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U.S. Department of the Interior
National Park Service

Scenic Road Feasibility Study

Sleeping Bear Dunes National Lakeshore
Michigan

Approved: James Rippe 5-4-82
Regional Director, Midwest Region Date

TABLE OF CONTENTS

- I. INTRODUCTION
 - A. Project History /1
 - B. Scenic Roads /2
 - C. Purpose of this Study /3
- II. PROJECT DESCRIPTION
 - A. Location /4
 - B. Land Acquisition /4
 - C. Engineering Specifications and Cost Estimates /8
 - D. Scenic and Recreational Aspects /11
- III. PROJECT FEASIBILITY
 - A. Engineering /12
 - B. Need for the Project /13
 - C. Environmental Impacts /19
- IV. CONCLUSIONS /23
- V. STUDY TEAM/COORDINATION
 - A. Study Team /24
 - B. Consultation and Coordination /25
- VI. REFERENCES AND BIBLIOGRAPHY /26

I. Introduction

A. Project History

The Benzie County Scenic Road is authorized in Section 12 of the enabling legislation for Sleeping Bear Dunes National Lakeshore, Public Law 91-479, October 21, 1970, 84 Stat. 1075:

Sec. 12. In order to facilitate visitor travel, provide scenic overlooks for public enjoyment and interpretation of the national lakeshore and related features, and in order to enhance recreational opportunities, the Secretary is authorized to construct and administer as part of the national lakeshore scenic roads of parkway standards generally lying within the parkway zone designated on the map specified in section 2(a) of this Act. Such scenic roads shall include necessary connections, bridges, and other structural utilities. Notwithstanding any other provision of this Act, the Secretary may procure of this purpose land, or interest therein, by donation, purchase with appropriated or donated funds, or otherwise: Provided, That land and interest so procured shall not exceed one hundred and fifty acres per mile of scenic road, except that tracts may be procured in their entirety in order to avoid severances. Property so acquired in excess of the acreage limitation provided in this section may be exchanged by the Secretary for any land of approximately equal value authorized for acquisition by this Act.

Three "parkway zone" corridors, including the Benzie County (Crystal Highlands) corridor, are included within the authorized boundary of the Lakeshore.

Proposals for the scenic road system were included in the Lakeshore's 1970 master plan. The Federal Highway Administration (FHWA) flagged the centerline of the Benzie County segment and identified alternative alignments for certain sections in 1974.

The scenic road proposal was reevaluated in a 1977 scenic road study. Five alternatives, including the no-build alternative, were considered for the Benzie County segment. The construction of 4.5 miles of the original proposal and use of portions of Warren and Platte Road to connect with Highway M22 was recommended by this study, but this recommendation was rejected in favor of the original proposal.

The scenic road concept was again reevaluated in the Lakeshore's 1979 general management plan. Decisions were made in this plan not to construct the northern scenic road segments, however, the acquisition of the Benzie corridor and construction of a scenic road and bike trail in this corridor are included in the plan. The general management plan was approved only after consideration of public comments, which were solicited at several points in the planning process. The fate of the scenic corridors in the plan closely reflects public opinion. Little opposition was voiced during the planning process against the

Benzie corridor, and strong support was received from the officials of Benzie County. On the other hand, much opposition was expressed to the northern corridors.

Legislation was introduced in the 97th Congress to delete the northern scenic road corridors, but not the Benzie corridor, from the authorized boundary of the Lakeshore. Some local groups, individuals, and jurisdictions (Lake and Benzonia Townships) have expressed opposition to the Benzie project. Some of the reasons for opposing the project include concerns about environmental and economic impacts and questions about the need for the road. Benzie County has reaffirmed their support for the project with the conditions that an environmental impact, engineering and feasibility study be developed before land acquisition begins.

B. Scenic Roads

A scenic road is more than just a way to get from one place to another. It is a road traversing areas with high aesthetic or cultural values. Accommodations for picnicking, parking, camping, and other recreation potential may be built into the scenic road corridor itself, or the highway may provide pleasant access to such facilities. A parkway is a scenic road restricted to noncommercial traffic, either within a larger park or, less often, comprising an entire park. Scenic roads must have certain significant features. These relate to scenic quality, variety, accessibility, location, adaptability to development, compatibility and other elements.

Great emphasis must be placed on the corridor for the scenic road. The corridor is much wider than a normal road right-of-way. In it may be found the elements which make up outstanding scenic vistas and the facilities for enjoying them. The features found there may include lakes and streams, wetlands, striking stands of timber, unusual geological formations, outstanding mountain or desert scenes, exceptional views, and cultural and historical features.

The scenic road corridor must be designated and protected against future encroachment or despoilation. Without adequate protection, the character of the corridor through which a scenic road passes may be altered, in time, sufficient to diminish or even eliminate the recreation or scenic value of the highway.

Landscape architecture and environmental highway engineering are integral to the design of the scenic road. The design involves sculptural curvilinear alignment that harmoniously integrates the road into its environment. Preservation and aesthetics are primary considerations in the overall design. Another objective is to clarify and strengthen the motorist's image of the environment by offering a picture which is well-structured, distinct, and as far reaching

as possible. Passengers should be able to locate themselves, the road and the major features of the landscape, to recognize those features with certainty, and to sense how they are moving by or approaching them.

Finally, the purpose of an appropriate design of the scenic road should be to deepen the observer's grasp of the meaning of his environment; to help him understand the use, history, and nature of the corridor and its surrounding landscape--a fascinating subject to study and interpret while he is driving or is at rest.

Complementary facilities along a scenic road or parkway include roadside rests, camera stops, scenic overlooks, hiking and bicycle trails, and the like. These add an individual character to the recreation opportunities.

