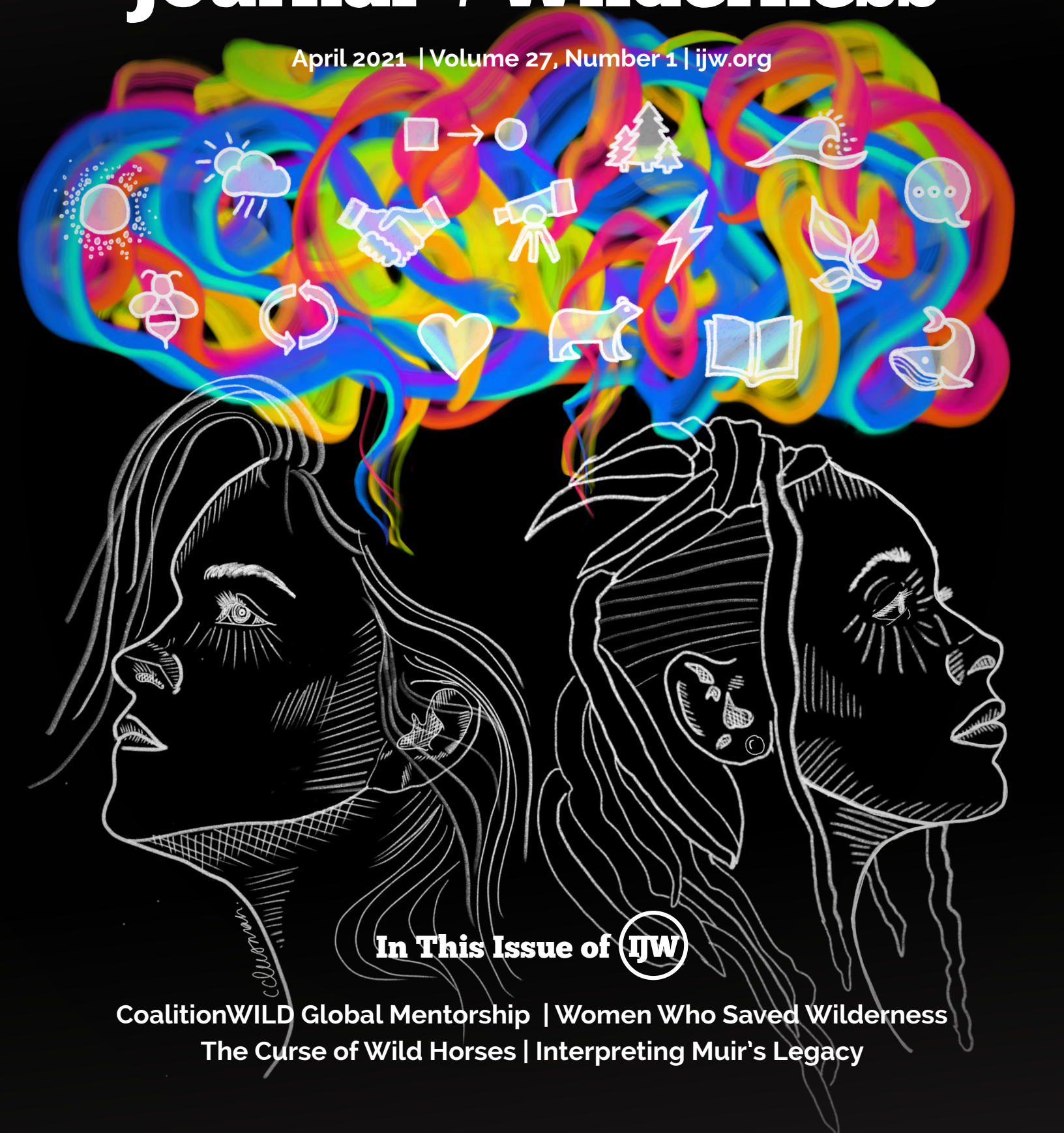
INTERNATIONAL

Journal of Wilderness

April 2021 | Volume 27, Number 1 | ijw.org



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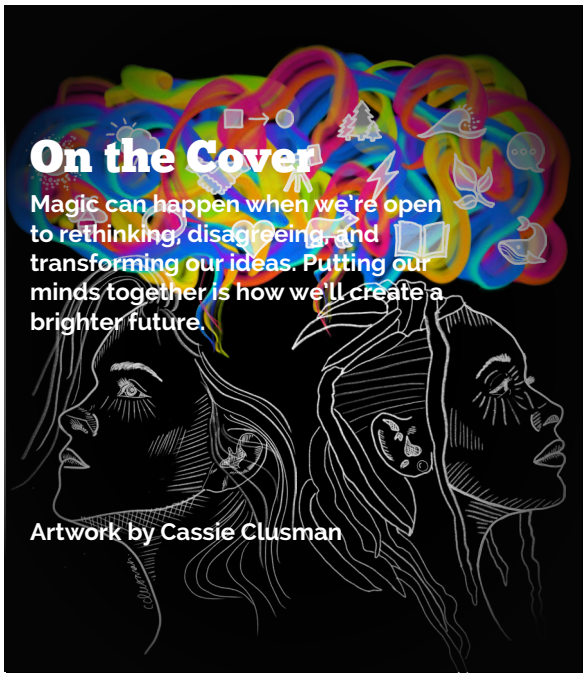

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IJW Editor-in-Chief Emeritus

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International IJW Journal of Wilderness

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International Journal of Wilderness (IJW) publishes three issues per year (April, August, and December). IJW is a not-for-profit publication.

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 ISSN # 1086-5519.

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EDITORIAL PERSPECTIVES

Protected Areas in a Post-Pandemic World

by ROBERT DVORAK

Robert Dvorak

I am excited that 2021 brings us the 27th volume of the International Journal of Wilderness, and with is comes new beginnings. While this sentiment can certainly seem cliché, it is one that represents the hope of many of us to begin considering a post–COVID 19 reality. Progress and sacrifices have been made, and commitment and dedication remain necessary, but as stewards of wilderness and global protected areas there is a desire to begin mapping steps forward.

The past 12 months have presented a variety of challenges and opportunities for conservation professionals. It has been a time to be introspective and examine core values, a time to reaffirm commitments and partners, and a time to evaluate the direction forward. The themes and concepts that have emerged from these reflections might not seem novel, but their application in a post-pandemic world will be essential for wilderness and protected areas.

Solitude

Wilderness is a place for peace and seclusion. It can provide insulation and wanted isolation from the modern technological landscape. But how might the needs for solitude change when some many individuals are craving social interactions and engagement? While nature was a mechanism to step outside the pandemic, what new challenges may arise as individual work to integrate and "step back" into society?

Demand

Over the past year, we have seen the utilization of natural resources substantially increase. This creates a great opportunity to engage new constituencies and partners in their protection and management. However, it has also created increased resources impacts, crowding, conflict, and challenges with visitor services. And this challenge has been compounded by uncertain fiscal and human resources. How will we approach these issues of impacts and capacity, particularly when we need positive change related to diversity, inclusion, and access more than ever?

Collaboration

Global conservation is only possible through partnerships, with individuals working "hand in hand" toward shared goals. But metaphorically, and figuratively, how can this be achieved when social distancing in necessary in so many ways? Resolute partnerships are formed through interactions, shared visioning, trust, and commitment – all of which are possible, but even more challenging through the video call, text message, or email. How can we revitalize collaborations and shared stewardship?

Essential

The past year has shown us how many people are essential in so many ways. The impact that other individuals have on our lives cannot go unnoticed and should not be ignored or taken for granted. And may I suggest also that wilderness and nature are vital to us all. We have demonstrated this past year how wilderness is a refuge for wild nature, but also for humanity, for each of us. Let us take the opportunity of these new beginnings in 2021 to further the integration of wild nature into society. Let us embrace the solitude, create an eager demand, and commit to collaboration. For wilderness is essential.

In this issue of IJW, Larry Beck and Dan Dustin interpret the evolution of John Muir's legacy. Michelle Reilly examines the significant contributions of women to the wilderness preservation movement. Martha Bierut, Rebecca Niemiec, Randy Welsh, and Dave Cantrell analyze practices that enhance volunteer retention. And Amy Lewis discusses learning faster and better through global mentorship.

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View of Long Lake in the John Muir Wilderness, Inyo National Forest, California, USA. **Photo credit** © Larry Beck.

Interpreting John Muir's Legacy

by LARRY BECK and DAN DUSTIN

Climb the mountains and get their good tidings. Nature's peace will flow into you as sunshine flows into trees. The winds will blow their own freshness into you, and the storms their energy, while cares will drop off like autumn leaves. – John Muir

Larry Beck

Dan Dustin

Jennifer Ladino (2019) begins Memorials Matter with this quote by John Muir, noting how he inspired seemingly countless national park professionals through his passion for nature. Similarly, Ken Burns in his 12-hour documentary, The National Parks, begins and ends with quotes by Muir. Often called "the father of the national parks," Muir shared his enthusiasm for wildness with generations of Americans, and his political influence helped protect many iconic parks such as Yosemite and Grand Canyon, and much of the land that later became wilderness in the American West.

Muir's stature as a historic figure can be measured in part by the number of objects named in his honor. The list includes 21 elementary schools, 6 middle schools, 1 high school, 1 college, a glacier, a mountain, an inlet, a highway, a library, a medical center, and a minor planet (Nobel 2016). Add to this California's 210-mile (338-km) John Muir Trail, John Muir Wilderness, and two sites administered by the National Park Service: Muir Woods

Figure 1 - Day hiker entering the John Muir Wilderness, Inyo National Forest, California, USA. Photo by Larry Beck.

Figure 2 - The popular 210-mile (338-km) John Muir Trail passes through some of the most outstanding wilderness in the world; trail sign located in Yosemite National Park, California, USA. Photo by Vicki Fielden.

National Monument and John Muir National Historic Site (Figure 1 and 2). His figure appears on the 2005 California commemorative quarter, along with Yosemite Valley's Half Dome and the California Condor, celebrating the most beloved of the state's ambassadors.

Muir is revered for his eloquent and powerful language in support of wild nature and species other than our own. He was outspoken in driving the politics of his time toward conservation. He took personal and political chances in broadcasting his love for the outdoors. His passion for life was infectious.

John Muir's Racist Past

Recently, however, in the aftermath of the killing of Black American George Floyd in Minnesota and a nationwide flood of vehement protests, Muir's racist past surfaced, along with animosity toward several other notable individuals. Monuments to Christopher Columbus, Father Junipero Serra, and other historic figures whose backgrounds aligned with the subjugation of Black Americans and Indigenous peoples, were toppled. Other monuments that were defaced or removed included those to confederates Jefferson Davis, Robert E. Lee, Stonewall Jackson, and Thomas Ruffin. Well-known commercial brands (for example, Aunt Jemima portraying a racist stereotype), university buildings (for example, the Wilson School of Public Policy at Princeton University because Woodrow Wilson had segregationist views), and sports teams (for example, the generic Washington Football Team – until a new name is chosen – formerly the Washington Redskins, a term demeaning to Indigenous peoples) were renamed as part of a national reckoning.

In July of 2020, news sources across the nation reported that the Sierra Club, which Muir

cofounded in 1892, realized it was time for "truth-telling" about Muir's past (see Grad 2020; Tompkins 2020). Michael Brune, the Sierra Club's executive director, wrote a post on the organization's website detailing Muir's racist sentiments along with white supremacist beliefs of some of the club's original members.

Although Muir focused most of his writing on the glories of nature, parts of his work characterized Black Americans and Indigenous peoples negatively. As Brune (2020) stated, "He made derogatory comments about Black people and Indigenous peoples that drew on deeply harmful racist stereotypes." In addition to Muir, Brune acknowledged that other early Sierra Club members and leaders, such as Joseph LeConte and David Starr Jordan, were advocates for white supremacy and eugenics, indicating that "Muir was not immune to the racism peddled by many in the early conservation movement." Indeed, some of Muir's writings from his thousand-mile trek through the South to the Gulf of Mexico described Black Americans as "dirty" and "irresponsible." At the same time, Muir also sympathized with some of those he met and bemoaned "the bigoted mindset he encounter[ed] amongst whites" (Nobel 2016). In California, Muir referred to California Indians as "lazy," "superstitious," and "garrulous as jays" (Nobel 2016). His perspective now seems particularly ironic because he carried a personal spirituality about the wonders of nature like that of native cultures.

Muir's racist remarks were made early in his adult life. Later, in his travels to Alaska, he spent time with various native tribes and came to admire their lifestyles and culture (Fleck 1978). In Travels in Alaska, Muir described sitting around a campfire and how "the brightness of the sky brought on a long talk with the Indians about the stars." He further commented that their enthusiasm was "refreshing to see as compared with the deathlike apathy of weary town-dwellers, in whom natural curiosity has been quenched in toil and care and poor shallow comfort" (see Teale 1954, p. 272). Muir evolved in his thinking about American Indians and "came to admire their stewardship of the land and expressed concern about the cruel ways they were treated" (Grad 2020).

Of course, we can't ignore Muir's racist comments. We can grow and forgive, but we don't want to obscure or ignore. Still, Muir provides an important lesson, especially in the context of current racial tensions. His beliefs about Indigenous peoples changed because of his direct exposure to them. One of the greatest challenges of prejudice is that those who are blinded by it do not have any meaningful connection to those they disparage. Muir demonstrated change as he became more familiar with, and more knowledgeable about, the original inhabitants of the lands he loved. He learned what he had in common with native peoples and his perspective changed.

The Sierra Club's Apology

The Sierra Club has accepted full responsibility for the overall early history of the organization. Brune (2020) acknowledged the "whiteness and privilege of our early membership." Like private clubs that exist to this day, club membership was possible only through

sponsorship from existing members, with applicants of color often screened out. Furthermore, Brune (2020) detailed the failure of many to acknowledge "the reality that the wild places we love are also the ancestral homelands of Native peoples, forced off their lands in the decades or centuries before they became national parks."

Gessner (2020, p. 86) adds that "many of the lands we would come to call 'wilderness' were in fact landscapes that humans had manipulated and manicured by farming and fire for hundreds of generations. They were also lands that were extensively used as hunting grounds, summer grounds, winter grounds." For this very reason, the environmental historian William Cronon (1995) pointed out, "The myth of wilderness as 'virgin' uninhabited land has always been especially cruel when seen from the perspective of the Indians who had once called that land home." Hikers and other backcountry enthusiasts are provided the illusion that they are experiencing the United States in its pristine and original state (Cronon 1995).

The Sierra Club's admission was intended to stimulate further conversation. In the meantime, Brune (2020) apologized for the club's early history, noting the harm the organization "has caused, and continues to cause, to Black people, Indigenous people, and other people of color." He continued, "I am deeply sorry." The club's commitment to change is expected to include a redesign of its leadership structure to include more leaders of color. The Sierra Club is also proposing a $5 million budget shift in the coming year, and with more funding in future years, to invest in staff of color and pursue racial and social justice work. Finally, the organization will spend time in a soul search scrutinizing its history. The Sierra Club sees this as a process that will take years to "regain trust from the communities we have harmed and create a diverse and equitable Sierra Club for the 21st century" (Brune 2020).

Interpreting John Muir's Legacy

The Sierra Club is to be commended for acknowledging the bleaker side of John Muir, other early club activists, and how that history has influenced who enjoys nature to this day. Clearly, there is work to be done. Yet as we reflect on Muir's legacy, we wonder if he would have progressed even further in his thinking had he acknowledged his shortcomings just as the Sierra Club is doing now. Might his contributions have expanded, just like the Sierra Club's, from a parochial view of humankind's place in the natural world to a more global perspective focused on social and environmental justice?

Having said this, to what degree should we judge Muir based on present day ethics and moral standards? Muir was a product of his times. In her pictorial biography of Muir, Gretel Ehrlich (2000, p. 221) noted that Muir lived at a time "of 19th century values, which held that expansion, industry, human dominance, and profit constituted the primary good." Muir had the courage to challenge that line of thought. Other icons of the environmental movement had their questionable sides as well. Aldo Leopold shot a wolf, and then – watching the fierce green fire die in its eyes – experienced an epiphany that would lead to his articulation of the most important

Figure 3 - The John Muir Wilderness. Photo by Larry Beck.

environmental ethic of our time (see Leopold 1949). Charles Melville Scammon was a ruthless whaling captain who drove the gray whale close to extinction. Yet later in life he became a renowned naturalist elected to the California Academy of Sciences. He wrote with a naturalist's flair for the Overland Monthly, along with Muir and Jack London, becoming a champion of gray whales (Beck 2020).

Muir influenced how his own generation, and others that have followed, can see nature in a more enlightened way. His life's work resulted in an evolution of American attitudes toward wilderness, major tracts of land set aside, policies designed to protect nature and all its inhabitants, and inspiration for countless nature enthusiasts. It is for these reasons that, despite his flaws, Muir remains relevant, perhaps even more so now than ever, as we grapple with environmental setbacks.

In judging Muir's legacy, we should be compelled to look inward, admit our own shortcomings, and acknowledge that we, too, have been participants in a system that oppresses Black Americans, Indigenous peoples, and other people of color. We need to understand that whiteness and privilege provide insulation from systemic racism, affording the dominant culture time, energy, and the luxury of enjoying wildlands in a way marginalized people have not. In owning up to our complicity, we can become better versions of ourselves.

Tributes to John Muir, including all those

entities that have been named after him, were not intended to celebrate the racism he portrayed earlier in his life. Those tributes exist because he deeply understood the beauty, wonder, and value of nature in our lives (Figure 3). Furthermore, Muir not only devoted his life to experiencing the wild places he loved so much, but he also acted in word and deed to protect those places in perpetuity for the benefit of everyone.

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Yes, John Muir was imperfect, and this aspect of his being should be acknowledged. The importance of a national narrative rooted in historical and scientific integrity demands it. The Sierra Club has now acknowledged Muir's racial injustice and has apologized for it. Telling the truth – the whole truth – may begin the process of healing for everyone, especially those who have been harmed by the wrongdoing. A focus on everyone is essential because our democratic way of life is only real if it respects the rights of all citizens. As we evaluate Muir's legacy, we must recognize that love is the antidote to hate, and that it calls us to higher levels of tolerance and forgiveness.

In Leave It As It Is, a book that provides a deeper and more truthful interpretation of the life of another venerated environmentalist, Theodore Roosevelt, Gessner (2020, pp. 103-104) writes, "What TR left us with … was a story of wildness. It's a damn good story … there are flaws in the story, some due to the times he lived in and some due to his own biases. Roosevelt is dead, and so he can't revise his story. That is up to us. We need to tell a new story about wilderness for a new time." The same can be said of John Muir. Let's celebrate the good he did while acknowledging his flaws. Let's take this opportunity to have conversations, build consensus, and incorporate diversity, all while remembering that his, too, was a damn good story.

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In a district known for its wildflowers, Mintbush is a colorful plant of the streamsides

STEWARDSHIP

The Curse of the Wild Horses: Deromanticizing Feral Horses to Save Australia's Kosciuszko National Park

by JOHN BLAY

This article documents two walks in the Byadbo Wilderness Area of Australia's Kosciuszko National Park that revealed inordinate numbers of feral horses, whose population has increased rapidly despite ongoing drought and consequent environmental damage (Figure 1). Their unchecked numbers, increasing at an inordinate rate, seriously threaten catchments throughout the 6,900-square-kilometer park (2664 square miles), as well as its high country and Alpine biodiversity. But feral horses, otherwise known as brumbies, are de facto protected from culling or rehoming by 2018 laws that class them as a "heritage" species with the support of public sentiment fostered by writings, photographs, and artworks, including poems such as "The Man from Snowy River," which extol them as wild bush horses. It is now time to reframe such works to engage the popular imagination with the realistic truth of the predicament. Desperate action is called for to reduce the feral horse populations. Perhaps if the poets, artists, scientists, and other opinion-makers can deromanticize the feral animals in support of changes to the law it would ensure their numbers

John Blay

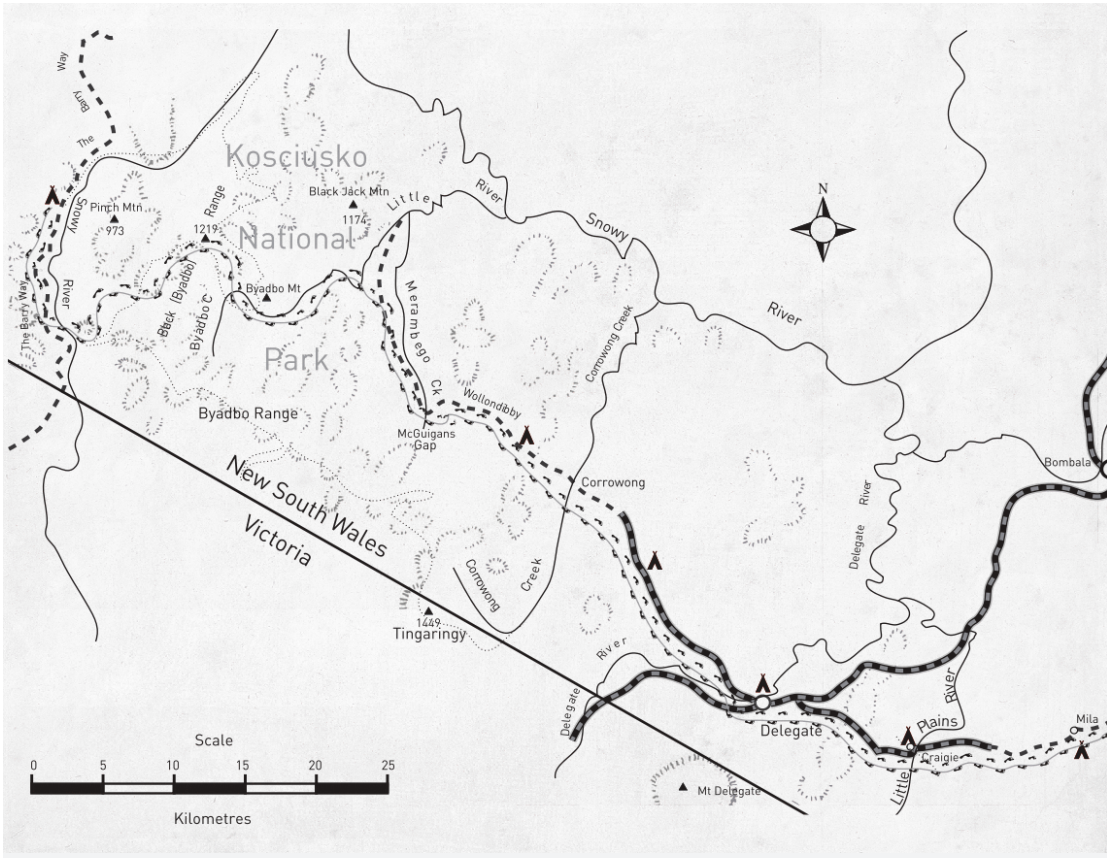

Figure 1 - Walking map of Byadbo Wilderness of Kosciuszko National Park.

can be humanely reduced as soon as possible. If, as Shelley famously wrote in 1821, "poets are the unacknowledged legislators of the world" (Shelley 1840), we should relegislate for the survival of wild nature beyond this day and age.

