SPRING 2026

COLOR BAND UPDATE

Approximately 69 of the 121 Pinyon Jays banded during this project have colored bands. Unlike the aluminum USGS band, these colored bands are plastic. As we enter the third year of this project, we're noticing some wear-and-tear on these bands. ***Some of the birds we've recaptured have completely dropped a band. We've noticed cracks appearing in others.*** Reds and oranges are nearly identical after sun-fading (although we stopped putting orange bands on soon after the project started because they were so close together).

All to say, keep a close eye on those bands when reporting color bands. Bands are read left to right (easier said than done, especially on flighty Pinyon Jays). You write the bands "left top left bottom/ right top right bottom." For example, the Pinyon Jay to the left of this image would have bands that read AS/RR or blue (azul) silver/ red red.

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121 Banded Birds

3,870 GPS Points Collected

63 Birds with GPS Tags

742 Datasheets

Mild Winter Temperatures May Have Helped Trigger Earlier Breeding

Corey Anco
Curator, Draper Natural History Museum

Our team searched for nests in mid-April at previously used and suspected nesting areas. Across five study sites, we located 20 new nests this year. Most of these nests were empty, suggesting that if breeding was successful, young had already fledged. In several cases, the nests may have been built in earlier years, but most nests showed clear signs of recent construction and use in 2026. A few nests still contained nestlings, and these young were noticeably farther along in development than those we observed last year.

In 2025, pinyon jays at two of our study sites were building nests by late March and laying eggs by mid-April. This year, when we visited two sites on April 11 and April 15, we found nestlings estimated to be about 5 to 18 days old. Working backward from nestling age gives us a rough estimate of when nesting likely began. Based on that timeline, nest construction at these sites may have started as early as late February and continued into mid-March. Egg laying likely occurred in early to mid-March, with hatching likely taking place between late March and early April.

Nestling ages observed from youngest (left) to oldest (right). Notice the feathers starting to come in and then the heads darkening (far right bottom and top of page).

Early Breeding continued from page 2

Average Temperature (°F) in 2025-2026: Buffalo Bill Dam

	January		February		March	
	2025	**2026**	**2025**	**2026**	**2025**	**2026**
High	35.26	46.23	28.39	54.21	55.19	62.80
Low	17.48	29.87	10.79	35.71	34.97	40.40

Source: NOAA.gov

These estimates are based on published timing data from the southwestern portion of the species' range, so they should be viewed as approximate. Still, they help illustrate a clear shift in breeding phenology. Pinyon jays can build nests in about 5 to 7 days and usually lay eggs within 1 to 3 days after nest completion. Eggs hatch about 17 days later, and nestlings typically fledge about 21 to 22 days after hatching. Using that schedule, nesting in 2026 appears to have begun nearly a month earlier than in 2025!

This pattern matches the weather conditions we observed. Average high and low temperatures in January, February, and March were substantially warmer in 2026 than in 2025 as recorded by the weather station at the Buffalo Bill Dam. Warmer winter and early spring temperatures may have contributed to earlier nesting activity this year.

Nestling ages also varied considerably between sites. That variation may reflect differences in breeding timing among pairs, or it may indicate that some pairs attempted an early nest that failed and then renested later. Pinyon jays are known to renest when conditions are favorable, and resources are sufficient. Given the strong limber pine cone crop we observed in 2025, it is reasonable to think that food availability may have supported multiple nesting attempts.

By mid-May we expect young to accompany adults in foraging activities. Look for a pink gape in the corner of their mouths, duller and more-gray plumage compared to adults, and begging behaviors. Listen for more raspy and frequent vocalizations, young jays are a raucous bunch!

Photos below: Nest searching requires an attention to detail and awareness of aerial predators that may threaten the pinyon jays.

Above: A Pinyon Jay is fitted with a new Druid tag. Sliding a pencil between the bird and the tag ensures a good fit.

