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Department of Health and Environmental Sciences  
STATE OF MONTANA HELENA, MONTANA 59601

MAY 6 1977

ENVIRONMENTAL SCIENCES DIVISION  
Board of Health Building  
(406) 449-3946

~~PHOTOGRAPH~~  
A. C. Knight, M.D.  
Director

April 29, 1977

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Environmental Quality Council, Helena, MT, 59601  
Department of Community Affairs, Helena, MT, 59601  
Department of Fish and Game, Helena, MT, 59601  
Department of Highways, Helena, MT, 59601  
Department of Natural Resources and Conservation, Helena, MT, 59601  
Montana Bureau of Mines and Geology, c/o Montana Tech, W. Park St., Butte, MT, 59701  
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Glacier County Attorney, Glacier County Courthouse, Cut Bank, MT, 59427  
Glacier County Sanitarian, Courthouse, Shelby, MT, 59474  
Glacier County Sheriff, Glacier County Courthouse, Cut Bank, MT, 59427  
Glacier County Library, 21 1st Avenue SE, Cut Bank, MT, 59427  
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Sierra Club, Attn: Joe Angell, General Delivery, Helena, MT, 59601  
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Montana Realtors Association, 2021 11th Avenue, Helena, MT, 59601

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Cut Bank Pioneer Press, 8 E. Main, Cut Bank, MT, 59427  
Western Breeze, 32 S. Central Avenue, Cut Bank, MT, 59427  
Daily Inter Lake, Box 8, Kalispell, MT, 59901  
Tribune Capitol Bureau, 515 N. Sanders, Helena, MT, 59601  
Lee State Bureau, Box 557, Helena, MT, 59601  
Associated Press, 317 Allen, Helena, MT, 59601  
United Press International, 2021 11th Avenue, Helena, MT, 59601

Reviewer:

The enclosed draft environmental impact statement (EIS) has been prepared for the proposed Golden Glacier Parklands subdivision in Glacier County. This impact statement is submitted for your consideration. Comments and questions will be accepted for 30 days after the date of this publication. If no communication occurs during the time period it will be assumed the person or agency does not have any comments. An extension of time, not to exceed 15 days, may be requested. All comments should be sent to the Subdivision Bureau, Environmental Sciences Division, Helena, MT, 59601.

A public hearing will be held at the Saint Mary Visitors Center, Glacier National Park, Saint Mary, MT, May 17 beginning at 7:30 p.m. to receive oral and written comments on the draft EIS.

Sincerely yours,

  
Edward W. Casne, Chief  
Subdivision Bureau

ENVIRONMENTAL IMPACT STATEMENT

GOLDEN GLACIER PARKLANDS

WESTERN TRAVEL & RECREATION, INC.

DUCK LAKE

GLACIER COUNTY, MONTANA

April 1977

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MONTANA DEPARTMENT OF HEALTH  
AND  
ENVIRONMENTAL SCIENCES

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Golden Glacier Parklands  
A Proposed Subdivision  
Glacier County

Pursuant to the Montana Environmental Policy Act, Section 69-6504 (b) (3), the act controlling both public and private water supply and sewage disposal for subdivisions, Section 69-5001; and the act to control water pollution, Section 69-4801, the following draft environmental impact statement (EIS) was prepared by the Montana Department of Health and Environmental Sciences (DHES), Environmental Sciences Division, concerning the request for administrative approval of GOLDEN GLACIER PARKLANDS, a proposed subdivision near Babb, Montana.

I. INTRODUCTION

This environmental impact statement is prepared pursuant to the only opinion of the Montana Supreme Court which addresses the responsibilities of the DHES to review subdivisions under the Sanitation in Subdivisions Act, Title 69, Chapter 50, R.C.M. 1947, and the Montana Environmental Policy Act (MEPA), Title 69, Chapter 65, R.C.M. 1947. That case, The Montana Wilderness Association et al. vs. The Board of Health and Environmental Sciences of the State of Montana et al., 33 St. Rep. 1320, (hereinafter referred to as the "Beaver Creek South" case) indicates that the department's substantive decision-making authority to approve or deny subdivisions is limited to a consideration of whether proposed water supply, sewage disposal and solid waste disposal systems are adequate to protect public health and prevent water pollution.

The Beaver Creek South opinion does not indicate that the department is relieved of its responsibilities to prepare an EIS which, to the fullest extent possible, satisfies the requirements of MEPA and the rules adopted by the DHES and the Board of Health and Environmental Sciences implementing MEPA (rules MAC 16-2.2(2)-P2000 through P2080). Therefore, although the Beaver Creek South opinion indicates that the department may only base final approval or disapproval of a subdivision on the criteria and statutory authority contained in the Sanitation in Subdivisions Act, the DHES does believe that it still has MEPA responsibilities. The MEPA analysis contained in this EIS attempts to analyze in detail the three statutory criteria upon which the department may make a final substantive decision--water supply, sewage and solid waste disposal--while still addressing the basic land use and environmental impacts that the Montana Supreme Court has indicated are a part of a local government's substantive decision-making authority under the Subdivision and Platting Act, Title 11, Chapter 38, R.C.M. 1947.

It must be emphasized that the DHES fully appreciates the fact that the Beaver Creek South opinion does not address the substantive questions concerning the scope of review required under MEPA when specific legislative limitations and directives have been imposed pursuant to other statutes. For example, the majority opinion does not address the question of what types of impacts must be analyzed, the scope of discussion of those potential impacts, or how the department is to obtain information concerning the impacts of an in-depth analysis is required. Therefore, to the extent that the DHES must interpret what MEPA responsibilities must be performed

in light of the specific limitations on the department's final decision-making authority under the Sanitation in Subdivision Act, this EIS has been prepared in conformity with the requirement of Section 69-6504, R.C.M. 1947, that the analysis comply with MEPA "to the fullest extent possible." The department believes that based on information submitted by the applicant and information reasonably available to the DHES, this EIS complies to the fullest extent possible with the mandate of the MEPA, the rules adopted to implement the act, the limitations imposed upon the department's decision-making authority under the Sanitation in Subdivisions Act, the authority conferred upon local governments under the Subdivision and Platting Act, and the reconciliation of these statutes by the Montana Supreme Court in the Beaver Creek South case.

## II. DESCRIPTION

Western Travel & Recreation, Inc., a Missoula development corporation, proposed to subdivide three parcels of previously undeveloped shoreline on Duck Lake, four miles east of Babb (in portions of Sections 15, 16, 17, 18, 19, 20, 21 & 22, T36N, R13W - see attached map #1). Although the land is privately owned, it is within the borders of the Blackfeet Indian Reservation.

The corporation plans to subdivide 140 acres of its 2,080 acres into 63 lots (see attached map #2), ranging from 1.1 to 3 acres in size and totaling 89.55 acres (1,315 acres are in the Duck Lake Basin, the remaining 765 acres are outside the basin). The development is divided into three separate parcels: 19 lots are in the western parcel, 15 in the northern parcel and 29 in the southeastern parcel. The corporation also plans to set aside 50.80 acres for parks.

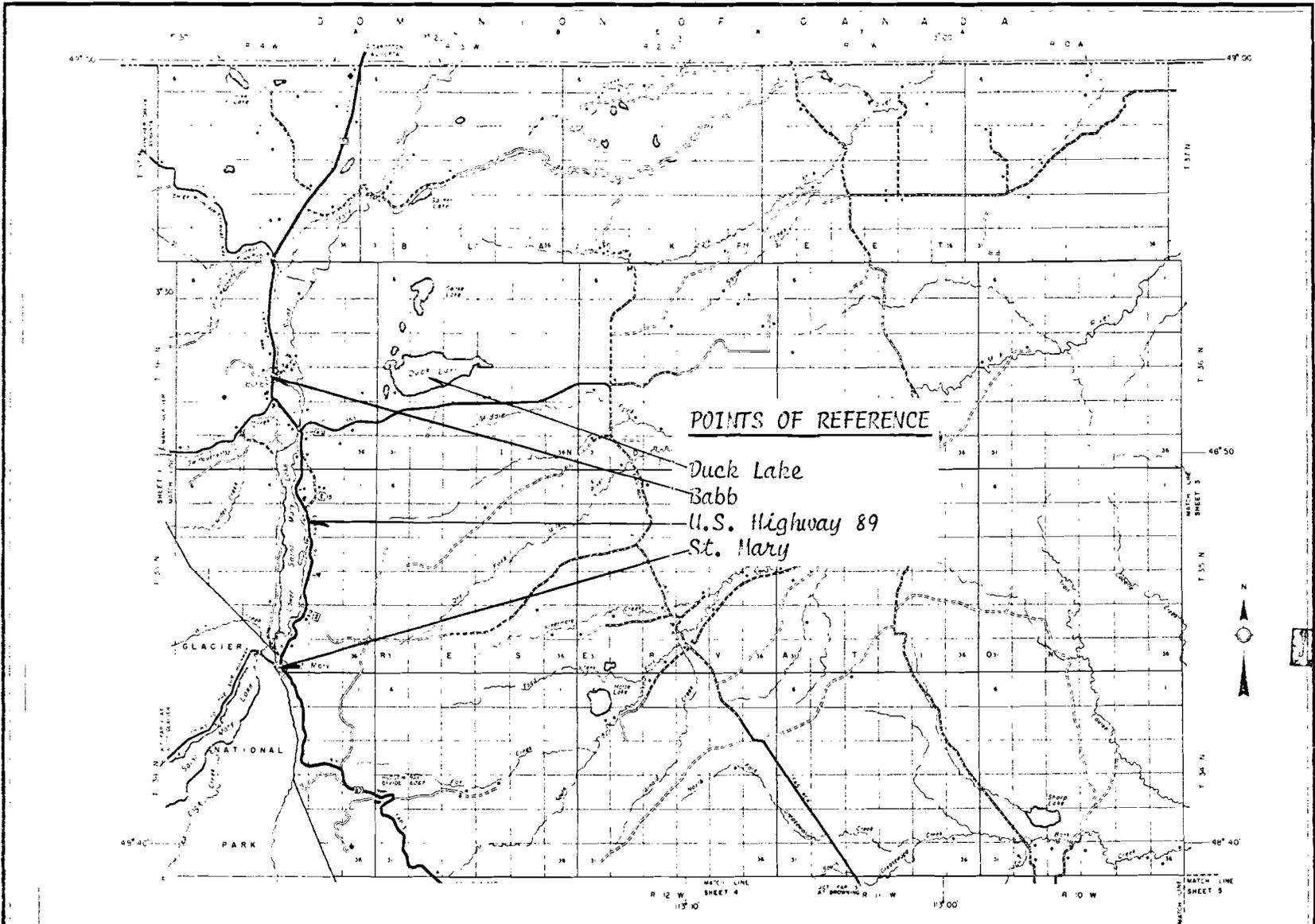
Restrictive covenants aimed at defining and controlling various aspects of development have been drawn up by the developer's lawyers.

## III. BACKGROUND

Originally Western Travel & Recreation, Inc. proposed to subdivide all 2,080 acres. Even though the scope of this review is focused only on 63 shoreline lots, it should be noted that the Glacier County Commission held a public hearing which resulted in its conditional approval of a development plan which called for the total development (252 lots) of Western Travel's land.

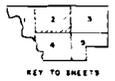
The hearing was held in the Glacier County Courthouse, May 5, 1975. The preliminary plat presented to the commissioners and the public was substantially different from the plans submitted to the DHES. The proposed development included the three parcels previously mentioned, plus a fourth parcel, situated just west of the tribal campground on the south side of the lake. In addition to the 63 shoreline lots being reviewed by the DHES, the preliminary plat proposed the development of 26 additional shoreline lots in the eastern part of the western parcel, one more shoreline lot in the northern parcel and a total of 162 lots away from the shoreline (10.1 to 11.7 acres) scattered throughout the four parcels.

The minutes of the meeting were taken by a stenographer, but never transcribed. Much of the technical information presented by the development corporation also applies to its proposal to the DHES and has been used throughout this EIS.



POINTS OF REFERENCE

- Duck Lake
- Babb
- U.S. Highway 89
- St. Mary



**MAP #1**  
**GENERAL HIGHWAY MAP**  
**GLACIER COUNTY**  
**MONTANA**

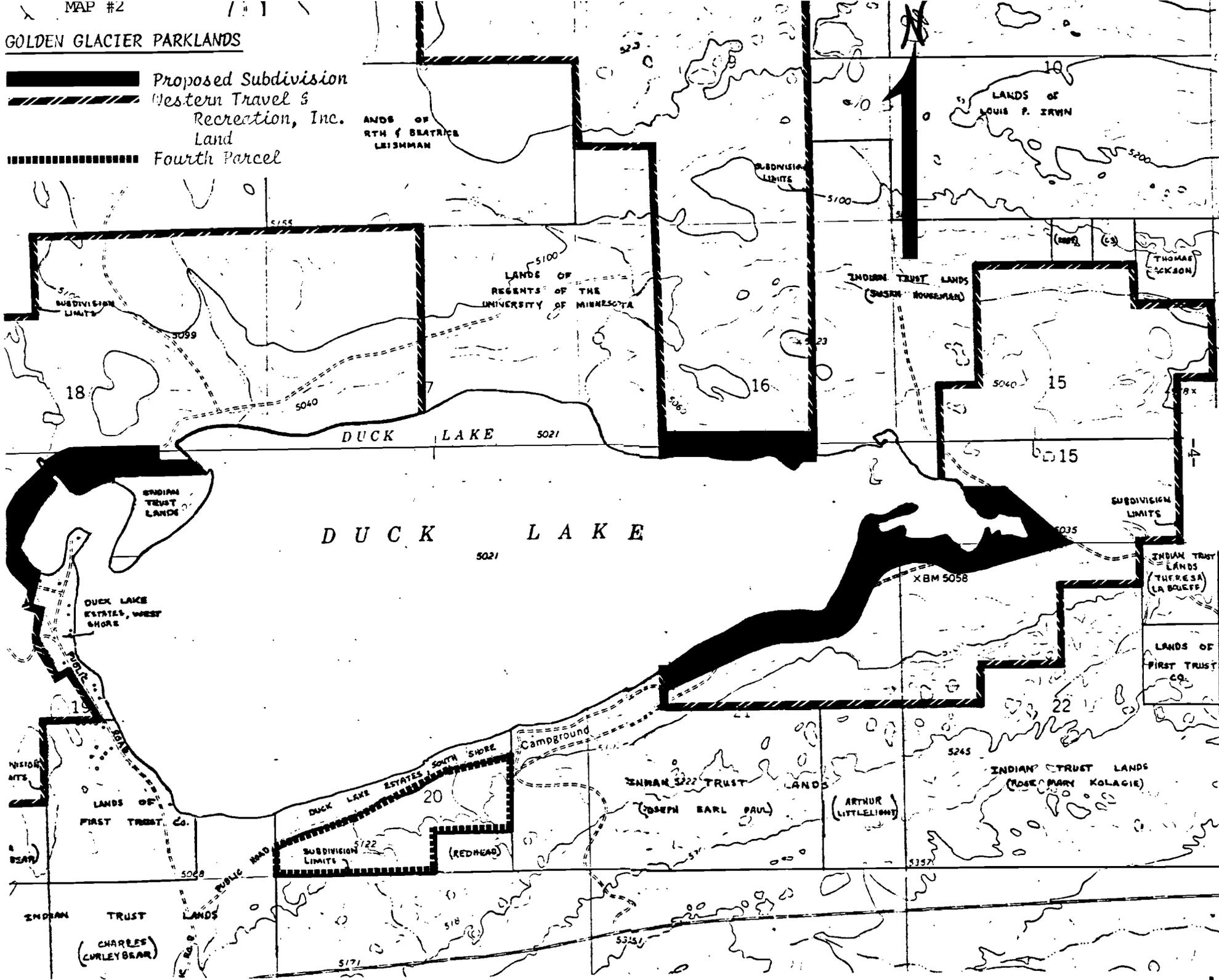
PREPARED BY THE  
 MONTANA STATE HIGHWAY COMMISSION  
 PLANNING SURVEY SECTION  
 IN COOPERATION WITH THE  
 U.S. DEPARTMENT OF TRANSPORTATION  
 FEDERAL HIGHWAY ADMINISTRATION

SCALE  
 1" = 10 MILES  
 1956  
 APPROVED BY THE  
 MONTANA STATE HIGHWAY COMMISSION

SHEET 2 OF 3 SHEETS

GOLDEN GLACIER PARKLANDS

-  Proposed Subdivision
-  Western Travel & Recreation, Inc. Land
-  Land
-  Fourth Parcel



During the early part of the meeting William Reely, President of Western Travel & Recreation, Inc., told the audience that if approved, there would be no out-of-state advertising for the sale of lots in the subdivision. Additionally, he said no more than five percent of the lots per year would be sold to out-of-state (or country) persons. Both conditions comply with regulations administered by the federal Office of Interstate Land Sale Regulations.

In addition to the information presented by the development corporation and its staff, the findings of fact included seven letters from federal and state agencies commenting on various aspects of the proposed subdivision, five letters from persons against the proposed development and 267 signatures of persons who were also against the proposal (140 of the signatures were said to be from persons who owned lots at Duck Lake).

The following is a summary of the letters received from the federal and state agencies:

Water Quality Bureau, DHES - Not enough water quality data had been gathered at that time to make a "wise decision."

Environmental Quality Council - It noted two major "shortcomings":

- 1) There could be "massive" social, environmental and economic impacts associated with the proposed development,
- and 2) information concerning environmental degradation was "...so incomplete as to warrant the most cautious and considerate approach to its review by the Glacier County Commissioners...."

Bureau of Indian Affairs - Made the following points: 1) The environmental assessment submitted by the developer only partially followed federal and state requirements for format and did not address the "ramifications" of the proposal, 2) the assessment made no references to coordination with the Blackfeet Tribe, impacts on Indian owned water and natural resources or the Indian people and 3) the assessment cannot be used as an "effective decision-making tool."

