ISSUE 24 : FALL 2023
OPEN RIVERS :
RETHINKING WATER, PLACE & COMMUNITY



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INTRODUCTION

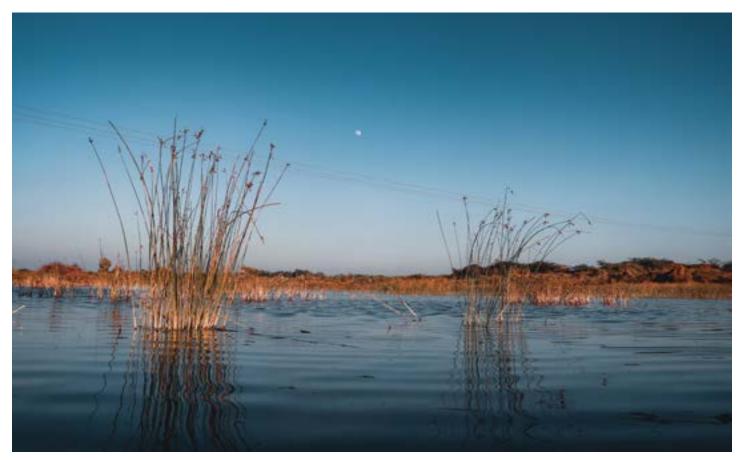
INTRODUCTION TO ISSUE 24 | LAYERS

By Laurie Moberg, Editor

The cover image for this issue is a meditation on layers. In its two-dimensional form, it reveals dark but reflective water, distinct aquatic vegetation, an autumnal shoreline, and powerlines stretching across the deepening blue in the sky. The image reveals the layers of the visible place (the water, plants, and sky), but also evokes the layers that are invisible: the geological history that formed the riverbed; the flora, fauna, and suspended materials hidden beneath the surface to the water; the human places and practices conjured by the powerlines and the presence of a photographer; and the social histories and

relationships that shape and are shaped by this place. This peaceful landscape carries an abundance of meanings, layered in amongst the reeds and water and beauty. The serene moment caught here reminds us that this place is not static, but is part of dynamic systems that can be disrupted by a change in any of the social and ecological conditions.

This image and the articles in this issue provide opportunities to see both beauty and complexity in the layers of our social and ecological worlds. From the seemingly distinct strata of



Reeds and shoreline. Photo by Renzo D'souza on Unsplash.

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millennia-old rock formations to the rings of a growing tree, layers are a part of our ecologies. This issue illustrates that like the layers of water imperfectly separated by density, our social practices are also layered with blurring at the edges. The articles gathered here compel us to consider both places and practices as layered.

Several articles reveal layered relationships with places that may otherwise remain hidden. Examining the social and ecological histories that have shaped the San Joaquin Valley in California, Vivian Underhill aims to reverse processes of "colonial unknowing": the intentional absence of memories about ancestral lakes and the Indigenous peoples who are deeply connected to them. In the aftermath of flooding across the Valley, however, the lakes reemerged, and with them, the layers of history and human connection that have so long been suppressed. Similarly drawing attention to often disregarded Indigenous relationships to place, Isabel Huot-Link invites us to bear witness to the #StopLine3 resistance movement in northern Minnesota. Acknowledging the vitality and vitalness of Indigenous-led resistance for shaping a hopeful future for all, Huot-Link, a settler herself, encourages us to see the potential in being unsettled. Ian A. Wright's republished review draws our attention to the elusive ecologies and stories of the Yarra River in Henry Saddler's A Clear Flowing Yarra. Written with what Wright calls "contrasting layers" the book moves between chapters on native fauna and chapters on how people engage with the river.

Yet layers are not always obscured, but instead emerge at the intersections of social and geological systems. Some of the articles in this issue focus on this intersection, on how the geology of a place shapes and is shaped by social practices over time. Patrick Nunnally walks us through environmental history of a stretch of the Mississippi River as it runs through what is now St. Paul, Minnesota. Nunnally explains the geological forces, Indigenous relations, settler practices,

and ecological restoration plans as the complex and overlapping layers that define that place. In his Geographies column, Jay Bell explores the formation the Eastern Shore of the Chesapeake, guiding readers through the geological processes that are part of this watery place.

A final set of articles explores the layers of impacts generated through research and teaching. I offer a reflection on community-engaged research practices demonstrated through a collection of articles previously published in *Open Rivers*. The article speaks both to the effects of work driven by public concern and the benefits of this work as it is shared with a broad audience as public scholarship. Amber Cameron and John Craven introduce the University of Minnesota Public Engagement Footprint, which illustrates a similar public impact. A visual, digital tool for mapping community-engaged projects connected to the University, the Footprint draws attention to individual projects as well as the value of the map as a more comprehensive resource. The Teaching and Practice column presents the work of several undergraduate students who participated in a seminar focusing on the Twin Cities stretch of the Mississippi River. The article includes both their reflections on the creative projects they assembled in the course and links to the projects themselves. While the projects engage the stories and histories of local places, the reflections demonstrate the processes of building connections through place-based learning.

Taken together, the articles in this issue evoke the social and ecological layers of particular places and practices. At the same time, they also offer provocation to consider how these layers emerge as places, people, and practices change. Recognizing the complex and numerous layers embedded in the landscape and socialscape may be enough to inspire us to reconsider our relationships with each other, reconfigure how we engage with a place, or imagine the possibilities of the future.

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About the Author

Laurie Moberg is the editor for *Open Rivers: Rethinking Water, Place & Community*, a digital journal of public scholarship published at the University of Minnesota (UMN) by the Institute for Advanced Study and UMN Libraries Publishing. She earned her Ph.D. in anthropology from UMN in 2018. Her doctoral research investigates recurrent episodes of flooding on rivers in Thailand and queries how the ecological, social, and cosmological entanglements between people and the material world are reimagined and reconfigured in the aftermath of disasters. In her current work, she approaches public scholarship as a critical strategy for expanding whose stories are heard, for shaping our public conversations, and for forming solutions for our shared ecological challenges.

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FEATURE (PEER REVIEW)

THE RETURN OF PA'ASHI: COLONIAL UNKNOWING AND CALIFORNIA'S TULARE LAKE By Vivian Underhill

Editor's note: This feature article has been peer reviewed.

The early morning sun shone off the water. I parked at the "Flooding Ahead" sign and walked past deep gouges in the ground. The teeth marks of a bulldozer's blade were still visible where it had dug in to strengthen the walls of an earthen berm along the edge of what was once a ditch and is now simply a slough meandering along a larger expanse of lake. My steps scared

two pairs of mallard ducks from the tall, bright green grasses. Swimming coots trailed Vs in the water; the lake's surface vibrated as insects hit the surface. Tiny swallows flew in formation together, feeding on small mosquitoes, yellow in the light. All around was the smell of pond life: decaying grasses and rich sediments.



Pa'ashi in April 2023. Image courtesy of the author.

This is Pa'ashi, which means "big water" in the Yokuts language: a lake so expansive that it stretches to the horizon like the ocean. Tiny algae leaves grew on the water's surface along the shore, leaving in their swirling pattern the mark of the water's currents. Occasionally bubbles burbled up from the brown, murky water along the edge. The water cast rippling reflections of light across the bottoms of signs and poles.

Pa'ashi, also called Tulare Lake, is located in California's San Joaquin Valley, and after decades of being dry, it resurged in 2023. When I first visited its shores in late April the lake was still growing, fed by snowmelt and heavy rains. Atmospheric river upon atmospheric river, floodwaters overran levees and berms, and the lake reclaimed its former territory. It is now the size of Lake Tahoe. Most mainstream media coverage—from *The New York Times* to the Bakersfield Californian—has focused on what the lake has flooded: farm equipment, crops, dairies, and homes. They frame this water as catastrophic flooding that has destroyed millions of dollars of crops and equipment. But these are not (only) floodwaters. This is a lake returning.

Even in April, the bird sounds were cacophonous. A flock of geese flew overhead, and above them a great white egret floated in the opposite direction. Two red-winged blackbirds making a nest on the top of a telephone pole trilled; a hawk watched them intently from its perch one pole over. Hundreds of wading birds—willets, curlews, innumerable others—slowly stilted away from me on their backward-folding knees. A mourning dove somewhere within the drowning almond orchard to the right called out its song.

Pa'ashi once stretched up to 100 miles long and 30 miles wide, though, as local historian Frank Latta wrote in the 1930s, "it never stayed still long enough for us to know how big it really was."[1] Along with the other lakes in the valley, it was drained by a series of water diversions, canals, and dams in the late 1800s and early 1900s.

Once the largest lake west of the Mississippi, Pa'ashi ran completely dry by 1898.

The Tachi Yokut, the original people of the lake, are now calling for the lake to remain. "I love this thing," Kenny Barrios, a cultural liaison for the Tachi, told me in an interview:

I love the fact that it came back for us. I love the fact that it took over the land that was taken from us. I love the fact that it's resilient and it still keeps returning, even through the destruction, that they tried to take it away. The lake is just like us.

With the return of the lake have come fish, birds, even the old weather patterns: breezes at least ten degrees cooler and more humid. Now living on the Santa Rosa Rancheria, a few miles north of the lakeshore, the Tachi have been holding ceremonies on the shore once more, teaching their youth what the lake means and re-planting tule reeds, once a keystone plant of the lake ecology, and native sage.

1898 was the first time in settler recorded history that the lake went completely dry, but settlers' triumphant claims that the lake was gone were premature, and the lake refilled repeatedly. In 1906, for instance, Orlando Barton, an early California settler, detailed the progress of the Kern River meeting the growing lake, inundating thousands of acres of farmland in its wake.[2] He described what he called "tidal waves" from the motion of wind over water and the play of whitecaps as they broke over each other. A cool breeze flowed from the lake, he said, and stacks of hay and barley floated to shore along with the wreckage of fences and buildings. "Man has reclaimed nothing," Barton wrote then, tongue in cheek; "Tulare Lake has reclaimed her own."[3]

Now, this sentiment is as easily asserted in 2023 as 1906: Pa'ashi is once more materially reclaiming the land that was taken from the Yokuts in the late 1800s. "The lake is doing a lot of talking

without us," Carlos Garcia Jr., a.k.a. Pops, also a cultural liaison for the tribe, told me.

The 1906 floodwaters stayed for five years until 1911. Settlers planted again, but the lake flooded again in 1916 and again in 1921–1922 when the water stayed for another two years. Each time it ran dry, the lake's power was sufficiently forgotten that each time it flooded, the water flooded millions of dollars' worth of crops—largely cotton and alfalfa—that had been planted in the lakebed. In 1937–1938, floods returned, and newspapers estimated a million-dollar crop loss of barley, hay, sugar beets, and cotton. That year, Frank

Latta, a local historian, made a boat trip along the lake and its tributaries—from Bakersfield to the San Francisco Bay—to remind residents of the watery nature of the valley floor.

Still, until Pa'ashi made its return this year, many people across the valley didn't even know about it or its fellows: Buena Vista Lake, Goose Lake, and Kern Lake. Why this insistence on forgetting the lake and its power, its implacable ability to return? I believe it is an example of what Indigenous and anti-colonial scholars have called "colonial unknowing." [4]



California Aqueduct being lifted over Wheeler Ridge and irrigated vineyards at the far south end of the San Joaquin Valley, 2019. Image courtesy of the author.

Draining Pa'ashi

Just a year ago, the land that is now underwater was arid cropland, irrigated by already-overdrawn groundwater and overallocated surface water. It was the center of the Central Valley's intensely profitable agribusiness industry, dominated by a few land barons like the J.G. Boswell Company and the Wonderful Company. Planting far more orchards and fields than the valley's natural hydrology could support, agribusiness also claimed large portions of water from the California Aqueduct and the State Water Project. These major water infrastructure projects flooded the traditional lands of the Mountain Maidu, the Winnemem Wintu, and Pit River Tribe to create reservoirs in northern California, and then carry that water down to the Central Valley on its way to Los Angeles.[5]

Growers also increasingly overdraft groundwater within the megadroughts that have gripped the valley for decades. The most recent reports predict that groundwater will be gone within a few decades. [6] Now, some orchards in the far southern San Joaquin Valley are irrigated with wastewater from oil fields. [7] In the absence of sufficient water, "in dry years, boy, [oilfield wastewater] really does come in handy," the general manager of one of these water districts told *The New York Times* in 2014. [8]

But this dry ground was historically covered in a network of sloughs, wetlands, and lakes. Almost three centuries ago, the Spanish explorer Fages, upon cresting the ridge of the Tehachapi mountains, looked out across this valley and called it *una buena vista*, a beautiful view of shining marshes, wetlands, and tule reeds that rose over 12 feet high. Fages was standing just above what is now called the Grapevine, the particularly dangerous portion of I-5 that plunges down a steep canyon from the ridges of the Tehachapis to the valley floor. I always thought this name derived from the highway's twists and turns—but

in fact the Spaniards named it *la cañada de uvas*, canyon of the grapes, because wild grapes grew so thickly through it that they had to hack their way through them.[9]

The San Joaquin Valley receives very little annual rainfall—only about 4 inches a year—but rain was only ever a small part of its hydrology. Massive rivers like the Kern, the Kaweah, the Kings, and the San Joaquin once connected Sierra snowmelt to the flat valley below. With no natural outlet, the water pooled and filled the valley: Tulare Lake, Buena Vista Lake, Kern Lake, and Goose Lake; Fresno Slough, Fish Slough, Old Slough, Mussel Slough, and Dry Slough; Panama Slough, Buena Vista Slough, and more. Around the lakes grew tule reeds in dense thickets, native oak stands, and dense riparian vegetation.[10] Beyond that stretched an expanse of grasslands and scrub brush; an early white settler who arrived in 1885 described traveling the plains as setting off to sea, paths slowly deepening like spokes of a wheel between houses.[11] The Yokuts lived in dozens of villages along the San Joaquin Valley and stewarded this land for generations, traveling the waterways in tule boats, hunting, fishing, and harvesting.

However, after the U.S. annexed what was then Alta California from Mexico with the Treaty of Guadalupe Hidalgo, settler understandings of proper land use propelled the work of what was called, ironically, "reclamation:" draining the lakes to create farmland in former lakebeds and irrigating the crops planted there using canals, dams, reservoirs, and water diversions.[12] This work created levees, leveled, drained, or flooded land, and, for a time, filled some channels deep enough that steamships plied the waters of Pa'ashi, running a steady trade in farming equipment, cattle and hides, wheat, turtles, and fish.[13]

As the lakes were drained, the Yokuts were forced from their land. Settlers brought diseases like malaria and smallpox, cut down the native oaks that had provided acorns, and burned acres upon acres of tule reeds to make way for agriculture. Their hogs, cattle, and other livestock trampled the tule roots and flattened the mussel beds that grew along the shore. Both the U.S. Army and private militias, supported by state and federal officials and often funded by taxpayer dollars, tracked down and murdered the Yokuts.[14] Government officials and U.S. agents stole several different promised reservations out from under them.[15] Laws such as the 1850 Act for the Government and Protection of Indians legalized the enslavement of Indigenous children within white homes, and generations of children were sent to residential schools.[16] With bounties on their heads, returning to the lake became increasingly dangerous, and settler law prohibited passing down traditional songs and dances. Still, as oral histories and testimonies show, people repeatedly snuck back, continuing to live on the lakes and rivers for years even as survival became increasingly difficult.[17]

Orlando Barton, the chronicler of the 1906 flood, had lived in the area since 1865; he had watched as farmers and land speculators, driven by discourses of manifest destiny, drained the valley's inland lakes and levelled its rolling hills. His remark that "Tulare Lake is reclaiming her own" reflected the ironies of "reclamation" as a process and a logic: who (or what) is (and should be) reclaiming from whom?

Retrospectively, white settlement destroyed over 96 percent of the Central Valley's original four million wetland acres and destroyed over 90 percent of its riparian forests in less than 150 years.[18] Of the 800,000 acres of saltbush scrub that are thought to have originally stretched between Fresno and Bakersfield, fewer than four percent remain, and these numbers are outdated as of 2023. This destruction also entailed the extinction or near-extinction of the San Joaquin kit fox, the burrowing owl, and the Tipton kangaroo rat. Even the physical level of land has changed: in some places the land surface was once thirty feet higher but has sunk as its groundwater has been extracted.[19]

This history is a reminder of the many world-endings before this one, a reminder that, as Potawatomi scholar Kyle Whyte says, the original people of this continent have already endured centuries of ecological devastation and apocalypse. "We already inhabit what our ancestors would have understood as a dystopian future," Whyte writes, citing a conversation with Lee Sprague about the ongoingness of colonial environmental catastrophe.[20] This historical and present-day dystopia for Indigenous peoples contrasts with settler understandings of climate change as some new, unthinkable future apocalypse.[21]

Today, it sometimes feels like the valley floats in an interminable present with an impossible future, as if the arid irrigated flat expanses are simply a land that people from elsewhere hurry to drive through or fly over with no imagination that lakes once lived here. Most people who live here don't know its history, either. Instead, the constant questions are how to get more water when there's never enough, whether that water is contaminated, how to keep on surviving among the valley's various extractive economies.

Colonial Unknowing

The lakes exist everywhere: in place names like Old River Road, Panama, Venice, and Herring Road. They are well-documented in the archives of the San Joaquin Valley, pervade the records, songs, and stories of the Yokuts, and live on in the landscape itself—in the dry depressions and embankments scored across the land.[22] For the Tachi, the lake and its constant ebbs and flows are a core part of their original songs and stories: in their creation stories, they were made from the bottom of the lake. When it grew in flood years they moved further away, and then in dryer years, they moved closer again. But until this year, mainstream narratives of the valley almost entirely avoided the lakes, exemplifying what Chickasaw scholar Jodi Byrd described in a talk at the University of California Santa Cruz as colonial agnosia. As Byrd said, colonial agnosia

describes the failure "to comprehend the realities of colonialism by those people who might most benefit from these conditions." [23]

Agnotology is the study of the production of uncertainty, ignorance, and doubt.[24] For example, ExxonMobil was aware of climate change since the 1980s but produced their own climatological research in opposition to delay mainstream acceptance of climate change.[25] Work on unknowns and unknowing has long been led by women of color and Indigenous feminist scholarship,[26] which analyzes unknowns as not only *absences* but as crucially productive of the colonial/imperial state.[27] For instance, Haitian anthropologist Michel-Rolph Trouillot elegantly showed in the case of archival unknowings that the question is not necessarily one of ignorance



Pa'ashi, flood of 1938. Frank Latta papers, courtesy of the Huntington Library.

or absence, but is one of producing histories as unknown or unthinkable.[28] As he describes European writers' inability to conceptualize the Haitian revolution even as it was happening, he also parses the many ways in which the interplay of presences *and* absences in a historical record creates these unknowings.[29] This is the thread that Byrd took up with the term "colonial agnosia" to describe the forms of incomprehension that, in a colonial context, are both common and normative.[30]

Further, the forms of knowledge that *are* produced can serve to disavow the colonial underpinnings of the current moment. In other words, forgetting is an active, productive part of memory rather than its absence. So, for example, public school fourth graders across California learn about the Spanish missions as a form of state pride, but not about the Indigenous people whose land they're on, the nature of that land, or the missions' violence against Indigenous peoples.[31] This state-wide public school project invites students to identify with the "civilizing" purpose of the missions' white settler superiority, rather than grappling with the missions' genocidal legacy.[32]

There has been relatively little work bridging environmental agnotology and colonial agnotology, but they have much to say to one another. Climate change is colonialism, just as Red River Métis scholar Max Liboiron asserts that "pollution is colonialism."[33] One of the reasons that the production of climate unknowing has been so successful is because oil-from whale oil to coal to crude petroleum—has always been the fuel of colonial projects.[34] And if a reliance on fossil fuels is central to the world that colonialism in its many forms built, then a refusal of its disastrous climate effects is central to its ongoing sense of survival. Thus, ExxonMobil can incorporate climate science into their Arctic drilling strategies (ensuring their ability to keep producing the "corpse juice"[35] of capitalism) while producing public unknowing about climate change more

broadly (assuaging fears about the survival of the world that colonialism built).

In California, the world that colonialism built, and every day rebuilds, is a flat, dry world covered by ag and oil fields. Today, even many hydrologists don't know about the lakes' presence. Once at a hydrology conference, a fisheries scientist working on salmon conservation began his talk by describing what he called the "ancestral lakes" that once characterized the region. Afterward, one person said they'd heard about the lakes once before and were glad to be reminded. No one else—at least no one who spoke—had ever heard about them, and they registered surprise and interest. As the conversation turned back to data management tools, the momentary presence (yet absence) of the lakes was one of many reminders of the inertia of unknowing in California's hydrologic knowledge. For a moment, the ancestral lakes might have opened a deeper set of questions about why the Valley is arid today and why there is such a push to imagine further water infrastructure projects at all. But the scientist didn't talk about why the lakes have since disappeared or about the dispossession and destruction that disappearance was a part of. While his description of the ancestral lakes may have produced a temporary disorientation—an imagination of a series of interconnected lakes shimmering above the dry San Joaquin Valley we know today-it ultimately left the lakes disconnected from the present and relegated to an inaccessible past.

But if the lakes are effectively written out of contemporary hydrologic knowledge of California, they were a central concern of the emergent field of hydraulic engineering in California at the turn of the century, part of the larger colonial making and unmaking of California environments.[36] Settlers engaged deeply with the lakes to drain them, and report after report was produced about their hydrology throughout the nineteenth and early twentieth centuries (think: Exxon's Arctic strategizing). In this profusion of writing and data, colonial unknowing pervades the ways that writers made sense of the lakes' disappearance.

Erasing the Lakes

1889: "When the first white settlers came to the Tulare Valley the lake was 60 miles long. It is now about 14 miles long. We do not know the cause, but we do know that the lake is shriveling, sinking and effacing itself from the map." [37]

1898: "All that remains of the once big body of water is scarcely sufficient for a pollywog to bathe in. The bottom that has for years been a bed of sediment is baking under the heat of a summer sun, and the cracks that are opening will soon be big enough for a man to drop into."[38]

I grew up in Colorado on the lands of the Arapahoe, Cheyenne, and Ute, saturated in a settler world. When I moved to California, I, too, thought the San Joaquin Valley had always been this way—until I heard about a project called the "California Water Fix and Eco Restore" and Indigenous resistance to it, such as the Winnemem Wintu's Run4Salmon journey. This project proposed to build two tunnels, each four stories tall, that would travel under the Sacramento Delta, bypassing that rich delta area to bring more water from Northern California dams to Southern California agriculture.[39] The dimensions of this proposal were absurd in addition to its clear environmental injustices, and I wanted to understand the assumptions that undergirded any idea that its magnitude made sense. In other words, it was through growers' claims that the valley needed more water that I learned about the water it once had.

Then, sitting in the air-conditioned reading room of the Huntington Library in Los Angeles, musty pages recorded the fleeing water snakes searching for a new home and the millions of decaying fish whose smell lingered for years.[40] I was there to search for early records of water infrastructure projects, linking them to nineteenth-century discourses of contamination and public health.

[41] But the materials also showed a deep subsurface ambivalence in residents' meaning-making around the lakes' disappearance: the work of colonial unknowing in the contemporary moments of individual lives.

Even for those ideologically invested in draining the lakes, it was a disturbing sight. In a time when malaria was still thought to come from bad air (*mal aria* meaning bad air in Italian), the smell of death and decay was so strong that settlers within a six-mile radius of the lakes left for air thought to be better for their health. Newspapers described millions of decaying fish, turtles, and frogs lying in the vast expanse of mud where the lake had been.

For instance, an 1889 newspaper article which aims to celebrate the lake's disappearance returns repeatedly to the birds and fish, dwelling on their dislocation. Though the writer describes the lake as "growing beautifully less," he also goes on to write:

where the angular crane once fished for suckers among the tules, and the wild geese, ducks and the majestic swan dwelt in peace and plenty, the horny handed-wheat grower is sacking up 12 to 15 sacks of Sonora wheat to the acres...For the first time in recent history, the pelican, geese, ducks, snipes, mud hens, and other birds, as well as the finny fish, have found that there is no longer a home for them. (*Tulare County Weekly Times*, Thursday, June 9, 1889)

The writer's attention is pulled back and forth: though there is a manifest-destiny kind of triumphalism here that centers the remarkable harvests of farming in lake-bottom sediment, the writer returns again and again to the cranes and wild geese, the pelicans, snipes, mud hens, and "finny fish."

In the hands of a hydrologic expert of the time, this ambivalence translates into an unknowing that appears frankly illogical. Frank Soulé, a professor of civil engineering, was hired to write a sweeping report of irrigation from the San Joaquin River in a massive 1901 volume edited by Elwood Mead. "It is not without interest," Soulé wrote, "to note in connection with this inquiry that Tulare Lake has for several years been dry, and that there has been no overflow from it into Fresno Swamp since about 1876."[42] He attributed this dry lake not to diversion for agriculture, but to the fact that there hadn't been a flood-stage year since 1861-62. He created a graph of the lake's surface level over time, along with a record of yearly rainfall in San Francisco, and went on to assert: "the prime cause of the recedence [sic] of the lake is not the increased use of water for irrigation, but the long interval between seasons of excessive rainfall and the recent long sequence of seasons with precipitation barely normal, or less than normal."[43]

This is a patently strange claim because draining the lakes had become the whole point of the canal systems. "Swamp and overflowed lands" was by now a legal category at work in a series of Swampland Reclamation Acts by which the State Legislature offered the ownership of wetlands to settlers in return for their drainage.[44]

Yet Soulé goes out of his way to assign the lake's shrinking to dry weather rather than human intervention. In fact, he continues, the extreme nature of this long dry spell might even be considered to signal "a change of climate," saying, "were it not that Indian tradition distinctly points to a still earlier period than that covered by the diagram showing fluctuations when the lake had all but disappeared." [45]

This is the productivity of colonial unknowing: by assigning Pa'ashi's draining to "natural causes"—dry weather and no floods—Soulé also naturalizes settler land practices and the new landscape they were creating. Further, by extending its history

to a longer, unnamed "Indian tradition" in which it was nearly dry, he relies on Indigeneity as the "ontological ground," in Byrd's language, on which to normalize settler practices and create a sense of settler emplacement. In so doing, he erases the full and functioning ecosystem that by nature ebbs and flows while giving no mention of any actual Indigenous peoples, whose ways of life were intimately entwined with these lakes and who were being slowly pushed—by settler violence as well as land loss—to ever-shrinking reserved lands.