Druid Tags

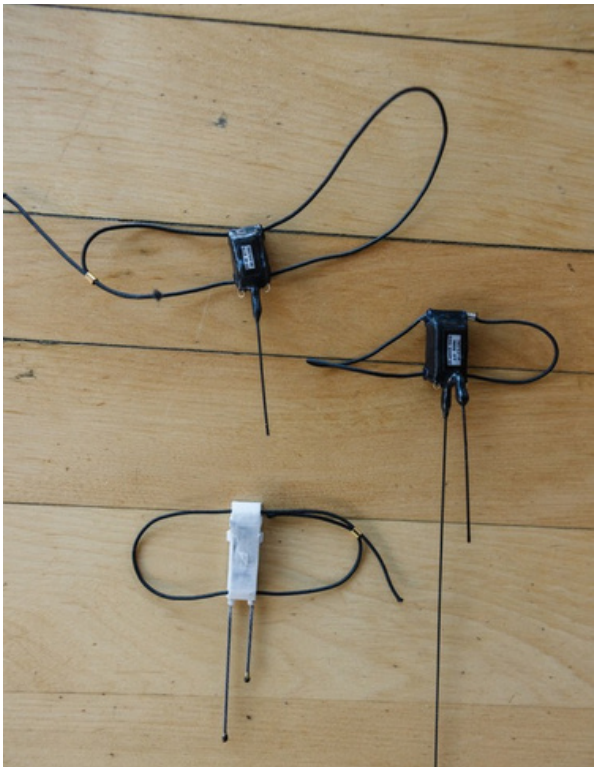
Jason Riggio

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

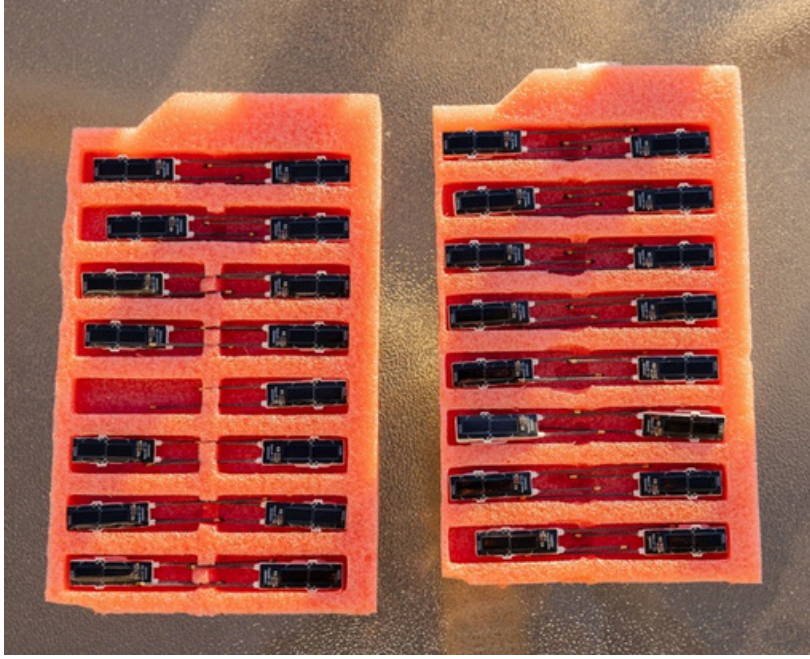
On a warm spring morning in the Bighorn Basin, a Pinyon Jay lifts off from a patch of pine-juniper woodland, joining its flock as they move across the landscape in search of food and nest sites. For years, movements like this have been mostly hidden from view, reduced to scattered observations or the occasional GPS point collected days apart. This field season, that is beginning to change.

Our Pinyon Jay project is taking a major step forward with the deployment of a new generation of GPS tags. These lightweight "NANO" tags from Druid Technology are among the most advanced tracking devices we've used to date, and they are already transforming how we study the movements of these highly social and wide-ranging birds.

So far, we've deployed 8 of these tags across 2 focal populations: 5 birds in the Thermopolis area, a new study area for our project, and 3 in our better-known Meeteetse flock. In just the first month since deployment, these tags have already returned an impressive 1,423 locations, a dramatic increase compared to what we've been able to collect with earlier technologies. What once felt like isolated snapshots is beginning to look more like a continuous story.



Right: The project now uses three types of GPS tags – (clockwise top-to-bottom) Lotek store-on-board, Argos, and Druid NANO tags.



Left: A Druid tag carrying pinyon jay is released to gather data (aka go about its business). Right: Solar panels help the Druid tags charge, prolonging their life span and increasing the amount of data they can gather.

In previous years, we relied on a combination of Argos satellite tags and store-on-board GPS units, each with important tradeoffs. Argos tags allowed us to receive data remotely, but only at an infrequent interval of roughly one location per week for a year. Store-on-board tags collected a point per day with a year of battery life, but we could only retrieve those data if we were able to recapture the same birds, which is no small feat for this intelligent and wide-ranging species.

The new NANO tags help bridge that gap. These devices strike a careful balance between weight, battery life, and data transmission. Like our previous tags, they use high-precision GPS, with location accuracy of just a few meters. However, they offer two key advances. First, they are equipped with miniature solar panels and rechargeable batteries, allowing them to collect dozens of GPS locations per day under good conditions. Second, rather than transmitting data via satellites or requiring recapture, NANO tags use long-range Bluetooth technology. When birds come within range of a receiver, such as a phone or a dedicated base station, the tags automatically download stored data, sometimes from over a kilometer away. This approach conserves battery life while still delivering high-resolution data in near real time.

