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Nurturing Biophilia: Merlin and Sanderling

Donald J. Burgess
Western Washington University, don.burgess@wwu.edu

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Don Burgess (**don.burgess@wwu.edu**) is an associate professor of Science Education and Secondary Education at Western Washington University, Bellingham, Washington 98225 U.S.A.

The author develops a narrative of Merlin predation to illustrate the growth of biophilia. Initially descriptive, the story evolves by following an iterative process of questioning and relationship building, which leads to an informed and purposeful application of biophilia.

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Eager to study natural history, adult students have gathered at an Audubon Camp on the Maine Coast. We have explored the Wreck Island Great Blue Heron colony and farther out, Eastern Egg Rock where Atlantic Puffins breed. Geologic explorations of the rocky points have provided a foundation for our study of the surrounding intertidal and forest communities. Bird banding has demonstrated migration, longevity, and behavioral adaptations. All of this experience is balanced with focused studies in the Queen Mary Lab. Formally a chandlery, the lab houses marine organisms, hundreds of stuffed birds, and the general tools used to study nature. Overall, the setting is a perfect place to nurture a love of nature.

Today, we take our spotting scopes and binoculars to an isolated mainland beach, an hour south of the Audubon Camp. As an ornithology instructor at Hog Island for a half dozen summers, I have come to cherish this field trip that offers intimate views of a variety of birds. As we drive on country roads, students chatter excitedly about their hopes, concerns, and motivations to study natural history in Maine. Several experienced teachers from the Midwest hope to bring nature study to their classrooms during the coming year. A young attorney from Vermont is considering a major career shift to an environmental job where she can be outside for her work. An intensive care nurse from Maine wants to hone her own familiarity with the Maine coast's flora and fauna. Drawn together by the outdoors, they all hope to enhance their love of natural history guided by experienced naturalists. The nurse speaks for the group when she tells us that her inability to "name" the local plants and animals undermines her confidence as an observer in nature. But are proper names really barriers to effective nature observation?

Heuristically, I share my own trajectory as a young naturalist with the group. It all began the moment I fell in love with birds. One spring day, I noticed a tiny bird with an intense black cap against glistening yellow feathers. Captivated by its color and behaviors, I had no idea what type of bird was responding to my feeble imitations of its song. Later, when I tried to find the bird in my mother's *Peterson Field Guide to the Birds*, I was shocked by the myriad of colorful warblers and had no idea how to differentiate all the plumages, voices, and behavioral cues. I couldn't believe such small animals could migrate to Central and South America. And from that one rapt encounter with a Wilson's Warbler, I never stopped pursuing birds and biology. Perhaps the names of things come after the veneration.

Observing Nature

Arriving at the parking area, we eagerly hike to the coast. From a promontory overlooking the ocean, we notice that the east portion of the beach is Popham State Park, where dogs and people roam free. Descending the hill, we clearly see that the Seawall Beach Conservation Area west of the Morse River is devoid of recreating humans, and we speculate it would be a better place for a ravenous shorebird to dine or tuck its bill under a wing to rest. When we are greeted by a seasonal intern from the Plover and Tern Recovery Project, she compliments our bird-friendly spotting scopes, which allow us to watch safely from a distance. As we observe sand-colored Piping Plovers that are nesting with Least Terns, the intern regales us, "When Least Terns are disturbed at the nest by a crow, fox, family dog or a child flying a kite, they aggressively attempt to chase the predator away. Piping Plovers will try to lure the predator from the nest with a broken wing display." As the sun glares on reflective sand, we observe several

adult terns shading chicks along the beach margin. We imagine how easy it is for "smart" predators like marauding crows and foxes to raid colonies for eggs and chicks. One of the students summarizes, telling us that with such limited habitat for nesting above the high tide line, any increased recreation or human development would severely disrupt tern and plover recovery efforts. It's so complex and encompass the entire beach community. I see that incrementally, we are making connections that helps us appreciate the many challenges faced by beach-dwelling birds.

Predation's Role in Developing a Sense of Biophilia

Turning our attention to the migrant Sanderlings feeding along the surf edge, we have a hard time keeping our binoculars focused on the fast-moving birds. Suddenly, the birds all leap into flight. A Merlin, almost invisible against the dark trees, glides toward the shorebirds. The small falcon swoops upward through the exploding flock to capture a sanderling. While still flying through the rippling flock of shorebirds, the falcon deftly nicks the sanderling's nape with its hooked beak.

