

TANANA BASIN AREA PLAN



PHASE II
DEVELOPMENT OF ALTERNATIVES
1983

EVALUATION OF ALTERNATIVES



STATE OF ALASKA
Department of Natural Resources
4420 Airport Way
Fairbanks, Alaska 99701

U.S. DEPARTMENT OF AGRICULTURE
Soil Conservation Service

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**EVALUATION
OF
ALTERNATIVES**

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EXECUTIVE SUMMARY

The Tanana Basin encompasses 21 million acres of land along the Tanana River in the most populated area of Alaska's Interior. The 12.5 million acres of state-owned land within the Tanana Basin, with the exception of those areas which already have area plans or are special recreation areas, is covered here.

This report examines four alternatives for the use of these state lands. The purpose of these alternatives is to evaluate the effects of different land management policies on the resources, economy, society and environment of the Basin. This evaluation will provide the basis for developing the Draft Plan.

Each alternative emphasizes a different set of resources. The four alternatives are:

ALTERNATIVE 1: Emphasis on Settlement

ALTERNATIVE 2: Emphasis on Agriculture

ALTERNATIVE 3: Emphasis and Fish, Wildlife & Recreation

ALTERNATIVE 4: Emphasis on Minerals and Forestry

The results of the impact analysis indicate that the actual amount of resource development that will occur in the Basin is not directly related to the acreages shown for each alternative, as market forces will play a major role in which areas are actually developed. However, these designations will affect the type and location of development. There is little difference between the alternatives as far as the level of mining or forestry is concerned. Therefore, the major difference between alternatives is the designation of land for settlement and agriculture. In terms of impacts the major differences are in the level of habitat, social, environmental and fiscal impacts. Since the sale of land by the state is usually an irreversible decision these effects must be examined closely.

Alternative 1 is likely to have a positive benefit to consumers (land buyers) who save relative to the cost of comparable land on the private market. Excluding agricultural land, this alternative designates the greatest amount of land for settlement (2.3 million gross acres, or 20% of the state lands in the plan area). Approximately 15,200 parcels of settlement and agricultural land would be sold under this alternative by the year 2000. According to the demand assessment, about 815,000 gross acres of land would be required to meet demand (this assumes that elimination of the discount and remote programs will not radically change the demand for land).

However, there would be many social effects of moving people into currently remote, sparsely populated areas. If 50% of the parcels proposed were lived on by the year 2000, the population of some rural communities could increase by over 600% as a result of this alternative. Whether this effect would be welcome or not depends on the community: some want increased trade while others prefer the status quo. There is the potential for environmental effects due to land clearing and improper waste disposal. The fiscal costs of delivering services to these areas could also place a large financial burden on the Fairbanks North Star Borough of as much as \$14 million if all of the proposed land disposals desired a maximum level of public services. However, if only minimal services were required, there could be a net positive fiscal effect on the Borough from property taxes. Outside the Borough, it is very likely that the fiscal impacts of the disposal program will be negative. In fact, this assessment indicates that the fiscal impact to the state for services and facilities in these areas could be as much as \$25 million per year. This alternative may require much larger outlays for fire management due to the increased acreage requiring full fire protection.

Alternative 2 which emphasizes agriculture, proposes allocating 1,214,000 acres (13% of state land in the Basin) for agriculture. Approximately 11,000 parcels would be sold for settlement or agriculture by the year 2000. The economic effects of this allocation are difficult to predict due to the uncertain feasibility of agriculture in the Basin. The acres designated for agriculture in this alternative exceed projected land needs for domestic agricultural self-sufficiency. If an export industry is feasible, however, this surplus acreage could come into production for the export market.

If the areas designated for farming were actually settled, there would be a large social effect on several of the smaller villages in the Basin, with some communities increasing 400 to 800% by the year 2000. This alternative is likely to have the greatest environmental impact of all of the alternatives because of erosion due to land clearing and plowing and the pollution caused by chemicals used in farming. This alternative could also have a substantial fiscal impact on the Borough if the farms were developed, and it would require an estimated state investment in roads of at least \$136 million. It may also have a large impact on fire management costs since farms are given full fire protection.

Alternative 3 This alternative recommends placing 7.6 million acres (or 60% of the state land in the plan) into management for habitat. While it can be shown that fish and game-related activities contribute significantly to the economy of the Basin, it is not possible to quantify the benefits which this Alternative may have. However, it is likely that the benefits due to fish and wildlife will be highest in this alternative.

This alternative recommends 5,200 parcels for sale in settlement or agriculture by the year 2000. Because of this lower level of land disposal, there would be less social impact in the outlying areas of the Basin compared to the other alternatives. The environmental impact would likewise be less and, because there are only 916,000 gross acres recommended for disposal under this alternative, there would also be considerably less fiscal impacts on the Borough and state.

Alternative 4 The economic effects of this alternative are not expected to be significantly different from present land management policies in the Basin. However, this alternative recommends disposal of less land than Alternatives 1 & 2 (13% instead of 27 to 29% of state lands). This decreases both the consumer benefits of disposals and their social and fiscal impacts. Alternative 4 could still have a substantial effect on the population of rural areas if most of the 10,400 parcels proposed for sale by the year 2000 are inhabited, even though the number of acres involved are half the amount of the first two alternatives.

Table 1 summarizes the acreage in each designation for each alternative. A summary of the effects of each alternative on some goals for the region is also included. These goals do not represent a comprehensive list, but are representative of the most frequently heard comments at the public meetings held on the plan during March of 1982.

In conclusion there are many common elements among the four alternatives, but the main differences occur in the number of acres allocated to settlement and agriculture, (see Table 1) and the associated social, environmental and fiscal impacts.

Table 1
SUMMARY OF PRIMARY LAND USES BY ALTERNATIVE
(in Thousands of Acres)

Primary Land Use Designation	Alternative 1 Settlement	Alternative 2 Agriculture	Alternative 3 Fish, Wildlife & Recreation	Alternative 4 Minerals & Forestry
1. Settlement	2,310 (20%)	1,723 (14%)	916 (7%)	1,250 (10%)
2. Agriculture	782 (6%)	1,214 (10%)	179 (1%)	369 (3%)
3. Recreation Fish & Wildlife	4,160 (33%)	4,427 (35%)	7,618 (61%)	4,667 (37%)
4. Forestry ^a	1,414 (11%)	1,396 (11%)	1,448 (12%)	1,689 (14%)
5. Other Combinations	2,783 (22%)	2,914 (23%)	361 (3%)	3,435 (27%)
6. Resource Management	1,024 (8%)	800 (6%)	1,952 (15%)	1,064 (9%)
TOTAL	12,474 (100%)	12,474 (100%)	12,474 (100)	12,474 (100%)
No. of Parcels to be Sold	15,200	11,000	5,200	10,400

^aThis includes the Fairbanks State Forest.

Figure 1. EFFECTS ON GOALS

GOALS	ALTERNATIVE				
	1.	2.	3.	4.	
1. Provide additional employment and income in the Tanana Basin	No significant effect expected.				Current economic information suggests that none of the alternatives will have a significant effect on the number of jobs in the Basin. Other factors, beyond the scope of the Tanana Basin Area Plan, will influence the economic development of the region. None of the alternatives is expected to significantly hinder development.
2. Protect Environmental Quality					Air, water and visual quality would receive the greatest protection under Alternative 3 since it minimizes development along rivers, lakes, scenic hwy., and other environmentally sensitive areas. Active development of roads and resources in these areas under the other alternatives would have adverse effects on environmental quality. Negative effects may be mitigated, however, through land use policies.
3. Provide additional opportunities for private ownership of land					Alt. 2 would offer the greatest amount of land for agricultural use, while Alt. 1 would sell the most for recreational and residential use. Alternative 4 would offer more limited quantities of land for sale, located primarily near existing population centers and where access is available. Alt. 3 would offer the fewest additional lands sales, relying instead on existing private lands and cabin permits to satisfy the demand.
4. Preserve the character of existing communities and lifestyles in rural areas.					Rural communities depend on local supplies of wood and wildlife. Traditional means of access also are important to many of these areas. Alt.3 would protect the character of such communities by offering about 5000 parcels for sale. Alternatives 1 and 2 could increase the sense of crowding by offering 15,200 and 11,000 parcels respectively in the Basin
5. Minimize the risk of fiscal impacts on the Borough and State					Costs of providing roads, schools, fire protection and other services may be minimized by concentrating development near roads and population centers. It is likely that Alternative 3 would result in the smallest fiscal impact to the Borough and State. Alternative 2, which could require over 600 miles of road, could result in the largest fiscal impact. There is a risk of increasing fiscal impacts on the Borough by as much as \$8 million per year and on the state by over \$25 million per year under Alternative 1.

LEGEND

Effect on Goal:

- Most Positive
- Moderately Positive
- Least Positive

INTRODUCTION

This report describes four alternatives for the management of state land and the possible consequences of each. It is part of Phase II of the Tanana Basin Area Planning Process. Phase I of the process was the Resource Inventory which was completed in January 1983. Phase II is the development, evaluation and public review of the alternatives, which will be complete by the end of June. The development of the Draft Plan begins Phase III and should be complete by October, 1983. The Final Plan, (Phase IV) is due for completion in December.

The purpose of developing alternatives is to examine the effects of different ways of managing state land on the resources, economy, society, and environment of the basin.

This document is organized in three parts. First, the general theme of each alternative, the policies common to all alternatives, and the policies which vary by alternative are discussed. Second, maps of each alternative are presented. The third section of the paper discusses the impacts of each alternative.

The maps included in this report summarize the designations into broad categories. More detailed maps and more information on each designation are available at the Division of Land and Water Management office of the Department of Natural Resources in Fairbanks.

Chapter 1

Description of Alternatives

CHAPTER I. DESCRIPTION OF ALTERNATIVES

A. GENERAL THEME OF EACH ALTERNATIVE

Alternative 1: Emphasis on Land Sales for Settlement

The theme of this alternative is to encourage residential and recreational settlement through the sale of state lands or the issuing of permits, such as remote cabin permits, that allow settlement use of state lands. In areas with existing or nearby access by road, water or air parcels generally will be small (5 acres or less) to allow the greatest number of people to purchase accessible land.

In remote areas, suitable land will be offered in amounts that attempt to satisfy long-term demand. Parcel size generally will be larger (5-40 acres), except in recreational subdivisions.

Alternative 2: Emphasis on Land Sales for Agriculture

The principal goal of this alternative is to assist in the development of an Alaskan agricultural industry by the sale of agricultural rights to state land. In accessible areas (generally within 6 miles of an existing or planned road or navigable waterway) most land suitable for agriculture will be offered for sale for agricultural development. In more remote areas most land with agricultural potential will be retained in state ownership for possible future agricultural development and managed so as not to preclude such development. This land may be classified as resource management.

Alternative 3: Emphasis on Wildlife Habitat and Recreation

The goals of this alternative are: 1) to protect fish, wildlife habitat, and recreation resources; 2) to protect or improve opportunities for their use; and 3) to protect the resources that sustain the lifestyle of residents in rural and remote areas. This is achieved primarily through retention of state lands in public ownership and management of those lands for multiple uses, particularly habitat protection and enhancement, recreation and forestry. Other land uses that complement these activities, such as expansion of tourism, also will be encouraged. Land will be managed to minimize changes in existing settlement patterns and maintain the rural qualities of the region.