Where a scenic road leads to a larger park, such as Sleeping Bear Dunes, it should be the introduction to the area, a mood-setter for the visitor, and a welcome to a special place that was set aside for their use. It is the beginning of a unique park experience that awaits the visitor and an important orientation to what lies ahead.

C. Purpose of this Study

The purpose of this study is to assess the feasibility of the Benzie County Scenic Road Project as requested by Benzie County and others. While the study does not provide an environmental impact statement or design-level drawings, feasibility is evaluated in greater detail than it has been in earlier planning efforts. Specific concerns raised by interested and affected groups and individuals are addressed in the study.

The study consists of two major sections. The project description section describes in detail the proposed road -- its alignment, engineering specifications, estimated cost, and scenic aspects -- and supporting facilities such as picnic sites and parking areas that would also be constructed. The feasibility section evaluates engineering feasibility, projected need for the road, and the environmental and socioeconomic impacts that would be associated with the road's construction.

The study is being made available to all interested parties. Target audiences include local authorities, groups, and individuals; elected officials; people owning land in the corridor; and National Park Service managers. The study provides better information than has heretofore been available upon which opinions and, ultimately, decisions on the future of the Benzie Scenic Road can be based.

II. Project Description

A. Location

The Benzie County Scenic Road Corridor, as authorized, connects U.S. Highway 31 and U.S. Highway 22 via the Crystal Highlands, a ridge between Crystal and Platte Lakes (see Vicinity Map). To date, the corridor remains predominately undeveloped. The majority of the corridor is an immature hardwood forest with birch, maple, beech, and ash the major species. Fruit orchards, maple sugaring and selective woodcutting operations, and some private residences are also present. Future development, especially for residential and orchard purposes, is considered likely.

The proposed scenic road alignment, as well as information on views, land ownership, proposed facilities, and general land use are illustrated on two scenic entrance road maps. The road will not connect with local access roads such as Warren and Eden Hill. The sole access to private residences adjacent to Long Lake will, however, be maintained.

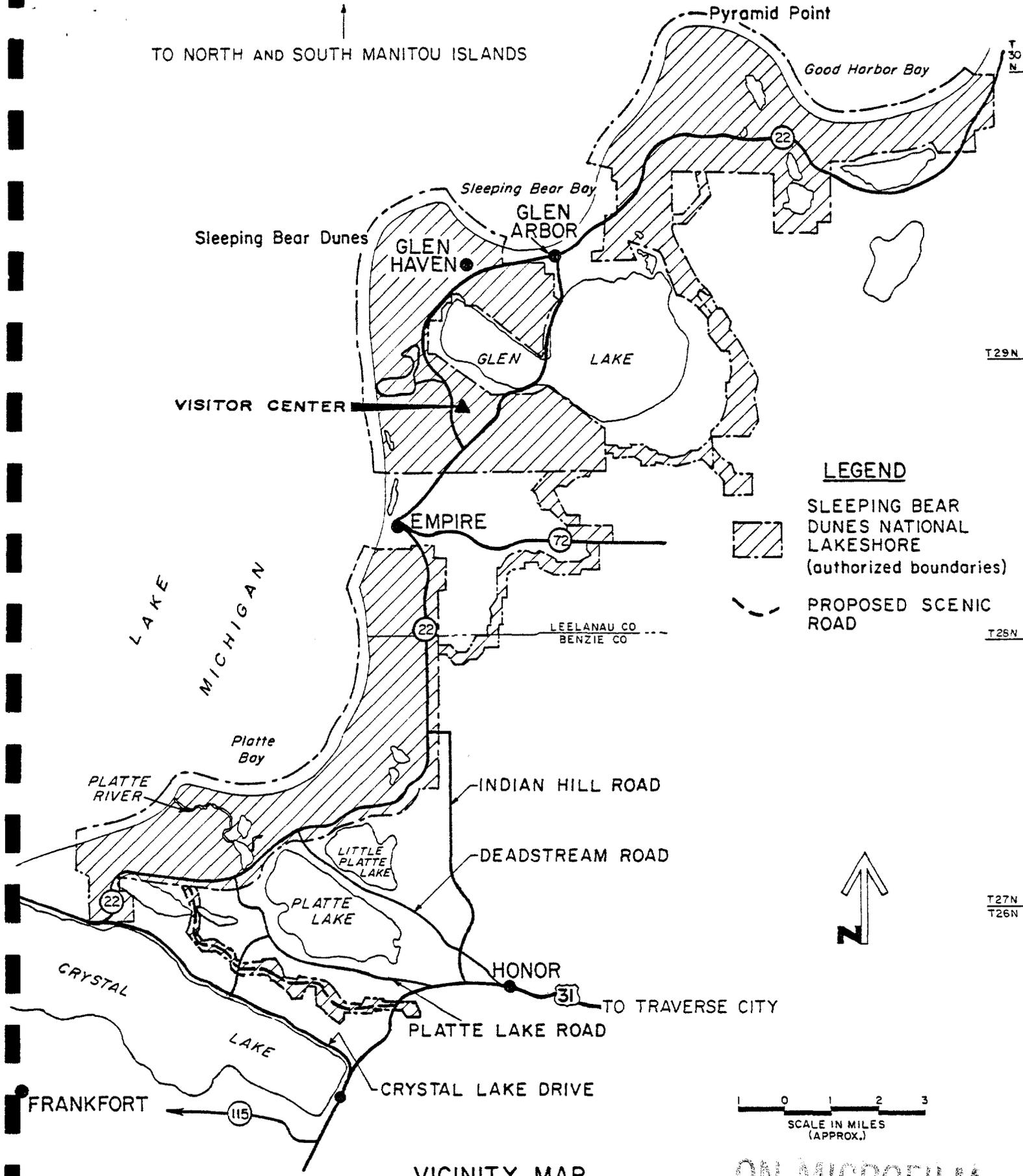
B. Land Acquisition

All lands required for construction of the scenic road and supporting facilities and operations will be acquired in fee. This mandatory fee acquisition area is approximately described as a 100-foot zone on either side of the centerline of the road. The actual width of this zone will depend on topography and will be wider at supporting facility locations and in areas where a separate bike path is provided. A more accurate description of this zone is the determination of construction limits, depicted on 1 inch equals 100-foot scale maps which are available for inspection at Sleeping Bear Dunes National Lakeshore Headquarters in Frankfort, Michigan.