A student exclaims excitedly, "There is so much swirling avian motion all around us that it is challenging to stay focused on the hunting falcon."

"Yes," I affirm, "Do you see the shorebirds' attempt to avoid capture? Notice how the flock alternately expose their dark backs and light bellies like a mesmerizing flashing dance."

We are all surprised by what happens next so I narrate, "The Laughing Gulls are all around the Merlin. Look, incredible! The Merlin just dropped its prey item!" As the Merlin abandons her meal to fly to the calm of the forest edge, I plunge headlong into the surf to collect the lifeless shorebird before it can sink below the waves. Spellbound, everyone turns to the specimen held in my hand.

Spangled grey and brown, the Sanderling, now limp and warm, deeply effects those who watched its final flight. We examine the five tiny talon marks and a nick at the nape presumably from the sharp hook of the falcon's beak. I ask, "What else can we learn through closer scrutiny?" One of the students describes the specimen, stating how it appears speckled above with snowy white underparts. Though pale overall, the wings have a black patch at the wrist.

I mention, "Those lesser wing coverts offer streamlining and an identity marker." A student describes another species field mark – a light stripe borders the eye like a white eyebrow. "Yes," I explain. "together, these features suggest that our bird has already begun molting to non-breeding plumage." A student captures the essence of the moment, suggesting that a bird specimen held in the hand sure tells a unique ecological story.

Fanning the left wing open before the bright sky, we look through the flight feathers for feather wear and lice damage. I prompt the students for deeper observation, asking them to notice that the secondary and primary feathers reveal degraded vanes and tip wear representative of older feathers. This suggests that the flight feathers of sanderlings are molted later in September after the bird has successfully reached its wintering grounds. We closely examine the foot, which yields an anatomical surprise.

"Unlike all other shorebirds," I explain, "there is no hind toe!" The naturalist Paulson (1993) suggests that the three-toed foot of the Sanderling is an adaption for running rapidly in a zigzag pattern up and down the beach following each wave.

One of the students exclaims, "Running in and out with the waves, Sanderlings really are my favorite *motorized* bird."

Another student states, "They must have such sensitive bills to detect prey items hidden in mud or sand!"

Another student rejoins, "It is so cool that all these anatomical features are linked to unique behaviors. I can't help but grow in admiration of the shorebird adaptations."

Gently wrapping our shorebird in a clean bandana, I tuck it in my pack as we continue to investigate the beach. I tell everyone, "Because of international treaties and conventions as well as domestic laws, I need a permit to salvage or transport the shorebird back to the Queen Mary marine lab. But just think, once prepared, the stuffed specimen will become a member of the Audubon Ecology Camp research and teaching collection."

Deepening Biophilia by Co-creating Our Story

Sauntering down the beach together watching different shorebirds feeding and roosting, one student inferentially recalls the Merlin hunt, "As we surveyed the beach with binoculars, a Merlin suddenly crossed the beach face, followed by an explosion of whirling shorebirds and mobbing gulls. I remember you telling us that that only experienced falcons hunt a large flock of birds. The risk of injury through collision is too great

for inexpert young falcons that are resigned to pursue lone birds."

Another student continues the story, "This implies that our Merlin is an experienced hunter of shorebirds able to face challenging conditions."

"Yes," rejoins another student, "the in-coming tide concentrates the feeding shorebirds but unsettles the bathing Laughing Gulls. The beach dynamics make for such a challenging hunt."

When a student asks, "What does it really mean to be a wild falcon?" the tidy ecological roles of prey and predator spin out of focus. We all try to imagine the hardship associated with the life of an avian predator – the endless cycle of fasting and gorging, the meditative hunts, the incessant mobbing gulls, the intense exposure that contrasts with such fierce independence. I openly recall Mary Oliver's poem, "Lonely, White Fields," she describes an exhausted and hungry Barn Owl's incessant quest for life-giving mice (Oliver 1992). Similarly, our Merlin challenges us to consider what it means to hold its *life in his fist, year after year into the hundreds of years*.

A student concludes, "Driven by hunger, I imagine the Merlin is now keenly surveying the beach for its next meal."

The image of a hunting falcon provokes a student to express her concern, "Now, I feel deeply sad for both the shorebird and ravenous falcon; the losses are significant. The dropped shorebird seems like such a waste of life energy. Who is the victim, the shorebird, Merlin, or both?"