Alternative 4: Emphasis on Forestry and Minerals

The principal goals of this alternative are to promote development of both mineral resources and an integrated forest products industry. These goals may be best met by retaining the proposed state forest reserves and other valuable forestry or mineral lands in public ownership. This ensures that a long-term, stable supply of forested land is available and that land remains open to mineral exploration and development.

B. POLICIES COMMON TO EACH ALTERNATIVE

All four alternatives were developed with these basic policies in common:

1. All alternatives promote multiple use of land and resources wherever such use can be consistent with the theme of the alternative.
2. All alternatives are designed to promote some diversity of economic development, whatever the particular emphasis of the alternative.
3. All lands designated for a particular use meet the minimum capability criteria as defined in the Element Paper for that resource.
4. Fire suppression levels used in interagency fire management plans, and the process of assigning those levels followed in that planning, will be applied to all state lands.
5. All land use will be managed so as to protect air and water quality.
6. Trails will be protected by easements or public retention.
7. To protect visual quality, generally a 300-foot buffer will be maintained between highway rights-of-way and state subdivisions and material sites, in accordance with existing regulations.
8. Public use corridors around lakes and rivers will be reserved and some land will be retained in public ownership in all alternatives.
9. Hazardous areas will not be sold.
10. Public compensation for the value of wood products will be required when land is disposed of for agriculture.

C. POLICIES THAT VARY BY ALTERNATIVE

In addition to the land allocations, which establish allowable uses of the land, there are also several land management issues which the plan will address. For each issue, there is a range of possible approaches to deal with it. The following policies respond to these basin-wide issues. For ease of analysis, the policies have been grouped by alternative. The advantages and disadvantages of each approach are discussed in Section III B of this report.

With the help of public and agency comments on these alternative policies, the Tanana Basin Area Planning Team will develop one approach to deal with each of these issues in the Draft Plan, which is due for completion by October, 1983.

POLICIES THAT VARY BY ALTERNATIVE

**Alternative 1
(Settlement)**

Management of Floodplains

- Settlement allowed in floodway fringe which is the area of standing water during a flood (as opposed to the active floodway where the water is moving).

Guidelines for Management of River Corridors

- 50 foot easements and 100 foot building setbacks will be required.

**Alternative 2
(Agriculture)**

- Same as #1.

- Same as # 1.

**Alternative 3
(Fish and Game and
Recreation)**

- Generally settlement will not be allowed in the floodway fringe, however exceptions to this policy are permitted.

- Generally 200 feet or more in public ownership along the shore.
- Protect the shoreline from degradation which would increase erosion.

**Alternative 4
(Minerals and Forestry)**

- Same as # 1.

- Same as # 1.

POLICIES THAT VARY BY ALTERNATIVE (Continued)

Alternative 1	Alternative 2	Alternative 3	Alternative 4
<p><u>Open Space Requirements for Residential Disposals On Lakes</u></p> <ul style="list-style-type: none">- On lakes greater than 40 acres reserve at least 10% of the usable land on the lakefront.- Maintain 50 foot easements along shoreline.	<ul style="list-style-type: none">- Same as # 1.	<ul style="list-style-type: none">- On lakes greater than 40 acres reserve at least 25% of the usable land on the lakefront.- Maintain a 100 foot publicly owned corridor.- Protect the shoreline from degradation.- If possible inlets, outlets and islands will be included in the public reservation.	<ul style="list-style-type: none">- Same as # 1.
<p><u>Where Mineral Entry Will be Allowed</u></p> <ul style="list-style-type: none">- Remote land which has not been sold might be reopened to mineral entry.- Subdivisions and agriculture parcels will remain closed to mineral entry.- Other lands will remain open.	<ul style="list-style-type: none">- Same as #1.	<ul style="list-style-type: none">- Critical habitats will generally be closed to mineral entry.- Subdivisions will remain closed to mineral entry.- Other lands will remain open. Wildlife values will be protected by MLUP's and leasehold location orders depending on the area.- Unsold parcels in remote disposal areas will be reviewed on a case by case basis to determine whether the area should be reopened.	<ul style="list-style-type: none">- Unsold parcels in remote disposal areas will be automatically reopened to mineral entry after the net acreage has been sold.- Subdivisions will remain closed to mineral entry.- Agricultural sale areas will remain open to mineral entry.

POLICIES THAT VARY BY ALTERNATIVE (Continued)

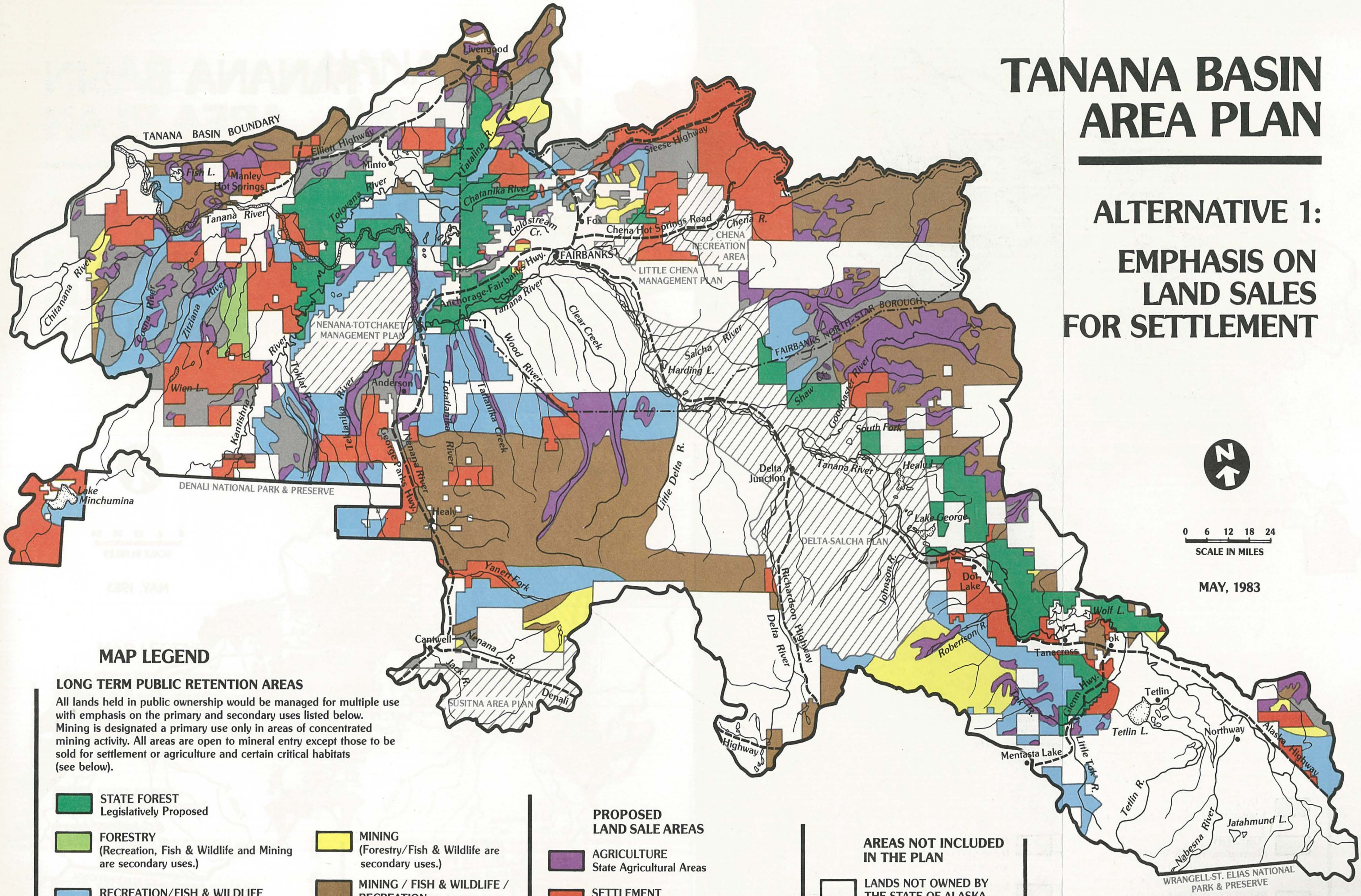
Alternative 1	Alternative 2	Alternative 3	Alternative 4
<p><u>Width and Management of Trail Corridors</u></p> <ul style="list-style-type: none">- In general, trails will have 60 foot easements.- Trail can be moved if necessary.	<ul style="list-style-type: none">- Same as # 1.	<ul style="list-style-type: none">-In general, different types of trails will have the following size corridors retained in public ownership:<ul style="list-style-type: none">Neighborhood — 100 feetCommunity — 300 feetState or Regional — 600 feet.	<ul style="list-style-type: none">- In general, trails will have 60 foot easements.- Trail may be moved or upgraded into a road.
<p><u>Protection of Visual Quality Along Highways</u></p> <ul style="list-style-type: none">- 300 foot buffer between the edge of the road right of way and a disposal that, when reviewed on a case by case basis, could be reduced to no buffer.	<ul style="list-style-type: none">- Same as # 1.	<ul style="list-style-type: none">- Adopt Scenic Resource Study recommendations for Parks Highway.- On other highways maintain at least 300 foot buffer between edge of highway right of way and disposals.	<ul style="list-style-type: none">- Same as # 1.
<p><u>Location of Commercial Recreation</u></p> <ul style="list-style-type: none">- Commercial recreation allowed where feasible to develop with a disposal.	<ul style="list-style-type: none">- No commercial recreation construction on designated areas of agricultural soils over 40 acres in size.	<ul style="list-style-type: none">- Commercial recreation construction not allowed in areas with significant wildlife values.	<ul style="list-style-type: none">- Commercial recreation construction should not preclude forest or mineral development.

Chapter 2

Maps of the Alternatives

TANANA BASIN AREA PLAN

ALTERNATIVE 1: EMPHASIS ON LAND SALES FOR SETTLEMENT



0 6 12 18 24
SCALE IN MILES

MAY, 1983

MAP LEGEND

LONG TERM PUBLIC RETENTION AREAS

All lands held in public ownership would be managed for multiple use with emphasis on the primary and secondary uses listed below. Mining is designated a primary use only in areas of concentrated mining activity. All areas are open to mineral entry except those to be sold for settlement or agriculture and certain critical habitats (see below).

- STATE FOREST
Legislatively Proposed
- FORESTRY
(Recreation, Fish & Wildlife and Mining are secondary uses.)
- RECREATION/FISH & WILDLIFE
(The secondary uses under this category vary from one area to another and are therefore not shown.)

