

Global Climate Geodesign Challenge: Northern Minnesota, An Indigenous Approach to Climate Action

Shaam Adam, Thomas Fisher, Joseph Hang, Julie Zhu

Collaborators: Leilei Duan, Pete Wiringa

Minnesota Design Center

Keywords: Global climate change, Carbon sequestration, Indigenous landscapes

The University of Minnesota's contribution to the Global Climate Geodesign Challenge involved a study of an area roughly 400 miles east/west and 175 miles north/south, stretching from the Red River to Duluth. Our goal was to maximize the carbon-sequestration capacity of that area. To achieve that goal, we began with a thought experiment: What if the original French idea of settling North America by respecting indigenous rights to the land had prevailed, and the continent had remained under native control, with white settlements having a very small physical footprint in trading outposts? With that in mind, we envisioned our study area returning to a pre-settlement condition, with its mixture of four biomes: prairie grassland, deciduous and coniferous forests, and tall-grass aspen parkland. We also envisioned a shift to intensive hydroponic, aquaponic, and aeroponic agriculture, renewable energy generation, and on-demand additive manufacturing, which would reduce the land necessary for human settlement by over 90%. That would enable a return of the rest of the land to carbon-sequestering native land cover, with a few, dense cities, linked by existing rail lines and each capable of meeting their own food, energy, water, and manufacturing needs.

Funder: This work was funded by a gift to the University of Minnesota from ESRI.

Northern Minnesota: An Indigenous Approach to Climate

Minnesota Design Center

University of Minnesota

December 14, 2023

Image 1. The MDC looked at how a return to an indigenous landscape in Northern Minnesota would dramatically increase carbon sequestration and serve as a model for climate change mitigation.

