A Week in the Andrews Forest in a Changing Season A Haibun Cycle

Holly J. Hughes

A necessary complement to the objectivity of science, then, is the subjectivity of experience. An enthusiastic openness to the lives of other species — the timing of tree blooms on city streets, the calls of frogs in wetlands or the arrival of migratory birds — is an act of resistance to deceptions and manipulations that work most powerfully when we're ignorant. "Post-truth" does not exist in the opening of tree buds.

—David Haskell

We are imprisoned in our small selves, thinking only of having some comfortable conditions for this small self, while we destroy our large self. If we want to change the situation, we must begin by being our true selves. To be our true selves means we have to be the forest, the river...

—Thích Nhất Hạnh



Seen, Unseen

Snow falls in sloppy, wet flakes as I drive up the road and into the forest, snow muffling the wheels on the highway, snow splatting on the windshield, snow dribbling down my neck when I get out of the car, reminding me that, yes, snow is just one more form of water.

I stow my week's supplies in the Greenhouse, grab my camera and notebook, and head out into the forest, aching for time in tall trees, for silence, for space for my coiled mind to unwind in its mossy arms.

I'm arriving here on the heels of a weekend in Astoria for the FisherPoets Gathering. There, on the shores of the Columbia, we shared poems, songs, stories, and a beer or two. I read my essay "Going Ashore," a reflection on the pull I feel between living on the water, as I did for many seasons, and the longing to sink my roots into the earth, as I've done the last decade. Since the political seismic shift six months ago, similar, seemingly opposing desires have been duking it out—the desire to flee, escape, retreat to my books, poems, and solitude—and the desire to connect with forces greater than me, whether in the natural or human community. Here in the forest, I hope to see beyond dualistic thinking; I hope to find enough space to hold both.

I head down a trail over snow-draped logs, brushing snow off the cedar and hemlock branches before they dump their cargo down my neck. Fern fronds splay open like a sundial. I follow my feet down to Lookout Creek, the same creek where we assembled to write in filtered sunlight back in September at the Blue River Writer's Gathering, the soft-spoken creek that now uses a megaphone to announce its arrival.

Meanwhile, this symphony is harmonizing, the high notes of the snow drop *plink*, *plink*, bass notes of snow clumps fall in resonant *thuds*, *whoosh* of the stream hurrying away. Today the sky is the same color as snow; only the dusty green firs and hemlocks offer a counterpoint, studded with wisps of *Usnea* and jellyfish-like splotches of *Lobaria*. *Squish*, *squish*, *squish* riff my feet heading home. They say dusk falls, but here, dusk seems to rise from the forest, released from the arms of the tall firs, hemlocks, and cedars. Soon this monochromatic landscape will fade to black, and I want to get home before it does.

Wait. I stumble upon a set of tracks. Each set symmetrical, paws landing in tandem, unlike a wolf that walks a straight line. Bobcat? Coyote? Fisher? I stand in silence, listen, grateful for evidence of a companion, even if I can't see it, for reminding me there are no easy answers, for the mystery this forest offers in dimming light.



We stand together seen, unseen—arrive in snow baffled silence.

Stepping in the Same River

I meet Fred Swanson, the archdruid of the Andrews Forest, at 8:30 a.m. to hike to the Log Decomposition plot, one of several designated reflection sites. A research geologist, Fred has spent the last three decades as a scientist at the Andrews Forest and is a senior fellow with the Spring Creek Project. I've met Fred before, but seeing him again, I'm reminded how much he resembles one of the trees towering above me: he's tall, lanky, with eyes that are simultaneously intense and wise. On the way, Fred gives me a tour of the headquarters and the art that's been created by writers and artists over the last 10 years of this program. We're invited here—thanks to the Spring Creek Project—to reflect on this forest and how we humans interact with it. This is a 200-year project, and we're just now entering the second decade. Ten more decades to go—what changes will the next bring? Given the political u-turn six months ago, it's sobering to contemplate what's ahead for this forest, for all of us.

You can't step in the same river twice, said Heraclitis. The forest echoes his words—we see it all around us here: the 500-year-old Douglas fir trees giving way to the hemlocks marching up the hillsides, the next generation blooming out of the stumps, detritus feeding what will follow. But this is natural change, not caused by humans, not on the scale that we're now exerting in the Anthropocene. Climate disruption has become an everyday reality; we just need to look out our windows to see it.