Drought in the Byadbo Wilderness

The Byadbo Wilderness isn't a tourist destination. There are no facilities. A few rough fire trails haphazardly follow key ridges, and yet I'm always overjoyed when I come through McGuigans Gap into Kosciuszko National Park's southeastern corner. It's like entering another world. But as we come into the grasslands about the bowl of Merambego Creek today, my first impression shocks me (Figure 2). It's so dusty, and what's happened to the grasses? Bare earth where there should be green. The usual mobs of kangaroos and emus are not so evident, and as we progress there are a few horses here, more there, scattered through the patches of eucalypt woodland. Near the almost-empty dam, put in by the park service for fire-fighting purposes, we find a few mobs of listless horses. Most of the understory's been cropped so hard you can see farther than usual. I had no idea the drought was so bad hereabouts. This is rain shadow country, so I expect it to be dry, but over the past twenty years I've never seen it so extremely dry. The horses barely move as we drive past. Normally they'd be racing away, but they are in poor condition. Maybe they're gathered here because all the other waterholes are dry?

Figure 2 - The grasslands and woodlands of Merambego during dry periods are sometimes stricken with what is known as the green drought, when the ground turns green but pastures do not provide edible grass.

The country gets steeper, hungrier, and drier. When we come into the cypress pine (*Callitris endlicheri and C. columellaris*) and white box (*Eucalyptus albens*) country, there are so few grasses it looks like a desert. Then, where the track begins to end near the junction of the Merambego with Byadbo Creek we find a surprisingly good flow of water. But the banks have been smashed. Piles of flood debris four and five meters (13 to 16.5 ft.) high include green tree trunks that have been tumbled downstream and stripped of roots and branches, so they now look like logs freshly prepared for milling. What has been happening in the Byadbo Wilderness? The Merambego catchment is about as dry as it's possible to get, and yet there's been a great flood in the adjacent catchment. It's bizarre. I've come here regularly over twenty years to explore and map the Bundian Way, and I've never seen so many horses. It must be more heavily stocked now than when it was grazed before becoming part of the park in 1970.

At our campfire that evening we ponder the mystery of so many horses. One creek dry, the other in full flow. Richard Swain is an Aboriginal man, a river guide who's been running canoe trips along the Lower Snowy for years (Figure 3). He has a good sense of the country and how the water flows through it. In the morning we set off walking westerly along the ancient route of the Bundian Way to see what's happened farther upstream in the great bowl of the Byadbo Wilderness Area.

For the first hour or so the country along the track is extremely dry, and there are fewer surprises than usual such as yam daisies and ground orchids. The little splashes of color lighten the dryness. In a dry tributary, creekside masses of roundleaf mintbush (*Prostanthera rotundifolia*)

flower in a joyful purple. Patches climb the hillsides to mingle with lichen-covered reddish boulders. Below, glimpsing the Byadbo Creek again, it has an unusually good flow. And by the time we reach the junction of Stockyard and Byadbo Creeks it's clear how terrible the damage has been. The once-lush flats have been cleared of trees altogether. Broken trunks and smashed undergrowth are piled together in heaps amongst trees on the slopes, and the transformation from the scene when I was here last year is complete. Now it's like a science fiction catastrophe, cleared of vegetation like a great parking lot. We walk upstream, but there's little point. When we come to the ancient quarry site where the old Aboriginal people had collected and shaped stone ax blanks, it's been wiped clean. So too all the smaller flats meandering on either side of the stream, their much-varied vegetation as well. At the streamside there were banks of lomandra and bulbines and orchids, food plants for the Aboriginal people as well as the horses. All gone. So too the slender black sallees (*Eucalyptus stellulata*) and the white box (*E. albens*). Also gone. On previous visits I saw grassy flats and black sallees and a small group of horses round every bend, usually with foals. Gone. No sign of them today. No matter how far we go, it's all the same: banks three or four meters (10 to 13 ft.) high like walls on either side of the stream and no greenery whatsoever. The creek more resembles a steep-sided city stormwater drain made of bare concrete where the water trickles over the stony bed.

Figure 3 - Richard Swain and John Blay follow the Bundian Way, an ancient Aboriginal route through the Byadbo Wilderness. Photo by Franz Peters.

Back at camp, somewhat dazed, we take stock of the situation. There are unsustainable horse numbers around the dam. They must have retreated from the deeper wilderness and are making their stand there. But there is no grass remaining. How can they live on dirt alone? Closer inspection reveals their condition is so poor they could barely have the strength to make it to the Snowy River, where there would be not much more food than here.

The Merambego catchment apparently missed all the rain from what must have been a very narrow, small-scale but savage, storm that hit the Stockyard only a few kilometers away. This drastic country misses the rainfall of the Australian Alps. Twice in previous years I have seen extreme weather that would have been similar to such an event, but neither had such singular ferocity.

In the weeks that follow my friend Richard and his wife, Alison Swain, record and photograph dying and dead horses along the Snowy River, some frozen in the most agonized throes of death (Figure 4a & 4b). He sees them pitifully wading into the river to claim the last green bits of reed that grow along the banks, often in competition with feral pigs, goats, and deer. The drought continues, like a signal of the changing of the climate.

Figure 4a & 4b -While the dry weather continued and grasses failed, many feral horses never made it back to the Snowy River from Byadbo. Photos by Alpine River Adventures and Richard Swain.

A Follow-Up Walk: Beyond Stockyard Flat

As the drought intensifies, some 12 months later, in November 2019 I am joined again by Richard, as well as Franz Peters, naturalist and one-time park ranger, for another walk into Byadbo to take a closer look at what had come to pass there. We have limited time and plan to walk this 30-kilometer (18.6-mile) section in one day, from Merambego to the crest of the Black Range that divides the headwaters of Byadbo Creek and the Sheepstation Creek tributary of the Snowy River at 1,000 meters (3280.84 feet) elevation. Wildfires have already started farther north in Queensland and are a potential threat here due to the ongoing extreme dry conditions. We depart Byadbo Gap about 8 a.m. Our aim is to chart how that weather event of about March 2018 we noted last year has impacted the ancient Bundian Way walking route.

Since 2002 and especially during the 2010 Bundian Way heritage survey for Eden Local Aboriginal Land Council, I have walked this area in different ways many times while mapping it and researching and conducting oral histories with old cattlemen whose families had used the area from settlement until it became a national park in 1970. We recorded the routes they used and compared them with older maps and historical surveyors' notes. At the time of our survey the Aboriginal crew dismissed the extreme difficulties of walking the area, saying people need a challenge nowadays, and this would be the most important part of the walk. It is where you can prove yourself. That said, walking here is indeed still a challenge.

Along Stockyard Creek that one flood event tore countless slender black sallee eucalypts out of the ground and deposited them far downstream in the piles of debris well above the earlier flood lines. The scene has barely changed in twelve months. Only sheet erosion on either side of the creek is more obvious. The few surviving flats have been grazed bare. Our clamber to the crest of the Stockyard Ridge is hot and dry and challenging, and yet these grassy woodlands don't appear to have suffered too much from the rain and lack of it. We follow the ridgetop for a few kilometers before we can descend a ridge to the junction of the Byadbo and O'Hares Creek in a traverse I've undertaken many times before. But this time the westward flowing drainage lines off Stockyard Ridge have suffered massive gully erosion most likely triggered by the feral horses grazing the drainage lines too heavily (Figure 5). The narrow, crumbling gullies are

Figure 5 - The extreme drought in the Stockyard Creek tributary of the Byadbo continued after the downpour that caused massive riverbed, sheet, and gully erosion.

four and five meters (13 to 16.5 ft.) deep. It would be hard to find stronger evidence of the damage being done by feral horses. There was no sign of the gullies when I walked the route during the heritage survey in 2010, just as they don't show on hand-drawn maps dating from the late sixties and early seventies.

Arriving at the junction of the Byadbo and O'Hares Creeks, there are few signs of any erosion such as we found along Stockyard. Several shallow pools survive in the creek bed near the junction, and none afterward. There is barely enough water, I guess, to last more than a week or two without real rainfall, but its quality is so disgusting, foul, and smelly few creatures would brave to drink it. The feral horses could only retreat from here to the Snowy River or to the dam at Merambego.

Edbo Flat

Byadbo isn't rich country. It ran large numbers of cattle at the time of first settlement during the late 1820s, but year by year those numbers kept falling. What used to be a good track ran through it, a groove in the ground maybe a meter wide, going east to west along the section of Byadbo Creek that leads to Edbo Flat. Here, there is a substantial area of lush native grassland. Hilltops overlooking the flat land show all manner of Aboriginal artifacts. It had always been regarded as a surprising, special place located in the middle of nowhere or the center of everywhere else. I had followed the track on many occasions over the years. But now, everything is different. The delightful route along creek flats beside the meandering creek overshadowed by eucalypts is changed. The creek is dry. And the flats and nearby dry-as-a-bone hillsides are now overgrown with interlaced branches of common cassinia (*Cassinia aculeata*), about three meters (9.8 ft.) tall. The environmental weed has greatly thickened up and spread since I was here five years ago. The main cause of the cassinia's spread is heavy grazing by the feral horses. The bare soil invites rapid invasion. Once invaded, the feral horses turn their attentions to the understory farther uphill. We have to crawl or smash our way through the scrub to make slow, unpleasant progress while its spent flowers explode about our heads and necks, and the debris get in our eyes and ears and down our backs where they cause itching. The leaves are sticky and unpleasantly smelly and irritate the skin and cause allergic reactions.

The Edbo Flat was like a Shangri-La or a magnet for its swampy grassland and wildflowers, surrounded by a ring of rugged mountain crests. After the extensive hot fires during the summer of 2003, upper parts of the Edbo Flat grasslands started to be overtaken by heavy regrowth and scrub made up of mostly white sallee (*Eucalyptus pauciflora*), black sallee (*Eucalyptus stellulata*), silver wattle (*Acacia dealbata*), and especially the dreaded cassinia. After disturbances such as hot fire or heavy grazing, when the earth is cleared to bare ground, the country responds with growth of weeds and/or scrub (Figure 6). When the firetrails were bulldozed along ridgetops, they were quickly lined with barriers of cassinia.

Any thoughts we might follow the old cattlemen's route beside the creek to the flat are abandoned. We now pass through the driest and most rugged parts simply because there

Figure 6 - Edbo Flats woodlands with brumbies.

is less cassinia. The three of us agree that the best way to regain balance in the locality is to get rid of the horses and reintroduce traditional cultural burning as practiced before colonization.

Along the Bundian Way, a heritage recognized pathway through the park, the horse over-population has ravaged the countryside, and yet the landscape has many remarkable features. It excites me to find places where metamorphosed slates have hardened in waves that break across the strata producing ax head–sized blanks as we found at the old quarry. Near the end of the walk and facing nightfall in a state of near-total exhaustion, there are moss-covered multicolored stones of volcanic origin where, beyond the cassinia, the cypress-pine dominate steep hillsides that slope towards the Snowy. It's adventurous country of remarkable beauty. Across the silvery tones of the mountainside, its gray box is studded with the gold of mistletoe, which stands out at a distance to make the slopes look like a mighty Aboriginal dot painting.

Examining Kosciuszko National Park

The 6,900-square-kilometer (2,700 square miles) Kosciuszko National Park includes the highest parts of the Australian continent and is home to the iconic Snowy River. Within 50 years of European settlement, the Alpine grasslands of the high country were recognized as valuable drought pastures in a region much prone to drought. Subsequently, a few horses escaped or were set free and began to populate the pastures.

If it were a farm, the national park would clearly be overstocked. Allowing the overpopulation to continue to such an extent should have attracted prosecution by the anticruelty authorities. And Byadbo Wilderness is not the only part of the park with unsustainable numbers of feral animals. In the adjacent Pilot Wilderness, the headwaters of the mighty Murray River have also been impacted by feral horses. Instead of extensive swampy wetlands holding the water back like a sponge for slow release to the westward plains, they have been grazed to mud that will soon enough become erosion gulches. Other parts of the national park rising into the Alpine habitats are also suffering. Unique wildlife is threatened. The countryside has never quite experienced an impact like this.

Historic Romanticism

In 1895 a foremost bush balladist, Banjo Patterson, wrote a poem that was an instant success. "The Man from Snowy River" extolled the wild bush horses and the man whose horsemanship single-handedly rescued a colt that had run away to join the wild mob. The poem's ongoing popularity brought a romantic aura to feral horses. At the time well-bred horses were highly valued. None were willingly surrendered to the wilds. Every blade of grass was valuable and wild horses were shot on sight. Any responsible farmer manages the stock on his land and strictly controls their numbers seasonally.

The poem was quickly taken to heart by the Australia public and is now arguably the nation's best known and favorite poem. Today the horses that would have been shot by the graziers of yesteryear have been romanticized as brumbies in books and movies. Tourists want to see brumbies in the wild, and horse tours have become popular.

The Science

Everybody knew the horse population had increased to an alarming extent, especially given the effects of climate change and drought. At a scientific count in 2014 there were nearly 10,000. But for years, the extent of their increase was hotly debated.

If the horse numbers are so considerable that in parts of the park they are dying of starvation, how can you change management of public lands where the managers' hands are tied? How can we allow the cruelty to continue while fragile systems at the headwaters of the dry continent's significant waterways are put under threat and the effects multiply? How can public opinion be turned around? Isn't good science the answer to such a deplorable situation?

Concern over the growing impact of a feral horse overpopulation in Australia's biodiverse

high country was increasingly voiced by scientists, land managers, and members of the public. But the New South Wales (NSW) state government enacted the Kosciuszko Wild Horse Heritage Act of 2018, which provided legal protection to the feral horses on cultural grounds. Scientists, much alarmed about the environmental hazards raised by the legislation, in an atmosphere of desperation, organized the Kosciuszko Science Conference to bring together key scientists and managers of the region in late 2018. Twenty-two scientists presented their research on current and potential impacts of feral horses across natural environments of the Australian Alps.

An accord issued after the conference and signed by more than 120 attendees stated that "scientific evidence shows that there is a clear and present threat to the natural water catchments and the natural ecosystems of Kosciuszko National Park and other Australian Alps national parks caused directly by thousands of feral horses" and called upon the NSW government "to substantially and urgently reduce feral horse populations in these protected areas" and repeal the Kosciuszko Wild Horse Heritage Act 2018 to restore the protected status of Kosciuszko National Park (Worboys et al. 2018).

In autumn 2019, the Australian Alps National Parks Co-operative Management Program working with Parks Victoria, NSW NPWS and ACT Parks and Conservation Service undertook a feral horse aerial survey in the Australian Alps. This survey followed the 2014 model by employing the same operational and statistical methodology. It allowed for the estimation of both the current population and the change in horse numbers in the surveyed areas during the past five years. Results from both surveys indicated that the overall Australian Alps feral horse population is large, widespread, and continues to increase in size. The estimated overall feral horse population within the combined surveyed areas more than doubled during the five years. The horse population across the area increased from an estimated 9,190 in 2014 to 25,318 in 2019. This is an increase of 23% per annum. Such rates of population growth and increase are consistent with international research, survey, and monitoring of feral horse populations across the world.

Like the case for taking action to reduce climate change, if the overwhelming scientific case against protection of feral horses is not sufficient to persuade our legislators to change the law, then what is?

Like the case for taking action to reduce climate change, if the overwhelming scientific case against protection of feral horses is not sufficient to persuade our legislators to change the law, then what is? How can it be that we allow spurious, emotional arguments to win over good science? Can you fight poem with poem? Why not relegislate nature to bring about change? Will changing the language and stories save the nation's most significant national park?

Plight of the Wild Lands

If there were scenes such as we had seen at Merambego on private property, I believe the owners would be prosecuted for cruelty to their animals. National parks aren't here for the convenience of horses; rather, in this region they're here for the unique native wildlife that includes the emus and kangaroos of the national coat of arms, as well as koalas, eastern quolls, antechinus, lyrebirds, and platypuses. Farms are for horses. The park is not drought pasture. I recall how a few times over the years I saw occupied horse floats visit Merambego and then leave empty, and now realize they weren't on NPWS business but rather leaving behind their old station horses. I guess the farmer preferred to do this rather than send his old horses to a knackery. But while I can't say all horses in Merambego were brought here by farmers, I do believe some of them survived and were joined by others from the drought-grizzled Byadbo Wilderness, resulting in the unsustainable population.

Various factions of the NSW government were already at odds on a range of environmental issues from climate change to privatization, management of the brumbies to water rights, land clearing, logging in national parks, protection of native grasslands, and more (Davies 2019). NSW deputy premier John Barilaro was instrumental in obtaining the heritage listing for brumbies through his controversial legislation in the NSW Parliament. Barilaro represents Monaro, which includes the region most infested by the feral horses and has been advised by his mentor and former state member Peter Cochran, who runs horse treks through the northern part of the park. Cochran has long argued official numbers of wild horses are grossly exaggerated (Ellicott 2019).

Cochran, who freely calls upon a wide range of political contacts, admits using his influence to enhance his horse-touring business and bring about amendments to the law that protects the horse paddock he regards as his right (Slattery and Worboys 2020). He rejects scientific arguments to sustain unique flora and fauna as "fake news," and adds, "I reject the science because I don't trust the scientists. Nobody does" (French 2019).

At the same time the more conservative side of government pursues an agenda of gradual privatization with the aim of smaller government. Staffing in national parks has been reduced drastically. Numerous other measures have been undertaken to override the scientifically based management of national parks. The politicians responsible for the reforms appear to hold distrust of science as an article of faith. Their actions to dismantle an otherwise effective number of nature management agencies would appear to arise from a belief that nature can take care of itself. NPWS staff numbers are now so low across the state the agency will inevitably be accused of incompetence in its management of the wild estate.

But it is popularly accepted in Australia that government at all levels has responsibility for nature. It must provide clean air and water and take reasonable steps to protect us from wildfire, for example, as well as maintaining a system of wild places or national parks. Outsourcing park management won't allow the necessarily broad overall systematic

management of natural areas. The market will not maintain our parks for us. I was recently told by a government figure that the reduced staffing levels in parks meant they would simply have to work smarter. But there's a fine line between the staff working "smarter" and system collapse, especially in times of emergency. The most beautiful and special places should be managed for all, and not commercialized or privatized. Thus, an independent national park system is under threat.

Even though the plight of the Byadbo Wilderness is sad, much the same story plays out across Kosciuszko National Park, the showcase of Australia's distinctive high-country wild nature. The public gaze has focused on the need to look after our wild places and yet the minimal emphasis on feral horses demonstrates a lack of depth and understanding of the landscape. It excuses the gravity of the damage they bring to the fragile ecosystems, not to mention the pain and suffering the unadapted horses will endure when drought tightens its grip once more.

Protected areas are intended to safeguard biodiversity in perpetuity, yet evidence tells that Australia is not the only nation taking steps such as the wild horse bill to undermine protected area durability and efficacy. Legal changes that include protected area downgrading, downsizing, and degazettement are happening across the world. In fact, the United States, Brazil, and Australia lead the world. Most of the changes (62%) are associated with industrial-scale resource extraction and development (Golden Kroner et al. 2019).

Shelley famously said that "poets are the unacknowledged legislators of the world," but his words have brought an ironic twist to Australia's best-known verse. The NSW government's brumby bill was intended to stop the culling of feral horses, and yet the subject of Banjo Patterson's poem is the recapture of a valuable colt that had got away and "joined the wild bush horses."

Conclusion

Many Aboriginal people and their Elders joined together in a Narjong ceremony to call for the true ancient heritage of the land to be recognized above that of a feral interloper that destroys Aboriginal sites in the upper catchment of streams and dries the rivers servicing Aboriginal communities downstream. They are especially dismayed that the heritage of feral horses has been raised above Aboriginal cultural and natural heritage (Ulman 2019).

We've known what to do and how, and yet our politicians who want to make all the decisions have been led down the garden path by the corruption of language. Aboriginal people lived on the continent for 70,000 years or more and maintain a respect for Mother Nature. It's time we turn things around and rediscover that respect. Language has become detached from the real world just as many feel themselves removed from "nature," that they have lost their sense of belonging, their sense of being connected to a particular place, of being responsible for it, of caring for it. We must find that sense of belonging and connection again.

And, how, I wonder, can we reengage the popular imagination with the realistic truth of

nature's predicament. Desperate action is called for. Poets, artists, scientists, Aboriginal community leaders, and other opinion-makers will have to rediscover the language of the natural world to distinguish it from the hollow "concepts" our politicians constantly argue about. If we can follow Shelley's dictum, it's time for us to relegislate for the survival of wild nature beyond this day and age. One way to begin is to deromanticize the "heritage" animals and the impacts of feral flora and fauna to keep the unique qualities of Australia's high lands and their wildlife.

It is a very strange impulse that suggests we can improve on nature, that we can see, for example, a very beautiful wilderness upland meadow that has found its balance and form with the husbandry of many thousands of years and think that all this place needs is a mob of horses to perfect it. The consequences can be found in the desolated Stockyard and the tortured forms of dead brumbies beside the Snowy River.

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Cumberland Island Salt Marshes. **Photo credit** © John Nettles.

SCIENCE & RESEARCH

Seasonal and Destination-Based Variation in Visitor Travel Routes in a Designated Wilderness

by JOHN M. NETTLES, MATTHEW T. J. BROWNLEE, RYAN L. SHARP, MICHAEL P. BLACKETER, and BRIAN A. PETERSON

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ABSTRACT As Global Positioning System technology improves, so does our ability to integrate spatiotemporal data into management efforts, including in designated wilderness areas. This study seeks to use space-time budgets, or how a visitor allocates their time as they travel through a space, to understand variation among wilderness users' travel patterns through federally designated wilderness at Cumberland Island National Seashore (CUIS). Despite relatively similar trip lengths, visitor travel routes differed in distance traveled to a terminal campsite. Additionally, visitors in spring spent more time and covered more distance than those in any other season. Understanding seasonality and related travel patterns can provide valuable insight for effective wilderness management. Important findings include: (1) the distance traveled to a camping area is useful to determine visitors' travel routes and space-time budgets, (2) travel patterns often vary by season, and (3) using GPS data loggers is a viable approach to study visitor travel patterns in designated wilderness.

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In 1984, a National Park Service (NPS) General Management Plan initiated a cap of 300 visitors per day at Cumberland Island National Seashore (CUIS). The application of this limit continues today despite significant growth in annual visitation levels. In 1984, annual visitation was 32,372 but has since grown to 61,896 in 2016 and reached a high of almost 92,000 in 2010 (NPS 2019). As with a number of parks and protected areas around the world, such a high level of visitation can contribute to management challenges and demands effective and efficient strategies for managing visitor capacity – that is, the maximum type and amount of use an area can accommodate (IVUMC 2019).

