10.17953/A3.42274

A 100-Year Bloom of Indigenous Limnology and Reconnection to Land through Field Stations

Raymond L. Allen, Sagen Quale, Celeste Hockings, Phenological Initiatives for Indigenous Peoples in Limnology Collective, and Gretchen A. Gerrish

Many, if not all, field stations and marine laboratories (FSMLs) throughout the United States and North and South America occupy Indigenous lands, have extensive colonial histories of resource extraction (e.g., plant and animal data, human knowledge), and have minimal, short-term, or nonexistent involvement with Indigenous nations and their citizens in the occupied lands.[1] Institutions of higher education in general fail to recruit, retain, and engage citizens of Indigenous nations. Though the racial category "Native Americans" fails to match the definition of tribal nation citizenship in the United States, extremely low percentages of self-identified Native Americans are enrolled in U.S. academic institutions, including undergraduates, graduate students, and staff and faculty members, with even lower percentages in science, technology, engineering, and mathematics (STEM) categories.[2,3] Advanced degree programs list only 0.21 percent of 2023 PhDs earned by Native American scholars, an order of magnitude lower representation than the general US population, where 2.9 percent of people identify as Native American.[4] While field stations struggle with many of the same institutional problems as main campuses, especially in their involvement with Native communities, their off-campus and location-based work, which is often environmentally centered, can align with regional Indigenous science priorities.[5,6] Simultaneously, these off-campus institutions, rooted in Western science and law, work with mainstream environmentalism and disrupt Indigenous ecosocial relations.[7]

The impact of field stations and marine laboratories on research and training in the field of biology is extensive and consistently tied to the work of well-established and successful academics, breakthroughs in long-term *in situ* studies, and research inspiration and appreciation.[8,9,10,11] Many FSMLs are lauded as prime locations to perform research, emphasizing settler colonial descriptive tropes such as "pristine," "wilderness," and "untouched by humans."[12] The long histories of prior held relationships and ownership, land and water modifications (e.g., fish stocking, logging, waterway modifications), and displacement are present but often ignored by dominant institutions. We argue that doing the work of understanding and citing the settler colonial histories of FSMLs is vital to create space for Indigenous reoccupation and to promote anti- and decolonial research agendas within field station settings. This is especially important, as there is a societal push in the United States to be more inclusive of Indigenous peoples in academic work.[13] Programming, resources, and engagement focused on Indigenous students and communities is increasing, but the quality, intentions, and outcomes depend on the goals of the respective institution, conversations with leadership, and embrace of Indigenous sovereignty.[14,15,16,17] We believe FSMLs can be a powerhouse in engaging Indigenous communities in the regions they occupy, offering opportunities for secondary and postsecondary education and training as well as academic employment for Indigenous people looking to remain close to their Indigenous communities.

We offer a case study and nuanced perspective on the possibilities for Indigenous nations and academics to reclaim space and knowledge in a university colony known as an FSML. These public and private islands of colonization, of which there are more than 300 within the United States and many more throughout the world, often prioritize and reinforce settler colonial agendas and methodologies.[18] With each FSML, there is a possibility for Indigenous reconnection to land through tribal community partnership or even tribal nation ownership. In our critique, we analyze FSMLs through the lens of decolonizing and anticolonial research practices, addressing settler colonialism (as defined by Tuck and Yang) in the past and present of FSMLs.[19,20,21] Simultaneously, we work with Max Liboiron's definition of land, where *Land* (with a capital L) refers "to the unique entity that is the combined living spirit of plants, animals, air, water, human, histories, and events recognized by many Indigenous communities," and lower-cased *land* refers "to the concept from a colonial worldview, whereby landscapes are common, universal, and everywhere, even with great variation."[22] We believe this definition of *Land* is especially important in the eras of the Land Back movement and the fight for water rights and the rights of nature, given how many FSMLs reside on the shorelines of lakes, rivers, and oceans, areas with extensive colonial histories. [23,24,25,26]

Focusing on our own local FSML, we walk through the history of the land that Trout Lake Station occupies, Trout Lake Station itself, and the inception of our Phenological Initiatives for Indigenous Peoples in Limnology project (PhIN). Our goal is to critically evaluate the structure, growth, and limitations of the PhIN program with the goal of improving the experience and sharing a scaffold for others who may be considering implementing similar programming.

Makadeike: The Shores of Trout Lake

Trout Lake has a long history with varying tribal nations, most recently with the Lac du Flambeau Band of Lake Superior Chippewa Indians, their Ojibwe name being Waaswaaganing. The Lac du Flambeau Band is an Indigenous nation with an extensive and multifaceted history within the region that is currently called northern Wisconsin. As our origin story goes, the Ojibwe were originally based on the East Coast of what is currently termed the United States and took heed from a prophecy to move to where "the food grows on the water."[27] Our ancestors migrated to the regions surrounding the Great Lakes, where *manoomin* (wild rice, *Zizania palustris*) was plentifully growing on the water. As colonization progressed in the region, the United States government forced a myriad of changes on the Ojibwe. One such act was the forced ceding of territory and the establishment of reservations containing the populations of multiple Ojibwe villages.[28]

Known as the Treaties of 1836, 1837, 1842, and 1854, these signed treaties between the United States and the Ojibwe bands in the Great Lakes region forced the cession of Ojibwe lands to the United States government. The land forcibly ceded, commonly referred to as the "Ceded Territory," covers northern regions in Minnesota, Wisconsin, and Michigan. The Treaty of 1837 included the claiming of 1,062,234 acres of Ojibwe land that was eventually distributed to thirty-three agricultural colleges during the National Morrill Act of 1862, providing millions of dollars in capital upon which universities grew, including the University of Wisconsin.[29,30] The Ojibwe tribes retained their inherent right to hunt, fish, and gather, albeit highly regulated compared to nontribal harvesting, on these nonreservation lands. There was and still is a long, fierce battle to practice these rights, involving protests, strict regulations, and court cases.[31,32,33,34] These practices are arguably the primary way the tribes maintain consistent relationships broadly in the territory. The Lac du Flambeau Indian Reservation, Trout Lake, and Trout Lake Station are all within the Ceded Territory.

The Lac du Flambeau tribe currently has a checkerboard reservation in the Ceded Territory. It's important we emphasize that the Lac du Flambeau Reservation and the area *beyond* the reservation, all the way to the Great Lakes, are both important to the Lac du Flambeau tribe. As Anishinaabe scholar Kyle Whyte points out, "Consider how strictly bounded reservations erase the larger territories that are significant to Indigenous peoples."[35] The Lac du Flambeau Reservation covers an area of about fourteen by fourteen miles, containing about 260 freshwater lakes within its boundaries. Here, the Lac du Flambeau tribe regulates, often differently from other nontribal entities, its land and waters through tribal law.[36,37] In addition, it operates its own tribal natural resources department, with extensive programs focusing on fish husbandry, *manoomin*, water quality, invasive aquatic species, and conservation law enforcement.[38,39] The south shore of Trout Lake is a seven-mile drive from the eastern side of the reservation's boundary, where Trout Lake Station sits. The Lac du Flambeau Band is composed of the different tribal villages in the region that were grouped together during the establishment of the reservation. What is colloquially called the *Trout Lake Village* is one such tribal village that became part of the Lac du Flambeau Band and was one of the earliest established seasonal camps (and last

villages) to be forcibly removed from the southern shores of Trout Lake, or what was referred to Makadeike or Ma-tak-e-ge-ihik.[40] Though Trout Lake is not currently within the Lac du Flambeau tribe's reservation boundaries, recent discussions among the Lac du Flambeau community and leadership revolve around recently digitized Bureau of Indian Affairs microfilms regarding an 1842 Lac du Flambeau Reservation that was much larger and included Trout Lake[41] (see fig. 1). The connection between Trout Lake and the Ojibwe was strong, but settler colonialism violently disrupted this ecosocial relationship through forced removal and land appropriation. For more than a century, tribal citizens have been mostly isolated from this body of water, and as the living memory of individuals who remember Trout Lake as an Ojibwe home blurs or passes with them, a "slow violence" has taken hold.[42]

Water has long been, and still is, the reason that groups survive, connect, and fight over these lands within the Great Lakes region. Not only has water provided wild rice, fish, and furs, it supports forests rich in game and forage to support humans in all seasons. Waterways have been used extensively for navigation. The Ojibwe used extensive canoe and portage routes that extended from Lake Superior through Trout Lake and to both the Chippewa and Wisconsin River systems, giving access to thousands of lakes through the areas.[43] The different Ojibwe villages that now make up the Lac du Flambeau Band were spread throughout a large region that extended from Lake Superior through both Chippewa and Wisconsin River watersheds. One of the largest Ojibwe communities established itself along the shores of Flambeau Lake at the source of the Bear River, which is still the center of the Lac du Flambeau tribe. This location was a prominent center for trade, and the canoe routes that served the Ojibwe for many generations became trade routes for the fur trade, eventually becoming extraction routes for the logging industry.[44] The rivers were dammed and the lakes modified to sluice cut trees from northern forests to southern mills on both the Chippewa and Wisconsin Rivers.