I think about my charge: to reflect on the forest and how we interact with it.

Reflecting on the forest is easy, comes naturally. Reflecting on our interaction inevitably brings with it politics, policy, sociology, the tangled web of human desires, every bit as complex as this ecosystem. I don't want to write about politics, but how will I escape it? I'll admit I've come to the forest craving silence, a respite from the 24-hour news cycle, needing to be reminded of resilience, of strength in diversity, of

a system that delights in complexity, not reductive thinking. A system that relies on cooperation in ways the scientists are only beginning to fully understand. Whether the truths of these tall trees--much less science or even facts--can be appreciated by the current administration is doubtful.

It feels right to be back in the forest one month into the current administration. I'd spent Inauguration Day driving Highway 101 up the California coast. We were in the Redwoods when the Inauguration came on, and we turned off the radio, rolled down the windows and listened to the trees swaying in the wind. These trees aren't living in a post-truth, alternate-fact era. I'm throwing my lot in with them.

I return to the library to learn more about the decomposition process, the unsung collective of microorganisms eating the decaying logs, returning them to soil to feed the next generation. Not only are they present in the decomposing logs, but they are critical for the health of the forest. Entire communities of interdependent organisms live symbiotically underground in the tangled roots of these trees; the mycorrhizal fungi provide them with nutrients in a form they can absorb. In some forests, these fungi provide the plants with up to 80 percent of their nitrogen and 90 percent of their phosphorus. The fungi, in turn, depend on plants to provide them with organic compounds needed for their own growth. Mutualism at its best. When a forest is clear cut, it can't grow back in its full ecological complexity without these vast webs of mycorrhizal fungi. Some scientists theorize that together, they form the largest organism on the planet. So much goes on beneath our knowledge, underground. I've come here to seek new perspectives; sometimes they're right under my feet.



We are gathering at the roots. Can't silence the mycorrhizal fungi the mycelia, the mosses.

Watersheds Shed Water

More water, but this morning it falls as rain on the blanket of snow now pitted and pocked. The snow tries to catch the droplets dropping deep, tries to muffle the rain, but it plunks away, dripping off the eaves, running down the gutters, down the road, down to the creek below my cabin.



Lookout Creek flows into the Blue River, which flows into the MacKenzie River, which flows into the Williamette, which flows into the Columbia, which flows into the Pacific. For two days, I drove through this watershed, noticing all the water standing in the fields, lapping along the sides of the highway, all the water with nowhere to go, all the water we waited for all summer, water pooling on a saturated earth.

no where to flow nowhere else to go will it find its way?

Stemfall, Throughfall

Today the snow's wraps are off, world noisy again, incessant thrumming of rain on the roof like the pileated woodpecker that chose the metal roof of my shed to amplify its mating call a few springs back. Rain a staccato on the cabin roof, rain pooling on the pavement, rain tattooing the patches of snow, creating tributaries that run down the parking lot, then down the road. I step off the pavement and onto the sodden path, where bark and needles hold the rain. I head down the path into the forest, peeling back my hood so I can hear, even if my head gets pelted. It's still raining, but now, the rain is distant, falling first on the leaves and needles of the canopy towering overhead, then slowly trickling down the branches until it runs down the trunk. *Stemfall*, the foresters say to describe the rain that runs down the trunks, as opposed to *throughfall*, the water dipping from branches and leaves. Either way, it falls onto the forest floor, where the mosses lie waiting, a three-inch sponge that's ready to soak up whatever falls. I breathe through my own resistance, become the mosses, try to embrace whatever falls.

rain a staccato, rain a tattoo rain running here, there every where

Hyporheic



Back down to the creek. Today, we move into adagio, the stream carrying the melody, punctuated by water dripping off the broad-leaved plants of the understory. Faint sun on the stream, the grasses, my face. The surface of the creek glides downstream, its speed not visible until it encounters shallow water, cobbled rocks. From here on its bank, I can see which rocks are newcomers, bright, tumbling in the flow, not yet covered with moss like the old-timers shoved aside to line the shores. This gravel bar clearly in transition—logs drifting down river, swirling, jammed against the banks until the next flood. Peaceful now, but chaos waits around the bend, logs lined up will change the flow, remind us that streams have a life of their own, that they won't be stopped or even deterred—the sheer volume of water flowing past a clue to the power surging beneath this serene surface.