- MINING
(Forestry/Fish & Wildlife are secondary uses.)
- MINING / FISH & WILDLIFE / RECREATION
- RESOURCE MANAGEMENT

PROPOSED LAND SALE AREAS

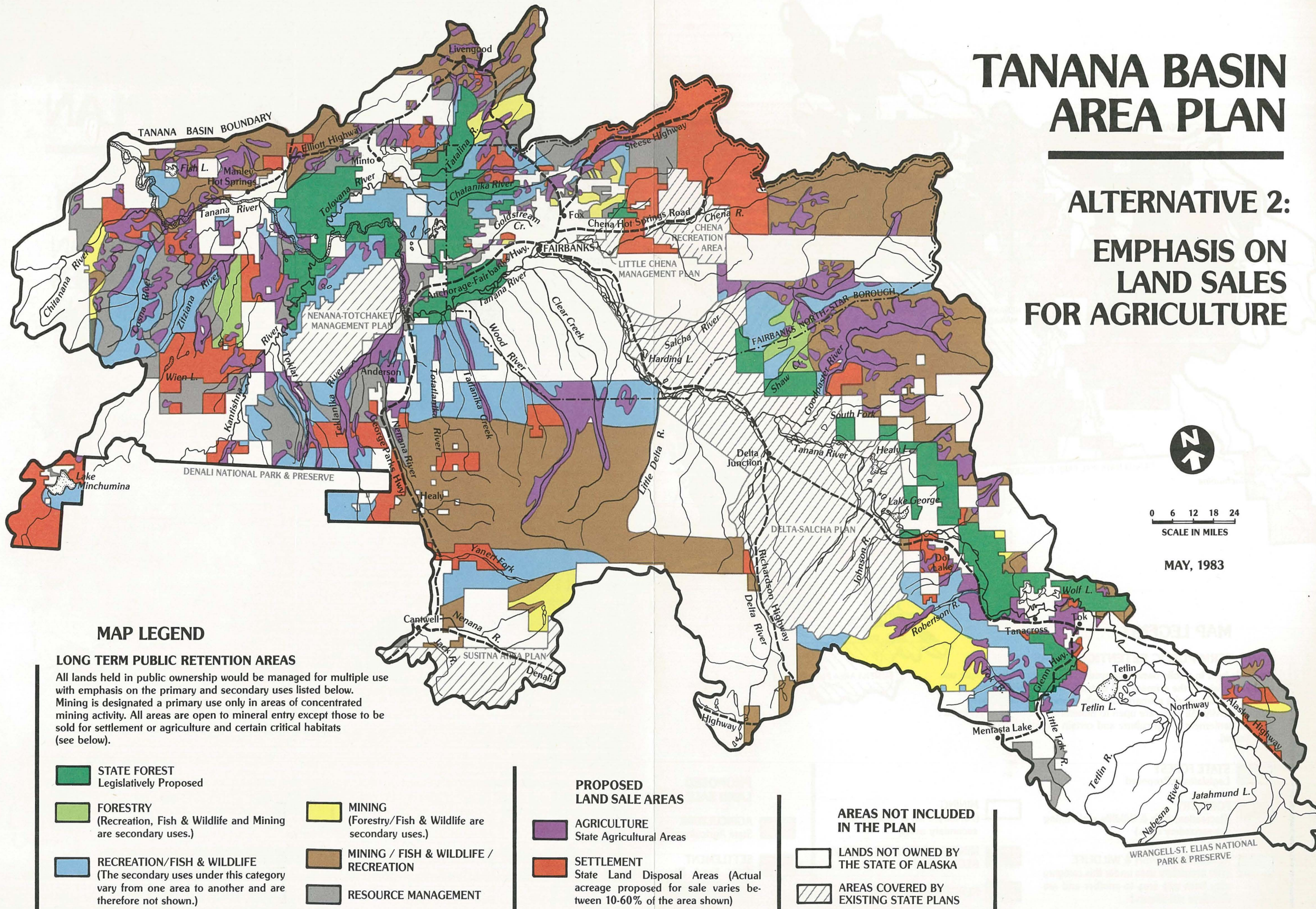
- AGRICULTURE
State Agricultural Areas
- SETTLEMENT
State Land Disposal Areas (Actual acreage proposed for sale varies between 10-60% of the area shown)

AREAS NOT INCLUDED IN THE PLAN

- LANDS NOT OWNED BY THE STATE OF ALASKA
- AREAS COVERED BY EXISTING STATE PLANS

TANANA BASIN AREA PLAN

ALTERNATIVE 2: EMPHASIS ON LAND SALES FOR AGRICULTURE









0 6 12 18 24
SCALE IN MILES

MAY, 1983



MAP LEGEND

LONG TERM PUBLIC RETENTION AREAS



All lands held in public ownership would be managed for multiple use with emphasis on the primary and secondary uses listed below. Mining is designated a primary use only in areas of concentrated mining activity. All areas are open to mineral entry except those to be sold for settlement or agriculture and certain critical habitats (see below).

- | | |
|---|--|
|  STATE FOREST
Legislatively Proposed |  MINING
(Forestry/Fish & Wildlife are secondary uses.) |
|  FORESTRY
(Recreation, Fish & Wildlife and Mining are secondary uses.) |  MINING / FISH & WILDLIFE / RECREATION |
|  RECREATION/FISH & WILDLIFE
(The secondary uses under this category vary from one area to another and are therefore not shown.) |  RESOURCE MANAGEMENT |

PROPOSED LAND SALE AREAS

- | |
|--|
|  AGRICULTURE
State Agricultural Areas |
|  SETTLEMENT
State Land Disposal Areas (Actual acreage proposed for sale varies between 10-60% of the area shown) |

AREAS NOT INCLUDED IN THE PLAN

- | |
|--|
|  LANDS NOT OWNED BY THE STATE OF ALASKA |
|  AREAS COVERED BY EXISTING STATE PLANS |

TANANA BASIN AREA PLAN

ALTERNATIVE 3: EMPHASIS ON FISH, WILDLIFE AND RECREATION




0 6 12 18 24
SCALE IN MILES

MAY, 1983



MAP LEGEND

LONG TERM PUBLIC RETENTION AREAS



All lands held in public ownership would be managed for multiple use with emphasis on the primary and secondary uses listed below. Mining is designated a primary use only in areas of concentrated mining activity. All areas are open to mineral entry except those to be sold for settlement or agriculture and certain critical habitats (see below).

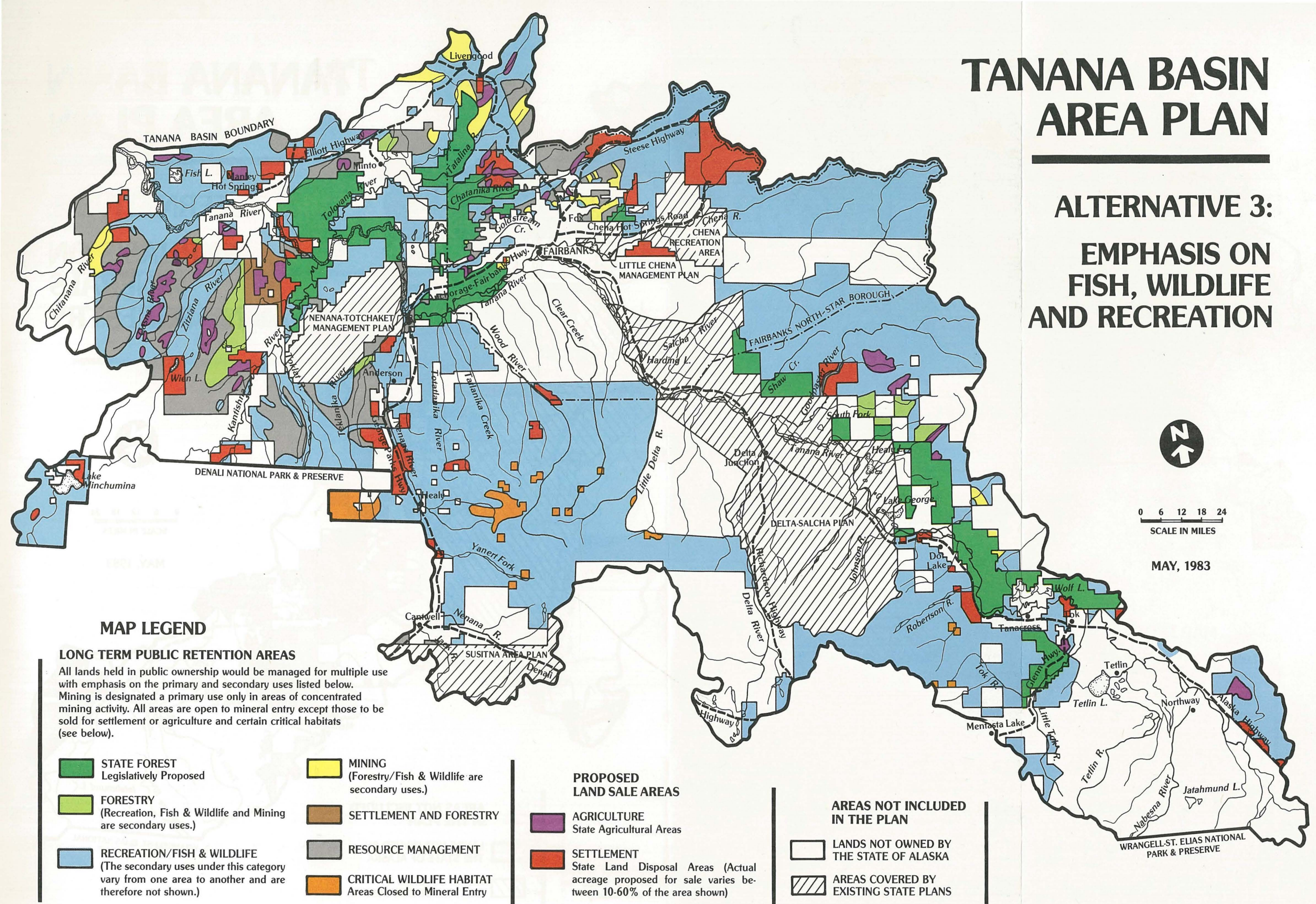
- | | |
|---|--|
|  STATE FOREST
Legislatively Proposed |  MINING
(Forestry/Fish & Wildlife are secondary uses.) |
|  FORESTRY
(Recreation, Fish & Wildlife and Mining are secondary uses.) |  SETTLEMENT AND FORESTRY |
|  RECREATION/FISH & WILDLIFE
(The secondary uses under this category vary from one area to another and are therefore not shown.) |  RESOURCE MANAGEMENT |
| |  CRITICAL WILDLIFE HABITAT
Areas Closed to Mineral Entry |

PROPOSED LAND SALE AREAS

- | |
|--|
|  AGRICULTURE
State Agricultural Areas |
|  SETTLEMENT
State Land Disposal Areas (Actual acreage proposed for sale varies between 10-60% of the area shown) |