What does this mean for our research? In short, we can now see Pinyon Jay movements in unprecedented detail. Instead of a single point every few days, we can track how birds move across the landscape throughout the day, where they forage, where they rest, and how they travel between habitat patches. Even at this early stage, the volume of incoming data is remarkable. With over 1,400 locations already collected, we are beginning to build a much clearer picture of how these flocks use their home ranges. As more data accumulate, we expect to refine our estimates of home range size, identify key foraging, caching, roosting, and nesting areas, and better understand how seasonal changes shape movement patterns.

Of course, these new tags are not without limitations. Because they rely on solar charging, performance can vary depending on weather conditions and whether the solar panel remains exposed above the feathers. Data transmission also depends on birds periodically coming within range of a receiver, so there can still be delays in downloading information. However, the tags store data onboard until a connection is made, ensuring that valuable observations are not lost.

As we continue deploying these tags and monitoring incoming data, we're excited to see what new insights emerge. Each GPS point adds another piece to the puzzle, helping us better understand the ecology of a species that has experienced significant population declines across much of its range. What was once largely invisible is now coming into focus, one movement at a time.

Lucky #4

Jason Riggio
Assistant Project Scientist,
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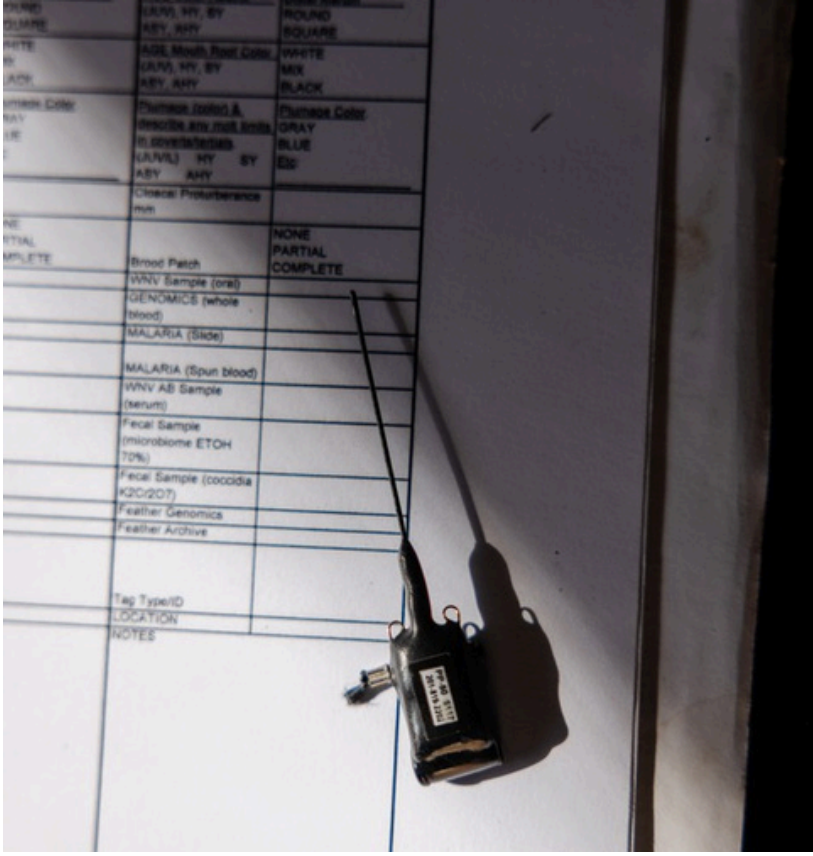


A store-on-board GPS unit, like the one above, was removed from 1713-07604

Some birds just seem to have luck on their side. "Lucky #4," was the fourth pinyon jay captured during our project, This bird, color-banded in Meeteetse on April 24, 2024 (red over silver, white over green), has now been caught an incredible four times. We recaptured #4 on June 21, 2024, and fitted it with store-on-board tag 4933. Nearly a year later, on May 24, 2025, we caught the same bird again and recovered that tag, yielding a treasure trove of 450 GPS locations. Hoping to build a long-term record from the same individual, we redeployed a new tag (5118). Then, remarkably, on April 11, 2026, we captured Lucky #4 for a fourth time, recovering another 431 locations. Of the dozens of tags we've deployed, only one remained unused that day, and by pure coincidence, it was the original tag #4933. We couldn't resist: Lucky #4 was fitted once again and sent back out with the Meeteetse flock. Here's hoping this remarkable bird continues to live up to its name, and that we'll see it again next season. Until then, we'll be piecing together the story told by nearly 900 locations spanning 22 months from this incredible bird.