I learn from Fred that I'm hanging out in the hyporheic zone, the area under or beside a stream channel that contributes water to the stream. With all the rain and melting snow the last few days, I'm witnessing hyporheic flow, the subsurface flow between the water table and surface water flow. Here, with the earth so saturated, water seems to be bubbling up from hidden springs, water brimming, pooling in the tracks left by my boots in the gravel, feeding the roots of the alders bent on recolonizing, fixing nitrogen, building soil. They're assisted in this by bacteria, insect larvae, and other small creatures that live here and aid in purification. Thus trees—like these alders—that extend their roots into the hyporheic zone have a steady source of nutrients, while their roots soak up the excess water. A beneficial partnership. The forest knows how to handle all this water—a complex system has been in place for millennia—and I'm witnessing it at work. I exhale.

I want to feel steady, calm, serene like this gliding stream, but the more I learn about stream dynamics, the less calm I feel. There's too much going on here; too much to understand. I can't help remembering the rain that runs down my paved street in

Indianola, and the county-wide program to create rain gardens to absorb the flow, keep it out of Puget Sound. I can't help thinking of the record-breaking rain that fell in February, taxing the storm water system in Seattle so that raw sewage overflowed into Puget Sound, despite all the backup systems. *Hypo* means beneath, but increasingly, we see it above ground. Here in the forest, the mosses and alder roots are waiting to receive it, and what it can't handle flows downstream. True, too much water will create log jams, but those will often provide shade for native trout. Every change brings consequences, some favorable, some not. *The forest will figure this out*, I tell myself. I want to believe that.

Dipper zooms past heading up creek it's urgent, he cries

Native to This Place

I pick out who I know. Towering overhead on the bank: Douglas fir, hemlock, western red cedar, a few Pacific yew, broad-leaf maples. Here, thickets of alder. Last year's leftover foxglove long gone to seed, teetering in the wind. Native blackberry vines zigzag over logs. A few dead, stiff horsetails. Moss coats every surface, inches deep. All the unromantic colonizers, doing their in-the-trenches labor, readying the soil on this gravel bar, making way for the next generation. I'm reminded that the iconic species of this forest—the tall firs, hemlocks, and cedars—wouldn't stand a chance without the pioneers going ahead, forging the way.





Fireweed, horsetail, alder make way for hemlock, cedar, fir we're all in this together

The Year of the Owl





This may be the Year of the Rooster in China, but for me, it's the Year of the Owl. They are flying into my life, my dreams, and I hope, might show up this week. The first sighting was early in January, driving home late under a full winter moon. A snowy owl appeared, wings splayed above the windshield for an instant, then gone, leaving me gasping, sure I'd had a vision. A student wrote a moving essay describing how unintentionally killing an owl reset the course of his life, which had gone off track. My mother-in-law, who loves owls, resembles one, with her crown of white hair and wise brown eyes.

The Andrews Forest is home to the spotted owl and I'm hoping to hear one. Each night I clamp on my headlamp, walk up the trail into the forest, and do my best spotted owl imitation. What I lack in training, I make up for in enthusiasm, listening to the recording on the Cornell Lab of Ornithology before I head out into the dark, moonless night. *Who who who whooo*. I listen. No response. Just the trees whispering among themselves.

If I can't hear the owls, at least I can learn about them. Each time I go to the office, I linger by the stuffed owl display, learn that the spotted owl nests in hollow trees high up in the canopy of the old-growth forest. This owl made choices that make its future tenuous: not only does it require acres of old-growth forest, it prefers to feed on flying squirrels and red-faced voles, which brand it a specialist. The barred, a more recent arrival, is a generalist, which means it'll eat whatever it finds. The barred owl is also less particular about its nesting sites and is aggressive about claiming territory. You can guess where this is going—and it doesn't look good.

Not just here, but also back on my home ground on the Olympic Peninsula, the spotted owl is threatened by the barred owl, which made its way across the country from the East Coast thanks to woodlots and trees humans planted across the prairies, providing habitat. How tempting to view the barred owl as the bully on the block when it's just living out its genetic code, making a living in the forest. A good

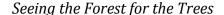
adaptor, yes. An opportunist, yes. I have to fight the urge to vilify them, treat them as interlopers.

Meanwhile, the genetic deck is stacked against the spotted owls. They're trusting, a trait that allows scientists to band them, but may not serve them well when it comes to predators. Their young are vulnerable after fledging—they remain on the forest floor. They need four times the territory of the barred owls to support their particular feeding and nesting habits. I can hear Darwin muttering *only the fittest survive.* Or, in this case, the most able to adapt.