Expert hydrologic knowledge functions uncannily similarly today—unsurprising given that, as Patrick Wolfe observed, settler colonialism is a structure, not an event.[46] The salmon scientist's description also worked within the same logics of colonial unknowing that Frank Soulé's report had over 100 years prior. So where does this inability to understand come from? Especially for hydrologists, then and now, whose work it is to produce expert knowledge about water, and who often hold a deep sense of connection to water?

If we consider colonial unknowing as not just a passive absence of knowledge, but in fact both produced *and* productive, then it becomes clearer. The field of hydrology in the U.S. west arose in tandem with political and economic interests in irrigating arid land and draining swamps.[47] Fields of knowledge have been developed, institutes founded, careers made, mortgages paid on the idea that California's hydrology is all wrong and needs intervention to set it right.

For a field premised on the need to "improve" the land through reclamation, the imagination that it once was radically otherwise is destabilizing. For settler society, to grapple with an untenable future and a undefendable past requires more than knowledge disembodied from body and soul. It requires an entirely different way of being in the world.

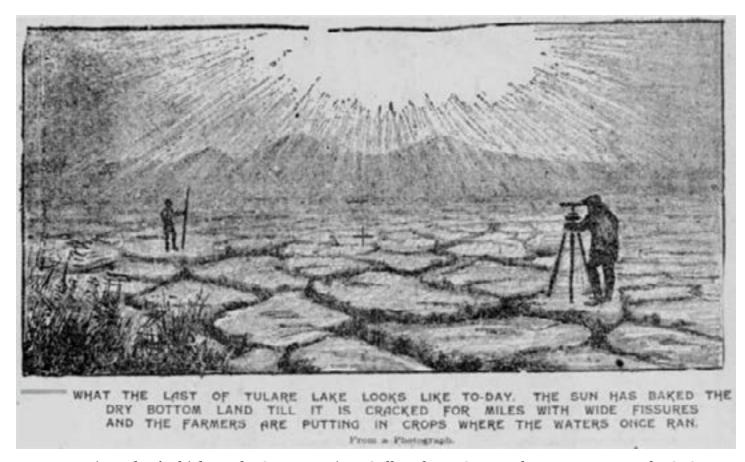
A Wall of Fish

There is one story that I can't get out of my head published in the *Tulare Daily Register* in 1889. For several years prior, no fresh water had run into the lake. This time, the unnamed writer is clear that it is because of irrigation diversions: "King's River, Cross Creek and Tule River had been tapped by irrigators for all they were worth in the previous dry years and the lake was low."[48]

As the lake shrank, the water became saltier and saltier. Fish had begun dying from the salt content long before the water was gone. In 1884, however, the rivers met the lakes once more in spring. As the writer described, "The fish met the fresh water in solid masses. Standing at the mouth of Kings River, one could see a wave come landward, a wave produced by the motion of a

mighty army of fish. The ditches of the Mussel Slough country were choked by them, and the country smelled like Egypt during the plagues." The writer is clearly describing fish who scented the incoming fresh water and were charging toward it for their survival.

That was the same year, however, that the first seine, a kind of fishing net, went into the lake. The seines were a thousand yards in length and about fourteen feet deep in the middle. Drawn in by horsepower, they could pull in as much as a ton of perch per seine per day. The spring is also when the perch spawn, leaving their eggs along lake edges as the water begins to warm, but the seines worked all year long, centering on the creek inlets, catching the fish where they were the most plentiful. Pa'ashi's perch would



Drawing of Pa'ashi from the <u>San Francisco Call</u>, Volume 84, number 75, August 14th 1898.

become extinct shortly afterward. The writer was horrified. "Catching them on her spawning grounds was not fishery—it was butchery—and the incessant dragging of the lead lines destroyed the spawn during incubation." He emphasized that if the nets had only paused during the spring, the fish populations could have remained.

A month after this article was written, the uproar had caught the attention of authorities and the fish commission superintendent, Mr. Woodbury, visited the area in response. Yet, as the newspaper reported, "he attributes the cause to the stranding of the fish upon the shores when the waters are driven out upon the land by the wind."[49]

The interactions between lake and wind were in fact one of the most beautiful things about the lake. It was large enough that, if the wind blew in one direction for a few days, the entire level of the lake would move in that direction, leaving a muddy shoreline for a few feet on one of its banks and heaving up on the other. If Mr. Woodbury was finding fish on the shores, it was likely because the actual lake surface was shrinking, or because they were already sickening and dying from the saline water. Yet he dismissed those deaths: "Those that are perishing in this manner, however, are of comparatively little value as a food fish." The perch, in contrast, were "one of the finest fish in the state," and he "emphatically state[d] that something must be done to check the present criminal destruction going on down there."

All that Mr. Woodbury ultimately did, though, was bottle some of the lake water, "which will be taken to Professor Hilgard for analysis in order to ascertain the feasibility of planting other kinds of fish there." The ecological disaster that the original writer described, in which salinity and lack of water created a wall of desperate fish, and in which overfishing during spawning led to a full extinction, was reduced upon Woodbury's expert knowledge to a technical problem: what

kinds of fish could be replanted for the purposes of fishing, along with the vaguest of suggestions that "something must be done." Of course, Pa'ashi would be dry within nine years, so all the replanting in the world would only lead to more dead fish on its banks. But the reduction of a full and functioning lake ecosystem to fishing interests epitomizes the extractive logics of settler colonialism.

Now, California's hydrologic planning centers around groundwater, and a 2014 law will require all groundwater basins to come into sustainable use by 2040. But California's groundwater, especially in the San Joaquin Valley, is critically overdrafted now. Further, the law explicitly does not override existing water rights, even though those rights are what brought us to our present groundwater crisis. In other words, the colonial unknowing that pervaded the draining of Pa'ashi and the overfishing of perch is also active in today's groundwater management: because it doesn't consider the massive hydraulic overhaul that created our contemporary conditions, it also propels California into an unsustainable future full of technical solutions and inequitable impacts.[50]

These "solutions" produce their own absurdities, their own unexpected impacts. Today, the valley is home to several "water banks," which take surface water and store it underground. Yet many of them are now contaminated with 1,2,3 TCP, likely a byproduct of a pesticide that was manufactured by Dow Chemical and Shell Oil and used on farmland from the 1950s to the 1980s.[51] Taking fresh surface water, sending it into groundwater, and in the process contaminating aquifers with surface toxins, or building four-story tunnels under the Sacramento Delta, are demonstrations that colonial unknowing not only works to unknow a colonial past, but it keeps us locked in a colonial present. In the demented logics of capitalism, this is what comes to seem common sense without an understanding of the colonial logics that brought us here.[52]

The Return of Pa'ashi

He [an old 49er] says driftwood was found on the knoll where the Fresno mill stands, showing that where I street is, water was 10 or 12 feet deep. Near Visalia driftwood was in the trees 12 feet high. He thinks a flood may come any winter that will destroy a great deal of property and cause considerable loss of life. He advises having a boat handy in all that country that has been under water in the last 40 years.

- *Daily Evening Apositor*, Tuesday Oct 15, 1889

This water has desires, and this water has always wanted to go to the lakebed: "water memory," as Lenape scholar Joanne Barker might say. [53] Canals, levees, and dams might defer that desire—might defer it even for generations—but they can't stop the water's movement entirely. After a powerful series of winter storms this year, levees across the Central Valley broke, and the valley was once more covered with what onlookers described as an inland sea, waves breaking over farms, houses, and highways. "When it came back," Pops said, "and I heard, the first thing I was doing was, oh, I can't wait to get out there and practice my ways...I get to take out my little brothers and cousins to go and fish and hunt this lake now." The lake is filled with shad, their tiny silver sides flashing in the sun, catfish prowling the shallow waters, bass jumping for insects. There are crawdads, frogs, turtles, and he's seen burrowing owls along the eastern shore. The breeze is cool and humid. He continued:

Everything is just flourishing. There are birds staying longer than they usually would—there's so many species that I've seen come back way stronger. They're more around than I've ever seen. And I've been fishing for 30 years now...it's so hard to describe how happy it makes me feel to be out there with just my brothers or just even

just another tribal member and share that moment.

Yet even though the Tachi are the original people of the lake, their presence on the lake today is illegal under settler law. Amid "No Trespassing" and "Road Closed" signs, "we can't even get a canoe out there to actually honor our ancestors," Pops continued, "or get in a tule boat and just be out there. They can come whenever they want, tell us to get off, because it is not our property. But they can have their airboats and they can fly around it all they want." In addition, under settler law, the Tachi don't hold rights to this water though they are working to regain these rights under the Winters doctrine, which holds that tribes have prior rights to all water that originates on, borders, or crosses a reservation dating to the time the reservation was established.[54]

He and Barrios also repeatedly pointed out how the lake today is villainized through claims that the agricultural chemical inputs in the soil have dangerously contaminated the water, or discussion of the destruction that the lake caused. Indeed, more than half of California's farmworkers live in the Central Valley and thousands lost work and wages to the floodwaters. Flooded housing added to weeks or months of lost wages for farmworkers and dairy workers. In the towns of Cutler and Orosi, for instance, a canal broke on Road 124 and people were evacuated. More than 131 homes were flooded in mid-March after water breached a canal in eight places, leaving many homes uninhabitable. Many have blamed the lake and its waters for the destruction of these homes.

Barrios and Pops feel for those whose houses have flooded, they said, but for the large growers to use that as a rhetorical tool to drain the lake as soon as possible is simply disingenuous. "The real people who own that property, they don't live here, they're not doing any of this hard labor work," as Pops said. "So when they're talking like

that, I know they're not talking for themselves. They're talking about their pockets." Further, the destruction of housing, and the fact that Pa'ashi's waters most impacted black and brown immigrant communities, was a produced problem. As scholars have long shown, the greatest harm of a natural disaster rarely comes from the "natural" part but instead from the power-laden structuring of risk and exposure. Here, too, the greatest harms of the floodwaters are actually the result of a racial capitalist economic and water rights structure—not the lake itself.

The floodwaters, if allowed to follow their water memory, would have first filled the old lakebed, the lowest spot in the county. However, this land is owned by the J.G. Boswell Company, an agribusiness megacorporation. Founded by cotton brokers from Georgia, Boswell was largely responsible for the draining of Pa'ashi, planting an empire of cotton in its place. The company now owns about 132,000 acres on the old lakebed. [55] Over generations, Boswell has continued to erect levees and canals to keep floodwater off its land. "In my opinion, this was premeditated by Boswell," Phil Hansen, a fifth-generation farmer in the area, said at a special meeting of the Kings County Board of Supervisors as the floodwaters were rising on March 18.[56]

Though water managers repeatedly asked to flood the Boswell fields to relieve the flood pressure, Boswell repeatedly refused. One water manager got multiple anonymous warnings saying, as he recalled, "We have papers drawn up and if you move the land plane or cut into the Homeland [canal], you'll immediately be arrested and thrown in jail."[57] At the height of the flooding, someone caused a breach in one stream in the middle of the night, causing the water there to rush directly toward the historically black community of Allensworth and protecting Boswell land. That same night, a "land plane"—a heavy piece of farm equipment—was placed on Boswell's Homeland Canal in order to prevent water managers from using it as flood relief. Allensworth was ultimately evacuated, as were surrounding farmworker communities like Alpaugh.

If not for these levees, Pa'ashi would have found the lowest point of its lakebed first, filling Boswell's land rather than these small communities. Boswell—the largest landholder in the valley who drained large parts of Pa'ashi—would now be holding the responsibility for its flood, rather than the farmworkers and residents who are now, slowly, piece by piece, cleaning the mud, silt, and water out of their homes. Instead, Boswell continued to plant new tomatoes this year while Allensworth, Alpaugh, Cutler, Orosi, and other communities were flooded because of the same infrastructures that drained the lake in the first place: canals, levees, and large agribusiness' ability to wield both political and extralegal tools.

Land or Lake?

Barrios and Pops say that, for them, the lake never died, it was just sleeping. It has never not been here; this is simple its re-awakening. As it returns, it also illuminates another face of colonial unknowing. In the flurry of news about the lakes this year, most coverage has framed them as catastrophically destructive floods. It emphasizes the crops destroyed and farm equipment lost, rather than the recurrence of the lakes

themselves. It registers a stubborn insistence on the lakebed as simply *land* rather than lake. Even as Pa'ashi is, by nature, changeable and shifting, colonial unknowing propagates in the characterization of the water as a flood, rather than a lake returning. Most coverage, too, has either ignored the presence of the Yokuts, or if it mentions them, doesn't address their ongoing presence and struggle for the lakes' survival.[58]

Mark Arax, for instance, one of the foremost chroniclers of water overuse in the San Joaquin Valley, wrote about the floods this year for *The* New York Times. "Amnesia," he states, "is how we built agriculture across marsh and desert and houses in floodplains and canyons of fire."[59] But then he himself re-makes that amnesia. Describing standing on the shore of a flood in 1997 that had begun to refill Pa'ashi's basin, he mutters to himself, "this is cotton land," both feet planted firmly in the circumscribed agricultural present rather than the unfurling past and future of the lake's return. And, as he goes on to explain the lake's history to the reader, he entirely un-self-consciously asserts: "the Indigenous people were long gone by the early 1920s," when the Boswell company arrived—a point patently refuted by the ongoing work of the Tachi and the other Yokuts tribes in the present.

Even with the lake's water lapping at levees and embankments now, settler writing is intent on continuing to normalize a drained valley, an irrigated expanse of fields, as the *true* nature of central California. Perhaps this inversion is part of the longer-term agnosia of colonialism: in order to see the settler colonial agricultural world as "normal," this water has to be seen the temporary abnormal flooding. Rather than seeing this place as a *lake* that is sometimes dry, it has to be seen as *land* that is sometimes flooded.

Saying only "reclamation" without remembering the lakes, or looking out at Pa'ashi and stubbornly calling it "cotton land," erases the water snakes who came swarming out of the reeds as the waters dried, looking for cool places to hide in the shade. To imagine the lake as permanently gone is to erase the fish—the perch, shad, trout, and others who crowded the meeting places of river and lake. To imagine that draining this water was "reclaiming" land erases the genocidal violence with which the U.S. Army and private militias

decimated the Yokuts and forced them from their villages to a series of shrinking and changing reservations. And it erases the resistance of those who snuck back to be near the lake once more.

Within this incomprehension, the dominant story can go on: the valley has always been like this, the "armpit of California," as coastal Californians often call it. This colonial unknowing has profound impacts: in this narrative, the extreme levels of pesticides, fertilizers, and hydrocarbons in the valley's air and water[60] are simply the unavoidable consequences of its extreme agricultural productivity. In this narrative, the valley's radical change was not a profound act of destruction but rather a reclamation of the land from the evils of wilderness, a testament to American ingenuity and willpower working with a profoundly flawed landscape from the start. Water scholars and historians to this day still fall into this kind of logic.[61]

What happens, then, when we unknow the colonial history of how California became this way? Whole generations of people grow up thinking that the dry, flat land that they drive across is natural, normal, rather than the work of canals and a machine called the Fresno Scraper, invented to literally scrape the valley's rolling topography into flatness. In a colonial world in which the toxic wastes of industry are a necessary evil, people might decide as they drive through that, yes, this barren, flat, dusty wasteland with its air pollution and smog is an acceptable sacrificial landscape. These are the fruits of unknowing: what reclamation produced is remembered as a land of deficits, and the horrors of the present become normalized.

Let the Lake Stay

By August, the lake had shrunk slightly thanks to evaporation and efforts on the part of the state and private corporations to re-drain it. I drove with Barrios and Pops in their white truck from the Santa Rosa Rancheria, past a "road closed" sign, and out onto the aptly named Levee Road. The pavement was now a peninsula, disappearing under the waves a quarter mile out. Mud flats, still with the linear scoring of old furrows, stretched out long before we reached the water. Still, there were egrets and great blue herons hunting for fish trapped on the shoreline with careful steps through the mud and shallow water.

Pops dipped his hand in the water and pulled out a tiny shad. The waves lapped quietly at the shoreline under a light breeze. Even in late August the temperature was only in the mid-8os, unheard-of for the Valley. Together we stood and watched a group of faintly iridescent brown birds with long bills land together on a low ridge of sediment within the lake. Hundreds of shad teemed through a small break in the ridge following a wind-driven current. We watched the birds wade out together as one, fill the break, and then feed on the shad swimming frantically between their legs.



Pa'ashi in late August 2023. Image courtesy of the author.

"What kind of birds are those?" I whispered.

"Hungry birds," Kenny replied. Pops said, "Happy birds."

I laughed—too loudly—and the whole flock lifted up and away, frightened by my voice.

Kenny and Pops ribbed me for my noise: "Here we are trying to be all quiet," they said, "and then *you* come out with that laugh! *Ha!*" they mimicked me.

Even as lake water is already being pumped out, it will take years, and the Tachi are not going to let the lake go without a fight. They are also working toward dam removal on all the tributaries that used to fill Pa'ashi every year: the Kings, Kaweah, San Joaquin, and Kern Rivers. And they continue to practice their ceremonies and practices on the lake, teaching their youth about the lake and its importance. "I could get in trouble," Pops said. "But I'm willing to risk that to practice my ways and to honor the lake and be able to say that I did that. When it was here, I got to do that."

As the Tachi call for the lake to remain, others agree. Several recent studies have investigated the potential of future flooding in California's Central Valley. Over the past million years, a megaflood at least as severe at California's historic flood of 1862 happens in California every 100–200 years. On the scale of megafloods, 2023 doesn't even register, while warming temperatures increase the likelihood of 1862-scale flooding by three times.[62]

In addition, the Central Valley might run out of groundwater in the next ten years if not sooner. The large growers know this, but they can also afford to drill the deepest wells. Already their wells are causing communities' wells to go dry. Some of these companies have been growing in the Valley since their fields were only bumper crops in between lake floods and have always been able to coast through droughts with groundwater.

[63] But groundwater overdraft is not a drought.

Groundwater is effectively a non-renewable resource given how long its regeneration rate is, and settler agriculture has now effectively drained this ancient gift of stored water.

Fish biologists and water scientists also argue that the lake should be restored as habitat and as part of a growing movement toward Indigenous management. [64] Recognizing Pa'ashi as central to this landscape's ecosystem would remake mainstream senses of the valley: no longer the productive agricultural region that feeds the nation (at a steep premium). Letting Pa'ashi remain could heal the Central Valley's relationship with water, serving as water storage, flood protection, and a profound new turn in ecological restoration.

"We're at a point," Barrios said, "when we're about to lose all of our water. More years of growing food isn't going to help. You know, it's going to kill us, but it's only going to benefit them. What are they going to do when the fifty years are up and there's no more water? They're going to sell their land and they're going to leave." Others might move away, he said, but they can't. They will remain right here.

Re-draining the lake and rebuilding in its lakebed guarantees future agricultural losses and would be a profound reinstatement of colonial violence. And, as the Tachi emphasize, it would be profoundly detrimental to everyone living here in the Central Valley. "It's not just our lake," Barrios said. "It probably means way more to us than it does to everybody else, but we're all going to benefit from it."

On the other side of the road, Pops showed me a dried frog that perhaps lost the water's edge as it receded too quickly. He found a catfish skull, too, with its tiny razor teeth and the roots of its antennae still intact. The deep sucking mud was tightly crisscrossed with thousands of bird feet prints. They told me about being out here at night, bullfrogging, and being startled by the signature *crack!* sound of a beaver's tail. Perhaps it was

out there making quick work of the drowning nut trees, turning plantation orchards into homes.

To consider, again, the Valley as filled with lakes rather than arid and dry would mean revisiting the project of land reclamation and hydrologic engineering—an edifice built on the idea that some lands are inferior and require intervention. What these interventions produced is a series of deaths, and they are part of a larger worldview and economic system that is slowly making our entire climate unlivable: all of us, now, are—or soon will be—the frogs in a drying pond, the water snakes searching for cool shade, the perch rushing the inlets.

In a time when scientists are chaining themselves to buildings to call attention to climate change;[65] when wildfires have grown so large in the absence of Indigenous firekeeping that they create their own weather patterns;[66] when groundwater levels have dropped so low that families who have lived here for generations are forced away because their wells have gone dry;[67] when agricultural corporations can afford to drill deeper and deeper, all the while bottling water from the island of Fiji[68] and selling it at \$4 a bottle in plastic produced from fossil fuels fracked from an anonymous "somewhere" that could just as well be right here; in this time, restoring the lakes is necessary political work.

And still the lakes keep calling the people back. The Yokuts have long said that the lakes are tripni, roughly translated as magical, with songs that call people to them.[69] Like they call the rivers that charge past flood-control protections to find the lakes again. Like they call the birds every year on their annual migrations, who keep coming back, who somehow find the slices of land scattered across the Valley where they can rest, no matter the dwindling water, no matter its salinity, its warmth, no matter the chemicals within it. The birds come back year after year because they need the lakes; they can't do otherwise. And neither can we.

"I want people to understand that we are for everybody," Barrios emphasized. We're not just for ourselves. We all have our own plans in this life. Some plans destroy things—well, our plans are to fix. We want to mend things."

When we returned to the west side of the road peninsula, the ibises were feeding again. *Don't laugh!*, they whispered to me, and I pantomimed complete silence. Instead, we watched them quietly together, nothing but the quiet slap of waves, the light wind with the smell of decay and lake life, the silver sides of the shad glinting in the birds' beaks.

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Footnotes

- [1] Frank F. Latta, Collection: Skyfarming.
- [2] Visalia Daily Times June 6th, 1906, Frank F. Latta, Collection: Skyfarming, Box 101 folder 1, Huntington Library, San Marino, CA.
- [3] Visalia Daily Times July 11, 1906, Frank F. Latta, Collection: Skyfarming, Box 101 folder 6, Huntington Library, San Marino, CA.
- [4] Vimalassery, Pegues, and Goldstein, "Introduction."
- [5] Middleton-Manning, Gali, and Houck, "Holding the Headwaters."
- [6] Dogan et al., "Statewide Effects of Ending Long-Term Groundwater Overdraft in California."
- [7] Kondash et al., "The Impact of Using Low-Saline Oilfield Produced Water for Irrigation on Water and Soil Quality in California."
- [8] Onishi, "A California Oil Field Yields Another Prized Commodity."
- [9] Gilbreath, The Heart of California.
- [10] The Yokuts now form the Tule River Tribe, Tejon Tribe, Chukchansi Tribe, Table Mountain Tribe, and the Tachi Yokut Tribe, each of whom continue to fight for access to their waters and lands in different ways.
- [11] Fragment of manuscript of Frank M. Chappell. Box 54 Folder 21. Frank F. Latta, Collection: Skyfarming, Huntington Library, San Marino, CA.
- [12] Worster, Rivers of Empire.
- [13] Igler, Industrial Cowboys.
- [14] Madley, An American Genocide.
- [15] Garfield, "Testimony of Ryan Garfield on Behalf of the Tule River Tribe of California in Support of S. 789, the Tule River Tribe Water Development Act"; Moreno, "Native American Resilience"; Frank and Goldberg, *Defying the Odds*.
- [16] Hurtado, Indian Survival on the California Frontier; Frank and Goldberg, Defying the Odds.
- [17] Frank and Goldberg, Defying the Odds; Latta, Handbook of Yokuts Indians.

- [18] Gilbreath, The Heart of California.
- [19] Galloway and Riley, "San Joaquin Valley, California: Largest Human Alteration of the Earth's Surface."
- [20] Whyte, "Indigenous Science (Fiction) for the Anthropocene."
- [21] Scott, "(Indigenous) Place and Time as Formal Strategy"; Dillon, Walking the Clouds: An Anthology of Indigenous Science Fiction; Gross, Anishinaabe Ways of Knowing and Being.
- [22] Alarcón-Jiménez, Pasalodos, and Díaz-Andreu, "Mapping with/In"; Latta, Handbook of Yokuts Indians.
- [23] Byrd, "Eyes That Can Never Close: Colonial Agnosia and the Mnemonics of Refusal."
- [24] Proctor, "Agnotology: A Missing Term to Describe the Cultural Production of Ignorance (and Its Study)."
- [25] Union of Concerned Scientists, "Smoke, Mirrors & Hot Air"; Whitman, "Exxon Arctic Drilling Benefitting From Global Warming."
- [26] This work includes, for instance, addressing the epistemological impossibilities and archival absences of the Middle Passage, or the fundamental uncertainties and indeterminacies involved in all forms of objectivity. Hartman, "Venus in Two Acts"; Alexander, *Pedagogies of Crossing*; Barad, *Meeting the Universe Halfway*; Vimalassery, Pegues, and Goldstein, "Colonial Unknowing and Relations of Study."
- [27] These approaches, together, describe the structured sublimation and active forgetting of settler colonialism and slavery as the conditions of possibility through which freedom and equality emerge within liberalism. Stoler, "Colonial Aphasia"; Vimalassery, Pegues, and Goldstein, "Colonial Unknowing and Relations of Study"; Bruyneel, "Codename Geronimo"; Vimalassery, Pegues, and Goldstein, "Introduction."
- [28] Trouillot, Silencing the Past: Power and the Production of History.
- [29] Anne Stoler ("Colonial Aphasia") similarly discusses what she calls colonial aphasia in the case of French colonial histories, arguing that the facts and histories are there—they have not been forgotten per se. Instead, she focuses on the profound dissociation between colonial histories and state-produced histories, such that colonial histories become unspeakable.
- [30] Byrd, "Eyes That Can Never Close: Colonial Agnosia and the Mnemonics of Refusal." Disability studies scholars have since rightly pointed to the ableist valences of "aphasia" and "agnosia," arguing against the conflation of these diagnoses and colonial cultural forms.
- [31] Keenan, "The Mission Project."
- [32] Sepulveda, "Our Sacred Waters."
- [33] Liboiron, Pollution Is Colonialism.
- [34] Daggett, "Petro-Masculinity."
- [35] Ahuja, "Race, Human Security, and the Climate Refugee."
- [36] Voyles, The Settler Sea; Nash, Inescapable Ecologies; Sepulveda, "Our Sacred Waters."
- [37] Tulare County Weekly Times, Thursday, June 9, 1889.
- [38] Tulare County Weekly Times, Thursday August 4, 1898.
- [39] Sze et al., "Defining and Contesting Environmental Justice."