Montana Department of Fish and Game - The subdivision, as proposed (252 lots), would pose a threat to water quality and trout in Duck Lake.

Montana Bureau of Mines and Geology - The developer's environmental assessment did not provide enough information, "...no approval can be recommended...."

U.S. Fish and Wildlife Service - Desirable impacts: The development could generate increased fishing pressure and add to tribal income, employment and general economic growth. The undesirable impacts: 1) Inadequate treatment of wastes could advance eutrophication of the lake, 2) development could disrupt migratory waterfowl behavior patterns, 3) there was a lack of information concerning big game use of the area and 4) increased development may increase fishing pressure, causing a demand for additional expenditures for fish stocking.

Department of Community Affairs - The 1) DHES needs to be consulted concerning water, sewer and solid waste plans, 2) the county commissioners should review road plans and 3) the developer might want to consider a "clustering" design approach for shoreline lots.

Public testimony against the development was given by representatives of the Environmental Information Center and Blackfeet Tribal Business Council; comments in favor of the proposal came from Reely and the corporation's engineer and attorney.

Glacier County Commissioners conditionally approved the development in June, 1975, Appendix A, and have since granted an extension to that approval.

#### IV. CURRENT ENVIRONMENTAL CONDITIONS

The 140 acres of shoreline proposed for subdivision has never been developed. The landscape varies from parcel to parcel. The western portion is covered with thick vegetation and adjacent to swampy areas; the shoreline in the northern parcel is thickly vegetated, but away from the lake the vegetation changes to grasses, indicating well drained soils, and the southeastern portion is generally characterized by a thick grass cover and well drained soils.

Most of the year the property is left undisturbed, however a local rancher has a grazing lease with the corporation and uses the land for about six weeks a year during the summer.

#### V. PHYSICAL ENVIRONMENT

##### Terrestrial and Aquatic Life and Habitats:

The impact of future development on Duck Lake's fish habitat is a major concern. The lake's high water table is maintained by spring runoff and possibly underground springs. Because there are no permanent inlet or outlet streams, rainbow trout do not naturally reproduce. However, nongame fish do.

Duck Lake has been managed by the Blackfeet Tribe and U.S. Fish and Wildlife Service (USFWS) as a single species fishery for recreational purposes. It was originally barren of fish, so all species have been introduced. In addition to rainbows, the lake supports populations of three nongame fish: white sucker, lake chub and fathead minnows.

As in all reservation lakes, fishing is permitted year-round. Tribal members are not restricted in the number of fish they may take. Non-members are permitted to catch 10 lbs. of fish or a fish a day. An estimated 25 percent of the anglers are members of the Blackfeet Tribe, while Canadians compose about a fourth of the fishermen.

Many anglers consider Duck Lake one of the best rainbow trout fisheries in Montana, but according to the USFWS there are indications its reputation may be changing.

The rapid growth of trout has been attributed to the abundance of aquatic organisms and an ideal lake environment. In the early 1960's fish ranging from 16 to 18 pounds were common. However, since then the number of large fish taken has declined.

Studies by the USFWS in 1974 (Appendix B) revealed the decrease in the number of large trout was attributed to a variety of factors. Such occurrences as pollution from improperly installed sewage systems, increased growths of vegetation, fishing pressure, the hardness of the hatchery trout and recreational development pressure combined to effect the trout's rate of growth.

Even though the lake is not producing the number of large fish it once did, it remains, according to the USFWS, a high quality fishery:

...Although the decrease in the numbers of large rainbow trout caught in recent years is of concern, the emphasis on this aspect of the fishery tends to understate the overall quality of fishing at Duck Lake. Few lakes support a five fold increase in body weight of rainbow trout during a period of four months while also yielding an annual harvest as great as that of Duck Lake. This high productivity indicates that the potential for continued quality fishing and the restoration of large rainbow trout is good. Through the implementation of wise management policies by the U.S. Fish and Wildlife Service, the Blackfeet Tribal Council and the considerate use by lake residents and visitors, the true potential of Duck Lake may be realized.

Although the Montana Department of Fish and Game does not participate in the management of Duck Lake, it commented on the impact of the proposed development at the county's review of the project:

...From our familiarity with the fishery and the Duck Lake area in general we are greatly concerned with the proposed subdivision. We consider the subdivision, as proposed, to be a threat to the quality of Duck Lake water, and subsequently the trout population that lake supports.

This subdivision is typical of many that capitalize on a fish or wildlife resource to promote land sales, but in the process threaten the quality of the resource they use for promotional purposes...At the present time we see no way where a development such as this could be anything but detrimental to Duck Lake and its surrounding fish and wildlife habitat...

The lake and adjacent countryside supports a variety of game birds. According to the USFWS such game birds include: Waterfowl - teal, pintail and mallard ducks and Canadian geese, and Upland Birds - ring-necked pheasant, sharp-tailed grouse and Hungarian partridge.

Tribal members may hunt year-round, but due to low bird populations, most members do not seriously hunt birds, the USFWS said.

Other common types of birds in the area include: Song Birds - horned lark, western kingbird, mountain chickadee and robin, and Birds of Prey - golden eagle, bald eagle and red-tailed, marsh and Swainson hawks.

Big game animals common to the area are mule deer, Rocky Mountain elk, pronghorn antelope and black bear.

According to the USFWS, population data is insufficient to determine the harvest importance. Tribal members hunt big game throughout the year, thus keeping the population low, the federal agency added.

Types of nongame animals living in the area are muskrat, beaver, coyotes and bobcats.

Since this phase of the development is aimed at shoreline development, it will impact birds and mammals which live in such areas. Song birds and some of the smaller nongame mammals will be able to adapt to the change in land use, however, waterfowl, birds of prey, game animals and larger nongame animals will probably move to more remote areas.

Water Quality, Quantity and Distribution:

Water Quantity:

Duck Lake is a pothole or kettle lake in the Hudson Bay drainage system and has a basin area of about 5,050 acres. According to information from the USFWS, the lake has a surface area of 1,467 acres, with a maximum depth of 24 meters (78.72 feet).

It is suspected the prairie lake maintains its high water table due to a combination of spring runoff and underground springs, a USFWS report said. The lake has no permanent inlet or outlet.

Since no hydrological report was submitted by the development corporation and reference searches fail to reveal professional groundwater studies, it is not known if drilled wells will provide enough water to meet state water supply standards. This lack of information was also noted by Miller Hansen, geologist for the Montana Bureau of Mines. In his letter to the Glacier County clerk and recorder, April 16, 1975, he said:

...In paragraph B of the environmental assessment (submitted by the developer) reference is made to the maximum and minimum depths to groundwater, with no reference to the material penetrated in reaching the groundwater levels. Logs of several wells to depths of 50 feet or so would be helpful in evaluating this area. One might expect in an area of glacial moraine to find a heterogeneous mixture of gravel, sand and clay. In similar areas, wells are found at reasonable depths in some locations, but at other locations thick clay prevents well development.

I do not believe that the application provides enough information, and for this reason no approval can be recommended.

The developer's engineer, Dean Marquardt, Kalispell, feels there is an adequate supply of groundwater. In his environmental assessment he said:

Each residence can be expected to use 250 gallons of water per day. It is the opinion of the project engineer that an adequate supply of water is available for domestic use. This is based on the geological nature of glacial till and the level of groundwater in the area. It is felt that this glacial till extends below the elevation of Duck Lake in all sections of the subdivision and that the possibility of confining layers of soil to isolate the general groundwater is remote. Therefore, any drilled wells or infiltration galleries (the type of water system proposed by the developer) tapping the groundwater should provide more than enough water for domestic needs.

The DHES does not believe the development corporation provided sufficient evidence to assure future homeowners that drilled wells will provide an adequate quantity of water for domestic use. Until sufficient evidence is received, infiltration galleries will be the only acceptable system for providing domestic water.

#### Dependability:

The development calls for the use of infiltration galleries to provide water for residential use. The galleries tap water bearing strata near the surface (around 10 feet) or if none are found, a trench is dug from the gallery to the shoreline, tiled, filled with gravel and covered with soil.

The Blackfeet Tribe owns and administers Duck Lake and claims surface (up to the highwater mark) and groundwater rights to all water within the boundaries of the reservation. There is a legal question whether water taken close to a lake via an infiltration gallery is surface or subsurface water.

The corporation and its attorney, Milton Datsopoulos, Missoula, believe Western Travel & Recreation, Inc. has riparian rights to the property. Datsopoulos discussed the matter in a legal opinion dated September 10, 1976 (Appendix C).

In discussing water dependability, it must be emphasized that the term implies dependability from both an availability and a water rights standpoint. There is no question that a dependable water supply for domestic purposes is available for the lots being reviewed in this impact statement. As to the question of water rights and who may own the right to use the water, those questions cannot be finally determined until there has been a formal adjudication of the issue under applicable water rights law.

#### Water Quality:

The USFWS made a three month study of Duck Lake in 1974 due to the decline in the number of large rainbow trout and the lack of information needed to make "wise management decisions." Another motivating factor was Western Travel and Recreation's proposal to subdivide the land around the lake.

To detect any change, three of the 1974 sampling areas (refer to map #3) were again studied in 1975. The two years of research revealed water chemistry parameters remained with "similar ranges," despite a flood in June 1975 (Appendix D).

The 1975 report also said studies concluded there was a slight increase in the variety of plankton in 1975, but, due to the flood, the abundance did not approach that of 1974 (Appendix E).

Aquatic vegetation sampled during the 1974 study indicated the presence of pondweed, stoneworts, smartweed, water milfoil and mosses. Pondweed proved to be the most common aquatic plant. The report said it was particularly abundant along developed portions of the shore and cattle grazing areas (Appendix F).

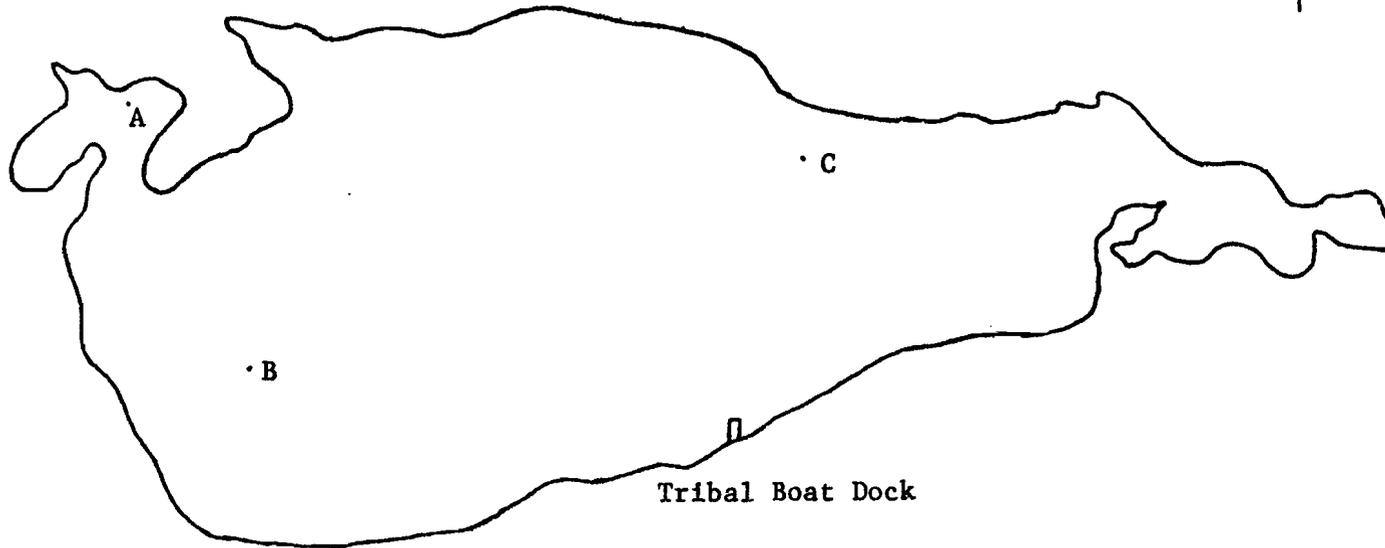
The three studies indicated the chemical properties of the water in Duck Lake do not fluctuate and the lake is not being threatened by gross quantities of aquatic plant and animal species which thrive in polluted waters.

#### Nutrient Status

Based on USFWS information and individual studies, Abe Horpestad, Water Quality Bureau, DHES evaluated the nutrient status of Duck Lake:

MAP #3  
DUCK LAKE  
BLACKFEET INDIAN RESERVATION, MONTANA

Surface Area - 1,467 Acres  
Maximum Depth - 24 Meters (78.72 ft.)



Stations for sampling water chemistry and plankton. Permanent stations:  
A - 2.5 meters (8.2 ft.) at a popular ice fishing area, B - 6 meters  
(19.75 ft.) near the lake shore development, C - 9 meters (30 ft.) where the  
impact of human activities is least.

Because this lake does not have permanent surface water inlets or outlets most of the nutrients utilized in the lake must be recycling. Such lakes can be very sensitive to nutrient inputs as there is no flushing action. Nutrients are only removed from the water column by physical, chemical and biological precipitation.

Because of the lack of inlet or outlet streams, conventional lake loading models are not strictly applicable. However, using these models and the land use nutrient contributions developed in EPA-660/3-74-020 (Estimating Nutrient Loadings of Lakes from Nonpoint Sources), the lake is not eutrophic although it is in the upper limits of the mesotrophic state.<sup>1</sup> These models are based on surface runoff, and phosphorus is strongly adsorbed to soil particles during percolation. Therefore, the lake should be phosphorus limited.

Algal assays that were done in our laboratory indicate that the lake very definitely is phosphorus limited (A state in which phosphorus is in short supply, thus accelerated plant growth will depend on the amount of phosphorus introduced to the lake.). There was no growth response to additions of nitrogen alone. There were good responses to phosphorus and outstanding responses to combinations of nitrogen and phosphorus. Phosphorus is a critical nutrient in that inputs of phosphorus could be detrimental to the lake. Because phosphorus is strongly adsorbed by soil particles, properly designed sewage systems which do not allow direct discharge of wastewaters to the lake should have little, if any, effect on the eutrophic status of the lake.

Data gathered by the USFWS in 1974 and 1975 showed that blue-green algae were rarely found in the lake at that time. The lake does support abundant growth of rooted plants. The growth of these plants should not increase due to development, nor should the growth of algae increase. This 1975 data included some phosphorus concentrations. The analyses were done in the field with a Hach kit and are probably over-estimations of the actual amounts present. The amounts they recorded would be sufficient to allow blue-green algal blooms. Such blooms did not occur. (According to the USFWS no known blooms occurred during the summer of 1976.)

Because most of the nutrients used in this lake must be recycling, surface water inputs from lawns, streets and construction activities should be minimized, as should any activity which will disturb the lake bottom sediments.

Roadway drainage must be engineered to prevent large amounts of sediment from entering the lake since the sediments would be rich in phosphorus and other nutrients. Precipitation and seepage must be ponded to settle out soil particles. Since the cut and fill slopes will be seeded, the presence

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<sup>1</sup>Eutrophic, mesotrophic and oligotrophic refer to different levels of nutrient enrichment. Oligotrophic lakes are nutrient deficient, while eutrophic lakes have an overabundance of nutrients. Mesotrophic lakes are transitional between the oligotrophic and eutrophic stages.

of ground cover will ultimately do a great deal to solve the problem; however, until the cover is established, it will be essential to control and treat runoff (for a further discussion of sedimentation refer to Transportation Networks and Traffic Flows, pp. 30).

Based on the algal assays, limited amounts of water chemical data and bioalgal specimens, DHES believes the lake is in the latter stages of being mesotrophic. DHES does not believe this subdivision, if developed properly, will cause the lake to reach an eutrophic state.

#### Coliform Bacteria

Water samples collected at 19 stations on three different occasions in 1974 revealed that five locations along the lake shore displayed coliform bacterial counts exceeding U.S. Public Health Standards. These findings led to a meeting of the USFWS, U.S. Public Health Service and Blackfeet Tribal Council to discuss means of maintaining health service water quality standards and prevent further pollution. As an outgrowth of the meeting, landowners have been advised of existing covenants governing sewage disposal. Administration of regulations has been delegated by the Blackfeet Tribal Council to a Water Pollution Control Commission. Actual enforcement of pollution regulations is accomplished by the tribal warden staff, which acts in cooperation with the local health service.

A. U.S. Public Health Service representative said no further testing has been done for coliform bacteria since the 1974 tests.

#### Potable Water

According to a water chemical analysis done by the Bureau of Indian Affairs' Soil, Water and Materials Testing Laboratory in Gallup, New Mexico (Appendix G), the water samples from Duck Lake were within the parameters of the public health primary standards. Since the infiltration galleries will, in many cases, indirectly take water from the lake, the water will meet state quality standards.

Slime growths in infiltration galleries are common at existing Duck Lake residences. Some people tolerate this, others use mechanical or charcoal filters for drinking water. If the water is properly chlorinated it will be potable. The existing water systems were constructed before subdivision review laws were enacted.

#### People & Livestock

No specific studies have been done concerning the number of persons who use Duck Lake for recreational purposes, however, state and federal sources estimate public visits to be around 25,000 fisherman-days/year.

There are about 100 residences in the drainage, with the majority of homes along the shoreline. Figured at three persons per residence, the population in the private sector is around 300 persons/day. But, only two residences are used year-round with another 25 used eight months a year.

Thus, the permanent/semi-permanent population is around + 20,000 people-days/year. If the remaining residences total about + 20,000 the total for the private sector equals around + 40,000 people-days/year.

