



**MVP 25th Anniversary - Pete Kero, Barr – Jim Plummer, IRRR
June 14th, 2023**

Organizing Years: 1998 to 2001



Early Meetings

Project CONCEPT

I.	September 2, 1999	IRRRB, Chisholm	"Clarifying Project Intent"
I.	September 23, 1999	NRRI, Duluth	"Developing a Project Workplan"
III.	November 18, 1999	NRRI, Duluth	"Agreeing to Project Intent"

Result: Consensus on the project scope, intent and goals

Project PLAN and STRUCTURE

IV.	January 7, 2000	Giants Ridge, Biwabik	"Finalizing the Project Plan"
V.	March 3, 2000	IRRRB, Eveleth	"Discussing Administrative Structure"
VI.	May 5, 2000	Giants Ridge, Biwabik	"Agreeing to Basic Operating Mechanisms"

Result: Consensus on the coordinating and funding mechanisms

Project IMPLEMENTATION

VII.	July 12, 2000	USS Minntac, Mt. Iron	"The Work Begins"
VIII.	September 26, 2000	NRRI, Duluth	"Matching Resources to Results"

Result: Working maps of mine reserves - past, present, and future

IX.	October 31, 2000	NRRI, Duluth	"Agreement on Project Deliverables"
X.	December 1, 2000	USS Minntac, Mt. Iron	"Launching Project Deliverables"