[40] The irony was not lost on me that, in order to learn about these historic lakes, I sat in the center of the wealth of Henry Huntington, a railroad baron and real estate mogul who busted unions and exploited Mexican labor. The Huntington Library remains a bastion of white exclusivity, having maintained an all-white senior staff until 2021. According to the *LA Times*, nearly half of their total staff are BIPOC, but if you take out the facilities workers, only 17% of the knowledge workers are BIPOC (Miranda, "The Huntington Library Has a History of Inequity. Can It Pivot toward Inclusivity?").

- [41] Underhill, "From Kern Island to the Streets of Bakersfield."
- [42] Soulé, "Irrigation from the San Joaquin River," 265.
- [43] Soulé, 265.
- [44] Morgan, History of Kern County, California, with Biographical Sketches of the Leading Men and Women of the County Who Have Been Identified with Its Growth and Development from the Early Days to the Present.
- [45] Soulé, "Irrigation from the San Joaquin River," 265.
- [46] Wolfe, "Settler Colonialism and the Elimination of the Native."
- [47] Molle, Mollinga, and Wester, "Hydraulic Bureaucracies and the Hydraulic Mission: Flows of Water, Flows of Power"; Teisch, *Engineering Nature*.
- [48] "Piscatorial Plundering." *Tulare Daily Register:* Tulare City, CA. Tuesday, Jan 29, 1889. Quoting in part from the *Stockton Express.* Frank Latta, Collection: Skyfarming, Huntington Library, San Marino, CA. Interestingly, one of the things this writer is most upset by is that the perch harvest was primarily processed and consumed by the Chinese community in the San Joaquin Valley, rather than by white residents.
- [49] "Investigating Tulare Fish." *Tulare Daily Register*, Tulare City, California. Friday, February 8, 1889. Frank F. Latta, Collection: Skyfarming, Huntington Library, San Marino, CA.
- [50] Underhill, Sabati, and Beckett, "Against Settler Sustainability."
- [51] Henry, "Massive dollars' needed to clean tainted groundwater from Kern County's banking projects."
- [52] Some water banks have stopped storing groundwater. The Metropolitan Water District, for instance, has stopped storing water in the Arvin-Edison Water Bank since 2020. Others continue to inject water for storage (Henry, "Massive dollars").
- [53] Barker, "Confluence."
- [54] Though these rights often remain on paper only, they offer one potentially powerful avenue for Indigenous reclamation of water rights. Indigenous nations across North America are using *Winters* to regain rights to water—including, recently, the Agua Caliente Band of Coahuilla Indians' major win against the Coachella Valley Water District in protecting groundwater from agricultural contamination. Yazzie, "Unlimited Limitations"; Curley, "Our Winters' Rights"; Zablan, "Tribal Rights to Groundwater."
- [55] Arax and Wartzman, The King Of California.
- [56] Henry, "Flooding out Other Farmers Was 'Premeditated' by the Powerful J.G. Boswell Company, One Farmer Asserts."
- [57] Henry, "Flooding out Other Farmers."
- [58] Some notable exceptions are: Beaumont, "'Healing Process'"; James, "'This Water Needs to Be Protected."
- [59] Arax, "My State is 1,000 Miles Long, and Not Everyone Living in It Hates the Rain."

[60] Burow, Shelton, and Dubrovsky, "Regional Nitrate and Pesticide Trends in Ground Water in the Eastern San Joaquin Valley, California"; Garoupa White, "Do You See What I See?"; Huang and London, "Cumulative Environmental Vulnerability and Environmental Justice in California's San Joaquin Valley."

- [61] For example, Littlefield, Ruling the Waters; Kelley, Battling the Inland Sea.
- [62] Swain et al., "Increasing Precipitation Volatility in Twenty-First-Century California."
- [63] Arax and Wartzman, The King Of California.
- [64] Beaumont, "Healing Process."
- [65] Harvey, "Scientists Risk Arrest to Demand Climate Action."
- [66] Brend, "Fire Experts Say It's Time to Rekindle Old Indigenous Knowledge to Calm Wildfires."
- [67] Arax, The Dreamt Land.
- [68] Harkinson, "Meet the California Couple Who Uses More Water than Every Home in Los Angeles Combined."
- [69] Alarcón-Jiménez, Pasalodos, and Díaz-Andreu, "Mapping with/In"; Latta, Handbook of Yokuts Indians.

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About the Author

Vivian Underhill is of Irish and English settler descent and was raised in Colorado, the ancestral lands traversed and stewarded by Indigenous nations including the Arapahoe, Cheyenne, Ute, Apache, Comanche, Kiowa, Sioux, Shoshone, and Pawnee. Her book manuscript in progress, entitled *Drained: Water, Oil, and Environmental Justice in Colonial California*, is based on seven years' ethnographic and community-based research on the environmental justice impacts of oil and gas extraction in California's San Joaquin Valley, grounded in California's longer history of colonial land transformation. She holds a Ph.D. in feminist studies from the University of California, Santa Cruz and is currently a postdoctoral scholar at Northeastern University's Social Science Environmental Health Research Institute.

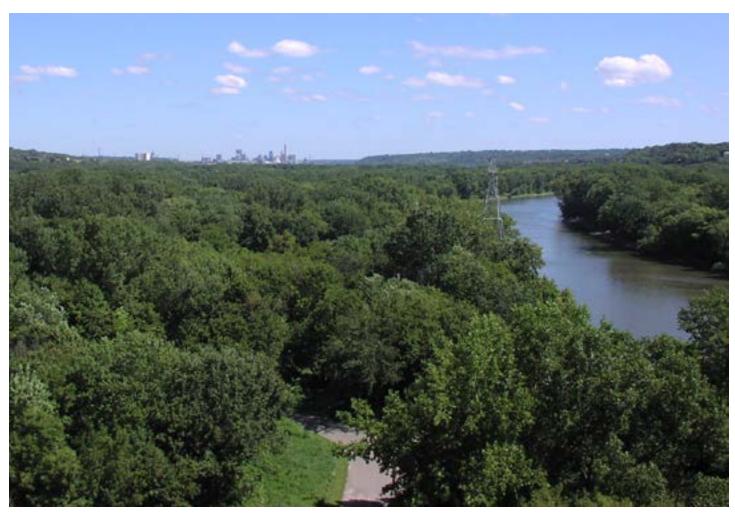
FEATURE

LAYERS IN THE LANDSCAPE: A FLOODPLAIN FOREST AND THE PEOPLE WHO HAVE INHABITED IT

By Patrick Nunnally

The Mississippi River in the Twin Cities region is a truly remarkable landscape corridor. It serves as part of an important flyway for North American birds, is the ancestral and traditional

homeland of Dakota people, and has been the site of several developments that have global and national significance. Food companies Pillsbury and General Mills began at flour mills located at the



Detail from Fig 17: The floodplain forest with the Mississippi River on the right, the city of St. Paul in the distance, and new trail development at the bottom of the photo.

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Falls of St. Anthony in present-day Minneapolis. Fort Snelling, located at the juncture of the Mississippi and Minnesota Rivers, was an early frontier fort that also was the location for an internment camp housing Dakota people after the disastrous 1862 US-Dakota War. Downstream, the site of St. Paul served as the head of river navigation for decades, and throughout the nineteenth century, was a jumping-off point for people and goods settling the northern plains.

All of these factors contributed to the river being designated as the Mississippi National River and Recreation Area, a unit of the National Park Service, in 1988. But rivers are not single points, of course, and the stretches of the Mississippi between the more celebrated nodes also have interesting and important stories, albeit more subtle than the major historical and natural attractions. This essay will address a stretch of the river that goes by several names. For the US Army Corps of Engineers, it is part of Pool 2, that stretch of the river that is impounded behind Lock & Dam 2 at Hastings, Minnesota. Figure 1 illustrates Pool 2 as it is defined by federal resource managers such as the Army Corps of

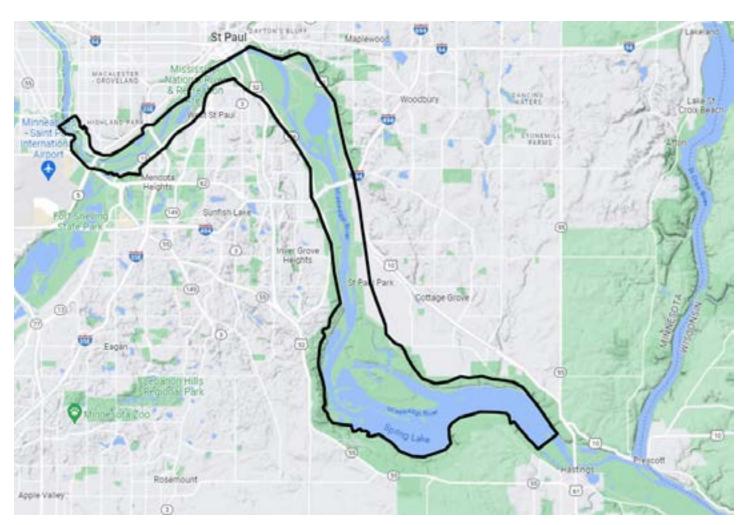


Fig 1: The area of Pool 2 stretches along the Mississippi River from the Ford Dam down to Hastings. Map data ©2023 Google.

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Engineers and the US Geological Survey. In river geography, a "reach" refers to a stretch of the river that retains comparable hydrological and geomorphological characteristics, in other words, where the land and water share many of the same characteristics. Pool 2 is quite a varied stretch of the river; this essay explores only that part of Pool 2 that is characterized by a floodplain forest, which is the upstream section, above downtown St. Paul. In St. Paul's <u>Great River Passage plan</u>, the city's master plan for its 17 miles of riverfront,

this stretch is referred to as the "Valley Reach" (City of Saint Paul 2013). Whatever the name, this part of the river illustrates many of its most important stories in microcosm, from the geological and hydrological forces that shaped the physical landscape, thorough its inhabitation by Indigenous people to a short-lived settlement of white settlers, called Lilydale, and finally to a series of park spaces that are rejuvenating biological systems and highlighting the continued presence of Indigenous people.



Fig 2: This drawing, taken from the Great River Passage Plan adopted by the City of St. Paul in 2013, illustrates the "Valley Reach," that stretch of the Mississippi River between downtown St. Paul and the confluence with the Minnesota River. Image courtesy of the City of St. Paul Parks and Recreation Department.

So just what is it about this landscape that makes it so subtly notable? For one thing, the connection between the river and the adjacent landscapes is much closer than on most of the river corridor. The lands bordering the river here are marked by frequent seasonal flooding, which is not separated by walls the way it is in most urban areas, or by levees as it is farther downstream to protect farmland. The floodplain here is covered with second or third growth forest, which has been undisturbed in many places since soldiers at

Fort Snelling cut the original growth for construction and fuel purposes. Figure 4 illustrates the densely wooded valley, with the City of St. Paul rising in the background from bluffs, much like the bluff vantage point from which the picture was taken.

Despite its geomorphological uniqueness, which created the particular configuration of floodplain and bluff, the long term history of this landscape reflects patterns found throughout the

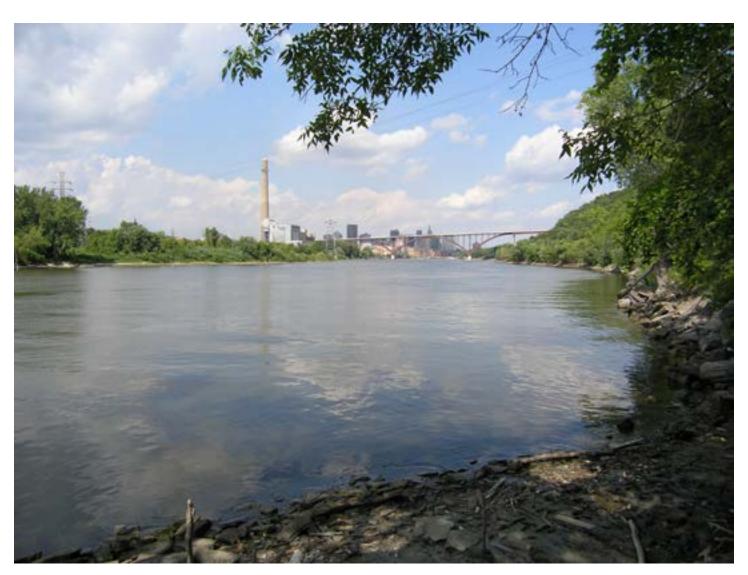


Fig 3: One of the distinctive characteristics of the floodplain forest stretch of the Mississippi River is the proximity of land and water, which allows for perspectives such as this one, facing downstream to St. Paul from the waterline near the former community of Lilydale.

Image courtesy of the author.

Mississippi River corridor. Indigenous people lived in proximity to the river, utilizing it for food and other purposes, and building a spiritual life around it. After the series of treaties through which the United States government established "ownership" of the land, settlers colonized the river's banks, adapting them in ways that yielded money. In much of the river, that era of industrial

capitalism is largely over, leaving behind landscapes that are being transformed into parks and "ecological restoration" sites. St. Paul's floodplain forest reach, then, is both unique and universal, and therein lies part of its importance. The layers of inhabitation of this landscape remain visible and present for centuries, even millennia, of human inhabitation with the river.



Fig 4: A view of downtown St Paul taken from a bluff at the upper end of the floodplain forest reach. The city itself and the cathedral to the left sit on benches left by catastrophic flooding of the Glacial River Warren approximately 12,000 years ago. The current Mississippi River channel is the low, tree-covered area in the middle of the image. Image courtesy of the author.

Water, Land, and People

The relationships between land and water define the floodplain forest reach, and, in this place, those relationships were established roughly 12,000 years ago when the Glacial River Warren cut its way through the immediate post-glacial landscape. As the Wisconsin glaciation retreated in what is now the Upper Midwest and Great Plains, it left behind Glacial Lake Agassiz as it tried to drain to the north into Hudson Bay and

was blocked by the retreating ice. Lusardi and Dengler (1994, rev. 2017) note that Lake Agassiz covered over 300,000 square kilometers. The surface area of glacial Lake Agassiz was greater than the surface area of all the Great Lakes combined; it was the largest freshwater lake on the planet at that time. Glacial Lake Agassiz had several outlets where it drained, usually in a catastrophic fashion, during its existence.



Fig 5: The immediate post-glacial water flow in this area was complex. To the right, the yellow shading marks a pre-glacial channel of the Mississippi River. Blue arrows indicate water flow directions during a catastrophic flood of the Glacial River Warren. Notice that the smaller Mississippi River, to the left, is flowing in a reverse direction to what it does today. This is because the high floodwaters of the Glacial River Warren block the river from its normal course. Only with the final decline of the River Warren could water bodies assume something like their present configuration. Image courtesy of Jay Bell.

One of the most dramatic floods of Glacial Lake Agassiz occurred around what is Brown's Valley, Minnesota today. The lake is thought to have broken through an ice dam and the raging river, known as the Glacial River Warren, carved out what is the Minnesota River Valley today. Water from glacial Lake Agassiz drained toward the southeast, eventually reaching the area that is now the Twin Cities where the Minnesota and Mississippi River join. Geologist Carrie Jennings (2023) describes Glacial Lake Agassiz, the Glacial River Warren, and their relation to the Modern Minnesota River. The massive floodwaters caused the Mississippi River to flow backwards up into

what is now the City of Minneapolis, and most of the floodwaters would have also carved the gorge and created today's blufflands and floodplains between the confluence of the rivers and St. Paul.

See the <u>video</u> featuring geologist Carrie Jennings describing Glacial Lake Agassiz, Glacial River Warren, and their relation to the Modern Minnesota River.

The River Warren also created a large waterfall (River Warren Falls) where the flood waters passed over an ancient, pre-glacial channel of the Mississippi River near today's Lowertown in St. Paul. This ancient channel is the precursor of

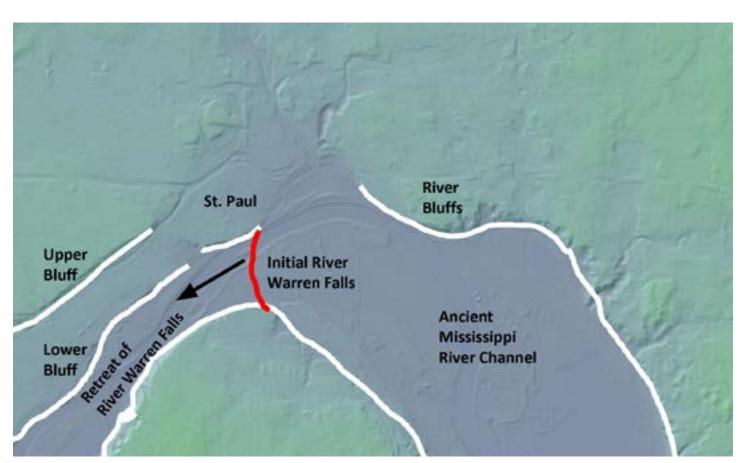


Fig 6: This image is made from a digital elevation model and shows the blufflines left by catastrophic floods of the Glacial River Warren. The approximate location of the original River Warren Falls is shown in red. Image courtesy of Jay Bell.

the wide Mississippi River that flows south from St. Paul today. The ancient river channel was filled with more recent glacial sediment that was scoured out by the floods, creating River Warren Falls on the edge of the old channel.

Over the hundreds of years in which the River Warren was cutting its way through St. Paul, evidence suggests that the flooding occurred in pulses where the river flowed at a higher level, only to subsequently have its flow reduced. These periodic flood pulses have resulted in a series of bluff formations in the city, all of which are above the current floodplain. In some areas of this reach, there are two distinct bluffs. On the north side of the valley, the lower bluff is below Shepard Road and the upper bluff above West 7th Avenue. The upper bluff was carved by the River Warren and the lower bluff is where the River Warren Falls subsequently carved another gorge. The geologist Greg Brick (2008) describes the process of landform creation as follows: "A waterfall on this glacial river, thought to have been grander than Niagara Falls, chewed its way upstream from downtown St. Paul" (7).

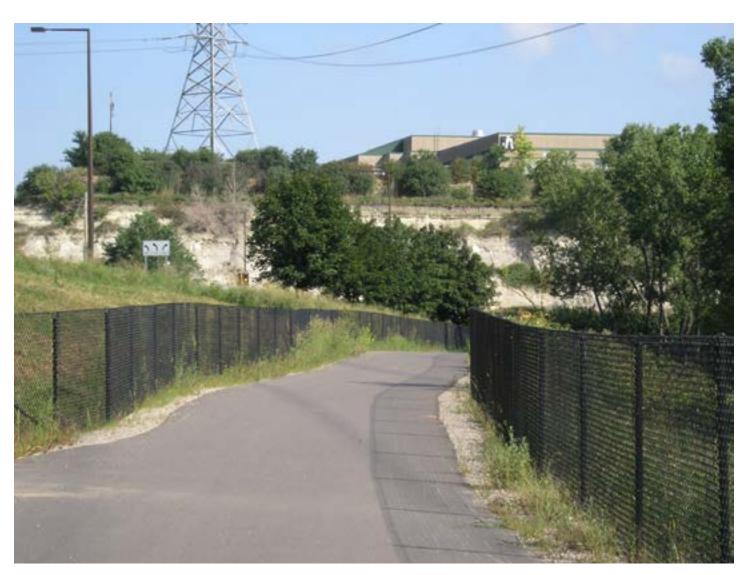


Fig 7: This bike path, adjacent to I-35E, reveals a view toward Shepard Road at the bottom of the bluffs. The successive floods of the Glacial River Warren left these bluffs on which the buildings sit, as well as the bluff where Shepard Road is located, well above the current river level. Image courtesy of the author.



Fig 8: Pickerel Lake before recent extensive park development. The lake, which is an example of a "yazoo channel" fed by groundwater and parallel to the present channel of the Mississippi River, is very close to the former village site of Lilydale. Image courtesy of the author.

As the river that became known as the Mississippi stabilized within its current banks, subject to periodic flooding, a distinct ecology emerged. These ecological communities are dependent on the interactions of land and water, with occasional seasonal floods filling more of the floodplain depending on the intensity of spring floods. Moreover, as the main channel stabilized, a series

of side channels (known as yazoo channels) were established that were fed by groundwater, surface water, and upland springs that were replenished by the occasional seasonal floods. Contemporary Pickerel Lake on the west side of the river (Figure 8) and Crosby Lake and the backwater marshes (Figure 9) on the east are examples of these remnant channels.



Fig 9: Another "yazoo channel," fed by groundwater and springs and paralleling the current channel of the Mississippi River. This wetland is in the upper/east end of Crosby Farm Park.

Image courtesy of the author.

Coarse, sandy soils form the river's banks, owing to deposition from fast-moving flood waters near the channel. Finer, silty soils travel farther inland on the slower moving floodwaters, and are deposited farther away from the bank. The sandy soils on the banks form a series of natural levees, which support particular vegetation species, such as silver maples, elms, cottonwoods and green ash (Randazzo 2013, 57). All of these are canopy trees, and the understory species associated with

them flourished as well; all these species were important to Indigenous people as sources of food, fiber, and medicines.

Humans came to this reach of the Glacial River Warren millennia ago. This concept is central to platforms as diverse as the <u>Bdote Memory Map</u> web site, the video "<u>Telling River Stories</u>" (Allies: Media/Art 2011) and the book *Mni Sota Makoce: The Land of the Dakota* (Westerman



Fig 10: A path through the floodplain forest in Crosby Farm Park. The ridge to the right of the image is a natural sandbar formed by sand deposition during regular, seasonal flooding.

Image courtesy of the author.

and White 2012). Dakota voices for all of these sources agree: this reach of the river is central to their genesis story, part of their conception of the center of the earth. Beginning in the eighteenth and nineteenth centuries, documents written by explorers and settlers created a more detailed sense of how Dakota people lived in this space, albeit those accounts have to be understood as told with a number of biases.

Many accounts of United States history proceed from an assumption that, while there were Indigenous people in North America, they had not altered ecological systems in any substantial way. This mythology, sometimes referred to later as "the ecological Indian" (see Krech 1999 for an argument overturning this myth), was used as a justification to take Indigenous lands in order to "improve" them. Westerman and White (2012) paint a very different picture, offering detailed accounts of how Dakota inhabited the southern parts of Minnesota. They make clear that, while the landscape may have been "empty" to undiscerning eyes, it was full of names, stories, meanings, and contemporary uses.

Westerman and White provide a map (2012, 121–22) of Dakota summer villages that shows the region around the floodplain forest reach to have been well populated, although no village is shown on the stretch of river between the confluence with the Minnesota and Kaposia's village, near present-day St. Paul. A number of factors have to be considered before judging that this particular stretch was "empty," however. For one thing, there is the question of what is a "summer village"? Contemporary observers, such as the missionary Samuel W. Pond, recount that Dakota moved seasonally, meeting in larger villages in warmer weather for agriculture and food-gathering purposes. In winter, people left summer

villages for smaller groupings more suitable to cold weather and winter activities (Pond [1908] 1986). A second question that should be raised is when were the villages depicted in Westerman and White's map active? Groups moved about more or less frequently as the availability of game and the suitability of soils for agriculture dictated. These caveats notwithstanding, the map and account in Westerman and White, along with other scholarship by Gary Clayton Anderson ([1984] 1997), Janet Spector (1993) and others, depict a landscape that was thoroughly inhabited by Dakota people in the eighteenth and early nineteenth centuries.