While the Ojibwe did participate in fur trade with other tribes and settlers along established canoe routes, early settler colonization of the region is strongly tied with extractive logging from which the damage remains evident on the shores of Trout Lake. From 1888 to 1906, tree cutting, waterway modification, land acquisition, and railway construction proceeded rapidly. White pines nearest to lakes in an area expanding out to within ten miles of waterways were the first to be cut. Trees were towed into lakes during summer, fall, and winter and aggregated to be flooded down rivers and streams in the spring and late summer when water levels were high. Dams were built along the Ojibwe canoe and portage routes to raise and lower reservoirs where cut trees would accumulate; rushing water would be released to sluice logs down the river at high speeds, carrying fish and plants, scouring river bottoms, and eroding shorelines. Rest Lake Dam on the Manitowish River was a major regional dam that went through multiple iterative builds, ranging in height from eight to sixteen feet during the logging period. Upstream, the dam slowed flow; accumulated waters reaching all the way to the Trout River allowed the transport for harvested white pine from Trout Lake's shorelines through the Chippewa River to the Mississippi River. During this early logging, Rest Lake Dam was used to raise the water level as much as sixteen feet, accumulating up to

1.8 billion cubic feet of water from 211 square miles of drainage, which, upon release, could sustain flow rates of as much as 932 cubic feet per second for ninety days.[45,46]

The potential harm of a proposed Rest Lake Dam on *manoomin* beds was recognized by the Lac du Flambeau tribe as early as 1878, and their objections were noted by the Army Corps surveyors before construction began in the 1880s. "The area to be flooded consists, aside from the lake systems, mainly of extensive meadows covered with excellent grass. There would also be drowned out some large fields of wild rice, from which the Indians on the Flambeau reservation derive at present a main item of subsistence. These Indians expressed great discontent at the possibility of any part of their domain being flooded, even showing a strong disposition to interfere with the progress of the survey."[47] By 1906, many of the nearshore white pines along most accessible lakes, including Trout Lake, had been cut and moved downstream; railways were being expanded into the region, allowing red pine and hardwood tree extraction from upland forests. Railways not only shipped trees from the north southward but also allowed more people to reach the remote waters and forests of the ceded territories. The Trout Lake Depot on the eastern side of Trout Lake was a hub of activity for the region and intersected routes north and south with access to the Milwaukee main line. As more people arrived, homesteading began, and Ojibwe access to Trout Lake, including their seasonal camp on the south shore, was lost.

Since the start of colonization and Ojibwe dispossession from lake shores and islands, Trout Lake has gone through major changes. According to Wisconsin state law, Trout Lake and other navigable waters in the state are legally held in trust by the State of Wisconsin.[48] Trout Lake shoreline and islands fall under both state and private ownership. The state lands are managed by the Northern Highland–American Legion State Forest unit within the Wisconsin Department of Natural Resources, with a small amount by the University of Wisconsin, Madison's Board of Regents.[49] The types of shoreline modifications include personal homes, businesses, public boat landings and trails, campsites, and a field station. In 1966, the Franciscan Sisters of Perpetual Adoration purchased a piece of shoreline property on southern Trout Lake, which they used over the years as a headquarters and, more recently, a spirituality center. Late in 2025, the same Catholic institution transferred this section of Trout Lake property to the Lac du Flambeau tribe for the original price the Sisters paid of $30,000, in what is referred to as the first known transfer of land from a Catholic order of sisters to a tribe.[50]

Trout Lake is one of the largest and deepest lakes in the area, larger than any lake on the Lac du Flambeau Reservation. It provides an important home for the cool water *adikameg* (lake whitefish, *Coregonus clupeaformis*) and *namegos* (lake trout, *Salvelinus namaycush*), the latter actually being a unique genetic strain of trout, a species normally found in the Great Lakes but a rarity in inland lakes.[51] Trout Lake also contains an endemic strain of lake mysis shrimp, found only in the Great Lakes and two other inland lakes in Wisconsin.[52] Unfortunately, Trout Lake is now also populated with nonlocal species including the spiny water flea, a predatory zooplankton that is difficult for larval fish to consume and easily spread by boat, and the rusty crayfish, a species known to mow down local plant vegetation. In addition, the shoreline has been

extensively modified by private landowners. Trout Lake was also extensively logged from the 1820s to the 1920s, causing a myriad of known and unknown changes to the ecosystem.

From 1917 to 1924, as logging throughout the region declined and old growth forests were no longer prominent on the shores of Trout Lake, researchers at the University of Wisconsin, Madison, built the field of limnology based around knowledge collected from more than 500 lakes sampled throughout the ceded territories, likely accessing waters following Ojibwe paddle and portage routes. UW Madison's north woods research was first headquartered in an old schoolhouse and garage at the Wisconsin State forestry headquarters on the north shore of the southern Trout Lake basin.[53] As the program expanded, six small buildings were constructed to house researchers and laboratory spaces. In the 1960s these were relocated across the south basin of Trout Lake during the winter, establishing a seventy-seven-acre parcel that UW Madison purchased from the Chippewa Lumber and Boom Company, where they are still in use along with a current laboratory, conference room, and additional housing facilities.[54]

As Trout Lake Station celebrates its 100-year anniversary, members of UW Madison's Center for Limnology and station staff members and alumni are engaged in reflection, envisioning its responsibilities and commitments for the *next* 100 years. We can read about positive points on what drove UW Madison academics to colonize the area for research, how many scientific research articles came from the station, and how instrumental the studies were for the field of limnology, for the development of courses teaching generations of students, and for the amount of community outreach done over the years.[55] With these reflections comes the sobering reality of how institutions, though successful to the majority, still perpetuate harms. We talk about this ignored history of Trout Lake and of UW Trout Lake Station not to shame or cause guilt but to unsettle the assumptions that the Indigenous lands that field stations and marine laboratories (FSMLs) occupy are untouched, ahistorical, and pristine locations to be studied, placed in a jar, and preserved for settler consumption. In the past decade, Trout Lake Station has become more involved with interdisciplinary academic work, and is making efforts to involve those reduced to minority status in STEM and local Indigenous groups, such as the Lac du Flambeau tribe.[56] Through one of these interdisciplinary works, the Zaaga'iganan Kinship Project (described in more detail later in the article and with his permission), we are fortunate to include remembered histories of the station from John J. Magnuson, professor emeritus at UW Madison and founding director for the Center for Limnology and the Trout Lake and Lake Mendota labs (currently the Hasler Laboratory) throughout different sections of the paper.

Makadeike Ogaawag (Trout Lake Walleye)

Even with all the changes in the ecological system and extensive settler government regulations, the Lac du Flambeau tribe's relationship to *ogaa* (walleye, *Sander vitreus*) in Trout Lake is one of the strongest and ongoing. Walleye are an integral part of

Ojibwe livelihoods as one of the key species of fish harvested in the spring season when the lake ice melts. Walleye are spring-spawning fish that normally keep to the deeper parts of the lake during the day and come closer to the shoreline to feed at night. Because of their nocturnal nature, they have eye lenses that reflect light at night, and when they are spawning in the spring, they frequent the near shore habitats.

The Ojibwe in the region have long used this seasonal event to harvest walleye in one of the toughest times of the year to access food. Ojibwe would canoe at night in the spring and use torchlight to see the light-reflective eye lens of the walleye and spear them. This technique of spearing by torchlight is where Waaswaaganing (Ojibwe—locative of "a torch") and Lac du Flambeau (French for "lake of flame") derive their names. The Lac du Flambeau tribe is still recognized as leaders in the practice, one of the most prominent harvesting techniques they still use today.

Before the 1980s, walleye harvesting, by force, was practiced only within reservation boundaries, greatly threatening what Kyle Whyte refers to as redundancy, both in lakes legally accessible for harvesting walleye and those individuals with continuous knowledge of these waters.[57] In 1974, two Lac Courte Oreille Ojibwe citizens and brothers ambitious enough to practice their inherent harvesting rights off-reservation in the ceded territories intentionally spear-fished outside the reservation to create a test case.[58] What followed was a series of federal court cases, multiple decisions by different judges, and ruling implementations that have led to off-reservation regulations that exist today.[59] During this period of federal court judgments, the Ojibwe in the ceded territories began repracticing their off-reservation harvesting techniques such as walleye spring spearing. Ojibwe harvesters at multiple lakes were met with large protests and threats at boat landings.[60,61] Lac du Flambeau tribal citizens experienced one of the biggest and most memorable clashes between protestors and harvesters at the southern boat landing at Trout Lake.[62] These events are still in the living memory of Lac du Flambeau tribal members, evoked whenever Trout Lake is mentioned. Some individuals who worked at UW Madison's Center for Limnology during this time remember them, too. Former Trout Lake Station director John Magnuson recalls the following: "A number of our graduate students signed up to be witnesses at Native American Indian spearing events. And the thoughts were that [they] needed to have any documentation of any violence or [unpleasantness], and there was a lot of unpleasantries." Later, "some of our students felt very strongly about this. . . . I don't know if they had any formal interactions, maybe some of them worked on lakes that were on the Flambeau reservation." Magnuson later described to the authors that limnology center students worked on other off-reservation lakes that were and still are relevant for spearing, such as Trout Lake and Sparkling Lake: "[The students] obviously, biopolitically, were on the tribe's side and they felt it was important. And we [at the center] didn't ask them to do that, but some of our PhD students would spend a good part of that season taking notes and documenting what happened at the spearing sites they observed." These types of violent events at boat landings and ongoing harassment on surrounding lakes (including an armed attack in 2020[63]) are rarely taught about, discussed, or written about by UW Madison and Trout Lake Station researchers, even

when research is directly tied to fish communities and tribal and nontribal harvesting within the region's waters.

Since being allowed to return to Trout Lake to harvest fish, the Lac du Flambeau Ojibwe's reconnection to the lake remains strong. Given its size, the amount of walleye and muskellunge that can be harvested via treaty rights is higher than most lakes in the area, which means dozens of harvesters can receive permits to harvest the lake when walleye are spawning. Trout Lake walleye also offer a memorable experience for young harvesters. The size of the lake walleye are extraordinary compared to most lakes, and harvesters catching flashes of the rare lake whitefish while spearing provides the sense of wonder needed to keep Ojibwe citizens coming back and wanting to know more about the lake wildlife.

A Fertile Ground

The ground was cultivated before the seeds of the Phenological Initiatives for Indigenous Peoples in Limnology project (PhIN) were planted, both locally at Trout Lake Station and within the broader scientific community, as institutions and funding agencies have increased their attention and efforts to integrate Indigenous peoples and perspectives. Before 2025, at the national scale, federal and state funding agencies had begun to implicitly call for tribal engagement, had initiated specific funding calls for tribally led or cosponsored projects, and had implemented requirements for proof of tribal approval and partnership when applying for funding.[64,65] As such, the ceded territories were seeing a mounting increase in research on *manoomin*, walleye populations, and toxins like PFAS, microplastics, and mercury in harvested foods.