Less-than-fee or fee interest will be acquired in all lands within the authorized boundaries of the scenic road corridor that are not in the mandatory fee acquisition zone. Less-than-fee acquisition will be the preferred option for all lands which will be used in a fashion considered to be compatible with the intent and purpose of the scenic corridor. Compatible uses are existing residential development, maple sugaring, existing orchards, and all non-consumptive uses which do not involve landscape and/or vegetative alterations (hunting, hiking, photography, etc.). Incompatible uses include development of new orchards, most timber cutting (limited woodlot maintenance for maple sugar operation enhancement could be permitted), and new construction.

It is recognized that some landowners will find the list of compatible land uses in conflict with their purposes in owning their lands. At the request of these landowners, fee acquisition rather than less-than-fee acquisition will be offered.

↑
TO NORTH AND SOUTH MANITOU ISLANDS



LEGEND

SLEEPING BEAR
DUNES NATIONAL
LAKESHORE
(authorized boundaries)



PROPOSED SCENIC
ROAD



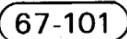
VICINITY MAP
SCENIC ROAD FEASIBILITY STUDY

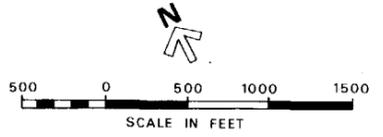
SLEEPING BEAR DUNES NATIONAL LAKESHORE

ON MICROFILM



LEGEND

-  PARK BOUNDARY
-  PROPOSED SCENIC ROAD CENTER LINE
-  ALTERNATIVE SCENIC ROAD CENTER LINE
-  TRACT BOUNDARY
-  TRACT NUMBER
-  PARKING AREA
-  VIEW POINT
-  WOODS

