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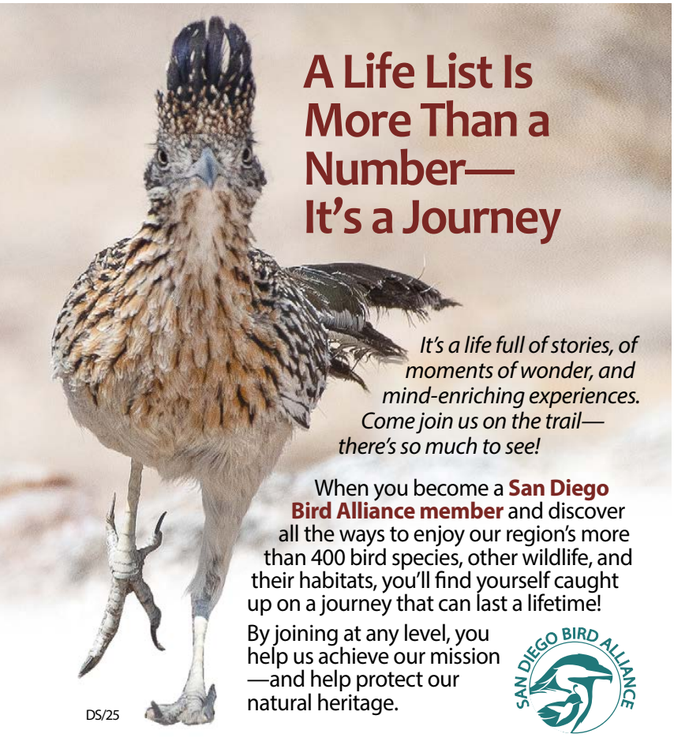

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DS/25

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Sketches SAN DIEGO BIRD ALLIANCE

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Sketches
SAN DIEGO BIRD ALLIANCE

Celebrating More than 75 Years of Protecting Birds

SUMMER 2025 • VOLUME 76 • NUMBER 3

UMWELT

A bird knows its world, its *umwelt*, through six senses.
Human activity is scrambling their signals.

40 American Avocets and a single Black-necked Stilt huddle in the morning chill at Famosa Slough.
Photo by Timothy Stump

Umwelt *Making Sense of Birds' Senses*

"The only true voyage would be to possess other eyes… to see the hundred universes that each of them sees." Marcel Proust

Thoughts from David Stump

When we think about natural habitats, we tend to focus on the things that we can physically preserve or rehabilitate. We add up acreage, monitor water levels, track shifts in the population numbers of our species of interest, and, as a doctor would, "check the blood work" that provides a glimpse into the overall health of the system. These things are all critical. But there is another dimension to the livability of a given habitat that can give us a deeper, more comprehensive understanding of the realities its plants and animals face, and perhaps new ways to address the challenging work of conservation.

This other dimension is embedded in the concept of *umwelt*. Developed as a biosemiotic theory by the German biologist Jakob von Uexkull in 1909, *umwelt* (a German word for "environment" or "surroundings") can be described as an animal's perceptual awareness of its environment as gathered through all its senses—plus the neural processing required to meaningfully interpret them. It is this model, this functional reality, that the animal actually "lives in." Its behaviors are shaped and guided by the totality of its perceptions, and those perceptions are finely tuned, in a healthy ecosystem, to connect to the real world. Different senses may fuse into a continuous flow of signals and signs as the animal navigates through its habitat.

What do we really know, what *can* we know, about the sensory worlds (*sensescapes*) animals live in? The differences, as they are discovered through research, help us understand each individual species' umwelt. But can we gain enough insight into how birds and other wildlife perceive their habitats that we can develop better strategies for helping them survive? We're beginning to find some answers, though we have much, much more to learn.

Most birds function with the five core senses—sight, hearing, touch, smell, and taste—on levels comparable to or superior to our own, but with the addition of electromagnetism (*magnetoreception*). They have additional sensory capabilities such as balance, pain, and temperature, as do we. As with humans, sight is the primary sense for most bird species. Sight involves more than acuity (sharpness of detail), and color (what part of the spectrum is seen), but also the speed of processing the signals sent to the brain. Raptors and some other groups of birds seem to have extraordinary acuity, with (by metaphor) Blu-ray eyes compared to our comparatively blurry VHS eyes. And they're processing at speeds that would let them see distinct frames in a movie instead of the continuous motion we experience at 24 frames per second.

A playful Raven enjoys its senses of touch and balance.

One of the givens of civilization, at least what is left of Western Civilization, is the structuring of time. The past/present/future we live in is embedded, it appears, in our senses as they are interpreted within our cultural "fishbowl." Our sense of time is at least in part shaped and bounded by our experience of motion—and birds may be even more keenly attuned to motion than we are. Does a Peregrine Falcon stooping at nearly 200 mph experience time slowed down, so it can better calibrate the life-threatening velocity of its dive on an unsuspecting pigeon? It may be akin to slow-motion photography. Our time awareness is partly spatial, in that it subjectively compresses or expands the spaces, real or visualized, we move through. How similar that may be to birds or other animals is an interesting question. The thought to consider here is the difficulty of objectifying actual perception, either ours or a bird's.

