The Red River Restoration Project

Hello, my name is Jeremy MacDonald, and I lead *Surbris*, a think tank based in Winnipeg, MB. Our organization specializes in providing research services to other companies. Currently, we are engaged in an internal project focused on enhancing the ecological health of the Red River Basin.

Through thorough research and analysis, we develop detailed proposals aimed at environmental restoration, which are presented to various stakeholders for potential funding and collaboration. The following is one such proposal.

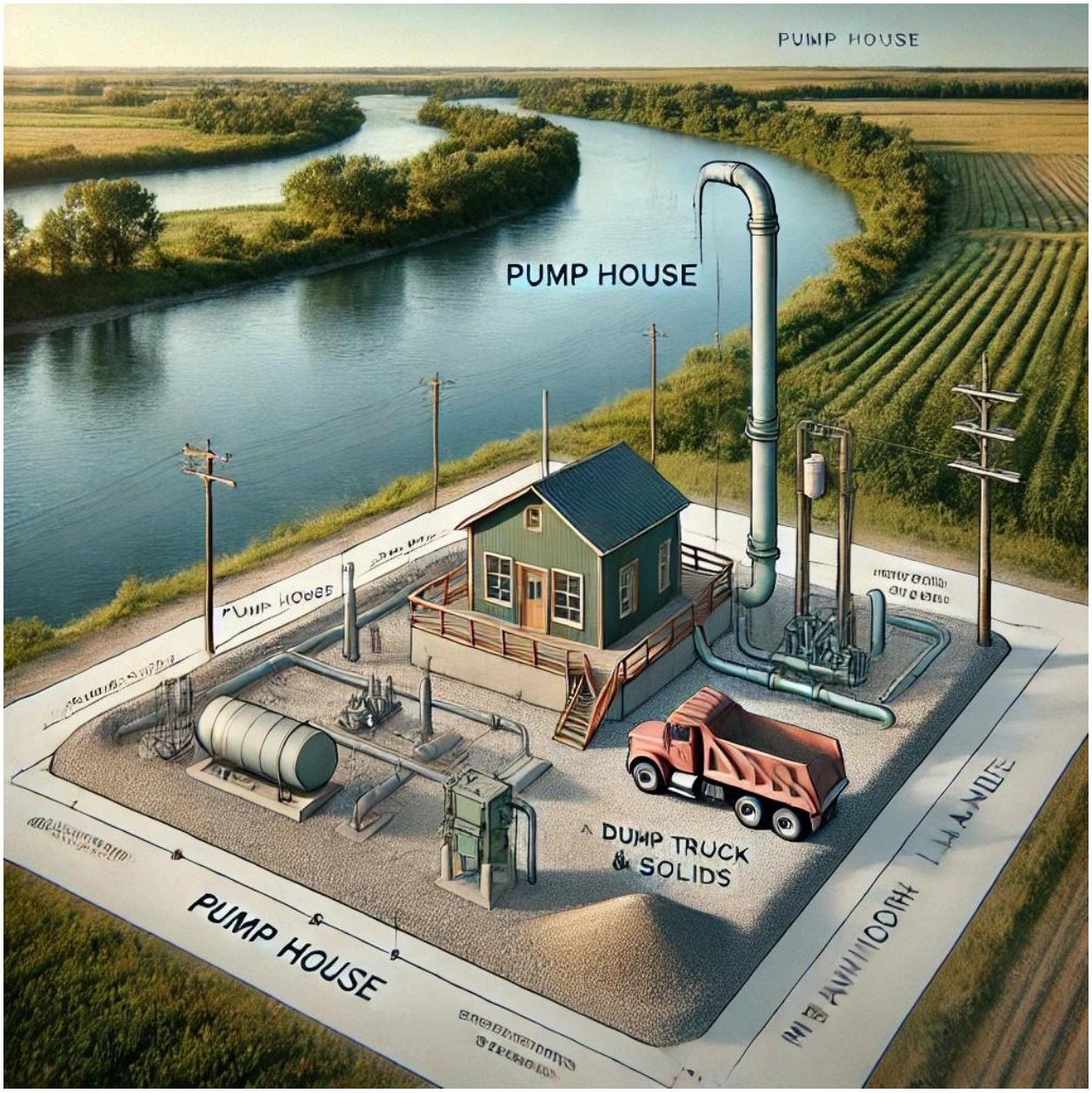
The Inspiration Behind the Project

The Red River Restoration Project originated unexpectedly through my personal interest in slacklining. While seeking a suitable location around Lake Winnipeg, I encountered numerous obstacles, including slimy rocks and invasive zebra mussels, which hindered access to the trees along the shoreline. This experience piqued my curiosity, prompting a deeper exploration into the ecological history of Manitoba and the Red River Basin.

