SPRING RECAP

This

or

That

Have you noticed Pinyon Jays selecting corn kernels during cold weather?

Doug Johnston, one of our community scientists, observed that Pinyon Jays visiting his feeder seem to eat cracked corn during cold snaps before switching back to sunflower seeds. Cracked corn has more carbohydrates than sunflower seeds. Carbohydrates are one of the easiest forms of energy for bodies-- avian or mammal-- to access. So Pinyon Jays switching to cracked corn before a cold spell could be the equivalent of runners carb-loading before a race.

Let us know if you observe the same thing!

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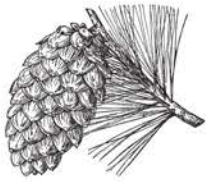
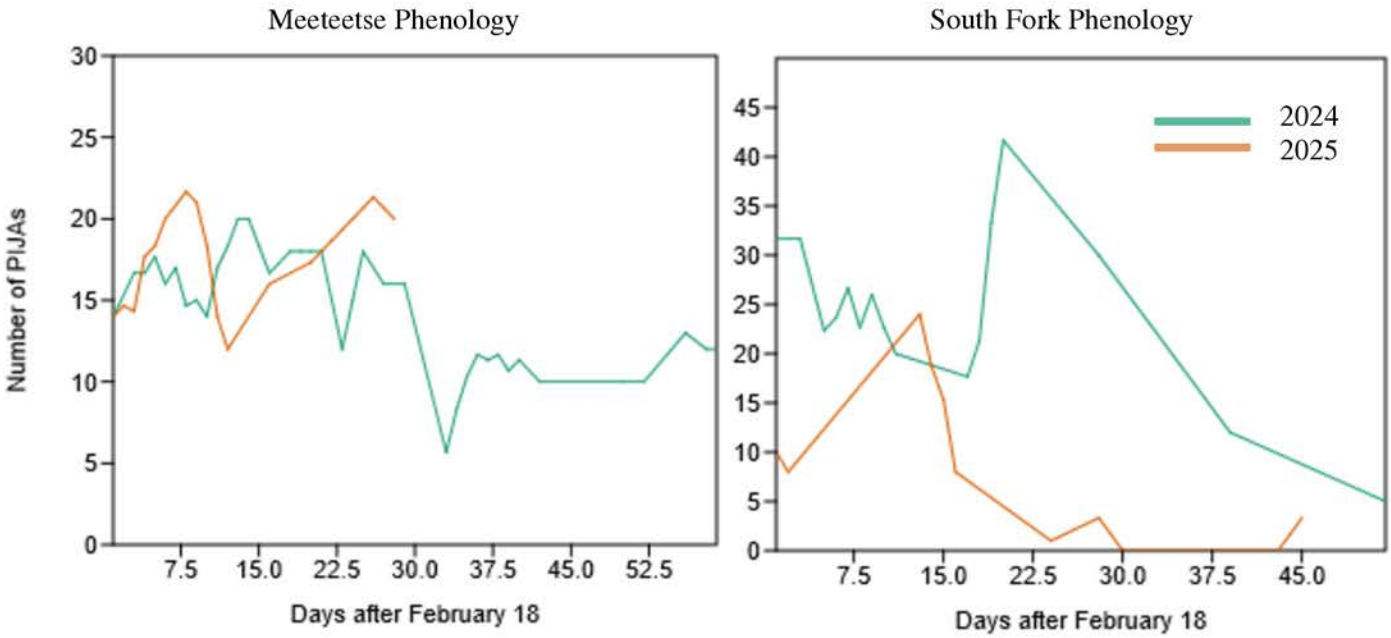




Data collected from the Meeteetse (left) and South Fork of the Shoshone (right) between 2024 (green) and 2025 (orange) show differences in abundance of Pinyon Jays observed after February 18th, but both show sharp declines in March. The team will continue to gather movement and survey data to see if these declines coincide with nesting.

Seasonality

Corey Anco

Curator, Draper Natural History Museum

Spring is well underway in the Eastern Greater Yellowstone Ecosystem. Migratory waterfowl, sandhill cranes, western meadowlarks, and mountain bluebirds have returned, the snow has melted in the basin, and birds are refurbishing and building nests in preparation for new arrivals.

For Pinyon Jays, spring is a particularly busy time. Entire flocks congregate over the winter to initiate courtship activities. Come spring, pre-bonded, monogamous pairs isolate and feed away from the main flock. The remaining flock consists of unbonded jays, including yearlings, nonbreeders, and widowed adults.