By adding the total number of fisherman-days per year to the number of residential dwellers, the total is around + 65,000 people-days/year. This converts to about 500-550 people in the basin for four months of the year.

Assuming the Golden Glacier Parklands subdivision is fully developed in 20 years, and no other subdivisions occur along the shoreline, the 63 lot development will increase the semi-permanent population to about + 37,199 people-days/year and the total number of residential dwellers to + 57,199.

According to Clay Stephens, rangeland manager for the tribal authorities, the number of cattle and horses in the drainage basin is around + 550, with the animals being in the area about 50 percent of the year. Thus, the livestock days per year is about + 90,000.

During his testimony at the county's public hearing for the development, Marquardt said the corporation owns 47 percent of the land in the basin (according to the developers, Duck Lake Basin contains a total of 4,250 acres: Duck Lake, 1,430 acres and dry land, 2,820. The corporation owns 1,315 acres and, using Soil Conservation Service figures, Marquardt determined the carrying capacity on the corporation's land was 97 head of cattle.)

If the proposed development is approved the corporation will build fences to prevent livestock from reaching the lake. Eliminating the livestock's access to the lake could be beneficial.

#### Proposed Water System

Each of the lots will use shoreline or near shoreline infiltratin galleries. Thus, 63 lots means 63 galleries.

The impact associated with this proliferation of individual systems could be lessened by having lot owners agree to install multi-family systems (less than 25 people or less than 10 individual residential hookups), but this would be up to the lot owners and not to any prearranged design on the part of the developer.

Ultimately it is possible a community water system or systems will be created by means of a rural sewage improvement district (RSID). Such an eventuality would require a high level of utilization and investment in the subdivision by individual owners, but in terms of practicality it is the only way an adequate and safe water supply could be supplied to the entire project area if the development eventually encompasses the entire 2,080 acres.

Each infiltratin gallery will consist of a sealed wet well which may or may not be connected by a porous rock filled trench to the shoreline (which, according to the project engineer, is the low water mark.). Concrete pipe with sealed joints, such as culvert sections or manhole sections, will confine the well space and receive the clean water recharge from either the manmade trench or an available water strata. This clear well or wet well is sealed on top by a concrete slab. An access manhole is cast into the seal slab and presumably a wellhouse will be constructed over the slab. A five gallon per minute (gpm) pump will lift water into the system while at the same time the pump activity will start the chemical feed device which feeds (probably) hypochlorite into the system. Downstream from the chlorinator is a pressure tank (30 gallons or similar acceptable size) which provides a pressurized system and a retention tank provides contact time. Since

this system needs 20 minutes minimum retention time and the rate is five gpm, the retention tank should have a minimum holding capacity of 100 gallons (5 x 20). This is what is shown in the corporation's plan (refer to Figure #1).

To insure the plans for each infiltration gallery water system meet state standards and the system is properly installed, the DHES will require the developer to retain a professional engineer (P.E.) to notify the department, in writing, that the plans conform to lot layout, meet state standards and the system has been properly installed.

#### Shoreline Considerations

A. It's possible infiltration galleries might dewater some shoreline seepage areas. At the same time, some of the seeps are going to make it more difficult to install infiltration galleries. Over a period of time it's probable the operation of 63 infiltration galleries will change the character of the shoreline, but it's difficult to accurately predict the secondary impacts of such a situation on terrestrial and aquatic biology. A community water system would lessen the impact and greatly reduce the possibility of adverse impacts on water quality, flora and fauna in the proposed development.

B. There are several instances where shoreline modification might occur. These include placement of water systems, building warfs and the construction of the road over a small lake inlet.

Paragraph six of the proposed development's covenants and restrictions initially read, "...No structure, with the exception of warfage, as herein provided, may be constructed within 50 feet of the high water mark of Duck Lake." When asked about this in relation to the placement of domestic water systems, the developers responded by "clarifying" the paragraph to state that structures required for water systems can be constructed near the lake.

Paragraph 15 of the covenants says, "Shoreline Protection - There shall be no alteration of the shoreline of Duck Lake in the form of landfill or the deposit of any other materials in said lake, with the exception of the exercise of riparian rights in the form of warfage as approved by the Homeowners' Association in writing."

According to Marquardt, the project engineer:

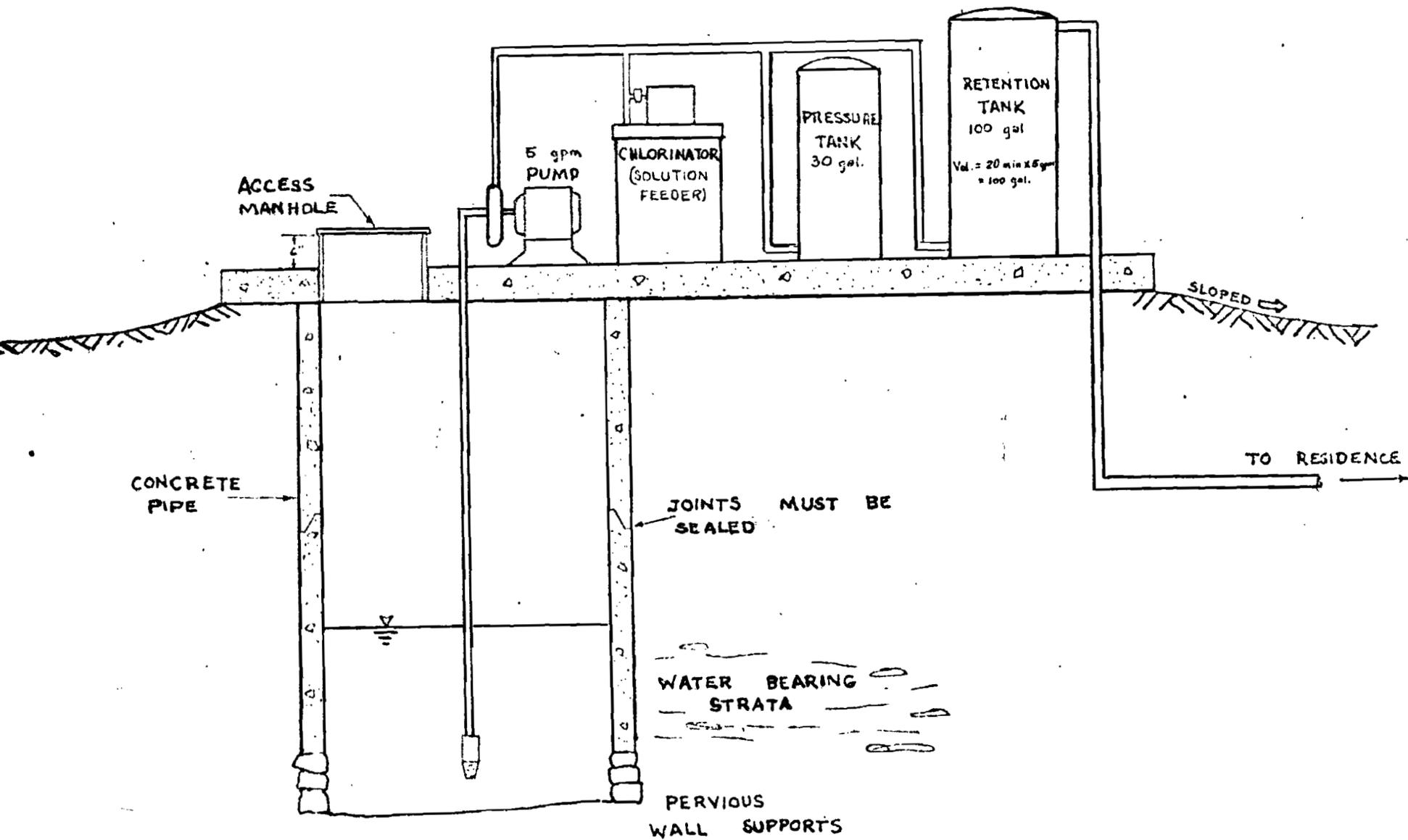
...The construction of an infiltration gallery would not alter or change the shoreline. The installation of a gravel conduit from the lake would have to be done in such a manner that the shoreline was not moved or its configuration changed, and so that material was not deposited in the lake itself, meaning in the water of the lake...

There's a question of whether the construction of the road over an inlet in the western tract of the subdivision is an alteration of the shoreline. Plans call for a 36" culvert to be placed in the inlet between lots 11 and 12. Dirt will be graded over the culvert to form the roadbed.

Marquardt discussed the proposal by saying:

...The fill across the inlet is not covered by the Stream Preservation Act since this is not a perennially flowing stream. Since Glacier County does not have Lakeshore Protection Regulations, there is no local control over this. The owners feel that the Federal Rivers and Harbors Act does not apply in this case and they do not wish to subject themselves voluntarily to its jurisdiction....

FIGURE #1



TYPICAL INFILTRATION GALLERY

The DHES believes that a fill across the inlet between lots 11 and 12 on the preliminary plat is unnecessary and unacceptable. A fill would alter the shoreline of the lake, create a potential water pollution problem during construction and over the long-term if improperly constructed restrict the exchange of water between the inlet and the main body of the lake. The DHES will accept a road bridge that will not alter the shoreline below the high water mark or as an alternative, relocating the road to circumnavigate the inlet.

Geology and Soil Quality, Stability and Moisture:

Geology:

The developer did not submit information concerning the subsurface geology of the Duck Lake area. A review of professional publications revealed that information concerning the subsurface geology of the land near the lake is general and in many cases considered inadequate for mapping purposes (Appendix H).

Geologists have determined the predominant bedrock structure for the area is folded and faulted Cretaceous, undifferentiated strata (such as shale or argillite). It is a highly disturbed belt, marked by compression and intensive failure, and is the "block" of rock which the mountains in Glacier National Park are thrown up against.

According to the Montana Bureau of Mines and Geology's Geological Map of Montana, the bedrock structure for the north, west and east sides of Duck Lake are Cretaceous, undifferentiated. The south side of the lake consists of glacial drift.

William Alden's United States Geological Survey Professional Paper entitled Physiography and Glacial Geology of Eastern Montana and Adjacent Areas (1932) discusses the effects of the St. Mary Glacier on the surrounding landscape:

...the St. Mary Valley was occupied at the Wisconsin stage by a great glacier 36 miles or more in length, which was joined by branch glaciers heading in the valleys of Swiftcurrent, Boulder, Red Eagle and Divide Creeks. So thick was the ice in the main glacier that it crowded up onto the west slope of St. Mary Ridge to a height of 1,200 feet above the level of Lower St. Mary Lake and formed there a small but well-defined lateral moraine. This moraine curves northeastward, forming a loop and showing that the ice crowded through the broad sag in which lie Duck and Goose Lakes (Goose Lake is a mile north of Duck Lake) to the head branches of the North Fork of the Milk River. Duck Lake is 500 feet higher than Lower St. Mary Lake, and the glacial lobe thrust into this sag was about 6 miles long and 6 miles wide when it left the main glacier. After recurving about the west end of the Hudson Bay divide, a mile north of Goose Lake, the moraine swings sharply to the east again and gradually descends the north slope of the divide, thus showing that ice from the St. Mary Glacier also crowded through the gap now traversed by the St. Mary Irrigation Canal and containing Spider Lake and extended at least 6 miles down the Willow Creek Valley. Extending thence northwestward to the St. Mary River is the moraine of the Keewatin ice sheet. In the St. Mary Valley northwest of Goose Lake, above the United States Bureau of Reclamation bridge and siphon at Fletcher, the ice was fully 1,000 feet thick....

Soils:

The SCS has mapped the soil types for the land around Duck Lake. The predominate soil complexes are Babb-Hanson and Adel-Babb (Appendix I).

Babb-Hanson soils generally are found in well-drained rangeland areas, while Adel-Babb soils can range from good to poor drainage and are found in forest-grassland transitional zones.

The soil complex for the western block of shoreline lots is Adel-Babb, while the complex for the northern and southeastern blocks is Babb-Hanson.

A number of 10-foot soil test holes were dug throughout the development, with 25 of the holes dug on parcels of land now being reviewed.

The shoreline in the western parcel is in a low swale area which supports stands of aspen, aquatic plants near the water and lush stands of grasses.

After an on-site inspection and review of the test information, Will Aikin, Kalispell office manager for the Environmental Sciences Division, DHES, said the Adel-Babb soils along the lakeshore generally exhibited heavy vegetative stands, which indicated groundwater was near the surface.

Originally the developers proposed developing the entire western shoreline-- 45 lots--but since a number of the test holes filled with water in minutes, the developers eliminated 26 of the proposed lots.

The soil complex for the shoreline lots in the northern and southeastern blocks are Babb-Hanson soils. Generally, the front of the lots supports vegetation such as aquatic plants, aspen, willows, etc., but the ground rises to provide deep, well-drained soils near the back. Normally these are low risk soil-water areas. Even up close to the lake these soils showed little or no water in the bottom of the test holes.

Three years ago Raymond Parker, a member of the SCS, who has since retired, was asked to evaluate the suitability of placing septic tank drainfields in the land around Duck Lake. In his report, Parker said the only significant limiting soil factor was the degree of slopes for some of the lots. His report was not specific and it said, "...If installations are designed to avoid the steep slopes there would be few limitations as long as the installations are far enough away to keep from contaminating Duck Lake itself."

The 63 lots all contain varying amounts of vegetation. Some have thickets of threes, shrubs and forbs, while others are mostly grass covered. The plans indicate where the drainfields are to be placed, thus the fields vary from lot to lot. If the drainfields are placed within the designated areas they will meet the state's required spatial standards.

Eight lots did vary from the general soil/disposal siting description. These lots (Lots 11, 20, 58, 59, 60, 61, 62 and 63 of the preliminary plat) have steep grades which prevent the installation of the standard septic tank system. The DHES will not lift the sanitary restrictions on the eight lots because they do not meet the minimum requirements for state standards, and therefore these lots cannot be included as part of the final plat.

The review and approval of sanitary disposal systems for the development will not be done by the local county sanitarian. Normally county sanitarians review and approve the placement of on-site disposal systems. In the case of Golden Glacier Parklands, the county commission for Glacier County is not eager to send the sanitarian-- who serves both Toole and Glacier Counties--onto the reservation due to possible problems concerning the question of jurisdiction and the developer will not accept assistance or control from representatives of the reservation's Public Health Service, Aikin said.

In lieu of county or tribal review, the developer has agreed that a statement will be placed in both the covenants and the certificate of plat approval that guarantees the plans and specifications for each individual system will be drawn up by a licensed P.E.

To insure the plans for each sewage disposal system meet state standards and the system is properly installed, the DHES will require the developer to retain a P.E. to notify the department, in writing, that the plans meet state standards and the system has been properly installed.

Percolation tests on each lot ranged from one to 56 minutes per inch; however, the majority in the Adel-Babb soils were from 20-30 minutes and in the Babb-Hanson soils the average was 20 minutes per inch.

DHES approval for effluent application rates will be based on a system operating at "no more than a gallon per square foot per day." This will likely result in longer than average drainfields--150 to 180 square feet per bedroom (excluding garbage grinders and automatic washing machines). Construction will be limited to standard absorption trenches only, seepage pits and deep trenches will be forbidden.

If properly designed, installed and operated:

1. Biological contamination of Duck Lake water by the individual sewage disposal systems will not occur.

2. The soil structure indicates that nutrients would be hindered from movement into the lake (the free calcium and alkaline pH in the soil suggests that much of the phosphates will be bound up chemically, however much of the nitrates will, in time, probably migrate into the lake).

However, the location of sewage systems in this closed drainage environment will eventually contribute to the nitrogen enrichment of Duck Lake by virtue of the nutrient entrapment in the local hydrological system. In terms of meeting state standards for sewage disposal, the proposed plan meets those standards and will not violate water quality standards.

#### Vegetation Cover, Quantity and Quality:

The vegetation in the area proposed for development falls into two well-defined categories. The first is the shoreline type, characterized by high groundwater, with aspen, alder and a thick understory of forbs, shrubs and grasses. The second category is the dryland native grasses.

Although some lots are comprised entirely of dryland grasses, others are covered with wetland deciduous plants. Most of the lots typically have the wetland vegetation near the shoreline and the dryland in back.

Impacts will result from site preparation for roads, buildings, drainfields and infiltration galleries, and from the usual human wear and tear on an area not previously inhabited. It's difficult to quantify these impacts since the construction will be influenced by the design of the sewage systems, which will vary from lot to lot, and how rapidly the subdivision develops.

In terms of revegetation, dryland plants and grasses will take longer to return to a natural state than shoreline vegetation due to the availability of water. However, wetland vegetation might be effected by the construction and use of infiltration galleries. It's possible such water systems placed close to the shore or that trenches from the shore to galleries may, through absorption, dewater areas near the structures. If these systems were scattered throughout the 63 lots the possibility of causing a major impact would not be great, but since it is proposed that each lot will have an individual system, it's possible areas with heavy deciduous growth near the shoreline will be dewatered.

Another possible impact could occur from the change in land use. It's possible homeowners will prefer lawn grasses to native varieties, thus changing vegetation from native to turf grasses.

#### Aesthetics:

The motive to subdivide the shoreline property accrues in part from the scenic value of the site. Those now owning homes or cabins along the southwest portion of the shoreline can appreciate the beauty of the area, situated as it is at the junction of the rugged Rocky Mountains and the Great Plains.

To the west there is a clear view of the Lewis Range and Chief Mountain in Glacier National Park. The clean air, jagged beauty of the mountains and the impressive sweep of the prairie make Duck Lake one of the most scenic spots in the nation.

With the exception of the developed shoreline, most of the area round the lake has not been appreciably altered by man. Much of it is covered with a dense growth of vegetation. However, the thickly vegetated shoreline changes to grass or rangeland as one proceeds away from the lake. In the northwest part of the lake the vegetation remains dense beyond the shoreline, due principally to the low, swampy topography.