Trout Lake Station has interacted with the Lac du Flambeau tribe throughout its history, recently through tribal Department of Natural Resources employees and K–8 elementary school programming, but there were attempts in the past by the Center for Limnology. Magnuson spoke of his past interactions with the Lac du Flambeau Band: "[S]omewhere in the '70s, early '80s, maybe into the early '90s, we started doing some things with the tribes. Some of our people wanted to use tribal lakes for their studies and some of them were major parts of our research. . . . We'd go to tribal Council and request permission to use them. Somewhere along in here . . . I think Jim [Kitchell] and I both thought that it was important that we begin to have graduate students from the tribe. . . . I started interacting with [UW Madison chancellor Donna] Shalala and the tribe with the idea of . . . a closer connection between the Madison campus (not so much the center or the Trout Lake Station) and the tribes. And I thought some of those interactions, in some respects, we failed. . . . We had a meeting with the [Lac du Flambeau tribal] Council and the assistant to [the tribal president] at that time . . . and we made a pitch to the tribes that we should increase the interactions of students between Lac du Flambeau and Madison. We weren't necessarily thinking Trout Lake, and I thought that was really a fun meeting. The thing that I remember the most of the meeting is [the assistant to the tribal president] said, 'Well, instead of us sending our students down to Madison campus, why don't you have your students spend more

time with us?' And so, we didn't accomplish anything. But our eyes were tuned toward each other, we knew about each other."

Considerably later from the events described above, Magnuson tells us that the Center for Limnology did finally recruit a Lac du Flambeau tribal member to their graduate program, Tom Hrabik. Hrabik did his PhD work on lakes around Trout Lake, and Magnuson points out that he became the center's first graduate student from the tribe. Trout Lake Station began formally collaborating on two projects in 2020, one studying habitat risk for *manoomin* and another supporting undergraduate student art interns in the Drawing Water program. These programs were established with members of the Lac du Flambeau Department of Natural Resources and went through the tribal council for a letter of support prior to applying for funding from the Wisconsin Department of Natural Resources and the UW Baldwin Wisconsin Idea Endowment, respectively.

The North Temperate Lakes Long-Term Ecological Research project (NTL-LTER) has also played a foundational role in investing in partnerships and PhIN programming. This project is one of the oldest running research sites funded by the National Science Foundation, with a primary research location being housed at Trout Lake Station. Starting in 1982, the grant has continually sampled seven lakes in the region through all seasons, generating one of the largest publicly available lake and winter limnology data sets in the world. NTL-LTER also provides numerous research experience opportunities for undergraduate student training, granting flexibility to innovate programming through supplemental funding that leverages its substantial community infrastructure. It was through NTL-LTER funding that the initial research of author Raymond Allen and the pilot PhIN workshops were supported. NTL-LTER still periodically provides support for the PhIN project, and because of the longer-term funding cycle of this grant, it has allowed the time and flexibility needed to build the program from the ground up, with the needs of tribal communities being a focal point from the start. The Drawing Water program, also originally established through a NTL-LTER supplement, has been maintained for more than fifteen years and historically brought in resident artists to communicate on the research and the lakes in the area.[66] Thanks to funding through the Baldwin Wisconsin Idea Endowment, the Drawing Water program expanded collaborations in 2021 with the Lac du Flambeau Department of Natural Resources to build a student artist mentorship program. Anishinaabe in the region have a long history of beadwork, basket-making, weaving, and other forms of place-based media production, and just as long a history of being scientists observing short- and long-term changes in the ecosystem and improving and adjusting practices to care for and harvest from the land.

With the groundwork laid, we live in a time when Indigenous voices are gaining more recognition at regional, national, and global scales. Grants to initiatives that claim Indigenous priorities and partnership are being awarded, but how many of these projects are truly tribally led or guided? How much of the work is prioritizing the employment and education of Ojibwe people to lead current and future inquiry? Who is leading conversations within tribal communities to resist extractive and assimilating practices? Under the leadership of author Allen and supported by Lac du Flambeau

Natural Resource program staff members and the Trout Lake Station director, PhIN was established to engage career folks of all ages to network, discuss, and critique these types of questions in a community setting where the majority of participants are Indigenous. Ultimately, the success of the program is a network of people who continue connecting and supporting each other as they navigate college, outreach, management, tribal governments, and community engagement surrounding environmental, data sovereignty, education, and scientific topics.

SINGing about PhIN

PhIN was inspired by author Allen's participation as a graduate student in the 2019 Summer Internship for Indigenous Peoples in Genomics (SING) program, now SING USA, hosted at the University of Illinois, Urbana Champaign, and his subsequent participation in 2023 as a speaker on waterways, fisheries, and "metabarcoding" at the IndigiData workshop. Week-long SING workshops focus on topics related to genetics and genomics research on Indigenous groups, and the program organizers at the time blended discussions, presentations, and demonstrations to the Indigenous participants coming from an interdisciplinary background.[67] Allen recalls it being one of the first times they were surrounded by a community of Native American scientists and Native people interested in science. The broader consortium of SING, which expanded to SING Canada, SING Australia, SING Aotearoa, SING Mexico, and others on the way, has branched off in different directions based on local interests, but is essential to envisioning Indigenous participants for PhIN.

IndigiData was built as an expansion on SING USA as an initiative focused on Indigenous data led by Indigenous researchers. In 2023, IndigiData hosted two workshops: one focused on metabarcoding and qPCR (a lab technique that amplifies and measures a specific DNA sequence in real-time during the reaction), mentioned above; the other focused on gene-editing and -modification taking place in Minnesota.[68] Similar to the SING program, IndigiData has influenced the topics and network of the PhIN project, and we emphasize the work that has taken place by Indigenous researchers that has allowed the PhIN program to grow. This acknowledgement of the SING and IndigiData programs also serves as a great preview on the synergy of *cousin programming*, discussed below.

PhIN sprouted from these programs and took root within the fertile ground at Trout Lake Station to focus on placed-based seasonal changes in the interactions with freshwater lakes and rivers. Major priorities we originally proposed were that the project incorporates seasonality and continual long-term observation, local tribal citizen involvement, community-building within the program, and an interdisciplinary component with a special emphasis on American Indian, Native American, and Indigenous studies and Indigenous science and technology studies.

The Roots: Workshop Structures and Topics

Multiple Indigenous writers and community members continue to poke at and critique the layout, timing, and expectations of academic institutions and their calendars,

especially in the United States.[69,70,71,72,73,74] It's during nonsummer months that key community and environmental events take place. Spring spearing for the Ojibwe usually takes place around March and April, and other important seasonal events that occur during the academic year in the region include fish netting, deer hunting, *manoomin* harvesting, birch bark harvesting, sugarbush (sap collecting), and many others. If academic institutions and tribal communities expect their tribal members to stay connected and continue cultural practices throughout their time in school, why don't we build in programming and flexibility to incentivize Indigenous folks to participate and not force decoupling of these learning modes while away at university? Similarly, how do Indigenous folks outside of academia approach the university system for answers, research, and assistance when staff members and students are constrained by the academic school year, expected to take extra time, weekends, or both to participate in activities essential to working together on seasonal environmental priorities?

In designing the pilot PhIN workshops in the area, we wanted to prioritize nonsummer seasons and the important cycles that summer initiatives miss. Namely, we developed our initiatives to focus on the fall, winter, and spring seasons. To emphasize how much the environment changes in the area, our initiatives are always in two parts, where participants can take part in events happening in two different seasons. We stress the importance of year-round land management, pushing against the prominent assumption that nothing is happening in the "off-season" for the neighboring organisms. During these off-seasons, Trout Lake Station and potentially many other field stations and marine laboratories (FSMLs) have decreased usage, making it easier to plan around seasonal events and provide housing for Indigenous folks who must travel or local community members who want to be fully immersed in the workshop experience. Along with housing, FSMLs often provide access to necessary field and lab equipment to demonstrate research techniques or allow the participants to gather data or organisms themselves. Trout Lake Station provides access to multiple boats and vehicles that can allow a small- or medium-sized group to safely access the water or ice, employing support staff to assist with driving, registration, licenses, and training. Access to appropriate field gear and safety training in a supportive environment is essential to removing barriers to participation in outdoor, all-season exploration. FSMLs are engaged in national discussions to address inequities in fieldwork settings stemming from those participants who have prior experience and proper gear. Due to the dispossession of land, economic disparities, and disincentives to hunt, fish, and gather throughout the United Staes, the intergenerational Indigenous knowledge and access required to get on a boat and fish or paddle a rice bed can no longer be assumed. Therefore, the access to a range of sizes of life jackets, boats, winter survival suits, warm waterproof boots, waders, and rain gear during these workshops help to ensure everyone has the opportunity to participate in outdoor activities.

Though much smaller than main campuses, FSMLs are contributors to systemic problems from colonialism, problems that are blatant and subtle, as scholar Leanne Simpson indicates: "Colonialism tries very hard to keep me off my land. It tries very hard to ensure I cannot speak my language, think as my ancestors did, find comfort in Elders or the river or the lake of rice."[75] Trout Lake Station and other FSMLs don't

actively exclude Indigenous peoples from these lands, but they still exist as private property as defined by settler governments and operate as additional barriers for Indigenous individuals or groups to visit, usually temporarily, and with named and unnamed limitations on what practices may be performed. As an example of the latter on a main university campus, two Cornell University students skinned, cleaned, and stored a legally hunted bear in a residence hall kitchen, prompting extensive media coverage, with some calls for repercussions for the students.[76] Though not named as Indigenous, these students experienced backlash from a local land-based practice performed in an academic setting. In addition, FSMLs often operate as getaways and home bases for recreation and research. As scholar J. M. Bacon points out, the work of John Muir, a well-known figure in the *preservation* movement, called for the preservation of *wild* places and "encouraged members of settler society to venture out into places they had not previously gone, further displacing Native peoples."[77]

Trout Lake Station and other FSMLs have begun the work of educating others on the history of Indigenous peoples whose homes they occupy through initiatives such as land acknowledgements or trainings. However, as the Yellowhead Institute plainly states, "Authorities often rely on land acknowledgments, cultural safety training, or project-based initiatives while avoiding commitments that transfer power or resources to Indigenous peoples."[78] Over the decades, these sites have also been extensively renamed without feedback or direct input from Indigenous peoples.[79] Simultaneously, as discoveries were and are made with changing technologies on these lands, Indigenous peoples are excluded from the body that names, describes, and updates their nonhuman relationships to the land.