Bird feeders may have been quieter while jays stayed busy courting suitors. After courtship peaks, paired jays immediately get to work rebuilding nests and constructing new nests. Eric, Jason, Amy, and I visited the sites of three separate flocks and at each site we observed birds carrying nesting material (sticks, twigs, grass) from one vegetation cluster to the next. Closer inspection revealed several nests in various states of construction, but we are still searching for a nest with eggs.

Studies in Arizona reveal Pinyon Jays will spend upwards of 40% of each day near their nesting grounds, restricting offsite foraging to the early mornings and evenings. Once nests are constructed and eggs laid, males will heavily provision their mate. Eggs hatch about 17 days after incubation. As I write this, females should be incubating or on the cusp of incubating in Wyoming's Bighorn Basin!

Left to right (bottom): Previous year Pinyon Jay nest; Paired jays will engage in "silent sitting" during the courtship period; One Pinyon Jay captured in Meeteetse showed many scratches and abrasions on its beak, potentially indicating heavy use of caches.

A Year in the Life of a Pinyon Jay

Jason Riggio
Assistant Project Scientist,
Museum of Wildlife & Fish Biology
University of California, Davis

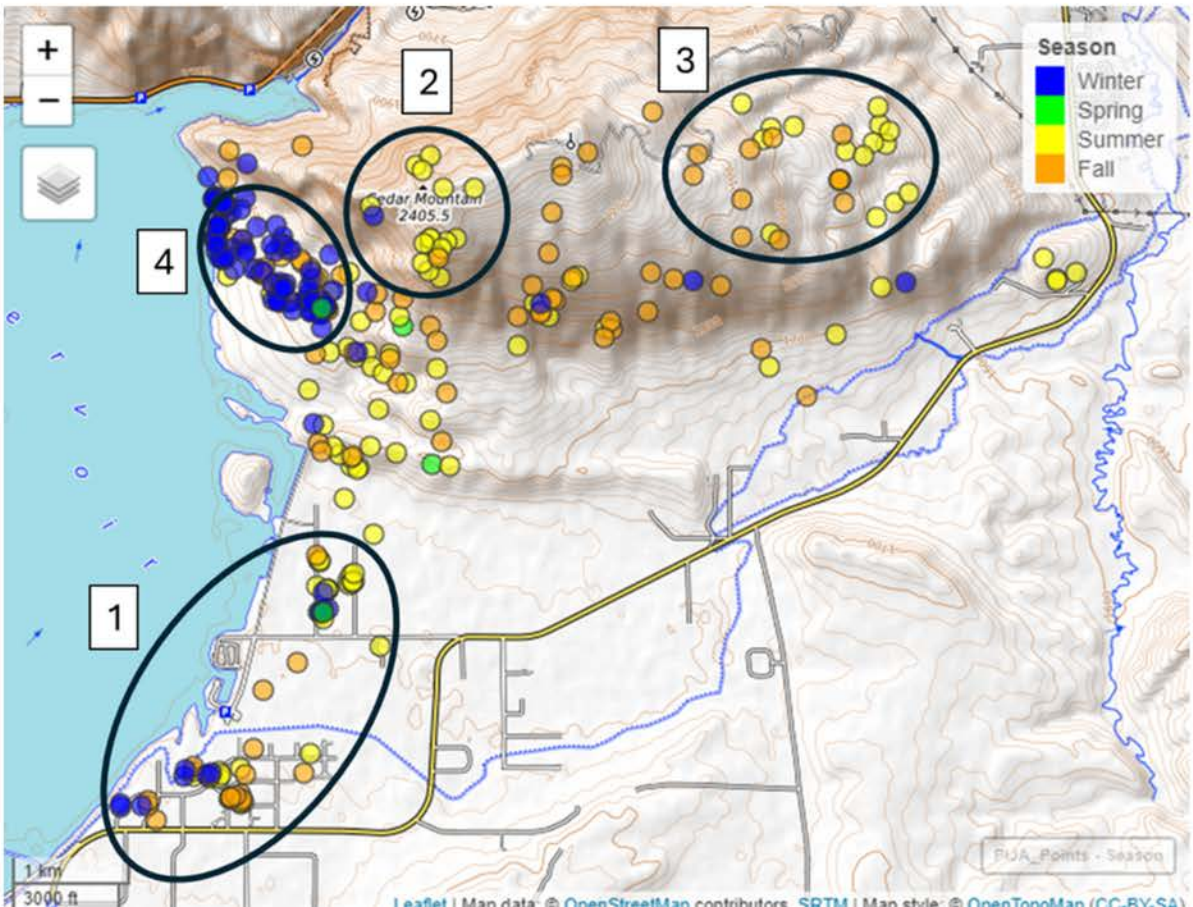
On May 29, 2024, we captured our 26th Pinyon Jay of the season—one of 64 birds we banded last year. This bird, designated #07626, was large enough to carry a store-on-board GPS tag, which records movement/location data. At 101 grams, it appeared healthy and alert, though we could determine only its age (after second year), not its sex.