In an attempt to deal with the problem of altering the landscape, the developer's restrictive covenants provides for the creation of a homeowner's association. The association is responsible for:

- 1) Creating an architectural control board which will insure that building materials must be natural and blend in with the surrounding environment.
- 2) Insuring utilities (telephone and power lines) are placed underground.
- 3) All cut and fill slopes on private roads will be reseeded.
- 4) Insuring that all structures (except for wharfage and domestic water systems) will be setback 50 feet from Duck Lake.
- 5) Seeing that tree cutting is limited to that necessary for access or building construction

The design of the subdivision includes six private parks to provide additional access to the lake. The marshy shoreline at the east end of the lake has been set aside to preserve the area for nesting waterfowl. Additionally, the road design utilizes a curvilinear alignment to eliminate long, straight stretches which can be monotonous and aesthetically unpleasing.

However, even with the guarantees provided by the covenants, any subdivision of the shoreline property will alter the aesthetic quality of the lake and surrounding environment. An example of that position could be derived from the fact that the covenants say shoreline property will not be altered, but exempt the construction of wharfs and water systems. The fact that both can be built means there will be alterations of the shoreline.

Another change in the present aesthetic state of the area will be the loss of solitude. People, automobiles, boats, etc., will accelerate the change from a quiet, natural area to a more populated area.

#### Air Quality:

Duck Lake lies in a transitional zone between the mountains and the plains. The climate for the plains portion of the Blackfeet Reservation is semi-arid, however, this is subject to variation depending on elevation.

A comparison of average temperatures and moisture between Browning and Babb points out the differences which can occur. Browning is in the plains area, while Babb is just west of the lake. Browning, elevation 4,416 feet, has an average temperature of 40.8° F (degrees Fahrenheit) and an average of 15.5 inches of moisture, while Babb, at 4,500 feet, averages 38.1° F and 19.90 inches of precipitation.

According to information from the U.S. Department of Agriculture, Babb's mean minimum temperatures for January range from 4-8° F, while the mean maximum temperatures for July range from 74-76° F. The mid-summer days are not oppressively hot and the winter extremes are not especially severe since they are seldom accompanied by strong winds, the federal agency said.

May and June are normally the wettest months with an average of two to three inches at Babb. The amount received between March and September averages between 65 and 75 percent of the total rainfall.

The reservation is subject to persistent westernly winds, which are usually more severe during the early spring and may do considerable damage to early seeded crops in dry seasons. At lower elevations, chinooks or warm winds often occur during the winter months and clear the winter grazing lands of snow, according to the Department of Agriculture.

According to the Montana Air Quality Bureau (AQB) said Duck Lake is situated in an area which has some of the best ventilation in the state.

It appears a possible source of air pollution would be dust from the proposed gravel roads. Proper construction and maintenance of the roads will reduce the chance of air quality degradation.

The bureau noted that occasionally dust control becomes a problem after the subdivision becomes developed. Presently the corporation plans for the roads in the subdivision to be private, however, it is possible future homeowners may want to dedicate the roads to the county. If this happens and a dust problem occurs, the

county is faced with the problem of dealing with the situation. One solution is to form a rural Special Improvement District (SID), but this is often difficult to pass.

The AQB recommends the developers, in an effort to avoid future complaints and disputes, consider altering the restrictive covenants to state that if the roads are dedicated to the county the residents would waive their rights to protest a rural SID if one is proposed. Thus, if the waiver of protest is in the covenants the buyers will know in advance what restrictions and protections they have concerning road dust.

#### Unique, Endangered, Fragile or Limited Environmental Resources:

Duck Lake is a unique and fragile resource. Pothole lakes in glaciated regions are common, but few have the size and depth of Duck Lake. Those features give it a quality of distinction.

The lake's fragile nature stems from the fact it is in the upper mesotrophic stages of nutrient enrichment and if the proposed development is not carefully planned and properly constructed, the nutrient level could increase to the point where the lake would become eutrophic.

Nutrient enrichment takes longer to occur in lakes which have inlets and outlets or are very deep. Increasing the rate and flow of water through a lake, which happens in most lakes during the spring, can produce a flushing effect, thus reducing the nutrient concentration. Since Duck Lake is in a closed basin and not subject to this annual flushing action, a relatively minor change in the amount of silt, nutrients, etc. could act as a catalyst to speed up enrichment.

In terms of endangered wildlife, the USFWS said there are four endangered or threatened species in the east slope area of northern Rocky Mountains. The species include: a) northern Rocky Mountain wolf (endangered), b) grizzly bear (threatened), c) black-footed ferret (endangered) and d) Peregrine falcon (endangered).

The federal agency did not identify any of the threatened or endangered species as having been specifically at Duck Lake.

Sightings of grizzly bears and wolves have occurred within a 15 mile arc west of Duck Lake. Glacier National Park is one of the few places in the lower 48 states where grizzlies are still relatively numerous, however, this is not the case with the northern Rocky Mountain wolf. In January a trapper from Babb caught and killed a wolf in the vicinity of Chief Mountain. According to the USFWS, this was the first recent documentation that wolves still frequent the reservation. In the past there had been rumors of wolf sightings, but no confirmation. Apparently the wolf was part of a pack which ranges mostly north of the Canadian-U.S. border. The federal wildlife service said when hunting is poor it is not uncommon for a pack to establish a hunting territory of around 200 square miles. With such a range, Duck Lake would be well within the bounds of hunting packs.

Another limited feature of the lake is the aesthetic qualities of the natural shoreline. Even with restrictive covenants, the area will be permanently altered. The nature of the area will gradually change from a quiet, natural setting to a recreational/second home development.

### Historical and Archaeological Sites:

Duck Lake doesn't appear to be a major historical or archaeological area according to documented information. However, many Blackfeet stories, legends and historical events have not been recorded, thus it would be inaccurate to assume there was no historical importance associated with the area.

James Willard Schultz, a non-Indian and member of the Pikuni Tribe (misnamed Piegan Tribe, one of the three principal tribes which makeup the Blackfeet Nation--commonly referred to in this document as the Blackfeet Tribe), made several references to Duck Lake in his book Signposts of Adventure and in a Montana Historical Society pamphlet entitled, Glorious Glacier:

#### Signposts of Adventure:

"77. Meksokut'siks O'muksikimi. Red Feet's Lake. Duck Lake.  
"Named for the immense numbers of ducks that frequent it.  
The Blackfeet generic name for ducks is 'red feet.'"

#### Glorious Glacier, "Return to the Beloved Mountains":

...I first saw the St. Mary's Lakes in October, 1882, in company with Charles Phemister, James Rutherford, Charles Carter, and Oliver Sanderville, all old plainsmen, good company, and best of hunters. We outfitted for the trip at the Old Agency, on Badger Creek, Blackfeet Reservation, and started northward. There was no trail after leaving the crossing of Little or Milk River, and we struck up country toward the big gap in the mountains, in which we knew the lakes must lie, and that evening camped on the shore of a large prairie lake that was black with ducks. I shot a dozen or more of them as they flew over a long point, and to my surprise and delight found that they were all canvasbacks and redheads, and very fat from feeding upon the wild celery beds of the lake. I named the sheet of water Duck Lake....

In terms of archaeological sites, Dee Taylor, an anthropology professor at the University of Montana, said they do not have any record of important sites in the Duck Lake area, however their "...lack of data may simply reflect the fact that we do not know of any archaeological reconnaissance that has been done or reported around Duck Lake."

Undocumented historical events traditionally were passed from generation to generation by word of mouth. At a point in nearly every culture this was a common way of recalling the past. In many instances, the introduction of writing replaced the importance of verbal history. In some cases both methods were retained. Schultz was an important, if not the most important, modern chronicler of Blackfeet stories and history. However, even a prolific writer like Schultz was not able to hear and record all the stories, legends and events which occurred throughout the centuries.

Unrecorded stories about Duck Lake are still told by members of the tribe. George Kicking Woman, a member of the Blackfeet Tribal Business Council, related one of those stories:

Long ago there was an old man who lived near the shore of Duck Lake in a log house. During the spring some of his relatives came to replenish their supply of fire wood. While gathering and cutting wood they camped near the house and used it as their headquarters. One day the old man was looking across the lake and saw something he had never seen before--a strange blue bird sitting in the middle of the lake. As he was watching the bird, his relatives returned to the camp. Hearing their return he called them to come quickly. They came to where the old man was sitting and he pointed out the strange bird. As he was directing their attention to the bird, it flew into the air, flying straight up, higher and higher. Just as it went out of sight there was a clap of thunder. The old man and his relatives marveled at what happened and agreed the bird was thunder.

#### Demands on Environmental Resources of Land, Water, Air and Energy:

The proposed development will create demands on land, water and energy resources. The permanent alteration of 140 acres of natural landscape to recreational or second home sites will be a major impact. The transformation of land will lead to the secondary impacts of increased demands on water consumption and energy.

Second home developments generally create demands on energy resources because these resources are derived from unrenewable fuels--such as petroleum and coal. In these developments, homeowners rely on varying amounts of electricity, propane gas, heating fuel and gasoline. Presently all of these energy items are available, however, there is growing uncertainty concerning future supplies.

### VI. HUMAN ENVIRONMENT

#### Social and Cultural Uniqueness and Diversity:

Two centuries ago three powerful tribes with common language and cultural bonds controlled vast amounts of land in Montana and Canada. The Southern Piegan (Pikuni) were the direct ancestors of today's Blackfeet Indians. They lived primarily in Montana. To the north were the Blood (Kainah) and the Northern Blackfeet (Siksika) tribes who descendants now live on reservations in Canada. These tribes spoke an Algonkian dialect, intermarried and provided mutual support during times of war.

Because of the remoteness from major transcontinental migration routes, the almost impassable Rocky Mountains to their backs and their reputation as warriors, the Blackfeet were the dominant force in the area for more than a century. Advancing settlers, travelers and traders could not be ignored, however, and after several small ineffective treaty attempts were tried, the Blackfeet were a part of a treaty made in 1851 at Ft. Laramie. The treaty placed the tribe under the jurisdiction and protection of the U.S. Government and recognized their very large land holdings in northern Montana.

After the 1851 treaty, the Piegan Tribe was subject to a series of treaties that slowly reduced its land holdings in exchange for promises of payments and protection from settlers that wanted the land.

In 1855, the government made a treaty with the Blackfeet and several other tribes designating a large portion of the original reservation as common hunting grounds for all of the tribes. Supervision of the tribes was assigned to the War Department to insure government directives were enforced.

Presidential orders and Congressional action in 1873 and 1874 arbitrarily moved the reservation boundaries 200 miles north with no compensation to the tribe.

The present Blackfeet Indian Reservation was established in 1888 when Congress ratified an agreement that removed Blackfeet control of a large land area to the east, including the townsites of Cut Bank and the Sweetgrass Hills. This land was sold for less than the going rate, and a claim for the unpaid balance to fair market value was finally settled in 1972, 84 years later.

The Blackfeet Tribe was subjected to one last land sale which reduced the boundaries to their existing location. In 1896 the tribe was convinced to cede the mountains along the western border of the reservation to the government for use as a national forest. In 1910 the area was designated as Glacier National Park.

In 1907 the government decided to survey the land inside the reservation boundaries and parcel out acreage to each individual Indian. In 1912 land allotments of 320 acres were made to 2,450 Blackfeet. Additional acreage was reserved at Browning and Babb for townsites and the remaining land was to be sold under the Homestead Act to non-Indian settlers further diminishing the landholdings of the Blackfeet Tribe. With the help of the Great Northern's advertising campaign homesteaders did settle much of the present reservation. The checkerboard pattern of land ownership within the reservation boundaries today can be traced to the land allotments and the Homestead Act.

The Blackfeet Reservation is considered a closed reservation. This differs from an open reservation in that open reservations, such as the Flathead Reservation, have officially sanctioned the purchase and development of land by non-Indians.

Since the final division of Indian lands under the Homestead Act the Blackfeet Tribe has been concentrating on maintaining its land base. With the Indian Reorganization Act of 1934 and the restoration of tribal powers in 1935 the Blackfeet have made progress in dealing with the non-Indian society. Today a land acquisition program to regain their land base is an important part of tribal administration. Population estimates for the Blackfeet Tribe in the early 1700's generally exceeded 15,000 persons. Smallpox contracted in 1781 greatly reduced their numbers. There were about 10,000 Blackfeet in 1847. The population was drastically reduced to 2,000 in 1885 by the ravages of disease and war. Since then the tribe increased, reaching 2,450 in 1912, approximately 5,000 in 1930 and 8,900 in 1960. In 1976 the total tribal membership was 10,650.

In 1890 there were approximately 60 non-Indians living on the reservation. The number of non-Indians rose sharply between 1920 and 1930, increasing to a high of 2,820 in 1940. It decreased since to 1,898 in 1976.

The tribal population on the Blackfeet Reservation in 1910 was 2,409. By 1930 it had grown to approximately 3,110 and 1960 to 4,530. Today tribal members are scattered throughout the world. The largest single concentration is on the Blackfeet Reservation which in 1976 had 6,302 members.

Today's Blackfeet society appears to be a unique combination of two ways of life, one emphasizing the traditional aspects of the old days (such as language, legends, religion, etc.), while the other includes aspects of the non-Indian society (federal development grants, health services, individual assistance programs, etc.).

A primary goal of today's tribal leaders is to insure that the Blackfeet Tribe retains its traditional identity, and is not assimilated into the mainstream of American society. This goal was emphasized in the introduction to the Blackfeet Comprehensive Plan - 1972:

The Blackfeet people have undergone a long history of struggle to maintain a separate identity against a dominant and numerically larger society. The Reservation is the end result, or perhaps the last stand, from which we can retreat no farther.

As is true of other Indian Reservations, we have been set apart and isolated from the mainstream of American life. This isolation has also been an advantage in that it has preserved to some extent our land base, without which we could not retain our Indian heritage.

The desire of our people is to provide a better standard of living and to improve our socio-economic conditions while retaining and consolidating the Blackfeet Indian Reservation.

Thus, reservation tribal members generally do not appear to be anti-development if it will benefit the tribe, but they do object to ventures within the bounds of the reservation which are contrary to the tribal plans and goals, and do not benefit the interests of the tribe.

Of course there are fringe elements in both directions. At one end of the scale are Indians who favor any type of development and at the other extreme are the militant Indians who would prefer to purge the reservation of all non-Indian influence.

Without proper scientific studies it would be difficult to say how influential various elements are when it comes to policy making. However, it appears the tribal council tries to consider all aspects of a situation before making a decision, using the established legal system as a last resort to resolving problems.

Presently about 23 percent of the persons living on the reservation are non-Indians. Undoubtedly there are social and cultural differences, but since most of these people choose to live on the reservation, they accept local lifestyles and customs, avoiding situations which would cause friction.

Non-Indians living adjacent to the reservation possibly have stronger anti-tribal feelings than those living on the reservation. This is not to say that the majority of non-Indians living close to, but off the reservation do not like Indians. However, differences between the tribal and county government over such jurisdictional questions as law enforcement, taxation, fishing rights, etc. have led to strong public statements by both sides.

Another great influence--both economic and social--on reservation life is the summer tourist trade. Thousands of persons from throughout the United States and Canada annually visit Glacier National Park, which forms the western boundary of the reservation. Tourists travel through the reservation going to and from the park, and most are relatively affluent people who spend hundreds of dollars to enjoy the natural splendors of the park. Additionally, a small number of persons own summer cabins in the reservation.

The majority of these summer tourists are conscious of the fact they are visitors and abide by tribal rules and regulations. In terms of impacts, it appears the tourists have more of an economic than social impact on the Indians, while the introduction to Blackfeet life and history serves as a social and cultural experience for the visitors.

According to the long-range comprehensive plan, the tribe is interested in expanding its service to traveling tourists. The tribal council's goal to cultivate and increase its land base within the reservation is contrary to attempts by Indians and non-Indians who wish to create developments which will not benefit the tribe. Thus, even though the Blackfeet Tribe does not own the proposed Golden Glacier Parkland land it is philosophically against the development.

No one knows what the full impact of the proposed development would be, it could range from extremely serious to none. The fact that the tribe has publicly stated it is against the subdivision tends to indicate the social impact could be serious.

It is also difficult to determine precisely what type of person would purchase a lot in Golden Glacier Parklands, but by considering what it would cost to: a) buy a lot, b) have a licensed engineer design a sewage system, c) put in sewage and water systems, d) build a cabin and e) pay for the labor, materials and the installation of utilities, it seems reasonable to assume the prospective owner would be relatively wealthy.

It is true there are persons who own recreational homes along the southwest and west shores of Duck Lake, however, most of these parcels of land were developed before the tribe formulated its long-range plans for the area and the state had not enacted its present sanitation laws. In essence, the existing lot owners have "grandfather" rights to their property.

If the proposed subdivision becomes a reality it will mean that for part of the year there will be a rather large, wealthy, private recreational community on the Blackfeet Reservation. Unless there is a radical shift in sentiments among reservation residents, the majority of persons--both Indian and non-Indian--living in the area will not welcome the arrival of these summer homeowners.

Another group of persons who will probably not welcome the new lot owners is the present recreational homeowners. Members of this group have indicated--through petitions, letters and public representation--that they are against further subdivision of Duck Lake property.

#### Local and State Tax Base and Tax Revenues:

If Western Travel and Recreation, Inc. develops its land the taxes on the property will increase appreciably. Presently the land is classified as agricultural, more specifically, grazing land. According to statistics from the Glacier County Treasurer's Office, in 1976 the corporation paid a total of \$565.40 in taxes on 2,186 acres in the Duck Lake area. Additionally, Western Travel also paid two and a half years of back taxes assessed against the property.