What can we learn from birds about time? Humans are building quantum computers and have developed powerfully accurate quantum clocks. Research indicates some birds navigate their migration routes by means of quantum effects. In their article, "How Migrating Birds Use Quantum Effects to Navigate," which was published in *Scientific American* in April 2022, Peter Hore and Henrik Mouritsen note, "Our experimental evidence suggests something extraordinary: a bird's compass relies on subtle, fundamentally quantum effects in short-lived molecular fragments, known as radical pairs, formed photochemically in its eyes. That is, the creatures appear to be able to 'see' Earth's magnetic field lines and use that information to chart a course between their breeding and wintering grounds." (Please review the article on pages 4–5 for some eye-opening facts about other ways birds experience the world.)

A Song Sparrow gathers nesting material, only to drop it a minute later for reasons of its own.

How an animal behaves is an expression of how it reads all the stimuli it processes moment to moment. When a species' umwelt interacts with the *umwelten*—the combined sensory unwelts of all the species in a biome—a richly complex network of biocommunications is created. This network sustains the whole biocommunity. When a species or group of species are in some ways "blinded" by limitations or distortions to how they can read their sensescapes, their vulnerabilities increase, and their presence in the habitat may dwindle or even vanish,

"I have been surprised many times to learn things we share with birds, and just as surprised to learn how different we are."
David Allen Sibley

thereby reducing the habitat's biodiversity.
For us, seeing may be believing, with our other senses reinforcing our convictions of what is real, but for birds seeing is about daily survival. When a Barn Owl goes hunting, for example, its ability to find its prey in near total darkness is diminished when the artificial lights that create our perpetual twilight make it more visible to the mouse it's tracking, and the sound of passing traffic muffles the precise triangulation it uses for a successful hunt. Another example is a male Spotted Towhee, perched on the highest branch of a Laurel Sumac, who must sing louder and longer to be heard through the constant white noise of an urban environment, sapping the energy it needs to summon a mate and making him more vulnerable to predators. Or consider Black Skimmers, the only birds with vertical pupils (natural sunglasses, as some call them), which enable them to see more clearly into the shallow waters they fish. Their hair-trigger reflexes are set to snap shut if they touch anything that feels like prey. Many skimmers have chipped or broken their lower mandibles by snapping shut on human junk in their trolling lanes.

In addition, the perpetual kinetic activity of our human presence may be causing chronic stress to birds, who are hardwired to be constantly alert to approaching threats and challenges (something like an air traffic controller). You have probably dealt with the challenge of birding on a trail heavily used by weekend joggers and hikers, who often are moving swiftly, talking loudly, or walking dogs. Now try to imagine a bird's experience of that same trail. A nesting Golden Eagle may be stressed to the point of abandoning its nest simply by the distant sights and sounds of unknowing hikers or climbers far from the bird's cliff-side perch. Can we realistically dial down the sensory disruption and confusion humans create and help normalize the umwelten of our remaining wild ecosystems?

Dinosaurs in the Anthropocene

We humans strive, by design and investment, to learn what we do not yet know. We desire to increase our understanding not only of our own habitats but of the entire biosphere—and beyond. It might be stated that all the natural sciences rely on technologies that greatly extend our biological senses, and that equip us to generate mathematical models that interpret the data provided. Whether it is with the James Webb telescope, built with the precision and clarity to see in detail galaxies nearly 13.5 billion light years away, or the advanced particle accelerators such as CERN, which can trace the paths of impossibly small subatomic fragments that exist for a tiny fraction of a second, our thirst to see, hear, and touch is insatiable. This thirst is deeply embedded in our own expanded umwelten, along with our other civilizational impulses.

Unfortunately, our ability to shape our environment to our own purposes has proceeded faster than the maturity needed to live wisely within nature, or the ability of plants and animals to adapt to the changes needed to coexist with us. It is by the insights of our senses, and the way they inform our attitude of dominion, that we modify

This Northern Mockingbird and Cooper's Hawk were perched in the same sycamore in the Tecolote parking circle, with the mockingbird on the highest twig issuing warning calls. Suddenly it dove, with the hawk simultaneously swooping after. The mockingbird won the short chase, barely. Photos by DS.

our environment, how we set the thermostat (so to speak) to our own liking, without serious thought to the consequences for the rest of the biosphere. We expect that what is fine for us should work fine for other living organisms. We now know that doesn't work in the long run, even for us humans.

It might be useful (though broadly speculative) to say that we have a core *hominid* umwelten, greatly expanded through our multilayered *cultural* umwelten. Expanded, but apparently not transcended. One way to describe (though not without controversy) the dominance of our umwelten is to say we now live in the Anthropocene: The Age of Humankind. Birds, science has revealed, are living dinosaurs, tracing their lineage back to the Jurassic. They've successfully adapted and survived time and again. Can they survive the Anthropocene?

