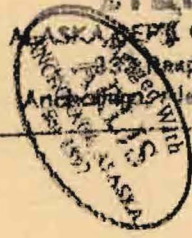


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ENVIRONMENTAL ANALYSIS OF  
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ENVIRONMENTAL ANALYSIS OF  
ACCESS ROAD ALTERNATIVES

By:

Terrestrial Environmental Specialists, Inc.  
Phoenix, New York 13135

For:

Acres American, Inc.  
Buffalo, New York 14202

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February 1981

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## 1 - INTRODUCTION

Work on the access road for the Susitna Hydroelectric Project is a coordination of effort by Acres American, Inc., R&M Consultants, Inc. (R&M), and Terrestrial Environmental Specialists, Inc. (TES). R&M is responsible for providing the routing, engineering, and design information for the access route. The role of TES is to provide environmental input into the selection of a preferred route, and then an impact analysis and, if possible, procedures for mitigation of impacts resulting from the selected route.

The objectives of the environmental analysis of alternative access corridors for the Susitna Hydroelectric Project are twofold: (1) to provide input into the selection of an access route that will be environmentally sound, and (2) to provide an impact assessment of the selected route. This report constitutes an analysis of three alternative corridors as provided to the environmental team by R&M Consultants, Inc., thus fulfilling the first of the objectives. The second objective will be met by the information and analysis contained in the Federal Energy Regulatory Commission (FERC) license application for this project. The various analyses will be contained in subsections of the license application dealing with specific environmental disciplines. It is the understanding of the environmental team that the routing of the selected route will be fine-tuned as the impact analysis continues after license application.

Analyses in most environmental disciplines, i.e. cultural resources and biological resources, are based upon literature, general knowledge of the study area, and some information obtained during the 1980 field efforts. Other disciplines, i.e. land use analysis and socioeconomic analysis incorporate a greater amount of current information and therefore analysis is in more detail than that of the other disciplines. Road or rail access (Parks Highway or Gold Creek, respectively, to Devil Canyon) are not separated except where there appear to be significant differences in impact between the modes of transportation or where there are differences in the routes.

In some instances, levels of detail of analysis are not equal concerning different portions of the corridors. Some sections of the routes, for example, are outside of intensive study areas in various disciplines; therefore, less was known about these sections than others. For cultural resources and biological resources, only those locations known to have a relatively high probability of impact or conflicts are mentioned. Therefore, the brevity of discussion of impacts in these disciplines reflects the amount of information available, rather than the probability or severity of impacts.

When more details are known and available to the environmental group concerning, for instance, policy regarding public use of the access road during and after dam construction, then feasibility of impact mitigation or avoidance can be assessed. Likewise, when more details are available concerning construction practices, particularly at stream crossings (type and size of bridges, foundations, or size of culverts), impacts and mitigation of these impacts can be discussed in relation to anadromous and resident fisheries, furbearers, other wildlife species, and vegetation.

## 2 - METHODS

Initially, numerous alternative routes were screened by a coordinated effort among R&M Consultants, Inc., Acres American, Inc., and TES and its subcontractors. After initial screening, three corridors emerged as likely candidates for further study - both engineering and environmental. The environmental analysis was based upon available literature concerning the study area or similar areas, data collected during on-going field studies within the first year of the Susitna Hydroelectric Project Feasibility Study, and general knowledge of the study area or similar areas by the environmental team. This report contains the results of this initial environmental analysis of the three candidate corridors.

Corridor 1 is a road access north of the Susitna River from the Parks Highway to Devil Canyon and Watana. Corridor 2 is access to Devil Canyon and Watana on the south side of the Susitna River, either by road from the Parks Highway or by rail from the Alaska Railroad. Corridor 3 is a road access route to Watana from the Denali Highway. Further breakdowns or combinations of these corridors are discussed and defined in the Land Use Analysis section and the Socioeconomic section of this report. Map references or "Sheets" refer to companion topographic maps (1:24,000 scale) indicating access corridors.

### 3 - ASSESSMENT

#### 3.1 - Land Use Analysis

##### 3.1.1 - Introduction

Impacts on current land use and related activities resulting from emplacement and use of an access route will vary depending upon the location of route and transportation mode selected. This preliminary assessment involved consideration of three routes and two modes which are defined as follows:

- (a) Northside: a new road from the west (Corridor 1), from the Parks Highway through Chulitna and north of the Susitna River to Devil Canyon and Watana; (designated 1 on Tables 1 and 2);
- (b) Southside: a new road from the west (Corridor 2), from the Parks Highway through Chulitna and Gold Creek and south of the Susitna River to Devil Canyon and Watana; (designated 2a on Tables 1 and 2);
- (c) Southside: a new railroad from the Alaska Railroad at Gold Creek, south of the Susitna River to Devil Canyon and Watana (essentially the same route as 2a); (designated 2b on Tables 1 and 2);
- (d) Denali: a new road from the Denali Highway to Watana and Devil Canyon; (designated 3 on Tables 1 and 2).