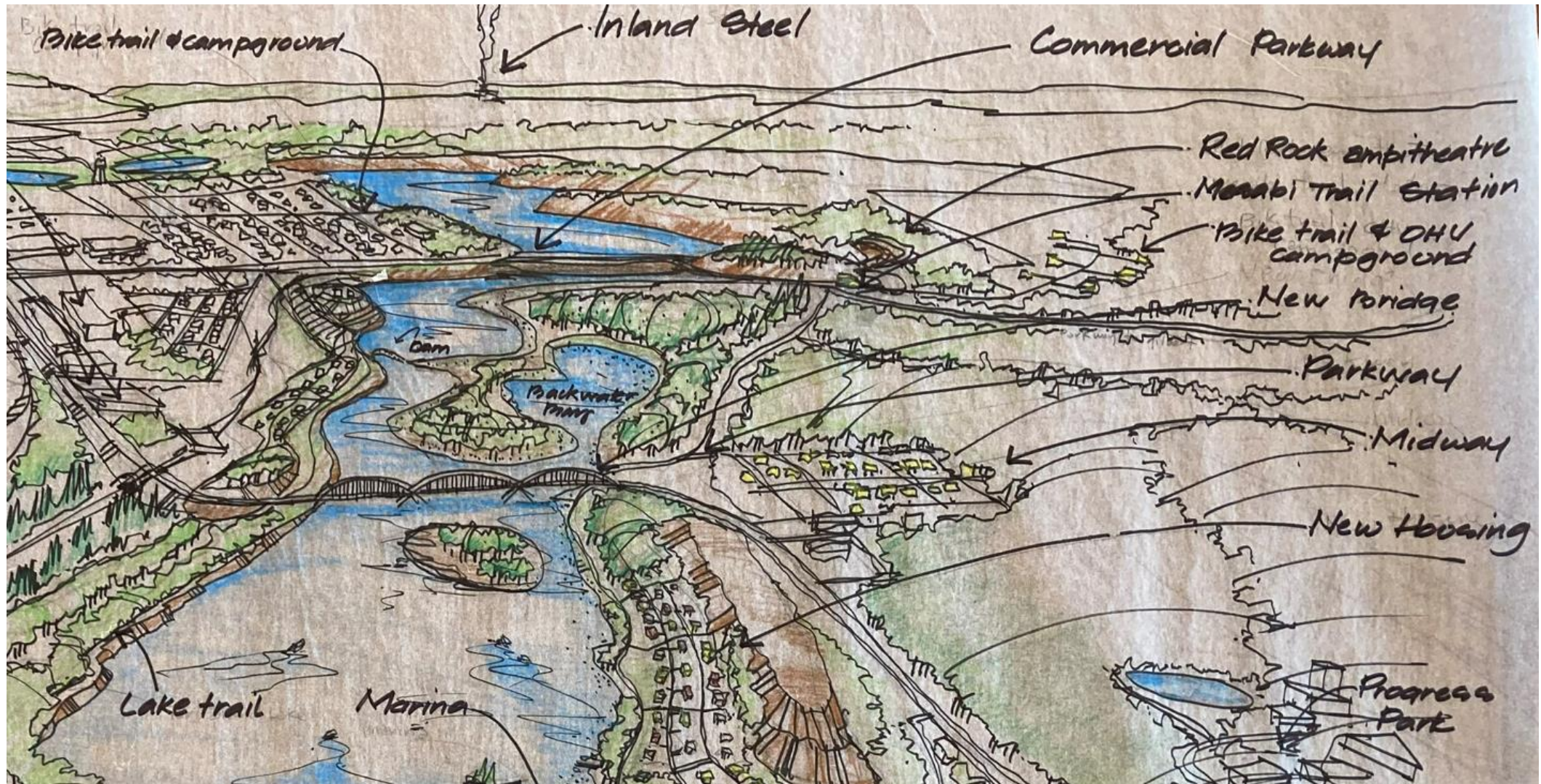
Charrettes – 2001 through 2007



Charrette Video



Virginia Charrette – October 2001



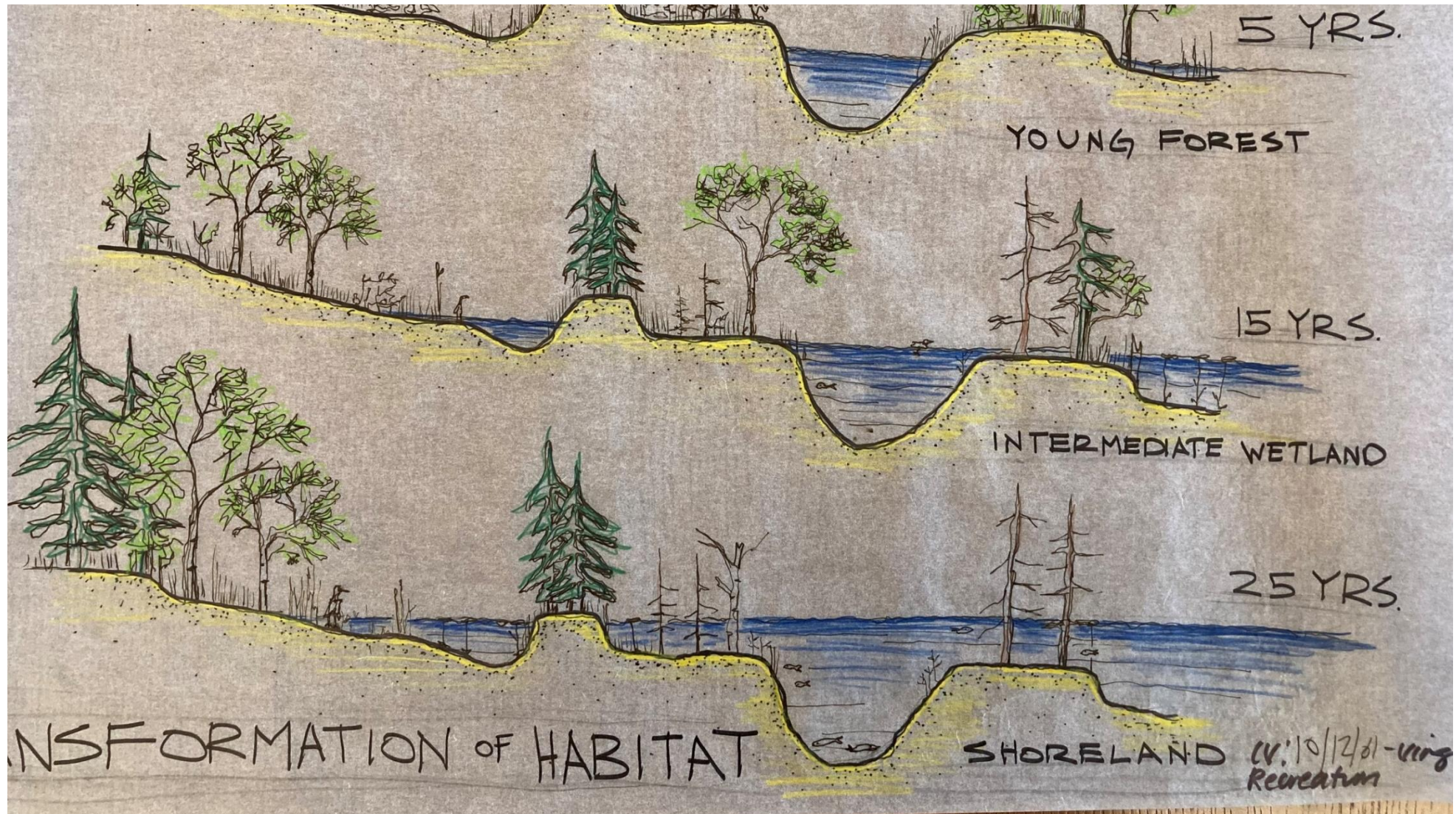
Red Rock



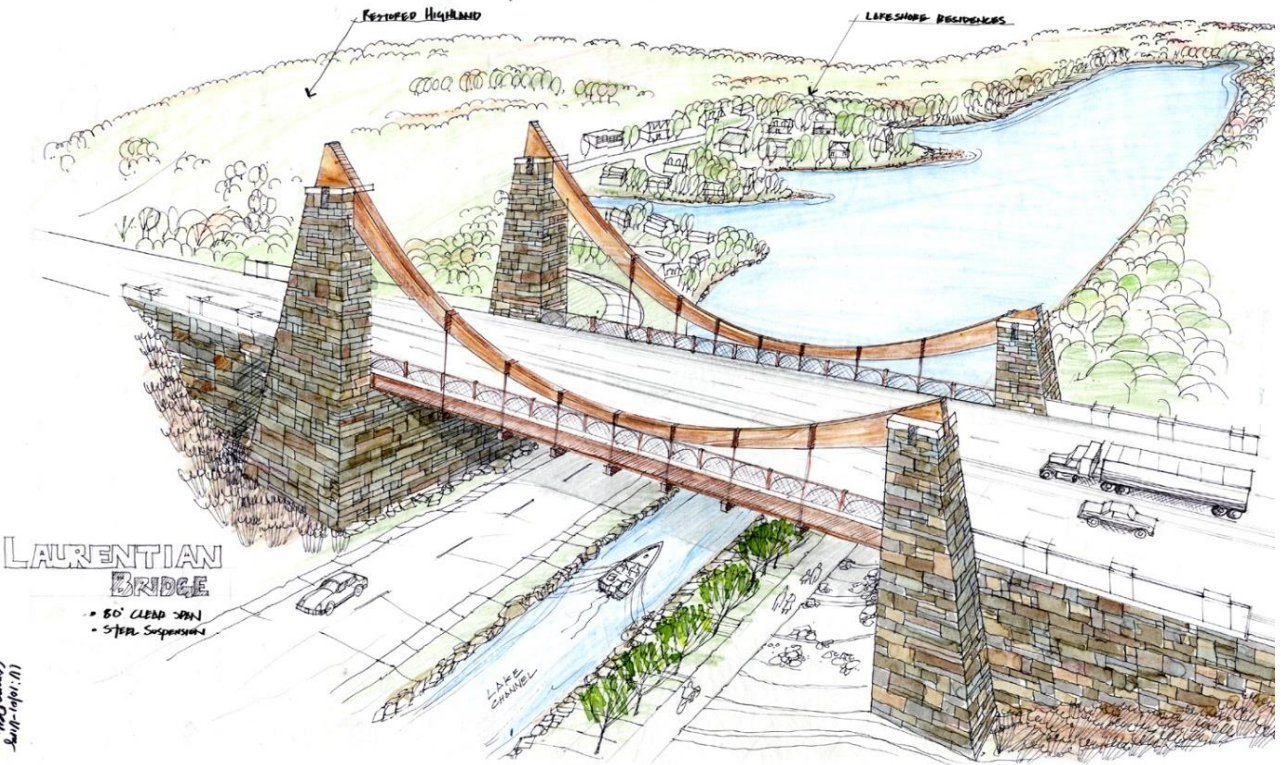
Iron Gap



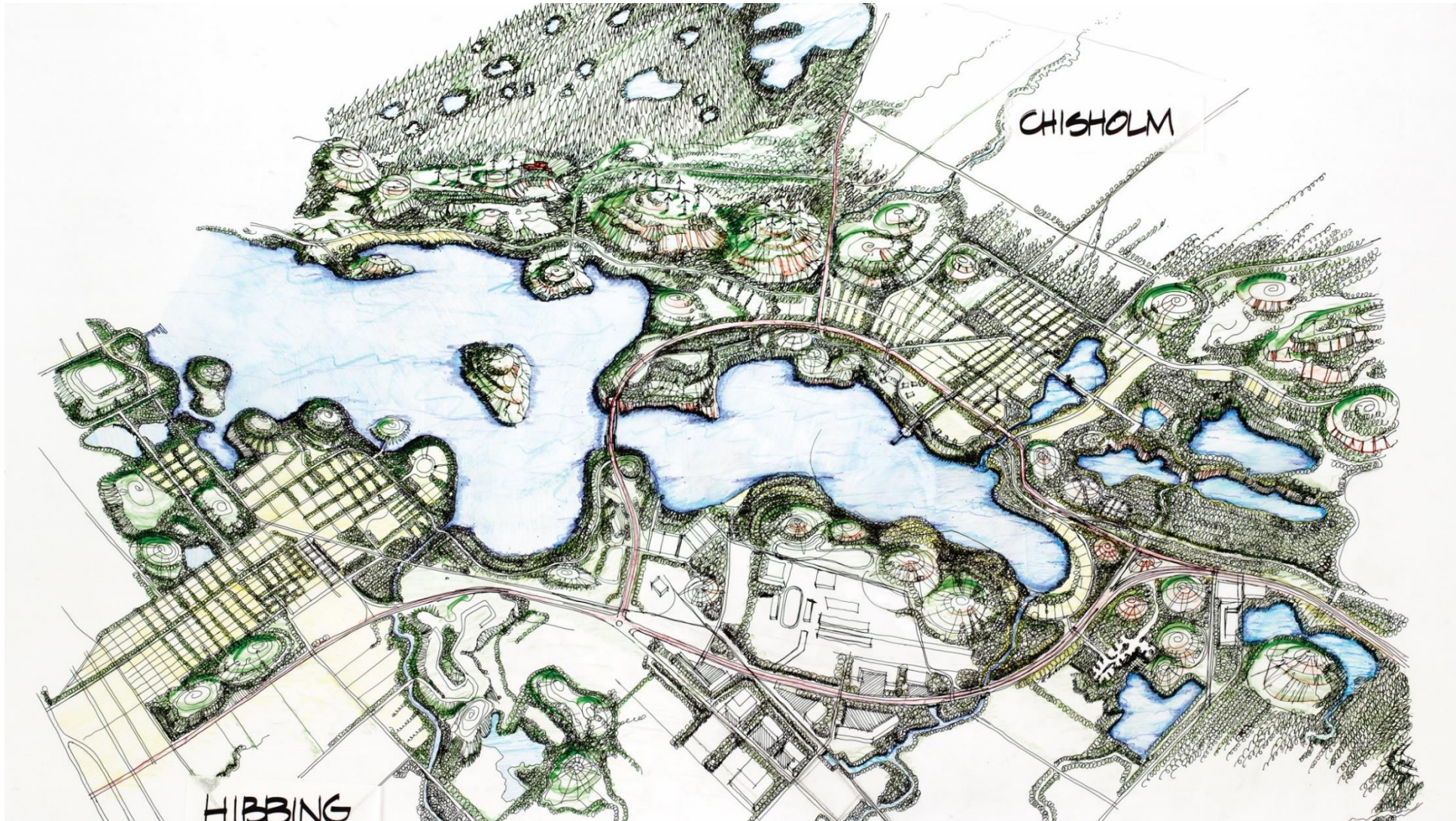
Transformation of Habitat