To begin addressing some of these systemic problems—including local and rural communities' disconnection and lack of resource allocation from university systems, especially for tribal nations—we have made a concerted effort to prioritize local land and topics, building the workshop schedule around the needs of local tribal community members. As an initiative spearheaded by a tribal citizen who grew up in the area and interned at multiple tribal departments, we were able to propose topics and layouts in collaboration with the Lac du Flambeau Department of Natural Resources through approval of the Lac du Flambeau Tribal Council.

Pilot Workshops: What Is a Lake?

Our pilot series of PhIN workshops took place in winter (January) and spring (March) 2023 and focused broadly on the topic of lakes. We hosted a total of four workshop attendees in the winter workshop fully at Trout Lake Station, including local tribal employees and UW Madison undergraduates. We invited speakers from the UW Madison system, Lac du Flambeau Band, and the Great Lakes Intertribal Council (comprising the Great Lakes Native American Research Centers for Health and the Great Lakes Intertribal Epidemiology Center). Due to a combination of limited pilot funding, and at the request of tribal partners, we arranged for the workshop to take place Friday through Sunday.

The sister workshop for the "What is a lake?" topic occurred a few months later in March when the ice was off the lakes. This session took place at the Lac du Flambeau Department of Natural Resources, within the reservation boundaries. Some workshop attendees returned for this event; others couldn't make the second workshop due to other commitments, so we extended invitations to Indigenous folk with developing relationships to Trout Lake Station staff and to other programs. Though the participant list changed, there was enough continuity in attendees to advance fruitful discussions and relationship-building regarding lakes.

While preplanning these initial workshops, we talked to Lac du Flambeau community members on ways to incentivize participation from community members and other local Indigenous folk. If we want local community member participation, we need the funds to offer them honoraria that would cover a day's pay at their full-time job or some other way to make it worth their time spending their weekends at the workshop. For our initial programming, we offered participants a $100-per-day honorarium for full participation in the workshop. For individuals who were limited in what they could receive due to their full-time job, we offered them small gifts (e.g., birch bark baskets) for their participation.

Mutual Growth: Workshops, Camps, and Internships?

For our second round of workshops, we built off our network and connections to the Summer Internship for Indigenous Peoples in Genomics program and IndigiData, focusing on a topic that wasn't directly posed by community leadership but has been a developing discussion among Indigenous scientists and various tribes in Indian Country: DNA and data. There has been some work involving DNA sequencing of aquatic species within the ceded territories and species of interest to the tribes, the most infamous being the attempts to sequence and modify the genetics of wild rice.[80] However, the direct relevance and—what is more important—specific requests and permissions for DNA sequencing of nonhuman species from the Lac du Flambeau is still developing. This has not stopped other nontribal groups from "pioneering" this work, sequencing and working on the genetics of tribally relevant species in the area, including walleye.

Our 2024 workshops on DNA and data took place at Trout Lake Station in winter (February) 2024 and fall (October) 2024. We followed a similar format of weekend programming with small five-person cohort sizes. In between these workshops, PhIN alumna Sagen Quale proposed and led a culture camp on wild rice harvesting and processing, coorganized with PhIN at Trout Lake Station. Culture camps in this area are events organized around a seasonal and culturally relevant activity, usually with a focus on certain demographics such as local tribal youth. This was the first *manoomin* wild rice camp to take place at Trout Lake Station.

Quale is one of the program alumni who stayed in touch with Trout Lake Station through summer limited-term employment (LTE) positions, with research focused on *manoomin*. She is a master's student in UW Madison's agroecology program, continuing her work with wild rice. She has returned to the PhIN workshop as

a speaker, organizing the Makadeike Manoomin Gabeshiwin (Trout Lake Wild Rice Camp) in fall (September) 2024. Activities of the *gabeshiwin* included wild rice knocker carving, *manoomin* harvesting in canoes, rice parching and thrashing, stories from local harvesters, and food preparation with Wiisinig LLC. The sixty registered attendees included most of the PhIN alumni, grad students from the UW Madison agroecology program, community members from Quale's tribe, and many other tribal individuals from surrounding Ojibwe bands and other regional tribal communities.

As our workshops have progressed to include new cohort participants, speakers, and demonstrators outside of the UW Madison system and more cultural activities such as the *manoomin* culture camp, we have kept the timing of weekend programming and small cohorts. In 2024, the project was awarded an internal project grant from the Baldwin Wisconsin Idea Endowment, allowing us to expand our seasonal efforts even further. PhIN now has the capacity to host undergraduate interns during the academic year on the main campus and during the summer at Trout Lake Station. Our goal is to have interns that focus half of their time caretaking the PhIN network with data gathered during future workshops and camps, and another half of their time working on an independent research project related to lakes and rivers and local tribal natural resources priorities.

Caretaking the Blossoms of PhIN

As the PhIN project grows, we wanted to proactively nourish and protect it from the suffocating branches of settler colonialism. According to scholar Leanne Simpson, "Extraction and assimilation go together. Colonialism and capitalism are based on extracting and assimilating. My land is seen as a resource. My relatives in the plant and animal worlds are seen as resources. My culture and knowledge is a resource. My body is a resource and my children are a resource because they are the potential to grow, maintain, and uphold the extraction- assimilation system."[81] Thinking about this description of colonialism relying on consumption, we actively regulate the amount of information about the program that is for external consumption.[82] It is a project by and for Indigenous people, aimed to regenerate Indigenous practices and research. Even as we write this piece, we're prioritizing the spread of methods for other Indigenous researchers and community members, and it isn't written in the popular and extractive format of "this is how you work with Indigenous people." The following section weeds, prunes, and builds trellises for aspects of the project. As we've tried to support the building of Indigenous futures through PhIN, we have noticed and have been directly informed of common practices that don't work toward our goal or how certain processes bottleneck Indigenous peoples' growth. Not all of the following thoughts and practices have been fully flushed out, but we believe it's important we write about them, so we don't get lost in the forest as the project develops.

Preventing a Monoculture: Speakers and Demonstrator Rotation

Our priority is to make space for Indigenous individuals or groups to attend, speak, or demonstrate at PhIN, and to invite individuals into different roles in later workshops.

A prime example: we invite student participants back as speakers. We don't want to repeat common university hierarchies where an expert or teacher is seen as someone with a degree, or that a learner is a young person or someone who hasn't attended college. Often referred to as "up, down, and sideways" mentoring in Western culture, the concept of intergenerational and interpersonal mentoring in Indigenous communities is inherent and maintained in our program priorities.

When only one Indigenous community member is brought into a project, we believe this can lead to a monoculture or monopoly of community connection and a bottleneck of ideas, thoughts, and experiences of other community members. The same concept applies to university staff participation. Another way we make space to prevent social monocultures is to invite expertise from a broader group of community members and university instructors. For example, when planning for demonstrators, we may have someone who can demonstrate fish netting and wild rice harvesting, and instead of offering both seasonal opportunities to the one individual, we make a point to extend one of these invitations to another community member. Along with broadening the network, we want individuals to gain experience teaching and working with the project and its participants to experience or reexperience Trout Lake in an Indigenous context.

Our goals in this type of organizing are to acknowledge that interactions amongst individuals in this space vary across power structures and long-term familial, local, and intertribal community connections. We do not want a program that is an echo chamber of ideas and ways of thinking. We do not desire a space that oppresses and assimilates Indigenous youth into complicity. We do not want to tenure speakers and demonstrators or physical spaces that reproduce harmful ideas or bring with them a history that doesn't allow for critical thinking.

Kin-Forward Programming

We strive to create space for broad kinship connections. Academic conferences, department gatherings, and many other research community–focused events exclude nonacademic kin. The PhIN initiative prioritizes methods and event formatting that doesn't prevent broad kin participation, including a participant's family—spouse, children, siblings, cousins, grandparents. We've built into the workshop programming multiple breaks, encouraging social intervals as the schedule progresses. For rural field stations and marine laboratories (FSMLs) such as Trout Lake Station, the open space and distance from large groups of individuals gives plenty of opportunities for tranquil seclusion and land reconnection.

For those from a Western academic background, it may come across as "distracting" to bring nonacademic folks into campus settings—or that's what some have been conditioned to conclude. One of the workshop instructors, Matthew Anderson, commented on this point and put it succinctly: "I was really glad to see folks with children seeing this as a good space for them to be able to engage the program, without them having to . . . leave their existence as a family unit or their role as parents at the door." There have been multiple scholarly articles written about the history of Western

academic structure, and a core component is the idea that an academic topic, especially science, must be siloed: discussions of that topic must take place apart from other disciplines and the outside community for progress to take place. These ideas have deep roots in colonialism, white supremacy, xenophobia, and heteropatriarchy, and the PhIN project pushes back against such ideas.

Culture Camp as Scientific Practice

The title *culture camp* can be a misnomer, similar to the phrasing of "traditional" as critiqued by Kim TallBear.[83] Such phrasing can set expectations that the substance of these gatherings isn't scientific—that the methods used to harvest flora and fauna were not developed through continuous relationships with the land, without innovation and improvement over time. As we expand the PhIN project, the importance of culture camps sits side by side with our original workshops. What better way to study the land, gather data, learn from your community, and define community priorities than being in a space of active harvesting?

In our original support of a wild rice culture camp, we saw a continuous space of support for a range of adults to learn and teach about their history and work with *manoomin*. A part we believe to be integral to the camp's success was the continuous space allowed for the camp. Though it was only two days in length, the participants were able to spend those days building relationships with each other, ranging from the networking among scientists usually seen at research conferences or speaking engagements to the sharing of harvesting techniques, knowledge on *manoomin* disease, family stories on the plant, and everyone's personal interest in taking part. As one participant put it, "To be welcomed in an environment with a young woman [Sagen Quale] who was willing to share her knowledge and to give us this space to actually come, learn, and participate . . . that just gives you such a deep appreciation of the land, of the rice, of the people doing this work. How inclusive it felt for everyone, seeing the group of people that were invited and who was willing to put in the work into that day—that did give me a deeper appreciation for it."