Vegetation, or as some Dakota say, "plant relatives," provides critically important threads of continuity between past and present Dakota inhabitation of this landscape. The cottonwood tree, in particular, has remained vitally important to Dakota people. In a July 2021 webinar, "Gifts of the Cottonwood Tree," Maggie Lorenz spoke of how the cottonwood is "a sacred tree, a medicine tree" (Wakan Tipi Awanyankapi 2021). Lorenz is the Executive Director of Wakan Tipi Awanyankapi, an Indigenous-led organization that works on cultural and natural restoration at a floodplain site just downstream from the River Warren Gorge. Jim Red Eagle, a respected Nakota/Dakota elder, spoke at the webinar and shared that, "We believe our spirit comes from the stars, so we relate that to the star in the cottonwood tree....Our spirit is from the star world, and within the branch is a star shape....The cottonwood brings water, it will find water" (Wakan Tipi Awanyankapi 2021). He cautioned that it is important to understand that there are multiple names for the cottonwood, depending on how it is being used, whether as medicine, as food, or as provisions for animals in a severe winter. Whatever its particular use, Dakota will often

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refer to "our cottonwood relative." The webinar was described very elegantly in an accompanying text, "Plants that Doctor the Earth: A Mid-Summer Appreciation of the Cottonwood," which also addressed contemporary concerns about water levels and pollutants in the Mississippi River and how changing conditions may be affecting cottonwood regeneration (Wakan Tipi Awanyankapi n.d.). Other writers have described medicinal properties of the cottonwood in different terms, explaining that "the anti-inflammatory

nature of its salicin-filled buds, leaves, and bark is well understood and appreciated" (Suchanek 2023).

A short, beautifully told <u>version of the cottonwood star story</u>, as given by Mary Louise Defender Wilson, is part of *My Relatives Say: Traditional Dakotah Stories as told by Mary Louise Defender Wilson* (2001). The star remains, as part of the joint structure of the cottonwood tree.



Fig 11: The star shape of the pith in twigs and small branches of the cottonwood tree is visible in cross-section.

See the <u>video</u> "The Star in the Cottonwood Tree." by Mary Louise Defender Wilson.

Beyond the specific values and attributes of the cottonwood tree, this stretch of the Mississippi, like the broader river itself, is of continued tremendous importance to Dakota people. The late Elder Alameda Rocha told a 2010 gathering, "We always lived along the river. We used it in many ways" (Rocha 2010). Dakota educator Ramona

Kitto Stately says, "The river itself is where I go....I really feel the spirits of my grandmothers in that place. So we walk all the way along that island, Pike Island, and that's where we look for the perfect round medicine stones" (Stately 2012). The Pike Island that Stately refers to is immediately across the river from the upper part of Crosby Farm Park, at the very head of the floodplain forest reach.



Fig 12: The confluence of the Minnesota River, shown by the silty water in the foreground, and the Mississippi River. Crosby Farm Park is in the background and Pike Island, wita tanka to Dakota people, is just to the left of the image. This area is known as Bdote, the site of Dakota genesis and genocide. Image courtesy of the author.

But the river is a place of pain and loss as well as renewal. Šišókaduta (Joe Bendickson) put the complicated feelings this way:

No one ever told us that this is where we were imprisoned in 1862. I just developed a connection to the river naturally. We would ride our bikes down there, go walking or hiking, or just go down by the river and skip rocks. We've been living here, according to our oral histories, since we were created,

this is the spot of our creation, the Bdote, so we've been here since the beginning of time, basically, according to the Dakota people. I also learned how the wasichu came and basically swindled us out of our land, with the treaty of 1805 (Sisokaduta 2012). Note: "Wasichu" is one Dakota term for white settler colonizers, who began to dominate this part of the river in the early nineteenth century.

"You can't negotiate with the river"

When Sisokaduta speaks of the Dakota being swindled out of their land, he is referring to a series of nineteenth-century treaties between Dakota people and the United States that conveyed land in exchange for various goods, services, and funds. These treaties have been addressed thoroughly, in exhibits such as Why <u>Treaties Matter</u> and at web sites such as <u>Bdote</u> Memory Map. The Minnesota Historical Society offers a clear map of treaty lands in the state. In all of these historical sources, it is evident that the treaties were never fulfilled as intended and, in fact, were likely fraudulent from their very signing. The brief account that follows addresses only the most salient aspects of the treaties affecting the floodplain forest on either side of the Mississippi in the River Warren Gorge.

The first treaty, between Lt. Zebulon Pike of the US Army and a number of Dakota leaders in 1805, is the subject of some controversy, historian Martin W. Case argues: "Today, many people believe that Pike Island in the Mississippi River, and its entire vicinity (on which the Twin Cities now rest) became the property of the US at a treaty conducted by Zebulon Pike in 1805. This is not true, and it is typical of the misinformation that surrounds Pike's conference with the Dakota" (Case 2012). Case points out that Pike may not have been acting on behalf of the United States government at all, that there are inconsistencies in the historical record about the terms of the alleged treaty, and that whatever Pike signed was never ratified by the Senate. Legally, if there's no ratification, there's no treaty; nevertheless, Pike's actions started a process of dispossession of Dakota land.

The north side of the Mississippi ("east" in common parlance because the Mississippi is generally a north/south river in its navigable reaches, hence has a common "east" and "west" bank) is where downtown St. Paul now is located and is likewise the location of Crosby Farm Park. This land was conveyed by treaty in 1837, signed in Washington D.C. between government officials and representatives of the Mdewakanton Dakota bands who had not been told in advance the purpose of the trip to Washington. The MnOpedia digital platform managed by the Minnesota Historical Society reports that "the Treaty of Mendota transfers control of lands that include what will later become St. Paul's West Side from the Dakota to the United States, thus opening it to legal Euro-American immigration" (Nelson 2015). This was the second land cession treaty signed in 1851; the first, at Traverse des Sioux between the United States and the Sisseton and Wahpeton bands, conveyed land farther west (Weber 2012). A tragic outcome of all of

these treaties is that after the catastrophe of the 1862 US-Dakota War, all treaties between the United States and the Dakota in Minnesota were unilaterally nullified by the United States government, legally exiling Dakota people from their ancestral home (DeCarlo 2022). As the voices of Sisokaduta, Ramona Kitto Stately, and many others remind us, Dakota people are still here and deeply tied to the land, but subsequent efforts and changing land use and settlement must be seen in light of the events between 1805 and 1863.

The treaties, of course, were devices to remove Indigenous people from their homelands and "open" them to white settlers. In the case of the Mendota treaty with the eastern Dakota, it did not take long for settlers to begin staking claims to the land on the west side of the Mississippi. Historical accounts in the personal papers of Lilydale village historian David Byrne indicate that the first real estate transaction on the west

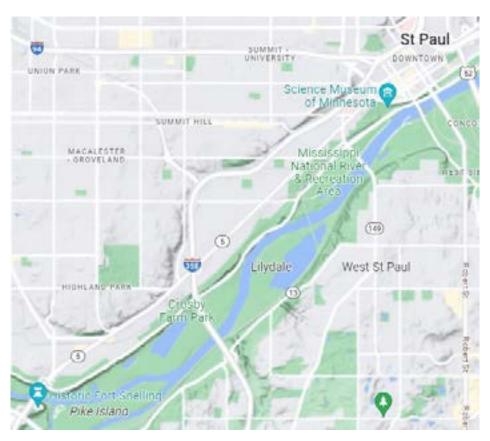


Fig 13: This map shows the Lilydale and Crosby Farm Park area. Map data ©2023 Google.

bank of the river between the town of Mendota and the city of St. Paul—the platting that would become the Village of Lilydale—was made in 1855, only four years after the area was available for sale to settlers, and involved the mayor of St. Paul (and soon to be Governor of Minnesota) Alexander Ramsey. However, there were no articles of incorporation or settlement until the 1880s (Owen n.d.). For several decades around the turn of the twentieth century, the settlement's news items centered largely on what its name should be (Lilydale, or Lilydale, or Lily Dale), what county it belonged in (Dakota or Ramsey), and whether or not it should be formally incorporated as a village separate from a rural township in the county (Byrne n.d.).

Tangible, physical aspects of a growing community appeared during the decades after initial platting in the 1850s. By 1893, a school house had been built, which, according to an article in the Dakota Historical Society (1982) magazine Over the Years, "provided shelter for church services, weddings, Ladies Aid meetings, and would later hold council meetings." The Twin City Brickyards opened in 1889 on land that was at the eastern edge of the village site. A nearby gravel pit owned by the Shiely Company became the subject of local controversy in the 1950s, as the company offered to help repair a road through the village at the same time as the village was considering separating from Mendota Township again. There was a great deal of suspicion about these two events being connected-Shiely would perhaps have more influence on an independent villagebut it does not appear that collusion was proven (Dakota County Historical Society, 1982, 3-4).

The river, though, was a constant presence in the physical landscape of Lilydale. During most

of the period of the village's existence, the river was mostly used for transportation and the removal of waste. The threat of flooding was an annual concern (Woltman 2019) There was no regional wastewater treatment until 1938, when the Metropolitan Wastewater Treatment Plant opened on the east side of St. Paul. The growing Twin Cities region and its industries had begun putting more waste into the river than could be removed naturally. Two other structural changes contributed to declining water quality. In 1917, a dam and lock were built upstream from the floodplain forest reach at the foot of the Mississippi River gorge. The intent of this dam was to provide hydroelectric power and to attract industry, a goal which was met in 1925 when the Ford Motor Company opened a plant at the site of the lock and dam (Bellvill 2019). The second factor, which may have been even more of an impetus for wastewater treatment, was the closing of Lock and Dam 2 at Hastings in 1930 (National Park Service 2020). This facility, which was part of the Army Corps of Engineers Nine Foot Channel Project to improve commercial navigation, backed water up past St. Paul, past the Lilydale village site, all the way to the lock and dam at the Ford site. The effect was to slow the flow of the river, as well as runoff from pollution sources on land, at a time when there was not yet a way to treat industrial or urban household wastewater. In effect, a river that flowed according to natural cycles and saw a spring "flushing" every year with the rise of water due to snowmelt was turned into a placid lake-like body of water, which was much more stagnant. According to village historian David Byrne, "Lilydale had no sewer system. They had septic systems. Floods in 1965 and later put the septic contents into the River" (personal email correspondence with the author, October 17, 2023).

Lock and Dam 2 at Hastings created a permanent condition of high water, eliminating the seasonal ebb and flow of river levels. The presence of a permanent water level suitable for commercial navigation meant that summer and fall, which were ordinarily "low water" seasons on the river, were no longer times when the river shrank in its channel. Subsequently, floods would perhaps be higher, although the correlation is poorly understood. Also poorly understood, and being researched currently, is the relation between standing high water and the health of the flood-plain's cottonwood stands.

According to an article in *Over the Years*, flooding in 1951 and 1952 "caused a mass exodus from Lilydale" (Dakota County Historical Society 1982, 4). Unpublished or privately published memoirs of this time paint a picture of farming, some houses with electricity, but some heating with wood stoves and lighting their houses with kerosene, and outhouses instead of widespread indoor plumbing. One writer recalls that the 1952 flood reached the eaves of his house, and his family never returned, while another waited it out until the even greater 1965 flood accelerated the exodus from the floodplain. After the school house closed in 1950, children took a bus to schools on St. Paul's West Side (Byrne n.d.). Some floodplain residents relocated to other parts of the region, and those who stayed lived in mobile homes with a kitchen and bath (David Byrne, personal email correspondence with the author, October 17, 2023).

By 1978, according to an article in the *Dakota County Tribune* by Yvonne Macko, land that had formerly been farmland and sand and gravel pits along Highway 13 on the bluff above the Mississippi had become home to 400 people—the relocated Village of Lilydale—although it would be referred to as "Upper Lilydale" for quite a while.

Byrne points out that the residents who had been moved off the floodplain, the original Lilydale village site, "landed in working class sections of St. Paul, West St. Paul and South St. Paul" and not up the bluff to what was a higher-end residential development (David Byrne, personal email correspondence with the author, October 17, 2023) Across the river and slightly upstream, the farm originally farmed by Thomas and Emma Crosby endured as a farm through the floods of the 1950s before being acquired by the City of St. Paul for eventual use as a park in the 1960s.

The exodus from Lilydale, which had begun in the late 1940s, was complete by the end of the 1970s. According to village historian David Byrne, Ramsey County had coveted the village site and surrounding bluffs and lake as a potential location for a regional park for some time. But the land was in Dakota County, complicating efforts by Ramsey County to develop a park on the site. According to Byrne, the state legislature passed a law in the early 1970s permitting a county to acquire land in another county, and the City of St. Paul became the site's manager. As Byrne put it, "The Lilydale city council felt they had no option and went along hoping to lobby for the best deal for the displaced" (personal email correspondence with the author, September 12, 2023). According to newspaper accounts, attitudes about the move among the displaced people ranged from resignation to bitterness. The last residents to leave Lower Lilydale agreed that a special place, a settlement in the middle of the city that felt like a rural village, was ending. But, as was reported in a short article, "Lilydale to Be Ghost Town? 4 Homes Moved by Barge" (unidentified clipping in the papers of David Byrne), "you can't negotiate with the river." Today, the "City of Lilydale, pop 619" sign on the I-35E bridge over the Mississippi River refers to the population of

the present city, which is on top of the bluff, along State Highway 13.

The current City of Lilydale has recently embarked on a research project to gather the stories of people who lived in "Lower Lilydale" A video, "A Call to Remember Lower Lilydale," hints at the stories that exist, as well as the landscapes that remain an oasis of quiet in the middle of a metropolitan area (Town Square Television n.d.).

See the <u>video</u> "A Call To Remember Lower Lilydale" by Town Square Television.

The 1970s was a period of dramatic change in this reach of the river. Crosby Farm, on the east side of the river, had been bought by the City of St. Paul in 1962 for park use, and development activity began in the 1970s. There was no bridge across the river in this stretch, so it is unlikely that there was much connection between Lilydale



Fig 14: This park path in Lilydale Regional Park likely follows one of the street alignments in the village, as illustrated in historical aerial photographs. Image courtesy of the author.

and the farming activities on the Crosby site. The City and the newly-formed Metropolitan Council followed in 1976 by purchasing the land on the floodplain where the Village of Lilydale had been. A park road appears to follow roughly the alignment of a central street in Lilydale. Sharp-eyed

vegetation experts might recognize the occasional lilac bush or other invasive ornamental plant as evidence of a former residential location. For the most part, though, in the roughly 50 years since residents left Lilydale, the floodplain forest has regrown.



Fig 15: This 1923 aerial photograph captures the village of Lilydale at what might have been its greatest population and spatial extent. The dark clump of trees left of the center appears to be roughly the spot of the park path in Fig 14.

Aerial photograph from City of Saint Paul aerial survey, 1923. Photo 4-6.

Image via John R. Borchert Map Library, University of Minnesota.

The River at the Heart of the City

For nearly a century, between the industrial heyday of the 1880s to the 1920s and a flurry of planning and park development activity beginning in the 1970s, the Twin Cities essentially "turned their back" on the Mississippi River. The river itself was a filthy, polluted mess and river-adjacent lands were either the sites of aging transportation and industrial infrastructure or gatherings of impoverished newcomers to the region. The examples of Bohemian Flats, Little Italy, and Swede Hollow, all of which were unplatted informal settlements sequestered in available space on the river, were the most common settlement type (Hines 2014). By contrast,

Lilydale was almost idyllic, with platted streets, formal government, and much less crowding than the other sites. Nevertheless, the river flooded all of them out, and with the retreat of the last Lilydale residents, the way was clear for city and regional government to put these lands to new purposes.

Development of regional parks on the land that was formerly the village of Lilydale and Crosby Farm depended on several sometimes-related events. In 1972, Congress passed the <u>Clean Water Act</u>, which regulated the discharge of pollutants into most of the nation's rivers from industrial

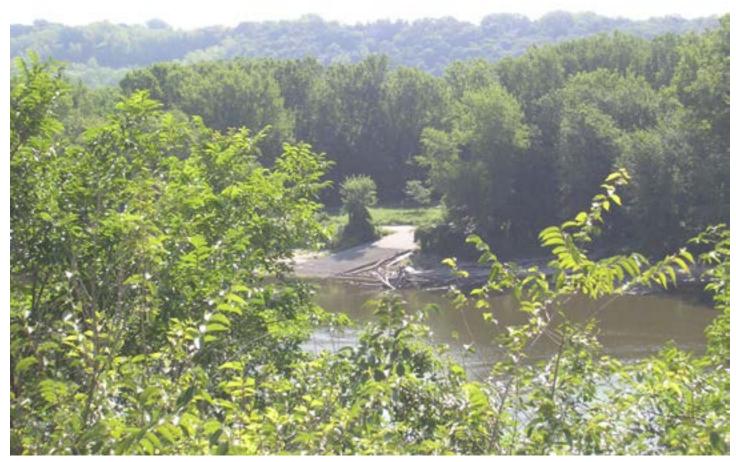


Fig 16: The boat launch in Lilydale Regional Park is roughly where the village site was. The image also clearly illustrates the bluff landscape overlooking the present Mississippi River and floodplain forest channel. Image courtesy of the author.

and urban sources. Although the river remains polluted from a wide array of dispersed "nonpoint" sources, the water is measurably cleaner than it was 50 years ago (Metropolitan Waste Control Commission 1988). The Minnesota Legislature created a Regional Parks system for the Twin Cities in 1974, under the purview of the Metropolitan Council. The impact was to coordinate park development on lands where the importance was regional, not just local. Crosby Farm Park and Lilydale Regional Park are both designated as regional parks. In 1976, in part as a response to proposed development near Crosby Farm Park (see Anfinson, n.d.), the State of Minnesota established the Mississippi River Critical Area, which regulates development and requires special local land use planning along a

72-mile stretch of the Mississippi River in the Twin Cities. Finally, in 1988, this 72-mile stretch of the river was declared to be the Mississippi National River and Recreation Area, a unit of the National Park Service. The image here shows the floodplain forest, with the Mississippi River on the right, the city of St. Paul in the distance, and new trail development at the bottom of the photo. The combination of features in this landscape, with the proximity of ecologically valuable spaces, urban space, and recreational space, all of which still have Dakota presence, is why this stretch of the Mississippi River was named as a unit of the National Park system.

The net impact of these changes is far-reaching. The river is cleaner, so it is more attractive for

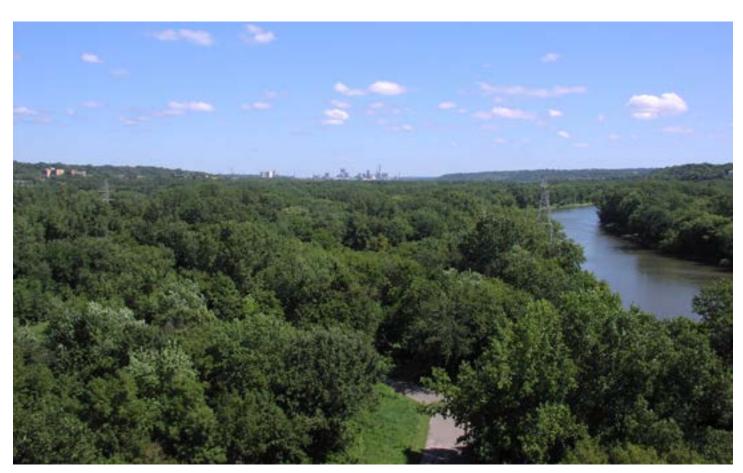


Fig 17: The floodplain forest with the Mississippi River on the right, the city of St. Paul in the distance, and new trail development at the bottom of the photo. Landscapes such as these, with the proximity of ecologically valuable spaces, urban space, and recreational space, all of which still have Dakota presence, are why this stretch of the Mississippi River was named a unit of the National Park system in 1988. Image courtesy of the author.

park development and for urban redevelopment of obsolete industrial and transportation sites. The combination of local, regional, state, and federal planning and policy protection makes the corridor much better protected than it would have been otherwise. In fact, when the City of St. Paul was implementing its Master Plan for Lilydale Regional Park, the potential to gain state funding for the process overcame local opposition from community members who wanted to preserve the park as it was, as a more "natural" landscape (Dunbar 2012).

Planning activity continued in the late 1990s and picked up speed considerably in the years between 2009 and 2019, with the City of St. Paul adopting and in some cases implementing master plans for parks at Lilydale and Crosby Farm Park.

By 2009, when the City of St. Paul adopted an addendum to the earlier Harriet Island-Lilydale Regional Park Plan, the area had become known and loved as a park with very little development. A road and bike trail passed through the floodplain forest, which retained several magnificent cottonwood trees, and there was a boat ramp on the Mississippi. A gravel parking lot adjacent to Pickerel Lake led hardy fisherfolk to an informal boat ramp. Despite opposition, the City went ahead with its adopted plan, addressing water and sewer issues in 2014, rebuilding the park road in 2017, and opening a picnic pavilion overlooking Pickerel Lake in 2019. The former inhabitants of the Village of Lilydale are not memorialized with so much as an interpretive sign, landscape feature, or street name.

Landscape Futures

Ironically, as Bob Shaw (2012) points out, the very layers of protection discussed above can be a contributing factor to challenges facing the river itself. Because the adjacent undeveloped landscapes are undeveloped, there is not an obvious constituency to press for remediation of problems such as increased sedimentation filling in the channel. Friends of Pool 2, an advocacy group for this stretch of the river, is focused for the most part downstream from St. Paul, where both commercial and recreational boating are concentrated. In the floodplain forest reach, matters are pretty quiet with regard to the river itself.

The case is very different on the land. Private sector advocacy groups such as the <u>Mississippi</u> <u>Park Connection</u> have teamed up with the City of St. Paul, the <u>National Park Service</u>, and the University of Minnesota to devise an adaptive urban silviculture program that might serve as a climate change adaptation and begin to answer questions about why cottonwoods are not thriving as they might be expected to. Moreover, those partners, plus the nonprofit Great River Passage

Conservancy, are combining efforts to develop a <u>River Learning Center</u> on a site adjacent to and including part of Crosby Farm Regional Park.

The Master Plan for Hidden Falls-Crosby Farm Regional Park concludes with this powerful acknowledgement: "This area's proximity to the Bdote must be acknowledged as future park projects move towards realization. Engaging with the Minnesota Indian Affairs Council (MIAC), local tribal leaders, and the Indigenous community will be necessary throughout the stages of every project (City of St. Paul Department of Parks and Recreation 2019, 58). Most Dakota people would say that Hidden Falls-Crosby Farm Regional Park is in and is central to Bdote, not just proximate to it, but the point is significant: working with Indigenous people, who have lived in and valued this place for millennia is a necessary part of planning for its future.

This is true throughout the length of the Mississippi. Indigenous continued presence must always be recognized, honored, and engaged, a fact which is important to take into account

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throughout the corridor. If we are going to live for a long time with the vicissitudes of the great river, we must understand the layers of the landscape that are present, how and why they developed and were (partially) erased, and what options remain for our future actions in place. Landscapes are layered in complex ways, not all of which are visible to the naked eye, or to the casual visitor. All of the settlements along the length of the river over the past 300 years, from cities such as

New Orleans and Memphis to the remnants of shantyboat communities, are on Indigenous land. The stories of Lilydale and the floodplain forest where it was situated are important in their own right, but also for what they suggest about how humans have lived in relationship to this big river in the past for millennia and what can be done to ensure a long term sustainable and just future with the river.

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About the Author

For over three decades, Patrick Nunnally's work has focused on understanding and enhancing the connections that people and communities have with places they value, particularly places along the Mississippi River. Nunnally is an environmental historian by training and is broadly experienced in gathering interdisciplinary teams and working with community partners in teaching and program development. For the past 15 years, Nunnally has developed a special focus on working with Indigenous community partners.

FEATURE

CREATING CHANGE THROUGH COMMUNITY-ENGAGED RESEARCH: AN OPEN RIVERS COLLECTION

By Laurie Moberg

66 Why are you doing this work?" P'Ong's question caught me a bit by surprise. I was sitting with P'Ong on a thin bamboo mat covering the tile floor of his home near the Yom River in northern Thailand. P'Ong had spent the day introducing me to his village including both the people and places that were part of the anti-dam protest movement there. After I'd spent the day asking him question after question about the

village and protests, I was surprised to have a question thrown back to me. I paused, trying to find my words, and that was not only because I needed to articulate my response in Thai, but because I needed to frame a response altogether. Why was I doing this work? I didn't want the answer to be simply about my dissertation, my Ph.D., or my future.[1]



Detail from 'Storying the Floods: Experiments in Feminist Flood Futures' Watershed meeting in Coon Creek. Image courtesy of Caroline Gottschalk Druschke, Margot Higgins, Tamara Dean, Eric Booth, and Rebecca Lave.

P'Ong accepted my pause as an opportunity to continue. He explained that farang (Thai for foreigners, particularly white people) researchers had been coming to this village for many years studying everything from Buddhist tree ordination to water quality in the river, from political protest campaigns to the forest biome. However, little of that research was for the benefit of the community or came back to be shared with community members; even less of that work took into account what the village considered the most important questions and concerns. This pattern left much of the community a bit disillusioned; while people were willing to share their stories with me, they had little expectation that I would do anything more than past researchers had done. Even if my questions were different, they were still MY questions. P'Ong was asking me to be a different kind of researcher. By asking why I was doing this work, he was giving me an opportunity to make this work better and more useful to this community.

Ultimately, P'Ong was pointing to the possibilities and power of community-engaged research. As a mode of collaboration, community-engaged research involves engaging and working with groups of people rather than merely studying about them. Bringing together both researchers

(often affiliated with institutions of higher education) and community partners to shape includes a variety of collaborative steps throughout the research project: identifying a concern, developing questions, shaping methods, conducting research, analyzing data, articulating outcomes, and enacting interventions. Starting from the concerns and experiences of community members shapes research that is intentionally responsive to community needs.

This commitment to community-academic collaboration aligns well with our priorities at Open Rivers. As a journal of public scholarship, Open *Rivers* creates a space for people to speak across disciplines, across professional sectors, across areas of expertise, and across communities to begin to understand different perspectives on the urgencies and tangles of environmental and socioecological challenges. We publish content that contributes to the interests of public discourse, speaks to public concerns, and strives to impact public action. Because our values resonate with those of community-engaged research, it isn't surprising that *Open Rivers* has become a platform for work that comes from this kind of research, specifically work that highlights pressing community environmental concerns.