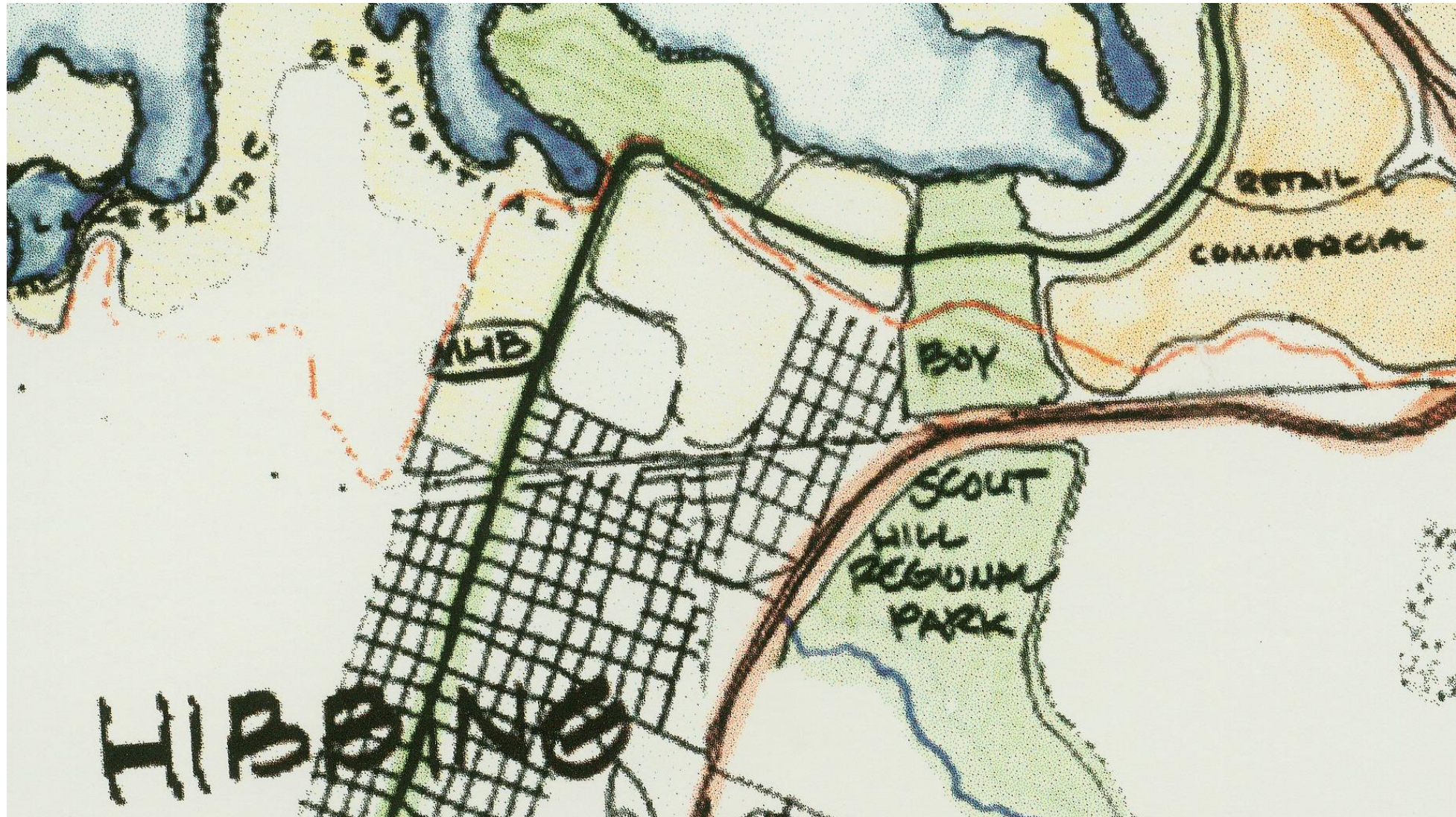
Realization of Charrette Concepts



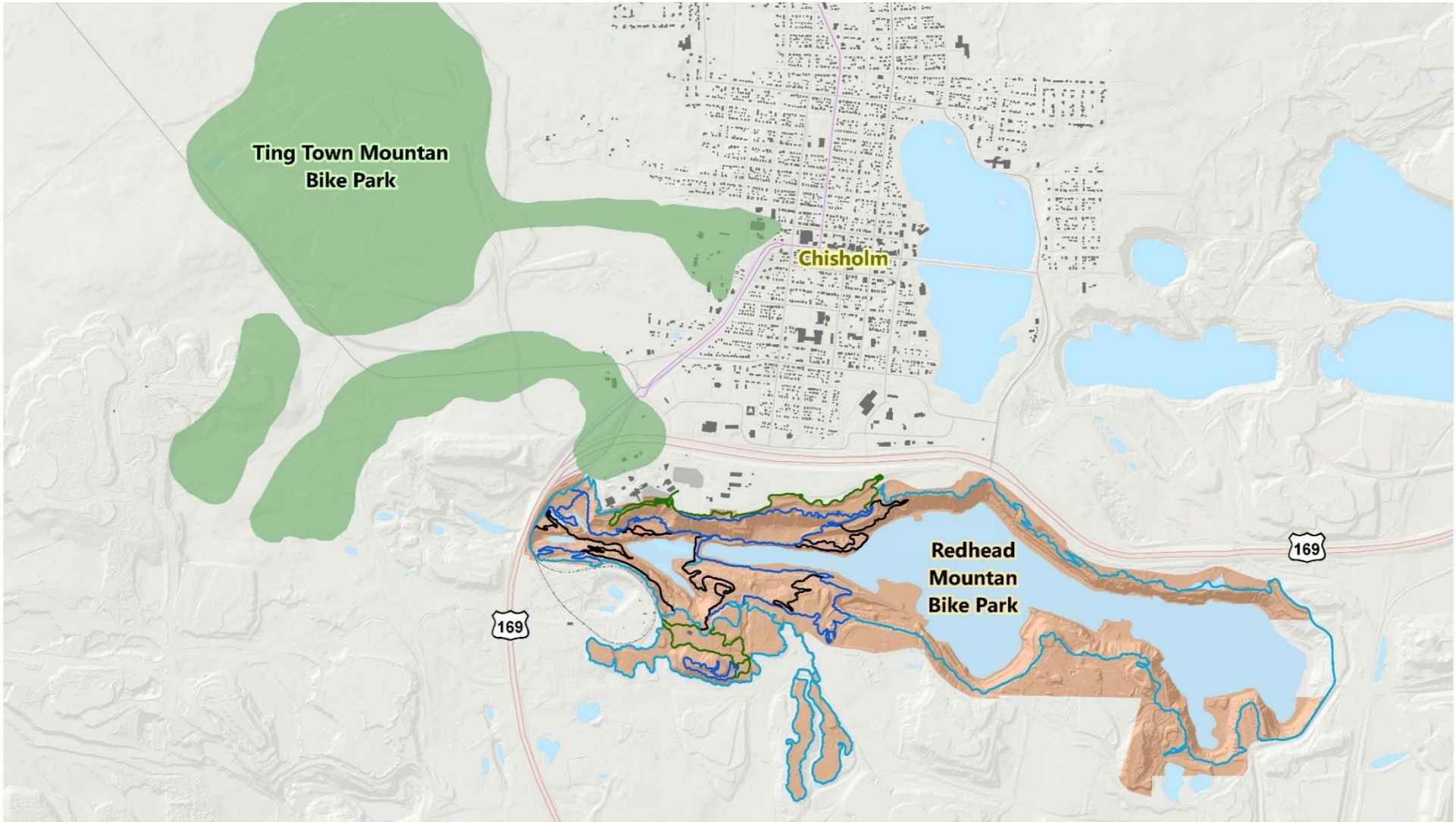
Chisholm – Hibbing Charrette 2003



Chisholm – Hibbing Charrette 2003



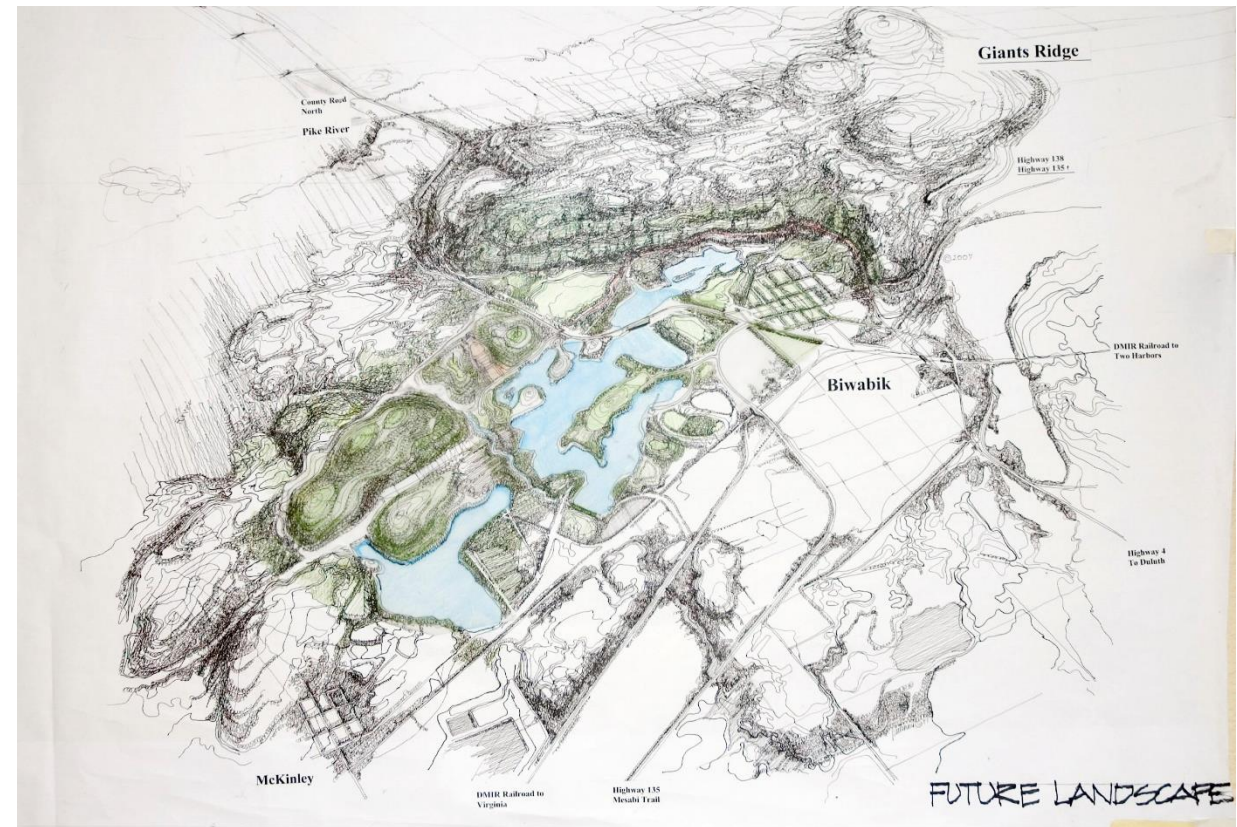
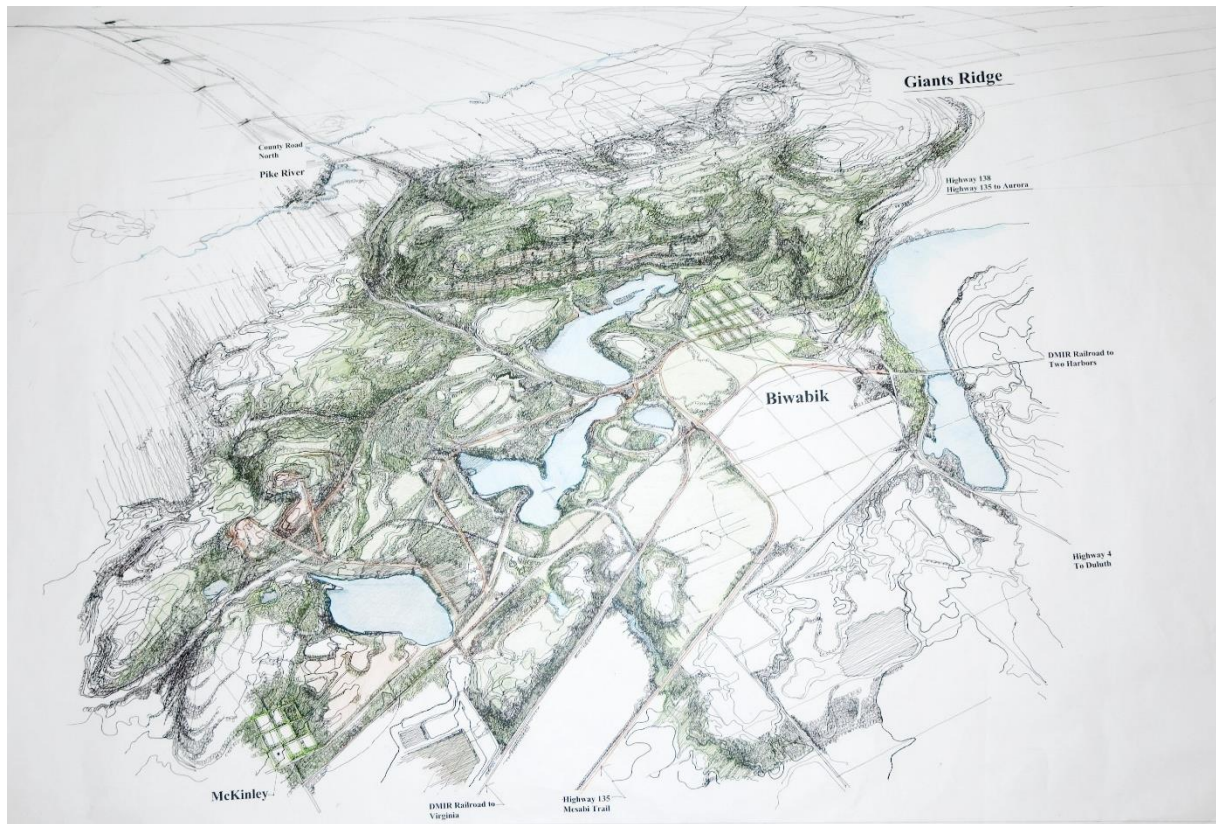
Ting Town Mountain Bike Park