The land use analysis involves assessment of the potential impacts on four general land use considerations, each comprised of several land use variables. These general considerations are defined as follows:



- (a) Land uses and associated site-specific activities. This category includes land uses that involve some form of long-term commitment of man's resources (e.g. structures), and the concomitant activities associated with them; these include residential uses, either isolated and remote or within a community; lodges; commercial developments and enterprises; agriculture; transportation; and mining.
- (b) Scattered and isolated activities; non-site-specific. This category includes activities which, generally, are non-continuous, and do not involve a commitment of man's resources at any particular site; these include consumptive recreational or subsistence activities, such as hunting and fishing, not related to a particular site; riverine activities such as boating or rafting; and scattered non-consumptive activities such as camping, hiking, and photography.
- (c) Surface resources and aesthetics. This category involves consideration of the natural land cover type itself as opposed to man's uses or activities; these include visual character of both land and water resources; ground cover, specifically flora; land surface integrity; and the overall natural character of the landscape.
- (d) Land management activities and related concerns. This category involves consideration of present or potential activities related to conservation or use of the land, and the effects on social or political policies; these include game management, general land management, off-road vehicle management, native claims, and economic land values.

### 3.1.2 - Methods and Assessment

The above categories and variables are listed in Table 1, which depicts the potential magnitude of impacts on the various land use concerns according to the access route being considered. A subjective numerical scale of 1 to 5 has been used, with 5 representing a great impact and 1 a small or negligible impact.



The numerical scale is a preliminary score used to delineate potential relative magnitudes of impacts, and does not represent a quantitative measure. It is emphasized that this assessment is preliminary. Its purpose is to identify only possible impacts, and estimate relative magnitudes, to enable a rudimentary comparison of the access schemes. This information, in combination with analyses provided in other environmental disciplines, can be used by those responsible for making the decision as to which access scheme will be implemented should the Susitna Project be constructed. A more definitive assessment will be performed on the selected route once that decision is made.

### 3.1.3 - Discussion of Findings

The previous section generally depicts the land use factors that would be affected, and to what degree, by each of the optional access plans currently under consideration. The following discussion pertains to each of the access plans by segment. For consistency, segments are simply delineated in accordance with the maps that accompany this report. That is, each map sheet depicts a segment (a portion of a corridor) whose number corresponds to the numbered maps. To further assist the reviewer, Table 2 summarizes structures that would be affected by each route.

#### 3.1.3.1 - Corridor 1 - Northside, Road

General - There will be increased traffic and activity affecting the Parks Highway and communities situated on it. There is a likelihood that commercial and residential uses will be affected with corresponding effects on economic land values.

#### Segment Sheet 1

- entails several stream crossings, including Pass Creek and a major bridge over Indian River;

Table 2

Summary of Cabins and Lodges Located in (a)  
Each Segment Area, Associated with Access Routes

SHEET SEGMENT NUMBER	CABINS & RESIDENCES BY ROUTE			LODGES BY ROUTE (b)		
	1	2a,b	3	1	2a,b	3
1	11	2		1		
> 2	> 7			1(9)		
2	5					
3						
4	1		1			1
6						
7						
14		2				
15		8			1(10)	
8		3				
9		2				
18						
17						
16			3			
Totals	24	17	4	2(10)	1(10)	1

(a) This table summarizes only residences and lodges which are located in proximity to alternate routes outside of communities; it does not include residences or other structures which may be affected within communities.

(b) Numbers in parentheses indicate number of buildings associated with each lodge.

- requires crossing Alaska Railroad;
- route would pass close to Summit Lake;
- significant impact can be expected at Chulitna, presently not served by road; commercial and residential activities as well as land values affected;
- at least 11 cabins and 1 lodge affected; 7 other cabins lie on or near border between Sheets 1 & 2.

Segment Sheet 2

- crossing and bridge over unnamed tributary to Portage Creek;
- significant crossing and bridge over Portage Creek;
- road would rim the canyon of Portage Creek;
- several minor stream crossings of tributaries to Portage Creek;
- would come within a half mile of High Lake and High Lake Lodge (nine buildings); - at least five cabins affected, in addition to the seven others lying on border between Sheets 1 & 2.

Segment Sheet 7

- road would follow rim of Devil Canyon, within 1/4 mile of Susitna River.

Segment Sheet 3

- portion of corridor parallels several-mile length of Devil Creek;
- passes within 1/4 mile of unnamed lake.

Segment Sheet 4

- parallels and involves significant crossing and bridge over Tsusena Creek;
- at least one cabin nearby.

### 3.1.3.2 - Corridor 2a - Southside, Road

General - Impacts on Parks Highway and communities there are similar to those of Corridor 1. Residential and commercial uses as well as land values would be affected.