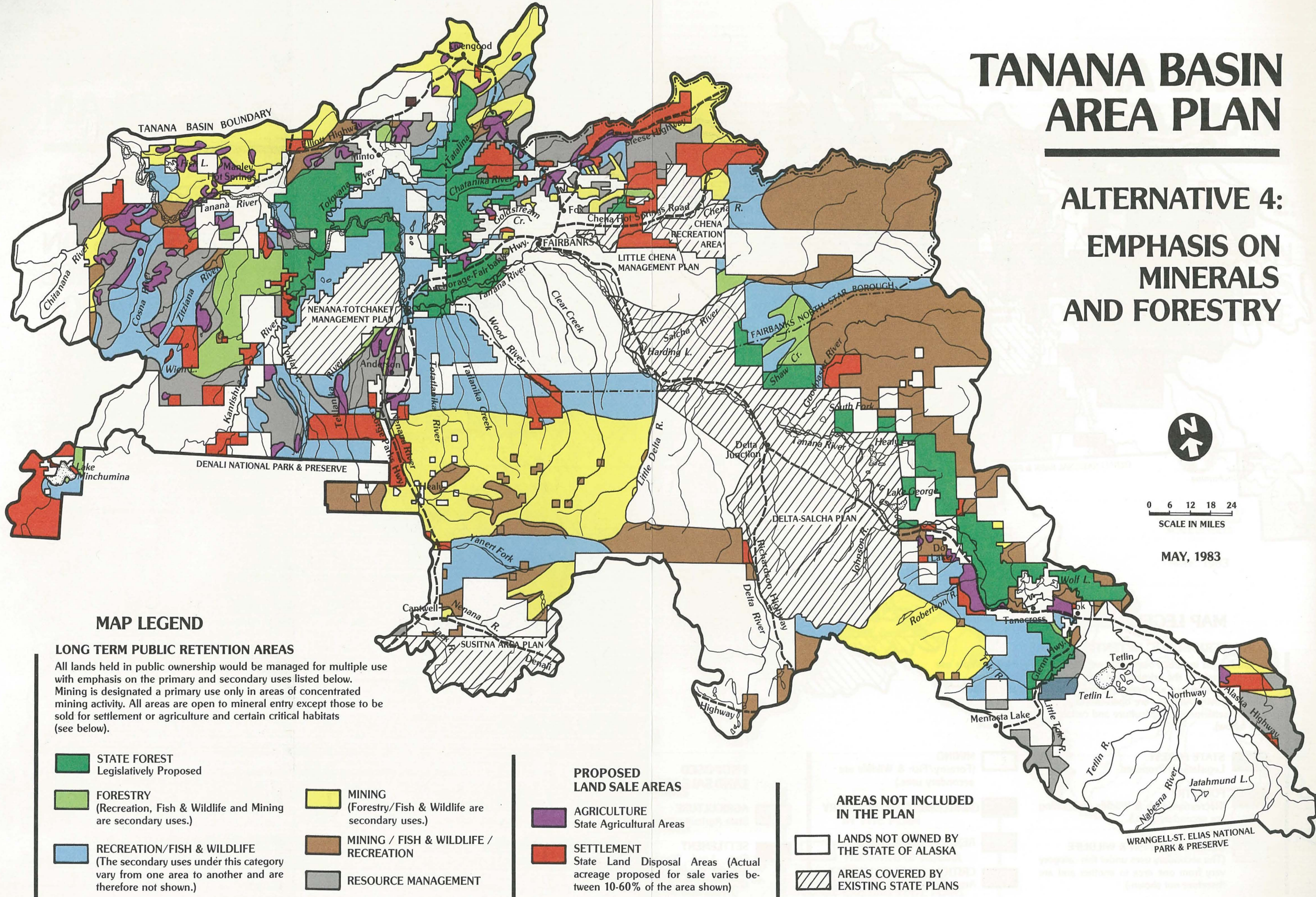
AREAS NOT INCLUDED IN THE PLAN

- | |
|--|
|  LANDS NOT OWNED BY THE STATE OF ALASKA |
|  AREAS COVERED BY EXISTING STATE PLANS |



TANANA BASIN AREA PLAN

ALTERNATIVE 4: EMPHASIS ON MINERALS AND FORESTRY



MAP LEGEND

LONG TERM PUBLIC RETENTION AREAS

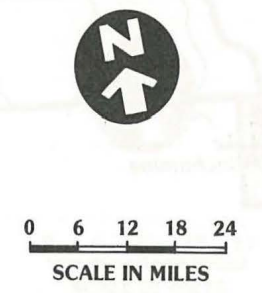
All lands held in public ownership would be managed for multiple use with emphasis on the primary and secondary uses listed below. Mining is designated a primary use only in areas of concentrated mining activity. All areas are open to mineral entry except those to be sold for settlement or agriculture and certain critical habitats (see below).

- STATE FOREST
Legislatively Proposed
- FORESTRY
(Recreation, Fish & Wildlife and Mining are secondary uses.)
- RECREATION/FISH & WILDLIFE
(The secondary uses under this category vary from one area to another and are therefore not shown.)

- MINING
(Forestry/Fish & Wildlife are secondary uses.)
- MINING / FISH & WILDLIFE / RECREATION
- RESOURCE MANAGEMENT

- #### PROPOSED LAND SALE AREAS
- AGRICULTURE
State Agricultural Areas
 - SETTLEMENT
State Land Disposal Areas (Actual acreage proposed for sale varies between 10-60% of the area shown)

- #### AREAS NOT INCLUDED IN THE PLAN
- LANDS NOT OWNED BY THE STATE OF ALASKA
 - AREAS COVERED BY EXISTING STATE PLANS



MAY, 1983

Chapter 3

Evaluation of the Alternatives

CHAPTER III. EVALUATION OF THE ALTERNATIVES

A. EFFECTS OF THE ALTERNATIVES ON EACH RESOURCE

1. EFFECTS OF ALTERNATIVES ON SETTLEMENT

a. Introduction

Outside the Tanana Valley State Forest, almost 2,400,000 acres of state land in the Tanana Basin have been identified as suitable for settlement. As described in the Settlement Element Paper (Resource Allocation Section, DLWM, Dept. of Natural Resources, 1983), these areas were defined through the use of aerial photos and exploratory soils surveys and are relatively well-drained, forested areas on low to moderate slopes.

Within the last four years, the state has offered 158,040 acres and sold 58,584 acres of land in the various disposal programs in the Basin. As shown in Table 2, most of these acres were small agricultural parcels.

Not all of the parcels offered for sale in each category were purchased. While 34% of subdivision land offered was sold, only 15% of the limited remote and 19% of the unlimited remote acreage offered was sold, but 96% of the small agriculture acreage sold.

Table 2.
PAST LAND DISPOSALS IN THE TANANA BASIN

Disposal Program	No. of Acres Offered 1979-1983	No. of Acres Sold 1979-1983	% of the Acres Offered Which Have Sold
Subdivisions	31,728	10,629	34%
Small Agri.(a)	24,150	23,139	96%
Remotes (ltd.)	59,120	9,055	15%
(unlimited)	15,070	2,804	19%
Other Programs	28,022	12,957	46%
TOTAL	158,040	58,584	37% (avg)

(a) This includes 14,357 acres disposed of in Potlatch Ponds. The status of this disposal is not determined at this time.

The demand for settlement land depends on a number of factors, including price, quality, location and the buyers perception of future prices. No economic study of the current disposal program is available. However, a projection of what the future response to sales would be, based on past sales, was prepared by DNR in 1982 (DNR, 1983). This study forecast the demand for private land in the Basin to be 193,993 gross acres over the next five years. This is land actually purchased. Part of this demand could be met from landowners other than the state, eg. the Borough or Native corporations.

Because much of the demand for land is for investment purposes, the amount of land likely to be used is substantially less than the acreage sold. According to the Settlement Element Paper, a total of 41,297 net acres, or 11% of land sold is likely to be used for residential or recreational purposes within five years.

b. Areas Designated for Settlement

The net acreage recommended for subdivisions, large tracts small agriculture and remote parcels for each alternative is shown in Table 3.

Of the four alternatives, the first sets aside the most land for settlement. This alternative designates a total of 2.31 million gross acres for settlement, but only 610,665 net acres of this would actually be sold, after allowing for the density of the settlement, easements and areas of poor soils or steep slopes.

Table 3.
NET ACREAGE RECOMMENDED FOR DISPOSAL BY EACH ALTERNATIVE

Disposal Program	Alternative			
	1	2	3	4
Subdivisions	20,205	17,381	10,065	16,380
Remotes and Large Tracts	546,050	345,917	153,597	329,191
Small Agriculture	44,410	44,410	27,510	42,010
TOTAL	610,665	407,708	191,172	387,581

These acreages are grouped according to five quality classes: "Type A" is land located within 2 miles of a road and within 40 miles of Fairbanks or 25 miles of another town. "Type B" land is located within 2 miles of a road but farther from a town than type A; "Type C" land is located within 300 feet of a river, lake or airstrip; "Type D" land is located greater than 300 feet but less than a quarter of a mile from a river, lake or airstrip and "Type E" land is greater than 1/4 mile from rivers, lakes or airstrips and more than 2 miles from a road.

The amount of gross acreage in each quality class for each alternative and the proportion of land of each type in the Basin is shown in Table 4. These acreages range from 39 to 98% of the total capable land for settlement in the Basin. The alternatives differ primarily in the amount of remote acreage (Type E) to be disposed, but there are also significant differences in the amount of quality classes A and B. Under any of the alternatives at least 150,000 acres, or 51%, of the most accessible and capable land (Type A) would be proposed for disposal in the Basin. This assessment includes only state-owned lands. There are also private and other government lands in each quality class which are likely to be suitable for disposal.

c. Comparison of Demand and Supply

Based on analysis of past land sales and projected state and regional population levels, the demand for private land in the Basin will be roughly 193,993 gross acres over the next five years and 620,778 acres for the years 1989-2000 (For a full discussion of how demand was calculated see Settlement

When the amount of capable land for settlement in the Basin is compared to the gross acreage demanded to the year 2000, it is clear that the state can supply the demand if no other resources are taken into account (Table 4). The projected demand is only 35% of the 2.3 million acres of capable land. However, the projected demand for Type A land cannot be satisfied as it amounts to 158% of the Type A capable land. Only if more land is made accessible by the year 2000 can this demand be met by state lands. Even if other landowners sell a high proportion of their land, the demand for Type A land may not be met. The University of Alaska, Borough and village and regional corporation lands total approximately 3 million acres, and a substantial proportion of this land may be sold. However, not all of this land is likely to be capable and accessible for settlement.

The net acreage proposed in each alternative is compared in Figure 1 with the projected demand by land quality class for 5 years and 16 years into the future (to the year 2000). None of the alternatives will meet the demand for waterfront property (Type C land), but the demand for land in most of the other quality classes would be met by most of the alternatives. Not all of this land is available for sale, however, since selected land is included as well as land which is encumbered by mining claims or other factors.

Figure 2 provides additional information comparing the actual requirements for building land (total demand less investment acreage) with proposed supply by land use type for each alternative to the year 2000. This figure shows all alternatives able to meet the supply of land actually expected to be built upon by the year 2000.

d. Economic Effects

As discussed in the Settlement Element Paper, it was not possible to calculate the benefits to consumers. The benefits of land sales to consumers are likely to be positive, however, due both to the favorable terms which the state offers and to the relatively lower search and purchase costs (since all information is in a single brochure).