Vision into reality for mountain biking



2007 Biwabik Charrette



2007 Biwabik Charrette

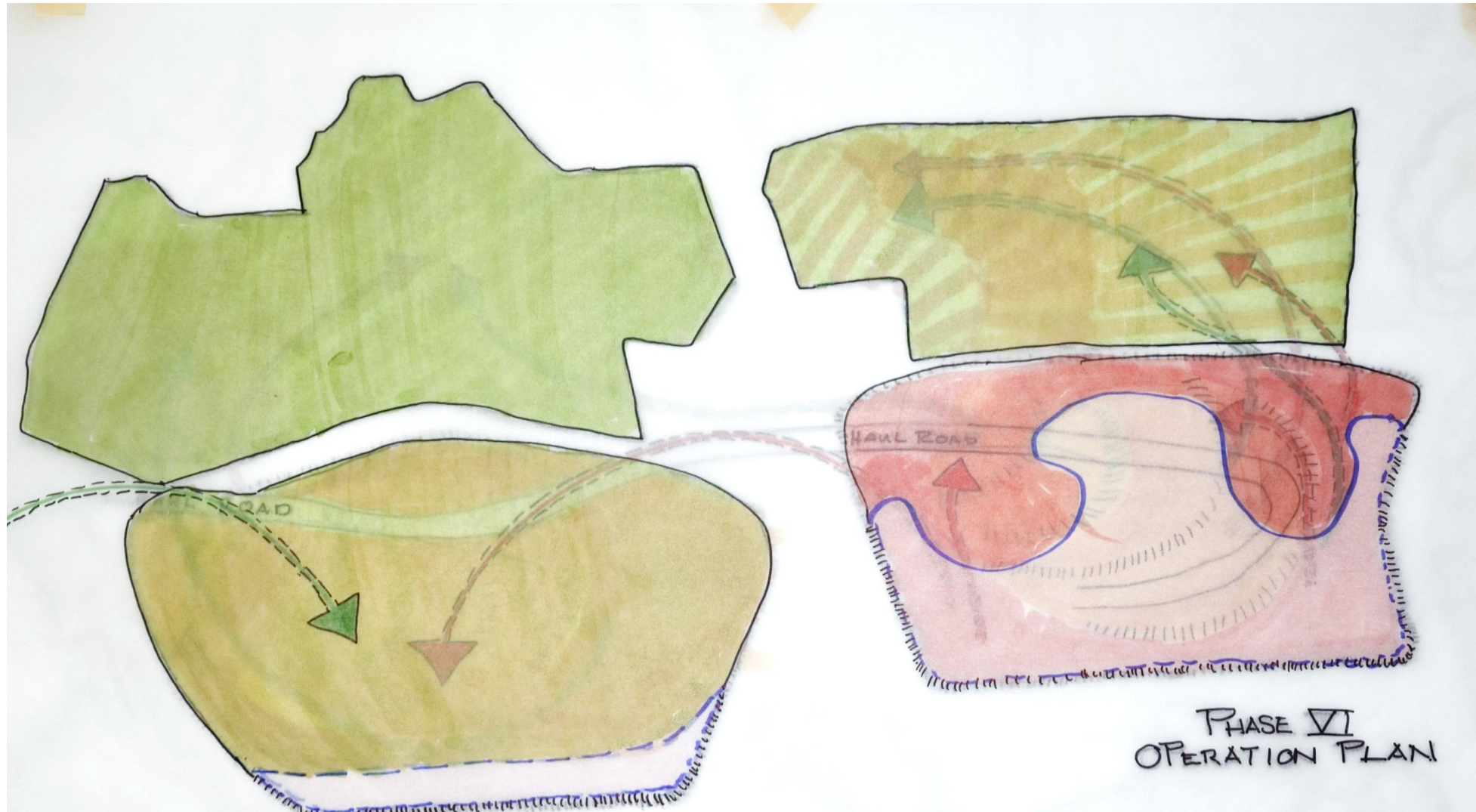


2007 Biwabik Charrette

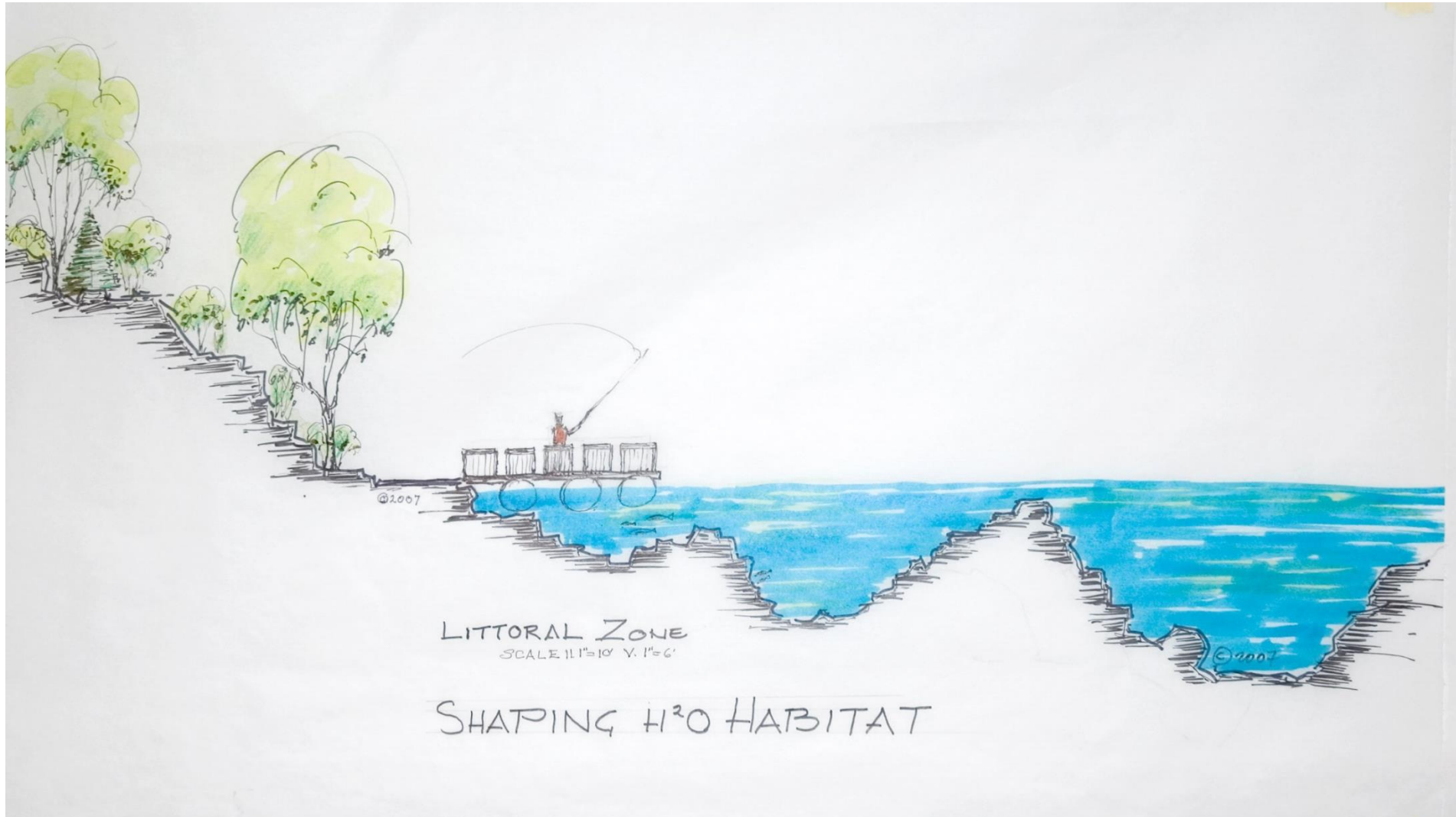


Laurentian Trail - Pike River view

2007 Biwabik Charrette



2007 Biwabik Charrette



Planning – Regional Approach – Education

- Strategic Plans – Vision and Mission
- Regional Approach – Land Use – Mining Maps
- Education – Quarterly Meetings – Web Site