Learn more about Lucky #4's movements in the next newsletter!

Beyond the Bell Curve

Reconciling Individuals and Populations

Eric Atkinson
Professor & Biology Dept. Coordinator
Northwest College

In long-term studies of animals such as fish, insects, whales, small mammals, or birds in our own program there comes that wonderful, sometimes serendipitous moment when we reencounter a previously marked individual. That bounding word, individual, matters more now than it once did. With the emergence of Individual-Based Models (IBMs), ecology has begun to circle back to something many field biologists have always felt intuitively: that the organism itself is not noise around a mean, but the fundamental unit of ecological truth.

"Beyond the Bell Curve" continued on pg. 6

Pinyon Jay #4 has been captured 3 times. Photo from #4's first capture in April 2024.

Morphometric measurements, such as tail length (left), are taken from each individual but contribute to population-level patterns.

"Beyond the Bell Curve" continued from pg. 5

Historically, ecology and its nested discipline of wildlife biology and management leaned hard into populations as statistical constructs. We quantified means (averages), sometimes medians, rarely modes, occasionally ranges; we plotted migration distances, diet breadth, roosting time, fecundity. The intellectual scaffolding was sound and powerful, grounded in the Central Limit Theorem and its promise that aggregated variation converges toward a Normal distribution. Some of you might remember *The Prairie Home Companion*, "…and the children are above average." The Bell Curve became both a tool and, at times, a kind of conceptual destination. In that framework, individuals were often treated as interchangeable draws from a distribution; useful but ultimately subsumed into the population-level signal.

And yet, I've always been a bit skeptical of that approach. Not because it's wrong necessarily, it clearly isn't but because it feels incomplete. Much of that skepticism comes from two recurring features of my own work: first, my sample sizes are often small; and second, I am drawn, almost stubbornly, to the lives of individual animals. There is something irreducible there. I like watching individual birds like the Yellow Warbler I named Gamgee, who bred in our yard for three years running and kicked a West Nile virus infection. A bird is not simply a data point contributing to a mean wing chord or infection prevalence; it is a trajectory moving through space, accumulating condition, encountering pathogens, making decisions we only partially understand.

Population-level patterns then emerge from these individual trajectories, not from imposed averages.

This is where IBMs offer a kind of reconciliation. Rather than discarding the population, they rebuild it from the bottom up. Each organism carries its own states: body condition, infection status, behavioral tendencies, and as such interacts with a heterogeneous environment. Population-level patterns then emerge from these individual trajectories, not from imposed averages. Modelers have formalized this shift, but for many of us in the field, the intuition predates the formalism.

We see it clearly in larger, well-studied systems. Female grizzly bears in the Greater Yellowstone Ecosystem do not reproduce according to a single population-level rate; their success hinges on individual energy acquisition, diet composition, history, and spatial opportunity. Likewise, the Wyoming Migration Initiative has shown that mule deer migration is not a uniform behavior but a spectrum of strategies: timing, routes, risk tolerance played out by individual does teaching their fawns migratory routes across landscapes. How to get 'there and back again.'