To do so, managers must understand typical use and dispersal of visitors throughout the area, often with limited staff and associated resources. As such, it is important that management efforts are directed efficiently and effectively, whether inside or outside designated wilderness. However, little is known of how visitor travel patterns throughout a wilderness area may vary by season and intended destination. The way in which visitors allocate their time during trips to backcountry campsites can help inform managers of recreational impact levels across the area and potential damage to wilderness quality. High levels of use during sensitive seasons for wildlife (Zhou, Buesching, Newman, Kaneko, Xie, and Macdonald 2013), heavy use of trails within wilderness (Marion, Leung, Eagleston, and Burroughs 2016), and high densities of wilderness visitors (Cole and Hall 2010) are all potential detriments to wilderness quality and therefore must be assessed. Despite this, there is a lack of information on how seasonality and a visitor's intended destination impact densities of use, general travel patterns, and time spent on specific trails.

While focused on specific implications for CUIS, this research sought to further improve the effectiveness of wilderness management beyond the seashore. We sought a deeper understanding of the factors contributing to the variation in wilderness users' travel routes. Specifically, we identified the (a) most popular travel routes; (b) percent of time and distance spent on main roads, side roads, beaches, trails, and campgrounds; and (c) differences in travel patterns across seasons and the influence of visitors' farthest campsite as listed on their wilderness permit.

Background

GPS Data in Park and Protected Area Management

Researchers use of Global Positioning System (GPS) technology has become commonplace over the last the decade, significantly improving the ability of researchers and managers to assess patterns of visitor use (for a review, see Riungu, Peterson, Beeco, and Brown 2018). Distributing small GPS data loggers in park and protected areas allows researchers and managers to assess travel patterns with objective data as opposed to relying on subjective visitor reports, which may have substantial error (Figure 1). The introduction of GPS units addressed this concern, providing a solution that was objective and descriptive. This drastically improved measurement accuracy, and correspondingly, methods for spatial research and analyses also

Figure 1 -The Canmore GT-740FL Sport GPS data logger with hand for scale.

improved (Hallo et al. 2012). These advances greatly benefit the field of park and protected area management in a way that is both compelling and realistic (Beeco and Brown 2013).

For example, Nielson and Hovgesen (2004) used GPS locations from personal devices to record individuals' movement over time and to identify travel routes, additional stops, and time allocated at each stop (Nielson and Hovgesen 2004). Other techniques were shown by Orellana, Bregt, Ligtenberg, and Wachowicz (2012), who used movement suspension patterns (MSPs) and generalized sequential patterns (GSPs) to analyze travel patterns. MSPs highlight where movement slows to identify potential areas of interest to visitors while GSPs illustrate the general sequence of site visitation. When combined, these patterns can help predict the flow of visitors, and when paired with other social science approaches, they can be used to develop an understanding of visitor preferences and potential environmental impacts (Orellana, Bregt, Ligtenberg, and Wachowicz 2012).

Visitor Space-Time Budgets

A substantial amount of visitor use management research within parks and protected areas has focused on the use of normative thresholds, or common ideations of acceptable conditions within the recreation experience (Manning 2011). This method is highly beneficial when determining acceptable levels of impact, desired conditions, and other aspects of visitors' opinions. However, very rarely do these common practices incorporate the observed behavior of visitors. By incorporating visitor space-time analysis into research of parks and protected areas, managers are given insight into the decision making of visitors (Dietvorst 1995). Peterson, Perry, Brownlee, and Sharp (2020) define space-time budgets as the way in which a visitor allocates their limited time to cover a limited spatial area. Findings from space-time research may be useful in designing future infrastructure and transportation routes, such as roads or trails, as well as preparing for potential areas of heavy impact (McKercher and Lew 2004). In doing

so, managers can minimize the long-term effects of human use, an important factor in managing designated wilderness (Hammitt, Cole, and Monz 2015). One approach to this analysis is to create space-time budgets, or the allocation of an individual's time across a given space (Pearce 1988). Thus, a space-time budget can be described as an estimation of an individual's personal schedule.

Visitor space-time budgets have been used in a wide variety of settings to understand preferences and patterns of visitors. In 2000, Balmford used space-time budgets to analyze the relative benefit of keeping large versus small animals on exhibit by estimating the amount of time zoo visitors spent at each exhibit. An additional study by Birenboim, Anton-Clavé, Russo, and Shoval (2013) used time budgets to identify distinct activity patterns among theme park visitors. Lastly, managers at Cumberland Island National Seashore used space-time budgets to identify the typical timing and patterns of frontcountry day use distribution, helping determine where to position staff and which areas may be more susceptible to impact (Peterson, Perry, Brownlee, and Sharp 2020).

Visitors determine their personal schedules (i.e., space-time budgets) by incorporating many factors into the decision-making process. Characteristics of both the destination and the visitor group are important aspects to consider (Lew and McKercher 2006). For example, a 1997 study of visitors to Cornwall, England, found that the presence of children within the group significantly altered behavior patterns (Thornton, Shaw, and Williams 1997). In addition, the past use history of a visitor group may significantly alter their current behavior; McKercher, Shoval, Ng, and Birenboim (2012) found that repeat visitors in Hong Kong were less likely to disperse throughout the area and more likely to return to the hotel between activities than were first-time visitors. Furthermore, distance decay theory posits that the relative distance to potential destinations may impact their popularity among visitors, with demand increasing until a tipping point at which it declines exponentially with increasing distances (McKercher and Lew 2003).

Given these collective findings, it is reasonable to postulate that even within a single wilderness area, individuals who elect to travel to farther destinations may use decision-making factors differently from those who elect to travel to nearer destinations. Although wilderness users often have varying outdoor recreation motivations, it may also be possible that – if decisions made throughout the trip are perceived in the same light as original decisions – those traveling to nearby destinations may travel in different ways from those traveling to farther destinations. For example, nearby travelers may choose different routes, travel at a different pace, or stop at different locations from those who choose farther destinations. When managing a park or protected area, knowledge of these variations in travel patterns can help inform management decisions such as where to position staff, how to allocate campsite permits, which trails to maintain, and what educational material to provide to visitors. Further, knowledge of visitor space-time budgets may provide insight into unwelcomed behavior such as the development of informal trails or use of unsanctioned campsites.

Seasonality of Behavior

While seasonal differences in visitation patterns have long been documented within the field of tourism and hospitality, their effects are dramatic, wherein they can impact employment, income, and overall community function (Butler 2011). Seasonal differences may even impact how tourists perceive destinations themselves. A 1997 study of visitors to Victoria, British Columbia, demonstrated that price-value perceptions are influenced by season (Murphy and Pritchard 1997). Further, weather patterns themselves may play a role in the development of an individual's space-time budget. For example, Verbos and Brownlee (2017) developed a Weather-Dependency Framework, positing that different outdoor recreation activities are more or less "weather dependent" and that weather dependency is often influenced by seasonality and its associated weather and resulting conditions.

Outdoor recreation activity participation, decision-making, and activity adjustments are all influenced by weather, seasonal patterns, and resulting biophysical conditions. Evidence of this influence has been found across several studies and was recently cataloged by Verbos, Altschuler, and Brownlee (2018). For example, Horanont, Phithakkitnukoon, Leong, Sekimoto, and Shibasaki (2013) found that even day-to-day variations in weather conditions resulted in changes to people's daily patterns, with differing impacts across geographic areas. It follows that large-scale, season-driven weather changes would produce similar variations in behavior. For example, seasonal variation influenced visitors at Hilton Head Island, South Carolina, whose trips differed in length of stay, reasons for visiting, and trip origin (Bonn, Furr, and Uysal 1992). Similarly, Zajchowski et al. (2020) found that the location, amount, and seasonal variation of ponding surface water at the Bonneville Salt Flats influenced visitor travel patterns across summer months.

When applying this idea of seasonality to designated wilderness, it may mean visitors weigh benefits and consequences of intrasite locations differently across seasons, resulting in different overall use patterns. Seasonal differences, then, may have significant impacts on the effectiveness of visitor management strategies and the impact on the environment. In designing effective management strategies, seasonality and seasonal differences of visitor use patterns should be illuminated and assessed.

Methods

Study Site

This study took place within the designated wilderness at Cumberland Island National Seashore along the coast of southern Georgia, USA (Figure 2). CUIS attracts visitors with diverse motivations thanks to its abundant natural, cultural, and recreational resources. This barrier island was designated as a National Seashore in 1972, opening to visitors in 1975 (Dilsaver 2004). Attractions include historic Plum Orchard Mansion, Dungeness Mansion Ruins, First African Baptist Church, five campgrounds, 20 miles (32.2 km) of undeveloped coastline, more than 50 miles (80.5 km) of hiking trails, and 9,886 acres (4,000 ha) of federally designated wilderness (Figure 3).

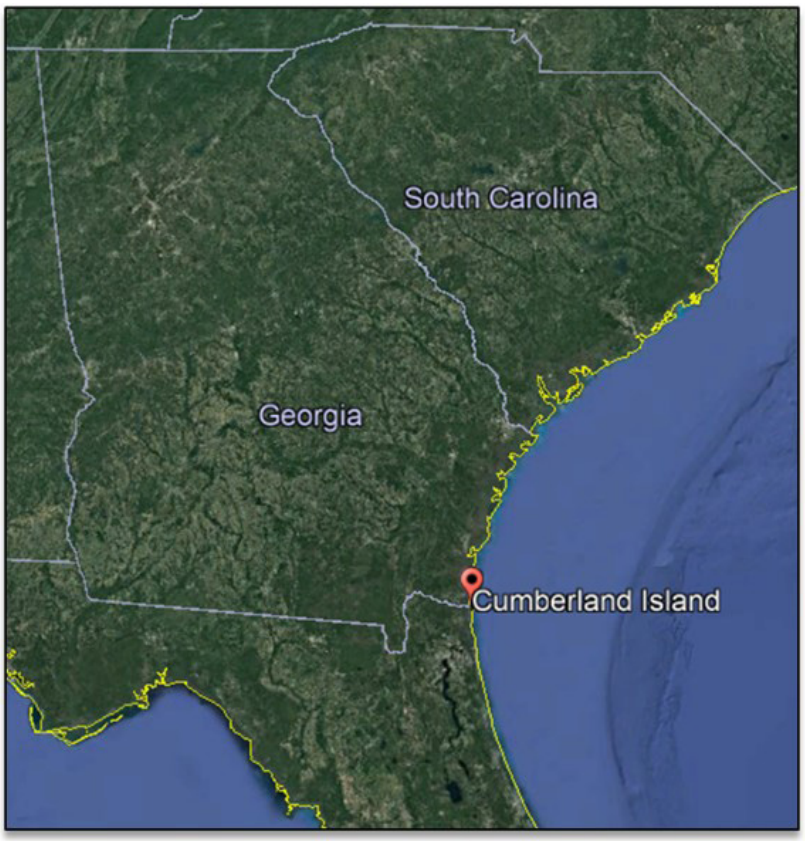

Figure 2 - Relative location of Cumberland Island National Seashore within the southeastern United States.

Figure 3 - National Park Service map of Cumberland Island National Seashore, with the four wilderness or backcountry campsites labeled.

As Cumberland Island is accessible only by boat, most visitors use a private passenger ferry that departs from St. Marys, Georgia. This service operates two to three times a day carrying no more than 150 passengers each trip, a limit that was established in 1984 and is now often reached during the peak season between March and July (Hallo et al. 2018).

The wide range of attractions on the island bring both wilderness and nonwilderness visitors (Hallo et al. 2018) with wilderness visitors attracted to the area to experience nature, solitude, and adventure. Typically spending multiple nights on the island, wilderness visitors – who make up approximately 2% of annual visitation – are responsible for paying additional fees and for obtaining a wilderness-specific permit before their visit. The southern end of the island includes several nonwilderness destinations such as the its southernmost beach, the Sea Camp Ranger Stations, and the Dungeness Ruins, all of which are frequented by both day and overnight visitors. Attractions such as Plum Orchard Mansion and the First African Baptist Church at the north end of the island, however, are surrounded by designated wilderness. Because of this fact, they are relatively inaccessible to most users (NPS 2019), for whom the distance between the ferry terminal and these attractions is too great to walk within a single day.

CUIS offers five distinct campgrounds, four of which are a greater distance from the park's entry point than the typical destinations of nonwilderness visitors. Three of these four are within

federally designated wilderness. Sea Camp Campground is the most developed campground and is easily accessible from Sea Camp Ranger Station, the main entry point on the island where the ferry disembarks passengers. Stafford Beach Campground (SB) is on the border of federally designated wilderness but offers fewer amenities than Sea Camp campground. Hickory Hill (HH), Yankee Paradise (YP), and Brickhill Bluff (BB) Campgrounds are all within federally designated (Figure 4). The campgrounds are officially listed as 0.5, 3.5, 5.5, 7.5, and 10.5 (.8, 5.6, 8.8, 12.1, and 16.9 km) miles away, respectively, from Sea Camp Ranger Station; however visitors may reach each campground a number of ways, including along the main road bisecting the wilderness area, on the beach, and on hiking trails. These overnight visitors reserve their camping permits, selecting specific campsites of their choice, up to six months in advance using the website www.recreation.gov. Each campsite accommodates up to six people with approximately four campsites at each wilderness campground. Dispersed camping outside designated sites is prohibited, and overnight campers cannot change the sites or dates on their permit once starting their trip.

Figure 4 - Photos of each wilderness or backcountry campsite, provided by the National Park Service.

Data Collection and Analysis

At CUIS there are backcountry/wilderness campers as well as frontcountry (i.e., nonwilderness) campers. This study focused only on overnight use of backcountry and wilderness campsites, and as such does not include overnight frontcountry users staying at Sea Camp Campground. Researchers used a stratified random sample (stratified across time, day of the week, and season; Vaske 2008) and entrance intercepts to administer Canmore GT-740FL Sport GPS data loggers to all visitors that held an NPS wilderness permit and intended to travel and camp in the wilderness area. The sampling ensured that all overnight wilderness and backcountry visitors had equal probability of being sampled during our sampling period. Sampling was stratified across seasons and occurred over six weeks in 2018 during the last two weeks in March (spring), two weeks at the end of July (summer), and two weeks in October (fall). Upon agreement to participate, researchers provided a GPS data logger to these overnight wilderness users to carry during their visit. If a researcher was not present upon visitors' return to the Sea Camp Ranger Station, they were instructed to place the data logger in a specified drop box for later retrieval.

These data loggers have been used successfully in several parks and protected areas, including CUIS and Denali National Park & Preserve and showed relatively high accuracy, durability, and ease of use (Peterson et al. 2020; Stamberger et al. 2018). The Canmore GT-740FL has a long battery life and allows for little device tampering due to the lack of an LCD screen and the presence of few buttons. These data loggers – which only receive, and do not transmit data – recorded latitude/longitude waypoints every 15 seconds and were only analyzed after being returned to the research team (Hallo et al. 2012; D'Antonio, Monz, Lawson, Newman, Pettebone, and Courtemach 2010). After downloading the logger data into MS Excel, the researchers performed an initial data cleaning prior to opening it in ArcMap.

Once in ArcMap, the trackers' geospatial data was analyzed for technical errors using steps outlined by Beeco and Brown (2013). These factors were largely based on physical feasibility, including distance between adjacent waypoints, acceptable level of error, and possibility of travel routes. The cleaned data for these routes were then merged by season and farthest campsite to create density maps of travel patterns, excluding time spent at attraction points. Each route was also analyzed individually using the attribute table in ArcMap and MS Excel to determine characteristics such as trip length, distance traveled, and percent of time spent on the main road, side roads, beaches, trails, and campsites. Whereas beaches, trails, and campsites are within the wilderness area, main roads and side roads bisect wilderness but are excluded.

The measured attributes were then compared using a one-way analysis of variance (ANOVA) and least significant difference (LSD) post hoc test in SPSS v24.0. For such analyses, dependent variables were time (minutes) and distance (miles), whereas independent variables were location of travel (e.g., main road, beach, trail), farthest campsite, and season (i.e., fall, summer, spring). For these

comparisons, statistical assumptions were met, including assurance of no statistical outliers as detected by box plots, independence of observations, normal residuals (Shapiro-Wilk's test), and homogeneity of variances (Leven's test, or a correction for nonpooled variances when appropriate). An alpha () level of 0.05 was used for all statistical tests and eta-square 2 was used as one interpretation of effect size for significant differences. Cohen (1988) and Ferguson (2016) suggest that approximately 0.01 indicates a small effect size, while 0.06 is medium, and 0.14 is large. However, even small effect sizes can have substantial implications for practice and theory (Fidler and Cumming 2013).

Results

Over the course of three seasons (spring, summer, and fall), researchers approached 82 wilderness groups at the beginning of their CUIS experience, 70 of which elected to participate, yielding an 85% response rate. The average size of eligible groups was 5.6 people. The analysis includes visitors to four of the five campsites (Stafford Beach, Hickory Hill, Yankee Paradise, and Brickhill Bluff). Although Stafford Beach is not within designated wilderness, it requires the same permit process and backpacking methods as the three wilderness campsites so was included in the analysis.

On average, wilderness visitors spent 79% of their total trip time at their campsites. Total trip time includes travel time on the island, time spent at attraction points (e.g., Plum Orchard Manion, Dungeness Ruins, the beach), and nights (Table 1). The remaining time was spent actively traveling, with 11% of time on trails, 5% on main roads, and approximately 2% on side roads and on the beach. In terms of distance traveled, 54% of the total distance traversed by wilderness visitors occurred on trails, 28% on main roads, and approximately 9% on side roads and the beach.

	Mean (SD) distance (miles)	Mean (SD) time (minutes)	% of total distance	% of total time
Main Roads	5.94^{1} (5.97)	$115.99^{1,2}$ (99.02)	27.53^{1} (23.68)	4.97^{1} (4.76)
Side Roads	2.22^{2} (2.16)	53.87^{1} (51.79)	9.32^{2} (6.79)	2.22^{2} (2.09)
Beach Travel	1.86^{2} (2.48)	55.86^{1} (74.73)	9.13^{2} (15.27)	2.33^{2} (3.73)
Trails	11.32^{3} (6.94)	262.9^{2} (162.92)	53.95^{3} (25.91)	11.03^{3} (6.84)
Campsite		2025.76^{3} (819.92)		79.29^{4} (8.16)
Overall	21.34^{4} (10.29)	2517.76^{4} (863.69)	100^{4} (0.00)	100^{5} (0.00)
F Value	114.71	349.82	337.405	5324.39

Table 1 - Average use of travel routes across all seasons and campgrounds.
*Note: Superscripts represent significant differences across travel types (p<0.05). "Overall" does not include time and distance while at attractions.

	Stafford	Hickory
Main Road	$89.90^{1}{}_{a}$ (77.53)	$81.39^{1}{}_{a}$ (70.00)
Side Road	43.27_{a} (41.17)	55.69_{a} (64.69)
Beach Travel	68.67_{a} (87.29)	34.23_{a} (40.34)
Trails	$190.23^{1}{}_{a}$ (112.85)	355.46^{2} (178.96)
Campsite	2141.60_{b} (901.81)	1801.08 (720.93)
Total	$2779.35^{1}{}_{c}$ (986.64)	2543.08 (859.96)

Table 2 - Comparison of mean (SD) time (minutes
farthest campsite.
*Note: Superscripts represent statistically significant diffe
Subscripts represent statistically significant differences a
include time while at destinations.

Travel Routes by Farthest Campsite

Of the 70 wilderness groups, 47% of users chose Stafford Beach as their farthest campsite while approximately 15% chose Yankee Paradise, 20% chose Hickory Hill, and 20% chose Brickhill Bluff. Visitors to Brickhill Bluff used the main road for significantly more time (M = 213.23 minutes, SD = 111.81), F(3,62) = 7.10, p < .001, 2 = 0.256 and distance (M = 12.19 miles, SD = 8.46), F(3,62) = 7.65, p < .001, 2 = .270 than did other groups (Tables 2 and 3). Stafford Beach visitors used trails for significantly less time (M = 190.84 minutes, SD = 111.00), F(3,62) = 5.92, p = .001, 2 = .223 and distance (M = 7.95 miles, SD = 4.61), F(3,62) = 8.16, p < .001, 2 = .283 than did other groups. In addition, distance spent on side roads generally increased with farther campsites, F(3,62) = 3.26, p = .03, 2 = .270 while time on side roads, F(3,62) = .77, p = .51, 2 = .036 did not.

Further, total trip time did not differ significantly, F(3,62) = 0.82, p = .49, 2 = .038 by farthest campsite and while total distance traveled was significantly less for Stafford Beach visitors (M = 25.05 miles, SD = 9.27), F(1,63) = 21.21, p < .001, 2 = .277 than all other backcountry/wilderness campers, it did not differ significantly between the remaining three sites (M = 38.54 miles, SD = 13.55), F(2,32) = .78, p = .47, 2 = .069. (Figure 5) Visitors to Stafford Beach were unique in that they spent most of the day at the beach, and their use was highly concentrated in this area of the island, seldom visiting popular attractions farther north.

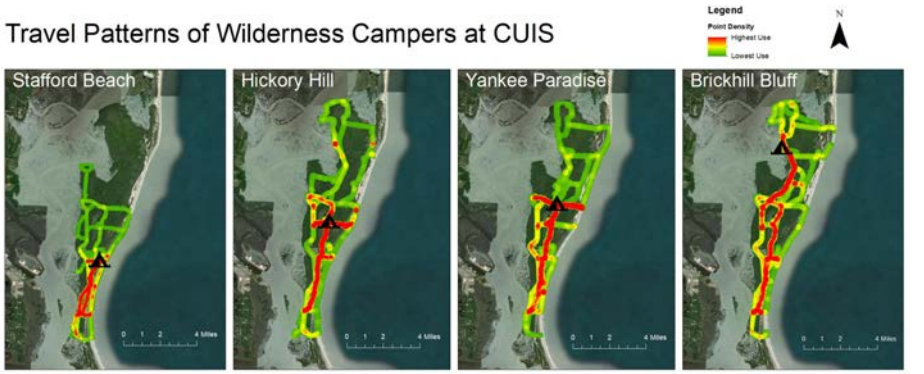

Figure 5 - Heat maps of travel routes by farthest campsite visited.