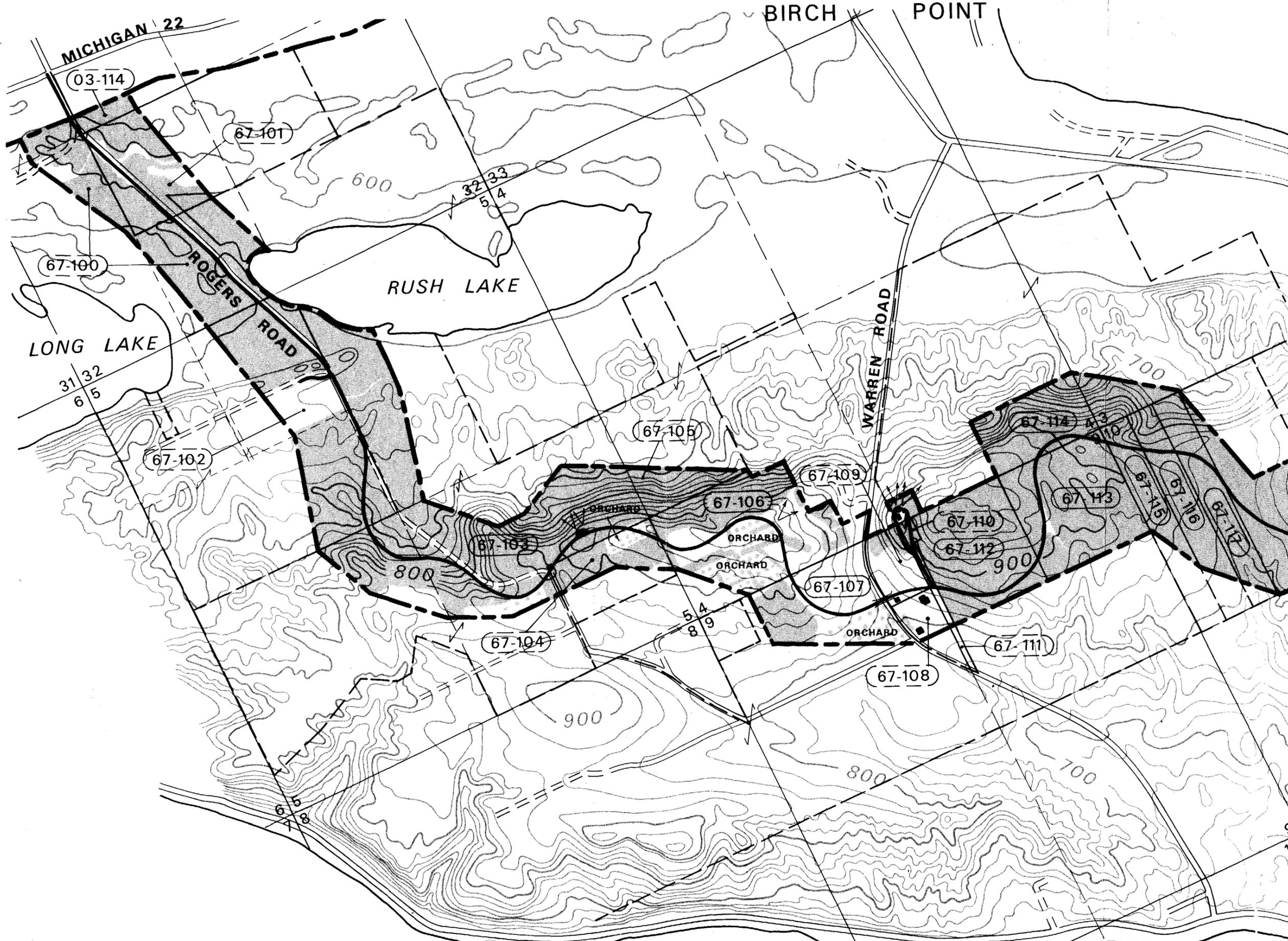


**FEASIBILITY STUDY
SCENIC
ENTRANCE ROAD
SLEEPING BEAR DUNES
NATIONAL LAKESHORE
BENZIE COUNTY, MICHIGAN**

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

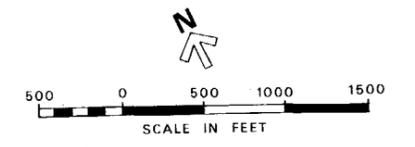
BIRCH POINT

MICHIGAN 22



LEGEND

- PARK BOUNDARY
- PROPOSED SCENIC ROAD CENTER LINE
- TRACT BOUNDARY
- TRACT NUMBER
- PARKING AREA
- VIEW POINT
- WOODS



FEASIBILITY STUDY
 SCENIC
 ENTRANCE ROAD
 SLEEPING BEAR DUNES
 NATIONAL LAKESHORE
 BENZIE COUNTY, MICHIGAN

UNITED STATES DEPARTMENT OF THE INTERIOR
 NATIONAL PARK SERVICE

The study team has identified a need for vista protection measures at one location outside the authorized boundary of the scenic corridor. This area is north of the corridor in the area immediately west of the proposed Eden Hill Road crossing (See maps.) Development of condominiums, for example, in this area could block the impressive views available from an overlook and parking area proposed at this site.

It is recommended that measures for protecting this vista be investigated.

C. Engineering Specifications and Cost Estimates

The proposed scenic road begins with an interchange structure on U.S. Highway 31 and continues in a generally northwestward direction along the Crystal Highlands to an intersection with Michigan Highway 22. Design criteria are as follows.

1. Length

- a. Proposed Scenic Road - 7.6 miles
- b. Scenic Spur - 1.0 mile
- c. Overlook Access - 0.3 mile

These figures are for linear miles of paved surface; straight-line distances would be somewhat less.

2. Design Speed

- a. Proposed Scenic Road - 35 miles per hour
- b. Scenic Spur - 20 miles per hour

3. Typical Sections and Specifications

- a. Proposed Scenic Road
 - 11-foot travel lanes
 - 6-foot paved shoulders, for use as a bikeway
 - 2-foot, flat bottom cut ditch
 - 3-foot guardrail widening where required
 - 2-foot curve widening on 12 degree or sharper curves
 - 38-foot subgrade width
 - 34-foot paved bituminous surface (includes bikeway)
 - 8% maximum super elevation (AASHTO Blue Book)
 - 16 degrees maximum curve
 - 8½ percent maximum grade

In some areas topography will require the bikeway to be separated from the road alignment. Decreased cut and fill requirements resulting from employing a close ground fit for the separate path make this a cost-effective approach. Where a separate bikepath is used, the typical road section will be reduced to 32 feet of subgrade, 11-foot paved lanes, and 5-foot turf shoulders.

b. Scenic Spur

- 10-foot travel lanes
- 3-foot shoulders

4. Fill and Cut Slopes

<u>Height (ft.)</u>	<u>Slope</u>
0-2	6:1
2-6	4:1
6-18	3:1
18-30	2:1
30-up	2:1
1-3/4:1	Special Condition

5. Drainage Structures

With the exception of the first mile, most of the proposed alignment is along the ridge top. As a result, most drainage structures will be in the 24-inch to 36-inch range. Culverts will be placed in all natural drainages. The outlet end will always be placed on natural ground. Headwalls will be used at culvert inlets in cut sections. End sections will be used for inlets in fill sections as well as for all culvert outlets. All culvert outlets will also have excavated catch basins. The basins will be covered with a drainage fabric and filled or lined with rock or stone. On embankments for surface runoff in areas where bituminous curbs are necessary to control runoff, pipe rundowns will be used. The pipe rundowns will be backfilled (covered) rather than exposed. Culverts in bench sections will be designed at maximum intervals of approximately 300 feet to reduce runoff concentration.

6. Major Structures

Grade separation structures will be required at Eden Hill Road and Warren Road to eliminate intersections between the terminals of the proposed scenic road. A grade separation interchange is also proposed at the U.S. Highway 31 terminus to eliminate hazards associated with making left turns across traffic.

The use of retaining walls is not recommended for site suitability and aesthetic reasons. They will be avoided wherever possible, especially in cut sections.

7. Cost Estimate

A preliminary cost estimate for the proposed scenic road is presented in Table 1. The estimate, prepared by the Federal Highway Administration, includes funds for project design and construction supervision.

Table 1
Preliminary Cost Estimate
Benzie County Scenic Road

<u>Item</u>	<u>Quantity</u>	<u>Cost</u> ¹
Clearing and Grubbing	110 acres	\$ 964,000
Earthwork/excavation	320,000 cubic yards	\$ 1,168,000
Earthwork/borrow	340,000 cubic yards	\$ 1,489,000
Crushed aggregate ² (for base course)	110,000 tons	\$ 1,752,000
Hot bituminous ² concrete pavement	31,000 tons	\$ 1,825,000
U.S. 31 overpass	lump sum	\$ 642,000
Eden Hill bridge	lump sum	\$ 2,570,000
Warren Road bridge	lump sum	\$ 540,000
Mobilization	lump sum	\$ 1,168,000
Drainage	pipes, inlets, paved ditches	\$ 1,168,000
Landscaping	lump sum	\$ 292,000
Other items	lump sum	\$ 4,380,000
Bike Trail ³	35,000 linear feet	\$ 730,000
TOTAL (rounded)		\$18,700,000

¹Includes administrative costs (defined in text)

²Assumes 3½" hot bituminous concrete mix over 8" crushed aggregate base

³Where separate; estimate assumes 3.2 miles combined, 5.3 miles separate. Separate trail assumptions are 8-foot width, 2" mix over 4" base, and close ground fit.