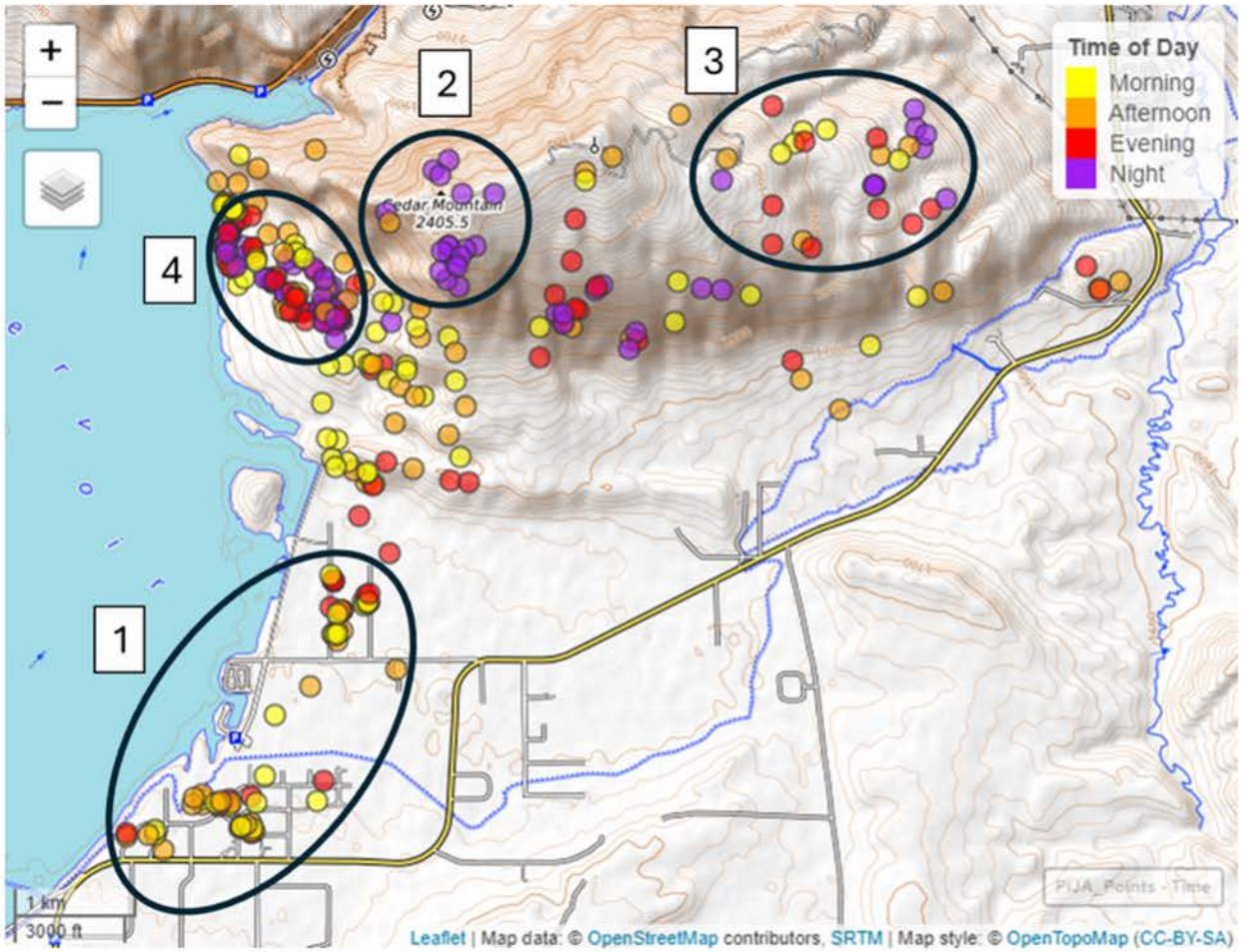
The team gets their first glimpse at the movements of #07626

The challenge with these GPS tags is the need to recapture the bird, and on March 2, 2025, we were lucky enough to do just that. Not only did bird #07626 gain approximately four grams in mass—but she also carried an egg! She had begun nesting nearby, with Pinyon Jays typically laying one egg per day until a clutch of about five is complete, after which incubation begins.