Living with Feelings

One of several reasons that biologists are quick to challenge some interpretations of animal behavior as "anthropomorphic" is to avoid the patronizing assumptions about animals alluded to above. But a new perspective is emerging—a new freedom to talk about animal feelings, motivations, and relationships, even consciousness. Many researchers, though still cautiously playing by the old rules, see very humanlike behaviors in some animals, including some birds.These observations go beyond problem-solving and tool-making skills to more complex emotional capacities such as playfulness, grieving, empathy, deceptiveness, and a personal bonding that at times looks suspiciously like friendship, loyalty, and mutuality. We recognize these

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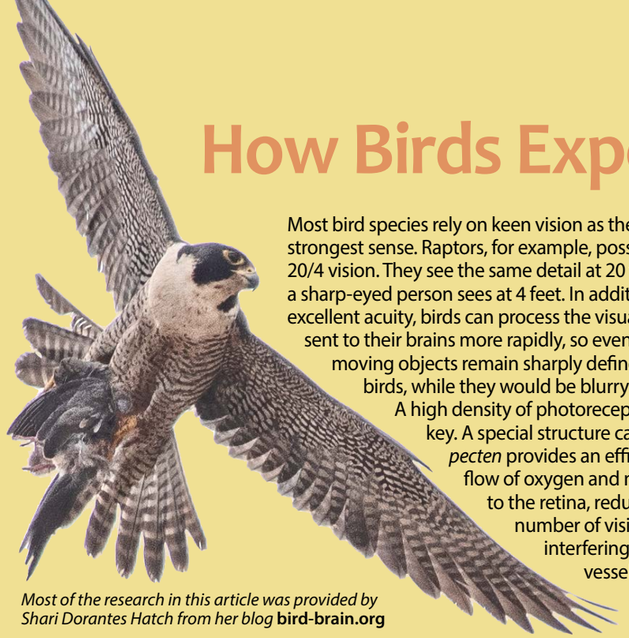
How Birds Experience Their World



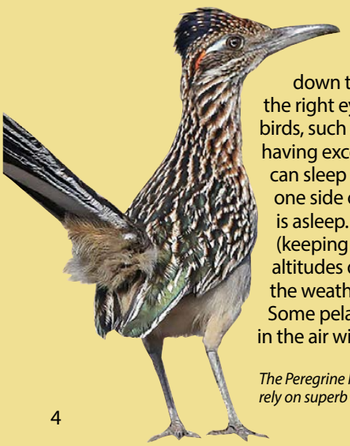
Most of the research in this article was provided by Shari Dorantes Hatch from her blog **bird-brain.org**

SIGHT

Most bird species rely on keen vision as their strongest sense. Raptors, for example, possess up to 20/4 vision. They see the same detail at 20 feet that a sharp-eyed person sees at 4 feet. In addition to excellent acuity, birds can process the visual signals sent to their brains more rapidly, so even quickly moving objects remain sharply defined for birds, while they would be blurry to us. A high density of photoreceptors is key. A special structure called the *pecten* provides an efficient flow of oxygen and nutrients to the retina, reducing the number of vision-interfering blood vessels.

In our *foveae* (an area of concentrated photoreceptors on the retina), there are about 200,000 photoreceptors per square millimeter. Some birds, including raptors, have two foveae in each eye—one that acts like ours and one that magnifies distant objects. A House Sparrow has about 400,000 photoreceptors. The European Buzzard, a buteo similar to our Red-tailed Hawk, has about 1,000,000 photoreceptors packed in its two foveae. That's mega-pixels!

Like humans, birds have two main types of photoreceptors in the retina: *rods*, which see colorless images in low light, and *cones*, which see color but require brighter light. Our cones are sensitive to three basic colors—red, green, and blue—from which we perceive seemingly infinite variations. Many birds, in addition to seeing these three colors, can see ultraviolet light, thereby experiencing a broader and more intense color spectrum.



Many birds (e.g., chickens) use their right and left eyes for different tasks, such as looking upward for aerial predators and looking down to find food. Some birds also favor the left or the right eye—called "sidedness." Sidedness in some birds, such as parrots and corvids, may be linked to having exceptional problem-solving skills. Many birds can sleep with one eye open, which may indicate that one side of the brain is awake while the other side is asleep. Maintaining a 24/7 vigil against predators (keeping their critical survival edge) or flying at high altitudes during prolonged migrations (flying above the weather) give many bird species a great advantage. Some pelagic species can spend more than a full year in the air without landing.

The Peregrine Falcon, Violet-green Swallow and Greater Roadrunner each rely on superb eyesight to pursue and intercept swift-moving prey.

HEARING

As with their reptilian ancestors, birds have no external ear flaps (called "*auricles*"). In birds with feathered faces their ear holes are not visible, as they are covered and protected by feather tracts. The auricular tracts covering a Peregrine Falcon's ears are modified to give maximum protection against hearing damage that would be caused by the unmatched velocity of its 200 miles-per-hour stoop.

Generally, birds can hear sounds within the same ranges of *frequency* (pitch) and *volume* (loudness) as humans. By measuring the volume of sounds traveling toward a bird's eardrums from different angles, a study focusing on the hearing of crows and domestic fowl discovered that the sound coming to one ear would register at a different frequency than the same sound coming through the opposite ear.

The frequency differences enabled the bird's brain to determine the sound's location—whether above, below, or level with the bird.

The bird's head is able to reflect, absorb, or diffract sounds. This is most highly developed in owls, renowned for their acute hearing. Owls have distinctively concave-shaped facial discs that can channel barely discernible sounds to their ears.

Birds can rapidly process multiple sounds at once, detecting fine nuances within complex vocalizations. They can recognize individuals within a dawn chorus of multiple species. Birds' ears can also muffle loud noises better than human ears can. Remarkably, birds' ears continually replace sensory receptor cells throughout life, so they don't experience hearing losses due to injury or wear from aging.

Deep infrasound is apparently used by albatrosses to map distant weather fronts, enabling its navigation across featureless expanses of ocean.