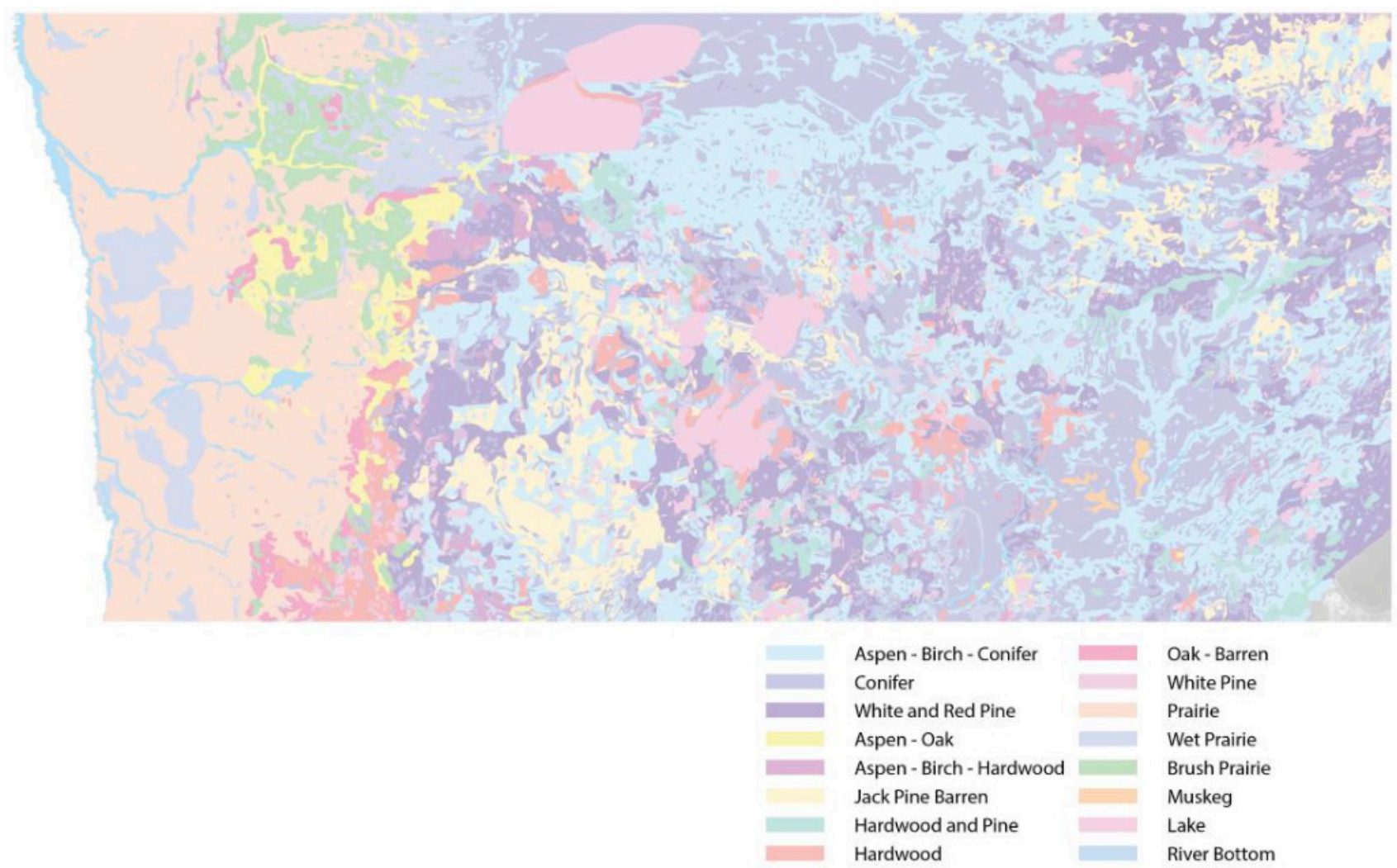


Image 2. The indigenous landscape in our study area - 400 x 175 miles - was highly diverse and one of the few places in North America that included all four of the continent's biomes.

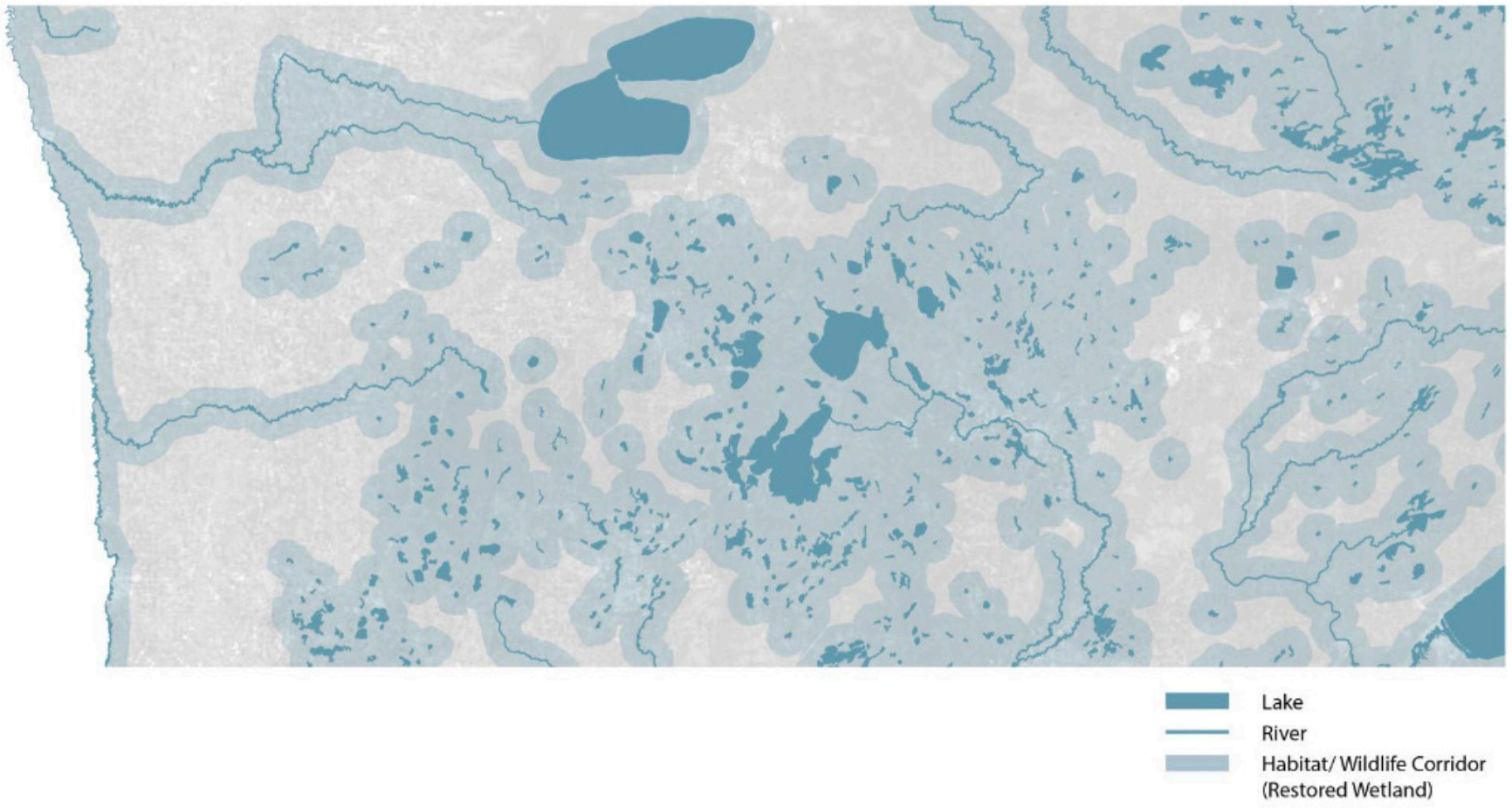


Image 3. A return to an indigenous landscape would greatly improve water quality and the biodiversity associated with it.