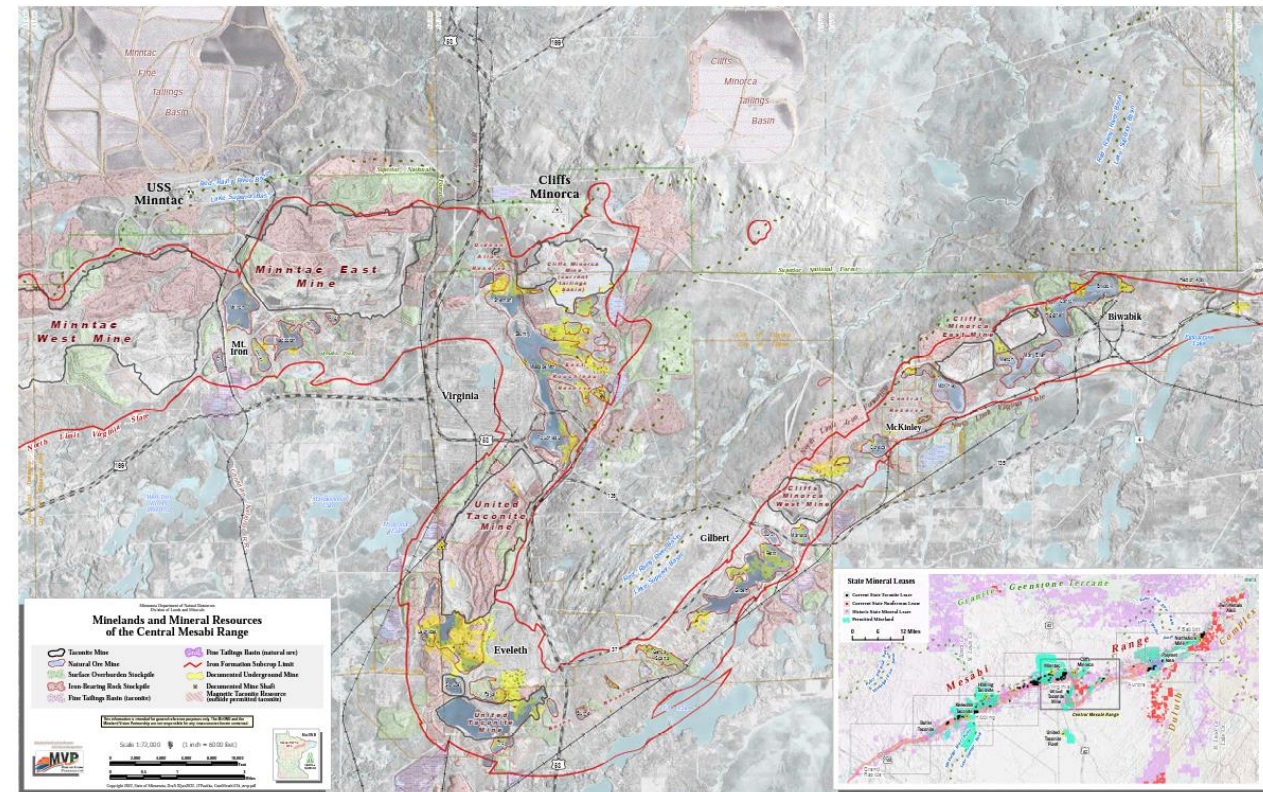
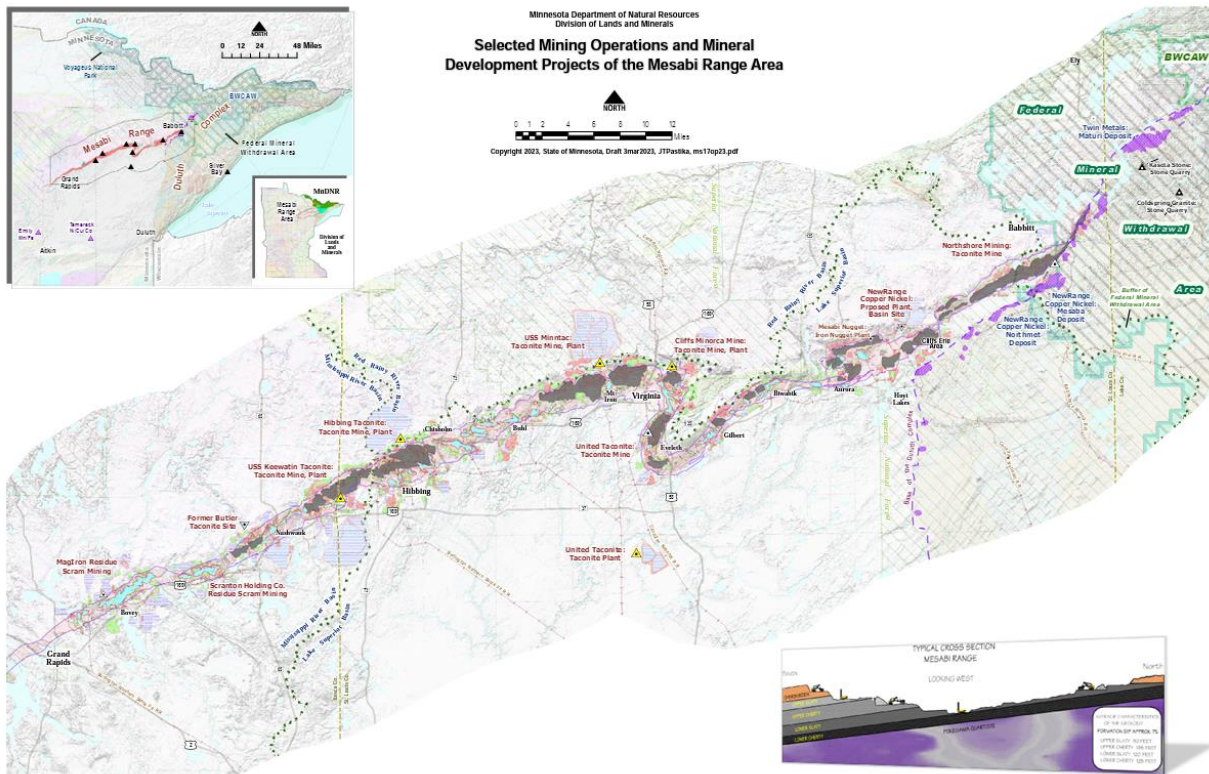


Strategic Plans

- LVP Vision – Transforming pits and piles into lakes and landscapes, our legacy for the future.
- MVP Vision – Shaping evolving landscapes for future generations
- Mission
 - Developing opportunities for dynamic minescapes
 - Preserving lands to sustain current and future mining
 - Providing resources and education



Regional Approach – Land Use – Mining Maps

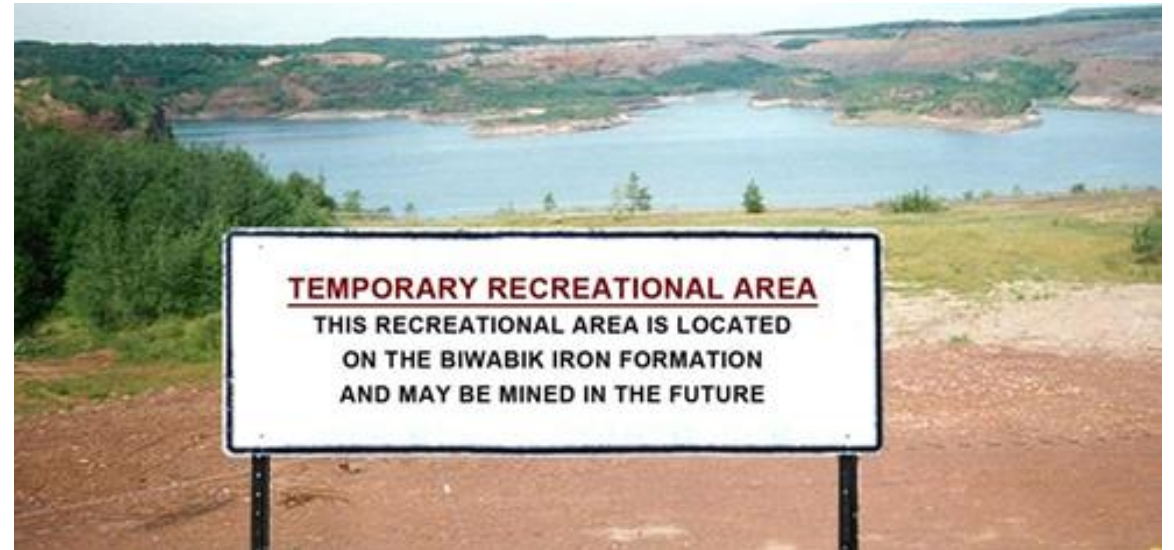


- 3 yearly MVP meetings - To provide a forum for mining interests, communities, and government to gather, learn and share information
 - Well attended
 - Conference style presentations
- Website – <https://mvpminn.org/>
- Mine Engineer Workshops
 - 2009 – Taught by the University of MN School of Mining and Metallurgical Engineering
 - 2014 – Short Course at the SME Conference