Information gathered in the Element Paper indicates that the revenues from the NCDO disposal program cover its direct costs. Type A subdivisions are the source of most of the net revenue, but most quality types break even in their direct costs and revenues.

e. Fiscal Impacts

Fiscal impacts are defined here as the indirect costs and benefits of the disposal program. The fiscal impacts of land disposals on the Borough government were calculated over a range from minimum to maximum (see Figure 3 and the Settlement Element). These impacts include both the positive effects of increased property taxes to the Borough, and the negative effects of increased services including schools and general government services to new residents. As shown in Figure 3, the fiscal impact of the land disposals proposed in Alternative 1 could be as large as \$8.5 million per year within the Borough.

Disposals outside the Borough may increase the costs to the State if airstrips, schools and other services are required in these areas. Figure 4 indicates that these costs could exceed \$25 million per year (see Appendix A).

f. Employment and Income Generated

There is a limited amount of employment and income generated by land disposals. These are difficult to estimate, as they fall in the categories of construction of housing, supply of materials and local government services to support new residential areas. In more remote areas, local services such as community stores, lodges and charter aircraft may benefit from disposals. These effects have not been quantified here but should be noted in the selection of alternatives.

g. Social Effects

See page 47 for a discussion of the potential social effects of land disposals.

h. Environmental Effects

See page 61 for a discussion of these effects.

Table 4.
COMPARISON OF AMOUNT OF CAPABLE STATE-OWNED SETTLEMENT LAND AND
AMOUNT OF LAND DESIGNATED IN EACH ALTERNATIVE.

	DISPOSAL QUALITY CLASS					TOTAL
	A	B	C	D	E	
Capable Land (a) (gross acres)	291,800	110,500	11,100	22,400	1,912,400	2,348,200
Demand (gross acres)						
1984-1988	109,578	12,350	26,558	12,875	32,632	193,993
1989-2000	350,650	39,520	84,986	41,200	104,422	620,778
Total 1984-2000	460,228	51,870	111,544	54,075	137,054	814,771
Alternative 1						
Gross Acres	268,700	100,900	5,600	22,000	1,912,400	2,310,000
Percent of Capable Land	92	91	50	98	100	98
Alternative 2						
Gross Acres	183,600	70,700	4,100	14,000	1,450,100	1,722,700
Percent of Capable Land	63	64	37	63	76	73
Alternative 3						
Gross Acres	149,700	35,500	4,700	16,000	710,200	916,200
Percent of Capable Land	51	32	42	71	37	39
Alternative 4						
Gross Acres	227,900	41,100	3,700	12,500	965,100	1,250,300
Percent of Capable Land	78	37	33	56	50	53

(a) Land capable of supporting settlement. See Settlement Element Paper for full discussion (DRD, DNR, 1983). This includes state selected as well as TA'd and patented land and the figures have not been adjusted for mining claims or other encumbrances which can only be detected on detailed status plats.

Table 5.
COMPARISON OF FORECAST DEMAND AND THE AMOUNT OF NET ACREAGE
DESIGNATED IN EACH ALTERNATIVE BY QUALITY TYPE

	DISPOSAL QUALITY CLASS					TOTAL
	A	B	C	D	E	
Forecast Demand (a)						
1984-1988	23,167	2,611	5,615	2,722	6,899	41,014
1989-2000	50,967	5,744	12,353	5,988	15,178	90,231
Total: 1984-2000	74,134	8,355	17,968	8,710	22,077	131,245
Alternative 1						
Net Acres	109,300	18,200	1,900	6,600	476,000	612,000
Alternative 2						
Net Acres	80,900	11,800	700	2,200	312,100	407,700
Alternative 3						
Net Acres	56,100	15,900	800	2,600	115,800	191,200
Alternative 4						
Net Acres	92,300	7,900	700	2,400	284,300	387,600

(a) Demand forecasts were taken from the Statewide Demand Assessment, the results of which are included in the Settlement Element Paper.

*Supply is only state land; in fact, other owners will sell land also.

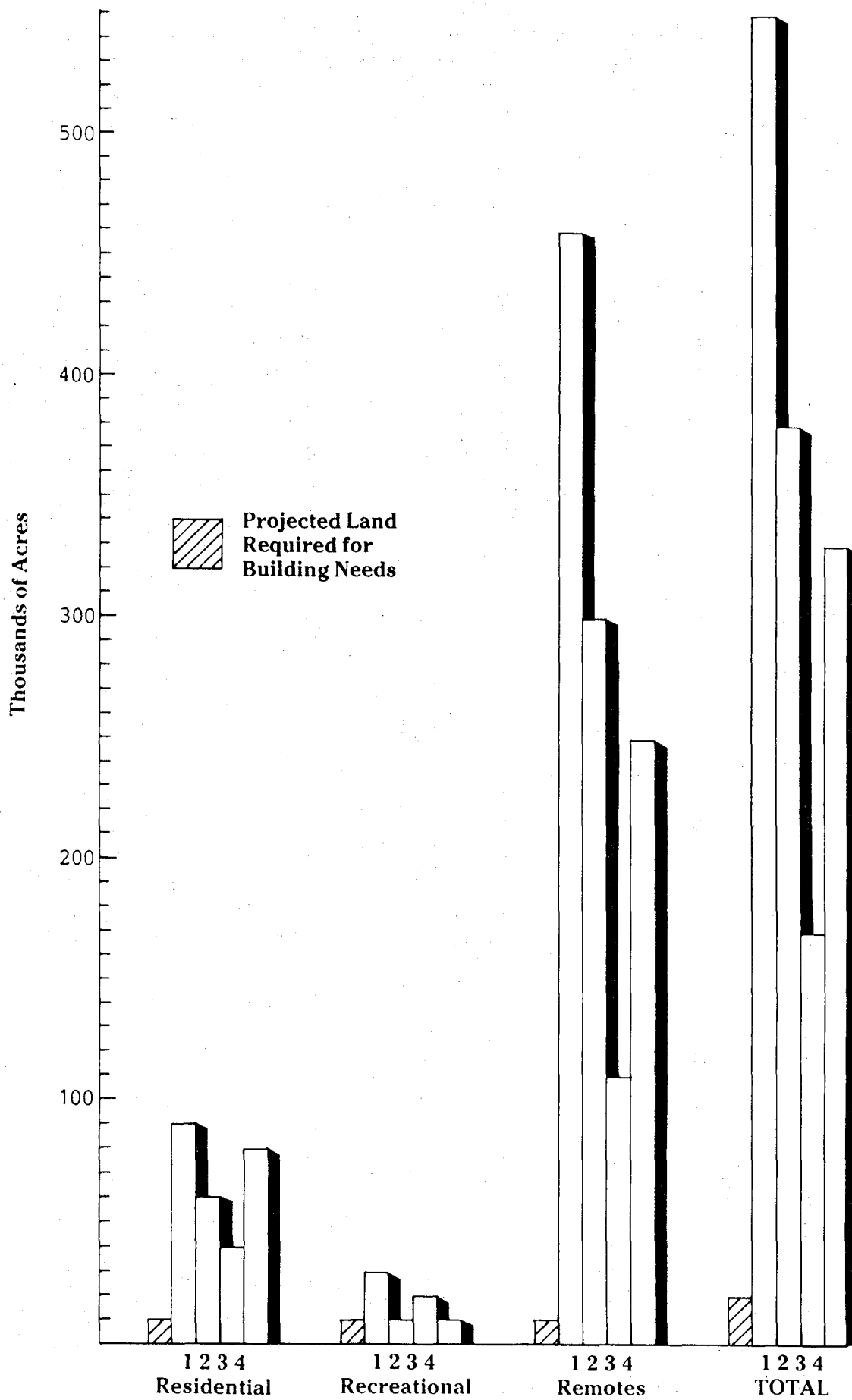


Figure 2.
NET ACREAGE IN EACH ALTERNATIVE COMPARED TO
THE ESTIMATED LAND REQUIREMENTS FOR BUILDING NEEDS
(IN THOUSAND ACRES) TO THE YEAR 2000.

Figure 3.
ESTIMATED RANGE OF NET ANNUAL FISCAL IMPACTS
OF DISPOSALS WITHIN THE ORGANIZED BOROUGH
(IN MILLION DOLLARS).

