get a good look at a single particular feather in the owl's wing. And that's easier said than done.

One way to glimpse that particular feather is to wait for the owl to fly and then snap a series of high-speed photos that freeze or stop the movement of the owl's wings. Then you can study the wing photos at your leisure, paying close attention to S4, the fourth secondary feather in the wing.

But first, a feather geography lesson is in order.

Starting from the outermost tip of the wing, wend your way toward the back edge of the wing, counting those big finger-like feathers as you go. These are primary feathers. There are ten on each wing.

Continuing down the rear edge of the wing, you'll next encounter the secondary feathers. Count down to the fourth one. Bingo! That is the one you'll need to study carefully. That's the one Denver says will reveal the sex of the young owl.

← Dark markings show that this is a young female who probably hatched the previous summer in the Arctic. This bird was photographed during winter in Manitoba, Canada.



↑ A molted snowy owl wing feather rests alongside cotton grass on the tundra.



↑ Denver studies a molted primary feather likely from a non-breeding male snowy owl.

FEMALE WING



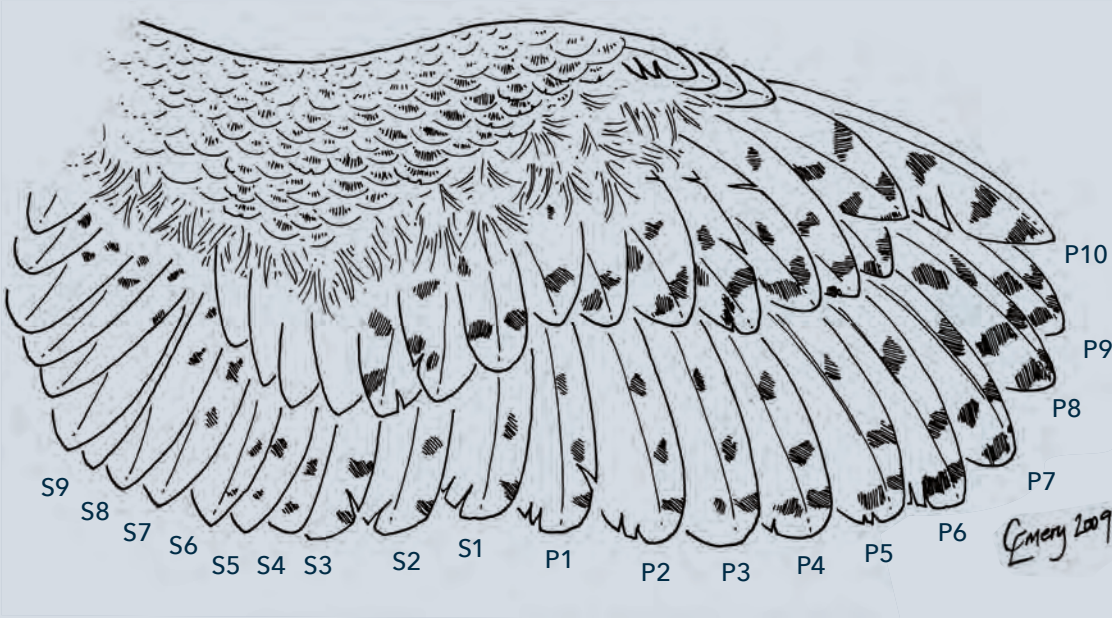
← The back edge of the snowy owl wing has two types of feathers, called primary (P) and secondary (S) feathers. Look to the S4 to see what types of markings show. Female owls will have transverse bars or irregular bars on the S4 that touch the feather shaft (also called the rachis).

→ At right, a female snowy owl's splayed wing reveals the S4 feather, which is most easily viewed on a flying bird.



MALE WING

→ Male snowy owls have spots or no markings on the S4 feather. Spots do not touch the rachis of the S4 feather.



Studying breeding snowy
owls also means studying
brown lemmings.





→ If you are a carnivore and you live in the Arctic, the chances are good you eat brown lemmings.



↑ A collared lemming sits atop a pile of owl pellets in a scientist's gloved hand. The pellets are full of the fur and bones of other lemmings, but don't tell the lemming!