A preliminary cost estimate was also prepared for an alternative with an on-grade intersection with U.S. Highway 31. The total estimate for this option is \$16,800,000.

D. Scenic and Recreational Aspects

The road, if constructed, will embody many characteristics important to a scenic driving experience. The proposed alignment has variety, passing through hardwood forests, open fields, fruit orchards, a lake/wetland area, and old pine plantations.

Scenic views are obtained from many points along the proposed alignment. To the north and east, Platte Lake, Empire Dunes, and Lake Michigan are the primary features, while to the south and west Crystal Lake is the focal point. In both directions orchards and farmsteads contribute a picturesque foreground. Small parking areas are proposed to allow motorists to stop and enjoy some of the more spectacular views, other vistas can be seen in transit. A one-mile scenic spur road and a short access road to a viewing area are also proposed. (See Scenic Entrance Road maps.)

Some vista clearing is proposed to enhance scenic views. This will be done in such a manner to appear natural, while preserving specimen and young growth. The openings created will be outside of the roadway clearing and will be aesthetically pleasing from a vehicle or on foot.

The proposed road is envisioned as the major southern entrance to Sleeping Bear Dunes National Lakeshore. As such, an unmanned visitor contact/information station is proposed in an open field (old nursery site) near the Eden Hill Road crossing. Other proposed visitor use facilities are a picnic area at the end of the scenic spur, a viewing platform at the end of a short access spur, comfort stations at the picnic area and the visitor contact station, and the bikeway, which would be constructed at the same time as the road.

Use of the scenic corridor for a variety of recreational pursuits is anticipated. Bicycling, picnicking, sightseeing, and photography will occur in conjunction with the facilities mentioned above. Provisions for other activities are possibly subject to constraints dictated by land ownership, easement stipulations, final project design, and ultimate decisions related to winter maintenance. Examples of recreational activities which could be provided for include hunting, snowmobiling on unplowed roads, cross-country skiing on unplowed roads or trails, and hiking.

III. Project Feasibility

A. Engineering

1. General

In general, construction would pose no major engineering difficulties. Clearing of approximately 130 acres will be required, and provisions for merchantable timber will be considered.

There are many techniques available to mitigate the impacts of construction, especially in the area of erosion control. Techniques such as those described in "Best Management Practices for Erosion and Sediment Control" (FHWA, 1978) will be examined during the final roadway design and the most appropriate mitigative measures (both temporary and permanent) will be adopted.

Special attention will be given to revegetation, both for erosion control and aesthetic reasons. Hand seeding for slope stabilization will be used during construction, with a more extensive program of hydroseeding and tree planting to follow after grading is completed.

2. Problem Areas

One grading problem area was identified near the southern end of Rogers Road. Initially considered options and related problems are as follows:

a. Follow Rogers Road alignment. In order to maintain acceptable (less than 8½%) grades, extensive fill would be required. This costly fill section would extend for approximately 2,000 feet and be approximately 60 feet deep at the maximum.

b. Follow a sidehill alignment. Since the existing terrain is on a 2:1 slope, this option would require unaesthetic cuts to the top of the existing slope.

Upon further inspection a modified sidehill alignment was identified and selected. By lowering the elevation of the alignment slightly and making limited but judicious use of high sliver cuts and retaining structures, the modified alignment is deemed acceptable with respect to both aesthetics and cost.

While not providing engineering problems per se, alternatives were considered in one other area. Both an at-grade intersection and a grade separating interchange structure were considered for the U.S. Highway 31 terminus of the proposed scenic road. The interchange was selected for safety reasons. Since an at-grade intersection meeting current roadway design standards could be constructed, a cost estimate for this option was provided in the cost estimate section.

B. Need for the Project

1. Visitation

Visitation to Sleeping Bear Dunes National Lakeshore for the period 1976-1981 is listed in Table 2.

Table 2

Annual Visits to Sleeping Bear Dunes National Lakeshore ¹

<u>Year</u>	<u>Visitor Days</u> ²
1976	696,600
1977	838,000
1978	759,100
1980	689,300
1981	759,000

¹Defined as the daily entry of any person, except National Park Service personnel (meaning staff of cooperating associations, concessioners and contractors, as well as those directly employed by the Service, and the households of personnel residing in the parks), onto lands or waters administered by the National Park Service.

²Rounded to the nearest hundred

The number of visits is determined from information gathered from four traffic counters at popular visitor use areas (Dune Climb, Stocking Scenic Drive, Glen Lake Beach, Good Harbor.) Periodic visual observations in other public use areas and National Park Service campground receipts are also used to tabulate total visitation. Visitation is highly seasonal with about 75 percent of the total visits occurring during the summer months. The average visitor stay is about 6 hours.

On a nationwide basis, year-to-year variations in tourism can be related to a variety of factors. These include consumer response to increasing energy prices, the economy, and the weather. Lakeshore

visitation can be assumed to respond to similar factors. Decreases in visitation since 1977, for example are probably related to a combination of increased gasoline prices and weaknesses in Michigan's automobile-based economy, the latter combined with the fact that the majority of the lakeshore's visitation originates in Michigan.