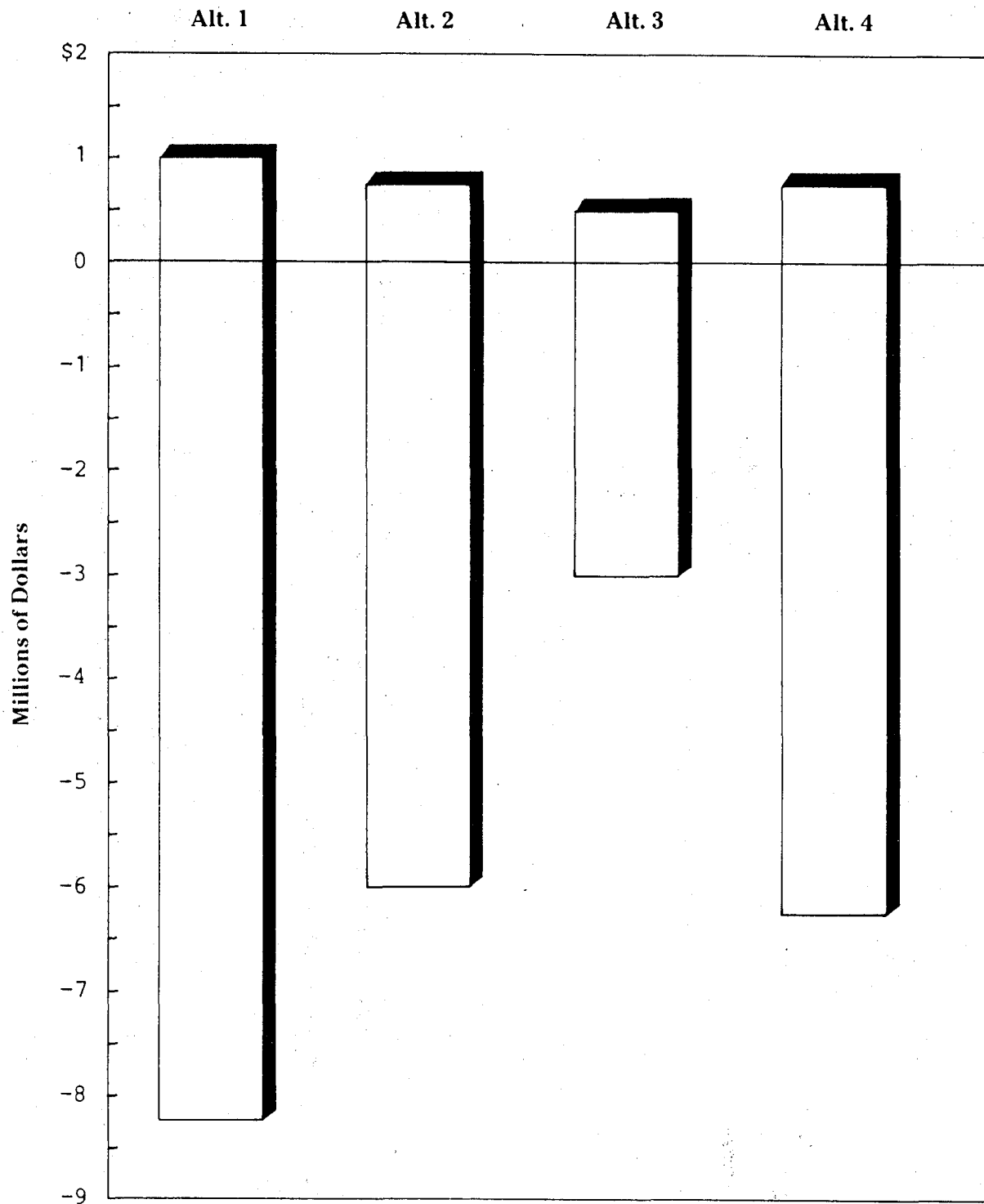
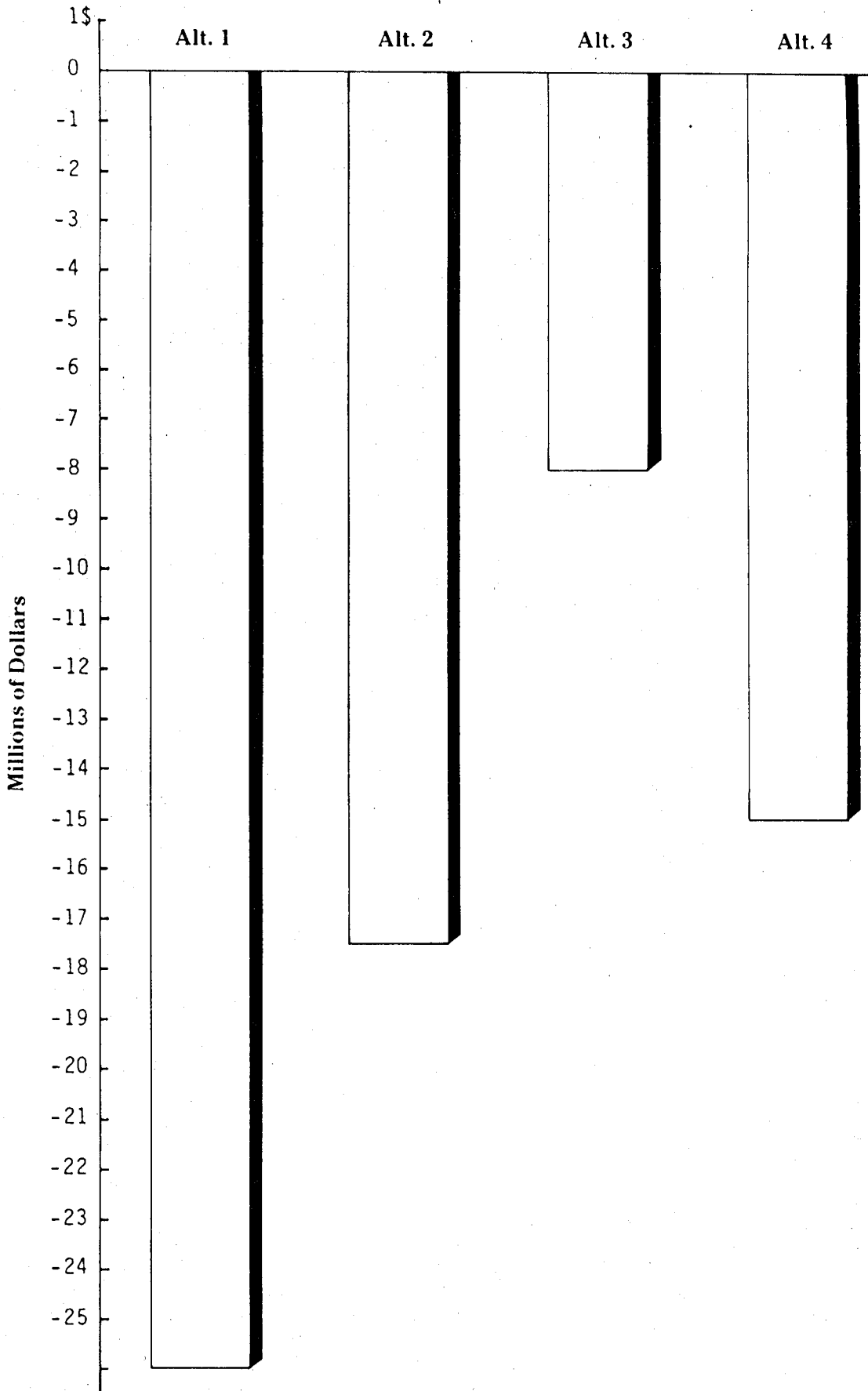


Figure 4.
ESTIMATED RANGE OF NET ANNUAL FISCAL IMPACTS
OF DISPOSALS OUTSIDE THE ORGANIZED BOROUGH
(MILLIONS OF DOLLARS).



2. EFFECTS OF ALTERNATIVES ON AGRICULTURE

a. Introduction

Exclusive of the legislatively proposed State Forest, 1,597,000 acres of state land in the Tanana Basin have been identified as having soils suitable for agriculture. As described in the Agriculture Element Paper (DNR, 1983), these areas were defined through the use of aerial photos and exploratory soils surveys and are likely to be Class II and III soils in the Soil Conservation Service classification system.

Currently there are approximately 178 person-years of on-farm employment in the Tanana Basin (Carol Lewis, Agric. Exp. Station, personal communication). Most of these people work in the Delta-Salcha area where there are about 95 farms currently operating (Roger Boyer, SCS, personal communication). According to Logsdon, et.al., (1977), the employment multiplier for agriculture is 1.01, which would indicate that total direct and indirect jobs in this industry are currently in the range of 202 person-years, about one percent of total Basin employment.

More farms are likely to come into production in the near future. As shown in Table 6, the agricultural rights on a total of 115,000 acres of state land will be sold in the Basin by spring, 1983. In addition, 264,000 acres have been identified for large and small ag. sales by 1985. If all of these projects proceed, there will be a total of 379,000 acres of agricultural land sold by the state within two years.

Table 6.
STATE AGRICULTURAL LAND SALES IN THE TANANA BASIN.

1) Sales as of Spring, 1983	
Delta I	60,000 acres
Delta II East	25,000
Small Ag. Sales	30,000
Subtotal	115,000
2) Planned Projects	
Nenana Totchaket	147,000
Delta Cr.	50,000
1984 Small Ag.	18,000
1985 Small Ag.	49,000
Subtotal	264,000
TOTAL	379,000 acres

A total of 15,000 acres are expected to be planted in 1983. Local markets are being established for the barley, livestock and vegetables which these farms are producing and if economic conditions are right, an export market may also develop.

The demand for farmland in the Basin depends on the demand for farm products. According to the Agriculture Element Paper, the demand for cropland in the state is approximately 485,000 acres. This assumes that the state will produce 43 percent of the domestic pork market, 25 percent of the beef and 75 percent of the dairy market by the end of this decade. The Tanana Basin will produce only a portion of this total demand. Assuming that it is economically feasible for the Tanana Basin to meet 50% of the statewide demand for cropland, 243,000 acres of agricultural soils in the Basin should be put into production. With the 379,000 acres already slated for disposal, there would be no need for additional acreage. However, if the Tanana Basin were expected to meet 100% of the state's cropland requirements, or if an export market develops, additional agricultural land may be needed in the Basin.

The current out of state demand for Alaskan barley is minimal because Alaska barley prices have not been competitive on the world market. This situation may change, however, if more Alaskan farms come on line and if world prices change. If Alaskan barley prices were to become competitive, the demand for agricultural land in the Basin would increase.

b. Areas designated for agriculture

(1) Cropland

For the Basin as a whole, the second alternative designates the most land for agriculture. With the exception of the most active mining areas near Fairbanks, Alternative 2 has identified all of the Class II and III soils located outside the State Forest for designation as agriculture. This amounts to approximately 1,214,000 acres. The State DNR, Division of Agriculture identified two types of areas: (1) those which are fairly accessible (within 6 miles of a river or road) and which may be developed within the next 5 to 10 years and (2) those which are more remote and which may not be developed until demand for agricultural products and transportation becomes available. Alternative 2 has designated 582,000 acres of preferred or accessible agricultural land and 632,000 acres of potential agricultural land. Until sold, both of these areas would be managed for multiple use but only if those activities would not preclude agriculture from developing in the future. Many of these areas may be placed under a resource management classification which protects this future option.

Alternative 1, which emphasizes settlement, has identified 782,400 acres, or 64% of the total Class II and III soils for agricultural designation. Alternative 1 has the largest effect on accessible agricultural soils (see Figure 5). Due to their location and good soil, these areas are also of primary value for settlement. However, Alternative 1 does identify 51% of all short term agricultural soils for farming and 77% of the more remote agricultural lands for retention in the event that they become accessible.

**Table 7.
AGRICULTURAL ACREAGE IN EACH ALTERNATIVE**

	Alt. 1	Alt. 2	Alt. 3	Alt. 4
"Preferred" Crop Land	295,700	582,000	163,000	256,000
"Potential" Crop Land	486,700	632,000	16,200	113,000
TOTAL	782,400	1,214,000	179,200	369,000

Alternative 3 identified 28% of the accessible agricultural soils for agriculture, but only 3% of the more remote, "long term" agricultural soils.

Alternative 4 designated 44% of the more accessible agricultural soils for farming and 18% of the long term areas. Much of this difference is due to the conflict between potential farm developments and existing mining in both the Manley-Tofty area and the uplands south of the Salcha River.

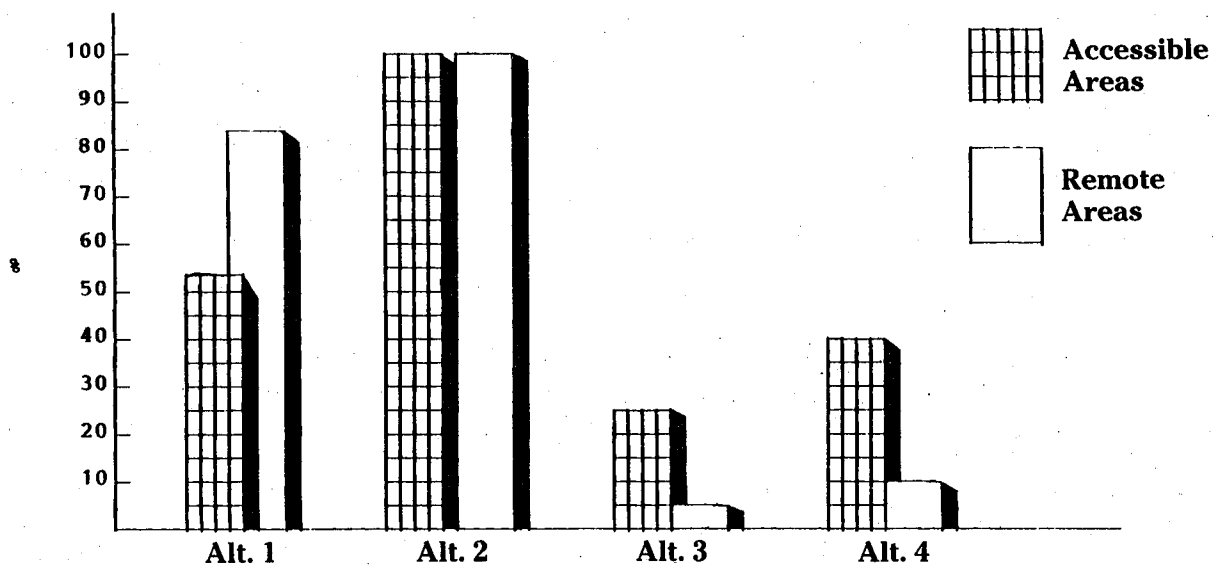


Figure 5
PERCENT OF STATE LAND SUITABLE FOR AGRICULTURE WHICH
HAS BEEN DESIGNATED FOR AGRICULTURE IN EACH
ALTERNATIVE (100% = 1,597,000 ACRES).