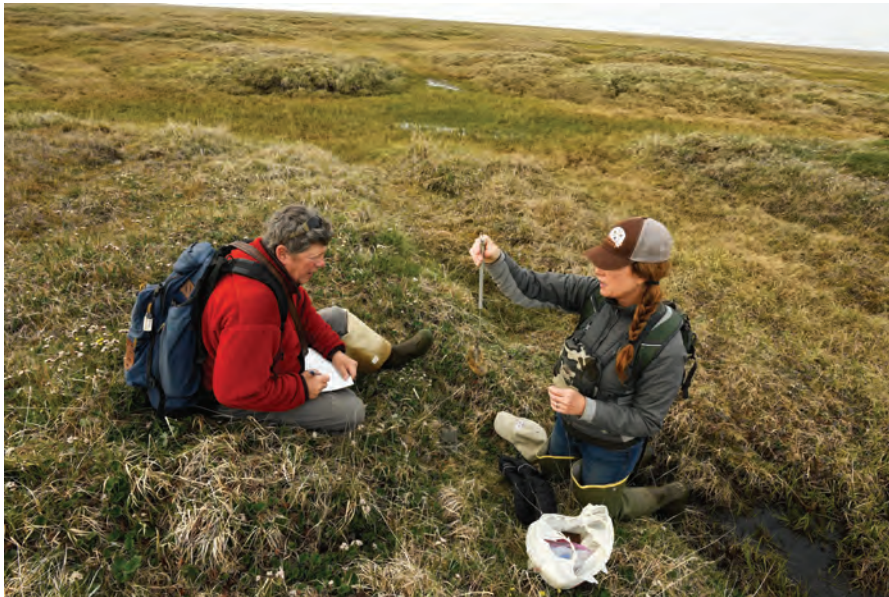
↑ A grass-eye view of a brown lemming might look like this. This rodent feeds on grasses and sedges.



↑ Collared lemmings live on drier tundra than brown lemmings.

→ Liberty and Denver walk to one of three lemming transects. Note the abundant cotton grass underfoot.





↑ Denver records weights as Liberty weighs each lemming they caught.



↑ Dressed for a chilly commute, Liberty and Denver (driving) head out to check a lemming sampling transect.

→ Steller's eider
drakes cruise a
tundra pond.



Lemmings of Urban Legend

If you, like a surprising number of people, believe that the tundra spawns waves of lemmings that leap off cliffs and into the sea, think again. You have been fooled by an urban legend that probably originated with fabricated scenes of unrealistic lemming behavior in the 1958 Walt Disney movie *White Wilderness*, a film in the studio's True Life Adventure series.

Filmed in Alberta, Canada (which has no ocean shoreline), the movie shows scores of lemmings supposedly leaping into the Arctic Ocean, driven by a great migratory urge. The lemmings in the film were actually imported from Churchill, Manitoba.

How do I know this? In 1994, my wife, Marcia, and I were honeymooning in Churchill, a birdwatching mecca. I happened to strike up a conversation with a resident of the town and somehow our talk turned to lemmings. He told me that when he was a kid, people connected to the movie came to town and offered to buy all the lemmings the local kids could catch. If I recall correctly, he said he was paid twenty-five cents per lemming.

The captured brown lemmings were transported nearly a thousand miles (1,609 kilometers) to the film set in Calgary, according to a Canadian Broadcasting Corporation television program called *Cruel Camera*, a show that revealed some of the cruelties and abuses to which animals in Hollywood movies have been exposed to create gripping, impactful action footage.

I quote a Wikipedia post about the film: "Bob McKeown, the host of the CBC program, discovered that the lemming scene was filmed at the Bow River near downtown Calgary, and not in the Arctic Ocean as implied by the film. McKeown interviewed a lemming expert, who claimed that the particular species of lemming shown in the film is not known



↑ Widespread misperceptions of lemmings are likely attributable to staged scenes in a popular 1950s film. The lemming depicted in this photo is behaving normally.

to migrate, much less commit mass suicide. Additionally, he revealed that footage of a polar bear cub falling down an Arctic ice slope was really filmed in a Calgary film studio."

Various other published stories report that the film crew threw lemmings off the bank of the river, making it look like the rodents were leaping to their deaths by drowning in the Arctic Ocean.

Wildlife films are notorious for staging action or surprising situations to increase viewership. Wildlife scientists observe and document what really happens in the wild. Rest assured that Denver has never observed a mass of brown lemmings headed over a cliff, plunging into the sea.



↑ A mother snowy owl and her chicks glow under the midnight sun. The male has brought in lemmings for them to eat (visible at left and right).



↑ Five snowy owl chicks watch a distant parent, waiting for the arrival of food.



← The male snowy owl has just brought in a pectoral sandpiper chick for his hungry chicks. He will “beak” it off to his mate, who seems preoccupied with the chicks down in the nest.

→ While checking on chicks at the webcam nest, Denver hugs the ground, facedown, as the male snowy owl defends his chicks by striking Denver's pack with his talons.



↑ Snowy owl chicks huddle at the nest with their mother for protection and warmth. Meanwhile, the mother looks away, tracking the male's whereabouts as he hunts. Note the large size difference between the smallest chick and the largest chick towering over it.