#### Segment Sheet - 1

- minor crossing of Pass Creek;
- crossing of Alaska Railroad;
- significant stream crossing of Indian River;
- significant impact on Chulitna, presently not served by road; will affect land values and commercial and residential uses;
- road will come close to an unnamed lake;
- two cabins are in area of this route in this segment.

#### Segment Sheet - 6

- would significantly affect the settlements of Canyon (passing essentially through it) and Gold Creek (within 1 1/2 miles of it), providing road access where none existed previously;
- there will likely be impacts on land values, and residential and commercial uses;
- involves stream crossing and bridge over Indian River;
- significant crossing and bridge over Susitna River

#### Segment Sheet - 7

- parallels south rim of Devil Canyon;
- involves stream crossing of unnamed tributary to Susitna; this also involves a sizeable gorge.

#### Segment Sheet - 14

- route crosses through the plateau area of the Upper Prairie Creek drainage, affecting an additional drainage; also, off-road vehicle use problem is possible in this area;
- route will pass near two cabins.

Segment Sheet - 15

- passes close to Stephan Lake and Lodge, consisting of 10 structures;
- there are at least eight cabins in this area;
- might create some off-road vehicle use in area.

Segment Sheet - 8

- involves crossing unnamed tributary to Susitna River;
- three cabins would be affected.

Segment Sheet - 9

- significant crossing and bridge over Fog Creek;
- possible off-road vehicle use;
- comes very close to Fog Lakes;
- there are two cabins in area.

3.1.3.3 - Corridor 2b - Southside, Railroad

General - There will be some increase in activity in communities near the Alaska Railroad, but probably less than with a road corridor. Rail would tend to restrict public access to less than what would be possible with a road. However, as a rail-head, the general area of communities of Sherman, Gold Creek, and Canyon may be affected in terms of residential and commercial uses.

Segment Sheet - 6

- significant impact likely at Gold Creek as it becomes a rail-head; impact on land values, and on commercial and residential uses;
- some impacts at Canyon of a similar nature to those expected at Gold Creek, but of a lesser magnitude;
- some minor stream crossings.

Segment Sheet - 7

- involves significant stream and gorge crossing, with bridge, over unnamed tributary to Susitna.

Segment Sheet - 14

- route passes through the plateau area of the Upper Prairie Creek drainage, affecting additional drainage, off-road vehicle use would probably be less of a problem than with a road.
- there are two cabins in this area.

Segment Sheet - 15

- passes close to Stephan Lake and Lodge; a significant impact on the Lodge is possible;
- also, there are at least eight cabins nearby.

Segment Sheet - 8

- stream crossings of two small tributaries;
- three cabins in this area.

Segment Sheet - 9

- would rim Fog Lake drainage;
- passes close to Fog Lake and two cabins.

3.1.3.4 - Corridor 3 - Denali, Road

General - This route would cause significant impacts to communities on the east side of the project area, including Denali, Glennallen, and others along Richardson Highway, because Valdez would likely be the port-of-entry for some project materials. Potentially major impacts on land values, residential and commercial uses, and the existing transportation system could occur. An important concern regarding the existing transportation system is the fact that



either the eastern or western (or both) parts of the Denali Highway would need to be improved or upgraded to accommodate project traffic. Such improvements would involve the road surface and bridges.

#### Segment Sheet - 18

- would affect traffic flow on Denali Highway;
- traverses flat, marshy area;
- potential for additional off-road vehicle use in area which already has problems with such use;
- passes very close to Butte Lake, presently used for recreation purposes;
- ground cover disturbance of tundra.

#### Segment Sheet - 17

- impacts are similar to those in Segment 18;
- crossing of Butte Creek;
- would allow deeper access into this area by off-road vehicles;
- within view of scenic mountain area.

#### Segment Sheet - 16

- parallels Deadman Creek drainage;
- passes very close to Deadman Lake;
- there are three cabins in this area.

#### Segment Sheet - 4

- passes within a mile or so of lake adjacent to Tsusena Butte;
- there is one cabin which could be affected in this area.

#### 3.1.4 - Conclusion

The most significant aspect of the analysis of access route schemes relates not so much to various impacts associated with a given individual scheme, but with the concept of access itself, in any form,

to the interior of the Susitna Basin. The provision of a means by which the general public can easily and frequently venture inland to an essentially pristine wilderness area potentially will induce profound alterations to the character of the Susitna area. Such alterations relating to access may be assessed quite distinctly from the emplacement of Susitna Hydroelectric facilities themselves. Access will facilitate the influx of people and activity within the basin, affecting both small concentrations and isolated residences, peripheral commercial and transportation systems, resource utilization and level of recreational activity, visual and aesthetic factors, and the overall natural character of the area. In addition, these effects will produce ramifications concerning the extent, adequacy, and need for management activity (e.g., fish and game, land, etc.), as well as changes in land values and development.