So, where had she been in the 277 days between captures? Thanks to 370 GPS locations (recorded every 18 hours), we now have an unprecedented look at nearly a year in the life of a Pinyon Jay in Wyoming's Bighorn Basin.

Throughout the year, she followed a fascinating seasonal pattern. In the mornings, afternoons, and evenings, across all seasons, she regularly visited homes north of the South Fork Highway (Figs. A & B 1), underscoring the importance of backyard feeders to local Pinyon Jays.





During summer (June–August) and fall (September–November), she ranged across the higher elevations of Cedar Mountain, roosting in dense Douglas-fir forest near the summit during the hottest months (Figs. A & B 2). By late summer and fall, she spent most of her time along the eastern slope of Cedar in the Limber Pine-Juniper woodland (Figs. A & B 3), likely taking advantage of calorie-rich pine nuts.

Winter (December–February) brought another shift. When she wasn't visiting backyard feeders in the valley, she stayed at lower elevations on the west slope of Cedar, near the Buffalo Bill Reservoir (Figs. A & B 4).

Over the year, bird #07626 occupied a home range of approximately 1,856 hectares (4,586 acres), spanning from 1,650 meters (5,400 feet) in elevation along the reservoir to 2,400 meters (7,880 feet) at the mountain's peak. Interestingly, she never crossed the South Fork Highway to the south or the east, or the reservoir to the west, and rarely traveled north beyond Cedar's ridge.

From just one GPS-tagged Pinyon Jay, we gained remarkable insight into the movement and habitat use of this species in our region. After collecting her data and taking measurements, we replaced her GPS tag and wished her well as she flew back to her nest. We look forward to seeing what next year's data will reveal about the life of this charismatic bird.

Left: Pinyon Jay #07626 was recaptured and her GPS fanny pack retrieved.

Top: Dr. John Marzluff shares information on nests with the crew. Right: Marzluff checks out a possible nest, pointing out characteristics indiciating it did not belong to a Pinyon Jay.

FROM THE FIELD

Corey Anco
Curator, Draper Natural History Museum

In February, the Draper Natural History Museum hosted ornithologist and Pinyon Jay expert, Dr. John Marzluff as our featured Lunchtime Expedition speaker. John gave a riveting presentation on the cognitive capacity of corvids, specifically, ravens and crows. For those that missed John's presentation, it can be found by searching "Draper Natural History Museum" on YouTube. The presentation is titled: *Gifts of the Corvids: Raven and Crow Research in the Greater Yellowstone Ecosystem.*

John also spent a few days with the Pinyon Jay research team visiting both a landowner's property in Meeteetse and a prospective nesting site. John cautioned us against using white bands on nestlings as these can look like fecal sacs and red bands as this can look like blood. Adult jays keep a tidy nest by actively removing fecal sacs and parasites. In extreme cases, an adult might mistake a white band for a fecal sac and *toss the baby out with the bathwater!*

John's insights into Pinyon Jay nesting and foraging preferences also proved invaluable. In one instance, we searched a prospective nesting site expecting to find a colony. While we didn't locate any nests at this site, John suspected it may have been a roosting location and potential caching and foraging site. When we returned the next month, we located nests further north and west of this location bringing merit to John's observations.

Over the next month, Pinyon Jay activity should increase at feeders near the birds' range. Young will hatch, demanding increased food resources. After 3 weeks in the nest, nestlings will fledge and accompany the flock to feeders incessantly begging for food with a voracious appetite!

Healthy or Not?

Eric Atkinson
Professor &
Biology Dept. Coordinator
Northwest College

When we think about the health and condition of songbirds, we quickly realize that birds, Class *Aves*, are a different critter than mammals. For instance, how do we estimate body size in a bird? Is it mass, wing span, tail length, overall 'bigness,' or something else? When thinking of a large owl, for instance, many people visualize a Great-horned Owl (*Bubo virginianus*), and yes, that is often thought of as our largest resident owl. But, what about Great Gray Owls (*Strix nebulosa*, isn't that a great scientific name meaning ethereal owl?)? Great Grays actually have larger wingspans than do the former but they are mostly all 'fluff' in substance.