Snowy Owl Quick Facts

Scientific name: *Bubo scandiacus*

Former scientific name: *Nyctea scandiaca*

Closest relative: Great horned owl, *Bubo virginianus*

World population: Data incomplete; no accurate numbers available.

Sexual dimorphism: Females are larger than males.

Weight: Female: 2–6.5 lbs.
Male: 1.5–5.5 lbs.

Body length: Female: 22–26 in.
Male: 21–23 in.

Wingspan: Female: 4 ft. 9 in.–6 ft.
Male: 3 ft. 10 in.–5 ft. 5 in.

Flight speed: Likely capable of 50 mph or faster; though rarely observed, snowy owls can soar in flight.

Clutch size: 4–11 eggs, though there are records of 15 or 16 eggs in one nest.

Incubation: 31–33 days

Age of chicks when they leave the nest: 21 days on average

Age of chicks capable of sustained flight: 45–60 days

How far can an owl rotate its head? More than 200 degrees in each direction but not as far as 270 degrees, as many books claim. An owl's fourteen neck bones enable great head-turning ability.

Oldest recorded snowy owl in the wild: 24 years old: from a snowy owl banded at Boston's Logan Airport by Norman Smith in 1992. Twenty-three years after it was banded, it reappeared at the same airport and was retrapped by Smith. Multiple published reports mistakenly state the owl was recaptured in Montana.

Do snowy owls have long-term mates? Most likely not, since they are nomadic and nest in distantly separated locations from year to year.



← Captive snowy owls at a zoo—male (l) and female (r).



← A mother snowy owl broods her clan, with only one of her chicks visible as it safely snoozes under her protective gaze. Only by using a blind to hide in was I able to capture this tender scene.



My photo blind sits at far left. The white specks at far right are a female snowy owl on the nest with a male snowy owl flying towards her to deliver a lemming. Can you find the white speck that is another male snowy owl? He's a little more than a third of the way from the right edge of the photo and farther out on the tundra.

→ The female snowy owl approaches the nest, once I am hidden from view inside the blind. The pink skin visible on the mother's belly is her brood patch, an area of bare skin that she will press onto her eggs and chicks to keep them warm.





↑ The father snowy owl (left) offers a lemming to the mother as the oldest chick looks on with great interest. Within seconds of the handoff, the male flies off to resume hunting. Note the differences in the plumage of the male and female snowy owl parents.

→ This snowy owl male took a break from hunting for his family—he just had a bath.





← Denver instructs Nagruk on how to band a snowy owl chick that Nagruk and his friends had taken off the tundra the day before. Nagruk is wearing a sealskin hat that his mother sewed for him.



↑ From the warmth of his parka, Denver extracts one of the two snowy owl chicks returned to the tundra.





← Nagruk and Denver place the captured snowy owl chicks back on the tundra near their nest.

What to Do If You Find an Injured Owl

While snowy owls rarely get injured by vehicle strikes in Utqiagvik, in most of the United States and large parts of Canada, many owls and hawks are injured or killed when they collide with moving vehicles.

If you find an injured or stunned owl by the side of the road, you can help the bird and perhaps save its life. First, make sure you aren't going to be struck by traffic as you help the owl. Check that your car is parked safely out of the line of traffic. If your owl rescue happens at night, make sure you use lights. Try to have a light-colored or reflective jacket at hand so you can slip it on to help drivers see you.

If you happen to have leather work gloves handy, put them on to protect your hands. If you don't have gloves available, that's okay. Next, find a coat or blanket that you can put over the injured raptor. Once the bird is covered, gently wrap the coat or blanket loosely around the bird. Then carefully but firmly grasp the bird (keeping the blanket between your hands and its body), making sure that the bird's legs and feet are pointed down and away from you. A raptor's powerful feet and sharp talons can injure you if you don't pick it up properly.

If you have a cardboard box, place the bird into it. Try to uncover the bird before you close the box. Make sure there are air holes in the box so the bird can get fresh air. If you don't have a box, you can place the bird in your trunk unless it's a hot day. As a last resort you can place the bird, still wrapped in the coat or blanket, on the floor of your car.

You'll need to transport the bird to a wildlife clinic, wildlife rehab facility, or a veterinarian that treats wildlife. Don't try to feed or give water to the injured bird. While it's legal to transport an injured raptor to a clinic, it's not legal for you to try to treat the bird yourself. Doctors and rehabbers are legally licensed to treat wildlife.

Every spring, it happens. People discover a flightless



↑ Marcia Wilson helps a Massachusetts homeowner put up a temporary nest platform for a great horned owl chick that prematurely fell from its nest, located higher up in the same tree.

owl chick on their lawn or perched on a low branch in their yard or neighborhood. With no parent owls in sight, most people might conclude the

owl needs to be rescued. Wrong!