Long-eared Owls and Acorn Woodpeckers rely on excellent hearing for hunting and communicating

TOUCH & BALANCE

Birds can much more precisely sense balance and equilibrium than humans can. Structures in their inner ears help them use gravity to detect which way their head is oriented, and to orient themselves in three-dimensional space. This enables birds to stand on one leg without wobbling—an ability which helps prevent heat loss.

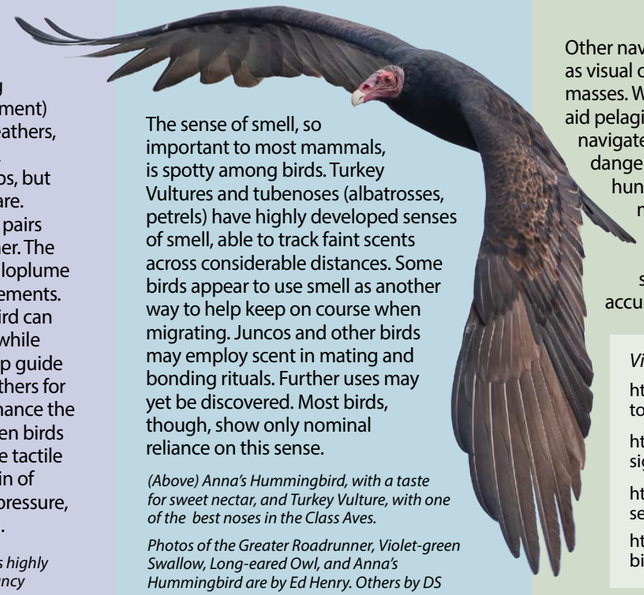
The sense of touch encompasses pressure, vibration, temperature, muscle tension, internal joint movements, and pain. Birds can also sense fluctuations in barometric (air) pressure; higher pressure makes it easier to fly. A bird's touch sensors can be found in their skin, tongue, palate, bill, muscles, joints, internal organs, and legs.

For flighted birds, the most important touch receptors are *mechanoreceptors* (detecting pressure, vibration, movement) in the skin attached to feathers, especially the *filoplumes*. Filoplumes have fluffy tips, but most of their length is bare. Typically, each filoplume pairs closely with a flight feather. The skin at the base of each filoplume senses the feather's movements. If a feather is amiss, the bird can make adjustments, even while flying. Filoplumes also help guide preening, aligning the feathers for flight. Filoplumes may enhance the effects of *allopreening*, when birds preen each other. There are tactile receptors deeper in the skin of many birds responsive to pressure, acceleration, and vibration.

(Top) Female Ruddy Duck with its highly sensitive bill and effortless buoyancy

TASTE & SMELL

Birds can taste the same flavors we do—sweet, sour, salty, bitter, and savory—but most birds' sense of taste is not as strong as ours because they have far fewer tastebuds (40–500 as opposed to 2,000–8,000). Taste receptors help birds identify food items for healthy consumption. For instance, insect eaters reject distasteful (bitter) caterpillars or other insects. Hummingbirds and other nectar feeders prefer sweeter nectar, and fruit eaters who crush the fruit before swallowing it prefer riper, sweeter fruits. Correspondingly, birds usually have minimal receptors for tastes they will never experience. Eagles do not have a "sweet tooth."



The sense of smell, so important to most mammals, is spotty among birds. Turkey Vultures and tubenoses (albatrosses, petrels) have highly developed senses of smell, able to track faint scents across considerable distances. Some birds appear to use smell as another way to help keep on course when migrating. Juncos and other birds may employ scent in mating and bonding rituals. Further uses may yet be discovered. Most birds, though, show only nominal reliance on this sense.

(Above) Anna's Hummingbird, with a taste for sweet nectar, and Turkey Vulture, with one of the best noses in the Class Aves.

Photos of the Greater Roadrunner, Violet-green Swallow, Long-eared Owl, and Anna's Hummingbird are by Ed Henry. Others by DS

MAGNETO-RECEPTION

Many birds—perhaps most—have magnetite particles in their heads, within the bill, skin, or nasal cavities. These infinitesimal particles can detect Earth's magnetic field, aiding in navigation. At least some birds also have magnetoreceptor cells in the retina of one or both eyes, which interact with visual photoreceptors. These receptors let the bird "see" Earth's magnetic field and use that sensory information to navigate. It's possible that a chemical mechanism based in the eye provides the *compass*, while magnetite receptors in the beak provide the *map*. The compass may detect the *direction* of the magnetic field, while the map detects its *strength*.

Curlews , such as this Long-billed Curlew, are excellent navigators.

Other navigation clues are important, such as visual orientation to the stars and land masses. Wind and water currents might aid pelagic birds. They must be able to navigate despite changes in the night sky, dangerous weather, exhaustion, and hunger. Some birds memorize their migration routes after a single trip, then recall them in reverse order for the return journey. Each subsequent migration improves its accuracy, and hence its survivability.

Visit **bird-brain.org** *for more info*

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qualities as inherently subjective, even personal—suggestive of human subjectivity and our sense of self. We are beginning to learn that the community life of at least several animal species exhibit behaviors that qualify as cultural, and that some legitimately appear to possess a sense of self. This may not be scientific blasphemy. Consider these words from David Allen Sibley's book *What It's Like to Be a Bird*:

"Instinct can't be blind obedience. It has to be subtle, to allow flexibility and choices. My growing sense … is that instinct must motivate a bird by feelings—of satisfaction, anxiety, pride, etc. I realize this is enormously anthropomorphic, but how else do we explain the complex decisions that birds make every day, balancing competing needs such as finding food, while minimizing effort and risk?"