Although the past six years have not shown a consistent trend towards increased visitation, there are several factors which indicate visitation is likely to exhibit a generally upward trend. Visitor origin surveys have shown the percentage of visitors originating in Michigan is increasing. In addition, the composition of Michigan originating visitation is shifting. Visitation from Traverse City, Grand Rapids, and other nearby population centers is increasing while visitation from the Detroit, Flint, Saginaw, and Jackson areas is decreasing. These trends, when considered in conjunction with the rapid population growth experienced in the nearby population centers in the last decade—a trend that local and state planning groups expect to continue—suggest that Lakeshore visitation will increase. Also supporting increased visitation is the fact that the lakeshore is a developing area. As such, it is just starting to get major development projects underway. As development proceeds, attractiveness to visitors is expected to increase with a concomitant increase in visitation.

Based upon a consideration of existing and projected trends and assuming an improved economic climate in Michigan, it is projected that Lakeshore visitation could reach 870,000 by 1990 and 1,060,000 by the year 2000. This increase amounts to approximately 2 percent per year.

2. Traffic Patterns

The majority of Lakeshore visitors enter the area from the southeast. State Highway M-22 is the primary road through the Lakeshore, with visitor access to M-22 coming mainly from State Highways 72 and 115 and U.S. Highway 31 (see Vicinity Map). Many visitors (an estimated three out of four) take some sort of circular (non-backtracking) drive through the Lakeshore.

The most popular visitor attractions at Sleeping Bear Dunes are located to the north of the intersection of highways M-22 and M-72. As a result, many visitors look for a short-cut between U.S. 31 and M-22. Exceptions are visitors coming from or through Traverse City, for which M-72 is the most direct route, and visitors wishing to visit Frankfort, who use U.S. 31 and M-115. Four paved county roads are currently used to travel between U.S. 31 and M-22; Crystal Lake, Platte Lake, Deadstream, and Indian Hill. None of these roads are, however, signed as Lakeshore access roads.

Construction of the proposed scenic road between U.S. 31 and M-22 would provide an identifiable southern entrance to the National Lakeshore. It is expected that virtually all visitors now using the four county road short-cuts would use the new road. Some visitors currently going to Frankfort

or entering the Lakeshore via Traverse City and M-72 would also be expected to use the new road, either for its scenic attributes or because it intersects M-22 to the south of all of the Lakeshore's primary visitor attractions. In addition, some local traffic will be diverted to the new road since it will provide a more direct, intersection- and driveway-free route between U.S. 31 and M-22.

3. Existing Road Capacities

Local traffic volume fluctuations reflect the rural and vacation oriented character of the region. Actual traffic counts on some roads are three times the estimated average daily traffic volumes (ADT) and the peak hourly volumes range between approximately 30 and 50 percent of average daily traffic volumes (Michigan, Department of Transportation, various years). The summer population in the ten-county Northwest Planning Region doubles during the peak summer months (Michigan, Department of Transportation, 1979) so local traffic fluctuates seasonally as does vacation traffic.

Population increases are not always directly related to increases in local traffic volume but since the population of Region 10 (Northwest Michigan Regional Planning District) increased approximately 30 percent between 1970 and 1980, it is anticipated that local traffic volume will show a substantial increase. Main traffic routes between population centers are projected to show greater increases in traffic volumes than area laterals. Another trend anticipated in the Lakeshore area is an increase in the percent of local to visitor traffic because visitation is not projected to increase as rapidly as the population has in the last ten years. One indication of this trend is reflected on the state traffic volume record at the station on M-22 just south of Empire. The 1960 average daily traffic volume at this station was the same as that recorded in 1979 (800 ADT), however, in 1976 and 1977 the ADT was as high as 1,000. The state projection for traffic at this station in the year 2000 is 2,800 ADT assuming a maximum growth scenario (abundant energy supply and maximum population growth).

Approximately 8% of this ADT (224 vehicles/day) is projected to be vacation traffic. Even using this maximum growth projection, M-22 at this site would only be approaching its peak hourly capacity (840 predicted; peak hourly capacity 800-900; Highway Research Board, 1965). Average ADT's for the county roads connecting U.S. 31 and M-22 are listed in Table 3.

Table 3
Selected Benzie County Road Statistics¹

<u>County Road Number</u>	<u>Name</u>	<u>Average Annual Daily Traffic</u> ²	<u>Number of laterals</u> ³
679	Indian Hill Road	323	80
708	Deadstream Road	562	170
706	Platte Lake Road	534	160
704	Crystal Lake Drive	284	270

¹From Benzie County traffic counts

²1978-1980; Counting station closest to and south of M-22

³Intersections, driveways, etc.

Indian Hill has the fewest number of laterals and it is the most direct route to or from the northern attractions of the lakeshore. Residential development along Indian Hill road will probably be slower and less extensive than along the other county roads because it is not lake frontage property. Crystal Lake Drive has the most driveways along it, however, county road traffic volume data indicated that the average traffic volume is lower than Platte Lake and Deadstream Roads. All three county roads that provide access to lake frontage property are developed and could become more so in the future.

Highway Research Board (1965) peak hour capacities for these four county roads are between 500 and 600 vehicles. Using a conservative assumption (peak hour volume=0.5 x ADT), average daily traffic capacities for the four roads are approximately 1,000-1,200 vehicles. Comparison with existing ADT's in Table 3 indicates that existing traffic volumes would have to increase 2-4 times before capacities of these roads are approached. If traffic volumes increase at the same rate projected for the project area's state highways (another conservative assumption), capacities on these county roads will be approached sometime after the year 2000 under a maximum population growth/abundant energy scenario. If these moderately optimistic conditions are not met, existing road capacities will be sufficient even further into the 21st century.

If one (or more) of these roads were signed as an access to the Lakeshore, traffic would increase dramatically. This increase would be expected to come mainly from non-local residents reluctant to depart from main or unsigned routes, but some traffic rerouting from the unsigned county roads would also occur.