Most likely the baby owl has just left the nest on its first attempt to fly, or the owl fell out because she lost her balance. Perhaps the chick was knocked out of the nest by a sibling or a gust of wind. If the chick is extremely young (in which case you won't see any long flight feathers growing on the wings), then you can build a second "nest" with some adult assistance. A plastic basin or open-topped wood box attached to a simple wood-framed platform can serve as a

→ Marcia picks up the young chick to place it in its new nest.



temporary nest. Place it at least six feet (about two meters) up on a tree trunk. Drill some small drainage holes in the basin. Throw several handfuls of pine shavings in the bottom. Place the baby in its new nest. Rest assured that the parents are nearby and will continue to feed the chick.

If the chick is larger but can't fly, you might put on gloves and gently clasp the chick's body from above (holding the wings firmly to the body with your gentle grip) and put the chick onto a branch perch four or five feet (about one and a half meters) off the ground. Then keep the family cat or dog away from that area for a few days. The owl parents will continue to feed the growing chick.

Don't worry about the urban legend that says handling a baby bird will cause its parents to smell your scent on the

baby and reject it. Not true. While many birds have a sense of smell, in some birds it doesn't seem to be well developed. And with most any bird, the parent won't reject its baby just because you handled it.

On a scent-related note: If you find a bird's nest, don't approach it closely, because the scent trail you leave may lead a raccoon, opossum, skunk, or other ground predator to the nest. While raptors usually defend against nest predations, most non-raptors (such as songbirds and ducks) can't stop predators from eating eggs or chicks.

In the case of a snowy owl nest, the male regularly fends off arctic foxes, so Denver need not worry about the scent trail he leaves around the owl's nest. Besides, there are no raccoons, opossums, or skunks in the Arctic.

← Before Denver and Liberty can band snowy owl chicks, they have to find them as the chicks explore the tundra around their nest mound.



→ Denver hoots to a male snowy owl circling overhead, ready to defend his chicks against human interveners.



→ "Got one!" says Liberty, holding the first chick of four she found. Note that this chick wears a band from a previous banding day.