Wing Chord

To measure the wingspan of a bird is tricky and definitely a two-person job. One would need to lay the bird against a solid background, stretch out the wings, and measure from the most distal primary (the wing or flight feathers—primaries, secondaries, and tertials--technically called remiges) on one wing clear across to the other furthest primary. Spread eagle, if you will. Not very comfortable for a bird or for a researcher! To circumvent this debacle just waiting to happen, the standard measurement taken for the wing is something called the wing chord. This measurement is taken from the alula, a small feather attached to the bird's thumb, on a folded wing, to the furthest primary feather. In North America, we take the 'natural wing chord' whereas in Europe most ornithologists flatten the naturally bowed primaries. Over a lifetime of banding, I've found the measurements differ by about 1mm.

But still, the wing chord is a measure of wing size, or more accurately the length of the remiges, and many people understand that the lengths of these feathers differ by not only species and within individuals, but by habitat, migratory pattern, age, and life style. Hence, is that a good estimate of body size? Probably not.

Getting to Body Size

What then, if mass and wing chord vary? Ornithologists largely agree that the best measurement of avian body size is the fused leg bone called the "*tarsometatarsus*." This bone between the knee and the toes is a fusion of the tarsal and metatarsal bones and does not change once a bird leaves the nest. It is a good estimator of skeletal size. Hence, if one takes the mass of a bird (within a species, for comparing cross species is problematic) which is really a volumetric estimate and divide it by the tarsometatarsus length (a linear metric), a '*condition index*' (CI) results. With our Pinyon Jays, upon each capture we develop an individual CI. Upon recapture, we can then make an estimate of the condition score of each bird.

Eric takes a tarsus length measurement (see Table 1). This particular measurement was from the notch.

Change upon Second Capture

Thus far in Spring 2025, we recaptured 5 Pinyon Jays originally captured in 2024, allowing us to calculate increases or decreases in CI; 2 have increased while 3 have decreased. Tarsometatarsus length should be static and it should be mass that changes, so what are the factors that do exactly that? First, one of our Pinyon Jays was a juvenile when originally caught, and that bird has indeed increased in mass. Secondly, body mass is dependent upon muscle mass (highly dense) and fat deposition (less dense). We assess a composite 'fat score' that describes (0-5) the fat deposited on the abdomen and in the furcular region (think, wishbone on a turkey), melded with an assessment of 'keel sharpness' indicating the robustness of the pectoralis muscles (the breast) sported by the bird. Ranging from thin and potentially burning muscle tissue for energy corresponding to 0-2, good shape from 2-3, and plump 3-5, one can dovetail this estimate to illuminate the CI with 3 of our 5 recaptured Pinyon Jays showing increase in fat/muscle scores. Even though these estimates are subjective, studies have shown good correspondence to actual whole-body muscle and fat estimates in other songbirds.

But, we study Pinyon Jays, and part of the wonder of this species is the expandable esophagus within which 40-50+ pine nuts can be carried. In our study, Community Scientists habituate jays with cracked corn and black oil sunflower seeds. Hence, if a jay has a throat-full, that may add an extra 3-4 grams to the weight, thereby causing us to overestimate the CI! Fat and muscle score should not change but this is tricky business indeed!

Now, one more potential addition to weight, namely when females are carrying eggs. We trapped 3 females (2 recaptures) thus far this spring carrying a noticeable (i.e., felt with our thumb when in-hand) egg. The average mass of a Pinyon Jay egg equals 6.65g (nearly 7% of a female's mass). Both recaptures showed slightly lower Condition Indices whereas each of their fat/muscle scores increased by half a value. So, we believe this is good news, indeed.

Bottom Left: Eric prepares to slide the ruler underneath the wing to take a wing chord measurement. Bottom Right: Each captured bird's data are recorded.