The Lac du Flambeau tribe, through their Voigt Intertribal Task Force representatives, have hosted youth culture and harvesting camps within the reservation boundaries. The camps have been successful, but the thirst for adult learning in an era of Indigenous culture revitalization is palpable. We also have taken note of the disincentive for off-reservation harvesting in the ceded territories. Looking into the process for net harvesting in the surrounding area for one of the PhIN workshops, the Lac du Flambeau tribal staff expressed surprise: we were told it had been more than a decade since they had been questioned about it.

Food sovereignty was at the forefront of organizing and camp structure. Thanks to the work of the chef of Wiisinig LLC, attendees were able to learn and prepare hand-sourced and local food items, with *manoomin* being a priority in every hand-prepared meal. A component of food science was built into the camp because *manoomin* harvesting, rice drying, parching, and cleaning were vital parts of the experience—to create a food that would last in the tough winter season. Culture camps, especially

those focused on harvesting, will need to be an integral component in PhIN and future programming. If a critique of Western science is a research topic's relevance to the local community, local food is core to how we live, learn, adapt, and innovate.

Incentives and Gifts beyond Honorarium

Honoraria serves as the go-to method for thanking or compensating someone for their presentation, demonstration, or other form of service in university settings. A word masked by academic jargon, *honoraria* can be a deterrent for someone participating in a project as a word that has no meaning outside of the ivory tower. We have used the phrasing *stipend* or *payment* to get the point across, while the bureaucratic process involving online portals, the providing of personal demographic data, can also lead to folks not receiving payment for their work. Direct payments or checks can be seen as a clear-cut method for program organizers, but given the mixed responses in the community, we propose a mix of methods of compensating or gifting for someone's expertise and time.

Gift cards from local businesses, such as tribal marts or gas stations, and well-known entities serve as great alternatives for compensating or thanking someone for their time. In addition, we recommend the purchasing of Indigenous-made gifts for individuals who do not want monetary compensation or thanks, or for those who cannot receive it due to their current job positions or titles. We want to emphasize the dual importance of supporting Indigenous-owned businesses, especially artists. Along with benefiting local tribal communities through gift cards or purchases, we contribute directly on the directive to keep monies in tribal communities.

For Indigenous artists, this form of support can be tremendously important. Hand-crafted, Indigenous-made items such as beadwork, paintings, prints, or baskets can take extraordinary amounts of time to prepare and sometimes require intergenerational teachings and support. By purchasing these items as gifts for the project, we have been able support regenerating artistic practices (e.g., black ash basket weaving) and helped the small-Indigenous owned businesses in the area that need extra support throughout the seasons, not just during the summer, when tourism is at its peak. At the same time, we want to continue building the Indigenous artist connections to Trout Lake, such as in the Drawing Water program mentioned throughout the article.

Written Applications as Barriers to Community Participation

As organizers, we have noticed how our application process for PhIN can be an overwhelming barrier for applicants. To make the process easier for ourselves, we created online applications available via a website and QR code links that lead to a handful of demographic- and workshop-specific questions. Though easier for us to process and compare applications, we have learned that this is a major barrier for community participation.

Combining a process of written applications to the program, we have also utilized shoulder-tap and affiliate recommendation methods to recruit PhIN workshop applicants and attendees. As we progress in the program, we want to think in creative ways

to offer these opportunities to community members. Maybe we would reformat to allow audio or visual submissions to the questions we ask, or forms that allow program alumni, affiliates, and collaborators to recommend participants. If our goal is to have Indigenous individuals with interests in freshwater lakes and rivers participate in the program, we need to use methods that allow potential participants the opportunity to express this interest and invite them into these spaces.

Tendrils and Offshoots

Over the past 100 years, Trout Lake Station's full-time and visiting researchers have performed a wide variety of programming geared at varying aspects of research, science communication and outreach, and field development.[84] In the early days, most of the work consisted of building a Western research program and providing data and publications for the development of the field of limnology. In concert with the Hasler Laboratory and what would later become home for the Center for Limnology, Trout Lake Station and its affiliates also focused on traditional Western teaching and field instruction on nearby bodies of fresh water, many being in the ceded territories.

In recent years, a research method gaining popularity in STEM is community-based research and community-based participatory research. A minimalist definition is the idea that a *community* is involved in research. Depending on the people or institution doing the work, the definition of community and involvement varies. On one side of the spectrum, it can be research on a community of interest to a research group. On the other hand, it can be research by and for the interest of a self-defined community. In the context of Indigenous peoples, the type of community-based research being done on or within a community is broad, giving rise to criticism for how extractive it can be. We raise this point because the programs we reference fall within the spectrum of community-based research and programming that is community-approved and relevant.

What we refer to as "cousin programming" is an event or initiative that occurs in a given place and doesn't necessarily have a direct connection to other programming happening in the same venue or by the same people. By using the term "cousin" instead of "sister" programming, we're opening up its interpretation to an Ojibwe kinship model. Cousin relationships in Indian Country can be extremely close. Some cousin relationships feel more akin to a sibling relationship, or distant but still close enough to serve as the nucleus for a close relationship to develop. We take a close look at some of the programming that has taken place at Trout Lake Station in recent years, walking through how the PhIN project was able to develop and find support through cousin programs and research.

Research Studies on Aquatic Plants, Peoples, and Parasites

Raymond Allen is the first author on this paper and lead for the PhIN project. He has two major research projects in collaboration with the Lac du Flambeau Band. The first is a social science research project titled the Zaaga'iganan Kinship Project that investigates human relationships to lakes in the area that are of interest to the Lac du

Flambeau tribe and Trout Lake Station. Using semiformal recorded interviews focusing on individuals with short- or long-term relationships to lakes, the project aims to know more on human thoughts and actions regarding lakes to inform research, education, and policy. Hosted at Trout Lake Station and the Lac du Flambeau Department of Natural Resources, the project has provided much cross-pollination for work being done at Trout Lake Station and involving the Lac du Flambeau tribe.

During the summer of 2023, when the Zaaga'iganan Kinship Project was in full development and implementation, coauthor Quale was hired as an LTE worker for a research project focusing on *manoomin*, hosted at Trout Lake Station. After her participation in PhIN earlier that year and gaining familiarity with Trout Lake, Quale was interested in maintaining a connection to Trout Lake Station: "That [PhIN workshop] was my first introduction into limnology, and I was just, like, 'Wow, this is a really cool group, this is a really cool program. I definitely want to stay involved.'" Quale's involvement with the wild rice research project expanded beyond the natural science approaches due to her background and degree in sociology. Because of the PhIN connection and the exchange of ideas and interests at Trout Lake Station, Quale's interest led to an independent project developed alongside the Zaaga'iganan Kinship Project during the following fall season. Referred to as the Manoomin Kinship Subproject, Quale and Allen focused on human relationships to wild rice in the area.

During the summer of 2024, the North Temperate Lakes Long-Term Ecological Research project provided summer internship funding for the Zaaga'iganan Kinship project. The research group hired Gabi LeBlang, a PhIN and Drawing Water alumna, who took on multiple duties for the project. An individual involved with many of the Indigenous-focused programs at Trout Lake Station, LeBlang has been instrumental in providing input and feedback on projects and has been a huge advocate for the PhIN program. PhIN independently provides a select amount of programming, but it's because of these other cousin programs that Indigenous people like Quale or LeBlang can continue researching at Trout Lake beyond PhIN, offering to share their own mentorship and ideas to others in each of the programs in which they take part.

Lastly, we briefly touch on Allen's fish parasite project. In collaboration with the Lac du Flambeau tribal fish hatchery, this project aims to investigate parasite populations in a variety of area fish important to the Lac du Flambeau tribe, including walleye, muskellunge, and cisco. By using a combination of microscopy and DNA metabarcoding, the group collects and analyzes tissues from locally harvested fish donated by the harvesters. From this work, we have been able to recruit staff members from the Lac du Flambeau fish hatchery (under the supervision of the Lac du Flambeau Department of Natural Resources) to participate in PhIN, and have also been able to engage in colearning with PhIN alumni on techniques relevant to their work in the hatchery.

Summary

We emphasize the importance of overlap and interplay between cousin programs in a given space—an approach often seen as "distracting" or "irrelevant" by academics

trained in Western disciplines. Trout Lake Station is a relatively small space, but the breadth of research projects and outreach programs undertaken with the oversight of the Lac du Flambeau tribe and its citizens has allowed the cross-pollination of ideas and peoples. Simultaneously, these programs have allowed a wide range of Lac du Flambeau and other Ojibwe band members access to Trout Lake Station. In doing so, the PhIN program accomplished its goals and has given reciprocal support and critical Indigenous analysis to neighboring programs at Trout Lake Station.

Alumni Feedback

A perk of starting PhIN in a targeted and small-cohort manner is that we can take direct feedback from our project participants. Instead of opting for written surveys for feedback (and to stimulate in-person discussions), we developed a series of formal interview questions covering various aspects of the project. The UW Madison Institutional Review Board has provided an exemption for the interview-based feedback study. We interviewed a total of four alumni involved in the project. After asking them the series of questions, we transcribed the interviews and adjusted grammar to clear up statements and, with their permission, incorporated their feedback into this section and into other relevant sections of the paper. Feedback that stuck out most to us included comments on what the participants feel makes PhIN different from other Indigenous-focused programming, how the programming at an FSML can disrupt norms, and the current and future involvement of participants. We will walk through some of the thoughts and ideas of our various alumni.

What Makes PhIN Unique?