## 3.2 - Cultural Resources

### 3.2.1 - Introduction

It is likely that cultural resources will be encountered by any of the proposed access corridors. Unfortunately, little intensive field reconnaissance has been conducted along the three proposed corridors to identify cultural resources. However, preliminary evaluations of the corridors can be made based upon the existing literature and the cultural resource research design that indicates areas having a high probability of containing cultural resources. A brief air survey, over the Denali corridor only, was conducted.

### 3.2.2 - Corridor 1

No archeological reconnaissance has been conducted on Corridor 1 to date, with the exception of a limited survey at the mouth of Portage Creek. The purpose of this survey was to locate and document a reported inscription made by W. M. Dickey in 1897. This inscription was located on the west shore near the mouth of the creek. It appears that several sites in the Watana base camp area are either on or very close to Corridor 1.

It is anticipated that cultural resources occur along this route based on archeological reconnaissance conducted during the 1980 field season in areas of similar terrain. Areas that probably have the highest potential for cultural resources are the confluences of major drainages, the banks of streams and rivers, mountain passes, and the margins of the numerous lakes located along the proposed route. In addition, areas of high topographic relief which afford a commanding view of the surrounding terrain also hold potential for the discovery of cultural resources.

### 3.2.3 - Corridor 2

Although no archeological survey was conducted along the proposed route of Corridor 2, archeological reconnaissance was conducted near Stephan and Fog Lakes during the 1980 field season. In

addition, several archeological sites have previously been documented in the areas of Stephan and Fog Lakes. Based on these data, it is possible to document 10 sites that are in proximity to Corridor 2. Depending on where the corridor crosses the Susitna to the north, several additional sites may be impacted.

#### 3.2.4 - Corridor 3

It is expected that the route leading north from Watana base camp will contain cultural resources because the access route follows a natural pass leading from the upper Susitna River to the upper Nenana River Valley. Passes such as these would likely have been utilized by past animal and human populations moving between the two areas.

A brief archeological reconnaissance has been conducted along portions of this proposed route. During this survey, four archeological sites were located: one on the south shore of Butte Lake, two on the north shore of Deadman Lake and one on Big Lake. Two of the four sites are quite close to the route. Unlike Corridors 1 and 2, Corridor 3 is largely unforested. Therefore secondary impact may be of greater magnitude than along the forested routes because of higher visibility of archeological sites and off-road vehicle traffic.

### 3.3 - Biological Resources

#### 3.3.1 - Plant Ecology

The prime consideration regarding access routes from a vegetation standpoint is the question of wetlands. This consideration involves engineering or construction problems, and also the legal aspects of wetland disturbance in addition to the intrinsic importance of the plants and associated wildlife in wetlands.

Corridor 1 between the Parks Highway and Summit Lake crosses the most extensive wetland area encountered by any of the access routes. Although the two wettest areas in this vicinity are avoided by the corridor, some potential impacts may be further reduced by rerouting the corridor on the south side of these wet areas.

Corridor 2 passes through a marsh at the north end of Miami Lake. This marsh might be avoided by rerouting the line to follow a ridge between the marshes. Corridor 2 passes between or very close to several other wet sedge-grass marshes and black spruce woodlands.

Corridor 3 passes through several areas associated with willow shrub and birch shrub types along Deadman Creek. These areas may indicate drainage problems. The area on the west bank of Deadman Lake is covered with sedge-shrub tundra. The high water table and sandy conditions here may present construction problems. Corridor 3 also passes across the upper sides of several wet sedge-grass marshes southwest of Butte Lake. Placement of the road a little further uphill may avoid these wet areas entirely.

The other major consideration from a vegetation standpoint is the possible disturbance of threatened or endangered plant species. None of the proposed corridors crosses known locations or likely habitats for threatened or endangered plant species.

### 3.3.2 - Fish Ecology

Impacts on fish resources of any access road construction and subsequent use may include effects on anadromous and resident fish at stream crossings or in any of the bodies of water in the vicinity. Although little is known at present concerning the anadromous and resident fish resources of the upper Susitna Basin, generalizations can be made and relative impacts on fish resources can be assessed relative to potential fish habitat disturbance. Main impacts resulting from construction in and near water bodies probably include siltation which will influence spawning success of both anadromous, and resident species, especially grayling. Indirect impacts on fish resources will result from increased access by anglers, and perhaps from impacts on water resources by other human activities.

All three access corridors involve numerous stream crossings; notable crossings are mentioned in the land use section of this report. Corridor 1, however, appears to have approximately twice as many stream crossings (that are identifiable on topographic maps) as the other two corridors. Corridor 1 also has major crossings of the Indian River and the upper end of Portage Creek. These two water bodies appear to be important to salmon.

Corridor 2 (road) has major crossings at the Indian River and the Susitna River just above Gold Creek. In addition, there are major stream crossings near Devil Canyon and at Fog Creek. Both road and railroad corridors pass very close to Stephan and Fog Lakes. These lakes are inhabited by various species of resident fish including Dolly Varden, lake trout, rainbow trout, and grayling.