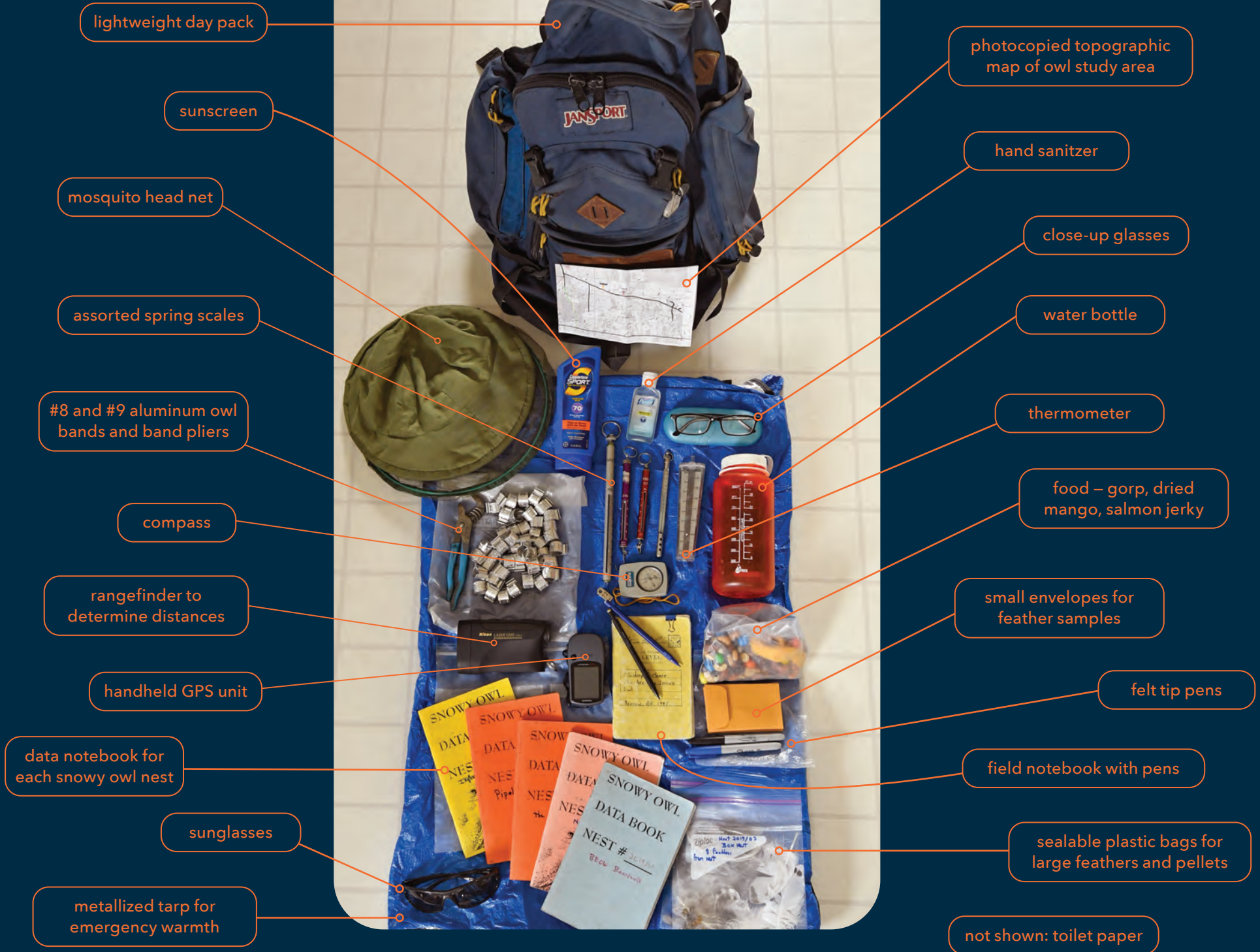


↑ Liberty hits the tundra as a male snowy owl strikes her backpack while defending his chicks who are wandering nearby.

→ Sitting on their nest mound, six snowy owl chicks rest while Denver prepares to band them.



← Denver's daypack contains all the things he needs to conduct his field research.



While sheltering in the lee of the nest mound, Liberty holds the chick as Denver places a band on the bird's left leg.

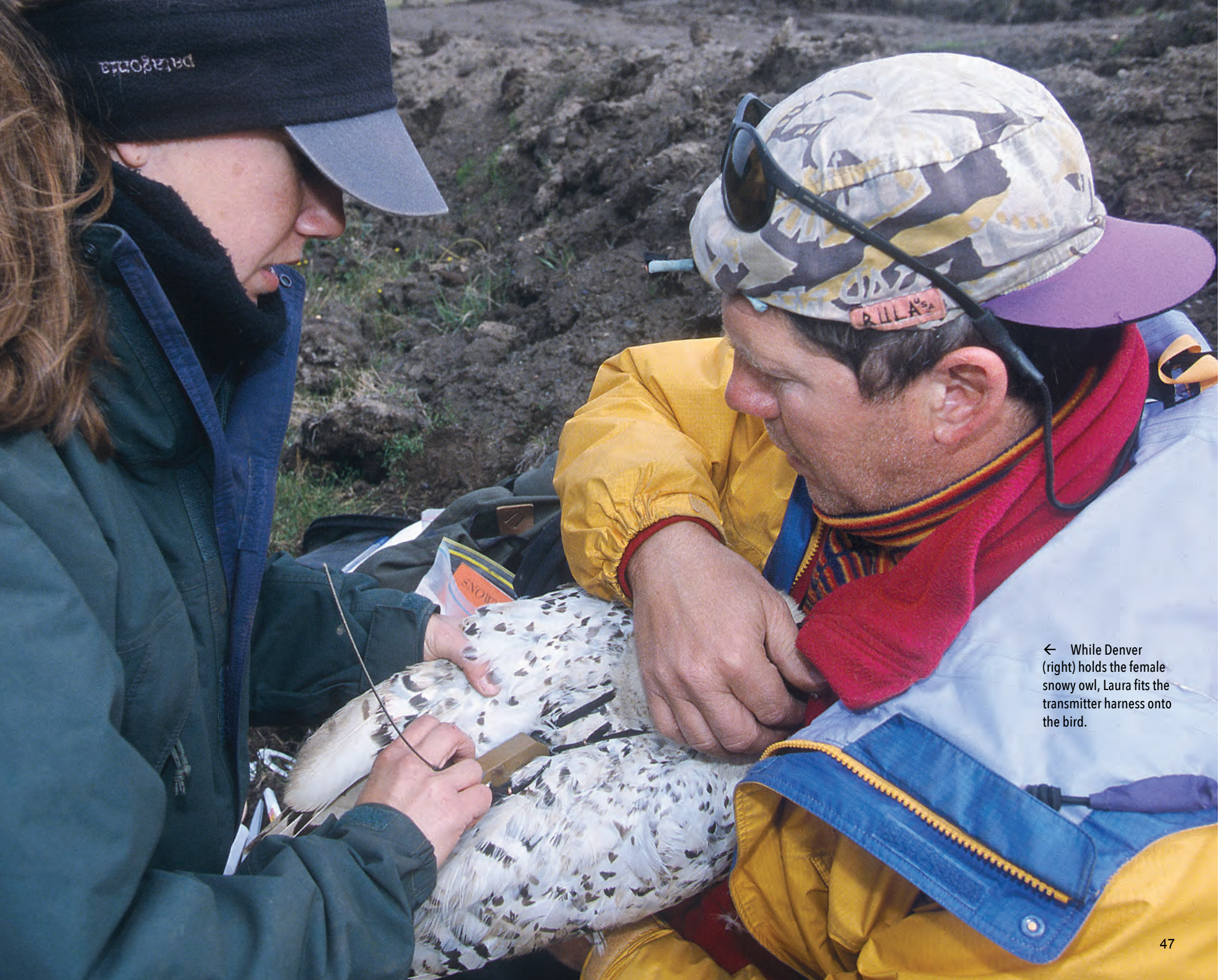




↑ A string of aluminum bands and pliers stand at the ready for banding snowy owl chicks.