Matthew Anderson, a professor at (and alumnus of) UW Madison who is involved in SING USA and IndigiData organizing, summarized what makes the PhIN project stand out: "Very few programs seem to be based in place, and the idea of PhIN being a very place-based workshop that deals with local topics, local people, and local context was a really cool idea." As we discuss earlier in the paper, place-based learning and research is the focus of the PhIN project and a core component in FSML work. Anderson later commented, "PhIN has done a good job of engaging outside of, let's call it the classroom, outside of the lab setting for participants. The ability to go outside and do things that have direct application [to] what is being talked about for the weekend [is] where those conversations really meet reality. That is new and very different from most workshops."

Sagen Quale and Devon DeVerney both grew up in the area, and each talked about their unique experience with PhIN and other Indigenous-focused programs. Quale has been involved with PhIN since the first workshop, and she directly compares it to a recent experience she had a week before the interview. Quale states, "Since being a part of PhIN, I have been able to go to different things, like Indigenous research forums, that were amplifying what we had talked about at PhIN . . . then, most recently, [being] able to go to the United Nations' World Food Forum, where they had an 'Indigenous territory,' they called it—tents that were safe spaces, but also where

talks and panels went on. But I'd say the best thing about PhIN was actually being on the land with the things that we're talking about specifically." DeVerney, who is heavily involved in programming and harvesting in the area, compares it to local programs: "Yeah, it was really different because a lot of our Indigenous activities that we do focus a lot [on] the traditional aspect of it. I came into this thinking there was going to be some of that, too, and there was. But it also dives a lot deeper into the scientific aspect of what we really need a lot more of, [material that] a lot of our tribal members need to know, don't really know, and are pretty scared to even think about at a level that Ray [Allen] is doing right now. . . ."

Our fourth and final alumna who provided feedback was Janelle Cronin, who commented that she enjoyed PhIN because "we felt like we were the majority in the space, as well as knowledge-holders. There was this level of respect, regardless of job title, of experience. We were in a space where we felt like we were listened to, even if that meant we felt like we didn't have any knowledge. It was still just a space that felt like it was for us, which is something that we enjoyed because [we] don't get that sometimes. Sometimes you're invited into these places, and you realize you're the only Natives there. [But] because we felt we were in the majority, we could relax a little bit, we could have fun, we could share but we also felt that whatever we did share was respected and listened to." Cronin's feelings resonate with Allen's experience participating in SING and IndigiData, and one he desired to replicate for his respective field and local tribal community through PhIN.

Though Indigenous folks make up the majority of our project's participants, instructors, and organizers, it's not completely Indigenous. We have invited non-Indigenous speakers to address workshop-relevant topics, and this can be their first time being in an Indigenous-led and focused program, one that unsettles Western science ideologies. Anderson brings up a point in his interview: "I think the inclusion of academics who don't have an understanding of Indigenous engagement is something I have not seen at the same level in other workshops. It's been very eye-opening for me in some respects. It would be interesting for me to know how other participants have perceived that." We believe it is important that this topic is brought to the forefront. A goal of PhIN is not to educate or train non-Indigenous folks on Indigenous-centered topics and areas of research, but we run the risk of having (and have had) white supremacy culture and its characteristics disrupt learning.[85]

Compared to local and more distant Indigenous programs, PhIN has been able to differentiate itself, filling a niche in Indigenous STEM. We have striven to create a project that balances the idea of broad Indigenous relevance but is especially relevant to Indigenous folks in the area or to those researching adjacent topics. An example of the former: even though walleye are exclusively freshwater fish, the Indigenous relevance and history aligns with that of the marine and freshwater salmon and the "salmon wars" on the West Coast of the United States. We keep in mind Shawn Wilson's reading of science: "Positivism is the domain of traditional science, as can be seen in scientists' quests for universal laws and rules of nature."[86] Of science's tools, Wilson continues: "We have tried to adapt dominant system research tools by including our perspective into their views. We have tried to include our cultures, traditional

protocols and practices into the research process through adapting and adopting suitable methods. The problem with that is that we can never really remove the tools from their underlying beliefs. Since these beliefs are not always compatible with our own, we will always face problems in trying to adapt dominant-system tools to our use."[87] PhIN currently teaches about (and with) dominant-system science tools in limnology, with some of these physical tools bearing the names of the non-Indigenous researchers who pieced them together, and we work with researchers whose aims are for universality.

Reimagining and Reshaping FSMLs for Indigenous Needs?

We sometimes compare field stations and marine laboratories (FSMLs) to islands of colonialism, which is useful in thinking about their ability to mirror and serve the institutions of which they are offshoots. This relegates the regions surrounding the islands to emptiness, such as the open ocean or outer space. As we've described throughout the paper in reference to Trout Lake and Trout Lake Station, this land is anything but empty and ahistorical. Through another perspective, FSMLs are the atypical entity in the regions they occupy and are a minority compared to the communities that surround them, unlike college towns in which the population, economy, and government are greatly affected by college campuses. This also means that FSMLs can stay under the radar in local communities.

Trout Lake Station can be considered one of these hidden or unnoticed FSMLs. As Quale mentions in their interview, "For many of the years I grew up in [the area], I never even really knew that the Trout Lake research station existed. I knew of Trout Lake but that was about it. I've gone my whole. . . twenty-two years without knowing that this existed." Author Allen never heard about Trout Lake Station growing up in the area, and throughout college as well. Trout Lake Station has had open-to-the-public events over the decades, but direct contact with tribal communities on par with other partnerships has happened in more recent years. For the Center for Limnology, Magnuson recalls only three Native American graduate students being mentored in total. A perk to being this neutral or ambivalent entity to local (especially tribal) communities is that FSMLs can think outside the box for their programming and research, unsettling expectations for what research and teaching can look like. Cronin mentions the reactions they received from their community: "[My husband] would go home and tell people 'This is what we did," or someone would ask us, 'What did you do in Wisconsin?' or 'How did you get to that [wild] rice camp?'" These remote, nonurban areas aren't seen as locations for consistent higher, postsecondary learning for local communities. But with connections to university systems with large resource pools—and large dollar amounts derived from Indigenous lands—it's possible to rethink expectations.

DeVerney talks about their experience with remote learning in university course work, and mentions the lab demonstration Anderson put on for the participants: "I always did labs online . . . and it was like the first time I ever picked up a pipette. It was really cool, finally, just to be in a space where I got to use a pipette instead of an online thing." After the start of the COVID-19 pandemic, the ability and willingness to do

remote work skyrocketed. What does a happy medium look like when some folks flourish in purely virtual settings while some folks need hands-on learning, but don't want to or can't live full-time in a place far from home? Universities may not have the support network needed for Indigenous students and staff members, a notion touched on by Cronin: "A lot of us are coming from different states, different tribal communities, all to this one central location that doesn't really have a Native support system other than the Native Center. There's limited activities they can do, limited research opportunities. . . ." PhIN has been able to create these spaces and opportunities at an FSML, and as we develop future programming, we want to continue pushing to remix the work that is done at FSMLs.

What Is Wanted for PhIN Futures?

In our interview, we gave alumni the opportunity to comment on ways they would retool PhIN. One topic was to involve more and different groups of folks. Cronin, who's a graduate student at a midwestern university, mentions wanting to bring more Indigenous students from her school. Quale wanted more involvement from colleges and universities in Wisconsin: "Hopefully we could get more involvement with the tribal colleges and the Native students down here at UW Madison. [With] it being a research station primarily targeted at undergraduate students, I think [it would be good] having PhIN be an introduction to get more Native students actually working in these summer positions . . . exactly as it happened for myself." And DeVerney talks about how he'd recommend the workshop to "a lot of younger guys and youth because this is stuff that I wish I had learned five, ten years ago, and would [have helped] me tremendously on getting a grasp on teaching a lot of these things to students [that] I'm having right now . . . not only the youth but a lot of our older generations as well." We are finding this feedback helpful when we think about how we don't want to pigeonhole the program into inviting and accepting applicants from the same backgrounds and interests.

In terms of program structuring, we were provided a variety of ideas from our alumni. DeVerney says, "I think another thing I would add is . . . a time where the group . . . can formulate more ideas [for] different kinds of [future] workshops"—an important point if we want to continuously update the program. Cronin talks about longer workshops, "and I think if I could add anything, it seems like . . . sometimes it doesn't feel long enough. There's some moments at the end of those days where . . . I wish we had time to just talk a little bit more about whatever it was. I wish we had more time to discuss [it]." DeVerney and Cronin agree that dedicated times for reflection, debriefing, and future planning are needed.

For larger-scale changes, Quale desires a growth in the camp component of the PhIN project: "I think a great aspect that we could continue to build on . . . is doing more camps. Obviously, the PhIN workshops [are] a huge [part of it], but [adding] camp setting spaces that also follow more [of] the season. [Wild] rice camp was one, and [it's] a great start, but it would be so cool to . . . do something with fish or spearing." We've mentioned the Drawing Water program at Trout Lake Station, and

its presence inspired Cronin: "I love the art component. I would love that, if that was part of PhIN, too—like today we're going to make something. I felt that was very cool to have [that] incorporated."

Anderson, thinking farther into the future, discusses PhIN leadership: "I would be thinking about . . . how that structured leadership in PhIN makes sense for the program. At some point you'll have to deal with it. It may not be now, it may not be three, four, or five years even. It could be quite a while. And maybe it looks very different because of the local context compared to a larger breath. That is . . . a good topic to be very thoughtful [about] in moving forward. It will make it very easy for you to have responses to folks when people ask about the future and what that looks like."

Together, all these points are making us proactively think about what this program looks like within the next five to ten years. For every calendar year, we average two workshops for the program with two individuals leading the organizing. We wonder what it would take to integrate at least one culture camp a year, extending the workshop a few extra days, and how [others] can take the lead with ideas they're passionate about. It is also crucial to consider that, in an era when some of this work is often categorized as DEI (diversity, equity, and inclusion), federal funding for these opportunities is and may continue to be at risk. As we mentioned earlier, our work is built around supporting tribal nationhood and citizens, and taking this feedback directly from our participants is a priority.