Corridor 3 parallels a section of Deadman Creek and passes quite close to Deadman Lake. Deadman Creek and most streams above Devil Canyon probably contain grayling. Near the Denali Highway, this corridor passes very close to Butte Lake, the area around which is already heavily used by recreationists for various purposes.

### 3.3.3 - Birds and Non-game Mammals

Any access road corridor chosen as the selected route will impact some birds and non-game mammals due to habitat removal or disturbance due to construction. Major potential impacts, however, are believed to be related to raptors, both during and after construction, and waterfowl. Particular attention will be given to these groups of birds during impact assessment and fine-tuning of the selected route.

Corridor 1 passes very close to potential raptor nesting habitat. This habitat occurs particularly in the lower Portage Creek area and along the Susitna River from the mouth of Portage Creek through much of Devil Canyon.

Corridor 2 passes very close to potential raptor nesting habitat along Devil Canyon and along the drainages upstream of Devil Canyon, where the route turns south and away from the Susitna. This corridor also comes very close to the upper end of Stephan Lake, an area important to waterfowl and migrant swans. The Corridor 2 (road) crossing of Fog Creek is very close to potential raptor habitat. Several old stick nests were found approximately 1,500 feet downstream from this proposed crossing.

The section of Corridor 3 southeast of Tsusena Butte passes approximately 1,000 feet west-northwest of a known active bald eagle nest. In addition, this corridor passes very close to Deadman Lake, a body of water that supported numerous waterfowl throughout September, 1980.

#### 3.3.4 - Furbearers

As with birds and non-game mammals, and other biological resources, furbearers will be impacted directly due to habitat destruction. Indirect impacts, possibly greater than direct impacts, will result due to increased access and associated human activity.

Corridor 1 between the Parks Highway and Devil Canyon passes through an area which supports numerous beaver, muskrat and mink, especially around the High Lake area and the Portage Creek drainage. The High Lake area also contains traditional denning sites for foxes.

The section of Corridor 2 between Devil Canyon and the Watana dam site contains some of the finest fox and marten habitat in the region, particularly around Stephan Lake. The Fog Lakes and Prairie Creek area support numerous beavers and muskrats, and otters are common there.

Corridor 3 along Deadman Creek between the Watana dam-site and Deadman Mountain is likely to have fewer conflicts with furbearer populations than many of the other sections of the various corridors. The furbearer populations in this area are relatively low, although there are beaver, mink, and fox present. The portion of this corridor from Deadman Mountain to the Denali Highway has a moderate population of red foxes; but almost no sign of beaver, mink, or otter were found when this area was surveyed during 1980. Impacts from human use for activities such as trapping could be minimal since established traplines already exist along this route.



### 3.3.5 - Big Game

Big game species in the Susitna Basin vary in their sensitivity to disturbance. Besides direct impacts due to location of a selected access route, other potential impacts on big game will result from traffic disturbance and collision potential, and possible effects due to increased hunting pressure.

Corridor 1 between the Parks Highway and Devil Canyon is largely confined to south-facing slopes. These are probably important moose wintering areas and are probably important black bear habitats as well. South-facing slopes are particularly important to bears in early spring, because these slopes are the first to become clear of snow and provide early vegetable foods for bears after they emerge from their dens. At least one wolf pack is known to inhabit the area.

Between Devil Canyon and the Watana dam site, several portions of this corridor (Devils Mountain and the mouth of Tsusena Creek) are important moose habitat. This route also goes through areas that appear to be heavily used by wolverine and bears. This portion of the route is higher than the most heavily used black bear habitat except in the vicinity of Tsusena Creek and the Watana dam-site, and is lower than most of the known brown bear dens. From a big game standpoint, concerns about this portion of the route are relatively low except in the Tsusena Creek area.

The Parks Highway or Gold Creek to Devil Canyon portion of Corridor 2 follows mainly north-facing slopes and is therefore probably less threatening to moose and bears than is Corridor 1. However, it is more likely to impact caribou, which may be more vulnerable to disturbance than other big game species. This impact can be minimized if the route is kept at the lowest altitude possible.

The portion of Corridor 2 between Devil Canyon and Watana dam-site is an area of major concern, particularly in the upper Prairie Creek, Stephan Lake and Fog Lakes area. This area supports one of the largest year-round moose concentrations in the area. At least

two wolf packs, substantial numbers of wolverine, and some bears (especially brown bears) inhabit the area. Caribou also regularly use the area, particularly around Fog Lakes. This route also crosses a mid-summer migratory route for bears moving from the Susitna River to Prairie Creek to feed on salmon.