Community-Engaged Research as Challenge and as Social Change

To understand the potentials and challenges of community-engaged research, we must first appreciate the values underlying this work. Community-engaged research focuses on cooperation and, better still, collaboration between researchers and communities. Typically, these communities share some kind of commonality—from geographic proximity to common interests to shared concerns about issues affecting their well-being—and through this shared affiliation, they have insight, experiences, and questions that can shape a collaborative research project

(Johnson and Jelks 2021). This approach also recognizes researchers as community members themselves, sometimes engaged in research in which they are part of both groups—researchers and community members.

Over the past several decades, this kind of research has gained momentum as a valued approach, reconfiguring the way academia and communities intersect and work together. Community-engaged research—done well, done collaboratively—asks for a shared investment in

the work and a shared commitment to the outcomes. This shift in focus—from academic inquiry to community needs—changes not only the questions we ask and how we do the work, but also redirects the values of the research itself. And the central value of this work is that it is of value to the community. Work stemming from this kind of engagement is, as Kathleen Fitzpatrick (2019) points out, "of compelling interest to the public that the project engages, precisely because that concern belongs to them" (175). Bringing campus researchers and community partners together to collaboratively guide the work makes the questions and processes more robust, more useful for effecting change, more able to make public impact, and more ethical (Jacquez, Ward, and Goguen 2016).

Yet the promise of community-engaged research does not diminish its challenges—and they are manifold. From lack of institutional support, tenure and promotion policies that do not favor

community-engaged work, the extensive time required to move at the pace of trust that exceeds the timelines of funders, and communities' distrust of researchers due to previous interactions, community-engaged research is complex and demanding (Fischer 2023, Fitzpatrick 2019, The TRUTH Project 2023, Tuck 2023). At the same time, the problems we face today—from climate change to racial injustice to political unrest and beyond—are messy and best addressed with expertise from varied sources, both within and beyond academia. This, then, is the crux of the paradox: done well, community-engaged research is incredibly challenging and yet vitally important. Put another way, doing community-engaged research "involves shared and equitable decision-making that leads to equitable ownership for the research process, which is imperative for meaningful and relevant answers to research questions. This, in turn, can lead to social change" (Jacquez, Ward, and Goguen 2016, 79).

Open Rivers Collection

This potential for social change is at the heart of the material we've gathered for this *Open* Rivers collection. Below, we offer a selection of articles previously published in *Open Rivers* that demonstrate community-engaged research methods and the core commitments of these methods: collaborative work, equity, and public impact. This sampling of the community-engaged research articles published in *Open Rivers* is not exhaustive, but we've collected them here because these articles specifically highlight the power of community-engaged research to effect social change. Specifically, the articles here speak to the potential for transformation that might contribute to solving—or at least improving—pressing environmental challenges and the social systems that shape them. From a mapping project with

tribal partners to reflections from researchers doing community-engaged work on hydrological and social systems, these articles offer insights for others on both the challenges and value of doing community-engaged work.

We've organized the material into a series of categories that demonstrate commonalities we see in the ways these articles effect change. The categories focus on evoking the voices and expertise of community partners, transforming institutional practices, and reframing the kinds of products shared through community-engaged research to ensure they serve public interests and needs.

Agency, Stories, and Expertise of Community Partners

One of the fundamental premises of quality community-engaged research is recognizing and honoring the contributions of community members as partners and collaborators. This commitment to community voices is even more important when addressing questions that affect communities that are disenfranchised or otherwise dismissed. Based on the Minnesota **Humanities Center's Absent Narratives** Approach™, intentionally creating space to include the perspective, stories, and expertise of people and communities who might otherwise be "absented" enriches our work, our relationships, and our capacities for identifying solutions and strategies for change. Organizers for We Are Water MN, a traveling exhibit organized by the Minnesota Humanities Center among several other state agency partners, wrote in *Open Rivers* that taking time to build relationships with community partners confirms a powerful conviction:

It's the belief that the people in our communities have something to teach us and that we can create new understanding together, that there is value in taking time to learn from and with each other, that building relationships with people can spark change by creating new pathways for solving problems and making decisions. (Gangeness and Tonko 2019)

We've selected a handful of articles here that prove this point. The authors share the stories of community partners in ways that validate their agency and expertise and give these perspectives circulation and credibility with broader audiences who might not otherwise learn to value these community stories. In addition, the content is included in *Open Rivers* in part because our commitment to making work broadly accessible means the community partners will have access to the work—to their own stories—as well.

"Restorative Cartography of the Theakiki Region: Mapping Potawatomi Presences in Indiana" by Elan Pochedley

In this article, Elan Pochedley (2021) writes about his collaboration with the Cultural Heritage Center of the Citizen Potawatomi Nation to "make visible...historic Potawatomi presences, ecological roles, environmental ethics, and narratives of geographic belonging" through decolonial mapping. Drawing on archival records as well as the expertise of partners, Pochedley offers a set of stories and interactive maps as starting points for reclaiming histories and places and reimagining collective futures. Pochedley (2021) writes: "As I've learned from visiting with relatives in Oklahoma and Michigan, as well as from Neshnabék writers and scholars, the sharing

of stories is critical for teaching communal ethics and lessons, while also creating space for individual interpretation and meaning making."

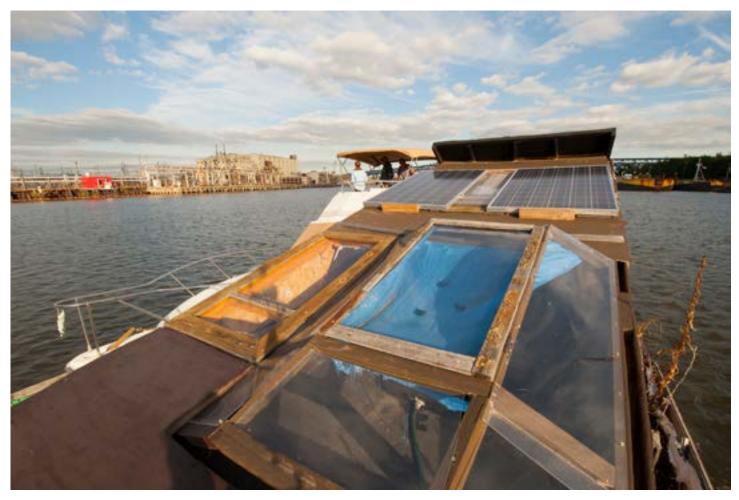


Wild rice and the 1833 Survey of Menominee's Reservation. Image by Elan Pochedley.

<u>"Forgotten Places and Radical Hope on Philadelphia's Tidal Schuylkill River" by Bethany Wiggin</u>

Describing the industrial, urban areas of the lower Schuylkill River in Philadelphia, author Bethany Wiggin (2017) explains that "this stretch of river can be described by what Ruth Wilson Gilmore calls a 'forgotten place,'" yet it also "teems with personal and local histories that intersect with histories of land use and social and environmental justice in and along the lower Schuylkill River." Wiggin and the Penn Program in Environmental Humanities worked with artist Mary Mattingly as well as other local activists and community partners to create public engagement around *Wetland*, a floating art installation, and

lab on the Schuylkill River. Drawing attention to issues of water quality, social practices that affect ecosystems, and human relationships with water and place, the work of *Wetland* gives voice to the river's myriad stories.



WetLand + Refinery: View from The WetLand Project's floating lab motoring up the Schuylkill River. Image by Phil Flynn. Image courtesy of Bethany Wiggin.

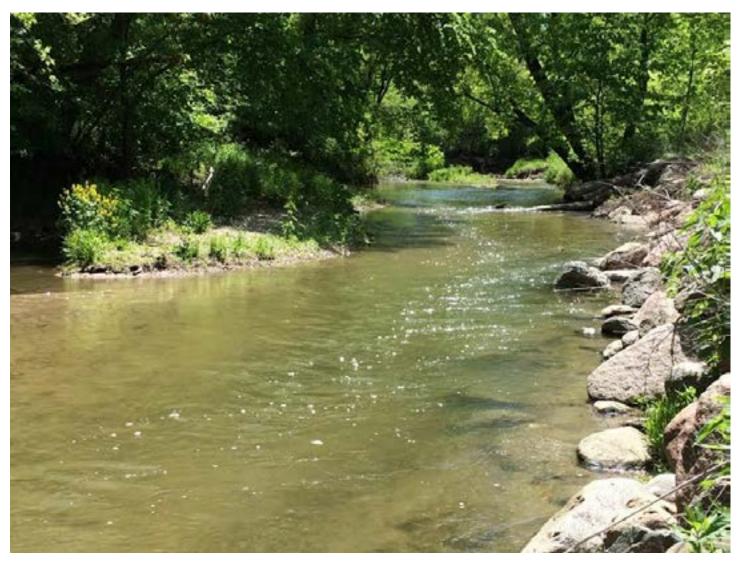
"What's in My Backyard? Empowering Indigenous Voices on Firefly Creek at Blue's Bottom" by Tianna M. Odegard

Gathering stories from her family and friends in the Upper Sioux Community that demonstrate the environmental changes of Firefly Creek, Tianna M. Odegard (2019) explains her commitment to community-engaged research as follows:

> I wanted to do research and produce work that connected to my home. This work thus provided me with personal growth while also educating me about areas of concern in Minnesota. I wanted to demonstrate that

we do not need to look far and wide to see the challenges of climate change that need to be addressed; instead, we can find many environmental issues within miles of where we live.

Written as a series of interview questions and responses, Odegard's work not only evokes experiences of a changing environment, but also gives space for Indigenous voices to share this expertise.



Firefly Creek. Image courtesy of Tracy Blue.

Formless Like Water: *Defensoras* and the Work of Water Protection by Natalia Guzmán Solano

Illuminating the complex struggles for water against extractivist industries in northern Peru, Natalia Guzmán Solano partners with *defenso-ras*—water and environmental defenders—who share their stories and struggles for their communities and for water. Guzmán Solano relates the ebbs and flows of the anti-extractivist campaigns led by *defensoras*, letting the voices and actions of these women teach us not only about the details of this struggle, but also about the agency of both women and water. As Guzmán Solano (2022) explains, "to love water is to love ourselves and coming to water's defense means defending our lives."



Defensoras and allies on retreat in Celendín. Image courtesy of Natalia Guzmán Solano.

Transforming Institutional Practices

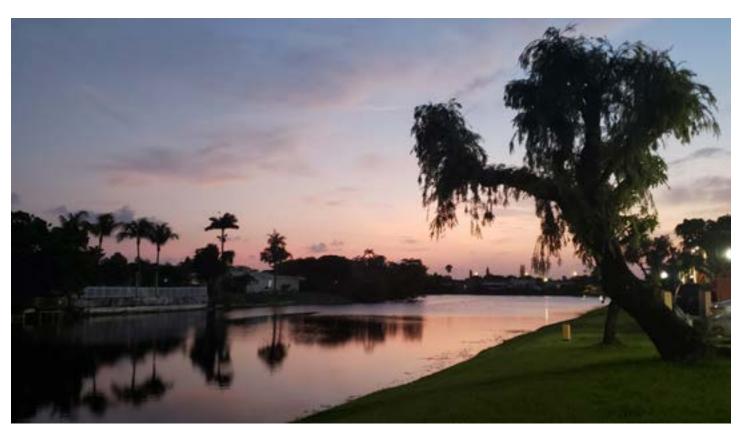
A recent article in the Chronicle of Higher Education argues that community-engaged research is a way for colleges and universities to demonstrate their public value "by using their expertise to solve concrete problems and shape public policy" (Fischer 2023). Making academic work valuable and useful to public audiences is a laudable goal, but it is only the first step. Collaborative work with partners is not simply about sharing academic expertise; it is about drawing campus knowledges together with community expertise to transform how we do work together and, by extension, what that work means. At its heart, community-engaged research prioritizes this kind of collaboration and equity; it works toward public impact, recognizing that "knowledge is cocreated via shared decision making for the purpose of social change" (Jacquez, Ward, and Goguen 2016, 77). These practices disrupt existing academic cultures; as colleges and universities embrace community-engaged research, they compel academic structures and cultures to shift as well (Post et al. 2016). As it diverges from standard academic research, community-engaged work disrupts institutional norms and has the potential to move academic practice toward greater public good.

The articles in this section highlight some of the ways community-engaged research transforms our institutional practices, from reconfiguring lab structures and classrooms to building the foundations for being good relatives.

"Reflections on Negotiating the Science-Society Relationship Together" by the Tropical Rivers Lab

In this article, the members of the Tropical Rivers Lab at Florida International University share their processes of grappling with the relationship between their academic work, their experiences and identities, and their community partners. The article involves a discussion of community-based scientific ideals—both their challenges and their potential for moving toward equity justice in scientific work. As the scientists in the lab explain, "traditionally, institutional science has not prioritized conversations that delineate what scientists' place and community are and how to engage them at an individual and collective level." The work of this lab draws attention to the limitations of traditional scientific inquiry

and demonstrates a shift in the paradigm for scientists to take seriously the ways that "who we are informs our scientific practice."



Daniela Daniele took this picture to show that her research interests began with the canal that flows behind her apartment. This semester she's defending her master's thesis on the historical ecology of the Miami River. Image courtesy of Daniela Daniele.

"Navigating the Ethics of Partnership" by Monica McKay

For students as well as faculty and staff at a university, engagement with community partners has gained importance and value. Monica McKay discusses some practices for guiding students to be good partners in community-engaged work. She reminds us that in doing this work, "we are always working in networks of committed individuals, each of whom brings resources, knowledge, and skills to the shared collective task of creating change on issues we all care about. In an ideal world, these networks are characterized by the constant exchange of these assets" (McKay

2017). In this article, she demonstrates strategies for transforming how we teach the foundations of community engagement to the next generation.



University of Minnesota students worked with Corporate Accountability International in 2008 to secure a ban on the sale of bottled water in Minneapolis City Hall. With the students in the photo are then-mayor R.T. Rybak (center) and current mayor Betsy Hodges (left), who was then on the Minneapolis City Council. Photo courtesy of Amber Collett.

"Navigating Indigenous Futures with the Mississippi River" by Vicente M. Diaz, Michael J. Dockry, G.-H. Crystal Ng, Virajita Singh, Daniel F. Keefe, Katie Johnston-Goodstar, Roxanne Biidabinokwe Gould, Jim Rock, and Christine Taitano DeLisle

In 2019, several University of Minnesota researchers as well as tribal and community partners gathered on the banks of the Mississippi River to host an event that was part of Dr. Joan Gabel's inauguration as university president. The event showcased not only two community-engaged research projects, but also the relationships, trust, and possibilities these quality projects developed. Demonstrating quality campus-community collaborations, the projects also press the university to transform its practices, to learn from these projects and, most importantly, from the community partners involved. As the authors write, they seek to

call attention to the larger political, social, and cultural stakes that our research

projects, individually and collectively, raise for and with our Indigenous community partners. Central among these stakes are the relations of ethics and kinship that attach to water and knowledge pertaining to water for Dakota and Anishinaabe and other Indigenous communities, as well as how such relations point to yet larger domains of belonging and connectivity beyond water, and about which academic research would do well to recognize, understand, and work with. (Diaz et al. 2020)

The article issues an appeal to academic researchers and institutions to not only do community-engaged research in partnership, but to go a step further and find ways to be good relatives.



President Gabel and project members and community representatives take "a spin" aboard the waa herak NOAA's Arc. From front to back: Mat Pendleton, Lower Sioux Community, Indigenous Futures Project; Eric Chapman, Lac du Flambeau Tribal Council member, Manoomin Project; President Gabel; Dockry, Manoomin Project; and Diaz, Indigenous Futures Project.

Reframing Products for Public Impact

Because community-engaged research is driven by community interests and needs, the outcomes have the potential to be of great value to participants. The challenge and the opportunity is to share these outcomes in ways that will reach and serve the public; this requires looking beyond the avenues of typical academic research (Isler and Corbie-Smith 2012). In some projects, "the product [is] as much about the process as the intended impact"; the collaborative work itself serves the community (Jacquez, Ward, and Goguen 2016, 87). For other research projects, researchers and community members must work together to identify what type of product will purposefully resonate with intended communities. Creating ways for research outcomes to support the community is a key part of how community-engaged research effects social change—by offering content that addresses a public concern in a way that is accessible and meaningful for those most impacted.

The articles in this section provide examples of a variety of different kinds of research outcomes that directly affect communities that are part of the research process. From investment in sustainable agriculture practices to public art displays, these products demonstrate creative ways of disseminating content to address public concerns and speak to the greater public good.

"Agriculture and the River: The University's Role in Societal Learning, Innovation, and Action" by Nicholas R. Jordan, Carissa Schively Slotterback, David Mulla, and Len Kne

Across Minnesota and beyond, "the agriculture-water relationship—now and in the future—is complicated," yet this relationship is at the center of myriad ecological, social, and political debates (Jordan et al. 2017). Focusing on a portion of the Minnesota River watershed, this project draws together campus researchers who have proven the ecological value of "some 15 winter-tolerant and perennial crops" and community stakeholders from local communities, state agencies, environmental organizations, farmers, and agriculture commodity groups. Together, these disparate partners worked to understand the

various perspectives of the different stakeholders, identify and design possible solutions, and begin the implementation of agricultural practices to improve water quality. The project facilitated the collaborative learning, innovation, and "coordinated action that are essential to address issues related to agriculture, water, and a climate for the common good" (Jordan et al. 2017). For this project, the process of collaboration, of working together across the divergent interests and perspectives of many stakeholders, made possible the implementation of new agricultural practices.



Eroded stream and river banks allow excess sediment — primarily clay and silt — into waterways. Sediment is considered a contaminant and contributes to cloudy, murky water, which degrades habitat for fish and aquatic life. Image via MPCA Photos, Flickr.

"Professor Jiao Xingtao and the Yangdeng Art Cooperative Project" by Jiao Xingtao and Mary Modeen

Over the course of several years, 37 artists visited Yangdeng, a small rural village in China, to participate in the Yangdeng Art Cooperative Project. In collaboration with local community members, the artists worked to craft public installations that share the patterns of everyday life in the village. From wall paintings on houses to benches on the main bridge over the Yangdeng River, the artworks themselves are intended to serve the community. Some of the artwork evoked stories from community members; other installations inspired people to reimagine their community, such

as when one villager turned a stretch of riverbank into a pleasing public social space. The creative projects stemmed from community stories and interests and simultaneously transformed the community itself.



The Twelve Jing Xiakou, a real scene, Taishan Shigandang. Image courtesy of Jiao Xingtao.

"Putting Suppliers on the Map" by Kelly Meza Prado

Working with a watershed organization in Colombia's cloud forest, researchers from the University of Minnesota and the University of Hawaii set out not only to understand the effectiveness of various water conservation efforts on water quality and quantity, but also to understand what motivates landowners' participation in conservation efforts. The collaborative project began with a commitment to "create a research product that would be beneficial" to the watershed organization and local communities. As a result, the team created a website with dynamic mapping to share the experiences and stories of local participants. The stories on the website were an effective tool: they have become

a communication tool for the watershed organization, and they helped researchers, the watershed organization, and other community members understand the varied motivations and values that drive water conservation practices. By aligning the product with community interests and needs, everyone benefited. As Meza Prado (2018) explains, "we hope that this work is one more example of how community-engaged research projects might create products that are useful to partners, especially when they are grassroots organizations that tend to be under-resourced and overworked." This commitment to products for public impact is central to community-engaged research and to creating real social change.



Baudelino Rivero shows one of the streams under protection of the Asobolo watershed organization. He visits this point in a weekly basis as part of his duties helping to monitor water quality. Image courtesy of Kelly Meza Prado.

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"Storying the Floods: Experiments in Feminist Flood Futures" by Caroline Gottschalk Druschke, Margot Higgins, Tamara Dean, Eric G. Booth, and Rebecca Lave

Written by both campus and community partners, this article examines a collaborative, "community-driven oral history effort in southwestern Wisconsin...[and] the work it inspired developing participatory flood models" (Druschke et al. 2022). After the area flooded in 2018, this oral history effort began collecting stories of how people negotiated the floods and the different kinds of grassroots interventions and support structures communities organized. Collected on a website, Stories from the Flood is an extensive archive of community content. The stories demonstrate that local communities "are already creating and sustaining creative responses to flooding, and have been for well over a century, inspiring us to argue for new flood management methodologies that attend to improvisation, narrative, and mutual support" (Druschke et al. 2022). The sharing of stories itself—the process of this research—gave community members a sense of support and agency. Sharing the collection on a website—a more durable product—allows these stories to give testimony, to highlight a variety of systemic failures of flood recovery efforts, and to build community cohesion for the future.



Fortney Farm in Soldiers Grove, Image courtesy of Tim Hundt

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Conclusion

Publishing these stories in *Open Rivers* is another way that all these authors have sought to create research products that speak to broader public audiences. The community-engaged research projects shared in this collection are rooted in the relationships between campus and community partners in place; the questions and products, then, are specific to those community interests and needs. Yet the projects offer examples for how to do quality community-engaged research. In this way, they have the potential to create wider public impact. Sharing their work with Open Rivers, a journal committed to publishing content that is accessible to a broad audience and contributes to public concerns, is one way that authors continue to effect social and environmental change beyond the project itself.

Community-engaged research is a powerful process for creating change. To do this work well, however, is not always easy, but it is invaluable. Turning research toward public impact is imperative for mobilizing collective action to

address current and forthcoming social and environmental challenges. Researchers who are deeply committed to this work argue that

equity-driven, collaborative, and intentionally change-oriented research practices may extend our direct impact as researchers but stretch our institutional capacity to support such approaches to research. Attending to existing research structures, policies, procedures, and practices within higher education institutions and how they need to strengthen or change to accommodate collaborative engagement research is imperative as we enter this next generation of community campus engagement. (Jacquez, Ward, and Goguen 2016, 93)

As campus and community partners galvanize our commitment to community-engaged research, the work will continue to change our society, our institutions, and ourselves.

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Footnotes

[1] Laurie Moberg, "Fluid Landscapes: Materializing the Future on Thailand's Flooded Rivers" (Ph.D. diss., University of Minnesota, 2018).

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About the Author

Laurie Moberg is the editor for *Open Rivers: Rethinking Water, Place & Community*, a digital journal of public scholarship published at the University of Minnesota (UMN) by the Institute for Advanced Study and UMN Libraries Publishing. She earned her Ph.D. in anthropology from UMN in 2018. Her doctoral research investigates recurrent episodes of flooding on rivers in Thailand and queries how the ecological, social, and cosmological entanglements between people and the material world are reimagined and reconfigured in the aftermath of disasters. In her current work, she approaches public scholarship as a critical strategy for expanding whose stories are heard, for shaping our public conversations, and for forming solutions for our shared ecological challenges.

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GEOGRAPHIES

MORNING ON CHESAPEAKE

By Jay Bell

Islide my kayak into the tranquil waters of the Chesapeake Bay as the first glow of sunrise is appearing behind me in the eastern sky. The bay is quiet today, waters smooth as glass as only happens a few times during the summer. There are many mornings when the winds and the tidal currents conspire to make it impossible for a small craft like a kayak, but this is a perfect

morning to be on the bay. I paddle about a half mile offshore; near the last sandbar, I pivot and point the bow toward the east so I can watch the sunrise, and soon it slowly appears in the loblolly pines that line the coast. The effect is stunning: a bright ball of light mounting the pines as a bright sparkly reflection of sunrise streaks toward me reflected in the waters of the bay. The Chesapeake



Sunrise over the pines and the bay. Image courtesy of the author.

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is quiet in the early morning hours—except for the birds. I look up and see two ospreys circling, looking for fish. A small flock of terns dart about, diving into the bay now and then for the plentiful minnows as a squadron of pelicans skims the water farther from shore. The ever-present laughing gulls glide down the coast and I spot a great blue heron stalking minnows from the beach. I marvel at the beauty and serenity of this place and how the water, land, and people came to be on this spot of the planet.

My family settled on this narrow, sandy peninsula to my east, known as Virginia's Eastern Shore, in the early 1600s, and I still own the farm we acquired in 1670 in the small town of Marionville. The geologic formation of Virginia's Eastern

Shore involves tales of meteors, continental glaciations, drastic changes in sea level, ancient rivers, and a process known as longshore drift. I'm currently floating in my kayak about half way down Virginia's Eastern Shore between Nassawadox and Occohonnock creeks. To the south about 18 miles is the harbor town of Cape Charles. Sometime around 35 million years ago, a large meteor struck the earth near that location. The impact crater was over 50 miles across; I would have been sitting near the rim in my current location and I ponder that I would have been vaporized upon the impact. The impact crater created a dent, a low spot, in the earth's crust, and as the continent assumed something close to its current location, the great rivers of Pennsylvania, Maryland, and Virginia



The author and his grandfather in the early 1960's on the family property.

Image courtesy of the author.

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(Susquehanna, Potomac, York, Rappahannock, and James, along with many smaller tributaries) would have flowed toward this depression that eventually became the Chesapeake Bay we see today.