	Yankee	Brickhill
	115.89^{1}_{a} (99.38)	213.23^{2}_{a} (111.81)
	63.44_{a} (48.35)	66.92_{a} (52.86)
	71.78_{a} (66.56)	31.77_{a} (62.58)
a	365.33^{2}_{a} (165.05)	293.77^{2}_{a} (169.98)
b	2054.00_{b} (835.26)	2203.31_{b} (696.52)
$^{1}_{c}$	3013.33^{1}_{c} (1033.05)	3078.46^{1}_{c} (975.00)

s) spent on various travel routes, by

erences across campsites at the .05 level. across travel types at the .05 level. Totals

	Stafford	Hickory	Yankee	Brickhill
Main Road	3.82^{1}_{a} (3.27)	5.28^{1}_{a} (5.00)	6.14^{1}_{a} (5.73)	12.19^{2}_{a} (8.46)
Side Road	1.48^{1}_{a} (1.39)	$2.28^{1,2}_{a}$ (2.38)	$2.84^{1,2}_{a}$ (2.16)	3.61^{2}_{b} (2.89)
Beach Travel	2.36_{a} (3.03)	1.14_{a} (1.11)	2.42_{a} (2.25)	1.04_{b} (1.95)
Trails	7.93^{1}_{b} (4.69)	16.35^{2}_{b} (7.47)	16.12^{2}_{b} (6.21)	12.43^{2}_{a} (7.42)
Total	25.05^{1}_{c} (9.27)	34.80^{2}_{c} (13.86)	40.52^{2}_{c} (13.00)	40.90^{2}_{c} (13.83)

Table 3 - Comparison of mean (SD) distance (miles) traveled on various travel routes, by farthest campsite.
*Note: Superscripts represent statistically significant differences across campsites at the .05 level. Subscripts represent statistically significant differences across travel types at the .05 level. Totals include distance while at destinations.

Travel Routes by Season

Of the 70 respondent groups, 31 visited in the spring, 18 visited in the summer, and 17 visited in the fall. Despite insignificant results of the ANOVA, $F(2,63) = 2.80$, $p = .069$, $2 = .082$, campsite selection differed significantly between spring and fall ($p = .02$), with 35.5% listing Stafford Beach as the farthest campsite in spring and 64.7% listing Stafford beach in the fall. Total trip time, $F(2,67) = 3.33$, $p = .004$, $2 = .090$ and total distance traveled were both significantly greater in spring ($M = 3083.23$ minutes, $SD = 953.44$; $M = 37.43$ miles, $SD = 12.51$) than in summer ($M = 2442.86$ minutes, $SD = 948.33$; $M = 26.99$ miles, $SD = 9.50$)(Tables 4 and 5). Visually, visitors to all campsites appear to be much more concentrated along the beach in the spring and fall than in the summer. Lastly, distance, $F(2,67) = 4.69$, $p = .012$, $2 = .123$ and time, $F(2,67) = 3.29$, $p = .043$, $2 = .089$ on trails were both significantly greater in spring ($M = 314.48$ minutes, $SD = 169.53$; $M = 13.98$ miles, $SD = 7.36$) than in fall ($M = 200.11$ minutes, $SD = 130.79$; $M = 8.55$ miles, $SD = 5.18$) (Figure 6).

	Spring	Summer	Fall
Main Road	119.7 (106.5)	110.4 (105.5)	116.1 (81.3)
Side Road	58.5 (55.8)	54.8 (51.3)	44.8 (46.6)
Beach Travel	72.3 (67.4)	36.0 (65.6)	50.8 (92.7)
Trails	314.5^{1} (169.5)	$240.6^{1,2}$ (160.4)	200.1^{2} (130.8)
Campsite	3083.2 (953.4)	2442.9 (948.3)	2596.7 (888.0)
Total	2760.0^{1} (882.1)	2264.4^{2} (940.3)	$2396.2^{1,2}$ (791.4)

Table 4 - Comparison of mean (SD) time (minutes) spent on various travel routes, by season of use.
*Note: Superscripts represent statistically significant differences across seasons at the .05 level. Totals include time while at destinations.
campsites at the .05 level. Subscripts represent statistically significant differences across travel types at the .05 level. Totals include time while at destinations.

	Spring	Summer	Fall
Main Road	6.84 (6.3)	5.08 (4.5)	5.94 (6.0)
Side Road	2.58 (2.3)	1.95 (1.7)	1.91 (2.4)
Beach Travel	2.45 (2.1)	1.27 (2.4)	1.55 (3.0)
Trails	13.98^{1} (7.4)	9.76^{2} (6.5)	8.55^{2} (5.2)
Total	37.43^{1} (12.5)	26.99^{2} (9.5)	26.85^{2} (15.7)

Table 5 - Comparison of mean (SD) distance (miles) traveled on various travel routes, by season of use.
*Note: Superscripts represent statistically significant differences across seasons at the .05 level. Totals include distance while at destinations.

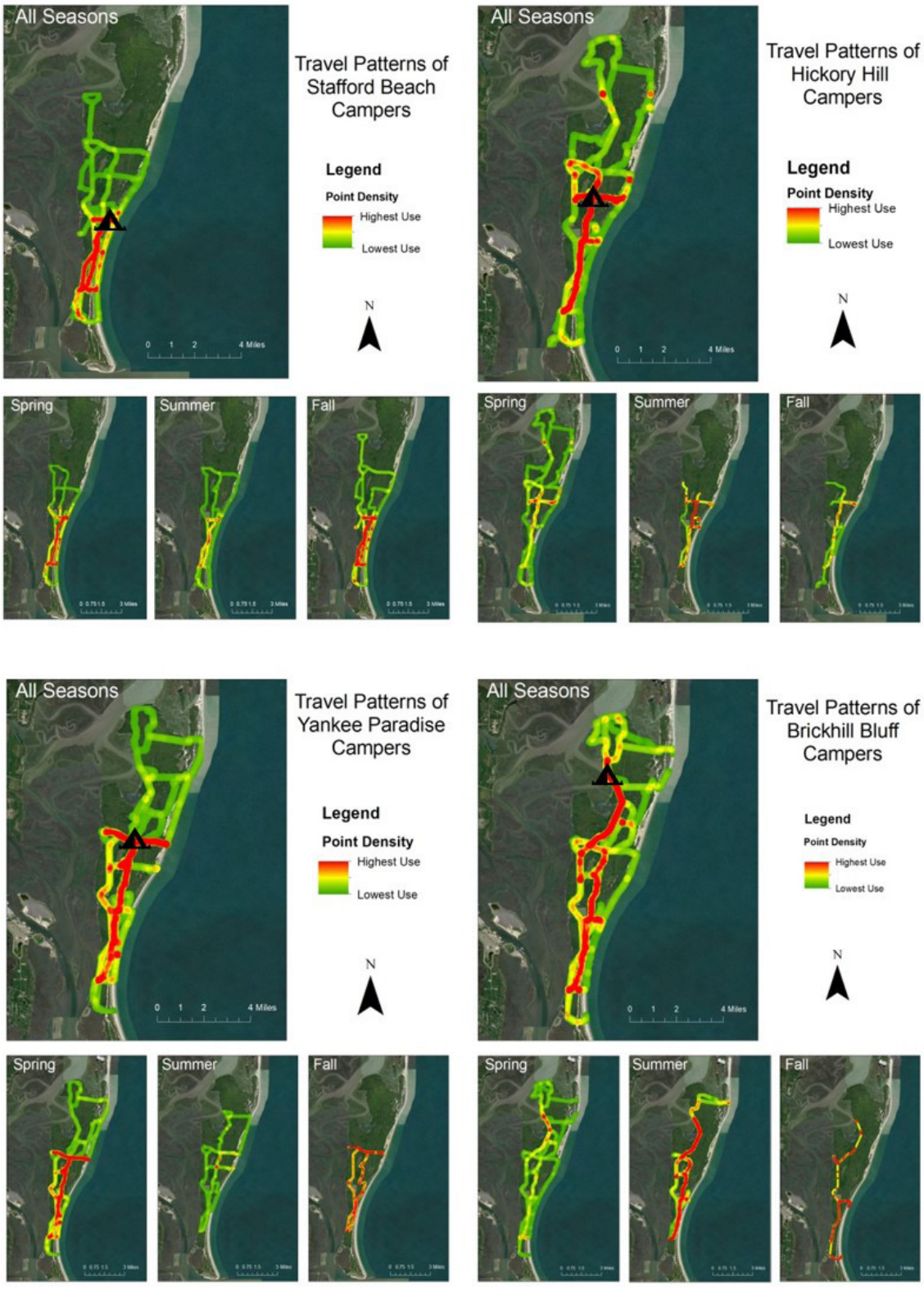

Figure 6 - Heat maps of travel routes by season and farthest campsite visited.

Summary and Discussion

Annual visitation at Cumberland Island National Seashore has increased dramatically since the establishment of a General Management Plan in 1984, placing additional pressure on its designated wilderness. To best understand visitor impacts throughout this large wilderness area, managers required information on visitor dispersal, including travel routes and patterns. However, little was known of visitor use beyond a few popular frontcountry sites. Our research addressed this knowledge gap by providing managers information regarding the travel patterns of wilderness visitors to CUIS and variations across seasons and farthest campsite. Use of trails, main roads, and side roads all differed by farthest campsite, whereas total trip length was consistent across all backcountry/wilderness visitors, and total distance traveled was consistent across visitors to all campsites beyond Stafford Beach. As a result, differences in travel patterns can be attributed to differences in route choices rather than simply campsite location.

Despite traveling to a wilderness campsite, backcountry visitors spent a surprisingly large amount of time along the main road. Those visiting Brickhill Bluff, the farthest campsite from Sea Camp Ranger Station, traveled nearly as far along main roads as they did on wilderness trails. Aside from the section of trail between Stafford Beach and Yankee Paradise, a large majority of travel through the wilderness area was along the road that actually bisects it. This is most likely the easiest path but lacks many of the characteristics of a wilderness experience. Not only is it a straight road with vehicles occasionally driving by, the heavy use of roads by backcountry/wilderness visitors could lead to feelings of crowding and lack of solitude.

This descriptive research provides a starting point for managers at CUIS to understand visitor use patterns throughout the wilderness area, outlining high use corridors, and determining areas of potential management concern.

Although slightly less informative, backcountry/wilderness visitors selected campsites in different proportions across seasons and typically traveled for greater time and distance in the spring than in the summer or fall. This is likely due to the hot and humid weather at CUIS during the summer and early fall. Further, this increased time and distance seem to be accounted for by increased travel on trails. Since most trail travel occurred between Stafford Beach and Yankee Paradise, this approximately 4-mile (6.4 km) portion of trail may be at high risk of crowding during the spring season. If this is the case, further limits might be put on the number of visitors allowed to camp at the same time beyond Stafford Beach. Seasonal weather might also play a role as lower temperatures during the spring season may create a more comfortable environment

along the trails than summer or early fall conditions. Thinning of brush along the trail may be a potential way to encourage visitors to use trails, even during warmer weather.

While these differences are not useful in predicting patterns, they do provide valuable insight into travel route variation at CUIS, and in general, differing by both end destination and season of use. This descriptive research provides a starting point for managers at CUIS to understand visitor use patterns throughout the wilderness area, outlining high use corridors, and determining areas of potential management concern. Future research could use GPS data loggers coupled with surveys or interviews to understand other interpersonal or intrapersonal factors (e.g., motivations to visit, desired benefits, past use history) that may contribute to travel patterns, route selection, and resource degradation. Research is also needed to assess the relationship between travel route and the quality of a wilderness experience, including the impact of road travel rather than trail use at CUIS.

We recommend managers of all applicable backcountry/wilderness areas consider the following ideas and methods in maintaining meaningful wilderness experiences.

1. Pay attention to visitors' farthest destination as a primary point of information and contributing factor to identify travel routes and space-time budgets.

2. Travel patterns likely differ across seasons, and effective management strategies should reflect this potential seasonal variation in travel behavior.

3. Research on visitor travel patterns should be revisited regularly to monitor for trends and potential problem areas, improving the efficacy of management efforts.

4. Distributing GPS data loggers is a relatively cost-effective mechanism to understand travel patterns, densities, and use in designated wilderness.

This study of wilderness and backcountry visitors at CUIS provides further evidence for the benefit of spatially or seasonally segmenting user groups. This research approach provides important insights into how the designated wilderness and associated backcountry areas are used at Cumberland Island National Seashore. Furthermore, the approach is transferrable to similar wilderness areas and backcountry settings where understanding visitor travel patterns may help inform management decisions. ijw

Acknowledgments

The views expressed in the article are the responsibility of the authors and do not necessarily represent the opinions or policies of the US National Park Service. Funding for this project was provided by the US National Park Service, associated with the Cooperative Agreement No. P16AC00449, facilitated through the Cooperative Ecosystem Studies Units. We would like to acknowledge the CUIS staff for their support and collaboration.

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Hiker on the Tonto Trail. **Photo credit** © Will Rice.

SCIENCE & RESEARCH

"On the Staff of the Grand Canyon": Assessing Manager and Stakeholder Perspectives on Sustainable Wilderness Visitor Use Management

by WILLIAM L. RICE, OAKES SPIVEY, PETER NEWMAN, and B. DERRICK TAFF

Derrick Taff, Will Rice, and Peter Newman

PEER REVIEWED

Oakes Spivey

ABSTRACT Overall visitation to Grand Canyon National Park (GRCA) grew 36%, and backcountry overnight visits increased 8% from 2010 to 2019. This research examines how park managers and other key stakeholders, such as park-partner staff, are managing increasing visitation levels. In total, 36 semistructured qualitative interviews were conducted with park managers and other key stakeholders during the summer of 2019. This study aims to inform sustainable visitor use management at GRCA and other wildland protected areas by examining the social, physical, and managerial considerations described by respondents. Results demonstrate both immediate and long-term operational issues and constraints for park management stemming from increasing frontcountry and backcountry recreational use.

Standing on the rim of the Grand Canyon in 1937, British author J. B. Priestley mused, "If I were an American, I should make my remembrance of it the final test of men, art, and policies. I should ask myself: Is this good enough to exist in the same country as the Canyon?" (p. 285). Priestley concludes that "every member or officer of the Federal Government ought to remind [themselves], with triumphant pride, that [they are] on the staff of the Grand Canyon" (1937, p. 285). The Grand Canyon is a geologic marvel that has long-standing indigenous importance and has drawn considerable global interest over the last century. Following its designation as a national park in 1919, with seldom exception, Grand Canyon National Park (GRCA) annual visitation has persistently grown, with a markedly frenetic increase in the past decade. Between 2010 and 2019, visitation increased by 36%, rising to nearly 6 million visits annually (National Park Service 2020). Therefore, to be on the "staff of the Grand Canyon" is not quite as romantic as Priestley might presume. As illustrated in research at other national parks undergoing similar visitation surges, managers must ensure the preservation of visitor experiences in concert with the resources through which they are facilitated (Manning 2007).

As visitation continues to increase at GRCA, further managerial attention is needed to appropriately balance recreation use and preservation – considering both ecological and experiential issues when making management decisions (Driver and Brown 1978). Manning (2007) presents a conceptual framework for managing visitor capacity in protected areas composed of three dimensions: physical, experiential, and managerial (Figure 1). The intent of this framework is to strike a balance between physical, experiential, and managerial sustainability. In this way, the recreation experience, park resources, and managerial services can be "maintained or even enhanced in the face of increasing use" (Manning 2007, p. 21).

The three dimensions (physical, experiential, and managerial) that comprise the conceptual basis for protected area management were first established by Driver and Brown (1978). The physical dimension includes the natural and cultural resources that facilitate recreation and is limited only to those resources that

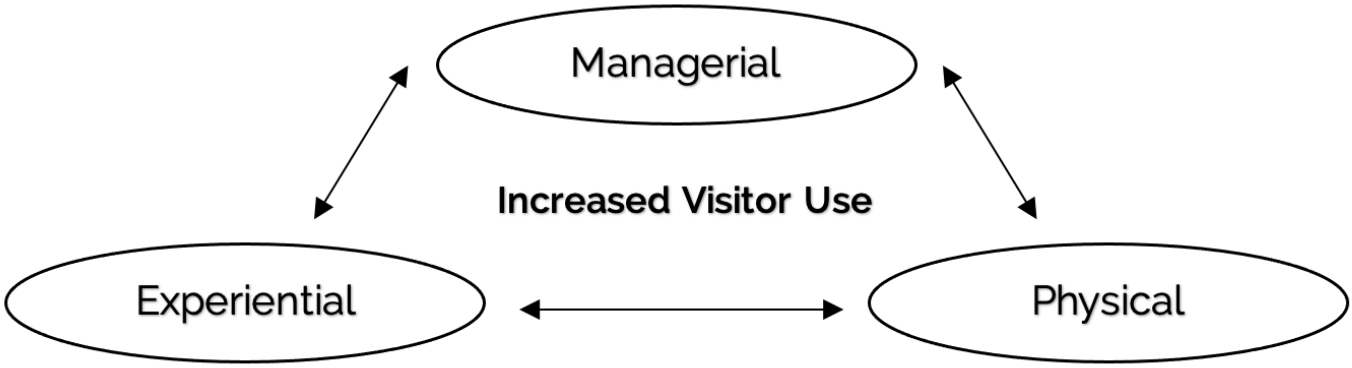

Figure 1 -A conceptual framework with the three dimensions of sustainable management of increased wildland visitor use management (adapted from Manning 2007).

Figure 2 – Multiple groups of hikers on the South Kaibab Trail. Photo by Ronnie Macdonald.

managers can control (Cole 2004). The experiential dimension encompasses all aspects of the visitor experience including motivations, experiences, and outcomes – both positive and negative (Driver 2008). The managerial dimension includes all legal mandates, facilities, staff, and financial resources that govern and support a protected area (Manning 2007).

Evaluation of the wildland visitor experience has enhanced our understanding of the interconnectedness of these three dimensions (e.g., Manning 2011; Monz 2009). However, there remains a dearth of understanding regarding how those individuals that are charged with carrying out sustainable management – namely, park managers, concessionaires, tour operators, and nonprofit park partners – conceptualize the interplay of these dimensions and the role each plays in wilderness management. It is thus the purpose of this study to examine how those that manage GRCA address increased wildland visitation. Principally, this includes an investigation to identify key stakeholders' perspectives on issues, constraints, and possible solutions to sustainably manage visitor use across the three dimensions of sustainable wildland management at GRCA, and examine the interactions between dimensions in both frontcountry and backcountry settings.

Methods

Study Area

Grand Canyon National Park encompasses most of the 446-kilometer (277-mile) Grand Canyon of the Colorado River – a UNESCO World Heritage site—in northern Arizona, USA. Ninety percent of the park is proposed as federally designated wilderness and is managed as such (Moore and Witt 2018). Backcountry visitation to GRCA is primarily concentrated in a relatively small area – the Colorado River and the Bright Angel-Kaibab Trail Corridor. During the past decade, backcountry overnights within GRCA increased 8% to 320,032 in 2019 (National Park Service 2020). A long-term study on a sample of backcountry camping areas found that the number of visitor-made backcountry campsites more than doubled between 1984 and 2005, resulting in vegetation impacts (Cole et al. 2008). Additionally, Pettengill (2016) notes that an overall increase in park visitation and backcountry day use has resulted in increases in unprepared hikers and search-and-rescue responses. While permitting and zoning of backpacking and river trips in the park allows for overnight capacity management, day use management in backcountry and frontcountry areas currently lacks such levers for controlling volume and distributing use.

Semistructured Interviews

To address potential issues, constraints, and solutions regarding sustainable visitor use management at GRCA, onsite semistructured qualitative interviews were conducted with National Park Service (NPS) employees and other key stakeholders throughout July 2019. Interviews were conducted in-person and by telephone with individuals identified by GRCA's Visitor Use Management Team. Additional respondents were identified via snowball sampling, following the methods of Garcia et al. (2018). Interview respondents were sought from all organizational divisions of GRCA (administration, interpretation, law enforcement and visitor protection, maintenance, planning and special projects, and resource management) and key park stakeholder groups (e.g., tour guides, concessionaire operators, and nonprofit park partners).

Only two researchers conducted interviews to maintain consistency. Interviews ranged from approximately 9 to 50 minutes, and all were digitally recorded. The interview consisted of 10 primary questions related to visitor use issues, managerial constraints, and possible solutions. All interviews began by asking respondents about the overarching visitor use management issues facing GRCA and then transitioned into asking about specific visitor use trends and management approaches to address these trends in both frontcountry and backcountry settings. As the interviews progressed, respondents were asked to discuss operational constraints and potential solutions.

Analysis

The recorded interviews were transcribed and inductively coded following the guidance of Rubin and Rubin (2012). While general thematic categories of social, physical, and managerial considerations were pre-established, underlying codes and categories were derived inductively through interaction with the data (Charmaz 1996; Rubin & Rubin 2012).

Coding of themes was completed individually by members of the research team, and then collaborative sessions were held to establish intercoder reliability.

Results

In total, 36 interviews were conducted with NPS staff (29 interviewees) and key park operations stakeholders (7 interviewees). Average length of employment as a member of the NPS staff at GRCA or a partnering organization was 12 years, with tenures ranging from less than 1 year to a maximum of 38 years. Given the goal of this study, analysis and intercoder consultation yielded themes of issues, associated constraints, and possible solutions related to each of the three components of sustainable visitor use management – managerial, physical, and experiential dimensions (Driver and Brown 1978; Manning 2007). The identified recurring themes illuminate issues and solutions related to staffing, infrastructure, resource degradation, wildlife habituation, crowding, and displacement. The results that follow are presented for each of the three dimensions of sustainable visitor use management in the sequence of potential issues and constraints, and solutions, highlighted through key quotes from the respondents.

Managerial Dimension

Within the managerial dimension, themes emerged concerning the need for both improved policy and communication of existing policy. Additionally, concerns about sustainable levels of staffing were prominent.

Issues and Constraints

When asked to identify visitor use management issues facing GRCA, many respondents reported concerns with visitor capacities:

> *"Ultimately, all of this ties back to the capacity and managing towards the desired conditions and the associated visitor capacity of the park. And that's something that is an unknown right now."* – Respondent 2

To this end, others mentioned the lack of conceptualized and quantifiable day-use carrying capacity indicators and standards (Manning 2011):

> *"From a broad perspective, there's just no concept of capacity. We don't have anything quantifying that, so what can we sustain here long-term?"* – Respondent 26

Unlike NPS staff, concessionaire operators are not directly bound by a mandate of preservation. Respondents noted the conflicting missions of the NPS and concessionaires:

> *"The concessionaires want more people, they never want fewer people, they always want more people … they don't have a visitation cap."* – Respondent 3

Aging backcountry infrastructure (e.g., the transcanyon water distribution pipeline, hiking and stock bridges, etc.) was also explicitly mentioned as being problematic, as was the ability to manage the volume of waste associated with increased visitor use:

"Some utility infrastructure issues that are developing and I don't even know necessarily if it is the visitor use creating that problem or if it's just age of infrastructure … there's a tremendous maintenance backlog in the park." – Respondent 28

"The compost toilets in the inner canyon, we have this discussion internally, they're not technically compost toilets because they get hit so hard and so aggressively … they can't actually compost because of the volume they're receiving." – Respondent 30

When asked about present operational constraints, many respondents cited staffing. Other respondents connected the issues of aging infrastructure to the shortage of staff:

"Even though we have 6 million people coming here, it seems like there's about 12 people trying to keep this park together, because we have no staff and no money. And the pipeline [that carries drinking water through the canyon along the Bright Angel and North Kaibab trails] is always breaking. And we're always like, on the verge of not having any water, and there's no one to fix it." – Respondent 3

While mentioning operational constraints, one respondent highlighted the relationship between the physical, managerial, and experiential dimensions by citing elements related to the mission of the park:

"We've got to be able to make that case [for any future visitation policies] in terms of the mission of the park, we've got to present it from both a resource stewardship perspective, but also visitor experience…. How is what we're going to do going to improve the visitor experience, even if it has some impacts that might be seen otherwise?" – Respondent 5

Solutions

Respondents referenced several potential contributions of the managerial dimension toward more sustainable wildland visitor use management, namely by way of potential policy changes and increasing staffing. The theme for more backcountry regulation and the communication of regulations through education was highly salient:

"There is a community that know the rules and regs and they do it [packraft] by the books and they're pretty bad ass people. So it's the regulations and it's still kind of getting worked out with the superintendent's compendium…. It is really kind of [to] help put it in more black and white." – Respondent 6

Additionally, respondents voiced the need for more staffing to handle increased use in both the frontcountry and backcountry:

"If you have more staff out there to help direct visitors, maybe it would reduce the impact to resources." – Respondent 2

Other solutions were directly related to concessionaire operators and tour companies (e.g., operators of the backcountry lodging at Phantom Ranch, backpacking outfitters, frontcountry hoteliers, etc.), and emphasized the importance of partnerships and communication:

"I think it's important that we work closer with tour companies to help them understand why we do the things we do and help get them on board with the park mission." – Respondent 5

"I think a lot of it is education [of concessionaires]." – Respondent 13

Physical Dimension

The physical impacts of increased wilderness recreation within GRCA are well-documented (see Cole et al. 2008). Therefore, unsurprisingly, respondents' perspectives within the physical dimension were centered around recreation's impacts on natural and cultural resources in the backcountry of GRCA, predominantly proposed as wilderness (Figure 3).