↑ These twenty-one-day-old chicks quietly wait from a comfortable perch on Liberty's boots as Denver prepares to band them.



← While Denver (right) holds the female snowy owl, Laura fits the transmitter harness onto the bird.

→ Laura Phillips attaches a noose carpet to Denver's jacket.



↑ Denver and Laura lay out a noose carpet at a snowy owl nest. Note the lemming on the carpet next to the egg.



↑ Denver gets ready to release the female snowy owl who's wearing the backpack transmitter. Note the antenna sticking out from her back.

Tracking Snowy Owls

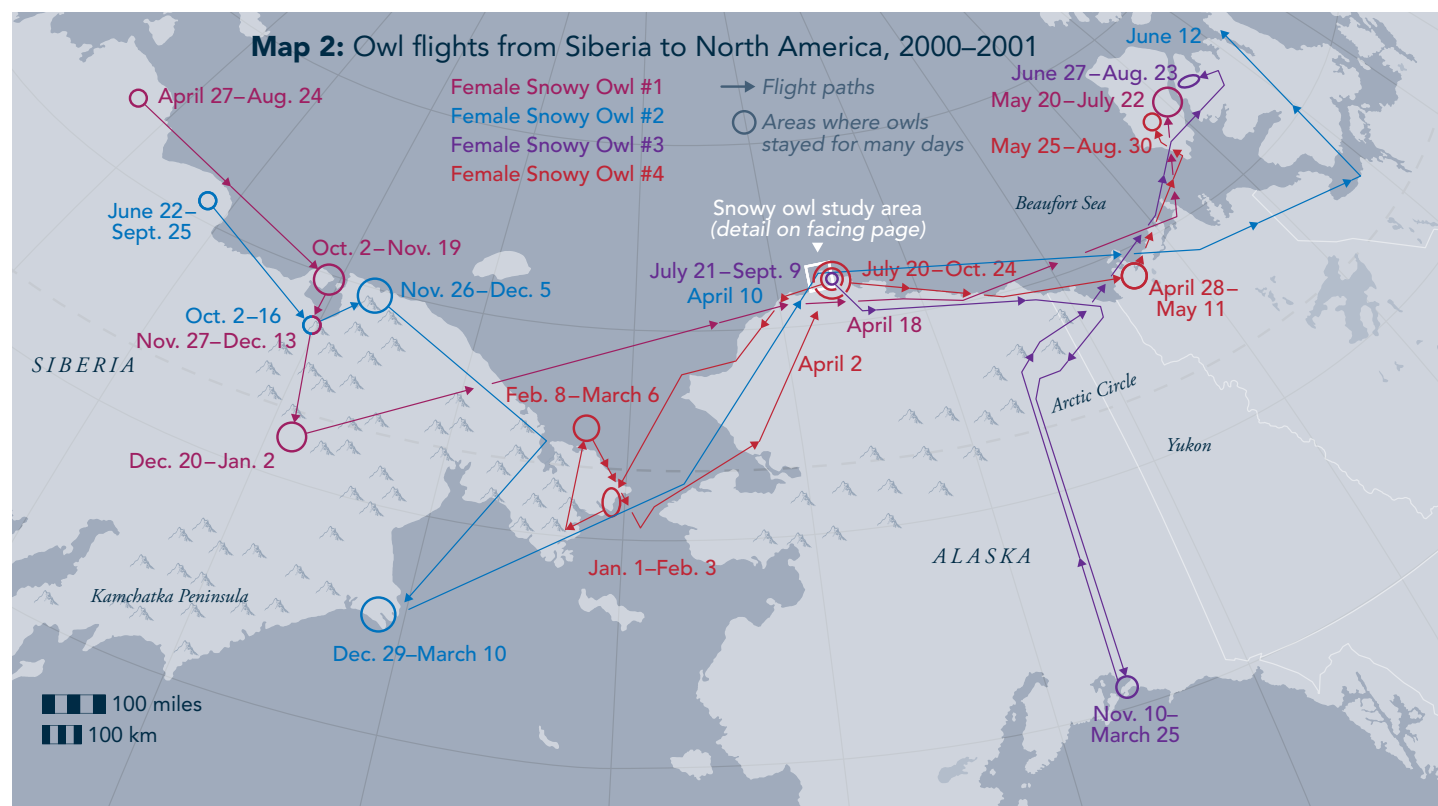
