ECOLOGICAL JUSTICE FOR CONTAMINATED RIVERINE COMMUNITIES

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ABSTRACT

The climate crisis, loss of biodiversity and ecosystem services have the same root cause- a separation between humanity and the more-than-human world. To repair ecological balance, this relationship also needs to be repaired. Through acts of remediation and restoration- framed in this research as acts of care for the planet, the relationship between humanity and the more-than-human world can be re-formed. Applying an ecological justice framework to remediation and restoration practices can help to reframe these processes. This research presents a conceptualization of ecological justice centered on the rights of nature, nature's agency, recognition of past harms, and the need for reconciliation. This ecological justice framework is further developed through community workshops in two case study communities. The case studies used in this research are riverine systems impacted by forestry and mining. While each community has unique contexts and histories there are broad similarities that provide useful grounds for comparison. Each river has gone through a cycle of industrialization and contamination, followed by a period of renewal. Both rivers now face new threats from the global expansion of data centers and the increasing presences of PFAs. Results from community workshops are presented with discussion on the implications of the findings.

INTRODUCTION

Our relationship with Mother Earth is out of balance. Repairing that relationship is crucial to ecological justice futures. A crucial part of relational healing is healing the scars of industrialization; and framing environmental remediation and restoration as an act of care for the planet. This work theorizes that through these acts of care, we can find new ways of relating to our planet. To explore this theory, a case study process is being utilized to analyze the environmental history of two rivers. The rivers are the Chigami-Ziibiing (St. Louis River in

the US), and the Kymijoki here Finland. In addition to environmental history, the naturecultural context of the rivers are being explored through community workshops and expert interviews.

ECOLOGICAL JUSTICE

The theoretical framing of this research is ecological justice and ecologically just futures. The term ecologically just futures is utilized rather than sustainability, sustainable futures, or even just transitions because the conceptualization of sustainability is still rooted in the nature/culture divide. And more importantly, the culture/economy divide.

In conventional sustainability, we talk about the three pillars or spheres, which, when balanced form “sustainability”. These spheres are commonly regarded as the economy, society, and the environment; the idea being that when the needs of the three spheres are balanced, we can reach sustainability. Ecological justice takes a critical eye to that concept and forces us to ask why the economy is given its own sphere. The economy is a human creation, and its function should be to improve human health and well-being. We will never have ecological just, or even socially just futures when we do not address the fundamental dysfunction of our global capitalistic economy.

The model I am proposing for ecologically just futures is comprised of planetary well-being, the rights of nature and ecosystem services. In this model, we have the coming together of human and nature health and well-being and a reframing of the economy as ecosystems services, which highlights the reality that the environment is the basis of all economic systems, even (and especially) virtual economies. The inclusion of the rights of nature also makes us focus on the right of nature to exist without providing services and regardless of the impact on human well-being.

Elements of ecological justice are commonly considered to include (Grabowski et al. 2022, Pineda-Pinto et al. 2021):

- Distributive- of environmental goods and bads
- Procedural- how nature is included in decision-making
- Retributive- punishment for wrong-doing
- Restorative (which tries to restore relationships to "rightness.")
- Capabilities and agency- ability to participate in processes/society

These aspects are a useful starting point but are still framed in human terms. This research argues that the starting point for ecological justice should be the consideration of the rights of nature. A reframed conceptualization of ecological justice can consist of:

- Rights- protections and entitlements

- Agency- allowing nature to act and function on its own and respecting its natural processes and behaviors.
- Recognition- understanding how nature has impacted human development and how human development has impacted nature
- Reconciliation- is both healing human impacts to nature and changing our relationship to nature.

This approach builds on the momentum of the growing international movement for the rights of nature. Focusing on the agency of nature also takes the focus away from what nature provides for humans and refocuses on what nature needs to thrive. Recognition is a crucial aspect of justice, as it requires an awareness of what has happened to begin to repair the damage. Reconciliation includes not only the restoration of ecological functioning, but also a shifting of how decisions are made and how prioritized nature is in human culture.

CASE STUDIES

Kymijoki

The Kymijoki is one of the largest drainage basins in Finland, and flows through a landscape formed by glaciation. Inner Finland is defined by the Salpausselkä terminal moraine. Sometime between 1000 and 3000 years before present, the Kymijoki began to breach that ridge and find its way to the Baltic Sea.