Why do I want to live in a world where the spotted owl will survive, Darwin's theory notwithstanding? Why am I rooting for the under owl, the less adaptable, more vulnerable species? That would mean barring the barred owl somehow. But no walls in this forest. Move them? Turns out scientists have been doing this in Washington State, relocating pairs of barred owls to different forests to give the spotted owls more room. And in some areas, they're now killing the barred owls. I breathe a troubled sigh of relief for the spotted owls, glad the scientists have their backs, but can't help wondering: Isn't our human action manipulating the natural course of evolution? But in the twenty-first century, what isn't?

Today, Steve, a spotted-owl researcher, was here to give a talk to a visiting group. I sat in on his slide show, fascinated to learn that there are now several hybrid pairs of owls—barred owls that mated with spotted owls in the Andrews Forest. So far, they're not yet successful in producing young, he reports, but the hybrid pairs seem to be accepted by both species. Maybe they'll work it out on their own.

Spare the spotted bar the bully barred but how?



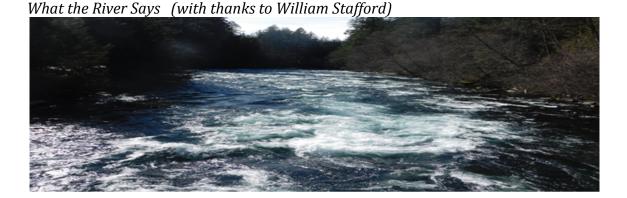


From here, I can see the forest—not the individuals, but the mosaic of firs, hemlocks, cedars, the aggregate, the sense of how they all fit together, the growing body of data, this elusive puzzle that is the Andrews Forest. Today the sun emerged, and after four days under the dripping forest canopy, I'm ready to emerge into the sun too, ready for a shift in perspective. I talk to Mark, the forest supervisor, who suggests driving part way up Forest Service Road #130 and hiking up to the quarry at the top. From there you'll be able to see The Sisters, he promises.

I follow the tracks of a logging truck up the snowy road as high as I dare, pull off on an outcrop opposite a set of solar panels. Not much snow where I pull off—a southwest exposure—but I round the next bend and am back in snow up to my knees. I trudge along, wishing I had gaiters, but determined to make it to the view—I've come this far. Looking across the valley, I see snow still dusts the trees on the next ridge.

It's easy to curse logging roads for the way they carve up the forest, but right now, I'm grateful for a path to higher ground and a glimpse of the rock formations that lie beneath the forest. Walking up this road I can see the soil beneath the roots of the trees—and there's not much of it. This mountainside is basalt—the colonizers have done their job well to break down this hard rock into enough soil to support these towering trees. Down below, the forest feels soft: sunlight filtered, *Usnea* draped over the branches. Here, life is hard: tangled roots cling to rock and the trees don't sprawl but grow straight up, one after the next, armies marching up the mountain. Grasses lie flattened under the weight of winter snow—the road provides the only curve through this harsh landscape. Snow carries the tracks of the logger's truck, then the logger's footprints as they tagged trees to be trimmed. Snow carries rabbit, deer, me. Above, a jet contrail bisects an empty blue sky, heading north.

Snow bears tracks of rabbit, deer, logger me equally



The MacKenzie River churns past, galloping white horses foaming at the mouth, tossing back their heads in the sun. A steady low *shuussh*, but beneath it gulps, groans, moans. The alders and cedars lining the bank lean in to hear better. So much water, so fast. Where is it bound in such a *whooshing* rush? Around this bend, over boulders, slick stones, carrying its cargo of logs. How seductive. How tempting to step in, be swept along in its certainty, its belief in movement, no matter the direction.

What the river says won't until we stop drop everything Listen

I sit on the bank listen, let the river run away without me

Experimental Forest



Here's the thing about this experimental forest. One moment you're walking down the forest path, and the next you're looking up a 100-foot concrete chute, steps on either side. Have I fallen down a rabbit hole into downtown Manhattan? Or traveled back to Valdez, Alaska, in the 1950s, when concrete was king? That was the first time I saw it. Now I know what to expect, but the sight of all that concrete in the midst of the forest still jars me. I've been here a few times, listened to Fred describe how this concrete chute gives scientists information about debris flow. I've always been at the bottom, looking up. Today, with my intention to keep seeking new perspectives, I climb the stairs.