For researchers studying animal behavior, the basic test for an animal's sense of self is the mirror test. If a mark is placed on the face of some corvids, or a bonobo or elephant, for example, and they're provided a mirror, and they touch the mark seen in their reflection, they know the reflection is theirs, and the mark is on their face. There is early but growing evidence that some animals, including some birds, can both make and respond to sounds that seem to identify individuals in their own group—that they have, in effect, names for each other.

Various attempts to teach animals the rudiments of human language are tantalizing (though not always convincing for everyone). Other long-held barriers separating humans from other animals, defended

> *"Senses that seem paranormal to us only appear this way because we are so limited and so painfully unaware of our limitations. Philosophers have long pitied the goldfish in its bowl, unaware of what lies beyond, but our senses create a bowl around us too—one that we generally fail to penetrate."* Ed Yong

for decades, seem to be falling, or at least cracking. If this trend in our scientific approach grows, it may open a new door for conservation. At this point I am imagining through my personal, subjective unwelt, and not speaking from confirmed science.

The passionately devoted biologists who study animal senses and their collective umwelten, many of whom are introduced in Ed Yong's *An Immense World*, seem to converge on certain conclusions. Perhaps the most promising one is the admission that getting inside the heads of these animals to actually see what they see and hear what they hear is not fully possible. Many such internal realities will always remain out of our reach. Why do I see this as promising? Perhaps most importantly, it may open the door to a new level of interspecies communication. True understanding is guided by humility. If that door opens widely enough, there is at least the possibility of human to wild animal communication on a cultural level. *Subject*, intrinsic to a sense of self, and *subjectivity*, intrinsic to culture, may allow the possibility for communication to flow both ways. That would not guarantee the end of the human war against nature, but it would give us hope.

Consider the Birds

Opinion Piece by Nick Thorpe

Birds share a lot of the same biological pursuits as humans—food, water, shelter, and opportunities to reproduce and raise young. Add in finding a mate, building nests, and avoiding being eaten, and you'll see that birds keep a full schedule! In the 21st Century, they are pursuing these goals alongside humans in spaces we conceptualize differently: city, park, wilderness, and the spaces in between. To the birds though, it's all *habitat*. As we go birding to find peace and joy in these shared spaces, let's consider the birds' *umwelt*, and their experience of us.

Birds are usually aware of us before we're aware of them. They have excellent vision and hearing, and often the advantage of available cover. Birds are always alert and typically wary of anything moving like a predator, as most birds are not on top of the food chain. For the most part, the birds you see have accepted the degree of risk inherent in having a human close to them. Respect a bird's personal space, approaching only if the bird is continuing its normal behavior—foraging, preening, etc. Try to be non-threatening in your approach—quietly walking diagonally toward the bird rather than straight at it and not staring at it like a predator would as you move. In most cases, standing still is the best way to prove to a bird that you're not a threat. Watching the bird's body language takes experience to learn but is a great indicator of the comfort/stress level of a bird and how close it will allow you to approach.

As was discussed in the Winter 2025 issue of *Sketches*, birds make a variety of vocalizations for a variety of purposes—attracting a mate, defending territory, staying in touch with other birds, and more. How often do we consider what we're "saying" when we play prerecorded sounds to try and lure a skulky bird out of a bush? There are many opinions, nuances, and not many quantitative studies regarding the use of playback and pishing sounds on birds. As bird lovers, we should avoid confounding or alarming birds with these sounds just to prompt them to behave as we want them to. Employing empathy in the field will help us reign in that impulse to cause disturbance for selfish gain.

Let's not let the thrill of the chase come at the detriment of the birds that allow us to enjoy them. There would be no birding without the birds! Learning the umwelt and language of birds helps us not only become better birders, but also better neighbors to our winged friends.

This Louisiana Water Thrush was in the middle of some controversy. Photo by Sandeep Dhar

A Quantum Theory of Bird Photography

by Sandeep C. Dhar

There's a memorable scene in *The Secret Life of Walter Mitty* in which our protagonist, Walter, finally tracks down the elusive photographer Sean O'Connell on a Himalayan precipice. He watches as Sean lines up a shot of a snow leopard—the "ghost cat"—in his viewfinder. It's the shot of a lifetime. The leopard then meets their gaze and emits an inaudible call. "When are you going to take it?" Walter asks. But Sean never presses the shutter. "Sometimes I don't," he explains, a gentle smile on his lips. "If I like a moment, for me, personally, I don't like to have the distraction of the camera. I just want to stay in it."

It's a scene that resonates deeply with me—a quiet rebellion, a profound choice for presence over proof, a stand against the camera's purely acquisitive nature. And it contrasts starkly with a certain frenzy I often witness (and have felt myself) in bird photography. As a participant in this world myself, I've observed how the drive for that "epic" or "rare bird" shot, fueled by cameras voraciously capturing scores of images per second, often tramples on the very naturalistic wonder we profess to be pursuing. It risks turning our being in nature into a mere transaction of ones and zeroes, reducing the experience to a checking of a box and the moment to something to just capture, collect, and display for later.