Figure 3 – Ecological degradation from recreation use on Cedar Ridge along the South Kaibab Trail. Photo by Will Rice.

Issues and Constraints

In addition to citing broad recreation impacts to park resources, many respondents mentioned specific sources and impacts of ecological degradation including social trails, wildlife habituation, and waste:

> *"We have social trails, you know, where people just kind of create like the quickest way to get to [a desired location]…. And I feel like once those social trails are created, it's really hard to get people to stop using those as areas."* – Respondent 23

> *"Elk, in particular, are very habituated and they let themselves get pet sometimes. And, you know, that creates problems, particularly around calving and rutting season…. We've had people gored. Squirrels are a big problem too, obviously."* – Respondent 24

> *"We see impact areas to resources. And in a lot of, it happens here at the South Rim for sure. You know, they're gathering firewood, they're trotting in areas where they shouldn't be – down trail I'm thinking specifically – not utilizing the bathrooms, and pooping in places they shouldn't be, going off trail, leaving trash behind."* – Respondent 4

Another emergent theme concerning the physical dimension was wilderness recreation's impacts on cultural resources:

> *"There's also a ton of cultural resources, too, that are in danger with so many people in the park – especially when they get into the backcountry areas.... [We must] try to be realistic about matching access with available areas for people, so that they're not having to camp outside of boundaries or do damage to resources that we're trying to protect."* – Respondent 27

> *"The biggest issues for us are adverse effects to cultural resources. And those can be archeological sites, historic buildings, cultural landscapes, ethnographic resources, plants, animals, insects, minerals, geological features, a whole range of things.... There's an entitlement that they can go where they want to go and do what they want to do without that awareness that their actions have consequences."* – Respondent 36

Tied closely to recreation's impacts on the physical dimension was the acknowledgment that the NPS has experienced a number of constraints toward their monitoring efforts:

> *"What we're seeing is resource impacts that we don't have systems in place to monitor effectively because we don't have the money or the staff to do that."* – Respondent 27

Solutions

Respondents offered several potential solutions to both preserve resources and restore degraded resources. The most salient management strategy included developing a parkwide, systems approach to carrying capacity, which does not currently exist:

> *"Reduce the visitation to the park on a daily and yearly basis. You wouldn't have to necessarily have a cost associated with getting a reservation to come visit the Grand Canyon, but it has a carrying capacity and we have exceeded that carrying capacity and we need to deal with that."* – Respondent 36

"One of the best solutions that we could look at is carrying capacity of the park and if we needed to shift demand management or timed entry … to make sure that people are visiting areas of the park in numbers that can sustain those visitors." – Respondent 27

For the issues of social trailing and wildlife habituation, respondents advocated for more indirect solutions (Figure 4):

"[Concerning social trailing] we have the ability to plant prickly pear or cactus in areas that we don't really want people to walk in. That actually does work really well." – Respondent 23

"For me, the biggest issue is really that we have a very uneducated visitor as far as wildlife goes. Who then thinks they're at a petting zoo… A lot of it is trying to educate." – Respondent 24

Figure 4 – – A squirrel gets a food reward from a hiker along the North Kaibab Trail. Photo by Clay Larsen.

Experiential

Respondents' perspectives concerning the experiential dimension centered on the impacts of dense visitor use in popular areas, primarily in the South Rim area of GRCA. Themes of crowding and displacement were salient across interviews.

Issues and Constraints

Respondents perceived crowding to be a significant experiential issue arising from increased visitor use. This theme of crowding was tied to the findings suggesting potential perceived failure to provide visitors with the "national park experience" in both frontcountry and backcountry settings, from some respondent perspectives:

"To some degree even things like viewpoints, you know, some of the sites – and Mather, Yaki, Hopi – they get so crowded with people, I worry that we're not offering them the experience that they should get

in a national park." – Respondent 33

"I mean, places are busier. It's harder to find a place where you can get away from it all." – Respondent 24

"[The visitor] is not receiving that National Park Service experience that you would hope for when you come to a park, and that's really hard." – Respondent 1

Displacement was another salient theme that arose in this dimension. Respondents perceive that increased use on popular trails (Bright Angel and South Kaibab) are pushing visitors into more remote areas and less traveled trails to find solitude:

"So the demand is so much higher. And it probably forces a lot of people not to do the popular hikes and just try to get away. And then that expands into other areas that don't normally see that amount of people." – Respondent 13

Solutions

To mitigate the experiential issues arising from increased visitor use, respondents again referenced establishing systematic day-use carrying capacities, but also underscored the importance of managing visitor expectations to meet present conditions. Two themes emerged in this area. First, proactive management was seen as a means of managing expectations of use levels before visitors' arrival:

"Just educating folks before they get here about what to expect. Whether they come the week of 4th of July or the week of February 2nd or sometime when there's some of our lowest visitation. So I think there's an education component that can really manage visitation a little bit." – Respondent 10

Second, reactive management was seen as a means of managing expectations in situ:

"We have this army of volunteers supported by a small cadre of summer seasonal employees led by a permanent position that goes out and teaches people how not to be miserable in their national park. So, in certain pieces, we can educate our way out of crowding." – Respondent 9

Discussion and Implications for Management

In addition to addressing the managerial, physical, and experiential dimensions individually, it is important to discuss how they interact. The relation and required balance between these three aspects of the setting is necessary to fulfill the fundamental three-dimension sustainability framework (Manning 2007). The importance of considering the interconnectedness of the three dimensions was evident through a response given by one respondent:

"When we were first implementing shuttle systems in the Park Service, we just implemented them and didn't really think about the associated impact to the trails and the visitor experience and crowding. That's what is happening when you have these large shuttle buses that are dropping off people at very defined spaces. And what happens to the resources that they experience after that?.. . What happens on pavement translates to what happens off-pavement." – Respondent 2

This form of systems thinking was an emergent theme within our study. Sustained increases in visitor use are forcing key stakeholders at GRCA to consider systematic linkages, as further highlighted through the three dimensions of protected area management. Due to this perspective, respondents largely felt that they could identify solutions to the complex problems they are facing, but in some instances, park units do not have the resources to fully implement these solutions.

Sustained increases in visitor use are forcing key stakeholders at GRCA to consider systematic linkages, as further highlighted through the three dimensions of protected area management.

Broader Impacts

The management of national parks has grown more and more complex in the context of a global economy where we are all intertwined with one another. This article shows the importance of systems thinking and that managers acknowledge that sustainable solutions exist in a social-ecological context. However, as park issues have become more complex, and science more advanced, how has the NPS institutional structure changed over the past 100 years? Solutions today demand integrated systems thinking and teamwork, and yet most park managers work in teams called "divisions." Future work should explore how the architecture of the NPS organization may hinder a systems approach to sustainable solutions (Figure 5).

Respondents' wide support for carrying capacity-related actions largely follows McCool and Lime's (2001) position that this tactic is a popular solution among managers. Setting wildland recreation capacities can be a rather straightforward process including measurements of all three dimensions of the recreation setting. Therein lies its appeal. The authors posit that carrying capacity's continued popularity among managers "may be because of its apparent scientific objectivity and simplicity" (McCool & Lime 2001, p. 380). Yet, a host of critiques have been made against the concept in recent decades—chiefly that it represents a simplistic view of reality that fails to sufficiently account for recreationists' behaviors (McCool and Lime 2001). Additionally, from the visitor perspective, carrying capacities are often less favorably viewed as they tend to restrict freedom (McCool and Lime 1989). However, as noted by Ponting and O'Brien (2015), establishing recreational carrying capacities that fully integrate the physical and managerial dimensions – not solely the experiential dimension – can be effective as one component of a larger strategy to manage increased use. Our findings show that park-level managers at GRCA understand the role of carrying capacities as exactly that – one part of the larger visitor use management equation.

Although carrying capacity was the most universally proposed solution to manage increased wilderness recreation at GRCA, education was also a highly salient theme. Education is the most widely applied form

Figure 5 – Backcountry day users wait to find shade and fill water bottles at Indian Gardens along the Bright Angel Trail in October 2020. Photo courtesy of NPS/K. Pitts.

of indirect visitor use management (Manning and Lime 2000). Looking across the three dimensions, we find that education was proposed to (1) manage behavior, (2) manage expectations in situ, and (3) manage expectations prior to visiting GRCA. All three approaches are perceived as plausible means of facilitating backcountry visitor use in a manner that adheres to management objectives. These tactics are very much in line with the strategies recommended by previous research to manage visitor expectations in high-use backcountry areas that are managed as wilderness (e.g., Rice et al. 2020; Taff et al. 2015, 2019). For example, Armstrong and Kern (2011) recommend communication with visitors prior to and during visitation to change perceptions of what to expect at densely used areas of a park and how visitors should react to crowded conditions. These types of approaches have been applied in GRCA through a number of strategies, including encouraging visitor behaviors that align with park management objectives through social media and onsite signs (Pettengill 2016), and should continue to be implemented and tested for effectiveness in GRCA.

The broader results of this research underscore the importance of understanding managers' perspectives of visitor use trends – in concert with collecting data on visitor perceptions and resource conditions. In a theoretical sense, adding managerial perspectives completes the conceptual framework of sustainable visitor use management (Figure 1). However, our data

Figure 6 – AJ Lapre, branch chief of interpretation, stands at a memorial service for a deceased ranger on the South Rim of the Grand Canyon in February 2020. Photo courtesy of NPS/M. Quinn.

revealed a more "practical" finding: managers and park partner organizations not only maintain and steward park resources, but they too, are park resources. Not only do they provide the face and voice of parks and protected areas, but they also endure very real impacts from increased visitor use and shifting recreation trends – as evidenced in our interviews:

> *"Things are fine, adequate, moving up. [The] Park Service, I think, is extremely limited in capacity and trying to support a lot of the operations. We're really holding things together with duct tape and bubble gum sometimes."* – Respondent 34

> *"And getting paid in sunsets only lasts for so long."* – Respondent 3

As Stephen Mather – the first director of the NPS – professed, "No picture of the national parks is complete unless it includes the rangers" (1928, p. vii). In this spirit, it is imperative that managers themselves are considered in future wildland protected area research and as part of the managerial dimension of sustainable wildland management – along with the services they provide (Figure 6). Additionally, the well-being of wildland managers merits future research, as much is still unknown concerning what is required of those who serve "on the staff of the Grand Canyon" (Priestley 1937, p. 285). JJW

Author Note

Funding for this research was provided through a Cooperative Ecosystem Studies Unit Agreement with Grand Canyon National Park.

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See page 87 for credits and captions.

Beyond Secretaries, Hostesses, and Cooks:
The Power, Humility, and Compassion of Women Who Battled to Save Wilderness

by MICHELLE L. REILLY

Michelle L. Reilly

In 1964, the 88th Congress passed an act to establish the National Wilderness Preservation System for the permanent good of the whole people, and for other purposes. This act is commonly referred to as The Wilderness Act. Many stories are told about the men leading the charge for wilderness preservation. These stories usually include three figures: Aldo Leopold, the well-known wildlife biologist, author, and ecologist; Robert Marshall, the philanthropist, forester, and cofounder and financier of The Wilderness Society; and Howard Zahniser, longtime president of The Wilderness Society and primary author of the Wilderness Act. Maybe some people even know about the more obscure Arthur Carhart who drafted the first known government memo explaining the idea of preserving natural lands for purposes other than development (the first mention of wilderness 23 years before the Wilderness Act was passed), or Sigurd Olson, author and National Parks Association president who helped write many drafts of the Wilderness Act. But there are other figures whose stories are seldom told in wilderness history.

Before the Wilderness Act was passed, 66 drafts of the bill were written, and Congress debated for eight years. During this time, from the 1940 to the 1960s, women were still seen

as homemakers and husbands' helpers. In 1961, President John F. Kennedy established the Commission on the Status of Women and appointed Eleanor Roosevelt as chairwoman. In a televised 1962 discussion with Roosevelt, Kennedy stated, "We want to be sure that women are used as effectively as they can to provide a better life for our people, in addition to meeting their primary responsibility, which is in the home" (McLaughlin 2014).

Society viewed women as homemakers and housewives. It is no surprise then, that stories of women's role in our wilderness history are seldom told. It would be distressing if future historical accounts left out Greta Thunberg or Ruth Bader Ginsberg when recounting environmental activism or gender discrimination. And it is similarly disheartening that the important female figures of our wilderness history are not credited. These stories have a critical place and need to be heard.

It would be distressing if future historical accounts left out Greta Thunberg or Ruth Bader Ginsberg when recounting environmental activism or gender discrimination. And it is similarly disheartening that the important female figures of our wilderness history are not credited. These stories have a critical place and need to be heard.

Margaret "Mardy" Murie (1902–2003)

Probably the most well-known woman in wilderness history is Margaret "Mardy" Murie, considered the matriarch of the wilderness movement. Mardy was a field biologist, a teacher, and an author. In her book, Two in the Far North, she advocated for wilderness protection in Alaska. Mardy was the first woman to graduate from the Alaska Agricultural College and School of Mines, now University of Alaska (Wilderness.net 2020). With her husband, Olaus Murie, she continued to explore Alaska while Olaus served as a wildlife biologist for the Bureau of Biological Survey, now the US Fish and Wildlife Service. Together they served in various roles for both the Izaak Walton League and The Wilderness Society.

Figure 1 – Mardy and Olaus Murie in fur parkas. Taken in January 1925 after they returned from their honeymoon. Credit: USFWS.

Figure 2 – Mardy Murie sawing wood with a wall tent in background (date unknown). Credit: USFWS.

In 1956, Mardy, Olaus, and other field biologists traveled to the upper Sheenjek River on the south slope of the Brooks Range, inside what is now the Arctic National Wildlife Refuge. Their mission was to garner support and gain protection for an entire ecological system as the Arctic National Wildlife Range. The couple recruited former US Supreme Court Justice William O. Douglas to help persuade President Dwight D. Eisenhower to consider their campaign. President Eisenhower established the range in 1960 and set aside more than 8 million acres (3,237,485 ha) for the "unique wildlife, wilderness, and recreational values" (Donahey 2018). After Olaus's death in 1963, Mardy continued to fight for wilderness preservation, writing letters, articles, and speaking at hearings. She returned to Alaska to survey potential wilderness areas for the National Park Service and campaign for the Alaska National Interest Conservation Lands Act. Her devotion to wilderness is apparent in her testimony to Congress in 1977 for the Alaska Lands Act,

> *I am testifying as an emotional woman and I would like to ask you, gentlemen, what's wrong with emotion? Beauty is a resource in and of itself. Alaska must be allowed to be Alaska, that is her greatest economy. I hope the United States of America is not so rich that she can afford to let these wildernesses pass by, or so poor she cannot afford to keep them. (Mongillo and Booth 2001)*

The Alaska National Interest Conservation Lands Act passed in 1980. In addition to renaming the Arctic Wildlife Range the Arctic National Wildlife Refuge, Congress gave protection to 104 million acres (42,087,307 ha) as various conservation lands and included increasing the size of the range/refuge by 10 million acres (4,046,856 ha). Mardy's contribution to conservation and preservation in Alaska helped protect some of the last remaining wilderness in the country.

In October of 2003, Mardy died in her cabin in Moose, Wyoming, at the age of 101. Upon her death, a Los Angeles Times staff writer wrote, "Mardy Murie served as her husband's secretary, hostess, and cook as well as forthright adjunct in his preservation activities" (2003).

In 1998, Mardy was awarded the Presidential Medal of Freedom by President Bill Clinton for her lifetime service to conservation (Teton Science Schools 2020). Those who knew her speak of how she touched their lives and inspired them. I hope that Mardy can be remembered as an inspirational leader and for dedication to wilderness and conservation; not only as her husband's secretary, hostess, and cook.

Virginia (Ginny) Hill Wood (1917–2013) and Celia Hunter (1919–2001)

Celia Hunter and Virginia Hill Wood were two women whose lifelong friendship, love of adventure, and pioneer spirits created a conservation legacy in Alaska. Celia and Ginny met in the early 1940s when they both served in World War II as Women Air Force Service Pilots (WASPs) and ferried military planes throughout the lower 48 (Kaye 2019). During this time, WASPs were not permitted to fly planes to Alaska, which only piqued their curiosity and interest. In 1947, after the WASPs were dismantled, they met a pilot in Seattle who hired them to deliver surplus Stinton airplanes to Alaska. In December, they set out on a frigid 27-day flight to Fairbanks and arrived cold but not dismayed. Perhaps it was inevitable that the adventurous pair would stay in Alaska (Kaye 2019). They continued to fly, either on commercial planes as flight attendants or as pilots for the fledgling tourism industry. The adventurous pair quickly decided large-scale tourism wasn't their style and with Ginny's husband, began to look for a wilderness setting where they could offer a simpler tourist experience (Kaye 2019).

In 1952, they filed a Homestead Act claim for property near Denali National Park with a view of the majestic peak. The trio opened the first ecotourism operation in Alaska and called it Camp Denali. This experience offered guests the opportunity "to live for a while in the midst of primeval grandeur" (Denali Dispatch 2016). Living and working at Camp Denali deepened their respect and admiration of Alaska's wild lands. In the late 1950s, Celia met Olaus and Mardy Murie and was inspired by their fight to set aside vast wilderness areas in the Alaska territory (Kaye 2019). In 1960, Alaska senator Bob Bartlett scheduled hearings throughout Alaska to build and strengthen opposition to the proposal for an Arctic wildlife refuge. Ginny and Celia set out to recruit Alaskans in support of the refuge to testify at these hearings. Ginny's testimony reflects her passion for wilderness values (Kaye 2019).

Figure 3 – The first season of Camp Denali, 1952. Credit: Northern Alaska Environmental Center.

> *The wilderness that we have conquered and squandered in our conquest of new lands has produced the traditions of the pioneer that we want to think still prevail: freedom, opportunity, adventure, and resourceful, rugged individuals. These qualities can still be nurtured in generations of the future if we are farsighted and wise enough to set aside this wild country immediately, and spare it from the exploitations of a few for the lasting benefit of the many (Alaska Women's Hall of Fame 2020).*

Ginny and Celia were successful; most of the testimonies were in support of the Arctic National Wildlife Refuge (Kaye 2019).

During this fight, they realized the need for an organized environmental group and created the Alaska Conservation Society (ACS), the first of its kind in the state. ACS continued to fight for conservation in Alaska and played a primary role in ending two large-scale energy projects (Alaska Women's Hall of Fame 2020). In the early 1970s, Celia became increasingly active in grassroots efforts to pass what would later become the Alaska National Interest Lands Conservation Act. Both women were strong supporters and were heavily relied on for their extensive knowledge of issues in Alaska (Kaye 2019). In 1976, Celia became the first woman executive director of The Wilderness Society – the first for any national environmental organization. Her role as a female executive director was not uncontroversial though, and she was met with disapproval. Despite this, her time in leadership was later described by a coworker as "an unforgettable lesson in the power of grace, humility, and humor in response to bias

Figure 4 – Celia Hunter and Ginny Hill on the porch of Romany's cabin at Camp Denali. Early 1960s. Credit: Northern Alaska Environmental Center.

and criticism" (Kaye 2019). In 1980, the Alaska National Interest Lands Conservation Act passed, protecting more than 100 million acres (40,468,564 ha) as national parks, refuges, forests, and wilderness.

Celia and Ginny inspired people through their activism, writings, and daily life. Celia frequently wrote columns for the Fairbanks Daily News-Miner and Ginny wrote for the Northern Alaska Environmental Center, of which she was a founding member. Celia and Ginny received numerous accolades for their conservation work. In 1991 they were awarded the Sierra Club's John Muir Award and in 2001 Alaska Conservation Foundation's Lifetime Achievement Award (Alaska Women's Hall of Fame 2020). Former governor Jay Hammond called Celia and Ginny "the grand dames of the environmental movement." Celia and Ginny never lost their enthusiasm for wilderness and conservation. May their stories continue to inspire us into action.

Pauline "Polly" Dyer (1920–2006)

Polly's story is an unfortunate example of how inaccurate historical narratives undermine the contributions of women throughout history.

Polly's love for the outdoors began in the 1940s when her family moved from the East Coast to Ketchikan, in the Alaska Territory. She later testified in front of Congress in support of wilderness that her years in Alaska "were the basis for my whole life since" (Becker 2010). From 1947 to 1950,

she and her husband spent time rock climbing, sailing, and backpacking thorough the Sierra Nevada range. It was during this time that she claimed she became an environmentalist.

In 1950, Polly moved with her husband from Berkeley, California, to Auburn, Washington, where they enthusiastically explored the Cascade and Olympic ranges. They joined the Mountaineers, and Polly initiated and served on the Mountaineers' Conservation Committee (Sowards 2020). In 1953, Polly, her husband, and two friends founded the Pacific Northwest Chapter of the Sierra Club, the first chapter outside of California. This same year she was appointed by the governor to serve on a committee to investigate a possible transferal of portions of Olympic National Park to the US Forest Service for commercial logging operations. In this role, she led the Mountaineers in a letter-writing campaign, submitting more than 300 letters. In the end, Dyer's leadership and the Mountaineers' advocacy proved instrumental in helping defeat the plan (Becker 2010).

The world of environmental activists was a much smaller one back then. In the mid-1950s, Polly Dyer met Howard Zahniser, executive secretary of The Wilderness Society, when they both fought to stop the construction of the Echo Park Dam in Dinosaur National Monument. Years later, during a visit to Polly's home in Seattle, Howard heard her use the word "untrammeled" in a campaign to protect stretches of coastline near Olympic National Park (Young 2019). Stories differ as to whether she recommended the word in his drafts of the wilderness bill. Regardless, it was her enthusiastic use of the word that inspired and swayed Howard to adopt this word as the primary descriptor of wilderness.