Two choices of steps, and I'm instinctively drawn to the wood steps to the right, formed of 2 x 6s on their sides, the steps being reclaimed by mosses. Why is this? I defend my choice. More natural. Wood. Moss. Quieter. More aesthetically pleasing than the regimented climb of concrete to the left. Concrete is made of silica, stone, water, all natural materials—true—but heated at a high temperature, demonstrating human's tendency to master nature. All the edifices that stand in testimony: dams, monuments, freeways. But in the twenty-first century, dams are coming down, bridges need repair, and the freeways and roads are pocked with potholes.

Meanwhile, my feet keep sliding on the slippery wood; the moss is beautiful but treacherous. Gripping the handrail, I make my way to the top, somehow expecting to see a view, a lake, perhaps, like the flume I used to climb in Alaska above an old cannery in Butedale. Instead, it's just the same Forest Service Road #130 that I hiked up a few days ago. I turn around, look down. Gasp. From here, the forest does look different, the trees below dwarfed by this concrete river, the emphasis here on experimental, not forest. Of course, that's the point. I'm all for research, have taught with scientists, know the value of facts and data sets, hypothesis and proof. But I know to listen to my body, too. Right now, I notice my heart rate. The steps, you just climbed 100 steps, I remind myself. But it's more than that—I've been held in the strong arms of the firs and cedars for several days. Here, I feel naked, exposed, vulnerable. Time to head down.

I gallop down the cement steps, grateful for good traction, making it down in half the time. I exhale, look up. The river of concrete still looks imposing, still looks out of place here in the forest, but those stairs worked. I'm reminded of the powerful closing image from the poem "Slab on Grade" by Oregon poet Clemens Starck: "For years people will walk on it,/hardly considering that it was put there/on purpose/on a Thursday in August/by men on their knees." Perhaps it's not one or the other; perhaps there's room for both in this experimental forest.

In the forest concrete steps a contradiction until I skip down two at a time.

Incremental Change



Back to Heraclitis. Not only can you not step in the same river; you can't see the river changing as it flows past you in each moment. This makes sense philosophically, in the abstract, but it's one of those rare times that the abstract is easier to grasp than the concrete. How do we notice change that happens imperceptibly, from minute to minute, especially as our collective attention span diminishes? The slow unfurling of the fern's fiddlehead? The spider's web

reaching to fill the door frame? The child next door who's now packing for college? Thanks to time-lapse photography, we can view time passing, but how often in real time do we slow down long enough to watch a bud break open?

The problem with climate change is that it's happening incrementally, glaciers melting, seas rising, right before eyes, but so slowly that we're not able to see it. It's not like the Cuyahoga River catching on fire, the Exxon Valdez oil spill—where devastation greeted us on the TV screen each night. That's why one of the most effective ways I've found to reach students is visually. Several years ago, for Earth Day, we showed the movie *Chasing Ice*, a powerful testimony to photographer James Balog's determination to show the retreat of the glaciers over time. The students were moved deeply, not only by the tenacity and courage of the photographer, but by seeing climate change visually, through their senses, a way that touched their hearts more powerfully than dry graphs ever could. That's the role of art, to take us to a deeper level, to allow viewers to experience what our minds too easily deny.

Scientists use the example of the frog to illustrate the insidious nature of incremental change. Drop a frog in boiling water and of course, the poor frog senses the water is too hot and leaps out. But drop a frog in water and slowly warm it up, and it won't leap until it's too late. The first time I heard this, the metaphor was lost on me; I was too worried about the frog. But the question is, of course, will we?

Basho, they've dropped your frog in boiling water what, then, will we do?

Waking to What Is



I wake to snow falling out the window, snow landing in the needles of the fir and hemlock; only the cedar knows how to let go. Every branch of the alders frosted, reaching out in all directions, ungainly, like a teenager who hasn't yet grown into his body. I notice how the tips of the firs droop, though they do this snow or no. But in this monochromatic landscape, each tree tip etches a snow-soaked sky. Same view out my window, same trees, same sky, but shapes and patterns suddenly visible thanks to this late-spring dusting.