(2) Grazing Land

There are currently no maps available of the areas which have grazing potential and there are no natural grasslands in the Tanana Basin. Therefore, no areas have been identified for grazing as a primary use, but grazing has been identified as one of several allowable uses in all of the alternatives. The specific restrictions on grazing vary by geographic area; details concerning these guidelines are available at the DNR office in Fairbanks.

b. Effect of Each Alternative on Agricultural Sales

In Alternative 2, the State DNR Division of Agriculture is recommending that much of the 582,000 acres identified for "short term" agriculture be sold within the next 10 years. Those short term areas which the final Tanana Basin Area Plan designates for agriculture will receive detailed examination and a schedule of recommended sales will be prepared by the Dept. of Natural Resources.

c. Effect on Production

Designating an area for agriculture does not mean that the area will be developed; the market and costs of production as well as the availability of financing are what will determine the extent of development.

If all of the agricultural land designated on each alternative were developed, production of barley, livestock and vegetables would increase. However, unless the economic situation changes substantially, there will probably be little change in crop production in the short term as a result of these designations.

d. Effect on Demand for Agricultural Land

If the state were 100% self-sufficient in all agricultural products and if the Tanana Basin were to meet 50% of this total demand, a total of 243,000 acres would need to be in production by the year 2000. Over 379,000 acres of agricultural land is slated for sale in the Tanana Basin by 1985, and thus no additional acreage would be needed for domestic production.

If an export market were feasible, then additional acreage is likely to be needed. Because of this, it may be important to protect the option to develop agriculture in the future.

e. Economic Effects

The Agriculture Element Paper indicates that the potential for large scale barley production in the study area is currently very marginal and economic expansion of the livestock industry is untested. If there are significant changes in domestic and world prices, production costs, infrastructure, etc., the economic benefits of agriculture could be substantial. Unless the economic situation changes, however, the economic effects of farming are likely to be small.

Benefits to Producers

The benefit to farmers is basically the profits they would make. Currently, the profits which farmers may make once the existing farms are in full production are difficult to estimate. Feasibility studies indicate that profits are likely to be very low in today's market and it is not possible to predict future profits at this time.

3. EFFECTS OF ALTERNATIVES ON WILDLIFE HABITAT

a. Introduction

Virtually all undeveloped land in the Tanana Basin serves as wildlife habitat of some type. However, due to both the complex relationship of animals to the land and the variable accessibility of wildlife populations to humans, there is a wide range of difference in importance of land as wildlife habitat (this is described in Chapter 7 of the Fish and Wildlife Element Paper, ADFG, 1983). Wildlife is similar to any crop, in that it grows productively only on suitable ground. The distribution and importance of habitat lands were assessed by compiling available data and interviewing experts in the field of wildlife management.

Wildlife resources are very important to the residents of the Basin, as well as to many non-residents. Wildlife resources support both consumptive uses, such as commercial, recreational, and subsistence harvests, and non-consumptive uses such as tourism and animal observation. The fish and game harvest lends stability to the local lifestyle and forms an important part of both the cash and non-cash economy in the Basin. An analysis done by ADF&G (see Chapter 5 of the Fish and Wildlife Element) which treated only consumptive, cash-accountable uses found that a total income effect of \$39 million and an equivalent of 1,740 jobs were supported by wildlife resources in 1981. The economic benefits of many other uses could not be quantified, but these uses are no less important.

The demand for wildlife focuses on habitat areas with good access. Demand has historically increased as the state's population increases, and the rate of increase in demand has often exceeded population growth. This trend will likely continue, with the regulation of seasons and setting of bag limits being used to tailor the harvest to levels that can be met by the long-term supply of the resource.

b. Areas Designated for Wildlife Management

The area identified as being suitable for designation for some form of wildlife management status totalled 8,265,000 acres. This represents 66% of the state land being considered in the Tanana Plan. However, the land identified was subdivided into the following four categories of descending importance, each with different implications for management:

(1) Critical habitats (4% of state land in Tanana Basin Area Plan)

(2) Special value areas (14% of state land in the Basin)
Both critical habitats and special value areas are recommended for single primary use management (i.e., the production and use of wildlife would be the primary management goal, with compatible secondary uses allowed).

(3) High value areas (29% of state land in the Basin) These areas are recommended for management as wildlife habitat with other compatible primary uses allowed and conservative management guidelines being used to protect the habitat.

(4) Moderate value areas (20% of state land in the Basin)
These areas would have more liberal guidelines in effect.

Not recommended for inclusion in any of the above categories was 4,209,093 acres, or 34% of the state land being considered in the plan. Several areas not being considered in the plan support significant wildlife resource values. Foremost among these is the Tanana Valley State Forest.

c. Designation of Wildlife Habitat by Alternative

The analysis below describes how the four habitat categories described above are affected by each alternative.

Alternative 3, with its emphasis on wildland resources identifies 7,618,000 acres, or 92% of the total wildlife habitat included in the four categories discussed above, for some form of wildlife habitat designation. Generally, designations for other uses were made only where they didn't conflict with wildlife values or where they were viewed as being compatible.

All other alternatives reduced the amount of land designated as fish and wildlife habitat.

Table 8 and Figure 6 show the amount of different value habitat lands in each alternative.

Table 8.
AMOUNT OF THE DIFFERENT VALUE HABITATS IN EACH ALTERNATIVE
(IN THOUSANDS OF ACRES)

	Total in Basin	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Critical Habitat	504	368	368	504	318
Special Value Habitat	1,718	622	673	1,700	761
High Value Habitat	3,567	1,774	1,889	3,303	1,883
Moderate Value Habitat	2,476	1,396	1,497	2,111	1,705
Total Acreage Designated for Habitat	8,265	4,160	4,427	7,618	4,667

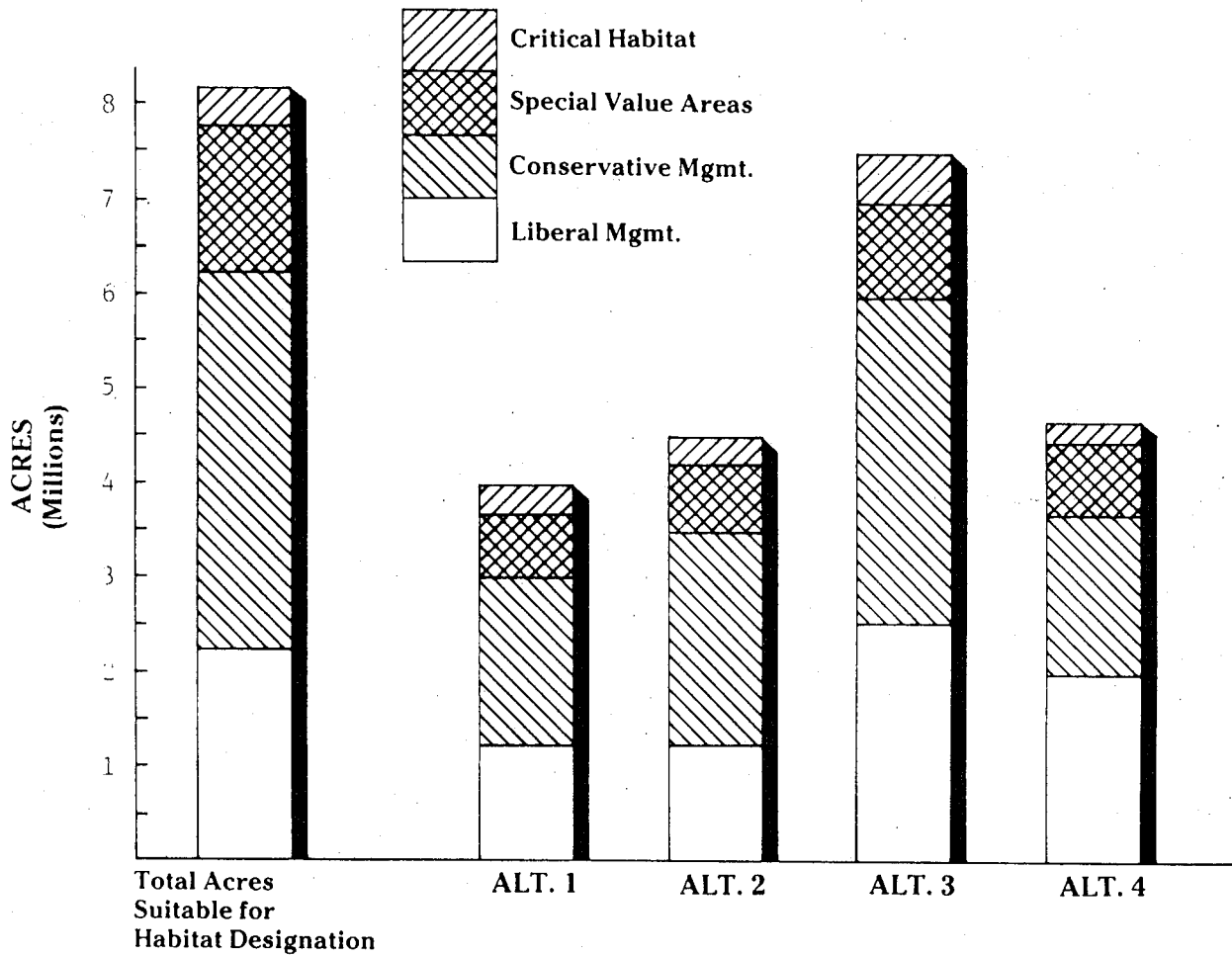
As shown in Figure 6, the first alternative has fewer critical areas designated for primary use habitat than the third alternative. This is because some of the critical habitats were recommended for co-primary designation as habitat and mining. According to the Dept. of Fish and Game, these uses are not compatible as co-primary uses, but mining could be a secondary use if it were not in conflict with wildlife.

Alternative 1 also designates less than half as many special value and high value areas for habitat as the third alternative and about two-thirds as many moderate value areas. This is because many of these habitats were recommended for disposal, agriculture or for co-primary use with a designation which ADF&G believes to be incompatible with habitat. This alternative may have a significant impact on riparian corridors and easily-accessed hunting lands.

Under Alternative 2, crop depredation by local wildlife may cause losses resulting in pressure to reduce wildlife populations. Grazing could result in loss of domestic animals to predation and disease transmission between wildlife and domestic stocks.

Alternatives 2 and 4 are similar to Alternative 1 in the amount of each habitat category recommended for designation as habitat.