As humans moved into the area, they found a river rich with aquatic life, like pike, salmon, trout and eel. The plentiful fish of the river encouraged trade – between cultures and across the sea. As a strong mark on the landscape, the river long served as a border between cultural groups, including the Tavastians and Karelians, and after the Peace of Turku, the border between the Swedish and Russian empires.

Both empires also took from the river, the Swedish crown granting fishing rights to monks (which upset the local fishing community) and the Russians establishing an imperial fishing lodge in the lower reaches of the river.

Figure 1

Kymijoki. Nela, n.d.

In the late 1800's the vast pinelands in the river's upper reaches began to be heavily logged. While logging was always part of the local economy, the scale and impact of it began to increase during this era. Along with the industrialization of the forests, came the construction of mills and dams along the river. At the start of the 19th century a series of major floods gave rise to massive water regulation activities within the watershed and across Finland.

Not long after this, in 1940 Kymin Osakeyhtiön (which would later become UPM) was founded. During this period and the time after WWII the exploitation of the river and the forests of the river headwaters increased dramatically. This exploitation drastically changed the landscape of Kymenlaakso. Peatland were ditched and drained to increase forested areas and the practice of floating logs on the river resulted in alterations to the riverbanks and bed.

With the expansion of mills and paper plants, came the development of hydropower dams, which decimated the populations of migratory fish. These mills and plants also deposited their effluent directly into the river, further impacting the water quality of Kymijoki. In 1960, a

sodium peroxide plant in Kuusankoski burnt down, this was the largest single release of dioxins and furans into the river.

In the 1960s and 1970s, as the global environmental movement gained traction, water quality regulations came into force and the wastewater entering the river slowly began to be cleaned. Even with the new protections, it took nearly 20 years for the water quality to begin to rebound. In the 1990s, the chemical contamination of the river began to gather attention, and a massive characterization of the riverbed was undertaken. These studies found the Kymijoki was most heavily contaminated with dioxins and furans (PCDD/F) and mercury in the northern part of the river. After nearly 20 years of studies and planning, in 2011 plans to remediate contaminated sediments were abandoned.

Chigami-Ziibiing

Through a landscape of peatlands and boreal hardwood-conifer forests, the *Chigami-Zibiing* flows from its head waters in the *Misaabe-wajiw* ('Giant Mountain'), emptying finally into *Chigami* (Lake Superior). Where the river meets the lake, a vast estuary forms, teeming with life.

Figure 2

Chigami-Ziibiing Watershed. Kmusser (2010)

It is not surprising then that this area, the estuary, has been home to people since the glaciers retreated. Successive generations of indigenous people have made their homes here, some moving on as times changed. When the Anishinaabeg people came to this land following their prophecies, they found manoomin (the good berry), or the food that grows on water, also known as wild rice.

As white colonizers pushed westward into Turtle Island (North America), *Chigami-Zibiing* became the center of the booming fur trade. The *Chigami-Zibiing*, as cross-roads of aquatic trade routes positioned the Anishinaabeg to be crucial in the coming fur-trade between North American and Europe. Fashions in Europe had an insatiable demand for the pelts of beaver, mink, and otter. (Gawboy, 2024) The decimation of those animals was one of the first major alterations to the landscape of the *Chigami-Zibiing* watershed.

As the fur trade subsided, the timber industry had its way with the forests of the watershed. The physical changes in the forests changed the hydrology and biodiversity of the region. The transportation of the harvested timber also required the development of railroads, and timber floating. The submerged logs and debris from clearcutting impacted the bed and body of the river, and the railroads further impacted the cohesion of the forests.

Along the river, mills and other processing plants were formed, and the ports of Duluth and Superior became even more active. At the same time, the timber industry was expanding, the mining industry also began to develop. Along the western edge of the *Chigami-Zibiing* is the *Misaabe-wajiw* (iron range). In the late 1800s, iron was discovered there, which started the next wave of industrialization in the region.

These mines are also deeply tied to the overall industrialization of the United States, being part of the companies that formed US Steel, the first billion-dollar company in the United States. As these industries grew, more Europeans came to the area, including many Finnish migrants. These Finns are credited with the formation of the unions that helped shape the history of the area.