4. Projected Use of Scenic Road

In the preceding sections, three topics affecting the need for the proposed scenic road--Lakeshore visitation trends, existing traffic patterns, and existing road capacities--were discussed. This section addresses a fourth topic, projected use of the scenic road.

It should be understood that these projections are just that--projections. These use figures are only as accurate as the assumptions made in their development. Uncertainties inherent in traffic and visitor counts, visitation projections, and assumptions concerning the percentage of total traffic attributable to lakeshore visitors and the number of visitors who will actually use the scenic road all contribute to uncertainties in the final projection. Nevertheless, by making conservative assumptions, useful "worst case" figures can be developed.

a. For 1981

It is estimated that 140 visitor cars per day would have used the scenic road if it had been in place in 1981. This translates to 51,000 visitor cars or approximately 180,000 visitors per year, approximately 24% of the Lakeshore's visitors.

This projection is based on the following assumptions:

(1) The average daily traffic volume on M-22 south of Empire (north of all four county road intersections but below intersection with M-72) is 1,000.

(2) The visitor ADT at this point is 200. A 1973 Benzie County survey found that 20% of cars going north on M-22 from Frankfort were vacationers. Michigan Department of Transportation estimates for the year 2000 are lower. Also assumed is that all vacationers are Lakeshore visitors.

(3) 70% of the vacationers on M-22 south of Empire would use the scenic road .

(4) Number of visitors equals 3.5 x the number of visitor cars. This is the multiplier currently used by the National Park Service.

b. For 2000

If the same percentage of visitors use the scenic road as would be estimated to use it in 1981, there would be approximately 196 visitor cars per day in the year 2000. This corresponds to 71,000 cars or 250,000 visitors per year. This assumes Lakeshore visitation will be 1,060,000 in the year 2000.

c. Cost per Visitor

A simplified form of cost/benefit analysis is to apportion annualized project cost on a per visitor basis. This yields a "user cost", which, while not meaningful in and of itself, can be related to other user costs. Similar calculations have been done for a limited number of National Park Service development proposals in recent years.

The user costs calculated for the proposed scenic road are \$14 per visitor (\$49 per car) in 1981 and \$10 per visitor (\$35 per car) in the year 2000. In addition to using the road use figures developed above, the following assumptions were made:

(1) Original project cost is \$20,000,000, which includes the intersection structure at the U.S. 31 terminus and \$2,000,000 for land acquisition. Land acquisition costs are estimated to be approximately 50% of a 1982 estimate for full fee acquisition; easement costs have not been estimated and the ultimate breakdown between fee and less-than-fee acquisition is unknown.

(2) Annualized capital cost is 10% of project cost, \$2,000,000 (OMB Circular A-94).

(3) Annual maintenance costs are negligible compared to annualized capital cost.

These user costs can be compared to user costs calculated for other National Park Service Facilities. User costs for scenic roads in Capitol Reef National Park, Utah, range between approximately \$.50 and \$1.50 per visitor. Campground user costs range from \$1-\$5 per camper in popular areas to \$20-\$40 per camper in an area where projected use was low.

Another way of looking at this user cost is, if each user were required to pay the entire cost, would he?

5. Conclusions

a. The Scenic road is not needed to alleviate existing traffic problems.

b. The earliest that traffic capacities on Crystal Lake, Platte, Deadstream, and Indian Hill roads will be reached is in the year 2000. At that time, lakeshore visitors using the scenic road would reduce traffic by 50 cars per day per road (if traffic is evenly divided among the four roads). Although this is a minor contribution to the total traffic volume on these roads, when considered in conjunction with the undetermined number of local users of the scenic road, construction of the scenic road could appreciably delay the need for increasing the traffic capacity of the county road network.

c. On a per-visitor-served basis, the scenic road appears to be an expensive undertaking; approximately an order of magnitude more expensive per visitor than scenic roads in another National Park.

C. Environmental Impacts

This section is not intended to be a comprehensive evaluation of environmental impacts, but rather an analysis of specific concerns that have been raised concerning the construction and operation of the proposed scenic road. A comprehensive analysis of environmental, cultural, and socioeconomic impacts will be undertaken in compliance with the National Environmental Policy Act if and when the project becomes one of the Lakeshore's high priorities and project planning funds become available.

1. Wildlife Habitat

Construction of the scenic road will require the clearing of approximately 130 acres of land, predominantly hardwood forest. This will result in the loss of approximately 10% of the scenic corridor's wildlife habitat. In the short-term, deer, birds, small mammals, and other wildlife will be displaced. In the long-term, however, protection of the scenic corridor through easements and acquisition will insure the continuing existence of high quality wildlife habitat through the perpetuation of existing land uses. Especially important are the preservation of numerous existing "edge" habitats -- transitional zones between orchards and forest, for example.

2. Water Quality of Platte and Crystal Lakes

Road projects in general have the potential to degrade water quality in two primary ways. Road construction may result in increased erosion of disturbed and denuded soils and concomitant introduction of sediment-laden runoff to nearby water courses. Once constructed, road runoff containing a variety of pollutants may enter bodies of water. Runoff volumes are increased due to the impervious surfaces of roads and parking areas. This runoff may also cause erosion and introduction of sediment to local bodies of water.

Although some erosion will occur on this project during the construction phase, the amount will be limited by use of appropriate techniques to reduce erosion and sedimentation (see Engineering Feasibility section). Techniques such as hand-seeding during construction, keeping access and haul roads within construction limits wherever possible, saving and replacing topsoil, and planting of native hardwood seedlings will be used.

