ANALYSIS

THE GITCHI-GAMI TRAIL & LINEAR RECREATIONAL SYSTEMS

GEOGRAPHIC INFORMATION SYSTEMS OVERVIEW

LAND TRANSFORMATION MODELING OVERVIEW
ANALYSIS

THE GITCHI-GAMI TRAIL & LINEAR RECREATIONAL SYSTEMS:
The Gitchi-Gami Trail runs from Two Harbors to Grand Marais moving through a landscape rich in natural beauty, and historic significance. Running parallel to the trail are the many other linear recreational systems on the North Shore. Even though these systems often run parallel to each other, the connections between them are weak or do not exist. The design investigations explored opportunities to create linkages that strengthen the region as network of recreational amenities that can be accessed from communities.

THE NORTH SHORE STATE TRAIL:
This 146 mile natural surface trail from Duluth to Grand Marais provides multiple opportunities for recreation along the North Shore. Primarily used by snowmobilers, it traverses St. Louis, Lake, and Cook counties in northeastern Minnesota. The trail winds its way through the forests behind the outer bluffs that overlook Lake Superior, and provides access to some of the most rugged and beautiful scenery in Minnesota. The trail also connects the Grants-In-Aid (GIA) trails at Silver Bay, Beaver Bay, Finland, Tofte, and Lutsen, as well as numerous local trails created and maintained by local snowmobile clubs.
[http://www.dnr.state.mn.us/state_trails/north_shore/index.html]

THE SUPERIOR HIKING TRAIL:
The Superior Hiking Trail is a 205-mile footpath that follows the rocky ridgeline above Lake Superior in northeastern Minnesota. It begins just north of Two Harbors, MN, and ends just before the Canadian border. The trail has 30 trailheads and 81 backcountry campsites making it ideal for both day hikes and backpacking. There are no fees, reservations, or permits required to hike or backpack on the trail.
[http://www.shta.org/]

THE NORTH SHORE SCENIC DRIVE:
The North Shore Scenic Drive has been awarded All-American Road status from Duluth to Grand Portage, based on its recreational and scenic qualities. The citation describes the North Shore as some of the most spectacular scenery in the country, wedged between the rugged Superior Highlands and the vast expanse of a shining inland sea. High quality experiences abound with opportunities to enjoy the outdoors along one of the greatest trail systems in the nation. The North Shore is one of the primary destinations for recreational driving in the Midwest. The unique geography, spectacular topography, diversity of habitats, and colorful heritage of its settlers combines to tell the story of a rich history, deeply rooted in plentiful natural resources, and dotted with innumerable points of interest giving visitors a reason to come back and visit again and again.

THE LAKE SUPERIOR WATER TRAIL:
Established by the Minnesota Legislature in 1993, the Minnesota portion of the Lake Superior Water Trail will eventually extend from the St. Louis Bay in Duluth to the Pigeon River on the Canadian border, a distance of approximately 150 miles. Cooperative efforts in Ontario, Wisconsin, Michigan, and First Nations will develop a water trail completely around Lake Superior, primarily for use by sea kayakers. The development and maintenance of the Water Trail is a joint effort of the Minnesota Department of Natural Resources and the Lake Superior Water Trail Association of Minnesota.
[http://www.dnr.state.mn.us/kayaking/lswt/about.html]

UNITED STATES FOREST SERVICE (USFS) TRAILS:
The United States Forest Service (USFS) trails include the Sawbill Trail in Tofte, the Caribou Trail in Lutsen, the Gunflint Trail in Grand Marais, and the Arrowhead Trail near Hovland. These roads are the major trails leading inland that provide access to the BWCA from the shore of Lake Superior.
TETTEGOUCHE STATE PARK
G. H. CROSBY MANITOU STATE PARK
TEMPERANCE RIVER STATE PARK
CASCADE RIVER STATE PARK
TWO HARBORS
SPLIT ROCK LIGHTHOUSE STATE PARK
GOOSEBERRY FALLS STATE PARK
DULUTH
GRAND MARAIS
NORTH SHORE STATE TRAIL
SUPERIOR HIKING TRAIL
GITCHI-GAMI TRAIL
NSSD HWY. 61
LAKE SUPERIOR WATER TRAIL