Case Study: #07626

Let's look at some measurements for the jay (#07626) highlighted in "A Year in the Life of a Pinyon Jay." Originally, we did not sex this jay but this year, carrying an egg, indeed she is a female. When looking at morphometric data, we can see that her mass has increased, as expected with egg, but some other measurements have increased as well (Table 1). Both wing chord and tail length increased as could occur with the molting and growth of replacement feathers, but both differences are possibly within the range of measurement error. Bill size metrics (2 length measures, depth, and width) all increased. Bird bills are very living tissue and capable of relatively rapid growth making up for wear (like when hammering open limber pine cones). Now, the two measures of metatarsus (tarsus) length are problematic. They should not change. The standard method of measurement described above suffers from low repeatability, and that is often why we take a more repeatable measure, but not as precise, with a wing chord rule. Even that increased. However, both may be within our margins of error. What I find most exciting is that her Fat Score increased by 25%, a measure I sometimes have more faith in than CI for the reasons I outlined above. So, perhaps some skepticism is warranted before putting too much emphasis on the CI based upon a) variability of mass due to carrying egg(s) and/or seeds and b) low repeatability in measurement of the metatarsus.

DATE	SEX	AGE	MASS	WING CHORD	TAIL LENGTH	BILL LENGTH (exposed)	BILL LENGTH (naris)	BILL DEPTH (naris)	BILL WIDTH (naris)	TARSUS LENGTH (Notch to distal scute)	TARSUS LENGTH (bend w/rule)	FAT SCORE (0-5)	CONDITION INDEX
5/29/24	U	ASY	100.8	145.0	101.0	32.78	24.32	7.70	8.17	35.00	42.5	2.0	2.88
3/2/25	F	ASY	104.7	148.0	**101.5**	32.82	25.47	7.98	8.22	36.69	43.0	2.5	2.85
Difference			**3.9**	**3.0**	**0.5**	**0.04**	**1.15**	**0.28**	**0.05**	**1.69**	**0.5**	**0.5**	**-0.03**
% Difference			3.87	2.07	0.50	0.12	4.73	3.64	0.61	4.83	1.18	25.00	-0.92

Table 1. Morphometrics of #07626 from her first capture on May 29, 2024, and second capture on March 3, 2025.

The Big Picture

Going forward, with more recaptures, we will be able to characterize how body condition varies through the breeding and nonbreeding seasons, while also assessing other measures of health like the presence of ectoparasites (feather lice, for example, for which we have noted some damage), and when we take blood, further estimates will be gathered (e.g., endoparasites, disease, and blood cell-type ratios). All these measures are needed, for we just can't ask these cooperative Pinyon Jays how they're feeling! Stay tuned for more to come!

Top to Bottom: A Pinyon Jay investigates the original pigeon trap; Eric sets up the drop-door trap operated by a car key fob; and Corey removes a Pinyon Jay from a ladder trap after a successful capture.

Trapping Pinyon Jays

Amy Phillips
Curatorial Assistant, Draper
Natural History Museum

Pinyon Jays are very attached to feeders and seemingly unruffled by being captured and banded. However, they are very intelligent, as is fitting for a member of the Corvid family. This has resulted in a series of traps as our team attempts to outsmart them.

The original trap is known as a pigeon trap, due to its common use for capturing pigeons. It is a wire rectangle about three feet long and just over a foot tall. Food is place inside the trap to entice the birds. They then push their way through four evenly spaced prongs. The prongs can only move inwards, so once the bird is inside it cannot get out. The Pinyon Jays seemed hesitant to push past the prongs, so a wire clothes hanger was straightened out and a string attached. One of our team members sits, ready to pull the string as soon as the Pinyon Jay is far enough into the trap.

The wire hanger works great, except it relies on us to accurately judge how far inside the Pinyon Jay is. To remedy this, Eric modified the trap with using a key fob and plexiglass doors. The doors drop down once the key fob is locked, moving the wires holding up the plexiglass doors.

Both trap set ups have downsides, as the sudden closure of the doors scares other Pinyon Jays away. Corey turned to one of the traps the team originally considered when designing the project: a crow or ladder trap. From the top of the trap, the crow hops down through the rungs of a "ladder." Once inside, it can't fly out because the gap between the rungs is too narrow. Most birds stay relatively calm, feasting on the variety of foods provided. This allows us to capture multiple birds.

Which trap works best depends on the situation. Wind affects all except the crow trap, but if the flock is small, the crow trap may go ignored. In the end, Pinyon Jays' behavior and unpredictable conditions mean there's no one-size-fits-all solution (yet!)—only trial and error, with each trap offering unique challenges.

Resources

List of Banded Birds

Behaviors and Interactions

Datasheets

Funding for this program was provided in part by the Bureau of Land Management and Community Foundation of Jackson Hole Edelweiss Fund.