By the 1940's, concern over the impacts of industrialization on the estuary began to surface. In the 1970's, the Western Lake Superior Sanitary District was formed to treat wastewater entering the estuary. In 1987, the estuary was designated as a Great Lakes Area of Concern.

Renewal- Kymijoki

One of the major improvements to the Kymijoki came about through the treatment of wastewater, and changes in the treatment of timber. As the various mills and plants along the river have closed, this has also brought an improvement in the water quality. Although the remediation of the Kymijoki did not move forward, there have been several projects focused

on the restoration of various habitats along the river. One of the most extensive initiatives has been the restoration of the salmon to the river. Since the native salmon were eliminated from the river, farmed salmon must be added to the river each year. While these salmon have begun to survive longer, there are still no, or limited naturally spawning salmon in the river.

A major barrier to the restoration of salmon, trout and eel population is the vast number of dams across the river. While many of the lower rapids are protected from future hydropower developments, the existing dams present significant barriers to migratory fish. The paper mills originally connected to these dams have closed, or decreased in size, the power generated from the dams has become an important part of the national power grid. These hydropower plants are now also attracting global megacorporations' data centers.

Renewal- Chigami-Ziibiing

The Great Lakes Area of Concern program was an offshoot of the Great Lakes Water Quality agreement between the US and Canada. This program and agreement sought to protect and improve the water quality of the Great Lakes. Once the individual sites were designated, it was up to the local communities to define the boundaries of the areas and develop plans for remediation and restoration.

Starting in the early 1990's several Remedial Action Plans were created as a collaborative effort between the various state, federal and tribal agencies. In 2011, the Great Lakes Restoration Initiative funding became available, and a more comprehensive implementation plan was made. The contamination extent was characterized, and sites were prioritized for clean-up.

The massive clean-up undertaking includes agencies from two states, the federal government, tribal governments and organizations, and a community advisory council.

One of the most complex sites is the US Steel/Spirit Lake site. This massive site was once the location of the US Steel mill, founded in the 1900s to appease Minnesota lawmakers that threatened to tax the iron ore the company was removing from the Mesabi range. The complexity and hazardousness of the site promoted the site to the national priority list, also known as the Superfund list. This site is also the location of the culturally significant Spirit Island, also known one of the final stopping points on the great Anishinaabe migration along the Great Lakes.

This site also highlights the difference of approaches in remediation the various agencies undertake. For the state and federal agencies, the priority is eliminating pathways and the risk to human health. In the Anishinaabe worldview the water and earth herself is sacred and locking those contaminates in her body is an abomination.

COMMUNITY WORKSHOPS

Kymijoki

Through community-workshops, the ecological justice status of the Kymijoki has begun to be be mapped. These workshops introduced participants to the concept of ecological justice, then participants worked together to locate areas along the river that represented those aspects, either positively or negatively.