What I uncovered was concerning. Over the past century or more, environmental changes have significantly altered the region. Notably, elevated salt levels in the Red River, caused by both natural and human factors, have disrupted native ecosystems, impairing plant and animal life.

Motivated to address these issues, I began studying the impact of silt accumulation on ecological balance. Silt affects water clarity, oxygen levels, and aquatic habitats, resulting in negative consequences for local flora and fauna. This research ultimately expanded into a broader mission: to restore the Red River to its natural state, rehabilitating riverbanks and revitalizing native species.

Thus, the Red River Restoration Project emerged—not only from environmental concern but from a vision to restore and sustain this vital natural resource for future generations. The goal is ambitious yet critical: to reverse the damage and create a self-sustaining, healthy ecosystem.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History Who Needs History : Understanding the Red River's Past and Present

The Red River Restoration Project began with a simple question: How did the Red River ecosystem function before human intervention, and how does it compare to today? This question led me on a deep dive into the river's history, revealing a complex story of transformation, degradation, and resilience.

Before significant human impact, the Red River was a thriving, self-sustaining system. Its waters supported diverse aquatic life, while dense forests along the banks stabilized the soil and regulated flooding. However, over the past two centuries, human activities have drastically altered this delicate balance. Essential infrastructure like dams, while necessary for modern society, has disrupted natural water flow and sediment distribution. Deforestation removed critical tree cover, accelerating erosion and silt buildup. Moreover, invasive species like zebra mussels have devastated native plant life, further destabilizing riverbanks.

Historical pollution has left an even more insidious legacy. For nearly a century, industries and communities along the river used it as a dumping ground. Layers of contaminants now lie embedded within the riverbed—like a hidden time bomb. During major floods, these layers are disturbed, releasing pollutants that saturate the water. Though water samples might show minimal contamination under normal conditions, flooding brings these dangerous materials to the surface, posing a severe ecological threat.

Silt buildup presents another significant challenge. Without the natural root systems of native plants to hold soil in place, erosion has accelerated. This loose sediment travels upstream into Canada, carrying with it a new generation of zebra mussel larvae from the U.S. Each year, this cycle worsens, spreading the invasive species further and compounding the river's ecological Issues.

Our project's goal is twofold: eradicate the invasive zebra mussels and reintroduce native aquatic species to stabilize and restore the river's natural balance. Inspired by successful programs from Kentucky Department of Fish and Wildlife mussel initiatives, we plan to implement indoor breeding facilities in Winnipeg and across Manitoba. These controlled environments will allow us to cultivate native species year-round, creating a steady supply for reintroduction into the river.

Fresh Water Endangered Mussels

Another critical aspect of our plan involves Netley Creek and the Netley Cut. By strategically filling the cut with river rocks, we aim to help the Red River Delta reform naturally over time. This will restore the delta's ability to filter and regulate water flow, contributing to the river's overall health.

This chapter sets the stage for understanding the challenges and opportunities ahead. Our approach is holistic and ambitious, but with careful planning and execution, we can reverse centuries of damage and ensure the Red River's resilience for future generations.

The Goal: Vision and Innovation—A Personal Mission

The Red River Restoration Project is more than an environmental initiative; it's a personal mission rooted in my deep connection to Manitoba. I grew up here—this river shaped my home, my experiences, and my sense of responsibility. When I encountered its degraded state firsthand, I realized restoring it was both a necessity and an opportunity.

Initially, I thought I could handle the project independently. My first concept was a portable, one-person system: a trailer-based setup with small pumps to extract silt and sand from the river. The plan was straightforward—pump water ashore, filter it through collection bags, and return clean water to the river. No particles larger than the government’s specified limit would re-enter the ecosystem. This prototype was simple but effective, laying the foundation for a much larger idea.

Scaling Up: From Portable Systems to Riverwide Solutions

The vision expanded. I developed a plan to install concrete blocks across the Red River in strategic patterns. Each block would function as a vacuum head, connected by hoses to a central filtration system. River water would be pumped ashore, cleaned, and returned, while silt and smaller debris—no larger than one centimeter—would be extracted. This design specifically targets invasive species like zebra mussels while protecting larger native aquatic life. By using natural river rock as a filter and directing suction downward, the system minimizes harm, allowing the riverbed to "sandblast" itself clean. This process dislodges hard-packed sediments and deposits them onshore for processing.