Mineland Reclamation Grants – Building the Vision – Now

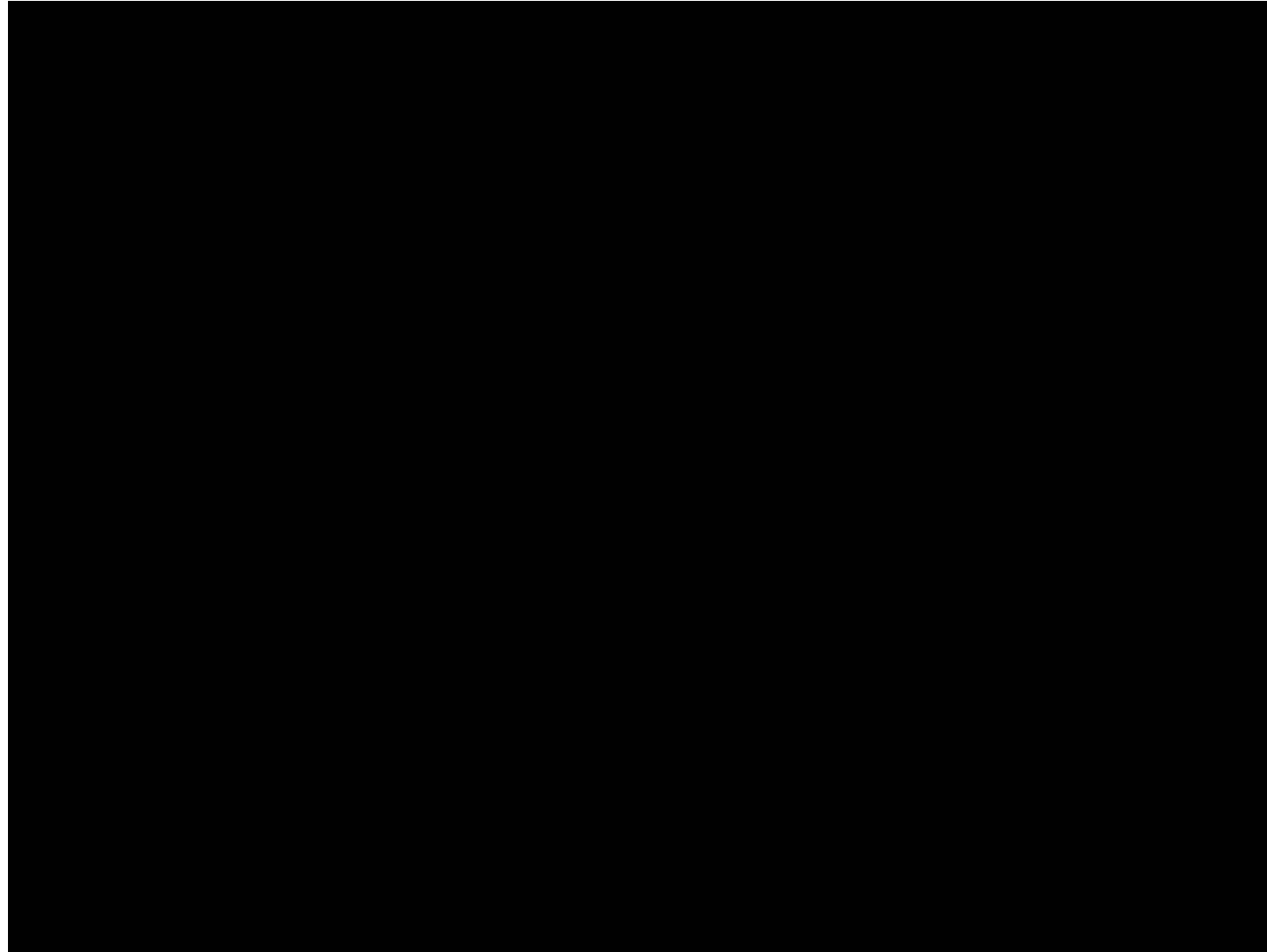
- 3 Key types – Reclaiming, recreational amenities, studies
- Since 2006 – 41 grants awarded
- \$5,751,000 in grant awards
- \$21,432,000 in project amounts



Mt. Iron – USS – Taconite Ridge – 2006 Wind Study



Virginia – United Taconite Stockpile 4006 Reclamation Video



Virginia – United Taconite Stockpile 1406 – Reshape, vegetate and mitigate



Hibbing Taconite In-Pit Shoreland Development

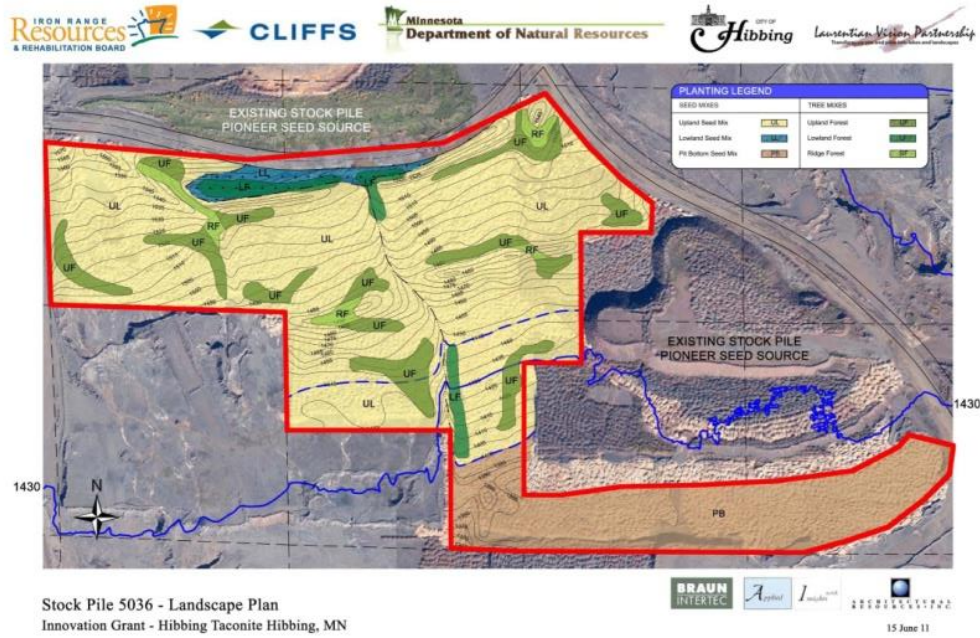
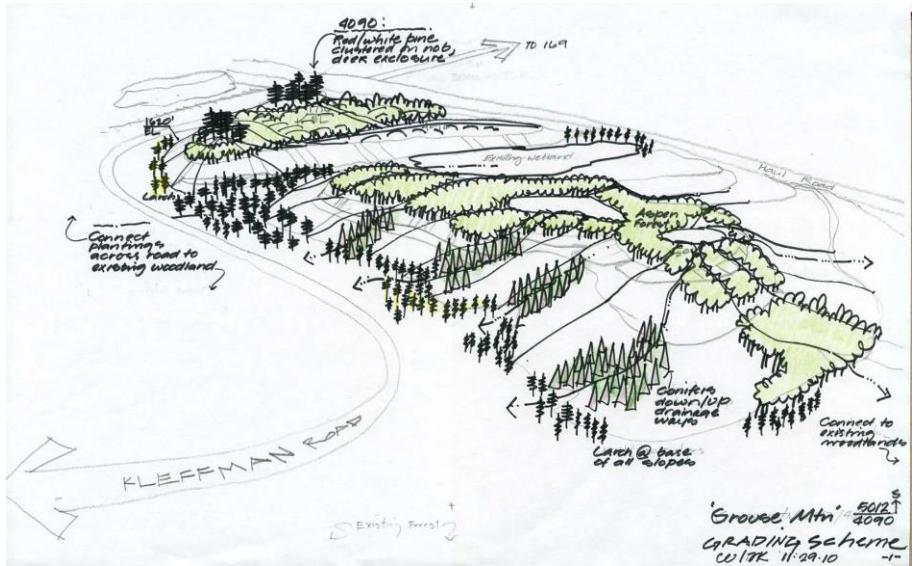