Unfortunately, his inspiration is seldom attributed to Polly. In The Wilderness Society's tribute to Howard Zahniser as the "unsung architect" of the Wilderness Act they write, "At some point in the process, Zahniser, allegedly inspired by the seashore near Olympic National Park, added a word he felt perfectly evoked the rugged, unique quality of wilderness-type lands to be spared mankind's undue abuse, which would become the bill's quintessential flourish: 'untrammeled'" (Greenberg 2016).

Polly continued to fight for federal legislation to protect wilderness. As the founder of the Mountaineers Conservation Committee, Polly pushed for recognition of Glacier Peak in the North Cascades, a campaign the Mountaineers engaged in starting in the late 1920s. In 1957, at a Senate committee hearing regarding copper exploration in the North Cascades, Polly stated, "Wilderness cannot and should not wear a dollar sign. It is a priceless asset which all the dollars man can accumulate will not buy back" (Becker 2010). In 1958, Polly organized a hike to protest a proposed road on the Ocean Strip of Olympic National Park. The hike drew many notable figures of the time including Justice William O. Douglas, Howard Zahniser, Wilderness Society cofounder Harvey Broome, author and National Parks Association president Sigurd Olson, and Mardy Murie, among others (Sowards 2020). The hike lasted three days and covered more than 20 miles (32.2 km) and was a key moment in the environmental movement in the Northwest.

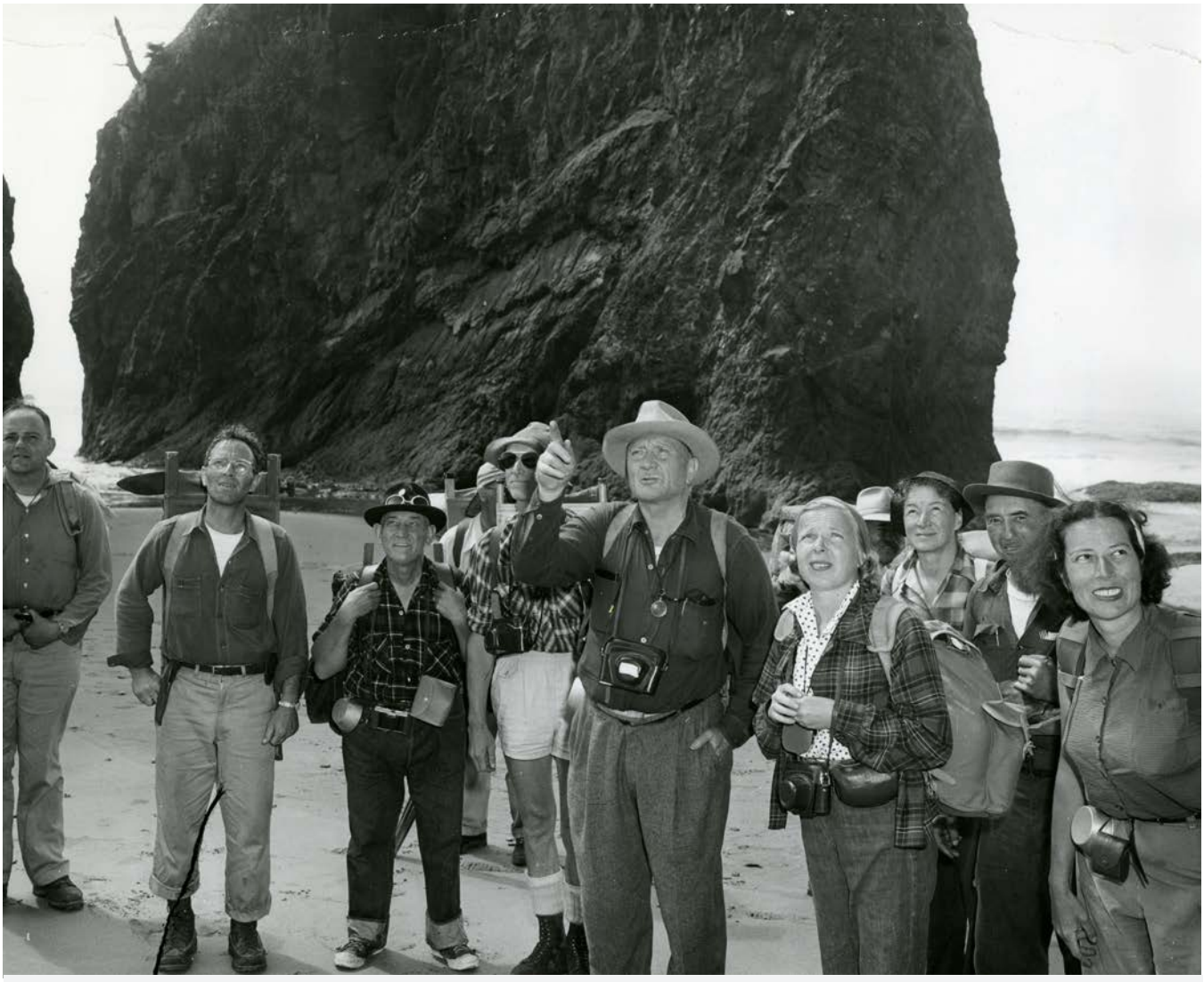

Figure 5 – – Polly Dyer, far right, and William O. Douglas, center, on a hike protesting proposed coastal highway in Olympic National Park (August 19, 1958). Credit: University of Washington; Bob and Ira Spring Collection.

In 1968, President Lyndon B. Johnson signed the bill that created North Cascades National Park. Polly was one of fiercest and most active proponents for the park but upon its creation, shied away from taking credit (Sowards 2020). I wonder if this shyness also explains her unrecognized contribution to the Wilderness Act.

The list of accomplishments and awards attributed to her is extensive. When asked what distinguished her from other environmentalists, Peter Jackson of the North Cascades Institute answered, "Humility. She had grace and presence. She was perfectly happy to let others take credit" (Young 2019).

Maybe it's no coincidence, then, that the word she contributed to the Wilderness Act, the single most important word in the act, is also one that wilderness professional associate with humility and restraint. "Untrammeled."

Helen Fenske (1923–2007)

Helen Fenske's wilderness contribution may seem small, protection of fewer than 4,000 acres (1,618.7 ha), but it was historical nonetheless. Helen fought for protection of marshes and meadows a mere 26 miles (41.8 km) from Times Square, an area that was eyed for multiple development projects. Great Swamp National Wildlife Refuge Wilderness was the first wilderness designated by the Department of the Interior, and Helen Fenske played a prominent role in galvanizing citizen support.

Helen, a "housewife who lived on the edge of the swamp," became an early leader for the Great Swamp campaign (Barry 2000). In 1959, the Port Authority of New Jersey and New York announced a plan to fill in the Great Swamp to develop a new multimillion dollar airport slated to be "the world's largest international jetport" (Fenyk 2014). Years before the jetport project was announced, the area was eyed for an apartment complex and then a pipeline project. Due to this history and the swamp's proximity to three universities, a substantial body of research and knowledge about the unique ecosystem of the Great Swamp Basin already existed. The area was home to 39 species of mammals and a nesting site for 244 species of birds. The Great Swamp Committee used this data to formulate a proposal that the area be designated a National Wildlife Refuge (Fenyk 2014). The proposal was sent to US Fish and Wildlife Service (USFWS) headquarters in Washington, D.C., but fell on deaf ears. After a meeting with FWS regional officials in Boston, Helen and Grace Hand, a friend and fellow supporter, went to the universities and gathered all the biological and ecological information they could find on the area.

On a second visit to the regional office, armed with their research, Helen secured a promise from the regional director; if the Great Swamp Committee could purchase 3,000 acres (1,214 ha), he would open a USFWS Office there and assign a manager (Nally 2013).

This ignited hope, and the Great Swamp Committee, led by Helen, sprang into action. But purchasing thousands of acres was not easy. The area had hundreds of woodlots dating back to the 1700s for which they needed the guaranteed titles before the FWS would proceed (Madison and Koch 2013). With the help of some local elites, the relentless committee raised $5,000,000 to purchase the titles to 2,600 (1,052 ha) acres of land. On May 29, 1964, the secretary of the interior oversaw the dedication of the refuge. But the Port Authority had not lost interest. They continued to propose highways, sewer plants, and other

Figure 6 – The work of Helen Fenske (1923-2007) is acknowledged at the 1960 dedication of the Great Swamp National Wildlife Refuge. Credit: USFWS.

projects for the refuge and adjacent lands (Madison and Koch 2013).

The Wilderness Act was signed into law on September 4, 1964. Helen sat in her office reading a news article about the newly passed law (Madison and Koch 2013). Section 2(c) of the act provides a definition of wilderness. In this section it states, "An area of wilderness is further defined to mean in the Act an area … which … has at least five thousand acres of land or is of sufficient size as to make it practicable its preservation and use in an unimpaired condition." She was struck by the words in the article she held in her hands, "Islands of Wilderness." This, she thought, was the answer! She immediately contacted The Wilderness Society and began to learn all she could about wilderness protection and the process for proposing wilderness. Although the total acreage did not meet the 5,000-acre (2,023 ha) criteria, she knew that wilderness designation was the only way to finally shut down the continuing assault of development interests (Madison and Koch 2013). The Wilderness Society continued to guide the Great Swamp Committee until the hearing for wilderness legislation was scheduled. At the final hearing, there were only two dissenting voices from labor unions in favor of the jetport. Fellow activist David Moore of the New Jersey Conservation Foundation said, "No one had taken on the Port Authority, and certainly no one had taken them on and won" (USWFS 2015). But Helen did.

Figure 7 – Helen Fenske reflects on the swamp that could have become tarmac but instead became a refuge 25 miles (40.2 km) west of Times Square. Credit: Fenske family.

The Great Swamp National Wildlife Refuge Wilderness was one of the last pieces of legislation that President Lyndon B. Johnson signed before leaving office. Shortly after, Lady Bird Johnson held a luncheon at the White House to celebrate the Highway Beautification Act and invited Helen Fenske to speak about the successful campaign for the Great Swamp (Madison and Koch 2013). During this speech she said, "Our story is not remarkable, nor unusual at all" (Kitchell and Rosenberg 2020).

Helen noted in an interview in 2000, "There were a lot of people who contributed to the campaign." Abagail Fair, of the Association of New Jersey Environmental Commission, said about Helen, "People have got to tip their hats to her for saving this area. Without her energy and her intelligence, I think we would be the fourth metropolitan jetport" (NJ Hills Media Group 2007).

I'd say that the fight continued and succeeded because of Helen's determination and spirit. As wilderness managers, her humble disposition is something we can all aspire to achieve in our own wilderness management.

Figure 8 – Caribou graze on the Coastal Plain of the Arctic National Wildlife Refuge, with the Brooks Range as a snowy backdrop. Credit: USFWS.

Sarah James (1946–present)

On the Coastal Plain of the Arctic National Wildlife Refuge there is a place referred to as The Sacred Place Where All Life Begins (Izhik Gwats'an Gwandaii Goodlit) by the Gwich'in of Alaska. The Gwich'in live south of the Brooks Range where their villages are strategically located along the Porcupine Caribou Herd's migration paths. The coastal plains serve as birthing and nursery grounds for the herd and are deeply intertwined with Gwich'in way of life (Ashley 2019).

In 1980, President Jimmy Carter expanded the Arctic National Wildlife refuge from 8.9 million acres (3,601,702 ha) to almost 19 million acres (7,689,027 ha) and designated most of these acres as wilderness. The 1.5-million-acre (607,028-ha) Coastal Plain was left unprotected. Soon after the wilderness designation, legislative attempts were made to open the Coastal Plain in the refuge to oil exploration and drilling (Donahey 2018).

Legislation to protect the Arctic Refuge Coastal Plain as wilderness has been introduced in every Congress beginning in 1986 (Donahey 2018). The Coastal Plain is described as "the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activity" (Llanos 2004). Sarah James is a native Neetsa'ii Gwich'in and has championed protection of the Coastal Plain for decades. In 1988, the Gwich'in leaders from across Alaska and Canada developed a resolution to formalize their opposition to energy development in the refuge and their support for wilderness designation of the Coastal Plain. Sarah was asked to serve as one of the eight representatives that would take this to the political arena. Sarah now serves as chairperson for the Gwich'in Steering Committee and as the official spokesperson on Arctic Refuge issues for the three Neetsa'ii Gwich'in tribal governments at the refuge's borders (Madison and Chase 2016).

Sarah has traveled internationally to give speeches and testimonies about the importance of the Porcupine Caribou Herd. In 2000, she met with former President Jimmy Carter, who pledged to her that he would ask then President Bill Clinton to declare the Alaska National Wildlife Refuge a national monument. In 2002, Sarah was awarded the Goldman Environmental Prize for her grassroots environmental activism with the Gwich'in (Goldman Prize 2002). In 2005, Sarah kept a five-month vigil near the Capitol to protest George W. Bush's second attempt to allow oil exploration in the refuge (Harball 2019).

In 2006 Sarah stated, "The calving and nursery grounds will never be completely safe until the Arctic Refuge has wilderness designation. We have to continue to educate people and work like we have since 1988 in order to protect the Sacred Place Where Life Begins" (Grist staff 2006). In 2015, The Wilderness Society awarded Sarah their Robert Marshall Award, their highest honor, for her conservation and land ethic work. The Ford Foundation awarded Sarah a fellowship as one of the Emerging Leaders in a Changing World. She was one of 20 chosen from 3,000 applicants (Gildart 2020 n.d.).

After 50 years of advocacy, Sarah continues to speak for the caribou and the refuge using positive messaging and compassion. Gail Small, a friend and executive director of Native Action, says that "Sarah never tries to be someone who's angry, or aggressive. She just talks her story." This strategy has served Sarah and her cause well (Harball 2019). She continues to win battles against oil interests and repeated attempts in Congress to legalize drilling in the Coastal Plain of the refuge.

In 2017, the Arctic Refuge lost crucial protection and was opened to the energy industry for oil and gas leasing. Area 1002, the target location, is thought to overlie a geological formation that could be holding millions of barrels of oil. Area 1002 is also part of the Porcupine Caribou Herd's migration route and calving grounds (Eaton 2020).

Sarah is leading the campaign against exploration in The Sacred Place Where Life Begins, and thanks to her, the issue has gained nationwide attention. She continues to campaign for wilderness designation.

Her lifetime commitment to conservation of the Coastal Plain is inspiring but, like others when asked about it, she modestly replies, it's just my way of life. "We've always been there …

Figure 9 – Sarah James speaking at the Arctic National Wildlife Refuge 50th Anniversary. Credit: 2011 Arctic NWR Symposium at NCTC. Photographer: Cara Schildtknecht/USFWS.

the creator put us there to take care of that part of the world" (Eaton 2020).

The world is lucky that she is there.

Closing Remarks

These are but a few stories that emphasize the contributions of women environmentalists and conservationists to our wilderness history. There are others, though; Doris Milner was instrumental in the preservation of the Magruder Corridor in the Selway-Bitterroot Wilderness in Montana; Diane Newell Meyer chaired a regional wilderness conference in 1972 to spur support for wilderness designation of six areas in Oregon; Heather Morijah contributed to the fight for designation of the largest roadless area remaining in the Great Plains; Marge Sill's work led to the passage of the Nevada Wilderness Protection Act and designation of 13 new wilderness areas across the state; Marjory Stoneman Douglas is well known for her campaign to protect the Everglades as a national park and later a wilderness; Jaylyn Gough is the founder and executive director of Native Women's Wilderness; and Regina Lopez-Whiteskunk continues to fight for protection of Bears Ears in Utah.

These women are talented and passionate pioneers. Their stories should be told so they continue to inspire other women who fight for wilderness. We should all show reverence to the power of the grace, humility, and compassion showed by the women who battled and continue to battle to protect wilderness. IJW

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HEWLETT
TRA
CLOSED
TO

PWV members patrolling the Hewlett Gulch Trail, an 8.2-mile (13.2-km) trail in Roosevelt National Forest.

What Keeps Wilderness Stewards Coming Back?

An Analysis of Practices that Enhance Volunteer Retention

by MARTHA BIERUT, REBECCA NIEMIEC, DAVE CANTRELL, and RANDY WELSH

Martha Bierut

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PEER REVIEWED

ABSTRACT We examined how wilderness stewardship organizations may enhance volunteers' sense of belongingness and feelings of being valued to increase volunteer retention. We conducted 33 interviews and 40 surveys of volunteers in a wilderness stewardship organization with high rates of retention. Our findings suggest numerous factors may enhance retention by increasing belongingness and the feeling of being valued, including organizing volunteers into small groups for hands-on activities during events such as training weekends; incorporating purely social events; offering diverse opportunities for volunteers to participate in leadership, mentorship, committees, or other unique positions tailored to the skills or interests of individual volunteers; creating opportunities for formal and informal recognition of volunteers' work; and helping volunteers see the impact of their work.

Randy Welsh

Dave Cantrell

Wilderness stewardship organizations are essential to protecting and managing public lands (Lewis 2013). As federal funds for management of wilderness areas have decreased in the United States, land management organizations and agencies have increasingly relied on long-term volunteers to maintain and patrol trails, educate trail users, collect data, and remove litter and invasive species (Bruyere and Rappe 2007; Lewis 2013; Stepenuck and Genskow 2018). Given the growing reliance on volunteers to help agencies manage wilderness areas, it is increasingly important for wilderness stewardship organizations to design their programs to keep volunteers engaged and active over time. High rates of volunteer retention are important for maintaining data consistency, preventing wasted financial resources on projects, and reducing costs of constant retraining of new volunteers.

A growing number of studies have begun to investigate what factors influence volunteer retention to inform organizations and agencies on how to enhance retention rates (Asah and Blahna 2012; Asah and Blahna 2013; Bruyere and Rappe 2007). Previous studies have suggested that volunteer retention in stewardship organizations is influenced by volunteers' social motivations to feel a sense of connection and belongingness as well as their personal motivations to feel valued and impactful (Asah and Blahna 2012; Asah and Blahna 2013; Asah et al. 2014; Measham and Barnett 2008; Ryan et al. 2001). Asah and Blahna (2012), for example, found that social motivations were the most significant predictors of volunteers' frequency of participation in urban environmental stewardship programs in Seattle. The more volunteers wanted to interact with like-minded people, the more frequently they volunteered for their favorite stewardship organization. Environmental motivations were important only when personal and social motivations were met. Furthermore, Ryan et al. (2001) found that while the desire to help the environment initially motivated individuals to start volunteering for stewardship organizations in Michigan, organizational and social factors, such as meeting new people and feeling needed, determined volunteers' commitment over time.

The importance of feeling a sense of belongingness and feeling valued for volunteering builds on psychological research, which suggests these concepts are critical motivators of human behavior (Ashktorab et al. 2017; Leary and Cox 2008). Burton's (1990) human needs theory suggests that belongingness (i.e., the need to be accepted by others and have strong personal ties) and self-esteem and recognition (i.e., the need to be recognized by others as competent, capable, and having an impact) are basic needs that humans are constantly striving for and seeking out in their life, along with needs such as safety and freedom. Indeed, a feeling of belongingness and greater self-esteem and recognition has been associated with enhanced motivation and a variety of positive outcomes, such as increased work performance and self-directed learning (Ashktorab et al. 2017; Bakker and Demerouti 2008).

Together, this research suggests that wilderness stewardship organizations could potentially increase volunteer retention

Figure 1 – PWV patrollers aid in trail navigation

by harnessing volunteers' fundamental needs to feel belongingness, valued, and impactful. However, few studies have examined what specific practices organizations can engage in to fulfill such motivations (Handelman 2013). Our study sought to determine what specific practices wilderness stewardship organizations can engage in to help volunteers feel valued and a sense of belongingness within the organization. We were also interested in understanding the factors influencing retention in wilderness stewardship volunteer programs, including factors beyond social and personal motivations that may reduce participation or cause volunteers to leave an organization.

Our study was guided by the following research questions: What types of experiences or practices help volunteers feel valued and a sense of belongingness within wilderness stewardship organizations? What types of experiences or practices make volunteers feel less motivated to contribute to wilderness stewardship organizations? Why did volunteers leave a wilderness stewardship organization, and what would make them feel more valued?

Figure 2 – PWV Trail Crew members clearing a fallen tree from a hiking trail.

Case Study Organization

Because we were interested in understanding practices that were effective at enhancing volunteer retention and volunteers' feeling of belongingness and feeling valued, we focused our research on a case study of the Poudre Wilderness Volunteers (PWV). PWV is an organization with high rates of retention, a two-decade history of stable operations, and existing ties to researchers, which facilitated close cooperation. PWV was identified as a case study of successful volunteer retention through conversations with leadership at PWV and the National Wilderness Stewardship Alliance. PWV was formed in 1995 to address the growing need for environmental stewardship volunteers to help manage public lands in the Canyon Lakes Ranger District of the US Forest Service in Larimer County, Colorado. From 1993 to 1995, the US Forest Service was forced to reduce coverage in the area PWV now patrols from 30 seasonal employees to 2. PWV cofounder Chuck Bell recognized a pressing need for volunteer support to reduce reliance on government funding. PWV was established as a nonprofit organization in Larimer County, Colorado, in 1996.

Today, PWV is a highly successful wilderness stewardship organization that boasts high membership and volunteer retention. In 2018, PWV had 318 active volunteers. From 2012 to 2018, PWV had 52 to 73 new recruits each year, with 55 to 80% volunteer retention beyond the first

year of involvement. Entirely volunteer run, PWV "recruits, trains, equips, and fields citizen volunteers to serve as wilderness rangers and hosts for the purpose of educating the public, and provides other support to these wild areas" (www.pwv.org). Leadership turnover at PWV is intentionally frequent, with board of director appointments lasting only two years to keep ideas fresh and to give all volunteers that want to progress into leadership positions the opportunity to do so. Some of the services PWV provides include conducting trail patrols to educate the public about backcountry safety and stewardship, reporting on trail conditions and usage, reporting and removing noxious weed species, and maintaining trails and other facilities. PWV members are expected to complete six trail patrols per season to remain an active volunteer in the organization.

This study will have the limitations of any case study, in that the organization selected reflects a community with specific demographics. Much of initial volunteer interest and recruitment for PWV could well be aided by the abundance of recreation resources adjacent to residents of Larimer County, Colorado, such as the Cache la Poudre River, the Arapaho and Roosevelt National Forests, and Rocky Mountain National Park. The local population includes people who moved here to be near these resources; as a result, accessing and protecting them may be a stronger motivator for residents than in some areas of the nation. What remains to be examined, however, is what mechanisms influence the high rates of retention within PWV, particularly given research suggesting that retention is often less influenced by environmental motivations and more influenced by social and community motivations (Asah and Blahna 2013).