Long-term erosion will be reduced or eliminated by, for example, placing storm drains at intervals of 300 feet or less and not diverting runoff into channels steep enough to cause gulying. Other techniques will be used as appropriate. Use of these techniques, coupled with soil characteristics in the project area (sandy soils which can absorb 6-20 inches of water per hour; S.C.S., Benzie County) will insure that runoff from the scenic road will not drain to Platte or Crystal Lakes, which are more than 2,000 feet from the proposed road at the closest approach.

The main pollutants associated with road runoff are suspended solids, oil, and lead (EPA, 1973). All are rapidly taken up by soil particles as water percolates into the ground. The most critical pollutant affecting surface water quality in the region is phosphorus (Michigan D.N.R., 1979). Phosphorus is contained in road runoff, but it also is rapidly immobilized as the runoff percolates through soil (Porcella and Bishop, 1975). Thus these pollutants will not reach Platte or Crystal lakes, either from direct introduction of runoff or from infiltration to the groundwater and eventual movement to the lakes.

Additional evidence is provided by existing studies of Platte and Crystal lakes (cf. Michigan DNR, 1979; Kerfoot and Skinner, 1981). These studies have not identified the shoreline roads adjacent to the lakes as significant sources of water-borne pollutants. Also not considered significant are activities such as orchard development, home construction, and borrow pit use, all of which require vegetation clearing and excavation similar to road construction.

The State of Michigan will review plans for the road. All pertinent regulations will be followed and the plans will be reviewed for specific compliance with Public Act 345, Inland Lakes and Streams Act of 1972 and Public Act 346, Soil Erosion and the Sedimentation Control Act of 1972.

3. Socioeconomic Impacts

The proposed scenic road project is consistent with the Northwest Michigan Regional Planning and Development Commission's goal of improving tourist and resort facilities. The scenic road will probably not be a significant tourist attraction by itself. However, the road will add to the character of the Lakeshore and in conjunction with other proposed facility improvements, it would add to the popularity of the Lakeshore as a tourist destination stop. This would result in an increase in local tourism business.

The proposed scenic road was also supported by the Benzie County Planning Commission in a 1977 letter for the following reasons:

- a. Financial feasibility of this corridor being used as a major Lakeshore entrance.
- b. The scenic road is compatible with existing federal legislation.
- c. The scenic road will allow visitor traffic to enter the Lakeshore at a more southern point which will tend to decrease traffic congestion of returning traffic to see the southern portions of the Lakeshore.
- d. The scenic road will separate local and Lakeshore traffic.
- e. Federal ownership of the scenic road will allow maintenance of the rural character of the corridor.

Benzie County support was reiterated in 1981.

The Townships of Benzonia and Lake have gone on record as opposing construction of the scenic road. Major reasons include lack of a demonstrated need for the road from a traffic and visitation standpoint, high cost, loss of tax base, and possible adverse impacts to the water quality of Platte and Crystal Lakes and to the scenic qualities of the area.

The new road will change the amount of visitor traffic on local roads (see Need for the Project section). This could adversely affect some businesses and resorts on county roads, however, tourist industries in general are expected to benefit from population and tourism increases. Information signs on the State highways would make visitors aware of the services provided on county roads. Construction of the scenic road may cause an undetermined percentage of visitors to bypass Frankfort. This could be offset by improved visitor facilities in the southern part of the Lakeshore, which would be expected to increase tourist business in Frankfort. Development of such visitor facilities will precede construction of the scenic road if current priorities are followed.

Construction of the scenic road would delay the need to upgrade the county road network in the project area. Undetermined savings would accrue to the local, State, and Federal agencies who will ultimately fund road improvements as the need for them is postponed to well into the twenty-first century. The rate of increase of local road maintenance costs will be reduced, since traffic on the scenic road, where the National Park Service will be responsible for maintenance, will take some traffic off of the local roads. These savings are more properly described as reapportionments, since, although funding sources are different, funding will still be required.

The loss in tax base to the county is estimated to be \$310,303/per year or 0.2 percent of the county total. The county loss is a sum of the percent state equalized value for Benzonia township (\$226,512 or 0.7 percent of the township total) and Lake township (\$83,690 or 0.3 percent of the township total). (Benzie County Planning Commission, 1982).

Acquisition of the corridor through less-than-fee and fee acquisition would ensure that the rural and wooded character of the ridge is maintained.

The local economy will benefit from the road construction, either directly, through wages to local workers, or indirectly, through materials and services purchased. This benefit is estimated to be about 20 percent of the total construction cost.

IV. Conclusions

The proposed scenic road is feasible from an engineering standpoint. The road is not needed to alleviate current traffic problems; however, there is a point in the future when the existing local road network will require upgrading to reduce traffic problems. The earliest this would occur is estimated to be between 2000 and 2010, and construction of the scenic road would be one solution to future traffic problems.

The cost of the project, both on an absolute scale and on a per user basis is high. Environmental impacts in areas of specific local concern are not, in the opinion of the study team, significant enough to preclude proceeding with the project. Concern about impacts on Platte and Crystal Lakes is unnecessary since the project would have no effect on the quality of these waters.

V. Study Team/Coordination

A. Study Team

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- Jerry Lindman, Surveying and Mapping Engineer, Federal
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- John A. Ronscavage, Chief Landscape Architect, Midwest Team,
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- Robert Wemple, Environmental Engineer, Denver Service Center, National
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- Max W. Holden, Resource Management Specialist, Sleeping Bear Dunes
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Regional biologist, and park planner.
- Raymond A. Kimpel, Chief Ranger, Sleeping Bear Dunes National Lakeshore.
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B. Consultation and Coordination

The following agencies were consulted during the course of this study. Their contributions are greatly appreciated.

Michigan Department of Natural Resources

Michigan Department of Transportation

Benzie County Planning Commission

Benzie County Road Commission

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