From Waste to Wealth: Economic and Environmental Synergy

The extracted materials—sand, clay, iron, and other minerals—are valuable resources. This isn't just an environmental cleanup; it's an economic opportunity. Fine clay, for instance, is perfect for artistic use, with potential applications ranging from pottery to sculpting. As it dries, the clay could even form gypsum roses, similar to Manitoba's natural geological attractions. With careful processing, we could produce mile-long geodes, further enhancing the region's cultural and economic landscape.

Building a Sustainable Future

My ambition is to transform this project into a crown corporation(failed). The resources extracted from the riverbed are like "printing money"—renewable assets that can fund further restoration

efforts. By creating a self-sustaining economic model, we not only clean the river but also invest in the long-term prosperity of our community. This dual approach—environmental restoration paired with economic innovation—ensures that the Red River remains a vibrant, living resource for generations to come.

This isn't just about fixing a river; it's about reclaiming our heritage and future. I'm committed to seeing this through, driven by a deep love for my home and a belief in the power of innovative solutions to heal our environment and strengthen our economy.

The Science: Harnessing Nature's Power—The Science Behind the Restoration

Our restoration approach leverages natural river dynamics to revitalize the Red River. The core concept is simple: by systematically removing smaller particulates, we enable the river to reclaim its natural sediment flow, ultimately restoring its ecological balance. Here's how the process works:

Step 1: Removing Fine Particulates

Rivers naturally transport lighter materials—like sand, silica, and fine iron particles—downstream. Over time, these materials accumulate in riverbeds, forming hard-packed layers that trap pollutants and disrupt natural flow. By extracting these fine particulates, we create a cleaner riverbed that allows the water to carry larger materials. This process mimics nature but accelerates it, achieving in days what would otherwise take decades.

Step 2: Mobilizing Larger Particles

Once the smaller materials are removed, the river's energy focuses on moving larger particles, such as small rocks. This process is similar to how rivers reclaim their natural channels after dam removal. As these rocks begin to shift, they fill in gaps along the riverbed, naturally reinforcing riverbanks and stabilizing the ecosystem. One critical target is the Netley Marsh Cut, a man-made channel that has disrupted the river's flow since the mid-20th century. Restoring this area with natural sediment will help rebuild the delta and improve overall water quality.

Step 3: Creating Turbulence to Combat Algae

Another significant benefit of this process is the formation of underwater rock hills. These structures create turbulence, which prevents harmful algae blooms. Algae thrive in still water, depleting oxygen levels and harming aquatic life. By mixing the water in natural rapids, algae are broken down safely. The turbulence transforms algae into harmless organic matter without depleting oxygen, supporting a healthier ecosystem. This method not only prevents blooms but also provides a food source for fish and other aquatic creatures.

Step 4: Supporting Native Species and Ecosystem Recovery

As the riverbed deepens and natural flow patterns are restored, conditions improve for native species. For instance, silver carp—predator fish known for controlling zebra mussel populations—require cooler, deeper waters to thrive. By creating an environment that supports these natural predators, we can control invasive species organically. This sets off a chain reaction: healthier fish populations lead to balanced ecosystems, reduced algae, and stabilized riverbanks.

Long-term Impact: Restoring Balance

The ultimate goal is a self-sustaining ecosystem where natural processes keep the river healthy. As sediments settle and rocks reinforce the riverbanks, the Red River will regain its ability to cleanse itself, transport nutrients, and support diverse aquatic life. This comprehensive approach addresses multiple issues—pollution, invasive species, erosion, and algae blooms—creating a resilient river system that benefits both the environment and the community.

Chapter 5: Request for Support:

I kindly request guidance on the following:

1. **Endorsement and Evaluation:** Could the government assess this initiative's environmental impact and, if favorable, provide a statement of support or a preliminary approval?
2. **Funding Pathways:** Are there specific grants, programs, or agencies that support environmental innovation projects like this?
3. **Partnerships:** Can you connect me with relevant departments or organizations that might collaborate on this effort?

Must watch was a big factor in the planning.

https://youtu.be/i1NI2ia3nDw?list=PLIdvjcCswlO7FXQyvc9rI9JegdYn6KSy9&t=146

JJKU@shaw.ca Jeremy MacDonald Lets Talk
Surbris…