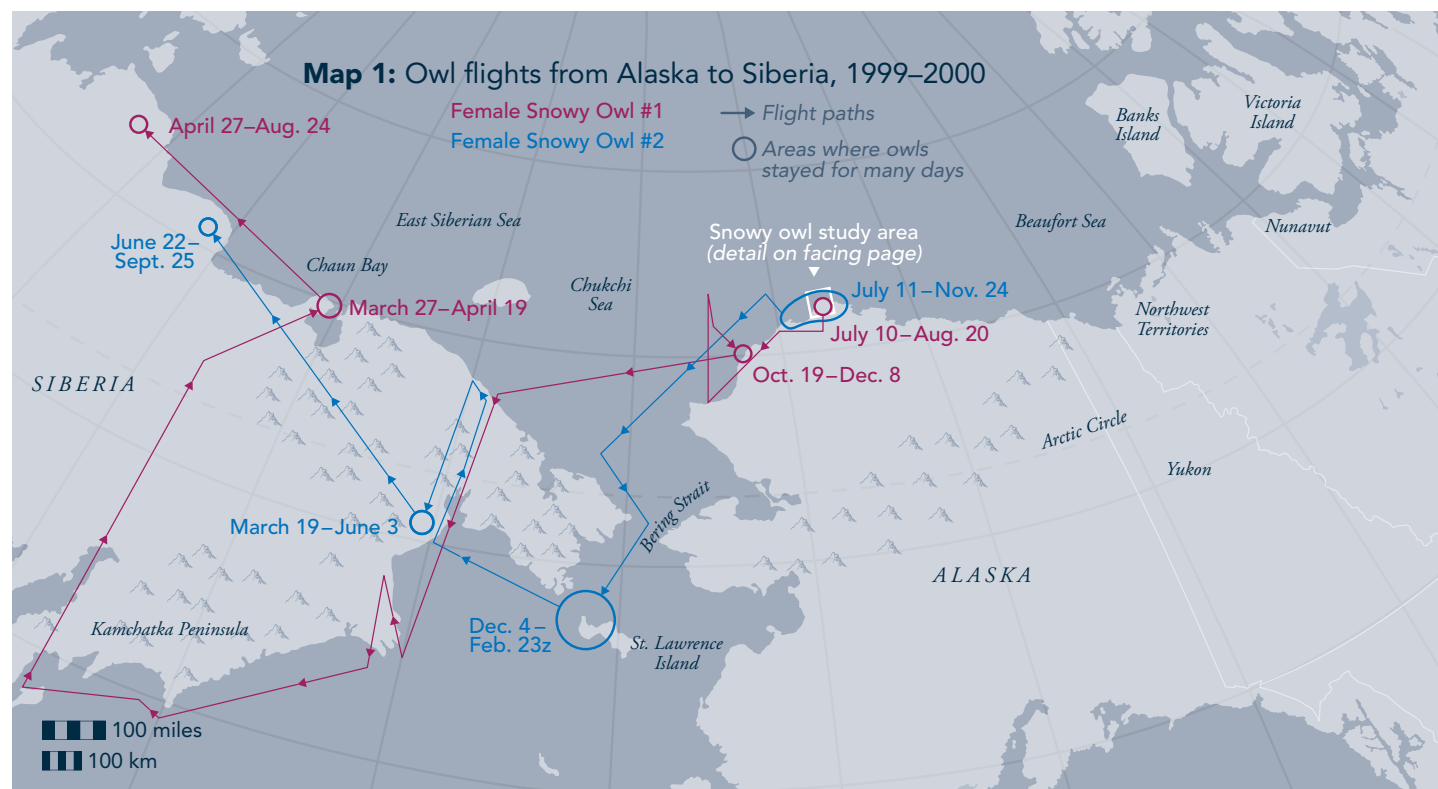
Where do snowy owls go when they leave Utqiagvik? To find out, Denver attached satellite transmitters to four snowy owls (females #1 and #2 in 1999, females #3 and #4 in 2000).

Female #1 (see map 1) spent time along the Alaskan coast before she beelined for Russia, hitting land on the north coast and then flying southward, and later north. She summered at the coast. Nesting? Denver couldn't confirm it. The following year (map 2) she came back to Utqiagvik before she peeled off, ending up on Banks Island in Canada for the summer. Nesting? Maybe.