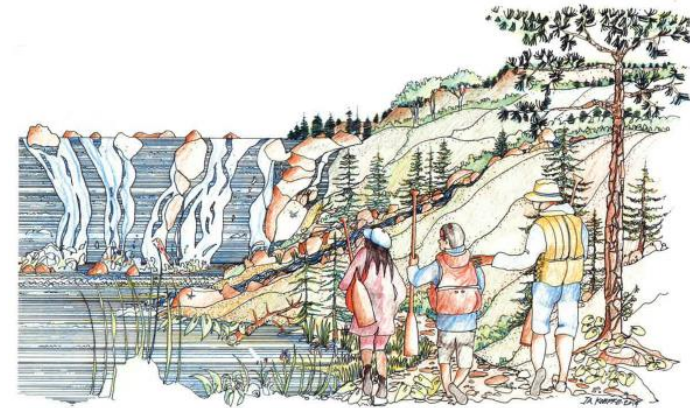
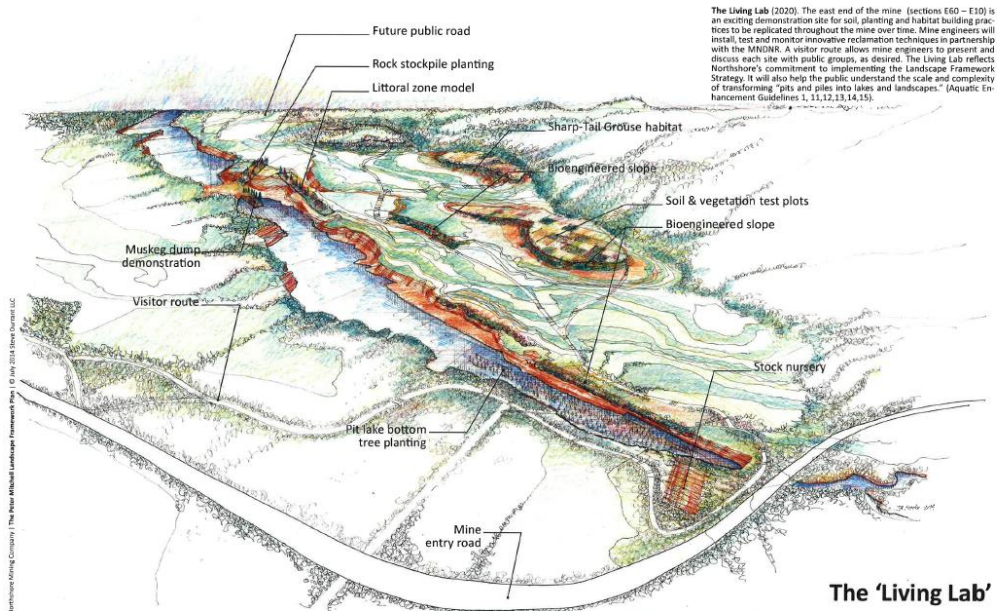
FIGURE 6



Hibbing Taconite Stockpiles 4090 & 5012 – Shape and vegetate



Northshore Mining: Peter Mitchell Pit Master Plan



Environmental Stewardship
 Going beyond compliance...being socially responsible...anticipating and addressing potential impacts before they occur...personal accountability...operating to preserve the environment for future generations.

Core Value | Northshore Mining Company



Hoyt Lakes – Sulfate Reducing Bioreactor Pilot



SULFATE SOLUTIONS

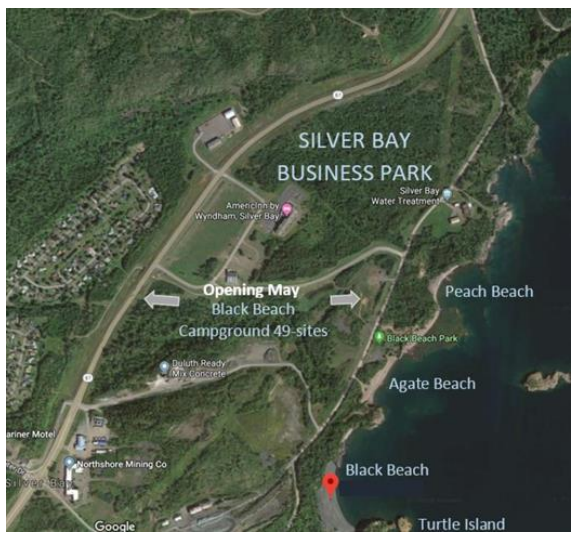
FOLLOWING NATURE'S LEAD

The Clearwater BioLogic process mimics nature's way of removing sulfate from the environment using naturally occurring bacteria.

Eveleth – United Taconite Spruce Stockpile and Truck Shop



Black Beach – Silver Bay – Northshore Mining Public Beach and Campground



Chisholm – Scram Tailings Reclamation Study

Iron Ore

Reclamation of iron ore tailings; Innovations in establishing native vegetation

by Allyz Kramer, Natalie White and Joel Asp

Minnesota has robust reclamation standards and have proven results in the taconite mining industry. Reclamation of overburden spoils, lean ore spoils and fine tailings from taconite production has generally been successful on the Iron Range, using a low input standard reclamation practice. Success at reestablishing vegetation on these landscapes is likely due to fairly favorable chemical and physical properties (e.g., few limitations due to acidic generating materials, metal toxicities and water and nutrient holding capacities). However, coarse tailings reclamation has proven more difficult, presumably due to lower nutrients and challenges with moisture holding capacities. Research efforts conducted since 1990 have struggled to develop a reclamation strategy for coarse tailings that meets the Minnesota Minelands Reclamation Rules, Chapter 6130.

However, new breakthroughs in scam mining technologies are producing fine and coarse tailings that have not been encountered nor reclaimed in northern Minnesota. Scram mining in Minnesota is defined as those mining operations that produce natural iron ore concentrates. Innovative research is underway to investigate and determine successful reclamation strategies to reclaim scam mining tailings from these scam mining operations. The research program is conducted through collaboration with SEH, Prairie Restorations, Inc. (PRI) and Mining Resources, LLC with funding support from the Iron Range Resources and Rehabilitation Laurentian Vision Partnership minnesoaparc grant program.

Allyz Kramer, SME member and Minnesota section chair, **Natalie White** and **Joel Asp** are biologists and restoration ecologist, respectively, Short Elliott Hendrickson Inc. SEH, Duluth, MN, email akramer@sehinc.com.

Figure 1
Site location map.



The research program was divided into three phases:

Phase I. Bench-scale testing to identify successful treatments to reclaim and restore scam tailings through evaluating surface soils amendments, viable seed mixes and plant germination, growth and densities. Phase I was completed in early 2015.

Phase II. Field-scale pilot trial to test larger scale effectiveness of the treatments deemed

Iron Ore



Phase I (2015) bench scale test for germination and growth rates of native species related to different nutrient treatments.

Table 2 contains a summary of dominant species and extent of cover by treatment. At the October 2017 site visits, the percent cover and species present were similar to what was observed in August with the exception that Canada wild rye was a more apparent component of the grass cover.

Erosion control/moisture holding treatments. Similar to Phase II results, straw mulch appeared to marginally out-perform hydro mulch as all

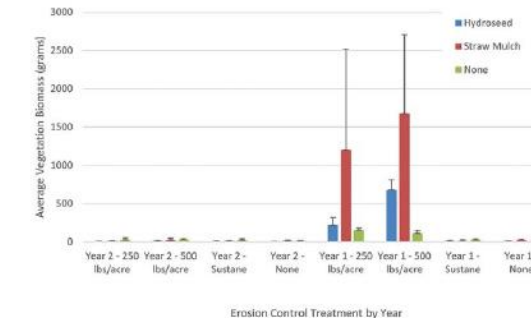
the control plots by visual observation.

In Fig. 2, 2017 vegetation biomass is compared by erosion control treatment, for each of the nutrient amendments. Error bars represent one standard deviation of the mean.

Figure 3 compares the biomass results for Phase II and Phase III of the study. Biomass results in Year 1 were strongly influenced by the oat cover crop; the much higher biomass in the 250 lbs/acre and 500 lbs/acre fertilizer treatments in Year 1 was almost entirely due to the oat cover crop.

Figure 3

Average vegetation biomass by erosion control treatment, Year 1 and Year 2 comparison.



Fertilizer treatments. In Phase II, the custom fertilizer treatment at either 250 lbs/acre or 500 lbs/acre outperformed both the control plots and the Sustane treatment plots. In Phase III, in the absence of the nutrient amendments based on dry biomass (Fig. 2), visually, the plots with the custom fertilizer treatment at either rate appeared to contain more individual native plants than the control or Sustane treatments.