Methods

Our case study involved a qualitative investigation into the factors influencing retention, conducted via interviews and open-ended surveys of PWV volunteers. We began with interviews of residents until we reached saturation, and then followed up with surveys. The in-person interviews allowed for a more in-depth examination of the nuanced factors influencing retention, belongingness, and feelings of being valued. The surveys supplemented the interviews by enabling us to look at which of the themes identified in the interviews were most reported among a larger sample of PWV respondents.

To recruit the interview and survey participants for this study, we sampled from the full population of all the organization's past and present volunteers by email solicitation in November 2018. PWV leadership provided a list of 856 current and past PWV volunteers that was already stratified by PWV leadership into three categories: (1) those who are highly committed to the group and are involved in decision-making; (2) those who are engaged with the group but not the most active (i.e., those who have completed their expected six patrols per year but are not involved in other ways) and those who are involved, but only minimally (i.e., those who have not completed their expected six patrols per year); and (3) those who were once part of the organization but have since left. Interviewing and surveying

volunteers from each of these three categories allowed us to determine how varying experiences, barriers, and motivations influenced volunteers with varying levels of commitment over time.

Through the interviews and survey, we asked participants 12 identical open-ended, semistructured questions about their experience with PWV, including when they felt valued and a sense of belongingness as a volunteer with PWV, when they felt less motivated to contribute to PWV, and what PWV could do to improve their volunteer experience. We also asked volunteers who left the organization why they had left (see survey/interview script in Appendix 1).

Interviews were carried out with 33 individuals from PWV who indicated their desire to be interviewed; of these interviewees, 9 were previous volunteers that had since left the organization, 10 were moderately or somewhat involved volunteers, and 15 were highly involved volunteers. After saturation was reached from the in-person interviews, the survey was sent out to the remaining volunteers who were interested in participating. The anonymous survey was created using Qualtrics with the same exact questions as the interview script. An additional 40 volunteers completed all or most of the survey.

What made respondents feel that they belonged	**Number of interviews & surveys mentioned**
Bonding at Spring Training	23
Serving in a leadership role and/or being asked to contribute in a specific way based on skills/interests	14
Social events	12
Bonding over working with a group or individual with shared interests, experiences, or goals	11
Animal groups during Spring Training	10
Being mentored or going on mentoring hikes and patrols	8
What made respondents feel valued	
Receiving thanks from the public	22
Feeling like they made a difference: engaging in a task successfully and seeing the on-the-ground impact of work	15
Getting recognition from the organization	13
Being asked to assume a leadership role or contribute a skill	13

Table 1 – The frequency of factors that facilitated volunteers' feelings of belonging as well as their feeling valued, reported in surveys and interviews

What led respondents to feel less motivated to contribute	Number of interviews & surveys mentioned
Too much work and pressure to contribute more, too many requirements	24
Lack of connection with other members	9
Accessibility issues	7
Lack of interest or appreciation when members offered to provide skills or input to the organization	7
Lack of support or exclusiveness from other volunteers, agency partners, or organization	4
What led respondents to leave the organization	
Perception that leadership or culture is not inclusive enough	9
Too much bureaucracy	7
Not enough recognition for effort	6
Not being heard by the organization, responded to, or reached out to personally	4

Table 2– The frequency of factors that were challenges to volunteer retention, reported in surveys and interviews

All interview recordings were transcribed. Interview and survey results were coded using "structured coding," which involves coding "a topic of inquiry to a segment of data that relates to a specific research question used to frame the interview" (Saldaña 2016, p. 98). We used an inductive approach for coding interview segments for each research question, which involved an iterative process of developing codes based on themes commonly mentioned in the data. Interview segments assigned to an initial code were then analyzed together for more detailed final coding. For each final code, we counted and tabulated the number of respondents who mentioned the code (reported in Tables 1 and 2).

Results

Overall, interview and survey respondents discussed positive experiences with PWV, and most reported feelings of belongingness and being valued in the organization. In the first two sections of the results, we discuss the factors that led PWV members to feel valued and a strong sense of belongingness. In Table 1, we review how frequently each factor was mentioned across all surveys and interviews. Then, in the third section of the results, we discuss the factors that reduced some respondents' motivations to volunteer and resulted in some volunteers leaving the organization (also summarized in Table 2)

Figure 3 – PWV Committee Chair meeting.

Fostering Belongingness

When asked what specifically led volunteers to feel a sense of belongingness in the organization, participants from interviews and surveys most often mentioned Spring Training, which is the annual training weekend for new recruits, and the focal point of the PWV's year (Table 1). Regarding Spring Training, one respondent mentioned, "You have to go through this training together, and that really, I think, bonds people." The training weekend takes place from a Friday afternoon through Sunday toward the end of May (which is typically as early as conditions allow outdoor activities and camping). While the training weekend is required for new recruits, all members are urged to attend, and many are directly involved in support activities. A typical Spring Training weekend may see up to 180 PWVs on-site. Settings have varied over the years, but participants may camp, stay in RVs, or lodge in bunkhouse facilities. Meals are provided throughout, and mealtime socialization offers additional opportunities for old and new members to meet. Very early in PWV history (ca. 1998), training transitioned from lecture-discussion models to an interactive on-the-ground experience.

Many survey and interview respondents mentioned "Animal Groups" at Spring Training specifically as fostering a strong sense of belongingness. Animal Groups are groups assigned at Spring Training that include eight new recruits and two "Animal Group Leaders." The groups are

alphabetical, from "Antelope, Badger, Coyote, Deer" to the number of groups required to keep group size at 10, typically up to "Hawk." The Animal Groups give new recruits a small core group within which they can form supportive ties, while the dinners and all-group activities at Spring Training give them an opportunity to start to meet more veteran members. One volunteer described the Animal Group experience as: "You're also given a group and a mascot at spring training, which I think made even more of a family feel." Another said: "You're divided into a group, you have a leader, and you work with that group of people. Right there is a real sense of belonging." The Animal Groups also help encourage belongingness for current members that take up the responsibility of leading a group. For example, one respondent said: "I was a group leader at the 2018 spring training, which involved a lot of preparation and study, but made me feel like part of the team."

Friday and Sunday at Spring Training involve a mix of activities, ranging from small-group learning about the organization to open-to-all classes, always including trail patrol essentials such as First Aid, navigation, and safety. On Saturday, a four-mile-long Training Trail is carefully designed with stations to simulate what may occur on patrol, such as signage that people will encounter on patrols, including a trailhead kiosk, wilderness boundaries, and designated camping sites; weed identification; encounters with horseback riders; orienteering lost hikers; recruiting potential new PWV members; and simulated medical emergencies. At each station, one recruit takes "point" and handles the situation, followed by feedback and group discussion. The Training Trail, while taking the whole of Saturday's training, is designed to be nonjudgmental and fun, with continual support from the two Animal Group leaders, and a focus on group learning and building camaraderie as well as confidence in volunteer roles and responsibilities.

Training continues after the Spring Training weekend through the mentor program. Indeed, mentoring was mentioned as another key factor fostering belongingness in surveys and interviews (Table 1). New recruits' first three patrols are with a mentor, a veteran PWV member who demonstrates how the initial training carries into actual field work, visitor contacts, and patrol reports. These patrol mentors can be different from their assigned Animal Group leaders and can be designated through social contacts or formally in the organization, which encourages new relationships and connections within the greater PWV community. As one respondent said: "When I first joined, my mentor became such a wonderful friend, a person who I fully respected, enjoyed his company and felt that I really belonged to such a great organization." Like with Animal Groups, respondents reported that serving as a mentor also helped to foster belongingness, not just being mentored.

Volunteers also reported feeling a sense of belongingness when they served in other leadership roles, were asked to contribute in a specific way based on their skills or interests, or when they worked closely with a group or another individual with shared interests and goals (Table 1). Besides from being an Animal Group leader or a mentor, one way in which

PWV volunteers could gain experience as a leader or contribute specific interests and skills was through organizational committees. Under the guidance of an active board of directors, PWV operates through many committees, a structure that gives many opportunities for members, including new recruits, to engage. As of this writing, there are 39 committees named on the PWV website. These range from general organization needs (e.g., Recruiting, Fund Development, and Trail Report Committees) to functions specific to organizational activities (e.g., Stock Riding, Kids in Nature, Weed Crew, and Affiliation Gathering Committees). A few committees are necessitated by the size of the organization (such as the Organization Handbook Committee). These varied and diverse committees foster an environment where volunteers may get involved at the organizational level in different realms of personal interest and continue to work in small groups with shared interests. When speaking to the role of committees and leadership positions in fostering belongingness, one respondent said: "The year I served as overall PWV board chair – I got to know a large percentage of our members." Another said: "She asked me if I'd be on the trail patrolling committee. That's kind of the way I got involved."

Volunteers also mentioned feeling a sense of belongingness when they attended social events such as casual meet-ups at a local brewery, fund-raising events, and the year-end party where individuals are recognized for years of service and stories of the year's highlights are shared. Of social events and the camaraderie and belongingness they foster, one volunteer recounted:

I show up [at the year-end event], and the people there that I maybe did a patrol with a year before or saw them at some event seven months before, and they knew my name, and they knew things about me … that couple that I initially met, I keep in touch with them regularly. So, people keep in touch … It was like, wow! These people cared to make that connection.

Helping Volunteers Feel Valued

In response to our question, "What makes you feel valued at PWV?" interview and survey respondents most frequently cited being recognized and thanked by people they met while on patrols (Table 1). For example, one respondent replied: "The people on the trail who are enjoying it say thank you for volunteering and for the work that you do. That's right at the top." Another respondent expanded:

When people walk our trails, and we encounter them on the trails, I can't tell you how many people say how clean our trails are compared to other trails they've hiked in other states and other areas. They just always comment on how impressed they are with their experience on our trails. That feels really good to me.

Respondents also mentioned feeling valued when they were publicly recognized by the organization and received awards. PWV holds year-end events, where stories of the season's field work are shared, and individual members are recognized at five-year increments for years of service. There is also special recognition for accomplishments such as carrying out the most patrols in a season. One participant said, "I've received a couple of certificates. I was even kindly recognized at the year-end event, which was surprising, really sweet, I didn't expect that at all.

That was really nice." Another said: "I've still got pins and a nametag. I have a special name tag, because I was there longer than 10 years and things like this." In addition to more formal recognition, participants discussed the impact of receiving more informal praise and compliments from others in the organization. For example, one respondent who works on reports for PWV responded about feeling valued: "When [I was] helping the first year and every year since then with the surveys and evaluations, [I] would be thanked a lot for taking this on. A lot of thanks."

Volunteers also reported feeling valued when they were able to feel like they "made a difference" or engaged in a task successfully and saw the on-the-ground impact of their work. For example, one interviewee said, "We hiked in 3 or 4 miles maybe, and we cleared a whole lot of little trees. So, you come back and think … we did good work today!" Another said: "The trail maintenance, I think I get more reward out of that. By the end of the day, you can see what you've actually done. To me, that's been pretty rewarding."

Finally, participants reported feeling valued when they were asked by organization leaders to assume a leadership role or to contribute a particular skill, and when their ideas were put into practice. On the importance of being asked to contribute a specific skill, one respondent said, "When they were working on the North Fork trail after I joined, they asked if any stock riders could come and they could help bring up pieces of the bridge … I felt really valued." Another

Figure 4 – A social gathering brings volunteers together.

said, "I was so happy that I was chosen and allowed to do some really special things right from the start. It made me feel good about myself but also humbled to say, 'man, I wouldn't have dreamed it would work out this way.'" Respondents reported feeling valued when their ideas were put into practice, which occurred on committees and/or when the board of directors considered their ideas. One volunteer recalled:

With PWV, I could, when I was on the board, or I could go to the board right now and say, 'do x. I think we should change the way this works,' or something.... I just don't feel like I have the type of influence with the city or the county where I'm able to with PWV. It's another group of volunteers, and if you get everybody on board to do something, as long as the Forest Service approves, we do it.

Factors that Reduced Motivation to Continue Volunteering

While most respondents reported that their experiences with PWV were primarily positive, we were able to identify several factors that led to feelings of decreased volunteer motivation, frustration, and stress (see Table 2). Many of the concerns expressed are an unfortunate result of the size of the organization and the range of tasks taken on by volunteers.

The most mentioned factor leading to decreased motivation was the perception that there was too much work, too much pressure, and too many requirements imposed by the organization (Table 2). For example, several respondents cited the patrol reports (i.e., reports that they had to complete summarizing what they did during a trail patrol, how many hikers they encountered, how many broken trail rules and regulations were witnessed, etc.) as a source of frustration, while others claimed more broadly that the organization takes too much time from their lives. For example, the "PWV Training Manual," which recruits are asked to partially master, now runs to more than 200 pages, and a conscientious new recruit might dip into a dozen other manuals covering specific areas. The need to provide good data to the US Forest Service has resulted in daunting, complex patrol reports (seven main categories, each with a plethora of potential details), so that learning to perceive and record the data that will go into a given report is challenging for some. Since the organization was founded to patrol trails, there is also a requirement of six patrols per year to occur in order to still be considered a fully active member, which some respondents claimed placed too much pressure on people volunteering their time. Other respondents offered that other volunteer tasks, such as serving on committees or doing trail maintenance, should be included in participation, since PWV's activities are far more diverse today than its establishment more than 20 years ago.

Some respondents expressed frustration at the pressure from others within the organization to do more or to participate in activities with which they weren't comfortable (e.g., one former member expressed interest in helping the organization in ways other than patrolling as they weren't physically able to travel to and hike the trails). One member stated, "I guess maybe having the more intensely involved members put less pressure on me to become even more involved would help." Others were frustrated by required rules, trainings, and recertifications.

For example, the US Forest Service recently mandated that members do training every five years of volunteering at PWV, which frustrates some longtime volunteers who feel very familiar with the rules and regulations already.

The second most common factor that PWV respondents cited that reduced motivation to continue volunteering was a lack of social connection with other PWV members. Indeed, while group activities such as Spring Training and one-on-one mentoring hikes helped foster belongingness among many volunteers, those who were less motivated to continue volunteering perceived a lack of social or emotional connection. For example, one interviewee said: "Unless you actually get seriously involved in the organization, you don't really get to know folks.... You sort of didn't see these people around again." Another respondent added, "Cliques are apparent, and not all members of the organization are other-oriented and welcoming."

Another factor reducing motivation to volunteer over time was a perceived lack of interest or appreciation when members offered to provide skills or input to the organization, causing a general lack of "feeling heard" in the organization; for example, one volunteer mentioned that they wanted to contribute a specific skill that they believed could greatly aid the organization and were met with resistance from organization leaders, causing a perceived silencing and lack of interest. Another demotivating factor was the sense that work was being undone by other members, such as current organizational leaders changing what previous leaders had established. Although not related to social or personal motivations, respondents also discussed accessibility issues such as mobility, health-related challenges, and logistical problems such as horse troubles, driving long distances, or inability to attend weeknight events.

Factors that led to volunteers leaving the organization overlapped with factors leading to decreased motivation among those who were still part of the organization (Table 2). Former PWV members discussed that they left because of the perception that the leadership or culture was not inclusive enough, which discouraged volunteers from taking leadership roles or making connections with senior members. Much of this dissatisfaction arose from a view that the same types of leaders from the same social circles get selected to lead the organization. The next most common theme was too much bureaucracy involved with the volunteer organization; one respondent added, "It just seems to be more bureaucracy. With trail reports, every trail report that you submit is scrutinized by a committee. If you do something the wrong way, you get this nasty note." Several respondents said that the perceived "red tape" and rigid organizational structure was too much like a professional work setting. Another respondent expanded on the frustrations of the bureaucracy involved in PWV: "They're too over-engineered.... They try to run it like a federal institution, like a federal branch. While we are under the guidance and the instruction of the feds, we are volunteers." Other reported issues were a perceived lack of organizational recognition for work or effort and not being heard by the organization, responded to, or reached out to personally.

Discussion

We found that volunteers' sense of belongingness in our case study was most often associated with serving in a leadership role or contributing unique skills/interests, social events, and a training weekend where participants were divided into small groups. Our results support those of previous studies conducted on belongingness in a work setting, which have found that belongingness is not only influenced by feelings of sociality (i.e., "being a member of a team") but also by feelings of having a worthy and credible role in that team (Ashktorab et al. 2017; Levett-Jones et al. 2007). In our case study, the wilderness stewardship organization helped new volunteers feel they were part of a team by not only hosting purely social events but also by hosting a Spring Training weekend, when new recruits completed hands-on activities together in small "Animal" groups. The Animal groups especially helped members feel like they were part of a team through shared hands-on experiences during training, shared group leaders, and symbolic gestures affirming group membership (i.e., the name of the animal mascot representing their group).

We found that volunteers' sense of belongingness in our case study was most often associated with serving in a leadership role or contributing unique skills/interests, social events, and a training weekend where participants were divided into small groups.

The wilderness stewardship organization also helped volunteers feel they had a worthy and credible role by asking them to complete unique tasks and take on diverse leadership roles. For example, respondents discussed a feeling of belongingness when they were asked to participate as a group leader at the annual Spring Training event, on the board of the organization, or as the leader or a member of one of the organization's many committees. We found that even the smallest request to take on a specific, "worthy" role could create a big impact; for example, when asked about what led to a feeling of belongingness, one volunteer discussed being asked by other volunteers to play a mountain biker in a role-play during Spring Training.

These results suggest that to enhance volunteer retention, it may be important for wilderness stewardship organizations to not only host social events but also to make sure new volunteers are part of a smaller group that feels like family. This group could engage in a variety of different tasks together, whether it's training (like PWV's Spring Training) or group trail patrols, and could use symbolic gestures to affirm group membership, such as shirts, mascots, or group names. Our results suggest that wilderness stewardship organizations may also benefit from offering numerous unique roles and leadership positions to volunteers, which could range from being on

the board of the organization, participating in a committee, or mentoring a new volunteer. Developing mentorship programs may be especially important for enhancing retention, as we found that in the case of PWV, these programs could enhance a sense of belongingness for the mentor as well as the mentee.

We found that formal and informal recognition were important for making participants feel valued. These results support those of Gooch (2005), who found that stewardship volunteers feel valued when they are thanked by the organization and when they feel that the work has been impactful. This also builds on Asah and Blahna's 2012 findings, which suggest that people are not only motivated to volunteer for stewardship organizations to protect the environment but also to "defend and enhance their ego" (i.e., to maintain and enhance personal affect). Our results therefore highlight the importance of exploring new and creative ways to ensure volunteers are recognized both formally and informally by those inside and outside the organization. For example, volunteer organizations and government agencies could put up signs for trail users saying, "Thank your wilderness stewardship volunteer for maintaining your trail," given our finding that gratitude from recreationalists was particularly motivating. In addition, organizations could offer formal recognition to volunteers; for example, awards or badges could be created for maintaining a website, raising a certain amount of money, mentoring, or organizing social events, in addition to completing trail patrols or engaging in more traditional wilderness stewardship tasks. It is, however, important to note that formal recognitions such as these were less commonly cited as motivating factors than informal recognition from organization members and the public in the case study of PWV. As a result, reminding the public, leadership, and other volunteers to thank those in the organization through more informal channels (e.g. emails, phone calls) could potentially make an impact for retention.

We also found that participants in our case study felt valued when they could engage in a task successfully and see the on-the-ground impact of their work. These findings relate to psychological research (Bandura and Schunk 1981; Keller 2006) suggesting individuals feel greater motivation to engage in a task when they have greater self-efficacy (they believe they have the ability to accomplish a task successfully) and greater response efficacy (they believe their actions will make an impact on desired outcomes). Respondents particularly discussed feeling motivated when they were able to visually see the products of their work (e.g., a section of a bridge built, or a section of trail cleared of downed trees). Our findings therefore suggest that to enhance motivation, wilderness stewardship organizations may seek to develop ways of showcasing the impacts of volunteers' work. For example, organizations could share "before" and "after" photographs of trail work and invasive species removal efforts or keep track of the number of recreationalists reached through volunteers' education to demonstrate the impacts of volunteers' work.

In addition to investigating how organizations may appeal to volunteers' need for belongingness and feeling valued, we also examined

factors that may reduce motivation and lead to volunteers leaving an organization. The primary demotivating factors we identified were the perception of too many rules and requirements, too much pressure to contribute, and too much bureaucracy within the organization; a perceived lack of connection with other members; and a perception that the leadership is not inclusive enough. The perception of too many rules and requirements could pose a challenge to similar wilderness stewardship organizations, which often rely on formal reports to keep track of, analyze, and synthesize the impacts of volunteers' work. Many stewardship organizations, such as our case study organization, rely on partnerships with federal and state agencies, which require formal reports and have certain rules and regulations that must be followed. Additional studies could examine if this perception of too many requirements is prevalent and demotivating in other stewardship organizations. If so, studies might do well to examine whether better distributing workload and responsibility to organizational leaders might lessen the perceived burden on patrolling volunteers. Another way to address this demotivating factor may be to ensure that organizational mentors and leaders better educate volunteers as to the value of requirements for goals such as ensuring trustworthy data and justifying activities to funding sources. Additionally, stewardship organizations could potentially choose these assignments for volunteers who have the temperament to enjoy the task and become proficient in it.

There are several limitations to our study that should be considered when interpreting our results. First, only 33 interviews and 40 surveys were completed to represent an organization with 856 past and present volunteers. While we ensured in our interviews that we received responses from volunteers with varying levels of motivation, our findings may not represent all volunteers in the entire organization. Another limitation was that the 40 surveys were completed anonymously, which prevented us from stratifying these respondents into groups based on level of participation, whereas we were able to do so with interview respondents. Additionally, our case study organization is in a community near to many natural areas on the Front Range of Colorado, so the organization may have had a larger population of individuals motivated to engage in environmental stewardship and recreation to recruit volunteers from. Further research could examine to what extent the practices for motivating volunteers we identified apply and how they could be adapted to the diversity of unique social and ecological contexts faced by wilderness stewardship organizations.

Conclusion

Given the increasing importance of volunteers to help agencies meet goals for wilderness areas, studies have begun examining the factors influencing wilderness stewardship volunteer retention. We build on this growing body of work by examining the specific practices that fostered volunteers' sense of belongingness and the feeling of being valued within a wilderness stewardship organization. Our findings suggest numerous practices that organizations could adopt to enhance retention, including creating small, supportive groups of volunteers that

engage in hands-on activities such as training; incorporating purely social events; encouraging involvement in unique tasks, committees, and leadership or mentorship roles; creating opportunities for formal and informal recognition of volunteers' work; helping volunteers see the on-the-ground impact of their work; and developing ways to make regulations and rules seem less overwhelming or demotivating. Future work may build on ours by examining how these strategies could be implemented across diverse wilderness stewardship organizations and the extent to which these strategies may enhance retention over time.