"Yes," another student continues, "I now see how the roles of the shorebird in our story are shifting from living bird and gregarious flock member to voracious sand flea predator, migrant shorebird, then suddenly falcon prey item, and now natural history specimen."

As we focus on the changing roles of the shorebird, I suggest, "By creating the account together, we inevitably share in its meaning."

That evening, I prepare the Sanderling for preservation as a museum specimen. The dissection of the migrant shorebird opens a world of animated inquiry. A student observes, "So, that is how you tell the gender of a bird. The ovaries look like a tiny strand of grapes! You mean, the ovaries actually shrink during the non-breeding season as a weight reducing flight adaptation?" We grow in awe of the adaptations that lighten a bird's airship, allowing it to traverse continents and oceans during annual migrations.

We examine layers of marbled fat that cover the Sanderling's breast and stretch the skin taught as a toy drum. I quantify the weight gain stating that, "some shorebirds preparing for migration can add 4% of their body weight each day, which is comparable to a human adult gaining more than six pounds a day."

A student articulates her amazement, "It would have taken days for our shorebird to accumulate its wealth of migration fuel. I wonder how many sand fleas are needed to make all that marbled fat?" We begin to imagine our shorebird as a member of a ravenous flock, running back and forth along the isolated beach probing the wet sand for marine invertebrates, or meticulously foraging the strand line driven with predatory zeal for sand fleas. I see that almost reverently we want to understand how all of this fits together – the sand flea/shorebird/Merlin/human ontology.

When our discussion of food for migration turns to stopover ecology, I offer a few research-based insights. During their long migrations, shorebirds concentrate and depend on a few stopover sites to refuel during their long migrations. Because long-distance migrants like Sanderlings rely on such distantly separated staging areas where they congregate in large flocks, they remain at risk to pollution and habitat changes. I conclude by reciting Aldo Leopold's far-reaching dictum: "The outstanding scientific discovery of the twentieth century is not television, or radio, but rather the complexity of the land organism" (Leopold 1993, pp. 145-6).

A student exclaims, "I get it! Seawall Beach is like a jeweled oasis where shorebirds can feed and rest along their vast migration landscape." We no longer see the shorebird as an isolated entity but rather see it connected in an interwoven fabric of species interactions that coalesce as a complex land organism.

Living Biophilia

The next day, circumnavigating Hog Island, we encounter a flock of migrant shorebirds intently feeding along the muddy intertidal shore. A calming hush enters our core. We understand that the spectacle of migration is tied enduringly to food availability. We infer that the mid-migration flock must be refueling. Rather than disrupt their essential feeding, we honor the shorebirds' mud flat and without a word, reverse our steps to walk back along the wooded edge, speaking only after we have cleared the cove. As we settle at the forest edge to write in our field journals, I share Rebecca Solnit's

(2000) poignant statement of place: "Sense of place is the sixth sense, an internal compass and map made by memory and spatial perception together."

Later, when we gather together and share our thoughts with one another, one student's journal entry begins with a hand sketch of the Earth overlaid with the flowing migration routes of the Sanderling. She reads her annotation, "Our collaborative story roots us firmly to the Maine coast, establishing a deepening sense of place. As we articulate our growing understanding of the shorebird's long migration, we discover that the dimension of our spatial perception has grown beyond the intimacy of Seawall Beach and now spans the imagined Americas."

Another student reads their poetic entry, "By studying one species' migrations, we encounter connections that unify continents. Our Sanderling weaves a diverse fabric of interdependent threads creating a living land organism. Our local, place-based story ties us ultimately to the larger Earth." I begin to realize that the notion of shared biophilia includes collective observations followed by co-construction of the living narrative.

Late that night, I visit the Queen Mary Lab to check on the Sanderling. Unwrapping the cotton batting that protects the drying specimen, I venerate the rufous edged feathers on the breast that give way to an immaculate white belly. Carefully aligning the feathers on the study skin, I revel in the wonderful week sharing natural history study. As I swaddle the specimen delicately in fresh cotton, I realize that *teaching* about the natural world hinges on sharing authentic experiences in nature with our students. I see clearly how the natural world inspires imaginative inquiry as we co-create our interpretive stories. Nestling the specimen between two other shorebirds in the teaching collection, I reflect that with each shared experience in the natural world, our stories evolve as we settle deeply and lovingly into our own sense of place.

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