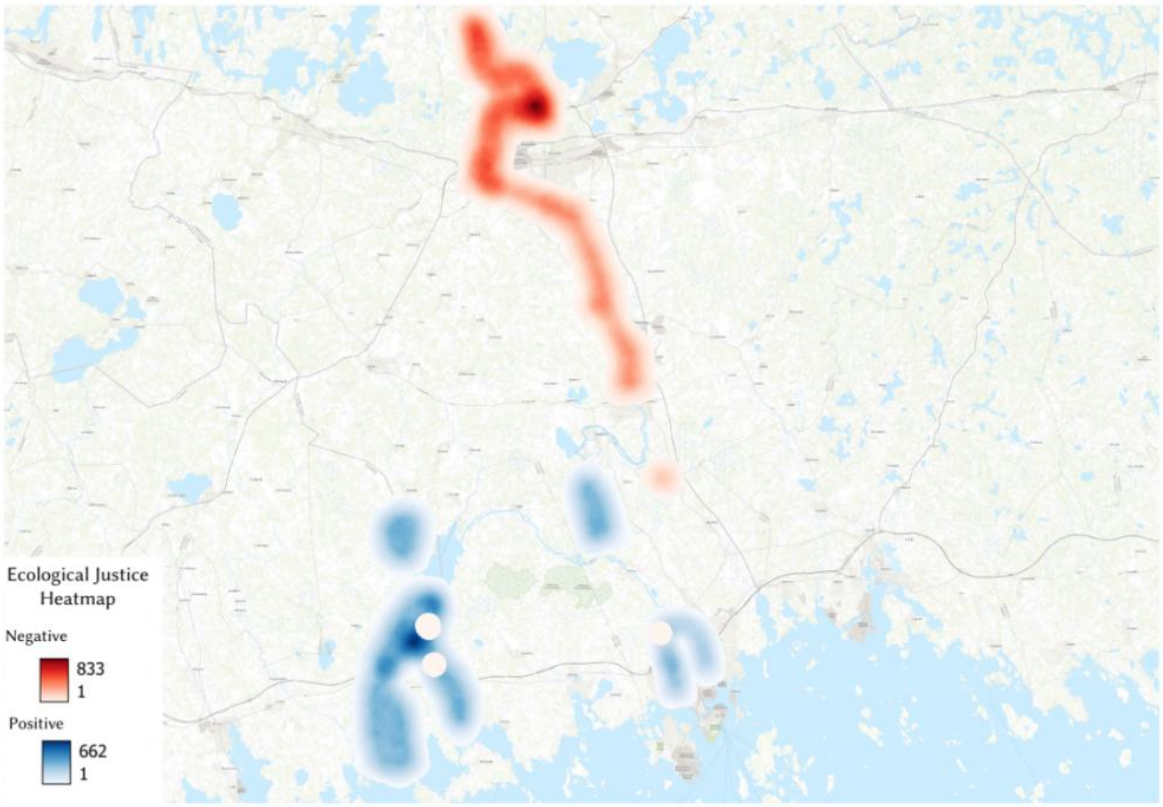

Figure 3
Kymijoki Ecological Justice Hotspots

The results from this exercise clearly shows that participants saw more positive indicators in the southern part, and more negative in the northern part.