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Appendix I: Interview Script

Poudre Wilderness Volunteers Interview Questions

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1. Do you have a background in environmental stewardship through school, work, previous volunteer work, etc.?
2. How did you come to know about PWV? What drew you to the organization?
3. How long have you been volunteering with PWV? How often do you volunteer, and what activities do you do when you volunteer?
4. Tell me about an experience that made you feel excited about being a part of PWV.
5. Is there an experience you can share that made you feel overwhelmed, frustrated, or less motivated to contribute to PWV?
6. Tell me about a time in which you felt like you first connected with someone from PWV.
7. Tell me about a time in which you felt like you truly belonged to the PWV community.
8. Tell me about an experience that made you feel valued as a volunteer with PWV.
9. Tell me about what could make you feel more valued as a volunteer with PWV.
10. How does your experience with PWV compare to other organizations you've volunteered with? Do you feel like you belong more or less to the PWV community compared to that other organization? Why?
11. Under what circumstances might you contribute more to PWV?
12. [If no longer volunteering with organization]: Why did you stop volunteering with PWV? Do you volunteer with other groups now? Tell me about the other groups you volunteer with and how they differ from PWV.

Mudflats in Cook Inlet at low tide. **Photo credit** © NOAA on Unsplash

CoalitionWILD Global Mentorship:

The Future of Wilderness May Depend on Our Ability to Learn Faster and Better

by AMY LEWIS

The CoalitionWILD Global Mentorship program pairs rising conservation leaders with veterans from the environmental field for a 12-month virtual and intergenerational exchange. The program provides avenues to build networks, encourages perspective exchange on challenges and celebration of success, and is committed to bridging the gap between generations, cultures, and experience. CoalitionWILD endeavors to go beyond developing the leadership skills in mentees. Rather, this mentorship program is committed to collaborative and equal partnerships between participants built upon foundations of trust, respect, and curiosity. Learn more at www.coalitionwild.org/mentorship/.

Amy Lewis

I am a wilderness conservationist, which makes me a member of a professional community that exists to protect wilderness for the benefit of all life. I joined the conservation profession because I believe in the power of nature to heal and preserve life, and because I believe in the power of people to change the world for the better.

It is, perhaps, on the shore of my beliefs and the tide of current events where my motivation to serve nature and humanity struggles most. In my lifetime, the world has lost more than half of its wildlife and more than a third of its wild

places (WWF 2014). As you read these words, on every continent sweeping damage to Earth's biosphere and the unraveling of the fundamental conditions that make human civilization possible are accelerating. In April 2020, even as the pandemic (a consequence of biological spillover that, in and of itself, is a viral message from our planet's ragged and fraying wilderness) sequestered billions of people within their homes, the atmospheric concentration of carbon hit a new record: 416 parts per million (United Nations 2020). This is the highest concentration of carbon in more than 800,000 years and just 34 ppm shy of the climate threshold scientists (and some oil industrial reports) have identified as catastrophic for global ecology and humanity (Song, Banerjee, and Hasemyer 2015).

In our sector, it is out of fashion to paint starkly ominous portraits of the global ecological condition, such as the one I have painted above. Doing so, the conventional wisdom states, defeats the audience before they can act and thwarts positive change. As a social movement theorist and practitioner, I find this sentiment not in line with the conclusions of others in my field and believe it is a misinterpretation of the volumes of research conducted on issue framing (Stone 1989; Baumgartner and Jones 1993; Baumgartner and Mahoney 2005). Urgent, existential need is one of the rudimentary elements of mobilizing messages. Even more importantly, a clear understanding of reality is a necessary condition for learning to take place, both personal and communal.

Given that, it could be beneficial on multiple levels to stand back and objectively take in the facts unvarnished by superficial optimism. What do we observe? For many, the indices – the collapse of biodiversity, surging wildfire intensity alongside rising temperatures, erratic weather, mass human migrations, all while greenhouse gases continue to accumulate in the atmosphere and wilderness dwindles – appear grim. Not entirely without hope, no. But certainly dire, and very definitely urgent.

Moreover, at a professional level, a blunt review of the facts reveals something more, something relevant to every single practicing conservationist: what we are currently doing, maybe not as individuals, but certainly as a sector and a community – our collective efforts to save nature across the globe – might not be working. Part of the problem is that conservation and wilderness conservation remain a narrow sliver of a larger environmental movement that only represents a fraction of society. For all our collective knowledge, we still have not learned how to make what we know more meaningful and relevant for the rest of society.

And if that is true, it is in all our interests to consider alternative strategies and what we might do differently. To admit that we haven't yet learned how to protect the biosphere and that we are still seeking answers. In the next 10 years, if not sooner, we must act on a scale and with a speed never witnessed to halt the destruction of nature, and with it the security of the future. But how can we hope to succeed when we haven't yet learned how to effectively marshal conservation's immense resources (both material and intellectual) to systematically and internationally defend wilderness at scale?

It struck me that inviting in more diverse perspectives could help with this endeavor. One natural place to begin is with young and emerging leaders.

Earlier this year while reevaluating both conservation's efficacy and my own contributions to our collective mission, I agreed to become a CoalitionWILD mentor to contribute the very answers that I now tentatively questioned to a bright and aspiring young conservationist. But instead of using this as an opportunity to repeat lessons that may or may not be relevant to my mentee, I thought this would be the ideal moment to practice learning with a partner. My mentee agreed and shared many ideas that have helped to structure our discussion. It is our hope that through this relationship and the CoalitionWILD Global Mentorship program we can become more effective conservationists, better equipped to confront the immense challenges ahead.

About My Mentee

Fleur Nash is one of the wisest and most thoughtful people I have ever met. I prefer to think of her not so much as a mentee, but as a professional pen pal. She is a PhD candidate in the Department of Geography at Cambridge University. Her research interests center around how conservation NGOs work better with all stakeholders in conservation interventions, and how theory and practice can work better together. She is particularly interested in decision-making concerning interactions between humans, nonhumans, and the environment – specifically how knowledge, values, and ultimately power influence who decides what and for whom.

Fleur is conducting her research in Laikipia County, Kenya, working with an international nongovernmental organization that is engaging stakeholders around land use and elephant conservation. She is tackling the complexity inherent in such an issue with intelligence, compassion, and a commitment to move beyond critique and create a practical value to her research. What impresses me about Fleur is that she is genuinely pursuing a model for creating environmental and development policy from a more "authentic place" based on firsthand experience and open and respectful discussion between all relevant interests.

My own work is far more global in scope. I am a member of an international team working to protect half of Earth's land and sea in time to stabilize the climate emergency and halt mass extinction, and I lead on global communications and outreach. Yet my interests and work overlap with Fleur's on the topic of "wicked problems," issues so thorny and complicated they are difficult or impossible to solve (Rittel and Webber 1973). In other words, we have not yet learned how to solve them.

In the environmental sector, wicked problems generally emerge when long-term and large-scale risks and uncertainties (ecological collapse in a watershed, extinction, or carbon emissions) intersect with sharply divergent public values (economic growth, unsustainable land use, unemployment) to generate political stalemates. Whether we like it or not, the future depends on dissolving wicked problems to implement collaborative and fair solutions that protect people

and nature.

It would be nice to think that we can bypass wicked by appealing to a higher authority, one more amenable to our type of expert recommendation. Unfortunately, not only is this not always possible (there are few, if any, higher authorities outside of the nation-state; meaning that at the country and global levels wicked problems cannot be circumvented), it is short-sighted to do so even when it is. Wicked problems have a way of not going away, undermining implementation efforts for years and diminishing opportunities for future reform. Therefore, learning how to embrace wicked problems and transform them is something we might all aspire to understand.

In my endeavor to improve my own ability to learn and become more effective at addressing the wicked problems I confront in my work, I could not have found a more perfect, receptive, and sensitive partner than Fleur. She inspires me by her example and with her advice, and the topics covered herein are the foundational principles of our explorative relationship.

Why Learning?

It is very likely that those reading this article have years of learning experience in the conservation field. It is equally likely that the type of learning we have engaged in has made us experts on describing a topic or a situation. We study the context within which we operate, we identify and analyze relevant variables, and we increase our understanding of what is theoretically possible if we could only manipulate those variables. Implicit to this type of learning is an assumption that expert advice ought to guide decision-making. If only that were always how it worked in the real world.

As a scholar and an environmentalist, this is the type of learning I have engaged in for decades. I am proud of the knowledge I have acquired using this method, and I am also at a place in my career where I have deemed that this type of learning is no longer enough. In his book, Leading Learning Communities, Fred Kofman, the former vice president for executive development at LinkedIn defined learning differently. "To learn is to increase your capacity to accomplish the results that you desire; to know is to be able to act effectively in a given domain" (1995, p. 2). This alternative definition of learning does not stop at information outputs and places the emphasis on practical outcomes. The implication of the latter definition is that we likely have the tools we need to save wild nature, the obstacle we must overcome is learning how to use them to the effect needed.

Peter F. Drucker, another observer of business and the economy, coined the term "knowledge society" when he described the radical shift of the US workforce in the 1990s. "By the end of this century, knowledge workers will make up a third or more of the work force in the United States – as large a proportion as manufacturing workers ever made up, except in wartime. . . . The great majority of the new jobs require a habit of continuous learning" (Drucker 1994).

Dynamic learning, as opposed to static knowledge, has become the very foundation of our economy. To some degree, conservation has always been based in learning. Many

of us are scientists driven at least in part by an innate curiosity about the natural world. Could we become more effective conservationists by feeding our curiosity about the social and human worlds? How would that ease the implementation of our projects?

Traditional Knowledge

The three primary drawbacks to the traditional definition of knowledge are: (1) it prioritizes theory over practices (Idhe 1986), (2) it discourages creativity and innovation (de Bono 1992), and (3) it disempowers students/learners/nonexperts (Freire 1970). The traditional definition of learning may impede our effectiveness and stifle our curiosity. By prioritizing theory over practice, application and implementation become secondary to that all-important theoretical understanding. When it comes time to influence social or political variables, we have invested little effort into understanding what type of interventions will yield the best results.

Additionally, the traditional definition does not encourage creativity or innovation. Authority belongs to those with the most experience by virtue of the fact that they will have accumulated the most information. In this model, we perceive expert knowledge to be a finished product as opposed to an evolving variable embedded in a fluid social-ecological system. In the words of Kofman, "The teacher, the 'knower,' makes deposits, transferring bits of intellectual capital, focusing on increasing the quantity of knowledge rather than the quality or meaningfulness of the information to the learner's life" (1995). Strict hierarchies can often stifle conversation and form the basis of the dreaded echo chamber. By opening expert knowledge to feedback and amendment by others, we create more expansive opportunities for everyone involved.

By creating an expert class, the traditional definition of knowledge divides society into "thinkers" and "doers," with thinkers being the privileged minority who parcel out information to everyone else. For those of an egalitarian bent (guilty!) this model is problematic from a moral and ethical standpoint. We want to expand agency for all people because we believe that it is right to do so. Also, in times of change and uncertainty, survival depends on teamwork and organizations tapping into the knowledge and ideas of all its members, particularly those most informed by day-to-day practice or most exposed to diverse stakeholders.

Each and every one of us simultaneously occupies two coexisting forms of reality: the objective and the intersubjective. Land, wildlife, stars, seas, and molecules shape objective reality. Experts excel at apprehending and describing this mode of reality. Intersubjective reality is superimposed on objective reality. Ideas, concepts, relationships, and power structures are the cornerstones of intersubjective reality. Countries, laws, identities, values, desires, and allegiances all contribute to the intersubjective reality. It is in this cocreated intersubjective multiverse that the latter definition of learning, the one that emphasizes effective action becomes far more relevant because whether we like it or not, the reality is entirely dependent on us, collectively. Learning to become more effective may very well mean learning how to be more inclusive and receptive. What better

practice to become a better learner than an intergenerational mentorship in which I and my partner cocreate more effective strategies and actions for ourselves and our respective work?

Learning to Embrace and Love "The Wicked"

Learning is a lot easier said than done. In this journey Fleur and I are on together, I am reminded of something I once read by the great satirical fantasy writer, Terry Pratchett. "Everyone loves to have had written," he once shared when asked about how he felt about writing. So too, I'm convinced, is it with learning. Everyone wants to have had learned.

Stepping outside expert hierarchies, structuring interactions based on curiosity for effective action, and collaboratively redrawing strategic roadmaps based on authentic knowledge requires an alertness and sensitivity that can be, frankly, exhausting. But if learning is a kind of muscle, then with diligence and practice, this kind of energy expenditure should lessen over time. The CoalitionWILD partnership with Fleur is helping.

At the outset of our relationship, Fleur and I agreed that we were both only interested in doing something novel. For Fleur, this means learning how to craft environmental and humanitarian interventions shaped by authentic and context-based direct experience. For me, it is discovering how the need to protect half of Earth's land and seas overlaps with what is meaningful for people around the world so that we can expand and mobilize unified support for wild nature.

By engaging those who are not necessarily experts, but do have a stake in expert recommendations, we commit to potentially complicating already complicated issues. But by doing so we also expand our potential to discover new solutions together through joint problem solving.

To help organize our approach to this type of professional lifestyle, Fleur shared with me an article about the relationship between care and curiosity. In it, "care" is described as an entry point for ethical action even as it is also recognized as a potential for harm to someone not in our sphere of care. Our care for one issue or entity can result in harm to another, after all. This is the dilemma at the root of wicked problems. The remedy for harmful care is curiosity. This may entail reimagining what care looks like. It also means continually learning about how we care and how that care impacts others. Finally, what is not stated in the article, but which I believe is implied, is an obligation to collaborate with the other, whoever or whatever that may be. By engaging those who are not necessarily experts, but do have a stake in expert recommendations, we commit to potentially complicating already complicated issues. But by doing so we also expand our potential to discover new solutions together through joint problem solving.

Care, Curiosity, and Collaboration: A Model for Learning

Based on our nascent exploration of this mode of professional living, Fleur and I have set forth the following questions to make continuous learning easier. This relational model of learning is also something I plan on applying in my own work, both within my organization as well as outside of it as I interact with the world to recruit new allies for wild nature.

1. **What motivates you? Define the problem and the opportunity.**

Understanding why participants have joined a conversation, be it a mentorship or a policy debate, is essential to understanding who they are as people and the category of solutions they can appreciate. It is also a chance to share your own motivations, which sets the stage for mutual problem solving, and opens channels of empathy. Emotional expression is the basis of good storytelling, and it is also a cornerstone of community building.

2. **What is your purpose? Define the solution.**

Sharing purpose helps us understand what others believe to be the solution. It goes beyond short-term and superficial interventions and illuminates longer-term goals. Purposes can range from being the best person possible, creating safe and stable habitat and/or economies, or radically shifting systems from one mode of operation to another. Purposes ought to be grand and unattainable with a single action or intervention. They are end points in a personal or communal journey.

3. **Is there any overlap or commonality between us? Define what we share.**

This step engages relational discovery and practice. How are we alike? By learning about what makes us similar we set the stage for aligning our purposes. When we do eventually discover how we are alike, we spark the potential to form a new community. Whether this happens depends upon how the participants prioritize their commonalities within their own larger identities. If one participant chooses not to recognize a commonality, it is essential to discover something else that is shared between participants. The more commonalities uncovered, the more potential for collaboration in the future. This step is also iterative and should be returned to frequently.

4. **How do you need help? Define the obstacle and the actions steps needed.**

Oftentimes, when we come together, it is because we need another's assistance. In the expert model of learning, this is not explicitly recognized, but it is true all the same. Experts need others to accept their knowledge and recommendations. The problem arises in that others may not feel they need expert recommendations. Being able to clearly and straightforwardly state how it is you need assistance to accomplish your purpose sets the basis for trust and puts participants on an equal footing. Recognizing our interdependency is also key to the care and creation of communities that problem solve together.

5. **How can I help? Define relevant resources and willingness to assist.**

After you or someone else has asked for assistance, it is time to evaluate how others can help.

It is also the moment when innovation begins. Oftentimes, what we ask for specifically another is unable to give. However, if they are willing to engage in genuinely creative and innovative problem solving around what they can offer then we have an opportunity to learn something new. Likewise, when someone asks us for our assistance, we may not be able to meet their specific request, but we might be able to offer something else that is relevant to their need that they have not previously considered.

6. Can I use the offered assistance? Define willingness to integrate.

Now comes the second stage in innovation, evaluating how or if we can use what is offered. This can be the most difficult and frustrating stage in continuous learning because what we are doing is world creating, merging visions of the world to manifest collaborative, joint, and potentially, transformative action. Many times, what is offered might not appear to work at first. If that is the case, it might behoove participants to return to step three and redefine commonalities. Learning, after all, is iterative, and it can take multiple attempts to learn how to become more effective at what it is we want to achieve. It is also important to note that changing conditions might also change participant willingness to utilize offered assistance. This can have multiple implications for our behavior and how we choose to proceed.

7. What happens when I apply offered assistance? Define results and report back.

The last stage in this continuous learning model is application. What happens when we utilize the offered assistance? Reporting the results can spark new opportunities for learning.

The above model of learning is generative and pragmatic, promoting possibilities for action. My objective is to identify a model of learning that can be applied to wicked problems and produce results. My assumption is that it may be necessary to discard knowledge hierarchies implicit to more traditional models of learning. My practice of this model is through the CoalitionWILD mentorship program. By including diverse perspectives in my own problem solving and empowering others to stand on an equal footing with my own experience, I am learning to learn. This is a skill I hope to develop and put to service for the benefit of conservation and our wild Earth.

It is one thing to accept that learning is about being effective. It is another entirely to embody learning to increase our competency. Over the course of the next year, I will be practicing how to learn with my mentee. I invite others within conservation to join me in this endeavor. ijw

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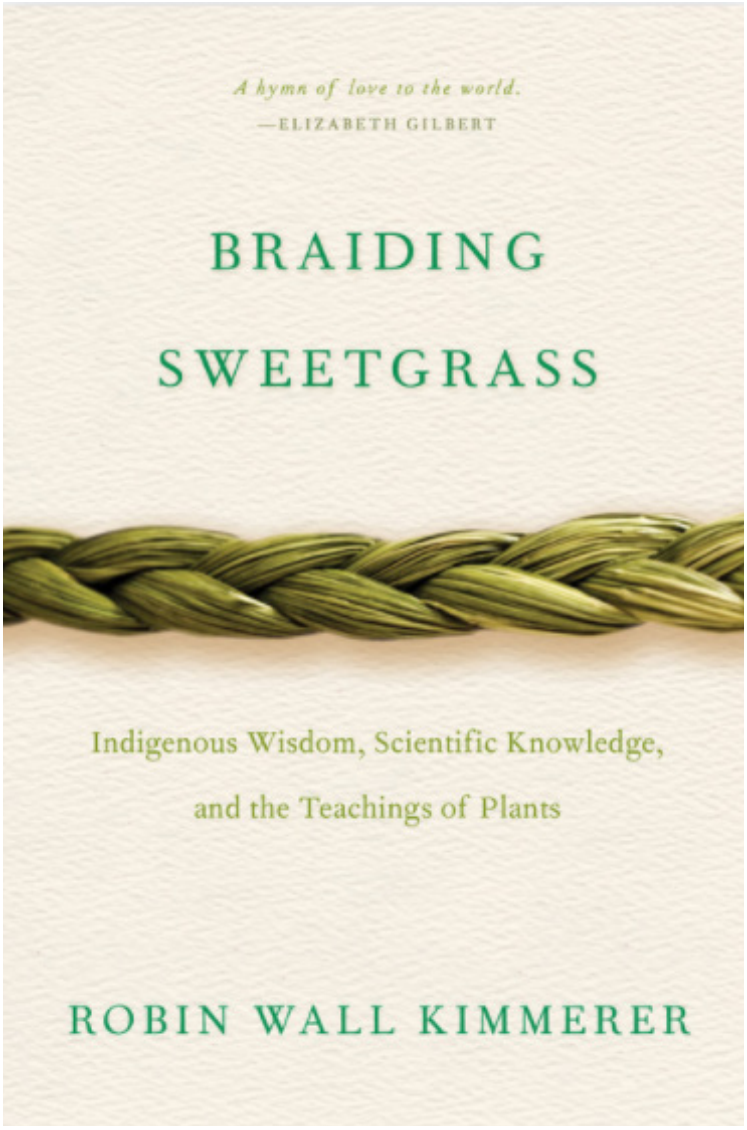
Great Sand Dunes National Park, Denver, United States **Photo credit** © Josh Gordon

Book Review:

Patrick Kelly, Media And Book Review Editor

BRAIDING SWEETGRASS: INDIGENOUS WISDOM, SCIENTIFIC KNOWLEDGE, AND THE TEACHINGS OF PLANTS

Robin Wall Kimmerer. 2013. Milkweed Editions, Minneapolis, MN. 408 pp. $18.00 (pb).



The view that humans are separate from nature runs deep in Western thought and wilderness stewardship practice. This construed human-nature dichotomy arguably underlies much of our species' environmentally destructive behavior while impoverishing us emotionally by severing our bond with the rest of the living world. In Braiding Sweetgrass, Robin Wall Kimmerer responds to this crisis of "broken land and empty hearts" by offering a braid of stories meant to reimagine and heal the human-nature relationship (p. 126).

As a trained scientist, decorated professor, and member of the Citizen Potawatomi Nation, Kimmerer is a self-described "traveler between scientific and traditional ways of knowing" (p. 37). Drawing on this diverse background, Kimmerer seeks to transform our relationship to land and open our eyes to an alternative way of understanding informed by Indigenous wisdom and botanic study. Through this lens, symbiotic relationships between all living things and their surroundings come into focus. Indeed, from Kimmerer's collection of essays emerges "a worldview shaped by mutual flourishing" (p. 371), in which it is impossible to separate individual well-being from the health of the whole.

Kimmerer argues that once we perceive organisms (including humans) and their environs as connected and engaged in mutual caregiving (rather than separate entities locked into rivalry), then the world presents itself as a gift. A gift, in turn, invokes an ongoing relationship characterized by feelings of gratitude from which springs a sense of responsibility to give back. If we can learn to see and walk again in "a world full of gifts" (p. 23), we can cultivate cultures of gratitude (both in ourselves and society at large), in which we act and recognize ourselves as cocreators of biocultural diversity. However, in keeping with the theme of reciprocity, "it is not a question of first getting enlightened or saved and then acting. As we work to heal the earth, the earth heals us" (p. 340).

Braiding Sweetgrass provides a much-needed examination of long-held assumptions about human separateness and offers a fresh way of perceiving the human-nature relationship in terms of reciprocity, connectedness, and caregiving. In doing so, the book lights a way for how we can heal our broken relationship with the land (and, by extension, ourselves).

Moreover, in promoting a revitalization of indigenous lands, language, culture, and philosophies, the book is highly relevant during this time of reinvigorated national discussions around issues of inclusivity, equity, and social justice. Kimmerer both inspires and challenges us to meaningfully integrate Indigenous perspectives into our economic, political, and stewardship agendas, with potentially subversive and far-reaching consequences. If we embrace this daunting but auspicious challenge of opening up to alternative ways of knowing and reconceptualizing our relationship with the more-than-human world, a more equitable, resilient future will be within our grasp.

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Facilitated by
WILD FOUNDATION
717 Poplar Avenue
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International Journal of Wilderness

April 2021 Volume 27, Number 1

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