Presently, there are three subdivisions on the shores of Duck Lake. Together they total 110 lots. Development varies from suburban-type homes to house trailers,

thus it is difficult to determine an average assessed taxable value for a house and lot. However, a Department of Revenue source said the following hypothetical example would be representative of an average home and lot at Duck Lake.

If the market value of an "A" frame home was \$5,000 and the value of the lot was \$2,000, then the taxes on the property--using the present mill levy--would be \$162.

The case of the hypothetical example shows that one recreational lot would, in theory, produce more than one-fourth of the amount of money now being derived from taxes on 2,186 acres of agricultural land.

It would be impossible to determine future state and local tax revenues for the proposed development of the 63 lots (140 acres). According to the Montana Department of Revenue, during the past four to five years some lakeshore lots on Duck Lake have sold for prices ranging from \$10,000 to \$12,000. But, no one knows what the market values of the lots would be until after the lots are sold. Additionally, it would be impossible to predict future mill levys, thus an estimate of future tax revenues from the proposed subdivision would only be a guess.

#### Access to and Quality of Recreational and Wilderness Activities:

There are few places in the nation which offer more variety in outdoor recreation than the area near Duck Lake.

The most renowned attraction is Glacier National Park. Each year the park attracts persons from throughout the United States and Canada. Outdoor recreation opportunities range from sight-seeing to wilderness hiking and camping.

Within 50 miles of Duck Lake lies vast tracts of federal forest lands, including the Flathead and Lewis and Clark National Forests and the Bob Marshall Wilderness Area. These areas also attract numerous outdoor enthusiasts.

Sportspersons are also attracted to the area. Duck Lake's reputation as a prime rainbow trout fishery is well known to persons who enjoy fishing. Even though it no longer produces the large number of trophy trout it once did, it still attracts many persons.

In addition to Duck Lake, the area offers lake fishing in Lake Sherburne and Upper and Lower St. Mary Lakes, fishing along the St. Mary River and a variety of other fishing opportunities in small lakes and streams in the area.

The Blackfeet Tribe recognizes the economic potential in providing services and facilities to tourists and sportspersons, and has developed a variety of campsites and recreational complexes. These facilities stretch from Duck Lake, south along the national park-reservation boundary to East Glacier.

In terms of impacts to the recreational use of Duck Lake, the proposed development would increase access to the lake for boaters and fishing enthusiasts, however, both would be required to purchase licenses from tribal authorities.

The potential impact of possibly having more persons using the lake for a longer period might have an impact on the present quality of recreation. But this would be difficult to accurately assess since it is not known how fast the development would grow, if all the lots would be sold and if all the land owned by the development

corporation will be developed. However, it seems reasonable to believe the proposed project will effect the current degree of recreational quality.

#### Quantity and Distribution of Community and Personal Income:

Economic development on the reservation is improving the overall personal income of the residents, according to the Blackfeet Comprehensive Plan. The report noted that in 1960 the per capita income was \$915 per person for those living on the reservation. That figure increased to \$1,048 in 1970 (approximately \$2,000 lower than the overall total for the State of Montana); \$1,286 in 1972, and \$1,400 in 1975. The projected per capita income for 1976 will be around \$1,600, according to the Blackfeet Tribe's recently published Overall Economic Development Plan.

The median family income for 1960 was \$2,716; for 1970 it increased to \$3,100. This is about half of the median income for Glacier County. The sampling survey by the Missouri River Basin Investigation Committee in 1970 indicates family income has increased in proportion to cost of living increases. While there has been a gain in income levels for the Blackfeet, there is still a large deficiency in relation to the other segments of society, authors of the Blackfeet Comprehensive Plan noted.

Earlier it was noted that persons living in the proposed development will probably be relatively wealthy, thus during certain times of the year (most likely summer), there will be a wealthy community living in an area which, in terms of per capita and mean income, is not wealthy.

#### Agricultural or Industrial Production:

Western Travel and Recreation's property is leased to a local rancher. According to Reeley, the rancher grazes livestock on the property for about six weeks a year, normally beginning in the middle of July.

The Montana Department of Revenue describes the land as "good pasture land," which is taxed annually at a rate of \$5.42 to \$7.17 an acre.

The corporation said it plans to fence the proposed subdivision, thus preventing livestock access to the lake and shoreline.

#### Human Health:

If water and sewer plans conform to state standards there should be no threat to public health. However, plans for the proper disposal of solid waste and emergency medical service may pose areas of concern.

Garbage and refuse disposal are discussed in the development's restrictive covenants:

11. Garbage and Refuse Disposal - No building site shall be used or maintained as a dumping ground for rubbish, trash, garbage or waste. It is the responsibility of each lot owner to dispose of this own solid waste outside the limits of the subdivision at an approved solid waste disposal site. All solid waste within the subdivision shall be kept in sanitary containers with tight lids. Such containers shall not be visible from any roads. The containers must be fly-proof. Lot owners must maintain neat and sanitary conditions in

the vicinity of refuse containers and must empty containers often enough to prevent nuisances from odor or accumulation. No on-site burning of solid waste will be allowed. If, at any future time, a solid waste disposal district is formed in the area, or if a solid waste disposal service becomes available, lot owners shall join the district and/or utilize the solid waste disposal service.

Originally, Western Travel and Recreation proposed to have the garbage and refuse from the subdivision hauled to the Browning landfill by the Mr. "M" Disposal service.

The company is licensed to transport garbage and refuse in Glacier County and had the hauling contract for the town of Browning. It also was responsible for the maintenance of the landfill.

Mr. "M" Disposal applied to the Solid Waste Management Bureau, DHES, to haul the refuse from the proposed development to the Browning site, but the bureau disapproved the application. Presently the landfill violates a number of state regulations, and approval for dumping garbage and refuse will not be given until the violations are corrected.

Additionally, the city of Browning has decided to discontinue its contract with the disposal company, thus it is unlikely the city council will allow the company to continue to use the site. The company is the only licensed hauler in the county and the nearest licensed landfill is in Cut Bank. There is a licensed site in St. Mary, but the owner is not licensed to haul.

After discussions with members of the Solid Waste Management Bureau, the corporation revised its covenants (as shown above) to provide for a "Pack In-Pack Out" type of solid waste disposal. Individual lot owners will be responsible for complying with the provisions of the covenants. The proposal was approved by the Bureau.

The second area of concern is a plan to provide emergency medical service. The development plan says emergency ambulance service is "generally" available from the National Park Service, but when the subdivision reaches full development an additional ambulance may be required. The report adds:

...It is difficult to determine who will finance this expansion. The National Park Service may find it necessary to purchase another ambulance by that time or the subdivision residences and surrounding population may find that contracting a private service for heavy use periods is the answer. Whatever the solution, it is apparent that some expansion is inevitable....

A representative of the park service said the corporation has never discussed the matter with park administrators and emergency medical service is only provided outside the park on a "good Samaritan" basis. The park service does not have jurisdiction off federal government property, and persons or groups planning subdivisions near Glacier National Park should not depend on using government vehicles for ambulance service, he said.

The government official added that another reason for not extending such a service outside the bounds of the park is that a mishap enroute to the hospital could result in a law suit against the park service.

The limited emergency medical service provided by the park service in the Hudson Bay District of the park consists of four station wagon automobiles which are used mainly for law enforcement, but can serve as ambulances. One of these vehicles is stationed at Many Glacier during the summer. The park service has an agreement with the Canadian government to transport emergency medical cases across the border to Cardston, Alta., which is the nearest complete service hospital for people in the Many Glacier-Babb area. However, in the last few years this service has been requested more frequently by persons visiting the park and is diverting time from the use of the vehicles for law enforcement purposes. In an effort to remedy this situation, the park service has been trying to get park concessionaires to provide some form of emergency medical service.

#### Transportation Networks and Traffic Flows:

According to the developer's engineer, Dean Marquardt, no new public roads will be constructed. Existing unimproved private roads will be upgraded and new private roads will be constructed. All lots will be served by interior rather than arterial roads.

The construction design for the roads indicates there will be a 60 foot right-of-way with two 12 foot driving lanes bordered by four foot shoulders. The driving lanes will be graveled to a depth of six inches. All cut and fill slopes will be seeded. Surface water drainage will be channeled into sedimentation basins (two cubic yards in size) situated in road ditches at two locations in the western block of lots. In one area the road crosses an intermittent stream and in the other it crosses an inlet to the lake. Both call for the placement of 24 inch culverts.

Due to possible negative impacts to water quality, erosion control should be broken into two phases: construction activities and the ultimate completed project.

During construction care must be exercised to keep all activities out of streams and above the high water elevation of the lake. No natural drainages should be blocked and temporary ditch blocks, settling bases, etc., may have to be constructed to control sedimentation and erosion as the work progresses. This can only be determined by construction planning and scheduling such as restricting construction to nonrainy seasons and definitely not during spring runoff.

The final design of roads should take into consideration the following items:

1. Ditches should be flat bottom rather than Vee bottomed to reduce velocities and erosion of the ditches.
2. All road cut or fill slopes should be no steeper than 3:1 if possible to facilitate vegetative cover. 2:1 slopes should be a maximum and allowed only where flatter slopes cannot be obtained.
3. The adequacy of the proposed settling basins cannot be determined without data on quantities of runoff and an analyses of the amount of sediment being carried.

It would also seem that alternatives such as a series of smaller basins constructed in the ditches or a dry well to percolate all the runoff into the ground should be considered. With only the one basin a little lack of maintenance could negate all the plans to prevent siltation. Again the feasibility of any of these plans requires more information.

4. The crossing of the small arm of the lake should be by a bridge of a design that will not disturb the natural banks below the high water elevation, or the road could be realigned to cross the drainage above the arm.

The corporation will pay for the construction of new roads and improvement of existing roads, Marquardt said. Year-round access to all lots will be provided if the homeowners association decided to maintain the roads. Some of the existing unimproved roads will be realigned and closed where they do not provide access to a lot.

The corporation's engineer said:

...The daily traffic generated by the subdivision is difficult to estimate because of the nature of the land use. The number of trips per day made by the residents of this recreational subdivision will be quite variable. However, upon full development (all 252 lots) improvements will be necessary on the existing county access road. Widening and resurfacing appear to be the most obvious changes. The cost of these improvements must be determined by the Glacier County Road Department....

Prior to the county's public hearing on the proposed subdivision (May 5, 1976), the Montana Department of Highways submitted the following comment concerning possible impacts on transportation networks:

...We have received the plat for the above subdivision, and find that it does not abut roadways under the jurisdiction of the Department of Highways. Therefore, we have no official comment.

However, we do note that the additional traffic would place an added burden for the ultimate improvement of Route 464, as part of the secondary roads obligation for Glacier County.

We also might comment that the individual approaches to Route 464 from the proposed subdivision should be well designed for slight distance, especially to the block isolated by private lands to the north. Perhaps the developer could secure some type of an easement across those private lands....

Also prior to the 1975 hearing, the Department of Community Affairs made the following suggestions:

...The developer should present the commissioners with a copy of the easements which will secure road access across the private lands mentioned on page 4 of the assessment. The roads in the proposed subdivision and those on the private land that are going to be used by the future lot owners should be installed according to the design specifications required by Glacier County before any lots are sold or some form of guarantee should be provided so that roads will be installed within a reasonable time of final plat approval. The county road department should be consulted regarding appropriate requirements for road width and road surfacing. The commissioners will also want to consider the improvements that will be necessary for the existing county access road to insure that Glacier County taxpayers will not end up subsidizing these costs....

The three proposed areas of development are separated by two parcels of privately owned land. One is owned by the University of Minnesota, and the other by 17 landowners.

Western Travel and Recreation has obtained a cross easement with the university, however the institution has expressed an interest in selling the property. One of the organizations which is interested in buying the land is the Blackfeet Tribe, but according to a university official, no purchase agreement has been signed.

The second parcel of land, known as the Susan Houseman parcel, is Indian trust land. Sixteen of the 17 owners are trust owners and the other owns a portion of fee patent land.

Attorney Datsopoulos recognized the importance of access in the introduction to his written opinions concerning the questions of access and water (Sept. 10, 1976).

"...The first problem is whether access exists to all proposed lots within the area: of course, it would be futile to proceed with this project without free access....," he wrote.

Part of his discussion referred specifically to the Houseman parcel:

...Western Travel has been actively seeking the permission of the Bureau of Indian Affairs, U.S. Department of the Interior, to obtain an easement across the trust land known as the Susan Houseman Parcel. Since there are 15 (sic) fractional 'owners' of this property who must be contacted, some of whom are deceased and others living out of state, and also since application must be formally made to the B.I.A. (See 25 C.F.R. 161.5), the process of approval will be a slow one. At the present time a substantial percentage of the fractional owners have given their consent to the easement. The Regulations provide that:

(c) The Secretary (of the Interior or his authorized representatives) may . . . grant rights-of-way over and across individually-owned land (that held in trust by the U.S., 25 C.F.R. 161.1(b)) without the consent of the individual Indian owners when . . . (2) the land is owned by more than one person, and the owners or owner of a majority of the interests therein consent to the grant . . . (4) the heirs or devisees of a deceased owner of the land or an interest therein have not been determined, and the Secretary finds that the grant will cause no substantial injury to the land or any owner thereof . . . (this latter is relevant because over one-fourth of the fractional shares are undetermined due to probate problems.)

Progress has been made in procuring consent and a majority (525/1050ths) has been or will soon be obtained. Further, since private roads through the subdivision provide the only access to the Houseman trust lands, and since Western Travel has been agreeing to trade access rights in addition to reimbursing the fractional owners, it is in the best interest of all parties and the B.I.A. that rights-of-way exchanges be made. The road proposed is professionally designed and should cause no injury to the land or its owners. For these reasons, B.I.A. approval should not be an obstacle to further progress....

The corporation tried to obtain an easement across the Houseman land (Dec. 9, 1975). The request was turned down by the Blackfeet Tribe (March 22, 1976), as was the appeal to the area director of the Bureau of Indian Affairs (BIA) in Billings. However, the bureau's objection was based on procedure. Myron Saltmarsh, an attorney for the BIA, said he wrote a letter to Ronald McDonald, of Datsopoulos & McDonald, June 9, 1976 stating that:

a) The appeal was premature because the corporation had not followed the proper procedure for submitting an application.

b) The corporation should obtain an easement application from the agent at the Blackfeet Reservation, then contact all 17 owners and ask if a majority would agree to the proposed easement.

c) The BIA needed more scientific information before it would determine if a development of the proposed size of Golden Glacier Parklands would seriously alter the present condition of Duck Lake.

If the corporation is able to get a majority of the landowners to sign the proposed easement it will be submitted to tribal authorities, and if they refuse to grant the easement, the matter can be appealed to the BIA's area director, Saltmarsh said.

The BIA attorney noted that he had not heard from the corporation or its attorneys since the June 9 letter.

In light of the preceding discussion, the DHES will recommend that the county commissioners of Glacier County reconsider their approval of lots 35-63 in the preliminary plat because access to these lots cannot be legally guaranteed. It appears one of the prerequisites for approval of a subdivision under the Subdivision and Platting Act is that a purchaser must be guaranteed access to a lot purchased. Based on the information submitted to the department, it appears the subdivider cannot give legal assurance to purchasers of the lots in question that access can be provided. Attached as Appendix J is a letter addressed to the chairman of the Glacier County Commissioners requesting that the County Commissioners reconsider their approval of the lots in question because of the access issue.

The access question should be resolved. If it is not, then, in the DHES' opinion, the local governing body should not allow the inclusion of lots 35-63 on the final plat.

#### Quantity and Distribution of Employment:

There would be short term employment generated by the development. After the construction of the roads and fencing the property, building would depend on how quickly the lots sold, the financial status of the lot owners and the ability of the owner to comply with DHES standards.

Possibly persons living on the reservation would be available to work on construction projects, but if not, laborers would have to be brought in from off the reservation.

#### Distribution and Density of Population and Housing:

As previously mentioned, there are about 100 persons living in the Duck Lake drainage, with the majority of residences situated along the shoreline. It has

been estimated there are around 300 persons per day in the private sector during the summer months, with only two homes used year-round and another 25 used eight months a year. Due to the recreational nature of the area, the private sector is supplemented by campers, fishing enthusiasts and boaters during the summer.

The addition of 63 residences could add around 200 more persons (assuming three persons per residence) to the private sector, and with visits from friends and relatives, the recreational population would likely increase.

It is difficult to determine how extensively the tribe's recreational area has been used in the past because the tribal recreational/fishing permits were not broken down on an area basis. However, a new accounting system has been adopted which lists the number of permits issued by area. The system began in October 1976 and according to tribal authorities the permits issued for October-November totaled 2,412.

In terms of housing, the development will be primarily second home or recreational housing. According to the developer's environmental assessment:

...The total number of dwelling units anticipated for the subdivision, assuming every lot will be built upon, is 258 (sic) (This was prior to the revision of the development plan.). It is doubtful that this number will be reached because of the recreational nature of the subdivision....

The restrictive covenants for Golden Glacier Parklands describes the type of housing which will be allowed in the proposed development. Generally, housing units will be:

...Used only for single family residences. Any exceptions must be approved by the homeowners association.

...Constructed on a site approved by the association. Once construction is started, it must be substantially completed in 12 months.

...Permanent structures, however according to Datsopoulos, persons may, on a temporary basis (not more than 90 days, park a camper or recreational trailer on the lot. This does not mean mobile homes will be permitted, he added.

It should be noted that although the covenants appear to strictly control design and construction of homes, the homeowners association is given the authority to grant exceptions to most of the requirements.

Demands for Government Services:

Demands for government services are centered in three areas: schools, law enforcement and fire protection.

According to Marquardt's Environmental Assessment:

...The town of Babb provides educational facilities for grades 1 thru 8. High school students travel by school bus to Browning.