Corridor 3 passes through one of the most important caribou concentration areas in the Nelchina Basin. Historically, virtually the entire Nelchina caribou herd has spent portions of the summer, fall and late winter in the area around Butte Lake and the hills to the south. In recent years the herd has used the area less than in the past, but there is good reason to believe they will again use this area more heavily in the future. ADF&G recently documented some calving along the northern part of the route, but it is too early to tell if a significant new calving area is developing. As previously mentioned, caribou appear to be more sensitive to disturbance than other big game species, such as moose. Roads, particularly those in open areas, tend to be avoided by caribou. Therefore, there is a chance that this route could lead to at least partial abandonment of important habitat. For other species of big game, this route is of less concern, although conflicts could occur.

### 3.4 - Socioeconomic Analysis

Impacts on socioeconomic conditions will vary in both magnitude and area of concentration depending upon which corridor or combination of corridors is chosen. The socioeconomic evaluation of access routes involves a somewhat broader perspective than some of the other environmental disciplines, as it is concerned more with the origin, mode, and destination of access and less with the site-specific emplacement. Exceptions to this might include, for example, the proximity to an active mining operation, but generally, socioeconomic considerations involve broader concerns and are more community-specific or region-specific than site-specific. Therefore, a somewhat different approach to analysis is required than was performed in the other environmental disciplines.

To facilitate the preliminary socioeconomic assessment, Corridors 1, 2, and 3 have been defined in terms of access route combinations. Analysis is based upon the impacts of access schemes related to the entire project and not solely on a particular access route regarded in isolation. Access route combinations have been defined based upon the mode of transportation to be used and connection with existing transportation facilities. The different access route combinations (schemes) are defined as:

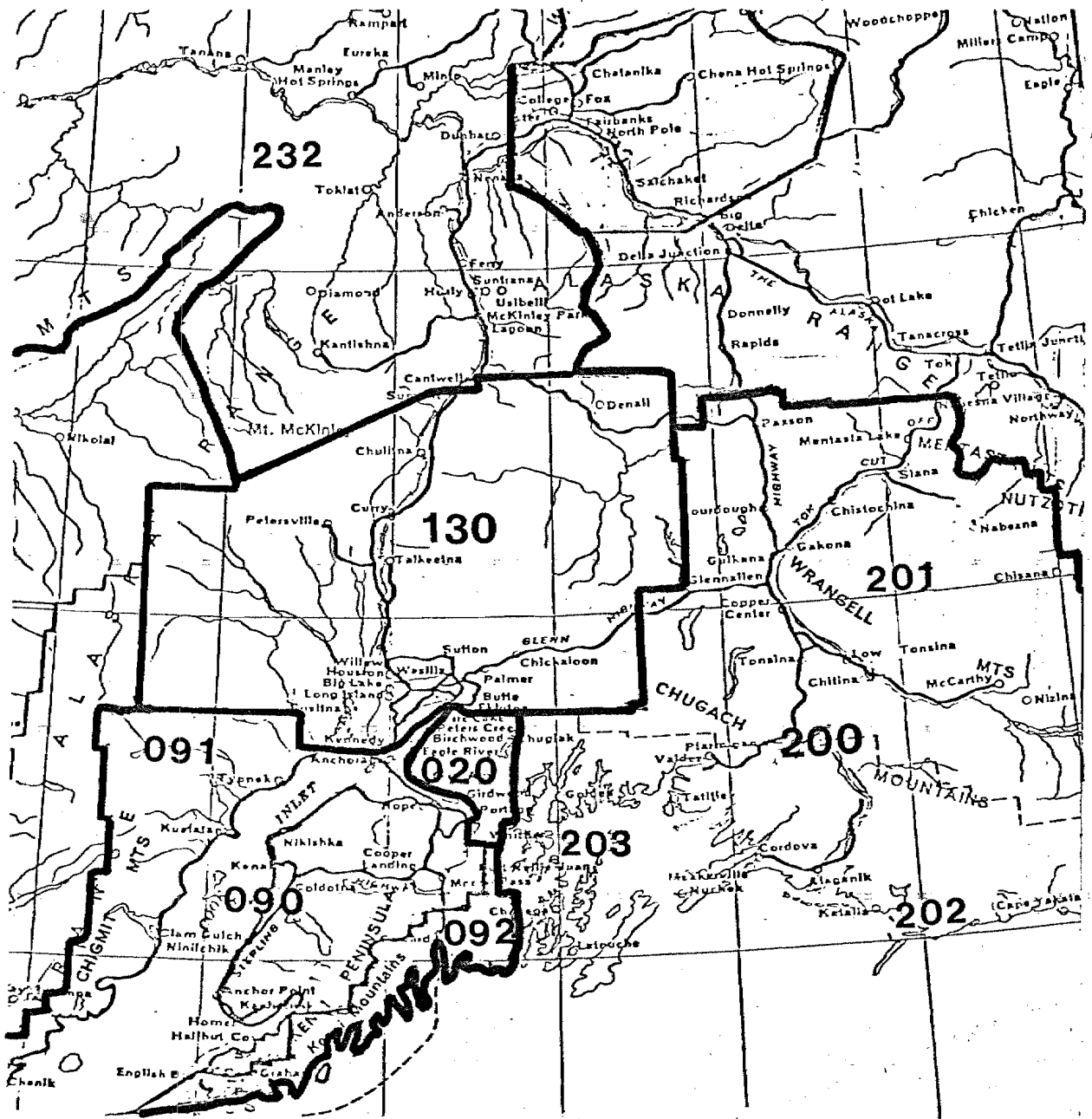
- (a) Access routes by a new road from the west: (Corridor 1) Chulitna north of Susitna River to Devil Canyon and north of the Susitna River to Watana, or (Corridor 2) Chulitna, south of Susitna River to Devil Canyon, and south of Susitna River to Watana. (Scheme A)
- (b) Access route utilizing existing railroad connecting with a new railroad to Devil Canyon and Watana (Corridor 2). (Scheme B)
- (c) Access route by a new road from the North, Denali Highway, to Watana and possibly Devil Canyon (Corridor 3). (Scheme C)
- (d) Access route from the west to Devil Canyon (Corridor 2) and by a new road from the north to Watana (Corridor 3). (Scheme D)