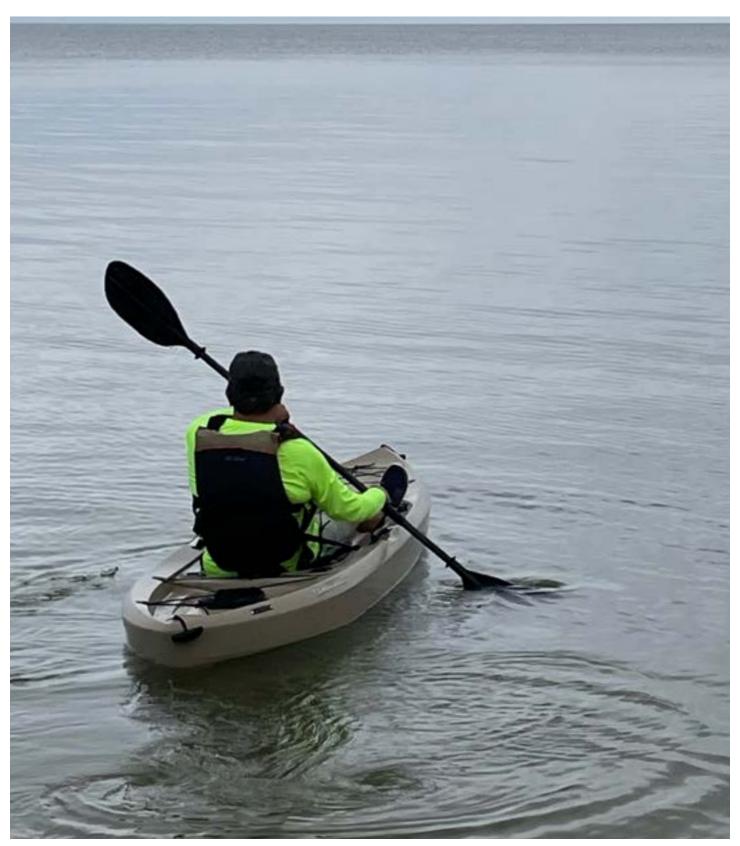
Even though the Chesapeake Bay was never covered with continental ice, the episodic glaciations of the last million years or so had a profound effect on the formation of the Chesapeake Bay and the Eastern Shore of Virginia. Glacial stages resulted in vast quantities of water being tied up in ice to the point that the world's seas dropped in the vicinity of 300–400 feet and would have returned to approximately the current sea level (sometimes higher) during the warm period between glaciations (interglacials). There have been multiple episodes of glacial and interglacial stages, each lasting approximately 50–100 thousand years. I'm skimming over a lot of detail here, but for our purposes, that's OK.

As a soil scientist, I've always longed for a time machine to take me back to see how our soils and landscapes formed. Lacking the invention of H.G. Well's imagination, I turn on the time machine in my mind to hundreds of thousands of years ago and reconstruct the formation of Virginia's Eastern Shore and the Chesapeake Bay. If we go back in time 400,000 years, we would find ourselves in an interglacial (warm) stage. Sea levels would be about where they are today; however, there is no Eastern Shore to my east. It's likely that from my kayak I would not be able to see land anywhere and would be in the Atlantic Ocean—not a great spot to be in a small kayak. The Chesapeake Bay would extend down to about the Virginia-Maryland state line and from there south, Virginia's mainland would be oceanfront (like Virginia Beach today). It would be a very long day's paddle across the ocean for me to get to land. The ocean swells are several feet high and capsizing would be a definite possibility, so I engage my mental time machine and fast forward 50,000 years to about 350,000 years ago.

Things have changed dramatically. My kayak is sitting on dry ground and there is no water to be seen. We are in the Kansanian glacial stage, so much of the global ice is locked up in glaciers and sea levels are approximately 300–400 feet lower than today. My kayak is stranded about 50 miles from the coast to the east—approximately where the continental shelf is located. The landscape is relatively flat and it's cooler than before. The loblolly pines have been replaced by spruce and fir trees in this cooler climate. I get out of my kayak and look around, nothing but land as far as I can see. The Susquehanna River is about 40 miles to the north near today's Virginia-Maryland state line. From there the Susquehanna River heads east 50 miles across the coastal plain to the Atlantic Ocean.

I get back in my kayak and fast forward to about 210,000 years ago during another interglacial period. I'm back floating in my kayak again. I'm facing east and I see the tip of the Eastern Shore, maybe a few miles to my northeast. So how did it get there? Remember we are near the end of an interglacial period, so the sea level is similar to today's. Because ocean waves predominantly come from the northeast, they will tend to move sand to the south via longshore drift. The waves strike the beaches at a slight angle, causing a migration of sand to the south and creating new sand bars and land. During this interglacial period, essentially a large sand bar was created and extended the land southward about 20 miles. This new land, known as the Accomac spit, extended the Chesapeake Bay about 20 miles south as well. So the Eastern Shore peninsula extends south during interglacial stages via longshore drift and is a high point in the landscape and is stable during glacial stages. I'm where the bay meets the ocean and the waves are still a bit rough for my liking, but it's only a couple hour's paddle back to land—assuming the wind isn't blowing.

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The author heading out into Chesapeake Bay on his kayak. Image courtesy of the author.

So back to my time machine and let's fast forward to 160,000 years ago during the Illinoian glacial stage. The sea levels dropped again and I'm back on dry land. It looks sort of like the last glacial period, except I can now see the Susquehanna River valley and the big bend as it turns east around the southern tip of the peninsula (Eastern Shore) and across 50 miles of coastal plain flowing to the Atlantic. As the peninsula has grown southward, the river has extended from Maryland to my current location before making its eastward turn toward the ocean. As I step out of my kayak and look around, I see no bay or ocean—to the north I see the Susquehanna River flowing south toward me, to the west I see the Susquehanna River a few miles away, to the south I see the river bending eastward below me, and to the east I'm looking across a 50-mile wide coastal plain extending to the Atlantic Ocean. So I'm on a high point (relatively speaking) between the Susquehanna River and the Atlantic and a good week's hike to reach the ocean.

I climb back in my kayak and my time machine takes me to 125,000 years ago during the Sangamon interglacial stage. Things look quite familiar now, not much different from when I paddled out into the Chesapeake this morning. The bay is about 20 miles wide to the west at this point and the Eastern Shore peninsula extends to the south about as far as I can see. During this interglacial stage the peninsula has continued to extend to the south, lengthening the Eastern Shore by approximately 18 miles to near present-day Cape Charles. This new land is known as the Nassawadox Spit Extension and the land where my family farm is located has been created. I'm well within the Chesapeake Bay and the waters are much calmer. I could paddle to the tip of the peninsula in one long day—if I was 40 years younger and the tidal currents were running south.

I quickly fast forward through the last glacial stage (Wisconsinian) and the sea levels have

dropped again and I'm on dry land. I look to the west and see the Susquehanna River valley extending southward. I'm 50 miles inland once more and the Chesapeake Bay has been replaced once again by the Susquehanna River. As we continue to travel forward in time, the many tributaries flowing into the Susquannah will become flooded when the ice melts and sea levels rise toward the end of the Wisconsinian glacial stage. They will become the tidal estuaries where I love to fish for Rockfish, Speckled Trout, and Flounder. These estuaries provide the essential shallow water environments that are required for fish spawning, clams, oysters, and blue crabs. As the time travel in my mind comes to an end, I'm returned to the quiet morning waters of the Chesapeake and I watch the sun as a new day dawns. All the familiar landmarks have returned. Since the retreat of the Wisconsinian glacial ice around 12,000 years ago, the interglacial stage we are currently in (the Holocene) has seen further southward extension of the Eastern Shore Peninsula. During the Holocene, the peninsula extended another 14 miles to Fisherman's Island where the Chesapeake Bay Bridge Tunnel connects the Virginia Mainland to the Eastern Shore. Fisherman's Island at the southern end of the Eastern Shore peninsula did not even exist in the early 1800s, yet continues to extend southward with every grain of sand transported down the barrier islands. The details of this geologic process are indeed complex and complicated and sea-level rise and land subsidence will affect it in ways we do not fully understand. I consider our own family farm that is adjacent to the saltwater marsh and how a few feet of sea level rise could turn it from farmland into marsh in the not so distant future—a disappearing legacy of nearly 400 years of farming by my family. I also consider that my family's time on the land is but a brief moment in the geologic history of the peninsula. The advance and retreat of glaciers and the southern movement of sands formed this land, and the crabs, oysters, fish, birds, and other wildlife are the true long-term residents.

I head back to land in my kayak, straight into the dazzling sparkle of the sunrise on the water. Beneath my kayak, I consider the importance of this water body to biological systems. It consists of 11,684 miles of shoreline and the shallow salt water marshes that are home for thousands of plants and animals, some permanent residents and many migratory. The shallows of the bay are critical spawning grounds for hundreds of marine species and waterfowl that will spend most of their lives beyond the bay, but their lives begin and are nourished in the Chesapeake Bay. The 18 million humans that inhabit the Chesapeake Bay watershed have significantly impacted the water quality of the bay, and overharvesting of marine life has significantly altered its ecology. As I approach the beach, I'm reminded again of the insightful words of Robin Wall Kimmerer: "To love a place is not enough. We must find ways to heal it."

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About the Author

Jay Bell was raised in the Appalachian Mountain region and the Eastern Shore of Virginia and attended Virginia Tech for his B.S. and M.S. degrees and Penn State for his Ph.D. Bell and his family moved to Minnesota in 1991 for his faculty position in the Department of Soil, Water and Climate at the University of Minnesota. His research has focused on soils of wetland environments, digital soil mapping and terrain analysis, soil geomorphology and carbon dynamics in wetland soils. He spent two academic leaves in Australia and worked in Morocco, Tanzania, Uganda, and Costa Rica. He has received numerous teaching awards and served as the Associate Dean of Academic Programs and Faculty Affairs for his college from 2008 to 2015. He teaches Basic Soil Science, Wetland Soils, Wetlands, Field Studies of Soils and a course on the Mississippi River corridor with an environmental historian. Bell and his wife spend summers on the Chesapeake Bay in Virginia where his family roots are. He enjoys traveling, hiking, biking, kayaking, cooking and he tries to still play the guitar when he can. He and his wife enjoy spending time with their two sons and their wives, who live in the Twin Cities, and especially their granddaughter. He is looking forward to retirement in the coming year and spending more time in Virginia, but Minnesota will always be home for a part of the year.

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IN REVIEW

SEALS, SWIMMERS, BAT CARERS By Ian A. Wright

Exploring the world of the pale brown, oft-maligned Yarra River

Author Harry Saddler's book on Melbourne's Yarra River is an engaging account of his years exploring its native species and human communities. He acknowledges the river's First Nations name of Birrarung, writing with a boyish enthusiasm. At times I felt his emotion jumping out of the pages, almost channelling David Attenborough's passion for species and the environment.

The book's major focus is on Saddler's obvious fascination with native animals. He delights in telling us about his adventures finding them on, in, and near to the Yarra. It sometimes reads like a police drama as be describes "staking out" the habitat of an elusive species. Night after night, Saddler keeps going back to potential hideouts. At one point he watches eleven sugar gliders emerge from a hollow in a river red gum, only metres from townhouses.



Detail of the cover of Harry Saddler's book 'A Clear Flowing Yarra.'

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Saddler had me hooked with his description of first encounter with a Yarra platypus:

We gawped and we gaped in mind-bent wonderment as a dark-brown platypus bobbed up to the surface of the pale brown Yarra and then dived again, disappearing instantly in the turbid water.

One of this book's themes is Melburnians don't really think much about the Yarra River. And not just the locals. I'm ashamed to remember hearing unflattering jokes about the Yarra in my childhood in Sydney. They involved the muddy appearance of the river, that looked like it flowed "upside down".

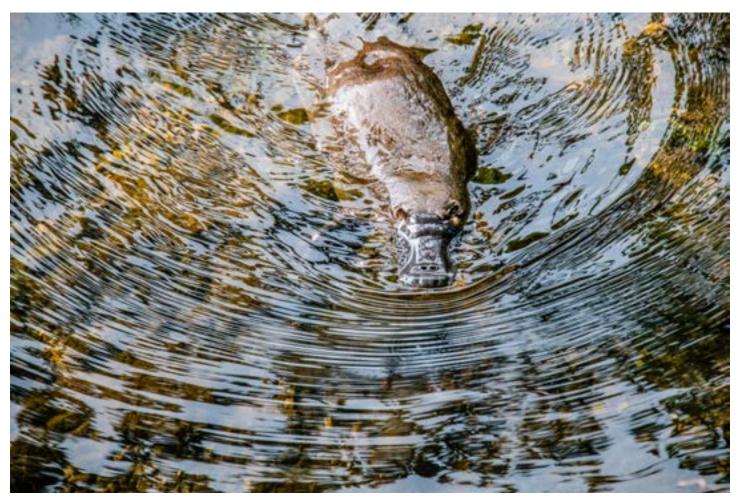
Once the Yarra was world famous for swimming: a long distance (three-mile) swim was held there for nearly 50 years up to 1964. It was once the

largest <u>open water swimming competition</u> in the world. Perhaps this book might help address the Yarra River's image problem. And remind people of its many values, from its rich biodiversity to providing <u>5 million people with much of their water supply</u>.

It might surprise many the Yarra River is still popular for swimming. Saddler tells us of his amazement when on a hot March day near Warrandyte in 2017:

As if in a dream, I found there a remarkable sight: hundreds of people swimming and bathing in a wide sparkling stream.

Just a word of warning though. As with many rivers affected by urbanisation and other human activities, water quality in the Yarra can be poor and hazardous to human health. As tennis player



There are platypuses in the Yarra. Photo by Trevor McKinnon on Unsplash.

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Jim Courier discovered, when he dived in the river after celebrating his 1993 men's singles victory in the Australian Open and picked up <u>a stomach bug</u>.

As I read, I could not help myself. I looked up the latest water quality advice for swimming provided

by the <u>Victorian EPA</u>. At the time of writing, they showed the river at Warrandyte had "good" water quality. This offered the only suitable swimming location on the river. The other three sites (Kew, Healesville and Yarra Junction) were all rated as "poor".

Contrasting layers

This book is written in contrasting layers. Chapters alternate between exploring different native species found in the Yarra, and exploring how people interact with the river. Native species that get their own chapter include the Powerful Owl, <u>Brush-Tailed Phascogale</u>, Short-finned Eel, Swamp Wallaby, Snakes, Rakali (the native water rat), Azure Kingfisher and Grey-Headed Flying Foxes.



The Yarra River at Wittons Reserve in Wonga Park. Image via Melburnian: Wikimedia Commons. (CC BY-SA 3.0 DEED)

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The Flying Fox chapter reveals a Yarra species, also commonly called fruit bats, that seems to attract very strong emotions. We are introduced to people caring for their welfare, such as Megan from "Friends of Bats and Bushcare". She points out how vulnerable they are to stress in very hot weather, with sprinklers installed in the Yarra bat colony to help keep them cool during heat waves.

On the opposing side we are told about the removal of a colony that had settled along the Yarra in the Royal Botanic Gardens – dispersed using noise, smoke and lights. It also gets political. The book mentions an unnamed former politician who tried to have a colony of bats in his electorate removed.



Grey-Headed Flying Foxes in Australia. Photo by René Riegal on Unsplash.

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Saddler describes how:

The biggest and most beautiful tiger snake I've ever seen was sliding out of the Plenty River onto broad, sunny rocks where that tributary joined the Yarra.

In case the reader still has any doubt about his feelings towards snakes, he states: "Snakes are great. I'll tolerate no snake badmouthing here".

For me, a major appeal is that along with celebrating the remarkable biodiversity of the river, Saddler explores the many groups and individuals who care about it: cleaning up litter, clearing the banks of invasive weeds. Dedicated people such as Daniella, who has lived near the river for 20 years. She has regularly picked up rubbish to help keep the river and its banks clean.

As I read, I wondered if Saddler would have written this book if a native Melburnian. He moved to Melbourne from Canberra about 20 years ago, where he lived far from the ocean. He grew up comfortable in fresh water: swimming in Lake Burley-Griffin and ACT rivers such as the Cotter, Molonglo and Murrumbidgee.

His book reads like an adventurous exploration of an unknown world. At least to him. And also, perhaps, millions of Melburnians. There is something about the excitement of exploring around the next bend of the river. Documenting unfamiliar landscapes, and discovering the home and habits of another species.

Apart from the playtpus, my other favorite species described by Saddler is Salvatore the Australian Fur Seal, who gets his own chapter. Salvatore became an unlikely star attraction living in the river during a very dark time for Melbourne, in 2021 during one of its tough

COVID lockdowns. For thousands of people, capturing a sight of this unusual visitor provided a thrill.

Watch the <u>video of the seal</u>, Salvatore, swimming in the Yarra.

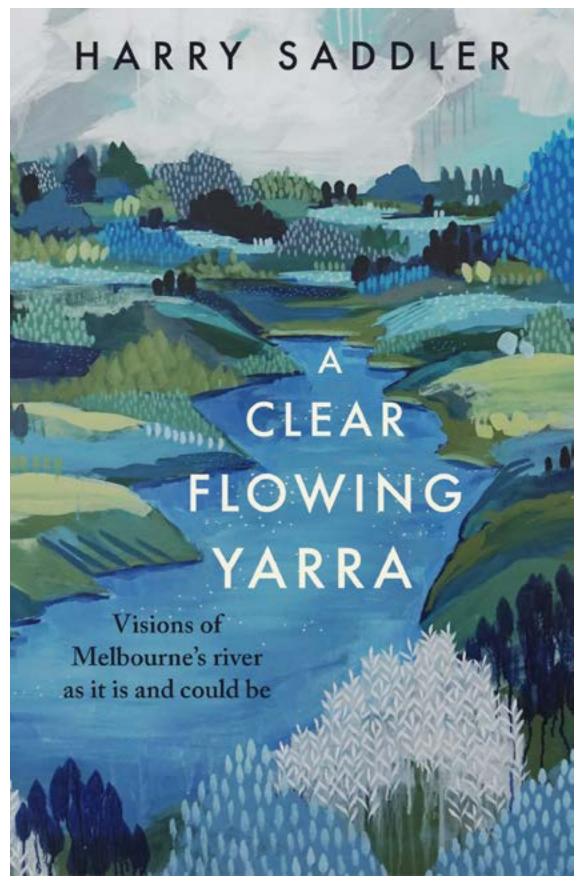
Harry describes the thousands of teasing photos and videos of Salvatore on the internet. I felt his frustration growing as he cycled up and down the river, meeting crowds of people elated after an encounter with the famous seal. But he kept missing out. Until finally, one day, near the Gipps Street bridge, on the main Yarra trail, his patience was rewarded.

He dived, and sometimes disappeared for what seemed like minutes before resurfacing further upstream, or further downstream; in these moments people on canoes would occasionally paddle by and I shouted out warning to them: be careful, there was a seal here just a minute ago and he's *massive*.

Perhaps another edition of this book might have pictures. And I really would have loved a map or two. Still, it reminds me of the importance of providing safe access for communities to engage with waterways, perhaps helped by walking or cycling paths, parks and public transport. Even in highly modified urban settings we might be able to observe native species mostly hidden from the public gaze.

This book, while a love letter to the Yarra/Birrarung, might also remind those readers not in Melbourne a similar unexplored river or natural landscape likely exists right under their noses.

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Cover of Harry Saddler's book 'A Clear Flowing Yarra.'

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PERSPECTIVES

RESISTANCE AS GROUNDS FOR FUTURITY: PLACEMAKING AND UNSETTLING THROUGH #STOPLINE3

By Isabel Huot-Link

Protecting the water is protecting life. Two-spirit Anishinaabe activist Taysha Martineau thus insists that Enbridge's Line 3 tar sands pipeline "should scare you so much that you feel called to step into that water" (Pickett et al., 2021).[1] But if that is true, then how did Line 3 succeed in going into operation? Clearly something is missing. Settler colonialism and capitalist cultural legacies have done their best to create division between humans and our

more-than-human relatives. Those of us who live on these lands and benefit as a result of settler colonialism can take our cue from Indigenous-led resistance to extractive industries, resistance which provides a beacon of hope for a future where all people exist in alignment with our more-than-human relatives.

With this piece I hope to share a little about the ways that the Indigenous-led #StopLine3



Detail of Collective Solidarity: During the 2021 Treaty People Gathering, individuals and organizations joined together at the headwaters of the Mississippi River to protest the pipeline river crossing there, and people of diverse faiths made signs to show collective solidarity with Anishinaabe treaty rights. Image courtesy of the author.

movement has shaped my outlook and understanding of social justice. I am a white settler colonizer of Germanic and Ukrainian descent, writing from the traditional and contemporary homelands of Dakota peoples. The University of Minnesota, at which I work, is a land-grant University actively profiting off these stolen Indigenous lands (The TRUTH Project, 2023). I am deeply grateful to the Welcome Water Protector Center, Migizi Will Fly, Red Lake Treaty Camp, Shell River Alliance, and Anishinaabe Agriculture Institute past and present communities for inviting and welcoming me into their spaces through a public call for Water Protector support and later as a researcher and community member.

For as long as Europeans have infiltrated Turtle Island,[2] Indigenous peoples have fought for sovereignty against continual repression by despicable state policies and violence. The United States' settler colonial regime inherently infringes upon the rights of Indigenous peoples, and mainstream discourse has finally started to acknowledge this reality. As the climate disaster proliferates and other movements, such as Black Lives Matter, draw attention to social inequities in the United States, Indigenous rights have risen to the forefront (Kaur, 2020), grounding movements that often integrate human and morethan-human concerns. One such movement, the #StopLine3 movement, demonstrates how a diversity of tactics can address the multi-scalar issue of decolonization (Hughes, 2018).

Decolonization is a term that has contested definitions and has often been misappropriated by relegating it to the intellectual and thereby removing the impetus for action (Tuck and Yang, 2012). Eve Tuck (Unangax) and K. Wayne Yang (2012) define decolonization as simply "the repatriation of Indigenous land and life" (21). Yang, under the pseudonym "la paperson,"

expands that, "Decolonization is, put bluntly, the rematriation of land, the regeneration of relations, and the forwarding of Indigenous and Black and queer futures—a process that requires countering what power seems to be up to" (2017: xv). Considering land, relationships, and futurity as key markers of decolonization brings into question how to enact that rematriation, regeneration, and forwarding. Assuming that decolonization is a multi-scalar issue—or something to be addressed at individual, community, and systemic scales of power—requires diverse tactics within movement building to address the issue at all three of those scales. Resistance camps of Indigenous-led movements participate in active land rematriation, actively build and regenerate relationships, and develop collective imagining of Indigenous—as well as Black and queer—futures. Through their demonstrated multi-scalar impact via a diversity of tactics (Burrell et al., 2022), Indigenous-led resistance camps pave the way for self-determination and cross-cultural community building, and for actualizing Indigenous futurity.

Grace Dillon first defined Indigenous futurisms in 2003, a concept which is often associated with science fiction literature, defining "a movement of art, literature, games, and other forms of media which express Indigenous perspectives on the future, present, and past" (Vowel, 2022). Chelsea Vowel (Métis) discusses that, as foundational to Indigenous futurisms, "uncovering Black/ Indigenous presence in the past, then asserting our existence in the present and into the future can be a way of seeing into, or even making, better futures" (2022). While futurisms may exist in literature, futurity may encompass tangible futures. During my time in the Line 3 resistance camps, I witnessed Anishinaabe leaders embodying this Indigenous futurity through speaking publicly about the history of colonization and treaty rights, making incontrovertible their present presence through ceremony and movement

building, building collective imagining of Indigenous futures through art, and demanding security of Indigenous peoples' futures by resisting a pipeline that endangers their ways of life.

Line 3 is a tar sands pipeline expansion project undertaken by multinational corporation Enbridge Energy. Though advertised as a "replacement" project, simply improving and replacing an existing pipeline, the new Line 3 in fact "follow[s] a new corridor and double[s] the original pipeline's capacity" (Wellman,

2022:152). Enbridge has crossed 200 bodies of water—including twenty river crossings—in creating an extended and new route for Line 3 (catwhipple, 2021; Marohn, 2021). The new line carries crude tar sands oil from Alberta, Canada through treaty territories in northern Minnesota to end at the refinery in Superior, Wisconsin from which it will be shipped overseas. Line 3 allegedly became operational on October 1, 2021, concluding a project whose estimated budget of \$8 billion makes it the most expensive pipeline in Enbridge's history (Wellman, 2022:152).



Honor the Earth hosted a concert on a raft by the Indigo Girls to build awareness for #StopLine3 and bring joy to the Water Protector community. Art that community members had built was placed along the shoreline of the Mississippi and audience members watched from the riverbanks or painted canoes in the water, challenging colonial conceptions of how art should be performed and shared. Image courtesy of the author.

Indigenous women- and two spirit-led protests against Line 3 have persisted for over five years, throughout project proposals and construction, continuing despite the flow of oil (Stop Line 3, n.d.).

Indigenous-led pipeline resistance movements center land and place and create diverse, intersectional communities of people building interconnectedness through shared values. This fosters change on the individual level for camp residents and supporters, on the community level through the camp's communal existence, and sets an example for what systemic change

can look like. Pipeline resistance then is a model for confronting systemic inequalities in power structures that persist within and beyond these spaces. While many activists may have their own vision of what liberation looks like, "decolonization is not accountable to settlers" (Tuck & Yang, 2012:35). Through relinquishing power and leadership to Indigenous and other BIPOC communities, settlers can heed the lessons of the pipeline resistance camps on Indigenous sovereignty, placemaking, and community building, to begin the culture shift necessary for environmental justice.