The recreational nature of this subdivision will result in few, if any, school age children. It is difficult to imagine any year-round residents living at Duck Lake because of the winter weather and lack of employment opportunities in the area. It is anticipated that lots will be purchased because of the excellent fishing at Duck Lake and the proximity to Glacier National Park. Lots being purchased for year-round residence seems very unlikely, especially for a family with school age children. Therefore it will be assumed that the number of school age children generated by the subdivision will be negligible, i.e. less than 10 in the next 20 years.

Discussion with the Clerk of School District No. 9 indicated that existing facilities are at capacity and additional students would be cause for expansion. The school bus route was expanded this past year to two buses so that immediate additional expansion does not seem necessary....

It seems reasonable that a recreational development which attracts persons on a seasonal basis should not pose any serious problems for local schools.

Law enforcement jurisdiction on the Blackfeet Reservation remains a question. The county says state law gives it control over all land in the county, including the reservation. However, when an Indian is arrested on the reservation by county officials, the suspect is turned over to tribal police.

Tribal authorities claim the sheriff's office does not have jurisdiction on the reservation, but when tribal law officers arrest a non-Indian, the person is turned over to county authorities.

The jurisdiction question remains unresolved and will probably have to be settled in court. Until then, the law enforcement agencies will probably continue their present form of cooperation.

Currently, the county has a deputy stationed at Babb, but Sheriff Jean Gertzen felt part-time help may be needed in the future.

Tribal authorities have a law officer stationed at Babb and three game wardens in the Duck Lake area. Additionally a part-time game warden is hired during the summer. A tribal law enforcement official felt the game warden staff could handle an increase in recreationalists.

According to Marquardt, fire protection will be provided by a volunteer fire department in St. Mary. However, the volunteer unit has been unoperational for about two years.

Harvey Thronson, Babb, said a number of problems arose after the fire department was organized. There was no place to keep the truck in Babb; it was difficult to keep running in the winter, and eventually the truck broke down, he said.

It is now being stored in St. Mary and the telephone number for emergency fire calls in the St. Mary/Babb area is a National Park Service number.

Park service officials said providing fire protection for structural fires off federal government property is similar to emergency medical service, it is provided only on a "good neighbor" basis. Additionally, persons planning developments on private property near Glacier National Park should not rely on the federal government for fire protection, the officials said.

Industrial and Commercial Activity:

It is possible, but unlikely that the 63-lot subdivision would prompt industrial development in the Duck Lake area. It could encourage more commercial growth in Babb or St. Mary, but both have businesses which serve seasonal visitors and it's hard to say if the proposed development would be the impetus needed to open new establishments.

Demands for Energy:

Representatives of Glacier Electric Coop, Inc. and Continental Telephone Co. of the West said they could service the proposed subdivision.

The telephone company presently doesn't have lines to Duck Lake, but past problems concerning line right-of-ways have been resolved, opening the way for construction.

According to the corporation's development plan, utilities will be placed underground. Individual lot owners, not Western Travel & Recreation, Inc., will pay for the installation of utilities, thus the total use of electrical and telephone services will depend on how many persons wish to have such services. Even if all 63 lots have electrical and telephone services the total demand should not prove to be a serious drain on the utilities, particularly since residences will be mainly used on a seasonal basis.

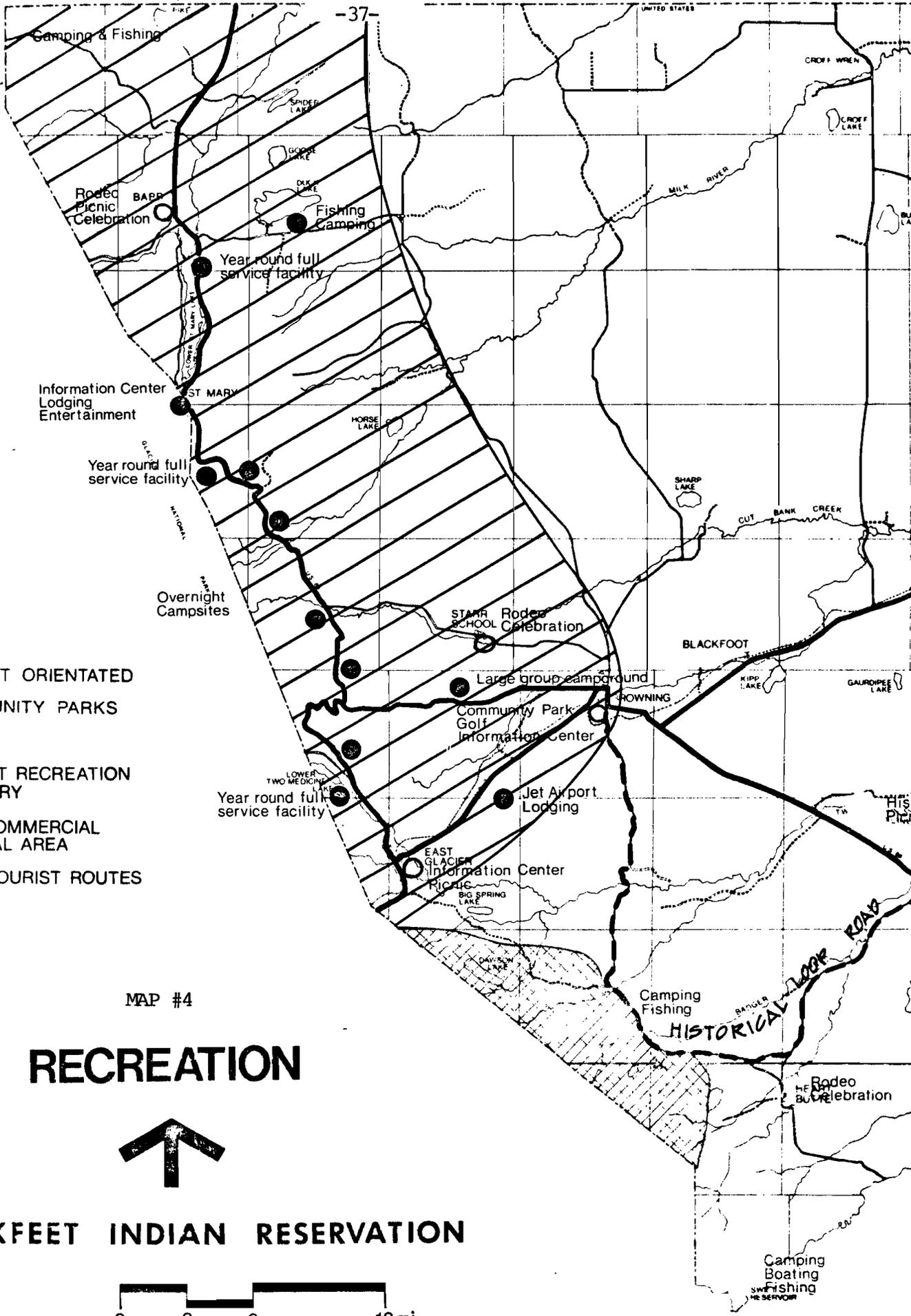
Locally Adopted Environmental Plans and Goals:

Law enforcement isn't the only jurisdictional difference between the Blackfeet Tribe and Glacier County government, another area is in planning.

The Blackfeet Tribal Business Council has approved a comprehensive plan for the entire reservation, which includes both tribal and non-tribal land. The long range plan was prepared by the Tribal Planning Staff and approved by the Blackfeet Planning Commission and the council. There is no county comprehensive plan, thus the tribe's plan is the only professionally prepared plan for the reservation.

In addition to the comprehensive plan, the tribal business council has issued an Overall Economic Development Plan. The economic plan, released last June, coincides with the comprehensive plan and outlines how the tribe proposes to implement various parts of the comprehensive plan.

An important goal in both plans is to properly plan and manage tribal recreational areas which will appeal to tourists and sportspersons visiting Glacier National Park. The planning area is bounded on the west by the park boundary; north by the U.S.-Canadian border; east by the north-south part of Secondary Highway FAS 464, and south by an imaginary line from Browning to East Glacier (See attached Map #4). Improvements and expansion of the tribe's Duck Lake recreational area has been given a high priority and is an important part of the total development program.



**LEGEND**

- TOURIST ORIENTATED
- COMMUNITY PARKS
-  TOURIST RECREATION INDUSTRY
-  NON-COMMERCIAL NATURAL AREA
- MAIN TOURIST ROUTES

MAP #4

**RECREATION**



**BLACKFEET INDIAN RESERVATION**



The only development called for at Duck Lake in the comprehensive plan is the upgrading of the tribal campground on the south shore of the lake (See attached Map #5). Shoreline which has not been developed is to remain in its natural state.

According to the economic development plan the campground is to be primarily a sport fisheries camp with facilities for overflow camping for Glacier Park visitors. The plan notes that important aspects of the improvement program are to insure that sewer and solid waste facilities are properly constructed.

The concern of sanitary facilities possibly posing adverse impacts on Duck Lake were reiterated by the Economic Development Administration when it asked the tribal council to write separate federal grant applications for tourists facilities at Duck Lake and Lower Two Medicine Lake (Nov. 26, 1976).

The proposed Golden Glacier Parkland subdivision would be contrary to the intent of the comprehensive plan, placing development in an area designated to remain undeveloped.

The development corporation and the county claim that since the proposed subdivision is privately owned land, it is subject to county, not tribal, planning authority. Thus the question of jurisdiction is again raised, and again, will have to be resolved by the county and the tribe or in court.

#### VII. PRIMARY, SECONDARY AND CUMULATIVE IMPACTS

The primary impacts of the proposed subdivision include the possible degradation of Duck Lake and the shoreline area, a permanent change in the land use pattern for the area and an apparent lack of community support for the project.

Information gathered by the department indicates the lake and adjacent shoreline could be seriously affected by recreational home development if specified precautions are not taken during the planning and construction of the subdivision. The protection of the water quality in Duck Lake is of utmost importance. Since the lake is in a closed basin any serious degradation of water quality could push the nutrient enrichment from the mesotrophic to eutrophic stage.

The change in the land use pattern, from a natural to second home/recreational setting, will permanently alter the use of the land.

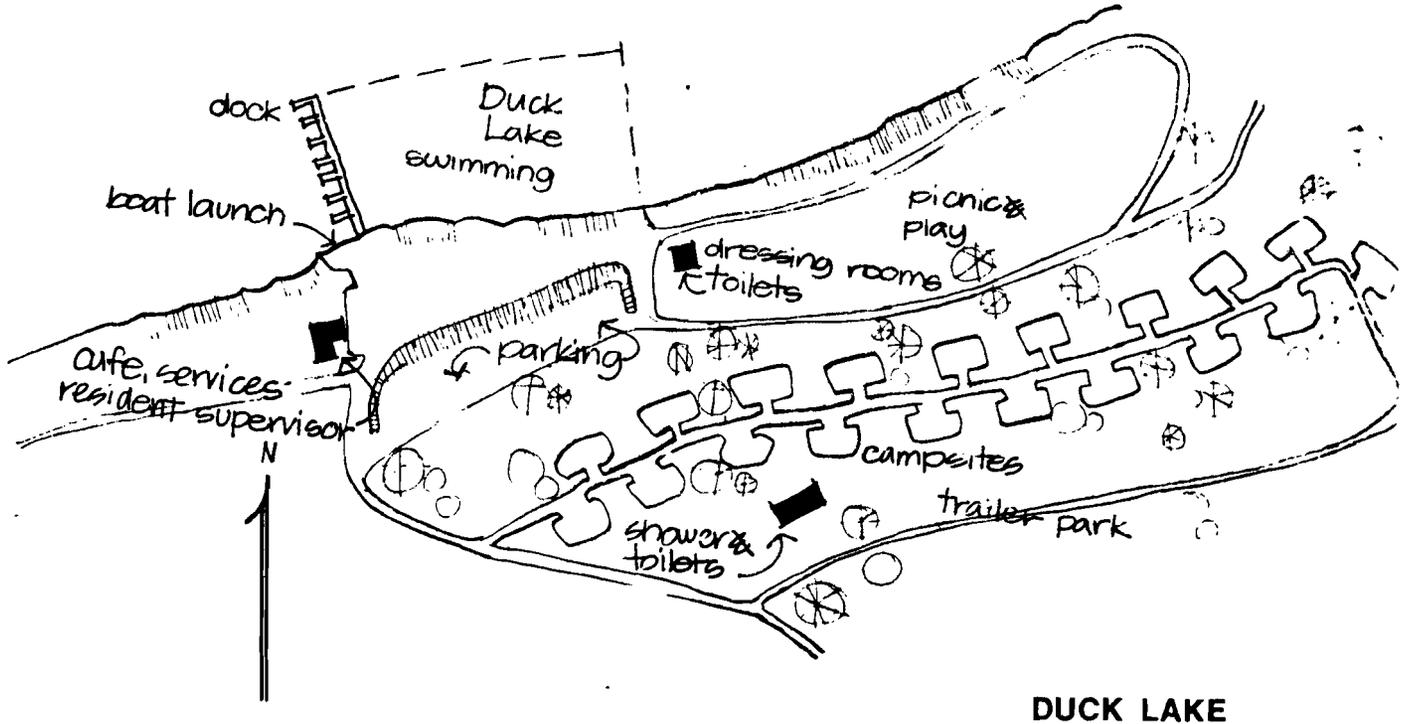
The last primary impact involves the seeming absence of local support for the project. The Blackfeet people have been against the development since it was proposed, and apparently have been joined by a number of persons who own recreational homes on the lake and some sportspersons. This lack of community acceptance could lead to a variety of problems.

Secondary impacts include: The possible decline of trout fishing and change in the behavioral patterns of migratory waterfowl, a change in the aesthetic nature of the lake and shoreline, increased fishing and boating access and the question of whether the homeowners association will be able to strictly enforce the provisions of the restrictive covenants.

The cumulative impact is the possibility of seriously altering the quality of life and recreation at Duck Lake. In an attempt to mitigate some of the unfavorable

MAP #5

PROPOSED DEVELOPMENT PLAN FOR THE DUCK LAKE TRIBAL CAMPGROUND:



**DUCK LAKE**

aspects associated with development, Western Travel & REcreation, Inc. has willingly worked with DHES officials to meet all state standards, provided restrictive covenants to control the direction of development and promised to eliminate livestock access to the lake. However, the fact remains that most of the responsibility for insuring the mitigating measures are implemented will not be the corporation's, rather it will be future, unknown, lot owners. Thus, if problems occur, it is impossible to say who will be responsible for correcting those problems.

#### VIII. POTENTIAL GROWTH INDUCING OR INHIBITING IMPACTS

If successful, Golden Glacier Parklands could provide the incentive to totally develop the corporation's property--2,080 acres. This would result in the creation of a large development which would attract a number of people. The corporation says at this time there are no subdivision plans beyond Golden Glacier Parklands. However, this does not rule out a future change in plans.

In terms of the proposed development, it will probably change the present character of life at Duck Lake--more people staying for longer periods of time, more boats, more access, etc. The change should not be to the degree of seriously impacting present government services or local businesses.

Some community problems do remain unsolved, namely emergency medical service and structural fire protection. The National Park Service's "good Samaritan" cannot provide the guarantee needed to service the people outside the bounds of Glacier Park.

#### IX. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF ENVIRONMENTAL RESOURCES

The land use and aesthetic qualities of the shoreline will be forever altered, this has already been discussed. Also, impacts on water quality and quantity have been discussed.

#### X. ECONOMIC AND ENVIRONMENTAL BENEFITS AND COSTS

##### Economic Benefits and Costs:

###### Benefits:

1. An increase in tax revenues for Glacier County.
2. Greater demands for local goods and services.
3. Construction would require the services of engineers, contractors & laborers.

###### Costs:

1. The cost of building and living would probably be high.
2. Possibly tax money will be needed in the future to pay for government services.
3. Emergency medical service.
4. Fire protection
5. Installation of utilities

##### Environmental Benefits and Costs:

###### Benefits:

1. More people enjoying living on the shores of a lake.
2. Preventing livestock access to portions of the lake.

Costs:

1. Possible decrease in the quality of fishing
2. Change of aesthetics and land use
3. Alteration of shoreline vegetation
4. Social and cultural conflicts
5. Change in quality of recreation
6. Possible closure of the lake by the tribal business council.

XI. SHORT-TERM vs. LONG-TERM COSTS AND BENEFITS

Short-Term Costs and Benefits:

Costs:

The proposed development will change the present land use, thus making it contrary to the Blackfeet Comprehensive Plan. However, the developer and the county claim the plan does not apply to private property on the reservation. The tribe believes all land on the reservation is subject to the plan.

Benefits:

More persons will be able to own lakeshore homes, and the change in tax classification will derive more tax revenue for the county.

Long-Term Costs and Benefits:

Costs:

There is a possibility the future quality of recreational fishing could be impacted by shoreline development. Additionally, warfage and water systems will change the character of the shoreline and, in the case of the water system, could effect vegetation.

Benefits:

Longer occupancy by property owners might prove beneficial for local businesses.

XII. ALTERNATIVE ACTIONS

1. Disapprove the subdivision: The physical and human environments would remain as they are now, with future recreational growth centered around the Blackfeet Tribe's existing campground.
2. Unconditional approval: The lake and shoreline are fragile areas. Development without specific considerations for the delicate nature of the area could lead to a serious decline in water quality.
3. Conditional approval: To protect the lake, shoreline and health of future homeowners, Western Travel & REcreation, Inc. must meet the following conditions before the DHES can approve the proposed subdivision. The conditions are:
  - A. The development corporation must retain a professional engineer to insure plans for sewage disposal and water supply systems meet state standards and the systems are properly installed. The engineer will certify to the DHES in writing that each system has been properly installed in accordance with the plans and specifications approved by the DHES.