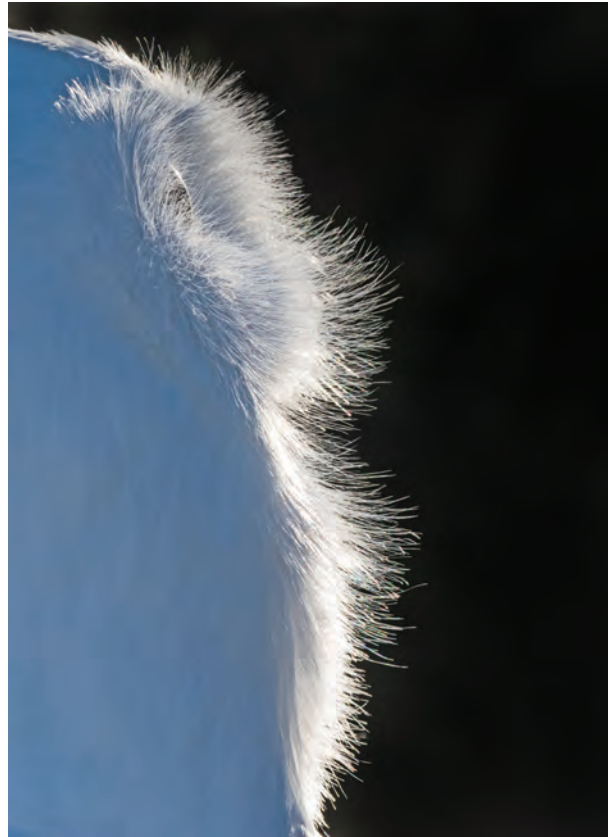
Female #2 (map 1) flew south over the sea and lingered two and a half months around Alaska's St. Lawrence Island. She too summered on the north Siberian coast. Nesting? Good question. She wintered in Russia, then the following year (map 2) she too came back to Utqiagvik before flying east and then north to Victoria Island, which neighbors Banks Island.

Female #3 (map 2) wintered on the coast of southeast Alaska before she headed north to spend the summer of 2001 on Victoria Island. That year female #4 also summered on Banks Island, not far from female #1. Nesting? That's anybody's guess.

The snowy owl study area map (at far right) depicts some of the area's complex biodiversity, and who's on the menu for hungry snowy owls.



→ Some older, all-white, male snowy owls stay in the Arctic during the winter, perhaps to remain near nesting territories they will use in spring. The thick, dense feathers of snowy owls allow them to endure temperatures of -50 degrees F (-45 degrees C.).



→ Norman Smith releases a banded snowy owl with help from his granddaughters. The owl was live-trapped at Logan Airport in Boston and released on a beach on the South Shore of Massachusetts.





← A solar-powered GSM transmitter (visible on the owl's back) uploads GPS data through a cell tower connection, allowing researchers to precisely track the owl's movements. This female snowy owl was live-trapped in March at Boston's Logan International Airport by Norman Smith, who banded her, attached the backpack transmitter, and released her on a salt marsh south of Boston. The owl flew to Baffin Island in the Canadian Arctic the following summer. The public can track snowy owls wearing transmitters on the website www.projectsnowstorm.org.



Large bags of sand placed atop a man-made dune of sand and gravel attempt to hold back the hungry Chukchi Sea surf from one of Utqiagvik's key coastal roads.



↑ A polar bear walks the beach at Point Barrow, scavenging what little food it can find. Bones from bowhead whales that were harvested by the community in April are visible behind the bear.



← At the nest, Denver examines a one- or two-day-old chick whose eyes have yet to open."



← A snow-covered brush pile offers potential shelter from predators for many animals including these gray squirrels.

→ A red eft spends a few years on land before changing into an aquatic eastern newt.



↑ A tiger swallowtail nectars at blooms in a New England garden featuring plantings to attract hummingbirds, butterflies, bees, and other pollinators.

GLOSSARY

From the University of Alaska Fairbanks webpage glossary on correct word usage:

avinnaq—Inupiaq for “brown lemming.”

Bubo scandiacus—genus and species scientific name for the snowy owl. *Bubo* means “horned owl.” *Scandiacus* means “of Scandinavia.”



circumpolar—the area around one of the earth’s poles. The snowy owl has a circumpolar breeding range that rings the North Pole but does not extend up to it.

crepuscular—active in twilight.

diurnal—active during daylight.

Inupiak—used to refer to two of the indigenous people of Alaska.

Inupiaq—the language of Alaska Inuit spoken on the North Slope.

Inupiat—used to refer to three or more of the indigenous people of Alaska, to the people collectively, or to the culture. Never use “Inupiat.”

Native—capitalize this when referring to people or individuals with ancestry in the indigenous peoples of Alaska.

nocturnal—active during darkness at night.

← A snowy owl sits out a blizzard at the coast of New Hampshire.