The analysis is predicated on several assumptions, one of which is that there will not be an enclave with a broad range of services at the project site, and that labor commuting patterns will develop as a function of accessibility to the dam sites (n.b., see note below). It is also assumed that if access is from the west, whether via a road connecting with the Parks Highway or a rail spur off the Alaska Railroad, the port-of-entry for project materials would be Anchorage, and impacts would be concentrated on the west side. If access were from the Denali Highway, it is assumed that Valdez would be the port-of-entry. In this scheme, impacts would be concentrated on the east side.

The socioeconomic analysis for the feasibility study in general will be based upon geographic aggregations of political units and/or census divisions, as socioeconomic data is available in such formats. At this point in the analysis of access route corridors, however, it is possible to perform qualitative determinations regarding which socioeconomic variables will likely be affected, by general area, given one or more discrete access schemes. Geographic impact areas have been delineated for purposes of this preliminary qualitative assessment (Figure 1) as follows:

- (a) West: The west side is comprised of two subareas, 1) the Matanuska-Susitna and Yukon-Koyukuk census divisions and 2) the Anchorage and Kenai Peninsula census divisions.
- (b) East: The east side includes the Valdez-Cordova census division.

\* Note: Unofficial information was received by TES concerning the possibility that a fairly well-developed construction enclave would be provided, with a significant level of services and housing for mid- and upper-level management and their families. This information was received too late to consider in this analysis. However, it is possible that, with such an enclave, there could be potential reduced magnitudes of impacts in certain categories. These would include ethnicity, culture, community, housing type and availability, and possibly a slight decrease in magnitude on public services. Although absolute impacts may decline somewhat in the aforementioned categories, or relative magnitudes, likely would remain the same.



LEGEND

Geographic Impact Areas

WEST

Matanuska-Susitna/Yukon-Koyukuk  
Anchorage/Kenai Peninsula

EAST

Valdez-Cordova

Census Divisions

130, 232  
020, 090 (091, 092)  
200 (201, 202, 203)

Figure 1. Socioeconomic Analysis of Access Schemes.

The Socioeconomic Analysis involved consideration of several impact categories, as listed in Table 3. These include a range of social, community, and economic factors as well as economic base elements. For purposes of the preliminary access route analysis, and given the data base currently available, only broad impact categories are considered at this time. As the study progresses, it will be possible to provide a somewhat more detailed assessment involving the discrete socioeconomic variables that comprise the impact categories.

As mentioned, the socioeconomic assessment involves a qualitative examination of impacts for each access route Scheme (A, B, C, or D). This was done for the geographic impact areas discussed above. Table 3 provides a listing of potential socioeconomic impacts for each category by geographic impact area. A subjective numerical scale of 1 to 5 was used, with 5 representing a great impact and 1 a small or negligible impact. The numerical scale does not correspond to a quantitative measure, but rather is a scoring system used to delineate the relative magnitudes of impacts. Relative refers here to the socioeconomic base upon which the impact will occur. Thus, for Mat-Su/Yukon-Koyukuk and the east side, the impacts are rated fairly high because of their relatively less developed socioeconomic base. This analysis is a process by which to examine the direct and indirect impacts on existing facilities and demand on those facilities, not induced impacts. For instance, the attractiveness of an increased and, perhaps, less expensive power supply for industry, and the impact associated with such changes have not been considered in the impact analysis.

Examination of the table reveals certain patterns that have developed as a result of the socioeconomic categories of variables being analyzed in this manner. Generally, if access scheme "A" is chosen, then the impacts will be concentrated on the west side, and few impacts of any significant magnitude will occur on the east side. This is viewed as the result of an easily accessible corridor (a road connection to the Parks Highway) for construction materials, equipment, and labor sources, and for post-construction alternative uses of the Susitna Basin.