Photographer aims at a Least Tern (in circle). Photo by Sandeep Dhar

Years ago, when I first acquired my telephoto lens, it was a transformative and novel experience. Bird photos now emerged with unprecedented detail—every feather barb, every glint in the eye, and I began to crave that crystalline detail. One spring I found an Allen's hummingbird nest in my backyard. Hummingbirds had nested there before, but this one was practically at eye level—a tiny, lichen-camouflaged cup tucked into the fork of a slender branch. I quickly set up a makeshift hide. When the chicks were a couple of weeks old, I could see their minute heads peeking above the rim as their mother fed them. Yet, the images weren't quite perfect. A single, leafy twig drifted in front of the nest, softening the focus on those crucial interactions between mother and chicks. What harm, I reasoned, in gently pulling that twig aside, securing it to a neighboring branch with a discreet piece of green string? Seizing a moment when the mother was away, I made the adjustment—a fractional change, I told myself, to "dress" the shot for that coveted sharpness. A week later, the nest was empty, the branches in shambles, a portion of the nest missing. Perhaps it was the neighborhood Cooper's hawk, a scrub jay, or a wandering cat. I'll never know but I felt that my subtle shift had inadvertently flagged the nest, making it fatally conspicuous.

That incident became my personal ground zero, the genesis of what I've come to call the "Quantum Theory of Bird Photography"—the understanding that our actions as bird photographers, no matter how seemingly insignificant, carry the potential to alter the delicate balance of a bird's habitat, its behavior, and ultimately, its safety. ***The observer, I believe, is never truly separate from the observed.***

Nowhere do I see clearer echoes of my former photographic self than at the shores of Imperial Beach during the nesting season of Western Snowy Plovers and California Least Terns. I have often seen photographers, sometimes in small congregations, inching closer, then closer still, to a nesting bird, or worse, chasing a fleeing chick to get a marginally better angle. Technically they are staying outside the twine-and-stick fence set out by U.S. Fish & Wildlife Service, but to ignore the dive-bombing terns or the panicking chicks reveals an act of consumption and the lack of appreciation for our urban wildlife. When I've gently approached some of these photographers to suggest keeping greater distance —explaining that stressed birds may abandon nests, that chicks separated from parents face predation, that our presence alone can alter critical behavior—I'm often met with dismissive shrugs or defensive explanations about staying "on the right side of the fence." The principles of ethical bird photography, it seems, have been reduced to mere technicalities rather than understood as a deeper covenant with the wild.

How did we get here? One wonders, watching the relentless pursuit of yet another razor-sharp photo, if the photographer is truly experiencing the thrum of the wild, or merely succumbing to a sophisticated form of acquisitiveness, an itch scratched by the sophistication of camera gear and the fleeting dopamine hit of social media validation. I have seen paths blazed through the sensitive salt marsh of the estuary—perhaps to get a marginally better angle on a foraging egret? Is this really a communion with nature? As Henry David Thoreau mused, "The question is not what you look at, but what you see." Are we really "seeing" the bird, its intrinsic worth, its beauty, its life, its struggle for survival in an increasingly deprecated habitat?

A burgeoning number of posts on social media now thoughtfully include information about the bird itself, perhaps detailing its migratory marvels or the delicate intricacies of its life cycle. I can sense a pivot toward emphasizing the welfare of the bird, moving beyond the photographer's acquisitive triumph.

When we frame the Great Blue Heron not as an isolated subject but as part of the ecosystem that sustains it, we are learning to layer the image with context and narrative and responding with a sensitivity that honors both the bird and the craft. In doing so, we have discovered what Sean O'Connell knew instinctively: that our restraint can be as creative as our pursuit. The true joy then isn't just the images we take home and share, but the serendipity that comes when we allow nature to reveal itself to us. The reward is a deeper connection we have forged—not just with our subject, but with our own capacity for patience, respect, and genuine wonder.

Sensational Shorebirds of San Diego

by *Shari Hatch*

San Diego's 30-plus shorebird species have superlative vision to find prey, avoid becoming prey, and fly swiftly without crashing. For example, Marbled Godwits can fly up to 24 mph and Least Sandpipers can fly up to 52 mph! Several features of birds' eyes help them see better than humans, such as their high density of photoreceptors. Unlike many songbirds, shorebirds don't need exceptional color vision; their plumage is mostly browns, grays, whites, and blacks—camouflage coloration. Each large shorebird eye faces sideward, so shorebirds lack binocular depth perception. Instead, they move their heads to figure out the relative distance of objects.

Tides affect when prey is available, so most shorebirds feed throughout the day or night. Short-billed turnstones, phalaropes, and plovers forage visually, putting them at a disadvantage in dim light. Whimbrels don't see well at night, so in dim light, they forage more slowly, in smaller areas, and with closer prey. Greater Yellowlegs forage visually in daylight, but with poor nocturnal vision, in darkness, they switch to catching prey by touch. Other shorebirds, such as Long-billed Curlews, Marbled Godwits, Willets, Black-necked Stilts, and American Avocets, can forage using both visual and tactile strategies.

By using tactile foraging, many shorebirds can feed in dim light or near-darkness. The bills of tactile foragers are densely packed with *mechanoreceptors*, differentiating potential food from non-food such as mud, sand, or pebbles. When probing into mud or sand, tactile sensors can detect pressure, movement, or vibration created by invertebrate prey. In addition, many shorebirds can sense vibrations within mud or wet sand, through their toes. Western Sandpipers and Least Sandpipers mostly use touch to detect buried invertebrate prey. Sanderlings mostly use touch to find prey, but they also spot prey visually and can use taste to sense prey in wet sand or mud.