LEGEND
- NORTH SHORE STATE TRAIL
- SUPERIOR HIKING TRAIL
- GITCHI-GAMI TRAIL
- NSSD HWY. 61
- LAKE SUPERIOR WATER TRAIL
GEOGRAPHIC INFORMATION SYSTEMS OVERVIEW:

Through the use of GIS technologies hundreds of data layers were analyzed and organized into thematic maps. This layering of information, research, and analysis formed the foundation and tools needed for the planning and design. By documenting and studying the multiple assets and themes, a holistic approach to the corridor design was developed that responds to the ecological, cultural, historic, and economic sustainability issues of the region. A regional resource analysis was made of the length of the Gitchi-Gami Trail from Two Harbors to Grand Marais and included the following base data layers:

- Bedrock Geology
- Surficial Geology
- Topography
- Infrastructure
- Elevation
- Ecology
- Development
- Infrastructure
- Historic Structures
- Hydrology
- Original Vegetation
- National Wetlands Inventory
- Native Plant Communities
- Biological Diversity
- Ecological Class
- FEMA Floodplains
- Landforms
- County Well Index
- Transportation
- User Needs
- Utilities
- Water Quality
- Land Use
- Land Cover
- Population Change from 1990 - 2000
- Gap Land Ownership

These layers were used as the basis from which an ecological understanding of this region was derived. The maps produced from these layers include: Geology, Topography, Hydrology, Original Vegetation, Ecology, Landcover, Development, Infrastructure, Land Ownership, Historic Structures, and Recreational Sites. These thematic maps and a brief description of each are found in the index pages 98-121.
LAND TRANSFORMATION MODELING OVERVIEW:
To determine how much non-urban land within and around the Gitchi-Gami Trail will transition to urban land in the future, by the years 2020 and 2050, analysts from the College of Natural Resources used a digital modeling tool called the Land Transformation Model (LTM). Developed by Michigan State University, this tool uses land use and land use change data from the past to predict how land use will change in the future. The model makes its predictions by considering factors that drive change, like distance to lakes, distance to interstates, and elevation. Details of this model and its application in this study are provided in the appendix pages 122-125.

PURPOSE OF THE REPORT:
The research team will analyze the area’s natural systems, existing natural and cultural amenities, development patterns, and land uses. The purpose of this report is twofold: First, to describe the application of the Land Transformation Model (LTM) (11) to an analysis and projection of land use for the Lake Country Scenic Byway study area in North Central Minnesota shown in figure 1. Second, to show how the LTM results can be applied to guide specific community planning and design.

STUDY AREA:
The study area traverses the length of the North Shore of Lake Superior in Minnesota. This is an area long known for its fishing, golfing, biking, and birding opportunities. Additionally, the area is an important part of the northern forest ecosystem that provides high quality aesthetic features, important contributions to the resource supply for the forest products industry, and habitat for a wide range of game and non-game wildlife species. Our study focuses on the North Shore settlements between Two Harbors and Grand Marais. A full report of the North Shore LTM findings is found in the appendix pages 120-124.

URBAN TRANSFORMATION PROJECTION FOR 2020 AND 2050:
Using the same method to project the 1991-2000 urban transformation, analysts projected urban transformation for years 2020 and 2050. Here’s what they found: The LTM projected a 57 percent increase in the area classified as urban land between 2000 and 2020. The increase projected for 2000 to 2050 was 143 percent. Among the 10-predictor variables, the three most significant variables for predicting land-use change were, in decreasing order of importance: distance to urban; elevation, and; distance to highways and county roads, specifically highway 61. Based on these variables, the LTM indicates that over the 9-year period, non-urban to urban land change is concentrated around areas of existing population and development.

The Gitchi-Gami Trail may also be analyzed further by subregion based on differences in landscape character or selected communities.

In using these projections, caution is urged to avoid over-interpretation. These projections assume the patterns of change observed from 1991-2000 will continue. That further implies continuation of the driving forces and constraints behind change. Yet we know there is change in these forces and constraints over time. Thus the projections should be viewed as suggestive of change and where it will likely occur, but not as a precise forecast. Additionally, the 2050 projection should be viewed as much more speculative than the projection to 2020.