Ahh snow. Not what I wanted, but what is. I wanted clear trails today for my last day in the forest, clear roads tomorrow to drive home. I wanted winter over and done, spring as certain as the swelling buds on the alders, daffodils poking up their insistent green antlers. But the trees don't have a preference, the trees receive it all. The trees know how to use this moisture, how to hold it, let it run down their needles and trunks into the soft ground. If I've learned anything this week, it's that this forest is one giant sponge, designed to hold whatever falls. I walk to the edge of the forest, stop, listen, not wanting to break this quiet. A varied thrush calls once, twice, three times. Why does its bright call seem threaded with urgency?

What does the snow mean for the varied thrush? What does it mean for all the birds and animals? Are they shivering in their burrows, cursing the weatherman? *Stop it*, I say. They are just doing what any smart animal does—adapting to the circumstances, their surroundings, no matter what the weather gods throw their way. But what about all those swelling buds I'd just observed on the alders?

And what does it mean that here in the Northwest that spring is almost a month late, while it's a month early on the East Coast? A shift in weather patterns—or clear evidence of climate disruption? What does it mean that when I return to reading the *New York Times* each morning, I'll read about an extreme weather event happening somewhere in the world every day?

Snow falls on swelling buds Does the varied thrush care or do I imagine concern?

Thinking Like a Forest



For the first time in days, I break my news fast and listen to a local National Public Radio station, hoping for a weather report. Instead, I hear a piece on Lyme disease.

Apparently, scientists have determined that Lyme disease is being spread not just by deer, but also by mice. Mice are plentiful because they're reproducing in forests that

have been logged and their prey have been eliminated—the owls, fox, wolves that need uninterrupted forest to survive. The mice have it made in these fragmented forests and woodlots; they'll happily be our neighbors, move in right next door in our suburbs, too. And with them, apparently, their cargo of ticks that spread Lyme disease. Deer, too, are well acclimated to living in the midst of people, their predators gone. I think of the Aldo Leopold essay "Thinking Like a Mountain," which I've taught to students many times over the years. We knew Leopold was right—you can't disrupt the predator/prey balance without paying the consequences—but even Leopold couldn't know how painfully this would play out.

I think about the clear cut Fred took me to the first morning, how ten years later the trees are clearly coming back. It's tempting to think *no problem, the forest will regenerate*. But what I'm learning this week makes me unsure. Yes, an old-growth forest can maintain itself, but regenerate? What about the armies of microbes, the mycelium, the mychorrizhal fungi? When the trees are cleared, what happens to them? Can they hunker down and wait years for the trees to send their roots down once more? What about the rain washing down those bare mountainsides, washing silt into the streams, stripping the soil of its nutrients? Without the roots of trees and mosses to hold the rain, the rain wreaks havoc. How many hillsides have slid once the forest was clearcut, often with devastating consequences, like in Oso?

Aldo, how long before we'll learn to think like a forest?

What's Ahead

The last morning. I set out in the snow to revisit all the places I've reflected this week, both the official reflection sites and my own sites, too. Without thinking about it, I'm rewinding the week, starting with yesterday's ascent of the stairs, then hiking up #130 to the lookout where I sat in the sun a few days back. I climb up onto the same rock, slippery now under a few inches of snow, look across the valley to the next ridge, where the cedars, firs, and hemlocks are draped in snow. As I sit, the clouds part for a second, turning the snow to glitter, drifting down like that final scene in *The Dead*, right onto the camera.



For a moment, time seems to stop, suspended, snow sifting through the air like flour. More likely it's me—I want time to stop—to linger in the snowy arms of the trees, to keep turning over stones, to keep looking until I see all the interconnections that knit this place whole, that remind me to sink my roots into the earth, to give thanks for the vast network of seen and unseen organisms that keep this forest working. To remember that to see the forest, you have to see not just the towering cedars and firs, but all its inhabitants: *Usnea, Laboria*, mychorrizal fungi, mycelia, mosses; the chattering Douglas squirrel, the silent fox, the sleeping salamander; the kingfisher, the dipper, the varied thrush, the spotted owl, and yes, the barred owl, too.

This forest reminds me *what is*: change is inevitable: the gravel stream will shift, the logs will rot, the rain will fall—and the snow fall, too—and I have faith that this forest will remain as it steadily, slowly, changes, its communities working together in systems that have evolved over the millennia. It's the undeniable incremental human change I fear, and I can't climb high enough to see what's ahead.

I walk back down the trail in a changing season into a changed world that is stunning, complex and in/out of our hands.