- B. A copy of a plat suitable for filing must be submitted. Lots 11, 20, 58, 59, 60, 61, 62 and 63 of the preliminary plat must be eliminated from the final plat.
- C. Every effort must be made to keep sediment from reaching the lake. A detailed storm drainage plan and related design for the control and treatment of runoff water must be submitted to DHES and approved.
- D. Road bridge details or road relocation plans must be submitted to DHES and approved.
- E. If recreational vehicles are to be allowed, the developer must submit design plans for a sanitary dumping station and a drinking water system to DHES in order to facilitate that type of recreational use.

### XIII. RECOMMENDATION

Based on information now available and the content of this draft EIS, the DHES recommends alternative three, conditional approval of Golden Glacier Parklands Subdivision.

APPENDIX A  
BEFORE THE BOARD  
OF  
COUNTY COMMISSIONERS  
OF  
GLACIER COUNTY, MONTANA

\*\*\*\*\*  
\*  
In the Matter of Application of \*  
Western Travel and Recreation, Inc., \*  
a Montana Corporation for Filing \*  
Preliminary Plat \*  
\*  
\*\*\*\*\*

M E M O R A N D U M  
O F  
F I N D I N G S

Pursuant to law and the Public Hearing held in the courtroom of the District Court House of Glacier County, Montana on the 5th day of May, 1975 at the hour of one o'clock p.m., the following findings of fact are made:

FINDINGS OF FACT

1. On April 7, 1975, Western Travel and Recreation, Inc. a Montana Corporation, hereafter referred to as W T and R, filed a proposed plat subdividing certain acreage in Glacier County in what is known as the Duck Lake Area, consisting of ninety (90) and one (1) acre lots, and one-hundred-sixty-two (162) lots of between ten and one-tenth (10.1) and eleven and seven-tenths (11.7) acres.
2. Public notice thereof was given pursuant to law by the Glacier County Clerk and Recorder.
3. A Public Hearing on the Preliminary Plat was held on the 5th day of May, 1975 at 1:00 p.m., pursuant to Sec. 11-3866 R.C.M.
4. The hearing was attended by interested private citizens from the counties of Glacier, Cascade, Toole, Flathead and Hill. Canadian citizens from Alberta also were present.
5. The proponent, W T and R was represented by Ronald B. McDonald, attorney-at-law at Missoula, Montana, and Dean K. Marquardt of Kalispell, Montana.
6. Each and every person attending said hearing was given an opportunity to testify and to file written statements of any kind.
7. Dean Marquardt qualified as an expert witness and testified at length in behalf of W T and R as to all matters concerning the plat and environmental impact and assessment, placing in evidence the Plat, Environmental Assessment, Declaration of Conditions, Covenants and Restrictions and Declaration of Home-owners.
8. Private property owners, fishermen and interested parties testified.

9. Representatives of the Blackfeet Tribal Business Council, the U.S. Public Health Service, U.S. Fish and Game Service, Bureau of Indian Affairs, and the Montana Environmental Information Center testified at length.

10. No limitations or restrictions were placed on the offering and reception of testimony and evidence.

11. No objections were made as to notice, date and time of hearing, nor were any objections made as to the legal sufficiency of the proposed plat.

12. Proponents raised various objections of an environmental and ecological nature.

13. All legal requirements were met by the proponents including all necessary filing and notice provisions.

14. The evidence of percolation test, demonstrating actual porosity and permeability, showed that there was no danger of pollution through percolation at the specified distances that all sewage disposal would be located away from the lake shoreline in accordance with State regulations.

15. The proponents requested CONDITIONAL approval pursuant to Sec. 11-3866 R.C.M. upon the CONDITION SUBSEQUENT that there be full compliance with all State laws and regulations regarding sewage and waste disposal.

16. The proponents further CONDITIONED their application upon establishment of an acceptable and satisfactory road system.

17. No unreasonable or excessive expenditure of county funds would be caused by said subdivision.

18. The land tax base would be substantially enhanced and increased by said subdivision.

19. That no real or substantial increase in nutrient intrusion into the lake by reason of said subdivision was shown. It appeared that agricultural and domestic uses of the land surrounding the lake for the past thirty years and more are the efficient cause of substantially all nutrient intrusion. That the exclusion of agriculture and livestock from the subdivided area would somewhat curtail such intrusion and be beneficial to the lake.

20. That an increase in fishing use hours of the lake is inconsequential in view of the facilities and powers of the Fish and Game Management of the Blackfeet Tribe.

21. That all land in the subdivision herein is owned in unrestricted fee simply by the proponents and is under the exclusive jurisdiction of the State of Montana.

22. That all matters concerning the proposed plat and subdivision are under the exclusive jurisdiction of the State of Montana.

23. That the law of the State of Montana exclusively governs this entire matter and all proceedings herein.

24. That no matters of Federal jurisdiction are involved in the filing of the proposed plat and in these proceedings.

25. That the proponents and objectors have acted in good faith.

26. That the water quality of Duck Lake will be adequately protected by virtue of the character of the soil herein and the laws and regulations of the State of Montana.

27. That the said plat and subdivision is in the public interest of Glacier County.

28. That the objections made hereto are not substantial and are greatly outweighed by the public interest of Glacier County.

29. That the general public health, safety and welfare of Glacier County is benefited herein.

30. Expressed public opinion has been only considered.

31. Effects of agriculture are found to be nondetrimental.

32. Effects on local services are reasonable and unburdensome.

33. Local taxation is beneficially affected.

34. No substantial adverse effects will occur to the natural environment.

35. Effects on lifestyles in the Duck Lake area will be beneficial.

36. A net public benefit to the State of Montana, Glacier County and the surrounding area results from this plat and subdivision.

NOW THEREFORE the said plat is hereby CONDITIONALLY approved and SUBJECT to further approval by the State Department of Health and Environmental Sciences and further acceptance of roadways by Glacier County.

This approval is given in accordance with Sec. 11-3866 and shall be in force for one (1) calendar year, and may only be extended as provided by law.

Notice hereof shall be forwarded to the proponents by sending a copy hereof, thereby informing proponents of the CONDITIONS herein which MUST be met to obtain FINAL APPROVAL of the final plat as provided in Sec. 11-3866 R.C.M.

DATED this 4th day of June, 1975.

ATTEST: Mary Lou Nanini  
County Clerk and Recorder

/s/ Wm. McAlpine  
Chairman - Board of County Commissioners

/s/ Fred R. Johnson  
Member - Board of County Commissioners

/s/ Douglas L. MacCarter  
Member - Board of County Commissioners

## APPENDIX B

Special Report 1974  
Fishery Management Report  
Duck Lake, Blackfeet Indian Reservation, Montana

Fish and Wildlife Service, Kalispell, Montana

### DISCUSSION SECTION (Page 10-12)

The rainbow trout fishery at Duck Lake continues to be one of the best in northwestern Montana. The high productivity of the lake supports growth rates of fishes that exceed those of most Montana lakes. Nongame species composed a large percentage of the gill netted fishes and during a part of 1974 fed on some of the same food items as trout. Feeding competition does not presently appear to be a factor in significantly limiting the growth of rainbow trout.

There are indications that the quality of fishing and other recreational activities at Duck Lake may decline if certain signs remain unheeded. The problem of lake pollution resulting from sewage disposal facilities which do not comply with U.S. Public Health standards is widely recognized. Improper disposal of sewage not only poses health and sanitation problems, but also threatens to hasten the eutrophication process of the lake. Detrimental effects of pollution are already apparent. The abundant plant growth clogging much of the shallow water is probably the result of nutrient enrichment from human pollutions. Areas of dense vegetation also occur along the eastern shore where cattle frequently graze. Excessive plant growth, in addition to being a nuisance to boaters and fishermen, affect changes in the lake ecosystem. The high pHs recorded at station A in September were probably due to the metabolic activity of the aquatic vegetation. These pH values approached the upper limit that trout can tolerate. Extended exposure could significantly affect growth and/or survival of rainbow trout in Duck Lake.

Dense vegetation can also contribute to the problem of oxygen depletion and winter kill. When thick layers of ice and snow decrease light penetration, aquatic plants decompose, thereby removing oxygen from the water. Observations along the northern and western shores in mid June revealed several dead rainbow trout about 500 grams or larger on the lake bottom. Possibly these fish were victims of winter kill.

Reasons for the decline in large rainbow trout are not precisely known. Lake pollution and abundant vegetation alone, cannot account for the decline. Possibly, fishing pressure is sufficiently high that introduced fish seldom remain in the lake more than 2 years. In the spring of 1974, 85,000 rainbow trout were introduced into Duck Lake. The 1973-74 creel data suggests that the number stocked is sufficiently high to accommodate angling pressure and to allow a significant number of fish a chance to grow. In contrast, 1968 estimates indicate that the number of rainbow trout introduced annually exceeds the number removed by fishermen and natural mortality by only a small margin. Consequently, the interval between introduction and removal for most rainbow trout is of short duration.

Assuming the 1968 creel figures are better estimates of the actual fishing pressure, several management alternatives could be exercised in an effort to increase the yield of large rainbow trout. More rainbow trout could be introduced so that a proportionately greater percentage of fish remain in the lake each year. This option, however, is probably not the best alternative since an increase in numbers of fish might increase feeding competition and result in a slower growth rate. The end product might be greater numbers of small fish.

Other management alternatives would tend to reduce the fishing pressure and/or the number of fish caught, thereby allowing more rainbow trout more time to grow. The fishing season could be limited, rather than open throughout the year. A closed season during late spring would coincide with stocking operations. Survival rates of introduced fish would probably increase slightly, early seasonal growth would begin before any fish were removed, and fishing pressure would be decreased. Lowering the catch limit for non-Tribal members or suggesting a limit for Tribal members could result in the removal of less fish from the lake.

A decrease in large rainbow trout might also be due to the strain of hatchery fish introduced. Hatchery breeding procedures may inadvertently have produced a fish of short longevity which results in the early death of rainbow trout. Plans to utilize different strains of rainbow trout in management are being evaluated.

APPENDIX C

Legal Opinion  
Proposed Golden Glacier Parkland Subdivision  
III. Water (pp. 3-6)  
Milton Datsopoulos  
September 10, 1976

...There appears to be an abundant supply of water in the Duck Lake area, particularly in the form of runoff from the mountains of Glacier Park during the summer. Given a sufficient quantity of water for both domestic and agricultural purposes, the issue raised by subdivision is whether or not non-Indians can obtain valid water rights on the reservation. The proposed system to capture water to supply the lots around Duck Lake consists of individual infiltration galleries with their own chlorination facilities. According to our engineer's study, there is water at eight to twelve feet below ground level.

In Winters v. U.S., 207 U.S. 564 (1908), the rule was laid down by the Supreme Court that when treaty reservations were created, the water on the reservation was reserved as well as the land. In Arizona v. California, 373 U.S. 546 (1963), the "Winters doctrine" was followed, but rather than leaving amounts of water open-ended, the Court quantified the reservation of water for tribal lands as the amount needed to irrigate all the practically irrigable land on the reservation. U.S. v. Cappaert, U.S. \_\_\_\_ 96 S.Ct. 2062 (1976) applied the rule of the Winters case to groundwater, which we are dealing with here. Although these cases dealt with Congressionally-created reservations, there is no reason to expect a different rule when dealing with a treaty reservation such as the Blackfeet. Arizona v. California, supra at 598.

These cases indicate that Indians on the reservations have rights to some of the water in the Duck Lake area, and that these rights have priority date as of the formation of the reservation. Arizona v. California, supra at 600. However, until these rights are actually put to beneficial use by tribal members, and quantified pursuant to law (whether state or federal), they are merely inchoate and should not be permitted to defeat other uses.

The implied reservation of water doctrine, however, reserves only that amount of water necessary to fulfill the purpose of the reservation, no more. U.S. v. Cappaert, supra at 2071.

Judgments are tailored to give the reservation only its "minimal need." Excess water is subject to other beneficial uses. Arizona v. California, supra; U.S. v. Cappaert, supra at 2070-2071. No court will condone a waste of water, so that until minimal tribal needs are established the Duck Lake groundwater should be available for appropriation. Later appropriations are, of course, subject to the tribal members' earlier rights.

How would lot owners within the proposed subdivision obtain a water right? According to the Dickson and Dillon cases cited above, as well as several Montana cases, state law is applicable to fee patent land. Anderson v. Spear-Morgan Livestock, 107 Mont. 18, 79 P.2d 667 (1938), dealing with conveyances of water rights; Woodtick v. Crosby, \_\_\_\_ Mont. \_\_\_\_, 544 P.2d 812 (1976), dealing with voiding of deeds. 25 U.S.C. 349 has the clear purpose of removing both the Indian patentees and the land itself from the jurisdiction and guardianship of the United States. Such land is no longer a part of the reservation. See 19 Opinions of the Attorney General 183. Thus, whether state or federal jurisdictions were invoked in the event of a controversy, state water law would apply on the patented land of the subdivision.

The state law for perfecting a water right for a small well is explicit. Wells less than 100 gallons per minute, located outside of a "controlled groundwater area," do not require a permit prior to appropriation of water. Section 89-3912, R.C.M. 1947. The Department of Natural Resources must automatically issue a certificate of water right if the appropriator has properly filed a notice of completion of the well within sixty days of completing it. Section 89-881(5), R.C.M. 1947. The date of filing is the date of priority of the right.

According to the engineer for the project, some lots may have too compact soil to recharge from groundwater at the eight to twelve foot level. These lots, comprising less than twenty percent of the development, are all on the shore of Duck Lake. Plans for wells here are similar to those described above, but include trenching to the lake and backfilling to aid natural recharge. No artificial means, including piping lake water, are proposed. Rather, the land will be back-filled with gravel to make a less compact soil. Flow will be by gravity, not pumping, since this is all to take place on the development and not in or on the lake; again, state law should be applicable. Dickson and Dillon, supra.

If access to lake water is contested, a potential conflict may arise. State law provides that an owner of lands on a navigable lake or stream (See Section 26-336, Section 89-501, R.C.M. 1947 - navigable in fact appears to be navigable in law) takes to the edge of the lake or stream at the low-water mark. Section 67-712, R.C.M. 1947. Federal law seems to provide that the United States holds title to the bed and banks of navigable waters (navigable in law is navigable in fact - Daniel Ball, 10 Wall. 557 (1970) on the reservation below the high-water mark. See Confederated Salish and Kootenai Tribes v. Namen, 390 F.Supp. 452, 457 (1974) (currently on appeal). Whether he owns to low or high water, however, the private landowner should be able to trench as he pleases - clearly he can under state law as he owns below the water line; he also can under federal law since access has been held to be a part of his federal riparian right. Namen, supra at 465....

Kipp Lake sample registered a pH of 9.65, the highest pH recorded anywhere on the Reservation during the summer of 1975, while magnesium hardness was only slightly higher than the calcium concentration. Other unidentified factors must have affected the ratio.

Dissolved oxygen concentrations were low at all three stations on June 11, and remained low at stations A and C to July 2. Low dissolved oxygen readings are expected in early spring immediately after ice out. The influx of large volumes of rain water, such as that during the flood may result in low concentrations of dissolved oxygen. Dissolved oxygen concentrations of June 11, and July 2 are cause for concern, particularly when it is noted that the bottom sample at station C contained only 4 ppm on July 2. Between June 4, and July 1, 12 days of extremely high winds were recorded for the St. Mary valley, suggesting that a considerable amount of mixing occurred. From mid July through September, dissolved oxygen concentrations were maintained at an acceptable level of 8-9 ppm. The high measurement of 10 ppm at station A on September 11 is similar to the one recorded in the fall of 1974, and is probably related to temperature and photosynthetic activity of aquatic plants.

Ortho phosphate concentrations ranged between 0.03 and 0.13 ppm preceding the flood (warm rains, from 20-23 cm (8-9 inches), occurred June 15-20, 1975 along the western portion of the Blackfeet Reservation, an area which only receives about 64-67 cm (25-30 inches) of rain annually. These rains combined with rapid snow melt at higher elevations within Glacier National Park produced extensive flooding on June 19, 1975.). Ortho phosphate levels peaked July 2, at 0.47 ppm at station A and July 21, at 0.22 ppm at station C. These high concentrations resulted from increased runoff during and after the flood. Interestingly, these high nutrient levels were not accompanied by plankton blooms. Station B experienced lower levels of ortho phosphates than the other stations. By September all three stations had concentrations of 0.05 ppm or less.

Slightly turbid waters were observed twice during the study period. Samples taken immediately after the flood contained a measurable amount of turbidity, with station A registering the highest level of 12 FTU. A second peak in turbidity of 14 FTU was recorded on September 11 and is attributed to marl deposition.

A comparison of the water quality data of 1974 with that of 1975 indicates that most of the parameters lie within similar ranges. Surprisingly, the flood appears to have had a limited impact upon the water quality. Some of the more major differences between the two years occurred in early fall, where some of the parameters showed increases in 1974 but not in 1975. A prolonged Indian summer in 1974 probably facilitated late season plant activity resulting in fall peaks in pH, dissolved oxygen and carbonate alkalinity. Cool and rainy weather began in mid August, resulting in less plant activity and the absence of fall fluctuating water quality parameters in 1975.

## APPENDIX D

Progress Report 1975  
Fishery Management Program  
Duck Lake, Blackfeet Indian Reservation, Montana

Fish and Wildlife Service, Kalispell, Montana

### WATER CHEMISTRY SECTION (Page 3-5)

Many of the parameters examined showed similar values at each of the three stations on a given sampling day, indicating that Duck Lake responded as a relatively uniform body of water in 1975. The range of values throughout the summer also tended to be small for most parameters.

Water temperatures of 8.5-11.2C on June 11, rose steadily to 17.8-30.4C on July 21, and then gradually declined to 12.4-12.7C on September 29. Temperatures at station A were higher than those at stations B and C until late September when all three stations were nearly the same.