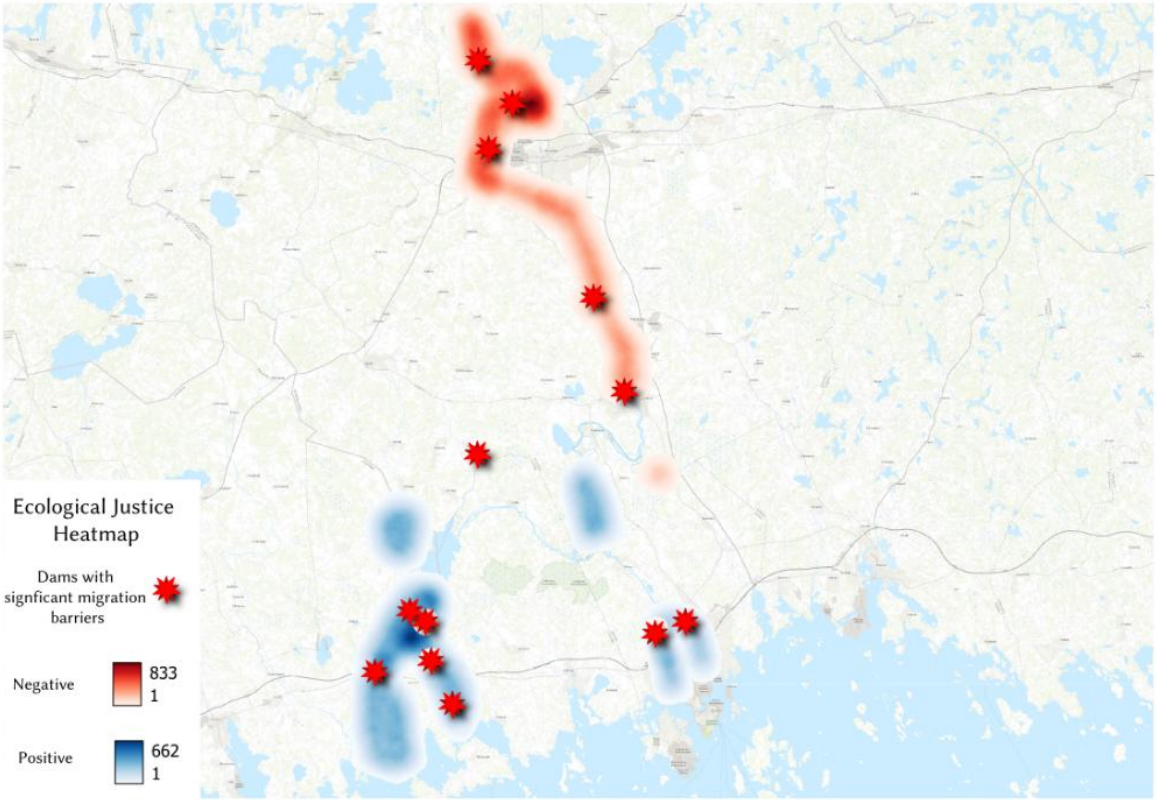

Figure 4
Kymijoki Ecological Justice hotspots and locations of dams

One of the indicators of negative ecological justice was the existence of dams. There are several dams on the river with partial to significant barriers to migration. Participants correctly located several of the dams in the norther part of the rivers, but missed several in the southern part.

One of the positive indicators of ecological justice was the location of protected areas. If we compare the indicated areas again against protected areas, we see there are many areas in the north that weren't indicated, and a few in the southern area that were also missed.

Part of this difference in the perceptions could be traced back to the contamination issues in the northern areas. From the surveys and interviews, it is clear people hold negative perceptions about the river; but there is also a feeling that those perceptions could/should be changed.

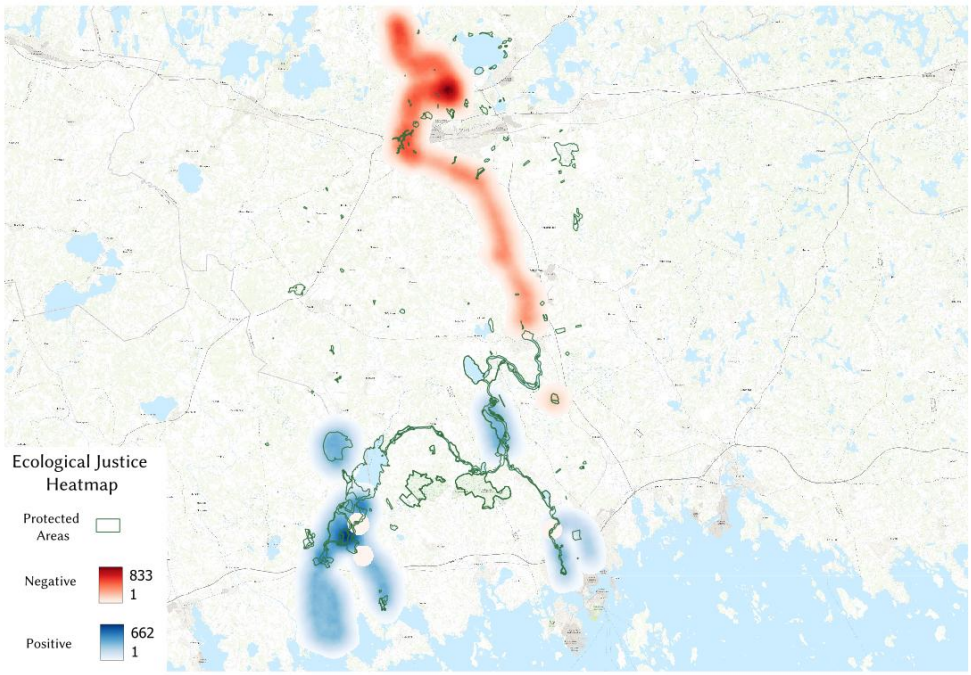

Figure 5

Kymijoki Ecological Justice hotspots and protected areas

Chigami-Ziibiing

Following are the results from the *Chigami-Ziibiing* community workshops.