(a)  
 TABLE 3  
 POTENTIAL SOCIOECONOMIC IMPACTS OF ALTERNATIVE ACCESS ROUTE  
 SCHEMES, BY SOCIOECONOMIC IMPACT CATEGORY

Impact Category	GEOGRAPHIC IMPACT AREAS												
	WEST								EAST				
	Mat-Su/ Yukon-Koyukuk				Anchorage/ Kenai				Valdez-Cordova				
Impact Category	Access Scheme				Access Scheme				Access Scheme				
	A	B	C	D	A	B	C	D	A	B	C	D	
Population Levels	5	5	2	3	2	2	1	1	1	1	5	4	
Ethnicity, Religion	2	2	1	2	1	1	1	1	1	1	3	2	
Cultural, Way-of-Life	3	2	1	2	2	1	1	1	1	1	5	4	
Community, Social, Political	3	2	1	2	2	2	1	2	1	1	5	5	
Housing - Type	3	2	1	2	1	1	1	1	1	1	5	4	
Housing - Availability	5	4	1	2	2	2	1	1	1	1	5	5	
Public Services	5	4	2	2	2	2	1	2	1	1	5	5	
Government Revenues	5	4	1	2	2	2	1	2	1	1	5	4	
Total Labor Demand	5	5	2	3	2	2	1	2	2	2	5	4	
Unemployed Labor	5	4	3	3	3	2	1	2	2	2	5	4	
Construction	5	5	2	3	3	3	2	2	2	2	5	5	
Mining	3	2	1	2	1	1	1	1	1	1	3	2	
Agriculture	1	1	1	1	1	1	1	1	1	1	1	1	
Forestry	3	2	1	2	1	1	1	1	1	1	2	2	
Manufacturing	3	3	1	2	2	2	1	2	1	1	3	3	
Commercial Fisheries	1	1	1	1	1	1	1	1	1	1	1	1	
Oil & Gas	1	1	1	1	1	1	1	1	1	1	1	1	
Transportation													
	Motor	5	2	1	2	4	1	1	1	1	1	5	4
	Rail	2	5	1	3	1	5	1	3	1	1	1	1
Port	1	1	1	1	4	4	1	3	1	1	5	5	
Public Utilities	5	3	1	3	2	2	1	2	1	1	5	4	
Communications	5	4	2	3	2	2	1	2	1	1	5	4	
Wholesale Trade	5	4	2	3	5	5	1	4	1	1	5	5	
Retail Trade	5	4	2	3	4	4	1	3	1	1	5	5	
Services	5	4	2	3	4	3	1	2	1	1	5	5	
Tourism/Recreation	5	3	2	3	3	2	1	1	2	2	5	5	

ECONOMIC BASE CATEGORIES

a. A subjective numerical scale in which 5 represents a great impact and 1 a small or negligible impact. See text for further details.

Access Scheme "B" represents an access route that is similar to "A" from a socioeconomic standpoint, except that impacts will be somewhat less due to utilization of the railroad instead of the Parks Highway. This is due to the more restrictive access associated with rail.

Access scheme "C" shifts the impacts from the west side to the east side, which is displayed by a substantial decrease in relative magnitudes under column C (Table 3) on the west side, and a dramatic increase in relative magnitudes on the east side. As mentioned before, this is due to the assumption that marine, and perhaps, air access will be through Valdez and that the Richardson and Denali Highways will be the haul road. Even with such a shift, impacts are still witnessed on the west side because it is believed that industry and labor pools along the Parks Highway will continue to be utilized.

Access scheme "D" will create impacts that will be dispersed over a greater area than with the other schemes. Impacts to the west side will vary in magnitude by a value of one or possibly two, depending on whether the route from the west is a road or railroad connection.

Some categories will be impacted or not impacted regardless of which access corridor is chosen. For example, categories such as housing availability, total labor demand, unemployed labor, construction, wholesale and retail trade, and services will all be greatly impacted on the west side, independent of which access corridor is chosen. On the other hand, categories such as ethnicity/religion, agriculture, fisheries (commercial) and oil and gas will be impacted negligibly regardless of the access route.

Generally, impacts will be comparatively less in the Anchorage-Kenai area than in other areas due simply to its relatively more developed socioeconomic base. The table reveals that relative magnitudes of impacts are somewhat "tempered" because of the capacity of the socioeconomic infrastructure to absorb anticipated project-related activity.

This analysis does not conclude with a recommendation regarding a preferred scheme. Rather, it is intended to provide an indication of the relative magnitude of impacts by area. Regardless of the scheme



selected, impacts can be termed considerable for either the west or east areas as defined above, with somewhat greater relative magnitudes of impacts on the east side with an eastern scheme than on the west with a western scheme.