Total dissolved solids remained virtually constant throughout the summer ranging between 334 and 362 ppm excluding two measurements at station A. One of these measurements was 403 ppm on July 21 and the other was 326 ppm on September 29. Conductivity at the surface and bottom were nearly identical at stations A and C until September. The difference in September may be caused by the precipitation of marl within the ecosystem. At station B conductivity was consistently higher at the bottom, probably due to the disturbances of soft bottom sediments by the instrument probe.

From June 10 to July 21, pH ranged between 9.15 and 9.30 at all stations. Station B had pH values within this range during the entire study, while station C had only one measurement of 8.7 on September 11 which deviated from this same range. No apparent explanation of this value can be offered, especially since the bottom pH measured at the same time was 9.15. Station A showed slightly higher pH readings during August and September, probably due to photosynthetic activity by the abundant aquatic vegetation.

Both carbonate and bicarbonate alkalinity fluctuated within a comparatively small range. Carbonate alkalinity showed an increase in September while bicarbonate alkalinity exhibited an approximately equivalent decrease. Total alkalinity remained relatively constant during the summer, decreasing slightly in mid summer and then increasing a small amount in early fall. The stability of total alkalinity indicates that fluctuations in carbonate and bicarbonate alkalinity generally represent shifts in the carbonate buffer system rather than changes in total concentration. The September 11 surface reading of 0 ppm carbonate alkalinity for station C might be correlated to the decrease in pH recorded for the same sample. The corresponding bottom sample contained 40 ppm carbonate alkalinity and a pH of 9.15.

Fluctuations of magnesium hardness and calcium hardness were within narrow ranges at all three stations. The concentration of magnesium ions increased slightly during August and September at stations A and C. Increases in magnesium hardness appear to be accompanied by small increases in plankton populations. A high ratio (about 5:1) of magnesium to calcium ions was again observed in 1975. In only three other instances has the concentration of magnesium ions been observed to greatly exceed that of calcium ions in waters of the Blackfeet Indian Reservation. It has been suggested that high magnesium to calcium ratios are due to pH levels being sufficiently high to precipitate calcium but not magnesium. However, one

## APPENDIX E

Progress Report 1975  
Fishery Management Program  
Duck Lake, Blackfeet Indian Reservation, Montana

Fish and Wildlife Service, Kalispell, Montana

### PLANKTON SECTION (Page 5 & 6)

The species composition of the plankton at each of the three stations showed greater variety than that of station C in 1974. Many of the plankters, however were represented by only a few individuals and most were not abundant enough to identify population cycles.

When considering all the phytoplankton observed, only Navicula was rated as abundant, and then only on June 11, 1975 at station C. None of the Chlorophyta made more than a rare appearance in any one sample. Ceratium hirudanella (Pyrrohophyta) and Lyngbya (Cyanophyta) were observed rarely or not at all in early samples but increased in numbers during August and September. A majority of the phytoplankton belonged to the Phylum Chrysophyta. Cyclotella, Dinobryon and Rhopalodia were common in one or two samples for the three stations combined. Station A, with its shallow, warm waters contained the greatest abundance of phytoplankton.

Cladocera and Copepoda were generally more abundant than the phytoplankton. Chydorus globosus was represented in small numbers in the September 29 sample from station A. Daphnia longispina was present at stations B and C during August and September. Neither of these two species were found in the 1974 plankton samples at station C. Cyclopidae were among the most common zooplankters throughout the summer. Senecella was common in early summer and early fall samples at stations B and C while it appeared occasionally in July 21 and August 11 collections from station A.

On rare occasions Diptera and Ephemeroptera were netted in plankton tows and are therefore included in the tables. The designation of "rare" is not intended as an indication of their relative abundance in the lake, but rather is more a reflection of the inability of sampling gear to capture individuals.

The low number of individual plankters, in general and of small phytoplankton, in particular can probably be attributed to the flood. (Editor's Note: The cool, cloudy, wet weather through the summer of 1975 could also have contributed to the low phytoplankton populations that season. The end of the summer revealed a small increase in diversity and abundance of the plankton, but numbers of individuals or colonies nowhere approached those of 1974.)

APPENDIX F

Special Report 1974  
Fishery Management Report  
Duck Lake, Blackfeet Indian Reservation, Montana

Fish and Wildlife Service, Kalispell, Montana

AQUATIC VEGETATION SECTION (Page 9)

Nine species of aquatic plants were collected in the shallow waters of Duck Lake. Potamogeton pectinatus was the most common plant in the lake. It was abundant in water 1-3 meters deep, particularly near developed portions of the lake shore and cattle grazing areas. In these areas dense aggregation of plants clogged most of the water column. At station A, P. pectinatus was associated with a stonewort Chara vulgaris.

Potamogeton vaginatus grew in water 1-2 meters deep along much of the southeastern shore, at patches near station A and along the northern shore. Typically, P. vaginatus growth was less dense than that of Potamogeton pectinatus.

Potamogeton praelongus was collected on one occasion near station A. Only one specimen was found floating at the water's edge and no rooted plants were observed.

Polygonum natans grew in one small area near station A where it was very abundant.

Two species of Myriophyllum, M. exalbescens and M. verticillatum, inhabit Duck Lake. Both species were found near the Blackfeet Tribal boat dock interspersed with Potamogeton vaginatus. M. exalbescens also grew along the southeastern and eastern shores where it was associated with Chara vulgaris and Potamogeton pectinatus, respectively. Scattered specimens of M. verticillatum were located very close to shore near station A.

Chara vulgaris was distributed throughout much of the shallow water areas of Duck Lake. This species was abundant near station A where it grew with Potamogeton pectinatus. Along portions of the southeastern shore C. vulgaris formed dense mats and was sometimes associated with Myriophyllum exalbescens. C. vulgaris also grew in scattered places along the northeastern shore where it frequently was associated with a moss tentatively identified as Polytrichum strictum.

Polytrichum strictum was found in firm sandy bottom areas along the southeastern and northern shores. Usually it formed dense mats. A second moss collected at station B was not identified.

The presence of mosses indicates that free carbon dioxide was available since they are unable to utilize bicarbonates and carbonates for photosynthesis (Ruttner, 1974 citing Ruttner, 1960). However, since all pHs were above 8.4, any free carbon dioxide was quickly bound in the carbonate buffer system. Consequently, areas inhabited by mosses must have received an external source of free carbon dioxide. This source was probably underground springs...

APPENDIX G

Water Chemical Analysis  
 Soil, Water and Materials Testing Laboratory  
 Bureau of Indian Affairs  
 Gallup, New Mexico  
 August 28, 1974

| Materials Tested                 | Mg/l   |
|----------------------------------|--------|
| Boron (B)                        | 0.02   |
| Iron (Fe)                        | Trace  |
| Calcium (Ca)                     | 10.02  |
| Magnesium (Mg)                   | 60.80  |
| Sodium (Na)                      | 21.38  |
| Potassium (K)                    | 7.04   |
| Phosphorus (P)                   | 0.01   |
| Bicarbonate (HCO <sub>3</sub> )  | 389.92 |
| Carbonate (CO <sub>3</sub> )     | 17.11  |
| Sulfate (SO <sub>4</sub> )       | 8.65   |
| Chloride (Cl)                    | 3.55   |
| Fluoride (F)                     | 0.28   |
| Nitrate (NO <sub>3</sub> )       | 0.62   |
| Total Solids                     | 461    |
| Dissolved Solids                 | 379    |
| Hardness                         |        |
| Calcium, Magnesium               | 325    |
| Non Carbonate                    | 5      |
| Alkalinity                       |        |
| Phenolphthalein                  | 29     |
| Total Alkalinity (Methyl Orange) | 320    |
| Arsenic (As)                     | Trace  |
| Barium (Ba)                      | 0.33   |
| Cadmium (Cd)                     | Trace  |
| Copper (Cu)                      | Trace  |
| Cyanide (Cn)                     | Trace  |
| Chromium (Cr)                    | Trace  |
| Lead (Pb)                        | .008   |
| Manganese (Mn)                   | Trace  |
| Mercury (Hg)                     | Trace  |
| Selenium (Se)                    | 21.50  |
| Silica (SiO <sub>2</sub> )       | Trace  |
| Silver (Ag)                      | Trace  |
| Zinc (Zn)                        | Trace  |
| Alkyl Benzene Sulfonates (ABS)   | Trace  |
| Phenols                          | Trace  |

## APPENDIX H

### Geology of Glacier National Park and the Flathead Region

By Clyde P. Ross

U.S. Geological Survey  
Professional Paper #296

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#### ST. MARY RIVER FORMATION

...A few exposures of the St. Mary River formation, which here constitutes the uppermost Cretaceous unit, are shown on plate 2 on the basis of Stebinger's published and unpublished work. The St. Mary River formation is present within the area of plate 1 but is not distinguished on that map. The formation consists, according to Stebinger (1912, p. 330-332), of light-gray fresh and brackish-water clay and sandstone with some red and variegated shale in the upper part. The total thickness of the formation is somewhat less than 1,000 feet. The formation in Canada north of the area of plate 1 has recently been described in some detail (Williams, 1951).

#### UNDIFFERENTIATED CRETACEOUS DEPOSITS

Along the eastern and southeastern borders of Glacier National Park numerous outcrops of beds of Cretaceous age project through the cover of material of Cenozoic age; the Cenozoic deposits are largely glacial. The Cretaceous rocks include all of the formations mentioned above, but the formations are not distinguished on the maps of the present report because of inadequate information....

Pages 72 and 73

#### TERRACE ALLUVIUM

...East of the mountains certain of the flat-topped hills are remnants of formerly more extensive benches and terraces. For present purposes deposits that occur on distinct benches but are not known to be of glacial origin are mapped together. On the plains in the general vicinity of the mountain front, W. C. Alden (1932, p. 12-18, 44-45, 70-71) has discussed and mapped bench deposits that he regards as of several different ages. M. Y. Williams and W. S. Dyer (1930, p. 91-113) also give a convenient summary of data on bench deposits in Alberta and northern Montana. The field notes and maps of geologists whose work has been utilized in the present report do not permit mapping distinctions between the different bench deposits satisfactorily, and the mapping done during the present investigation was not extended into the plains area. The bench deposits are poorly consolidated or uncemented gravel and sand that were laid down by streams in erosion cycles earlier than the present one. Fossils have not been found in the bench deposits within the two regions here reported on, but the relations are such as to lead Alden to regard most of them as of Pliocene(?) and early Pleistocene age--an inference which seems in accord with all data now available although some of the bench deposits may be of pre-Pliocene age.

## GLACIAL DEPOSITS

In recognition of the incompleteness of available knowledge, different kinds of glacial deposits are not distinguished on the maps. At least four kinds are present had have been shown in parts of Alden's maps, published and unpublished, but further field work is needed to map satisfactorily the different deposits. The four kinds include remnants of the deposits of pre-Wisconsin glaciers, deposits left in the mountains by glaciers of Wisconsin age, ground moraines spread by mountain glaciers that reached the Great Plains, and deposits left by continental ice sheets.

On the plains east of Glacier National Park, a diverse assemblage of highly deformed rocks is overlain by a mantle, which is thin in many places, of unconsolidated material that is largely ground moraine from mountain glaciers of Wisconsin age. This mantle is not shown on plate 1. Too little is known about it to permit the mapping of its components or accurate delineation of its limits. It is widespread between the mountains and St. Mary Ridge, but numerous outcrops of the underlying rocks are present in this area. Between St. Mary Ridge and Milk River Ride, deposits assignable to ground moraine are scanty, and outcrops are so poor that little has yet been learned as to the pre-Pleistocene rocks. Therefore, it has seemed wise to show east of the mountains on plate 1 only those Cenozoic deposits that are in discrete, relatively easily recognizable units. The areas shown on plate 1 as containing undifferentiated Cretaceous deposits have rocks of that character either in outcrops or under thin cover. In these areas future detailed work should yield much more detailed information in regard to the Cretaceous rocks than is now at hand.

Although little is known of the rocks in the plains east of the park, on the plains in the eastern part of the Flathead region, the limits of the morainal deposits are known with sufficient accuracy so that it has seemed desirable to show them on plate 2, even though it is appreciated that future work will result in modifications. Where Cretaceous rocks are shown in the part of plate 2 east of the mountains, Stebinger and his associates, in work already cited, have obtained so much information that the attempt to record it has been made on pl. 2.

Glacial deposits in topographically high situations on the plains east of Glacier National Park are known from the studies of Alden and his associated to have been laid down relatively early in the Pleistocene and probably in more than one state. Alden (1912, 1932, Alden and Stebinger, 1913) has described these deposits and mapped them in a general way. From his work it is clear that Swiftcurrent Ridge, Boulder Ridge, Saint Mary Ridge, and other uplands east of the park are in part capped by early Pleistocene glacial deposits, which are now somewhat cemented and much weathered. Drift similar in age to that on these ridges must have been deposited within the mountains but has not yet been recognized there....

## APPENDIX I

### Soils

Babb Series - Generally, this series consists of deep, well-drained soils formed in calcareous glacial till derived from mixed rock sources. It occupies uplands at elevations of 4,500 to 6,000 feet. Slopes are two to 35 percent. The native vegetation is mainly rough fescue, bluebunch wheatgrass, Idaho fescue and forbs with some aspen.

In a representative profile the surface layer is black cobbly loam about seven inches thick. The subsoil is dark grayish brown and grayish brown gravelly loam about 114 inches thick. The underlying material is white gravelly loam.

Permeability is moderate (0.80 to 2.50 inches/hour - SCS) and the available water capacity is moderate. Reaction is neutral to a depth of about 21 inches and mildly alkaline below that depth. These soils have a high organic content in the surface layer.

Babb soils grow range grasses, however some areas support "tame" pasture, woodland or grazable woodland habitats.

Adel Series - This series is characterized by deep, well-drained soils formed in alluvium. The soils occupy alluvial fans, stream terraces and swales in uplands at elevations of 4,500 to 6,000 feet. Slopes range from zero to 35 percent. The native vegetation is mainly rough fescue, bluebunch wheatgrass, forbs and aspen.

A representative profile has a surface layer which is very dark gray loam about 26 inches thick. The subsoil is dark grayish brown loam, about 14 inches thick. The underlying material is grayish brown, light clay loam.

Permeability is moderate and the available water capacity is high. Reaction is slightly acid to a depth of about 26 inches and neutral below that depth. These soils are high in organic matter in the surface layer.

Adel soils are principally used for rangeland, but some are used for dryland "tame" pasture or raising small grains, woodland and grazable woodland.

Hanson Series - Hanson soils typically have a 10-inch dark gray noncalcareous loam, a dark grayish brown or dark brown calcareous loam and nearly white gravelly or stony loam.

These soils are found on alluvial and colluvial fans and on slopes below outcrops of limestone and highly calcareous shales. Slope gradients range from about six to 40 percent. Hanson soils formed in deep, very calcareous sediments contain more than 60 percent coarse fragments of limestone ranging from fine pebbles to stones.

Generally, these soils are well drained; runoff is slow to medium, and permeability is moderately slow.

Hanson soils support native range grass crops, and some of the less stony soils can be cultivated.

The soil types around the lake have been mixed by glacial action, thus the soils do not occur homogeneously, rather they occur in the form of soil complexes. The two predominant soil complexes are the Babb-Hanson complex (189 CE) and the Adel-Babb complex (389 CE). General characteristics for these soils are:

Babb-Hanson - This complex consists of soils that occupy uplands. Slopes range from five to 30 percent. About 50 percent is Babb soils, 40 percent Hanson soils. The Babb soils occupy foot slopes and sides of ridges and hills. Hanson soils occupy the ridges and hill tops. Included in mapping are about 10 percent Adel soils. They occupy the well-drained swales and basins. Also included are a few small lakes and poorly drained swales. Small areas with scattered groves of aspen are also included in mapping. Babb and Hanson soils have the profiles described as typical for their respective series.

Surface runoff is medium, with wind and water erosion hazards judged to be slight to moderate. The soils in this complex are suited for use as rangeland.

Adel-Babb - This complex comprises soils that occupy hills and swales in the uplands. Slopes range from five to 30 percent. About 40 percent is Adel soils and about 40 percent is Babb. Adel soils occupy the swale positions and Babb soils the plain and convex slopes of the hills. Included in mapping are about 10 percent Hanson soils and 10 percent poorly drained swales and small ponds. The Adel soils in this complex have a profile similar to that described as typical for the series. The Babb soils in this complex have a profile similar to that described as typical for the series except the substratum is light clay loam.

The soil complex is considered to be a forest-grassland transition zone. Most of the Adel and Babb soils have aspen cover. Plant life ranges from a rough fescue range to poorly drained swales and areas bordering small ponds which support growths of sedges and willows.

Surface runoff is medium and the erosion hazard is slight for water to slight to moderate for wind. These soils are suited for woodland and grazable woodland.



Department of Health and Environmental Sciences  
STATE OF MONTANA HELENA, MONTANA 59601

APPENDIX J

~~XXXXXXXXXX~~  
A. C. Knight, M.D.  
Director

April 29, 1977

Chairman  
Board of County Commissioners  
Glacier County  
County Courthouse  
Cut Bank, MT 59427

Dear Mr. McAlpine:

Attached for your review is a copy of the draft environmental impact statement on the proposed Duck Lake Subdivision. Pages 32 and 33 indicate that the applicant has not secured legal access to lots 35-63. Therefore, the Department of Health and Environmental Sciences formally requests that you reconsider your approval of lots 35-63 in the preliminary plat because the access question has not been resolved. Specifically, the Department requests that you reconsider your approval of lots 35-63 in light of the findings contained in Findings of Fact (16) and the conditional approval rendered on June 4, 1975.

We thank you for your cooperation.

Sincerely,

/s/ A. C. Knight

A. C. Knight, M.D., F.C.C.P.  
Director

ACK:TME:dmg  
Enclosure

cc: J. Moore, Glacier County Attorney

4-29-77

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