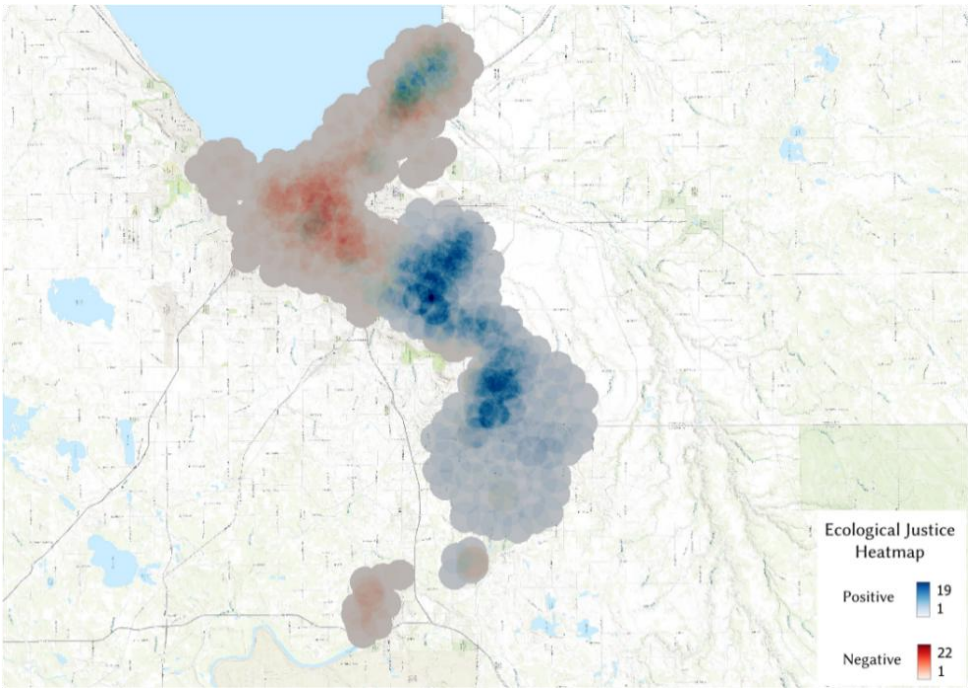

Figure 6

Chigami-Ziibiing Ecological Justice hotspots

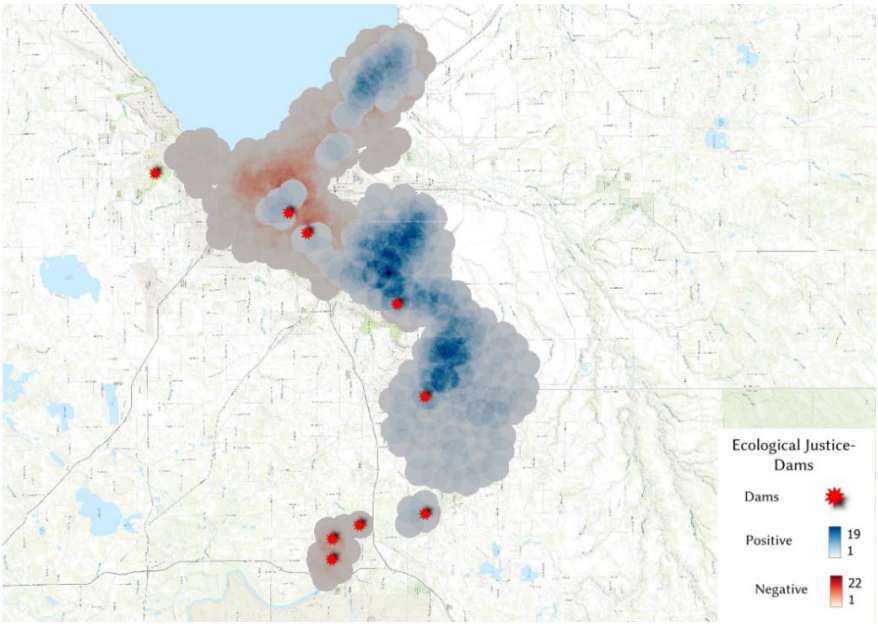

Figure 7

Chigami-Ziibiing Ecological Justice hotspots and dams

Same as the Kymijoki, an indicator of negative ecological justice is the location of dams. The participants in the *Chigami-Ziibiing* workshops located the hydroelectric dams significantly better than the Kymijoki participants.