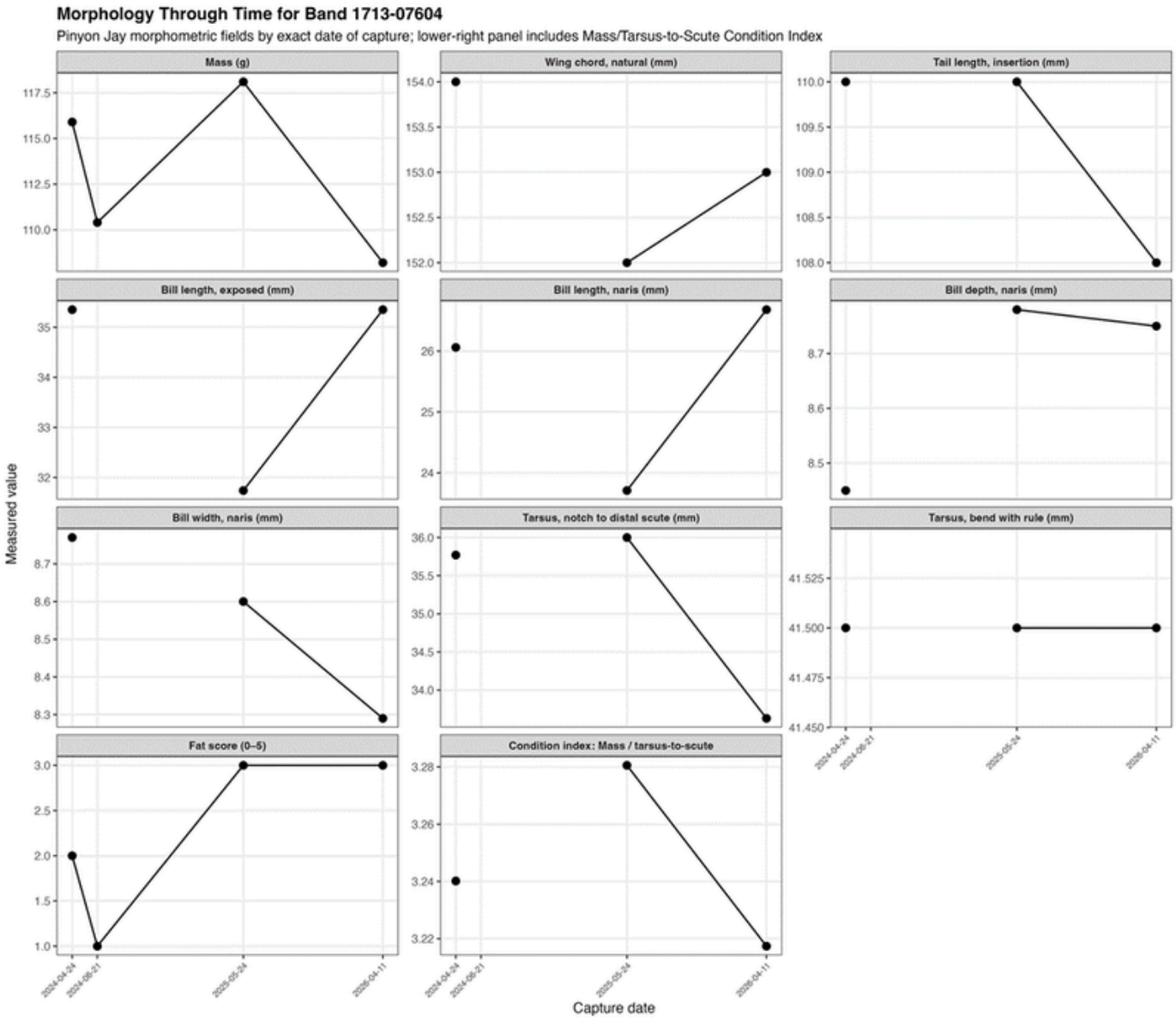
"Beyond the Bell Curve" continued from pg. 6

1713-07604

And so, we come back to our own birds. Pinyon Jay 1713-07604, encountered four times now, is not just a repeated measure; he is a narrative. The figure accompanying this piece makes that point visually in a way our older frameworks struggle to capture. Across successive captures, mass rises and falls (≈116 → 110 → 118 → 108 g), fat score climbs from leaner states (1–2) to more robust condition (3), and the mass-to-tarsus condition index peaks before declining again. Structural measurements like wing chord, bill dimensions, and tarsus remain comparatively stable with perhaps some measurement error involved, as they should, anchoring the individual's morphology while its physiological state fluctuates around that scaffold. That said, bird bills are living tissue producing keratin, so even there fluctuations may occur as the bill lengthens and shortens due to use.

What emerges is not noise, but pattern; a living organism moving through seasonal and ecological space. A gain in condition followed by decline; a body responding to resource pulses, energetic demands, perhaps even pathogen pressures. In a traditional statistical frame, these points might simply refine a mean or contribute to variance. In an IBM frame of mind, they resolve into a trajectory one Pinyon Jay navigating his environment through time, its state variables shifting in ways that matter for survival, reproduction, and disease dynamics.

That, to me, is the real promise here. Not the abandonment of population thinking, but its enrichment. The Bell Curve, as do other population models, still has its place but alongside it, and perhaps beneath it, are the lived paths of individuals. And occasionally, if we are fortunate as we have been with 1713-07604 we get to follow one just long enough to see that those paths are not random at all, but the very mechanisms by which populations take shape.



Recent Highlights

Birds are now banded and carrying GPS tags in Thermopolis, Wyoming!

Collaborator Frank Stetler, a non-game biologist leading the Wyoming Game and Fish Department's state-wide research on pinyon jays joined us in the field. More to come!

The project banded our first nestlings! Because the lower leg (tarsus) reaches near-adult size early in development, the USGS band will remain the correct size as the birds grow. In the future, these bands may help us learn more about lifespan and dispersal.

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.