Image 4. The French idea of settlements as small outposts in an indigenous landscape would lead to a few, dense settlements; intense urban agriculture, renewable energy generation, and additive manufacturing to meets residents' needs.

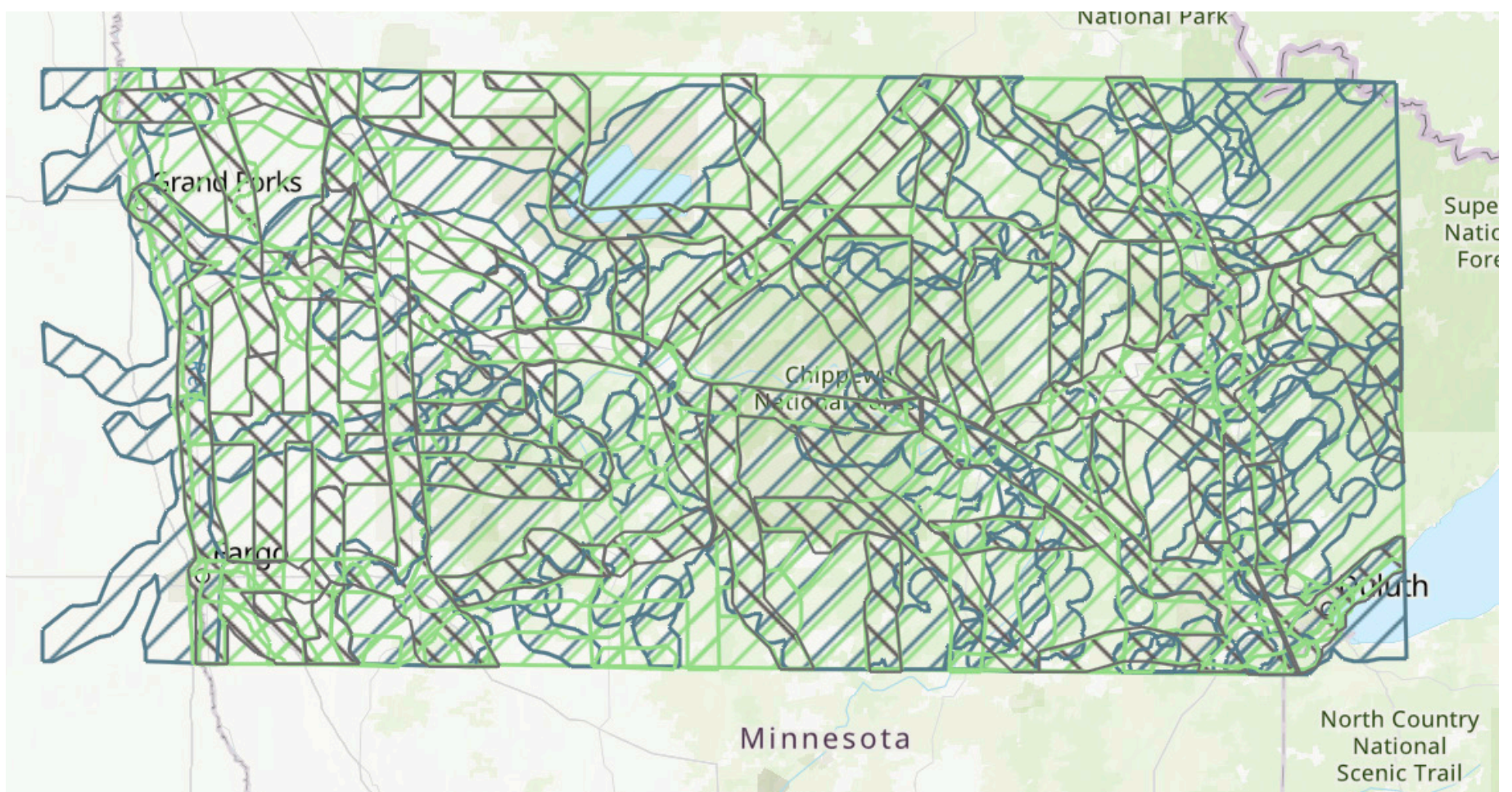


Image 5. The final design looked at how the area would return to a primarily forested and grassland landscape, with rail line corridors connecting a few, dense settlements.