Even visual foragers such as Plovers, Spotted Sandpipers, Black Turnstones, and Black Oystercatchers have touch sensors in their bills, mouths, and tongues to differentiate food from non-food, and to help position food for maneuvering and swallowing.

Many shorebirds have excellent senses of smell; most can use smell to find food, recognize other birds, choose mates, and navigate. Many birds have remarkable anatomy for detecting odors through specialized scent receptors in their nasal passages, which send signals to the brain's olfactory bulb to interpret these signals.

Birds' taste receptors are on the base of the tongue, the palate, and the throat, which can detect the same five flavors we possess.

Almost two thirds of shorebirds migrate thousands of miles to and from breeding grounds and wintering grounds, using visual landmarks and guidelines such as coasts and mountain ranges, rotations of the sun or the stars, wafting smells, wavering sounds (especially low-frequency sounds), and magnetism! (See "How Birds Experience Their World" article on page 5 for more information about magnetoreception.)

Long-distance shorebird migrants include Sanderlings, Black-bellied Plovers, Greater Yellowlegs, Least Sandpipers, Red-necked Phalaropes, and Western Sandpipers. Willets and Marbled Godwits migrate short, intermediate, or long distances. Three shorebirds migrate intermediate or long distances: Whimbrels, Spotted Sandpipers, and Semipalmated Plovers. Killdeers and American Avocets migrate intermediate distances. Three other shorebirds migrate short to intermediate distances: Black Turnstones, Black-necked Stilts, and Long-billed Curlews.

Shorebirds are truly sensational!

Photo by Karen Straus

Photo by Karen Straus

Above: Sanderlings in their winter whites and a Ruddy Turnstone searching for molluscs.
Below, top row: Western Sandpiper, Greater Yellowlegs, and Semipalmated Plovers
Bottom row: Black Oystercatcher, Red-necked Phalarope and Whimbrel.

Willets (shown right) patrol the water's edge looking for crustaceans such as this striped shore crab. The wide variety of beak shapes and sizes, from Long-billed Curlews (see page 5) to the dainty plovers shown below, allow many species to use the same feeding grounds without directly competing.

Few shorebirds can flash such a dramatic visual alert as the bold black and white flight feathers of the otherwise low-key Willet.

The Marbled Godwit is one of the more common shorebirds along our coastline, and is often seen in the company of Willets.

Photo by Ed Henry

Photo by Ed Henry

Willet photos by Timothy Stump

Uncredited photos by DS

Through Their Eyes

Awakening Umwelt *at Silverwood Wildlife Sanctuary*

By Sandy McCann, Director of Education

At Silverwood Wildlife Sanctuary, learning doesn't begin with a textbook—it begins with a shift in perception. Through the *Silverwood Science Discovery* school program, San Diego Bird Alliance invites young learners to explore nature not just as observers, but as participants. It's a rare chance to step into another being's *umwelt*—to consider how a rattlesnake senses the warmth of a sunlit rock, how a bird watches the landscape from above, or how a plant thrives in silence and wind.

For the 70 fourth-grade students from Lindo Lake Elementary who visited this spring, Silverwood offered more than a field trip. It offered a new way of seeing the world.

"I saw an animal face-to-face, and it was fun," one student recalled after an encounter with a rattlesnake. Another said, "It was my first time going hiking up a hill… I felt like I was brave." Their awe was visceral. Hummingbirds darted into view. Trapdoor spider holes, gall wasp nests, and sunburst rock formations sparked fascination. And for some, it was their first time using binoculars—learning to scan the canopy the way a hawk might.

One student said quietly, "I thought nature was just nature. But I heard a lot of animals." In that moment, their umwelt expanded. They no longer stood outside of nature looking in. They were part of it—noticed by birdsong, greeted by wind, changed by the land. Educators watched this sense of interconnectedness happen in real time as they witnessed their students light up with curiosity. "The observation deck was really special," one teacher reflected. "It made nature a much more tangible idea." When students learned how even brushing a leaf can change its course, they began to understand their impact and the unseen threads that bind us to the natural world.

At its heart, Silverwood teaches that to care for nature, we must first try to understand it—not just from our own point of view, but from within the experiences of the species who live there. That is umwelt. That is the gift of standing still long enough to hear a bird's alarm call or to imagine how a plant feels the dew on its leaves. In a world of noise and speed, Silverwood offers a quiet invitation: Come see the world as others do.

Photo by Natalie Ruane

A Bloomin' Blue-eyed Success: *San Diego's New, Official City Flower*

by Rebecca Kennedy, Communications Manager

San Diego has a new city flower!

We are thrilled to announce the completion of the "Your City, Your Flower" project, a collaborative effort that has culminated in the selection of San Diego's new official flower: the native Blue-eyed Grass *(Sisyrinchium bellum)*.

The journey began with the formation of a diverse stakeholder working group, including Indigenous partners, biologists, community members, and representatives from environmental organizations, educational institutions, and businesses. Together, they developed a detailed set of criteria to guide the selection process. The goal was to choose a flower that is native to the region, culturally significant with Kumeyaay ethnobotanical value and an 'Iipay and/or Tipay name, ecologically beneficial, resilient to climate stress, and representative of San Diego's cultural and natural identity.

In March, the public was invited to participate through a fun and engaging bracket-style voting competition known as the "Floral Faceoff." More than 7,750 San Diegans voted in head-to-head rounds to decide which bloom best captured the spirit of our city.