Discussion and Future Planning

The PhIN project continues to flower and reclaim space because of the continuous watering from Trout Lake and its connections, the nurturing and pruning by people based in tribal communities, and also by the work of those willing to find and weed out colonial roots. The land that Trout Lake Station occupies is soil rich in indigenous history, and the Indigenous peoples who have walked on this soil also planted seeds for their community, not knowing when a season of settler colonial hardship would let up and end. One of these seeds is the PhIN project, an entity aimed at restoring Indigenous research and knowledge production on fresh water.

As PhIN continues to grow and find niches that support Indigenous research and sovereignty, it is our obligation to share our successes and pathways toward improvement so that other FSMLs that occupy Indigenous lands can also establish reconnections to or regenerate those Indigenous nations and communities. By making space for local Indigenous scientists to pursue research and programming that centers local tribal nations and interests, Trout Lake Station provided an environment that would allow PhIN to be developed and implemented. Simultaneously, Trout Lake Station had broadened its programming to allow linkages between PhIN and other initiatives that either brought in local Indigenous expertise or had a partnership that directly supported community members.

On the other side of this collaboration, the Lac du Flambeau tribal community had also been sowing the seeds for Indigenous youth to pursue their academic interests for decades, and teaching their citizens the importance of treaty rights, maintaining

cultural practices, and resilience in the face of colonial structures. Makadeike has been on the minds of Lac du Flambeau community members for decades as well, keeping alive the memories and harvesting practices related to the lake. It's because of all these paths intersecting that multiple, local Indigenous community members can survive and build group projects such as PhIN. For those reading this at or near an FSML, it may seem like a daunting task, but the land you are on is full of Indigenous seeds of reconnection that are waiting to germinate.

Funding Acknowledgements and Disclaimers

This material is based on work supported by the National Science Foundation Postdoctoral Research Fellowships in Biology program under Grant No. 2305847. The funders had no role in this project's development, design, and delivery. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the NSF.

Interview data from the Zaaga'iganan Kinship Project was identified and included in this research with direct quotes, with the consent from the study participant. Institutional Review Board approval for this research project was granted by the University of Wisconsin, Madison, Committee for Protection of Human Subjects (2022-1430). The Zaaga'iganan Kinship Project was supported in part by a community-based water research grant provided by Water@UW-Madison and UW Madison's Office of the Provost.

The PhIN project was supported in part by the Ira and Ineva Reilly Baldwin Wisconsin Idea Endowment and by the NSF through the North Temperate Lakes Long Term Ecological Research (NTL-LTER) program (#DEB-2025982).

Notes

1. Megan Raby, "The Colonial Origins of Tropical Field Stations," *American Scientist* 105, no. 4 (2017): 216, https://www.americanscientist.org/article/the-colonial-origins-of-tropical-field-stations.

2. Rebecca Nagle, "Pro Bono," interview with Chrissi Nimo, *This Land*, Crooked Media, September 13, 2021, https://crooked.com/podcast-series/this-land/, audio: Listen from 15:09 to 16:36 to hear Nagle and Nimmo discuss tribal citizenship compared to race.

3. Jessi L. Smith, Erin Cech, Anneke Metz, Meghan Huntoon, and Christina Moyer, "Giving Back or Giving Up: Native American Student Experiences in Science and Engineering," *Cultural Diversity and Ethnic Minority Psychology* 20, no. 3 (2014): 413–29, https://doi.org/10.1037/a0036945.

4. "Survey of Earned Doctorates (SED)," National Center for Science and Engineering Statistics, 2023, https://ncses.nsf.gov/surveys/earned-doctorates/2023.

5. Susan K. Flowers, Kari O'Connell, and Victoria M. McDermott, "Crafting Field Station and Marine Lab Communities for Undergraduate Diversity, Equity, and Inclusion," *Bulletin of the Ecological Society of America* 102, no. 4 (2021): e01908, https://doi.org/10.1002/bes2.1908.

6. Jerry R. Schubel, "Some Thoughts on Keeping Field Stations and Marine Labs Afloat in Turbulent Times," *Bioscience*, 65, no. 5 (2015): 458–9, https://doi.org/10.1093/biosci/biv034.

7. J. M. Bacon, "Settler Colonialism as Ecosocial Structure and the Production of Colonial Ecological Violence," *Environmental Sociology*, 5, no. 1 (2019): 61, https://doi.org/10.1080/23251042.2018.1474725.

8. Peter F. Brussard, "The Role of Field Stations in the Preservation of Biological Diversity," *Bioscience* 35, no. 5 (1982): 327–30, https://doi.org/10.2307/1308849.

9. Federica R. Colonna, "Stazione Zoologica Anton Dohrn, Naples, Italy," *Embryo Project Encyclopedia*, December 22, 2014, https://embryo.asu.edu/pages/stazione-zoologica-anton-dohrn-naples-italy.

10. E. Florey, "Highlights and Sidelights of Early Biology on Helgoland," *Helgoländer Meeresunters* 49 (1995): 77–101, https://hmr.biomedcentral.com/articles/10.1007/BF02368338.

11. William K. Michener et al., "Biological Field Stations: Research Legacies and Sites for Serendipity," *BioScience* 59, no. 4 (2009): 300–310, https://doi.org/10.1525/bio.2009.59.4.8.

12. Dani Nowosad, "SciQ: A New Approach to Ethical Research in the North," *Canadian Geographic*, February 15, 2023, https://canadiangeographic.ca/articles/sciq-a-new-approach-to-ethical-research-in-the-north.

13. Robin W. Kimmerer and Kyle A. Artelle, "Time to Support Indigenous Science," *Science* 383, no. 6680 (2024): 243, https://doi.org/10.1126/science.ado0684.

14. Katrina G. Claw et al., "A Framework for Enhancing Ethical Genomic Research with Indigenous Communities," *Nature Communications* 9 (2018): 2957, http://dx.doi.org/10.1038/s41467-018-05188-3.

15. Ibrahim Garba et al., "Indigenous Peoples and Research: Self-Determination in Research Governance," *Frontiers in Research Metrics and Analytics* 8 (2023): 1272318, https://doi.org/10.3389/frma.2023.1272318.

16. Kate Nelson, "Inside the Fight for Indigenous Data Sovereignty," *Atmos*, February 6, 2024, https://atmos.earth/inside-the-fight-for-indigenous-data-sovereignty.

17. Sandeep Ravindran, "Open with Care," *Science* 386, no. 6720 (2024), https://sandeepr.com/Clips/Science/Open%20with%20Care-science.adu0429.pdf.

18. Beth Baker, "The Way Forward for Biological Field Stations," *Bioscience* 65 (2015): 123–9, https://doi.org/10.1093/biosci/biu210.

19. Linda T. Smith, *Decolonizing Methodologies* (London: Zed Books, 2012).

20. Max Liboiron, "Decolonizing Geoscience Requires More than Equity and Inclusion," *Nature Geoscience* 14 (2021): 876–7, https://doi.org/10.1038/s41561-021-00861-7.

21. Eve Tuck and K. W. Yang, "Decolonization Is Not a Metaphor," *Decolonization: Indigeneity, Education, and Society* 1, no. 1 (2012): 1–40.

22. Max Liboiron, *Pollution Is Colonialism* (Duke University Press, 2021), 6–7.

23. Jean Dennison, "Beyond #LandBack: The Osage Nation's Strategic Relations," *American Indian Culture and Research Journal* 47, no. 2 (2024): 117–35, https://doi.org/10.17953/A3.6617.

24. Dina Gilio-Whitaker, "Rights of Nature and Community Rights," in *As Long as Grass Grows: The Indigenous Fight for Environmental Justice, from Colonization to Standing Rock* (Boston: Beacon Press, 2019).

25. Delaney Hall, "The Rights of Rice and Future of Nature," *99% Invisible*, June 21, 2022, https://99percentinvisible.org/episode/the-rights-of-rice-and-future-of-nature/.

26. Aileen Moreton-Robinson, "Bodies That Matter on the Beach," in *The White Possessive: Property, Power, and Indigenous Sovereignty* (Minneapolis: University of Minnesota Press, 2015), 33–46.

27. Edward Benton-Banai, "The Migration of the Anishinabe," in *The Mishomis Book: The Voice of the Ojibway* (Minneapolis: University of Minnesota Press, 2010), 94–102.

28. "Ceded Territory Boundary (Treaties of 1836, 1837, 1842 and 1854)," Great Lakes Indian Fish and Wildlife Commission, February 4, 2025, https://data.glifwc.org/ceded/.

29. Robert Lee and Tristan Ahtone, "Land-Grab Universities," *High Country News*, March 30, 2020, https://www.hcn.org/issues/52-4/indigenous-affairs-education-land-grab-universities/.

30. Elise Mahon, "Teaching Indigenous Land Dispossession in Wisconsin and Beyond," *University of Wisconsin–Madison News*, January 18, 2023, https://news.wisc.edu/teaching-indigenous-land-dispossession-in-wisconsin-and-beyond.

31. Great Lakes Indian Fish and Wildlife Commission, "Spearfishing Protests," February 15, 2012, 16:30, https://www.youtube.com/watch?v=kM_SQo7EC50&t=374s.

32. Great Lakes Indian Fish and Wildlife Commission, "Rise of the Walleye Warrior: Lac Courte Oreilles v. Voigt Decision," January 25, 2023, 7:45, https://www.youtube.com/watch?v=MlNx9_OF-Oc&t=1s.

33. Larry Nesper, *The Walleye War: The Struggle for Ojibwe Spearfishing and Treaty Rights* (Lincoln: University of Nebraska Press, 2002).

34. Melina Walling and John Locher, "Behind Upper Midwest Tribal Spearfishing Is a Long and Violent History of Denied Treaty Rights," *AP News*, July 9, 2024, https://apnews.com/article/spearfishing-ojibwe-history-supreme-court-legal-tribes-conservation-099af52b631c374a2ca7079ca00d18f3?fbclid=IwY2xjawINzOtleHRuA2FlbQIxMAABHcdKP4XTgsQPRB9zAjrB0zutujtwa8K7QrCh4OfXxZu8gFEez1qkhtt9Xw_aem_FZInmxsFIvRnhpsKe2d-oA.