#NoDAPL and a Legacy of Resistance

Scholar activists Nick Estes (Kul Wicasa, Lower Brule Sioux) and Kyle Powys Whyte (Citizen Potawatomi Nation) have positioned pipeline resistance—through their case studies of the #NoDAPL movement—in the historical context of generations of Indigenous resistance efforts (Estes, 2021; Whyte, 2017). Alongside this history of resistance is a history of violent state repression. Dakota peoples' contemporary homelands have been under attack with the construction of Energy Transfer Partner's Dakota Access Pipeline (DAPL) running from Canada through the Dakotas and Iowa and ending near Illinois. The main resistance camp for the #NoDAPL movement was located at the Missouri River crossing near the Standing Rock Reservation in North Dakota. The prominent environmental organization Indigenous Environmental Network discusses how during the height of #NoDAPL "local and state officials used military tactics to suppress public protest and intimidate water protectors," consistent with historical tactics against Indigenous resistance (Rees, 2021). These overblown tactics against non-violent protesters represent the continued repression and genocide that the United States employs against Indigenous resistance.

#StopLine3 is an extension of this legacy. Charlotte Degener Hughes' (2018) undergraduate thesis positions #StopLine3 in a similar framework as Estes and Whyte did for #NoDAPL, building upon a history of Indigenous resistance. She argues that this movement exemplifies a successful use of a diversity of tactics, ranging from legal to artistic to ceremonial. Hughes elucidates how "Indigenous-led resistance to mega projects all over Turtle Island are not only acts aimed to protect the land, but ultimately work to dismantle settler colonialism through native sovereignty and resurgence" (2018:31). These two go hand in hand, ever inseparable.

Burrell et al (2022) demonstrate through indepth interviewing and participant observation that Line 3 resistance takes the form of forging "legal avenues to shake the petro-state, creating cultures to refuse colonialism and embrace climate justice within Water Protector camps, and building an Indigenous-led renewable energy economy." These three avenues, the authors posit, are critical to consider and expand upon in future resistance projects. Audra Simpson (2014) discusses refusal as a critical tool for Indigenous sovereignty. Despite the surface failure of this

movement—as the pipeline is currently in operation—the cultures of refusal that developed within Water Protector camps are key to the maintenance of the larger context and legacy of Indigenous resistance. Through sustained relationships, I have observed that several of these <u>former camps</u> remain active in various and changing ways, continually engaging in community development.

Between #StopLine3 and #NoDAPL, it becomes clear that pipeline resistance is about more than a single project. Each resistance coalition builds toward an Indigenized future. "The #NoDAPL camps didn't just imagine a future without settler colonialism and the oppressive institution of the

state, but created that future in the here and now" (Estes, 2021:253). By creating Indigenous-led spaces where Indigenous and settler peoples came together for a common goal of Indigenous sovereignty, #NoDAPL put decolonization into action according to Tuck and Yang's (2012) framework of decolonization as land back. The resistance camps for #StopLine3 built a similar legacy, intending to stay active despite the pipeline's construction. Although both companies completed their construction and began to transport oil, the Indigenous-led #StopLine3 and #NoDAPL movements are proof that decolonization is possible, as well as necessary, for a just future for all.



Water protectors walking down to the river to pray at Honor the Earth's former resistance camp. During the height of the #StopLine3 movement, the Welcome Water Protector Center was open for education, movement building, and spiritual healing.

Image courtesy of the author.

Line 3 Community Impacts

Extractive industry projects like Line 3 disproportionately affect Indigenous women and two-spirit relatives, and they are related to increased rates of violence against Indigenous women by non-community members. A 2019 report by the U.S. Bureau of Justice Statistics confirmed that in a region of Montana and North Dakota where oil and gas production increased, rates of violence, disproportionately affecting Native American women, increased in parallel (Barrick et al., 2019). This example is not an exception, but the rule. Living on Earth, an environmental journalism program on public radio, reported that a majority of the 4,200 Line 3 pipeline construction workers came from outside Minnesota (2021). Their lack of a local connection can promote disregard for local peoples' well-being and increase violence. To this point, two Enbridge workers were arrested in a sex trafficking sting in northern Minnesota in June 2021 (Zoledzioski, 2021).

This relationship between extractive industry and gender-based violence, drawing on Kimberlé Crenshaw's concept of intersectionality (1991), is part of why it is important that the resistance movement is led by Indigenous women. The conversation about Indigenous sovereignty is not only about protecting the water: "for Native women, sovereignty often marks the difference between life and death" (Deer & Nagle, 2018). The Missing and Murdered Indigenous Women movement centers the high rates of Indigenous women who go missing (MMIW USA, 2023), highlighting the danger of permitting industries like oil production that are known to correlate

with increased violence. Anishinaabe women and two-spirit leaders including Taysha Martineau, Sasha Bealieau, Winona LaDuke, Tania Aubid, and Tara Houska among others, continue to lead Water Protector communities in opposition to Line 3 and other extractive arms of colonialism.

#NoDAPL and #StopLine3, in resisting the fossil fuel industry, have mobilized people of many races, ethnicities, and other identities around the movement to decolonize. The climate crisis, while affecting Indigenous peoples to the highest degree, does affect *everybody*. Melanie Yazzie (Diné) reminds her <u>Red Nation podcast</u> audience of the common knowledge that "reducing carbon emissions is the number one thing we all gotta get behind if we don't want to die from climate change" (Red Media, 2021). Furthermore, she argues that the way to reduce those emissions isn't by new technological innovations or capitalist imperialist power schemes; the way is through Indigenous-led resistance.

It has been proven on numerous occasions that Indigenous-led movements are critical for reducing carbon emissions. The Indigenous Environmental Network published a report that indicated "Indigenous campaigns are resisting projects equal to at least 1/4 of U.S. & Canadian greenhouse gas pollution" (Rees, 2021). In mitigating the climate crisis, Indigenous-led resistance movements thus contribute to the futurity of the human species by resisting the extractive way of life that threatens our continued existence.

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The Resistance Camp as a Point of Encounter

Resistance camps for #StopLine3 on Anishinaabe lands were short-term residences of ever-changing, diverse communities—including Anishinaabeg, citizens and descendents of other Indigenous nations, Black folks and other people of color, as well as white folks; gueer and trans folks; babies, children, adults, and elders; and multitudes of other kinds of diversity—joining together in allied resistance to the Line 3 pipeline. Quechua scholar Sandy Grande (2004) explicates how, to "understand the complex and intersecting vectors of power shaping the historical-material conditions of indigenous [sic] schools and communities," one might start "at the point of 'encounter,' examining the various dimensions of conflict and contradiction between the sovereign

peoples of the Americas and the colonizers" (29). As "points of encounter," or spaces of multifaceted diversity, the #StopLine3 and #NoDAPL resistance camps act as space for dissecting and toppling oppressive power dynamics and structures within American society. Nick Estes (2021) posits that justice may be achieved through "the kinship relations between Indigenous and non-Indigenous and the lands we both inhabit" (Estes, 2021:256). These kinship relations may destabilize structures of power, build momentum behind decolonization, and open space for Indigenous self-determination that may propel a broader cultural shift away from white supremacy.



During the 2021 Treaty People Gathering, individuals and organizations joined together at the headwaters of the Mississippi River to protest the pipeline river crossing there, and people of diverse faiths made signs to show collective solidarity with Anishinaabe treaty rights.

Image courtesy of the author.

Placemaking toward Self-Determination

Beyond mitigating ecological destruction, Indigenous-led pipeline resistance involves relationship building that, in their leadership and through their Indigenous worldviews and practices, requires mainstream culture to shift. Michelle Daigle (2016) discusses Indigenous geographies of self-determination in refusal of colonial spatio-legal identities. Daigle (2016) illuminates how Omushkegowuk Cree are "confronting the violence, pain, and fear that has been inflicted on our communities, bodies, and lands" (265) through everyday kinship relations. Recognizing the plurality of pathways to Indigenous self-determination, Daigle's (2016) study shows how

according to Omushkegowuk Cree ontologies, place is shaped by local people, knowledge systems, and land-based practices as well as by colonial-capitalist structures of power. More than this, however, place has meaning precisely because of the agency that lives within our ancestral lands, including animal and plant nations, and thus what can be learned about governance and self-determination through intimate relationships with our non-human kin. (268)

In this way, relational geographies of Indigenous self-determination shape and are shaped by place. Through the building of community space to address colonial violence, relational geographies of Indigenous self-determination may create a theoretical framework for Indigenous space-making as self-determination.

Frontlines camps for #NoDAPL and #StopLine3 developed particular geographies by addressing colonial harm within resistance camp space.

Residents built relationships with and around particular places through art-making, cultivating gardens, skill-sharing, sharing stories, educating youth, and organizing resistance strategy in response to the geographies of treaty territories, reservations, and pipeline corridors (Estes, 2021; Welcome Water Protectors, n.d.).

In my time in community in some of these camps, I observed the way building art to decorate the space transformed its narrative and grounded the community. At the Welcome Center in Palisade, Minnesota, posters depicting native animals with their Anishinaabemowin names written on them lined the side of the highway along the camp property. This interruption of Minnesota highway driving with a highlight of more-than-human relatives paired with their names in the language of the 1855 Treaty holders in this land highlighted this place's intent and purpose, going beyond simply resisting one pipeline. These little actions in facilitating placemaking transformed these communities.[3]

Through Anishinaabe leadership and placemaking, the resistance camps built toward self-determination, as developed by Tuck and Yang's (2012) definition of decolonization as land back. Through occupying Anishinaabe treaty territories and Indigenizing public spaces, the ideals of land rematriation became, if only for short periods, realized. This relationship with land rematriation exemplifies on a small scale how pipeline resistance brought together a community oriented around various connections to place, and through the maintenance and transformation of camp space, developed the grounds for Indigenous futurity.

Conclusion

#StopLine3 is one point on a timeline of Indigenous resistance and self-determination reaching far in all directions. This fight points activists toward consciousness building beyond what has been previously developed in white communities, signaling a potential for future justice. However, it is imperative to highlight that Indigenous leadership in the movement towards justice is critical. #StopLine3's connection to the land-back movement reminds settlers that environmental justice is not only intersectional, but inherently centers Indigenous sovereignty as exemplified by Indigenous placemaking. One

Iñupiaq and Chicana Water Protector attests through a digital art piece that "Land Back is the most practical and efficient strategy to combat climate change" (Uksrunna 2021). Decolonization does require settlers to unsettle—to reimagine our concepts of ownership, land, progress, and comfort—because only through framing the land as a relative rather than a resource will any futurity where people exist alongside the Earth be possible. I offer as next steps to consider: What are Indigenous leaders and activists in your area asking for? How can you become more involved?

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Footnotes

[1] The Enbridge Energy Line 93 replacement pipeline is known locally as Line 3 in reference to the name of the old pipeline upon which the new project expands (Hassanzadeh, 2023).

[2] A term used by many (but not all) Indigenous nations to refer to what is known as North America that I have learned through colleagues' use and discussion.

[3] According to Project for Public Spaces, "Strengthening the connection between people and the places they share, placemaking refers to a collaborative process by which we can shape our public realm in order to maximize shared value," ("What is Placemaking?" 2007).

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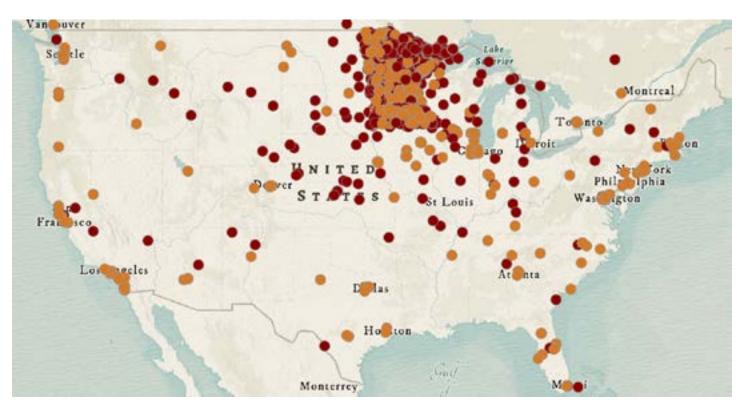
MAPPING ENGAGEMENT: A DIVE INTO THE UNIVERSITY'S COMMUNITY-ENGAGED PARTNERSHIPS

By Amber Cameron and John Craven

The University of Minnesota is working to share community-based academic projects and partnerships involving water resources—as well as other social and environmental concerns—as a way of illustrating the University's research-based, public engagement activities.

The <u>University of Minnesota Public Engagement</u>
<u>Footprint</u> is a public database and map
that details the breadth and scope of the

University's service, outreach, and community engagement across the state of Minnesota and beyond. Created by the <u>Office for Public Engagement</u> (OPE) in partnership with <u>U-Spatial</u>, the Footprint is a work in progress; it currently has nearly 4,000 active entries, with approximately 75 percent of current entries representing partnerships in Minnesota. The projects that appear on the map are submitted voluntarily by researchers, faculty, and staff from across the



This is a map of the University of Minnesota's impact across the United States as illustrated on the Footprint map. Image courtesy of John Craven.

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University's five-campus system to document ongoing partnerships with communities. The Footprint can be searched by geographic location, project type, community partner, Sustainable Development Goals as identified by the United Nations, and more.

The Footprint's framework was created in 2021 as part of the University's MPact 2025 Systemwide Strategic Plan as a way for University faculty and staff to locate, identify, and connect with others working in the same geographic areas or on a similar topic. In addition, the public can access the Footprint from the University of Minnesota system website to learn about University-community partnerships taking place in their neighborhoods, communities, and around the globe.

As an interdisciplinary tool, the Footprint provides a space to showcase the diversity of partnerships, such as the University's water-related partnerships. University-community partnerships represented in the Footprint can be searched in several ways, including by one or more of the 17 Sustainable Development Goals (SDGs) developed by the United Nations as part of its 2030 Agenda for Sustainable Development. Users of the Footprint can filter for water-related SDGs: (1) clean water and sanitation and (2) life below water. The Footprint currently contains 418 partnerships under the above two categories.

For example, the Footprint includes the Minneapolis-St. Paul Metropolitan Area Long Term Ecological Research Program (MSP LTER), a partnership between the University's College of Biological Sciences and Wakan Tipi Awanyankapi, a Native-led environmental conservation nonprofit. Together, they are working to measure heavy metal levels in soils and plants in native plantings for pollinators. MSP LTER is part of a network of sites around the world funded by the National Science Foundation to study how urban stressors affect the ecological structure and functioning of urban nature, including

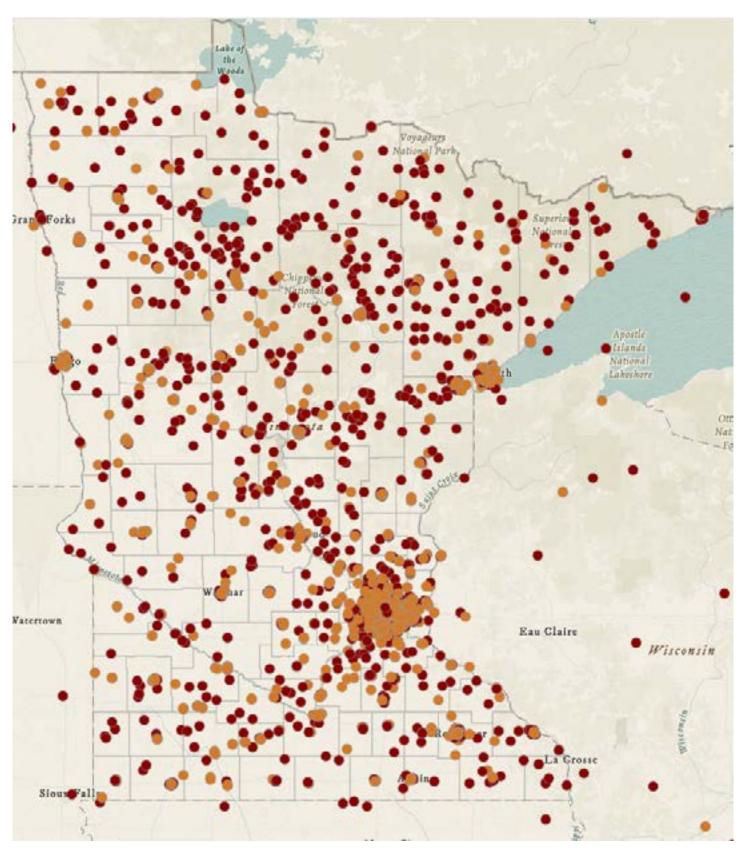
pollinators, urban forests, urban watersheds, and lakes and streams.

The Footprint also demonstrates that, led by the Department of American Indian Studies, faculty from across the University system are also working on a project with Indigenous partners, exploring the significance of place, community, and knowledge production in relation to humanities research and its impact on climate crisis research. This project involves several partners, including Makoce Ikikcupi, a landback, restorative/reparative justice project that is developing a Dakota village at a 19-acre site in Granite Falls, Minnesota; working with Makoce Ikikcupi involves learning Indigenous modes of environmental caretaking.

On the Footprint, we can also find the work of the Minnesota Aquatic Invasive Species Research Center (MAISRC) housed in the College of Food, Agricultural and Natural Resource Sciences. MAISRC has built a collaborative network of volunteers, state and local government managers, and landowners across Minnesota to map and monitor invasive phragmites (common reed) and implement treatments, reversing the spread of



The Public Engagement Footprint logo clearly shows the outline of the state of Minnesota. Image courtesy of John Craven.



This is a screenshot of the Footprint map clearly showing the entries in the state of Minnesota.

Image courtesy of John Craven.

this damaging plant. In 2016, MAISRC researchers determined that this plant posed a high risk of uncontrolled spread, and Minnesota had a critical window of opportunity to control the invasive species. MAISRC is now leading a collaboration of state and local partners throughout Minnesota to implement the removal of phragmites.

In continuing efforts to increase participation in the Footprint, staff from the Office for Public Engagement have been involved with many issue-related affinity groups throughout the University. As an example, an Office for Public Engagement staff member now participates on the University's Water Council, which serves to leverage resources from across the University to address pressing concerns of access to clean water. Participation in the Footprint is one way the council's mission of documenting University-community water-related partnerships is being supported.

Participation and sustainability are the biggest challenges for a data-driven project of the Footprint's scope. In fact, they are the main reasons why very few institutions of higher learning have been able to capture the full depth and breadth of their university-community work on an ongoing basis. While the University of Minnesota is a systemwide enterprise made up

of five campuses, it's a relatively decentralized organization. Without centralized control, ensuring alignment and consistency on projects and initiatives can be a challenge and participation in those projects and initiatives can vary from campus to campus, from college to college, and from unit to unit.

For example, some campuses, colleges, and units collect information on university-community partnerships through a centralized office, while others rely on individual faculty and staff reports. The University's Office for Public Engagement staff work with each campus, college, and unit on a one-on-one basis to incentivize and support the collection of Footprint data. And because sustainability of the Footprint is key to its success, OPE has dedicated staff time to the ongoing collection of data and site maintenance.

As participation in the Footprint grows, its usefulness will grow for both University researchers and the broader community. One of the most comprehensive, user-friendly digital maps of its kind, the Footprint provides a comprehensive platform where internal and external partners can learn more about work happening on specific topics and/or in specific communities, aiding in increased University-community collaboration throughout Minnesota and beyond.

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THE RIVER AT OUR DOORSTEP: STUDENT PROJECTS TELL STORIES OF THE MISSISSIPPI RIVER

By Donal Couch, Nichole Jacquez, Hope Werstler, Caitlyn Barrett, Jenna Duncan, Rianna Knoll, and Aryana Becchetti

The Mississippi River, by all accounts one of the great rivers of the world, flows through the middle of the campus of the University of Minnesota in Minneapolis. During fall semester, 2022, the University Honors Program continued a long-standing commitment to introducing students to the river at their doorstep by offering an Honors Seminar called "Environmental Justice and Climate Futures: the Mississippi River Corridor." I was privileged to lead the seminar.

The seminar's final project, several examples of which are included below, asked students to



An aerial view of Northrop Mall, part of the University of Minnesota Twin Cities' East Bank area. Image courtesy of Ben Franske.

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"tell a river story." Students were encouraged to step away from the standard college fare of writing a term paper, and to experiment with whatever form would best suit the story they had chosen. The topics offered were likewise very open-ended; students were invited to shape their chosen story from a subject we had touched on in class or, perhaps a topic that we did not discuss, but that nevertheless piqued their interest. In addition to the student projects, when we were preparing the projects for publication, we asked them for personal statements about their work, why they chose the topic and what they found gratifying about it; those statements are included here as well.

Students worked on their projects, either in small groups or individually, for a number of weeks, which allowed for a great deal of deliberation and reflection, refining both the subject and form of the various works. As a result, and as this collection shows, there is a great deal of variety. We have a draft Google web site, several walking tours, a proposal for an ArcGIS StoryMap,

and several audio/video presentations. Subjects are quite diverse also, ranging from the historic Black community in the nineteenth-century village of St. Anthony (now part of Minneapolis) to the now-gone Jewish community on St. Paul's West Side Flats, to a number of projects addressing the region's Indigenous heritage and continued presence. Some of the topics are more scientific, such as an examination of the river's changing water quality.

The students and I hope you enjoy their work and find it rewarding, perhaps offering a glimpse into a previously unknown subject. The experience of the seminar offers what every veteran teacher knows: if you provide bright, motivated students with a provocative subject (like the Mississippi River) and give students ownership over how they approach the subject, wonderful work can emerge.

Pat Nunnally, Lecturer, University Honors Program

Donal Couch

When tasked with synthesizing the knowledge and learning I had gained throughout the course (HSEM 3205H Environmental Justice and Climate Futures: the Mississippi River Corridor) into a River Story, I was, at first, adrift. As a Chemical Engineering major, I found the curriculum to be quite the departure from what I was familiar with. Of the material we had covered in the course, one of the things I had found most fascinating were documents from the St. Anthony Falls Heritage Board on their interpretive visions of the west and east banks of the Falls. The more than 120 pages across two documents explored how the history and environment of this pivotal location could be tied with that of the people who have inhabited these lands. In addition to these documents, I was astonished by the foundational history of Eliza Winston and her

plight for abolition movements across the US. Eliza Winston was a slave from Tennessee whose owner eventually brought her with his family when they traveled to what was then St. Anthony, Minnesota (now northeastern Minneapolis) to visit the "healing" chalybeate springs. While there, with the help of local abolitionists, Eliza gained her freedom in a heated legal case. Prominent local attorney Francis R. E. Cornell won the case using only article 1, section 2 of the Minnesota State Constitution: "there shall be neither slavery nor involuntary servitude in the state." Despite Minnesota's abolitionist leanings, a large mob formed and struck the homes of known anti-slavery advocates. There is dispute of what happened to Eliza after she gained her freedom; some claim to have evidence that she left for Canada where she could live freely,

without being accosted, while others believe she returned to Tennessee.

Despite being from southeastern Minnesota, I had never been taught anything about this, nor had I ever heard of it outside of this course. For my project, I decided to merge these two aspects, focusing on the history of the early Black community of St. Anthony in what is now the Marcy-Holmes neighborhood of Minneapolis.

In my experience, and perhaps in dominant narratives, the early Black community of St. Anthony has been underrepresented in stories of Minnesota's history. As the home to the first free Black residents of the state, along with the original location of Minnesota's first African Methodist Episcopal church (St. James AME Church, to which many other congregations trace their roots), the subject matter is important to Minnesota's history. Moreover, the abolitionist activism and antislavery efforts stemming from this community are an underlying component of how political beliefs and affiliations in the state became what they are today.

See Donal's project <u>here</u>.

For this project, I created a planning document emulating comprehensive plans of city development commissions. I focused on overhauling the structure of interpretation in the area by



Eliza Winston (1830–?) was an enslaved American from Mississippi who was freed from her owners while with them on vacation in Minnesota, a free state.

providing content for a guided tour and signage, for example. The impetus for this was that when I was exploring the current content, I found only one sign on the Eliza Winston case, which was a landmark case for abolitionism, and nothing is said of other achievements of early Black Americans from Minneapolis.

The first Black graduate of the U of M law school, the first Black American elected to the Minnesota House of Representatives, the first Black American high school and college sports coach, the first Black American to play football in the Big Ten, among many other firsts, are overlooked. By creating an (admittedly basic) planning guide highlighting some of these influential people and histories, I hoped to demonstrate how there are exciting and important stories intrinsic to Minneapolis that are not currently being told and shared like they should be. The historical figures

we feature and the stories we tell about them are essential to representation of people from all backgrounds, and this project is meant to explore ways that can be done locally.

The class as a whole and this project especially were enlightening experiences for learning about my own blind spots in the history of the land around us. While I had a cursory understanding of the displacement of Native peoples and the history of minority and immigrant group populations in the state, through taking this Honors Seminar, I became educated on topics that I knew very little about previously. This has helped me develop a more nuanced understanding of events in current times and will continue to aid me going forward; it has opened my eyes to looking for hidden and underrepresented stories everywhere I go.

Nichole Jacquez

Walking along Pike Island Hiking Trail, I am filled with nostalgia. From my own childhood field trips, witnessing actors firing on a line, to viewing the rivers from those royal-esque walls, I recall feeling pride and triumph—like the fort's existence was a feat of Minnesota power that I inextricably became a part of.

The nostalgia I have contradicts with what I now know about this area and Bdote in general. On the banks of this river, where flitting few fish ripple against the surface, a people call this their creation place, their place of origin. But just outside of the walls, hundreds of those same people died, broken like the treaties they were once promised. The path near the river is paved in concrete, packed with a paradox that summarizes the Indigenous experience.

For my river seminar class, I visited Pike Island and wrote the above as my reflection.