It was a tight race! But the people have spoken, and Blue-eyed Grass, a vibrant, purple-flowering member of the iris family, came out on top. While its name suggests otherwise, it's not actually a grass, but it does grow low to the ground, spreading color across meadows, coastal bluffs, and hillsides. Its beauty is matched by its practicality—it's drought-tolerant, fire-resistant, and a vital resource for local pollinators.

Choosing a native flower as the city's symbol reflects our region's commitment to sustainability and conservation, and it honors the unique biodiversity of the county.

Have you seen Blue-eyed Grass lately? Consider planting it in your yard, sharing its story with friends and neighbors, or simply keeping an eye out for its striking blooms on your next walk through a canyon trail.

The City's new flower goes by several names: Common English: Blue-eyed Grass, Common Spanish: pasto de ojitos azules, 'Iipay (Kumeyaay language): Aa kuushaaw, Latin Name: Sisyrinchium bellum.
Photo by Natalie Ruane

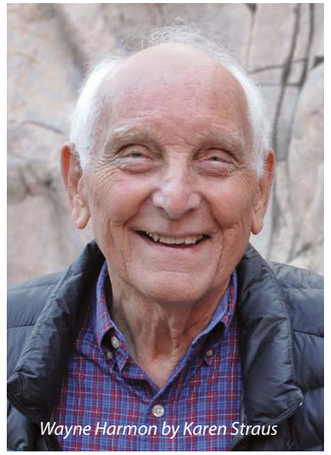
In Memoriam

Remembering Two Champions of Birds and the SDBA Mission

by Rebecca Kennedy, Communications Manager

A Life in Flight: Remembering Wayne Harmon

We are deeply saddened to share news of the passing of Wayne Harmon, a beloved friend of San Diego Bird Alliance. Wayne's contributions to bird conservation, education, and our broader community were immense, but what we will remember most is his joy, generosity, and love of birds.



Wayne Harmon by Karen Straus

His interest in birds began early, nurtured by a childhood around chickens and pet birds that his mother kept. That spark never left him. A natural observer with a curious mind, Wayne studied geography at San Diego State University and went on to teach the subject at Grossmont College, inspiring countless students to see the world with greater depth and care. His travels took him far—living in England and taking a sabbatical in France—but wherever he went, birds were not far behind.

Birding became a central part of Wayne's life after a chance encounter on a weekend hike in the San Diego River Estuary, where he and his wife Margaret met Bill McCausland leading an outing with San Diego Audubon. From that day forward, birding became a weekly ritual, an adventure they would share together nearly every weekend. His involvement with the organization grew steadily from there. He served on the board for many years and was president from 2003 to 2005. He was also a committed member of the Conservation Committee, advocating for wetland protection, climate resilience, and urban habitat conservation. Along with Mike Matherly, Wayne co-founded *Avian Adventures*, a creative fundraising effort for San Diego Audubon that led birding trips across Oregon, Washington, Panama, and beyond.

Wayne and Margaret's love of birds was not just a hobby; it was a way of life. For 58 years, they made their home into a sanctuary for wildlife, filling the property with native plants and refusing to use any pesticides or herbicides. They're convinced it's known by the birds on the Pacific Flyway. And we believe it is, too.

Those who knew Wayne remember his twinkly-eyed smile, his sincerity, and his capacity for delight—whether dancing, lingering for hours in an art museum, or learning French just to share more with the woman he loved. As Margaret put it: "He was the best husband. How many guys will do all that?"

Wayne's legacy lives on in the birds overhead, the landscapes he helped protect, and the countless people he inspired.

Dave Povey: A Legacy on the Water

The San Diego birding community recently said farewell to one of its most cherished members, Dave Povey, whose passion for seabirds and dedication to sharing that love with others left a lasting impact on everyone who knew him.

Dave was an active part of the San Diego birding community, where he served as president of the San Diego Field Ornithologists for a time, planned and organized pelagic birdwatching trips off the San Diego coastline, and conducted Christmas Bird Counts across the county. Dave was always eager to help someone find their lifetime bird. He himself wouldn't hesitate to drive for hours to seek a rare bird reported as sighted. He absolutely loved when young folks joined bird trips, so he could share his knowledge and enthusiasm.

He was known for his kindness, patience, and generosity. He dedicated himself to the service of others. It has been said about Dave, "That is the blueprint of a good man."

On the morning of April 13, friends and family gathered at sea for a special pelagic trip to celebrate his life.

During the three-hour tour, seabirds appeared as though in tribute—jaegers, phalaropes, and shearwaters gliding across the swells. At the moment Dave's ashes were scattered into the ocean by his family, a fin whale surfaced just 20 feet from the boat. "David loved the ocean his entire life. In that moment, the sea paid its respects," said his fiancé, Teri.

A fixture on local pelagic trips, Dave was known for his role in "chumming the gulls"—casting popcorn or fish scraps to attract birds and stir excitement among fellow birders. In a final gesture of remembrance, each person aboard was invited to toss a handful of popcorn into the sea, a ritual of joyful noise and fluttering wings in his honor.

Dave's enthusiasm and deep knowledge of the sea created lasting memories for countless people in the birding community. His legacy lives on in the seabirds that ride the ocean winds and in every birder who looks to the horizon, hoping to catch a glimpse of something wild and wonderful.

Dave Povey and gull chums. Photos by Bruce Rideout (inset) and Nancy Christensen