Hydroseed treatments. The plots designed to test one-step versus two-step

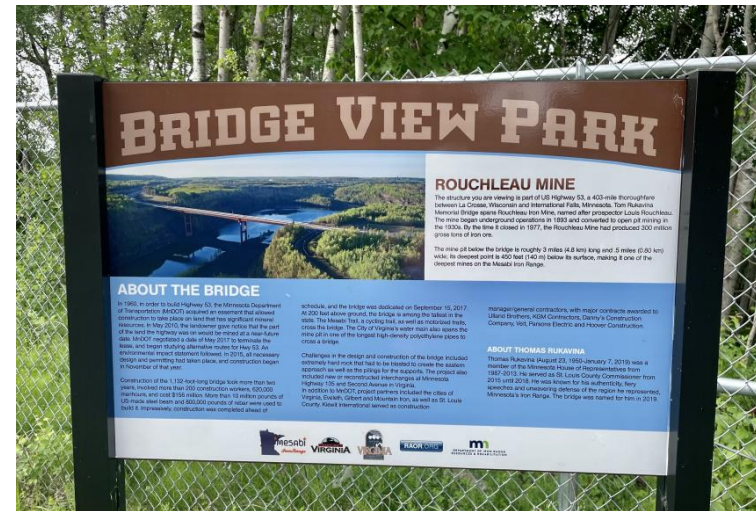
Buhl – Judson Mine Pit Disc Golf Course



Virginia – United Taconite Barrier Berms



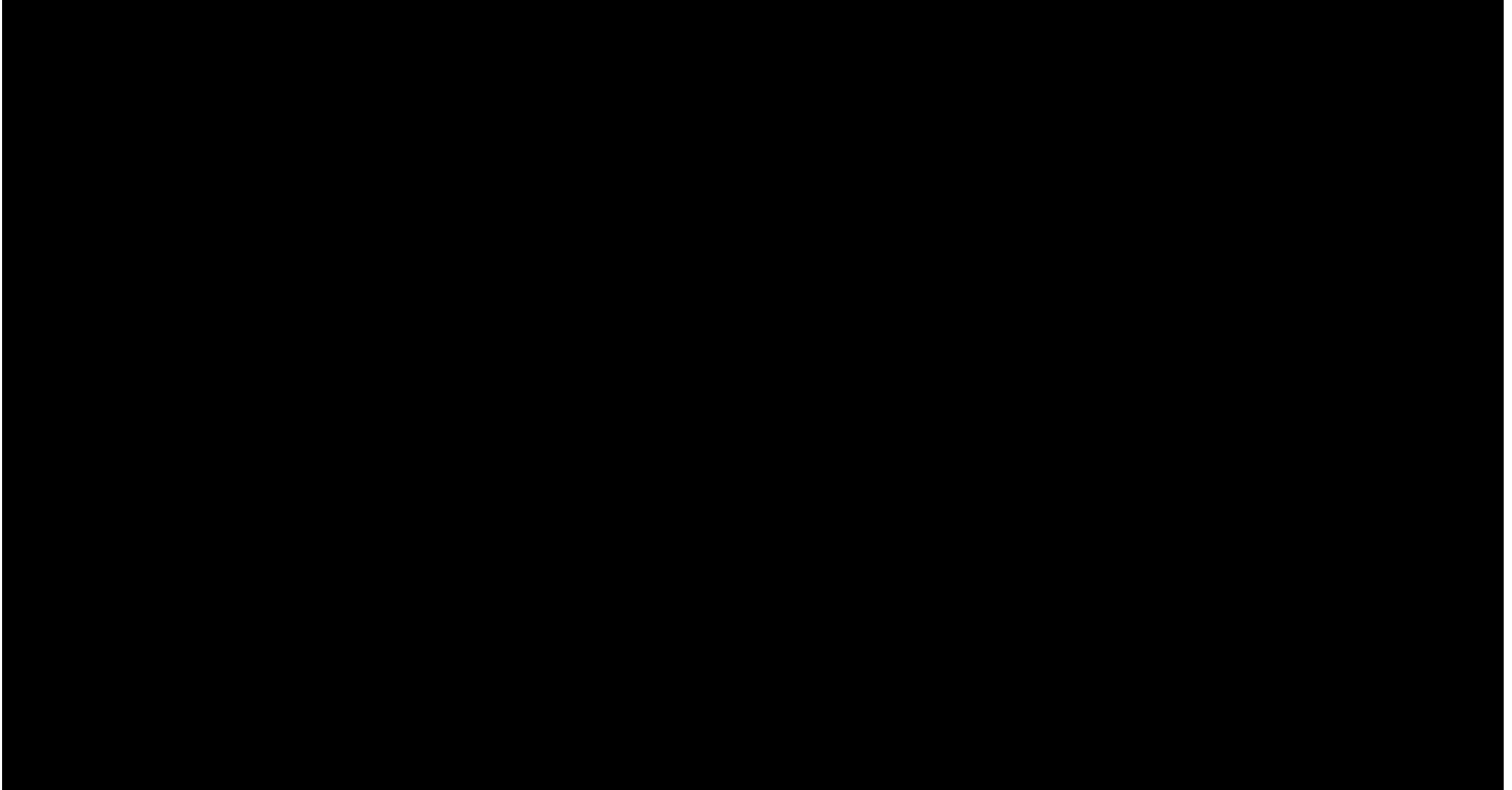
Virginia – Tom Rukavina Bridge View Park



Chisholm – Redhead Mountain Bike Park



Chisholm – Redhead Reclaimed Video

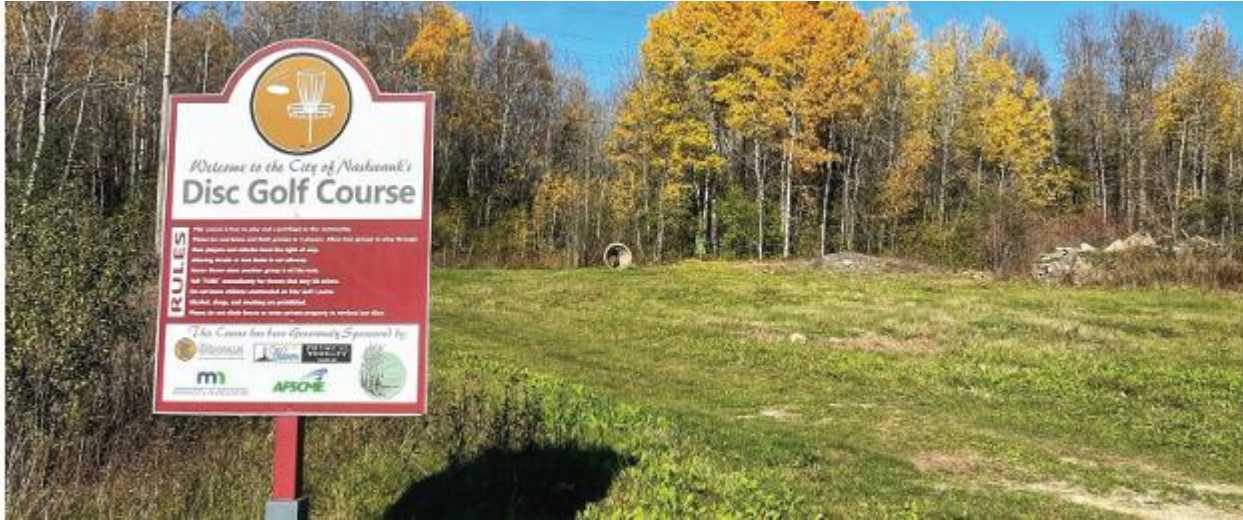


Cohasset – Tioga Mountain Bike Park



TIOGA
RECREATION

Nashwauk – Disc Golf Course



Chisholm – Bruce Mine Park



Hibbing Mine View Relocation



Hibbing Taconite 5001 Stockpile Vegetation Project



Hibbing Disc Golf Course Relocation



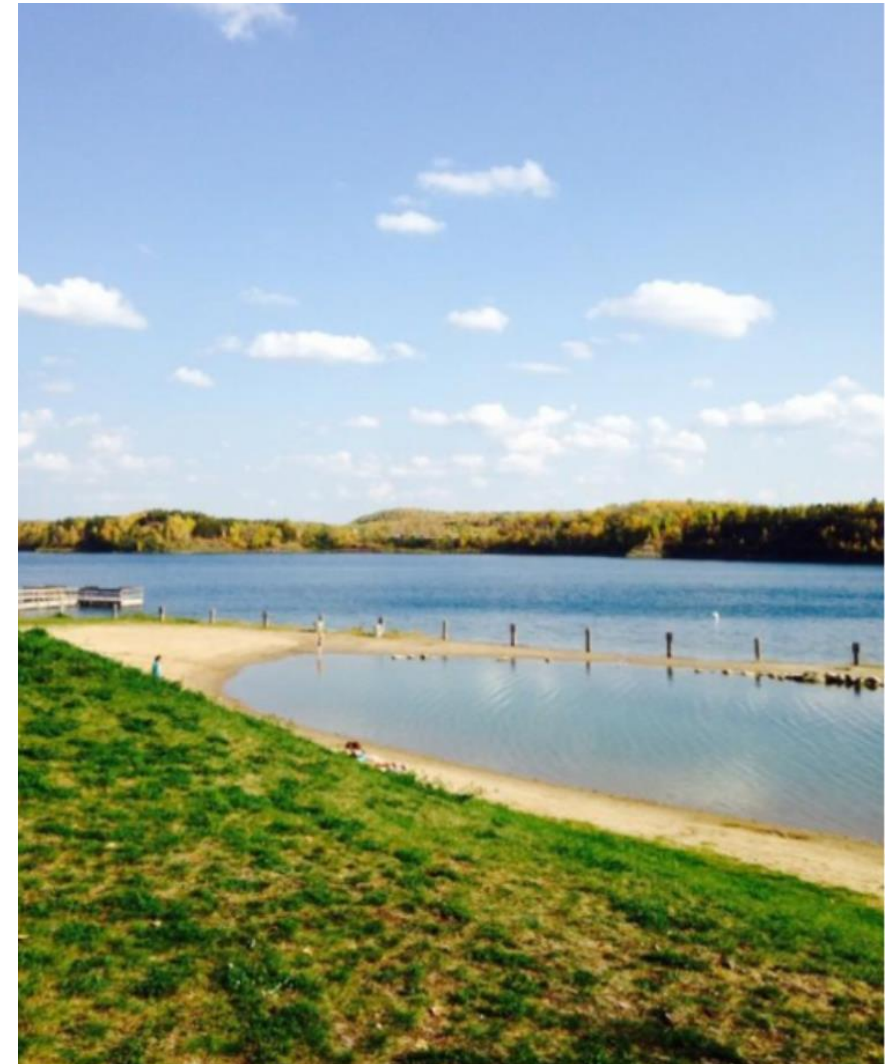
Kinney Mine Pit Improvements



Coleraine – Public Golf Course Improvements



Gilbert – Ore-Be-Gone Campground Improvements



Let's leave a usable landscape legacy for future generations...!





Thank You!