The location for Fort Snelling is a popular field trip destination for young Twin Cities metro Minnesotans. You can ask most former local school children to reminisce about the lunch they had on the stone steps or their immersive experience with the play soldiers on the field, but a majority of those people could not explain to you the breadth of importance of this place. Sure, Pike Island was a momentous piece of land for European settlers; Fort Snelling helped cement Minnesota as an important place of trade. But it was only through this seminar that I learned that the Dakota—the Indigenous people occupying this land, and who have for thousands of years prior—were forcefully removed and killed in an area synonymous with their people's beginning: Bdote. The dissonance between my reminiscing and my new knowledge was only amplified by the trail signs I read on the way. Indigenous presence was reduced to merely a tagline; they emphasized the power the fort gave the forming state instead. There was no reference to just how important and

sacred Bdote is or the people whose presence was essentially erased.

See Nichole's project here.

When it came time to "tell a river story," our final project, I decided to revisit Pike Island's trail signs; I wanted to create designs that supported and uplifted Dakota stories, while curated through an ever-changing digital landscape. Each sign I proposed had a differing amount of polish, but a uniting feature of all were QR codes, each unlocking a related audio from a Dakota perspective to accompany each hiker on their way to the next signpost.

This project helped me realize the importance of multiplicity. In my mockups, it became apparent to me that providing multiple ways of learning through an audiovisual format made history readily accessible to as many people as possible. My various disciplines in environmental science, humanities, and art enabled me to create signs that I believe are more engaging and intuitive than the current signs on the trail today. I found multiplicity in my sources, too; if non-indigenous Americans take history lessons solely from a white colonist perspective, we lose American history. Centering an Indigenous perspective allows for a broader and more realistic understanding of the United States' inception and expansion, and fosters more empathy and understanding through all the people who interpret those stories. My proposed trail signs are one way to do that. Multiplicities exist within ourselves, the gifts and skills of others, and the stories they have—if we are just willing to listen. This is key to chipping away at the paradoxes that exist not only at Pike Island, but across the entire United States, and that's a lesson that will resonate with me in all my future endeavors.

Bdote

A Place of Creation

W hat is your creation story? For the dakota, the creation story starts here, at Bdote.

Bdote, generally, means "Where two waters come together". This term can refer to a plethora of different waters meeting, but the most important of Bdote to the Dakota is the confluence of the Minnesota and Mississippi Rivers.

In Dakota stories, it is said that seven tribes came from the seven stars of Orion's constellation belt; they then descended onto the confluence of the Mississippi and Minnesota rivers. The first breath of each newborn comes off the confluence. As such, this broad area has a long history and sacred significance.

In fact, the Dakota's history branches back to before any settlers came. Over 10 thousand years! Pike Island is known as Wita Tanka, and the place we currently know as Minnesota is Mni Sota Makoce — Land Where the Waters Reflect the Skies.



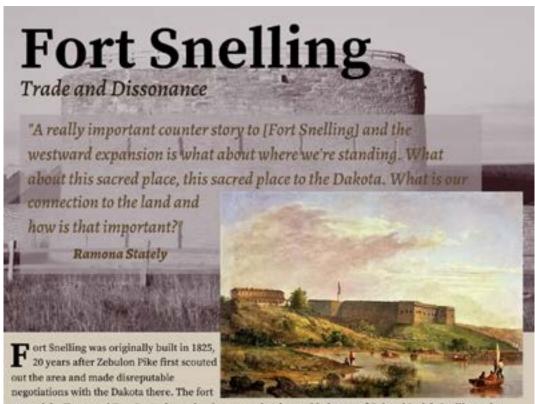
Over the years, many have found this confluence area, like the artist that painted the image above. The most famous of which is Zebulon Pike, which is where the name Pike Island came from.

Pike is known for scouting the land for Fort Snelling, but the details surrounding his interaction with the Dakota living here are shrouded in lies: Only two out of seven Dakota elders were present for the negotiations, and the process was hindered by a language barrier. He had promised a trading post, but that promise was never fulfilled — Fort Snelling was built instead.

Listen while you walk and complete the puzzle here:



This poster excerpt from the project talks about Bdote and its role as the place of creation to the Dakota.



was originally named Fort St. Anthony, but its namesake changed in honor of Colonel Josiah Snelling, who watched over a majority of the six year construction process. The Fort's main goals were to keep the British from going further west, as well as keeping them away from the fur trade that was immensely profitable in the 1800s.

Shady Business

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The process of obtaining this land is skeptical at best. Because the president of the United States had not given Pike authority for an expedition, he had no authority to even negotiate with the Indigenous land. Additionally, the acreage at Bdote ("Place where two waters meet", approximately where Fort Snelling is) was priced at a mere two thousand dollars, although Pike estimated its value at 100 times more than that. Throughout price negotiations, no Dakota were present. Fort Snelling's history is legally and technically illegal, but the United States carried through its construction. As a place of creation to the Dakota people, Fort Snelling was a transgression and invasion of sacredness – and unfortunately, just one of many against the Dakota.



Buffalo Soldiers

Fort Snelling found great success during Antebellum, otherwise known as the time period prior to the Civil War. But in the two decades following the end of the Civil War in 1865, the fort still continued to expand in use. From 1882 to 1888, the fort was headed by a segregated African American unit. This was the Twenty-Fifth United States Infantry Regiment, but alongside the three other segregated units, you would find better luck if you asked for the "Buffalo Soldiers".

Unfortunately, the time prior to World War I was a period in which Fort Snelling aided with the expulsion of Indigenous peoples in the western United States. During World War I, segregation within the armed forces continued. The violence shown towards indigenous peoples throughout the United States has in some forms still persisted to today.

Listen while you walk and complete the puzzle here:

This poster excerpt from the project talks about the dissonant role of Fort Snelling in the

history of the area.

Hope Werstler

From 1882 to 1963, St. Paul, Minnesota's West Side Flats was home to a tight knit, Jewish immigrant community. Although stricken with poverty and frequently destroyed by flooding from the Mississippi River, this neighborhood carries stories of cultural preservation, faith, and overcoming the hardships that came with life in the New World. Although physical evidence of this neighborhood has been wiped from the banks of the Mississippi, storytelling has the ability to preserve the memory of the now dispersed Jewish community that once called the area home.

See Hope's project in this video.

I have spent my entire life hearing stories about my own Jewish family. I remember sitting on the couch next to my Grammy, listening to her tell my sister and me story after story while sifting through photo albums as big as encyclopedias. Every photo is a memory that would've been lost without her, and for me these stories were portals into my own Jewish community. They taught me about my family, and in turn helped me learn about who I am as a Jewish individual. The lost Jewish community of the West Side Flats in St. Paul is an important subject because it is a community without a storyteller like my Grammy, but that doesn't mean their stories are not worth telling.

This project was my final assignment for an Honors Seminar at the University of Minnesota called "Environmental Justice and Climate Futures: the Mississippi River Corridor." The course focused on the Mississippi River and its effect on the biological and socio-cultural systems of the past and today. The course put a strong emphasis on communities and how they viewed and utilized the river, with the final project asking students to choose one of these communities and tell its story. When choosing the format for this project, I wanted to choose something engaging, something I would want to learn from. In my

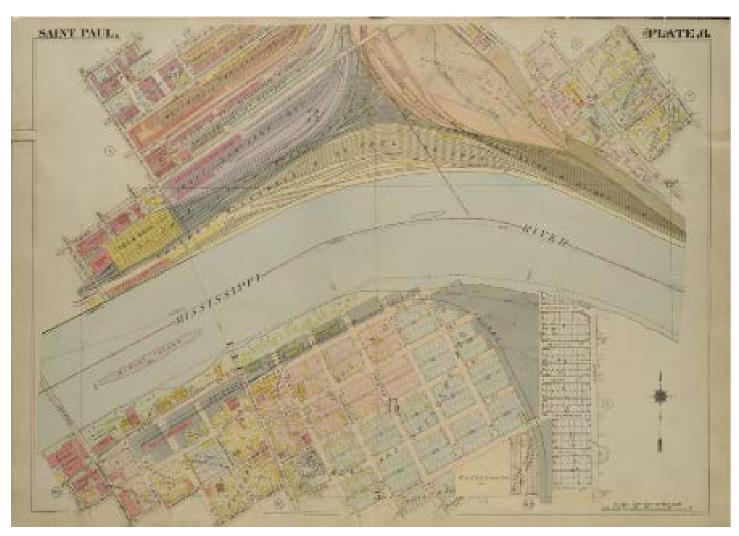
mind, an interactive story map is like a "choose your own adventure" approach to looking at documents. It allows for user exploration and can make it easier to locate the exact information needed for a project. And with maps, photos, and videos, a story map is a multimedia learning experience, which can deepen a student's understanding and interest in the subject.

This assignment taught me that without documentation, stories are lost in time. And the stories of ethnic groups around the world deserve to be told because those communities still exist today; they just might look a little different.



The Beth David Synagogue was a small Orthodox congregation founded in 1917 by 15 Jewish, immigrant men. Image via University of Minnesota Libraries, Nathan and Theresa Berman Upper Midwest Jewish Archives.

When Jews first came to America, like many other immigrant groups, they found that living in an almost exclusively Jewish community was a way to preserve their culture, cuisine, and native language. Without these communities, Old World traditions would've been quickly forgotten as members assimilated into their new surroundings and way of life. But nowadays, the majority of Jews live outside of Jewish communities, maintaining their cultural and religious connections through extracurricular activities, online groups, and story time with their Grammy. This story map has the potential to become one of these tools that keep stories alive in the minds of a strong, yet dispersed community.



Map of St. Paul in 1916 showing the area around the West Side Flats.

Caitlyn Barrett

In the University of Minnesota Twin Cities Honors Seminar course titled "Environmental Justice and Climate Futures: the Mississippi River Corridor," the goal was to understand the history of the Mississippi River, such as its importance to the Dakota and Indigenous people as well as the colonization of the river and surrounding land that led to the development of the Twin Cities (Minneapolis—St. Paul area of Minnesota). The University of Minnesota Twin Cities (UMTC) campus is considered the flagship campus to the broader University of Minnesota (UMN) system, which involves four other campuses. To end the semester, we were assigned a project to tell a "river story." The goal of the project was to understand the river and its significance to the people and ecological systems around us. I wanted to pursue a story that focused on the strained relationship between UMTC and Indigenous people. UMTC has made increasing attempts to mediate this relationship by using land acknowledgements and a tuition program offering Native students full tuition coverage at any UMN campus. However, there is substantial debate over the minimal effort involved in land acknowledgements, the inaccessibility of the tuition program, and how use of the Mississippi River does not accommodate Indigenous perspectives on land and water. Incoming students at UMTC should be aware of institutional efforts to resolve this conflict, as well as Native and Indigenous perspectives of these efforts.

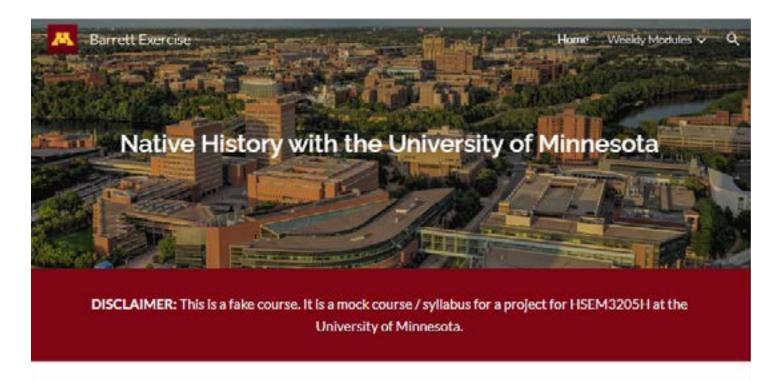
To tell the story of the relationship between UMTC and local Indigenous people, I chose the format of a mock half-semester course that is asynchronous and available almost fully online. One reason I chose this format for this project was that it could lead to something actionable. With some adjustments, such as consultation from American Indian Studies faculty on campus and local Indigenous leaders, a course like this could be implemented on campus. Incoming

students are already required to go through certain modules that educate them on sexual assault and substance abuse, so the asynchronous module format is not unfamiliar to them. Second, I chose an asynchronous course model because this would allow for higher enrollment without excessive emotional labor on Native/Indigenous faculty and communities. Implementing an educational course like this would be a small step for UMTC administrators to demonstrate they are dedicated to accommodating Native and Indigenous perspectives by being vulnerable about their shortcomings to students.

See Caitlyn's project here.

After completing the course project, there were several takeaways I had from the challenges of pursuing this project. First, it was quite difficult to find information on the relationship between UMTC and local Native/Indigenous people. Most sources and information focus on the impact of all five campuses or the Morris campus, which used to be an American Indian boarding school. Second, there are significant limitations of the course modality and audience. The course is mainly informative, with little direction on how students can use this knowledge to advance this social cause. In its current state, it simply makes students aware of the relationship rather than giving students an outlet for action. However, awareness is a good first step for students to hopefully become more involved in University relations. Third, referring to the problem itself rather than my project, the complexities of this relationship do not have a simple solution. In a search for a solution, the TRUTH project created a report enumerating suggestions that University leadership can take to repair the damage done to Indigenous communities.[1] The researchers on this project recommend a multitude of actions that must be implemented, as the effects from Native/Indigenous displacement continue to harm Native/Indigenous communities and

benefit University officials. Although my project has some limitations, if it was implemented, it would be a way for UMTC officials to acknowledge the harm that has been done to Native/ Indigenous communities by the University.



AMIN 100:

This half-semester course is designed to give you introductory information to the variety of topics and issues that are present between the University of Minnesota system and Native/Indigenous people. This course will provide assignments in a variety of modalities to allow you to reflect on the ideas in this course. This course is intended for freshmen at the University of Minnesota Twin Cities Campus.

Week 1 - History of University Land

Week 2 - Land Acknowledgements

Week 3 - University Native American Promise Tuition

Week 4 - Native American Presence in Staff and Faculty

Week 5 - UMN Repatriation of Cultural Collections

Week 6 - Native Organizations on Campus

Week 7 - Wrap Up

Screenshot of the mock syllabus website by Caitlyn Barrett.

Jenna Duncan

While there are stories in every place the Mississippi ebbs and flows, I chose the Bruce Vento Nature Sanctuary to be the focus of my project: a walking tour proposal. This location initially piqued my interest because it is a site of deindustrialization and ecological restoration, which is a unique narrative in this otherwise heavily industrialized area of St. Paul. Although the present landscape contains scars and remnants from the past, they do not tell the full story. This narrative begins with Wakan Tipi, a cave sacred to Dakota people, which is located within the present nature sanctuary. As railroads and industries expanded in the late 1800s, this space was desecrated and eventually became a dumping ground filled with toxic waste. However, after immense community efforts, the Bruce

Vento Nature Sanctuary was created with the goal of connecting people to Dakota traditions and serving as a wildlife refuge. After researching for this project, I've come to appreciate that there is much more nuance than what meets the eye. This landscape has experienced extensive man-made alteration and is anything but "natural," despite it presently serving as a nature sanctuary.

See Jenna's project <u>here</u>.

Fundamentally, this story is about shifting values and whose voices are heard. It is important for a variety of reasons, but especially because the erasure of Dakota culture and voices to further industrial development is central to the narrative. After I wrote this project in the fall of



Wakan Tipi, a cave sacred to Dakota people, is located within the present Bruce Vento Nature Sanctuary. Image courtesy of Wakan Tipi Awanyankapi.

2022, the Lower Phalen Creek Project, which is an organization that played a pivotal role in restoring this space, has been renamed Wakan Tipi Awanyankapi. This Dakota name, which translates to "those who take care of Wakan Tipi," demonstrates the importance of this space to Dakota people and is indicative of reclaiming visibility. I hope this project highlights how actions taken in the past continue to have real ramifications today for Dakota people. Additionally, the ecological restoration of the Bruce Vento Nature Sanctuary was largely accomplished by community efforts, the importance of which has not received due recognition.

Since location is central to the story, it felt natural to develop a walking tour proposal at the Bruce

Vento Nature Sanctuary to convey this narrative. Being immersed in a space is essential to gain a more complete understanding of the events that transpired there and how the past has influenced the present. Additionally, it facilitates the establishment of meaningful connections between people, nature, and traditions, which all intersect in this space. Furthermore, having a tour guide share this story would help participants engage with this narrative in a memorable way that encourages them to share this story with other people they know. It is critical to remember that although this narrative began in the past, this story is ongoing, and it is up to future generations to decide how it will continue.



A restored wetland located in the Bruce Vento Nature Sanctuary, also known as Wakan Tipi. The adjacent rail yard and downtown St. Paul can be seen through the tree line.

Image courtesy of Jenna Duncan.

Rianna Knoll

I am a Mortuary Science major at the University of Minnesota and as someone studying death, I have become attuned to the practices that go unrepresented. Indian Mounds Park is a popular Minnesota public site known for its magnificent view of the Mississippi. More importantly, it is a sacred cemetery for Dakota people that has been reduced from around fifty to six marked burial mounds, each containing the cherished remains of multiple ancestors. It is my mission to venerate the deceased and their resting place. So, when I was granted the opportunity in my **Environmental Justice and Climate Futures** course to research any topic regarding the Mississippi River, I instantaneously drew my attention to the significance of the remaining land and practices once performed at Indian Mounds Park. I believe bringing forth this knowledge makes the Dakota ancestors and their successors feel more real to Minnesotans facing a disconnect with the surrounding culture.

However, this disconnect is widespread as the "church and casket" funeral has become reinforced in all of Western culture through generations of tradition. The land that Americans inhabit once belonged to groups of people with very different burial traditions. The Dakota used the mounds, river, and artifacts they buried with the deceased to ensure a proper ascension into the peaceful afterlife and bring together their community of the living. It is important to recognize that these practices encompass similar

elements as contemporary Christian funerals: gathering and laying to rest.

To educate my community to this similarity, I proposed a walking tour to highlight the locations of the removed graves that symbolize such analogous practices. I used ArcGIS to create the project, as it allowed me to divide my tour into the history that would be shared with the tourists and the tour plan I had conceived. This allows readers to digest the heavy topic before picturing my proposition. In addition, ArcGIS is a mapping tool, so if there was a chance for my walking tour to become a reality, this would be an excellent way to map the tour spots and visualize the large ground that could be covered.

See Rianna's project in this <u>storymap</u>, or download the storymap <u>here</u>.

After completing my project on Indian Mounds Cemetery, my biggest takeaway was how easy it can be to encourage a respect for death. By educating myself and my class, I have been given the opportunity to enlighten a greater audience. Death is seen as a taboo subject, but normalizing conversations about it will help us learn from the past and make changes to be better in the future. All considered, I want to teach readers that death may be commemorated with differing burial practices, but it is a sacred and unifying phenomenon among all us humans. I hope this project can help prevent mindsets of judgment that enable the mass desecration of consecrated spaces.

Aryana Becchetti

For my final project in the "Environmental Justice and Climate Futures on the Mississippi River" class, I decided to take advantage of the opportunity to further educate myself and my classmates about the history of contamination on the Mississippi River in the Twin Cities. By talking about the water quality of the river, we can bring more awareness to the importance of conservation. Also for students like myself who are not from Minnesota, learning about where we live can give us more appreciation for our community. In turn, the reader becomes more engaged in their community and protecting the environment.

See Aryana's project here.

The Mississippi River has an enormous effect on the quality of life for the people and ecosystems in the Twin Cities area. The importance of water quality should not be underestimated. Around the early 1900s, when the quality was particularly bad, it caused a typhoid fever outbreak and the loss of many aquatic species, and the riverfront became a health hazard for the residents nearby. Water is the center of life, so we must care for it and treat it right to avoid recreating these conditions.

The format of my project is a slideshow presentation that includes a timeline of human involvement with the river, an analysis of the timeline, and a section on why water quality on the Mississippi River is important. The timeline starts in 1810 and goes on until 1990. This period goes from the beginning of settler use of the river, up to when some of the major water protection laws and restoration acts were put in place. When



The front page of the slideshow shows Minneapolis over the Stone Arch Bridge.

Image courtesy of Aryana Becchetti.

viewers see how much we have affected the river in a relatively short amount of time, it helps the audience understand the severity of the topic. The analysis section is broken down by half centuries starting in 1817 and goes into further detail about the water quality on the Mississippi. This organizes the impacts of particular human behaviors and highlights the related major changes in water quality. Finally, the "Why this is important" section provides the reader with further explanation of the severity of this topic, and how it affects everyone, including the reader.

Before starting this project, I knew that a large body of water located within a major city (like the Mississippi) most likely had a record of contamination. However, I underestimated just how much settler behaviors have affected the river. As stated in the timeline, in 1817, the water was described as "entirely colorless and free from everything that would render it impure, either to the sight or taste."[2] By 1907, the water

was declared unsafe for humans or livestock to touch, let alone drink. After just 90 years of human involvement, the river changed forever. However, some of the important work of the ensuing 110 years, from 1907 to 2016 (the most recent State of the River report) shows that a great deal has been accomplished to make the river cleaner than perhaps any time since urban industrial settlement in the mid-1800s. Some of the major accomplishments that helped restore the river to a cleaner and healthier state include the establishment of the Minnesota Pollution Control Agency, the Metropolitan Waste Control Commission, and the Federal Clean Water Act.

Although significant damage was done to the river in a relatively short period, a great deal can be done to restore the environment in a similar amount of time. This gives me a sense of hope that we can learn from our mistakes, and often we can restore our environment to a healthy state again. Although the river may never

Why is this important?



Learning about the history of pollution and the eventual restoration of the Mississippi River is crucial so we can ensure nothing like this happens again. Educating the public on the importance of river conservation is how we can continue to protect the river for future generations. Along with that, keeping the public interested and connected to the river means more people are willing to help preserve it. Studies show that having a strong connection to a place makes people more enticed to protect it. Telling stories about the history of the river can help shed light on the horrible history of contamination and ensure that the river is protected for future generations.

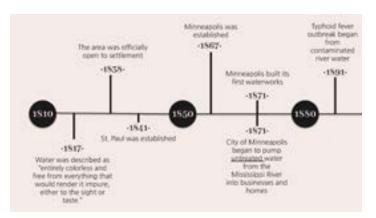
Learning about the history of pollution and the eventual restoration of the Mississippi River is crucial so we can ensure nothing like this happens again. Image courtesy of Aryana Becchetti.

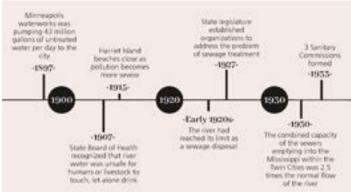
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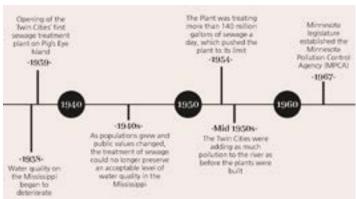
be completely free from the damage caused by human impact, the water quality is the healthiest it's been in over a century.

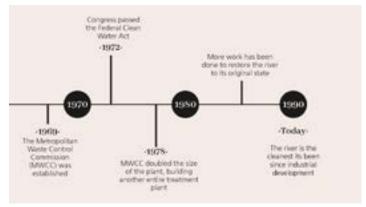
This project allowed me to learn more about the area I live in and made me more passionate about advocating for it. Having a strong connection to where we live and understanding its past makes people more committed to protecting it. By creating this presentation, I hope to offer people more insight into water conservation in the Twin

Cities and why it's important to care for our land. When the river became unsafe, everyone was affected by it, and the community had to work together to restore it. One of the biggest things that I took away from this project was that when we collectively work together to make our environment better, we can achieve a lot. I hope that by showing others the history of water quality on the Mississippi River, we can accomplish more together as a community and continue working towards making our home a better place.









Timeline of human involvement with the Mississippi River in the Twin Cities area from 1810 to present day. Images courtesy of Aryana Becchetti.

Footnotes

[1] The TRUTH Project, 2023, Oshkigin Noojimo'iwe, Nagi Wan Petu Un Ihduwas'ake He Oyate Kin Zaniwiçaye Kte (Renewing Systems Landscapes through Indigenous Traditional Management Practices), https://sites.google.com/view/truthproject/research/report.

[2] "River of History." National Park Service, U.S. Department of the Interior, www.nps.gov/miss/learn/historyculture/river-of-history-chapter-3.htm.

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About the Authors

After graduating from the University of Minnesota in May 2023, Donal Couch moved to Ann Arbor, Michigan to start his Ph.D. in chemical engineering at the University of Michigan. His research focuses on biomass conversion to platform chemicals by engineering synthetic microbial communities.

Nichole Jacquez is an undergraduate student studying Environmental Sciences, Policy, and Management at the University of Minnesota. Outside of her botanical forays, she enjoys tennis, playing farming simulators, and crocheting.

Hope Werstler is a senior at the University of Minnesota Twin Cities with a dual degree in Environmental Sciences, Policy and Management and French Studies. She has always enjoyed exploring the connections between communities and their natural environment. She hopes that you will enjoy learning about the once prominent Jewish community that called the St. Paul West Side Flats home, a topic that is close to her heart as a Jewish American.

Caitlyn Barrett is a graduate student at the University of Minnesota in the Department of Political Science. Her graduate research focuses on American politics and political psychology.

Jenna Duncan is a second year undergraduate student at the University of Minnesota in the University Honors Program. She is majoring in Environmental Sciences, Policy, and Management on the Conservation and Resource Management track and minoring in German. Outside of the classroom, she is involved in ecological research in the Snell-Rood lab, and she has interests in pollinator conservation, urban pollutants, and environmental justice.

Rianna Knoll is a University of Minnesota Medical School student working towards her B.S. in Mortuary Science. She is also part of the University's Honors program and is the Fall 2023 associate editor for their psychology journal, Sentience. After college, Rianna plans to become a licensed funeral director and embalmer.

Aryana Becchetti is a junior at the University of Minnesota studying Political Science. Her goal is to become a lawyer and work in environmental law. In her free time, she enjoys hiking, fishing, and crocheting.