35. Kyle Whyte, "Settler Colonialism, Ecology, and Environmental Injustice," *Environment and Society: Advances in Research* 9, (2018).

36. News Review Staff, "Anglers Encouraged to Fish Close to Home; Lac du Flambeau Tribe Closes Boat Landings," *Vilas County News-Review*, April 30, 2020, https://vcnewsreview.com/stories/anglers-encouraged-to-fish-close-to-home-lac-du-flambeau-tribe-closes-boat-landings,153927.

37. Katie Thoresen, "Vilas County Opens Most County Highways to ATV and UTV Riders," *WXPR*, April 7, 2025, https://www.wxpr.org/outdoors-leisure-and-sports/2025-04-07/vilas-county-opens-most-county-highways-to-atv-and-utv-riders.

38. Frank Vaisvilas, "Critics Contend Ojibwe Overfish Walleye. Thanks to Tribal Fish Hatcheries, It's Not Even Close," *Milwaukee Journal Sentinel*, December 11, 2024, https://www.jsonline.com/story/news/local/wisconsin/2024/12/11/wisconsin-tribes-raise-return-far-more-walleye-than-they-harvest/76772313007/.

39. Mike Moen, "Culture, Conservation Thrive as Great Lakes Tribes Bring Back Wild Rice," *WXPR*, October 14, 2024, https://www.wxpr.org/native-american-news/2024-10-14/culture-conservation-thrive-as-great-lakes-tribes-bring-back-wild-rice.

40. 1843 Census of Lake Superior Chippewa, *Letters Received Office of Indian Affairs*, 1, quoted in James Bokern, "The History and Primary Canoe Routes of the Six Chippewa Bands from the Lac du Flambeau District" (MS thesis, University of Wisconsin, Stevens Point, 1987), 78.

41. Leo Filipczak, "Lac du Flambeau Reservation: 1842 Boundaries," *Chequamegon History*, October 23, 2021, https://chequamegonhistory.com/2021/10/23/lac-du-flambeau-reservation-1842-boundaries/.

42. Bacon, "Settler Colonialism as Ecosocial Structure," 64.

43. Bokern, "History and Primary Canoe Routes."

44. Ibid.

45. Jim Bauer, "The Rest Lake Dam and the Manitowish Waters Chain of Lakes: 1888–1978" (Master's thesis, University of Wisconsin, Stevens Point, 1978), https://mwhistory.pastperfectonline.com/archive/8C9DF139-0096-4A05-B939-163699243880.

46. United States Army Corps of Engineers, *Annual Report of the Secretary of War for the Year 1880* (Washington: Government Printing Office, 1880), 1636, https://www.google.com/books/edition/Report_of_the_Chief_of_Engineers/9fkWAQAAIAAJ?hl=en&gbpv=0&kptab=overview.

47. Ibid.

48. "Waterway Regulations and the Public Trust Doctrine," Wisconsin Department of Natural Resources, November 5, 2024, https://dnr.wisconsin.gov/topic/Waterways/about_us/whyRegulate.html.

49. "Owner Listing Generator," Vilas County Land Information Department, February 4, 2025, https://experience.arcgis.com/experience/a0d866dbd53042aeae591aa83f0aa6d8/.

50. Robin Washington and Danielle Kaeding, "Franciscan Sisters Transfer Land to Lac du Flambeau Tribe in Bid to Repair Boarding School Legacy," *Wisconsin Public Radio*, November 3, 2025, https://www.wpr.org/news/franciscan-sisters-transfer-land-to-lac-du-flambeau-tribe-in-bid-to-repair-boarding-school-legacy.

51. Bokern, "History and Primary Canoe Routes," 78.

52. Chancey Juday and Edward A. Birge, "Pontoporeia and Mysis in Wisconsin Lakes," *Ecology* 8, no. 4 (1927): 445–52, https://doi.org/10.2307/1930152.

53. Annamarie L. Beckel, "Breaking New Waters: A Century of Limnology at the University of Wisconsin," *Transactions of the Wisconsin Academy of Sciences, Arts and Letters* special issue (1987): 1–122, https://digital.library.wisc.edu/1711.dl/44N2KX6ER3XFM9A.

54. Kathryn Egan-Bruby, "Archaeological Investigation at Trout Lake, Vilas County, Wisconsin," Museum Archaeology Program, Wisconsin Historical Society, 2001.

55. Adam Hinterthuer, "Celebrating 100 Years of Building Careers—and Community—at Trout Lake Station," *University of Wisconsin, Madison, Center for Limnology Newsletters*, 2024.

56. Adam Hinterthuer, "Collaborations between Trout Lake Station and Lac du Flambeau Tribe 'Just Makes Sense,'" *University of Wisconsin, Madison, Center for Limnology Newsletters*, 2023.

57. Whyte, "Settler Colonialism," 132.

58. "Crossing the Line: Tribble Brothers," Great Lakes Indian Fish and Wildlife Commission, December 30, 2025, https://glifwc.org/ogichidaa/crossing-line-tribble-brothers#the-story.

59. "Ojibwe Treaty Rights," Milwaukee Public Museum, November 5, 2024, https://www.mpm.edu/educators/wirp/nations/ojibwe/treaty-rights.

60. GLIFWC, "Spearfishing Protests."

61. GLIFWC, "Rise of the Walleye Warrior."

62. Nesper, *The Walleye War*, 137–9.

63. Christopher Johnson, "Vilas County Man Receives $343.50 Fine, Deferred Prosecution for Shooting at Native American Spear-Fishers," *Oneida Nation News*, January 12, 2021, https://oneida-nsn.gov/blog/2021/01/12/vilas-county-man-receives-343-50-deferred-prosecution-for-shooting-at-native-american-spear-fishers/.

64. "Regent Policy Document on Tribal Consultation," Tribal Relations, University of Wisconsin, Madison, December 9, 2021, https://tribalrelations.wisc.edu/wp-content/uploads/sites/1359/2021/12/uw-system-tribal-consultation-policy-20211210.pdf.

65. "Progress Report on Action Plan of the National Science Foundation to Enhance Tribal Consultation," National Science Foundation, October 2021.

66. Frederick Swanson, "Confluence of Arts, Humanities, and Science at Sites of Long-Term Ecological Inquiry," *Ecosphere* 6, no. 8 (2015): 132, http://dx.doi.org/10.1890/ES15-00139.1.

67. "Summer Internship for Indigenous Peoples in Genomics (SING)," Carl R. Woese Institute for Genomic Biology, February 4, 2025, https://sing.igb.illinois.edu/.

68. "IndigiData Indigenous Data Science Education," *IndigiData*, February 4, 2025, https://indigidata.org/.

69. Adrienne Keene, "The Next Chapter," *Native Appropriations*, January 16, 2024, https://nativeappropriations.com/.

70. Lorinda Riley, Kristina Hulama, Ho'oleia Ka'eo, and Genesia Paolo, "Wrangling the System: How Tenure Impacts Indigenous Research," *EPF: Philosophy, Theory, Models, Methods and Practice* 2, nos. 1–2 (2022): 38–55, https://doi.org/10.1177/26349825221142290.

71. Leanne B. Simpson, "Land as Pedagogy: Nishnaabeg Intelligence and Rebellious Transformation," *Decolonization: Indigeneity, Education, and Society* 3, no. 3 (2014): 1–25.

72. Leanne B. Simpson, *As We Have Always Done* (University of Minnesota Press, 2017), 149–50.

73. Desi Small-Rodriguez (@native4data), "Haven't written a word of academic writing all summer! I'm told that if I want tenure I should be using my 'free time' to work on pubs all summer. Instead, I'm choosing community, being a good relative, & dare I say rest. If that means I'm not a good academic then so be it.," Twitter (now X), July 29, 2022, https://x.com/native4data/status/1553135185859846150?s=46.

74. Raymond L. Allen, "Academic Training Took Me Away from My Indigenous Homeland—but I Found My Way Back," *Science* 389, no. 6759 (2025): 542, https://doi.org/10.1126/science.aea9402.

75. Simpson, *As We Have Always Done*, 44.

76. Anjelina Gonzalez, "Cornell Students Skin Bear in Gaŋędagǫ: Hall Communal Kitchen, No Charges Filed," *The Cornell Daily Sun*, September 8, 2025, https://www.cornellsun.com/article/2025/09/cornell-students-skin-bear-in-ganedago-hall-communal-kitchen-no-charges-filed.

77. Bacon, "Settler Colonialism as Ecosocial Structure," 61.

78. JoLee Sasakamoose and Miranda Field, "Braiding Accountability: A Ten-Year Review of the TRC's Health Care Call to Action," *Yellowhead Institute*, (2025): 3, https://yellowheadinstitute.org/wp-content/uploads/2025/09/Braiding-Accountability-Final.pdf.

79. Bacon, "Settler Colonialism as Ecosocial Structure," 63.

80. Aurelien Bouayad, "Wild Rice Protectors: An Ojibwe Odyssey," *Environmental Law Review* 22, no. 1 (2020): 25–42, https://doi.org/10.1177/1461452920912909.

81. Simpson, *As We Have Always Done*, 75.

82. Bhiamie Williamson, Sam Provost, and Cassandra Price, "Operationalising Indigenous Data Sovereignty in Environmental Research and Governance," *EPF: Philosophy, Theory, Models, Methods and Practice* 2, nos. 1–2 (2022): 281–304, https://doi.org/10.1177/26349825221125496.

83. Nick Estes, "The End of US Empire? with Kim TallBear," The Red Nation Podcast, The Red Nation, August 31, 2020, https://directory.libsyn.com/episode/index/show/therednation/id/15815267, audio: Listen from 46:50 to 51:16 for Kim TallBear's critique.

84. Hinterthuer, "Celebrating 100 Years."

85. Tema Okun, "White Supremacy Culture Characteristics," *White Supremacy Culture*, 2021, https://www.whitesupremacyculture.info/characteristics.html.

86. Shawn Wilson, *Research Is Ceremony* (Winnipeg: Fernwood Publishing, 2008), 36.

87. Wilson, *Research Is Ceremony*, 13.