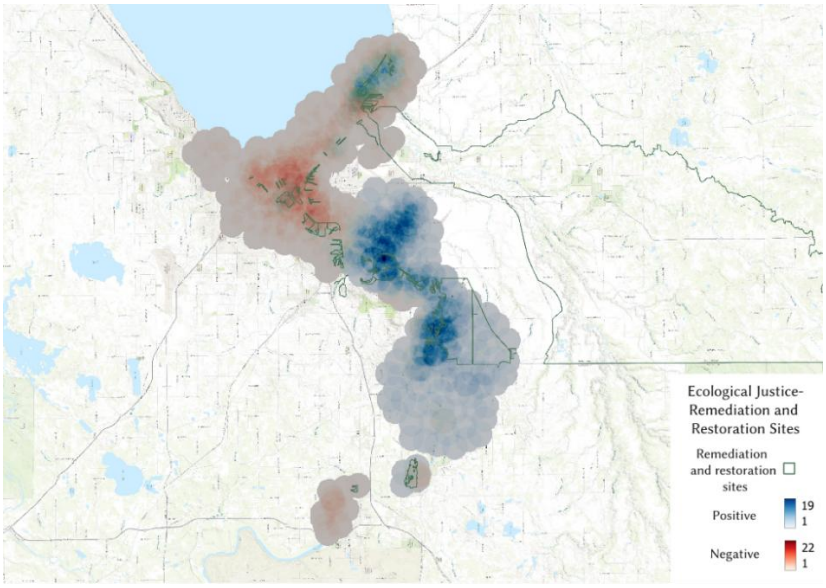

Figure 8

Chigami-Ziibiing Ecological Just hotspots and remediation and restoration sites

One indicator that had both positive and negative connotations was the location of the remediation and restoration sites in the estuary. This is due to some participants seeing the remediation and restoration activities as a positive and some seeing the contamination of the sites as a negative, or a perceived incompleteness of the remediation/restoration activities.

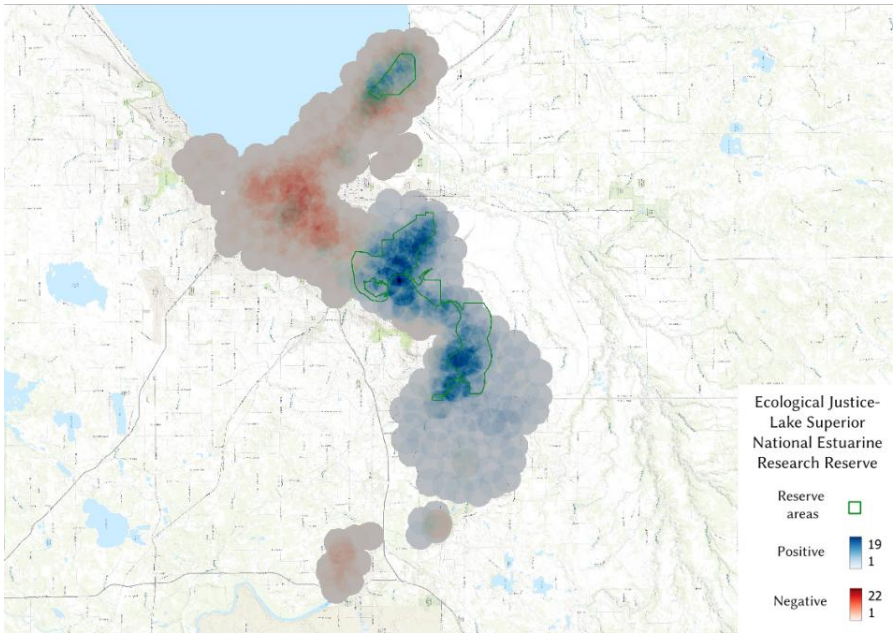

Figure 9

Chigami-Ziibiing Ecological Justice hotspots and the Lake Superior National Estuarine Research Reserve lands

One of the best indicators of positive ecological justice are the areas managed by the Lake Superior Estuarian research reserve. This organization is part of a national system of research reserves and is housed within the University of Wisconsin. They conduct long-term monitoring, and community outreach and educational activities.

It is clear from people's comments and the interviews that Chigami-Ziibiing has really benefited from an active and engaged community of concerned citizens, and the existence of education and outreach activities by the St Louis River Alliance and the Lake Superior National Estuarine Research Reserve. In addition to that, the presence of the Indigenous communities has had an impact on how people are able to view their relationship to the river and responsibility to it. There is also a community, and way of working together that has grown out of the last 20 years of remediation and restoration actions.

CONCLUSIONS

Both rivers play important roles in the history of their communities and nations. Lack of active remediation and restoration projects does not fully explain the negative image of Kymijoki. Rather, it can be understood as a lack of community around the river. The Kymijoki case study also shows a division of agency between employees and community members, with no active citizen action groups in Finland.

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