Figure 6.
SUITABLE WILDLIFE LANDS DESIGNATED AS HABITAT IN EACH ALTERNATIVE



Note: Single use habitat lands placed in incompatible co-primary use designations are not included in this graph.

d. Effects of Designations Upon Both the Supply of Fish and Wildlife and the Opportunities for Human Use

It is very difficult to accurately forecast the effects of the alternatives on fish and wildlife resources. The way an area is managed and the quality of the habitat involved will determine the extent of the impact on any given area. However, several generalized effects of development upon wildlife populations can be summarized.

These include (but are not limited to): loss of habitat, interruption of seasonal movements or activities, adverse effects on habitat quality, displacement of animals, and the introduction of disease. Effects upon the use of wildlife include: increased competition for resources, restriction of access, wildlife depredation, and displacement of present users. The following table estimates the potential for occurrence of some of these effects by land use designation.

**Table 9.
POTENTIAL IMPACTS OF LAND USES ON FISH AND WILDLIFE RESOURCES**

Type of Impact	Land Use Designation			
	Settlement	Ag	Forestry	Mining
EFFECTS ON WILDLIFE POPULATIONS				
Habitat Loss	X	X	?	X
Interruption of Seasonal Migrations	X	X	?	?
Water Quality Degredation		X	X	X
Increased Fire Suppression	X	X	X	X
Animal Displacement	X	X	X	X
Increased Disease Levels in Wildlife	?	X		
EFFECTS ON USE OF WILDLIFE				
Overharvest of wildlife	X	X		?
Increased Competition for Wildlife	X	X	?	?
Access Restriction	X	X	?	X
Displacement of Present Users	X	X	?	?

e. Effect of Designations on Supply Compared to Demand

Any significant degree of designation of habitat to uses in conflict with wildlife such as land disposals will increase the relative demand for wildlife in those areas remaining in production. Demand already exceeds supply for many species of wildlife, including: Dall sheep, caribou, moose, and salmon. Demand will continue to increase as the human population increases and the effects of allocating land to development may exacerbate this situation. This increase in demand will concentrate along access routes, increasing conflicts around villages and other high-use areas.

f. Economic Effects of Designations

Under present conditions, there is a significant annual economic benefit from wildlife resources in the Tanana Basin. The benefits to both consumers of these resources and producers of revenue from wildlife will decrease if lands are converted from wildlife production to a conflicting land use. While a quantitative comparison of alternatives is not possible at this time, the highest total benefit from wildlife resources is likely to result from the extensive wildland designations shown in Alternative 3.

As previously stated, a total income effect of 66 million dollars and an employment equivalent of 1450 jobs is generated by the portion of the wildlife economy that is relatively easily quantified.

However, other segments of this economy have not been quantified, either because of lack of adequate documentation or because they are not quantifiable in terms of dollars. The values of the existence of wildlife, its role in cultural activities, in the non-cash economy, and as a partial replacement for cash are of significance in the Tanana Basin and should not be ignored when comparing the benefits of various management options.

4. EFFECTS OF ALTERNATIVES ON FORESTRY

a. Introduction

There are approximately 1.72 million acres of state-owned commercial forest land within the area covered by the Tanana Plan. Currently about 5 million board feet of lumber and about 37,000 cords of fuelwood are produced annually from these forests. Timber and fuelwood harvesting activities generate an estimated \$4 million in annual income effects and about 115 jobs (or about 1% of total Basin employment).

The demand for lumber and houselogs is currently estimated at 25 million board feet (Forestry Element Paper, DRD, DNR, 1983). Therefore, the Basin is currently producing over 20% of its total need, while the rest is imported from Canada and the lower 48. Although the export market is not expected to be significant in the near future, the prospects for doubling local production are very good if a stable timber supply exists.

b. Area Designated for Forestry in Each Alternative

On all alternatives, most primary use forest, minerals, habitat areas are open for timber harvesting. This discussion, however, centers on those areas which are designated primary use forestry rather than those where forestry is allowed as a secondary or co-primary use.

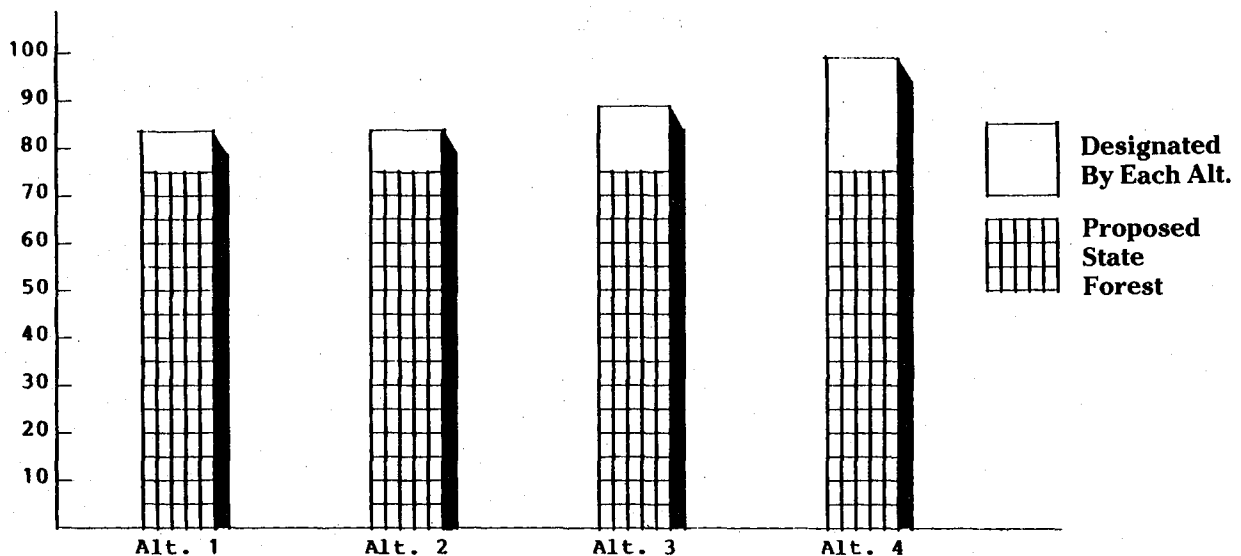
The fourth alternative designated the most land for forestry. When the proposed state forest is included, approximately 98% of the state land suitable for forest management has been designated for forestry in this alternative.

The other three alternatives are nearly equivalent in their impact on forestry, each with over 80% of suitable forest lands designated for primary use forestry in each alternative.

Table 10.
ACREAGE OF PRIMARY USE FOREST LAND IN EACH ALTERNATIVE

	ALT. 1	ALT. 2	ALT. 3	ALT. 4
State Forest	1,238,000	1,238,000	1,238,000	1,238,000
Additional Forest Land Designated	156,000	138,000	190,000	431,000
TOTAL	1,394,000	1,376,000	1,428,000	1,669,000

Figure 7.
PERCENT OF STATE LAND SUITABLE FOR FORESTRY WHICH HAS BEEN DESIGNATED FOR FORESTRY IN EACH ALTERNATIVE
(100% = 1,724,000 ACRES).



c. Effect of Designations on Production

Exclusive of the Tanana Valley State Forest, the areas designated on each alternative lie in relatively inaccessible locations and may not come into production for the next 15 to 20 years. Therefore, these areas are not expected to have a foreseeable impact on production; areas within the State Forest are more likely to be developed in the near term.

d. Comparison of Demand and Supply

According to the Forestry Element Paper, the allowable cut within the State Forest is estimated to be 15.75 million board feet per year in both the accessible and nonaccessible areas. Of the total demand of 25 million board feet, it is unlikely that the local market will absorb more than 15 million board feet of air-dried spruce. Therefore, the small additional acreage which each alternative has designated for forestry is not likely to be of significance in meeting the foreseeable demand for forest products.

e. Economic Effects

It is likely that an additional 3 million board feet could be harvested from the State Forest as soon as the timber sale could be administered (larger harvests would require expansion of the local mills since capacity is about 8 million board feet). If this additional harvest took place, the immediate economic impact of the State Forest would be an additional \$234,000 per year in benefits to local sawmill owners, little or no impact on consumers, an additional \$2.4 million in income effects and an additional 15 jobs (see Forestry Element, DNR, DLWM, 1983). It is unlikely that local sawmills will expand significantly beyond this amount in view of the uncertain market for air-dried lumber.

In addition to the economic benefits of harvesting sawtimber, there are also benefits from harvesting fuelwood on state land. Although the exact number of acres of fuelwood is not known for each of the alternatives, the Forestry Element estimated that the return per acre of fuelwood harvested is approximately \$65. Alternative 4, which has the largest amount of land recommended for forest management, may also have the largest benefit due to fuelwood harvesting.

In comparison to the State Forest, the forest land designated in each alternative will have a marginal effect on the Basin's economy in the foreseeable future since these areas are still very remote and the relatively accessible State Forest is more likely to be developed.

5. EFFECTS OF ALTERNATIVES ON RECREATION

a. Introduction

The Tanana Basin has a wide variety of recreational resources. According to a statewide survey, 88% of Tanana Basin residents see recreational opportunities as one of their important reasons for living in Interior Alaska. There are now large amounts of public land available for recreational use, but new development and changes in land ownership would alter the area's traditional recreational land base.

Although information is lacking on the number of acres of state land available for recreation, a number of areas of varying value for recreation were identified for each subunit within the Basin (see Recreation Element Paper). Sites were ranked for high, moderate or low value based on the criteria of: 1) intensity of existing recreational use; 2) location of the area in relation to population centers; 3) the irreplaceable nature of the site; and 4) the economic value of the site for tourism.

In 1981, residents and tourists spent a total of approximately 27 million dollars for recreation in the Basin. Recreation generates another 19 million dollars in indirect income effects and accounts for about 1400 jobs or about 6% of total Basin employment. These totals should not be attributed entirely to state land, however, since some of the recreation in the Basin occurs on borough, federal or private land.

As discussed in the Recreation Element Paper, residents currently spend almost 4.2 million user days on recreation activities in the Tanana Basin. The current demand for recreation is likely to increase as population increases in the Basin and as Alaska becomes a better known vacation stop for tourists. According to the projections discussed in the Recreation Element, the number of user days will more than double by the year 2000. This increase will put pressure on existing recreational facilities in the Basin.

This evaluation is divided into three sections. The first compares both the quantity of land available for recreation under each alternative and the quality of the recreational opportunity. The second section of the evaluation compares the supply of recreational land available in each alternative with the demand for general recreation. The last section assesses the economic effects of recreation in the four alternatives.

b. Areas designated for recreation

(1) Size and location

To evaluate the impacts on recreation it is necessary to determine where and to what extent public recreational opportunities are excluded. Public recreation is excluded on land to be sold for either settlement or agriculture. On the other hand, most lands retained for other resource uses have some potential recreational value. For example, on all alternatives, primary use mineral, forest and most habitat areas allow recreation as a secondary use.

The table below shows the total gross acres of state land likely to be lost to public recreation due to land sales for settlement or agriculture in each alternative. The table also shows those lands to be sold which were identified in the Recreation Element Paper as having specific recreational values.

Table 11.
LANDS WITH RECREATIONAL VALUE
WHICH ARE DESIGNATED FOR SALE.

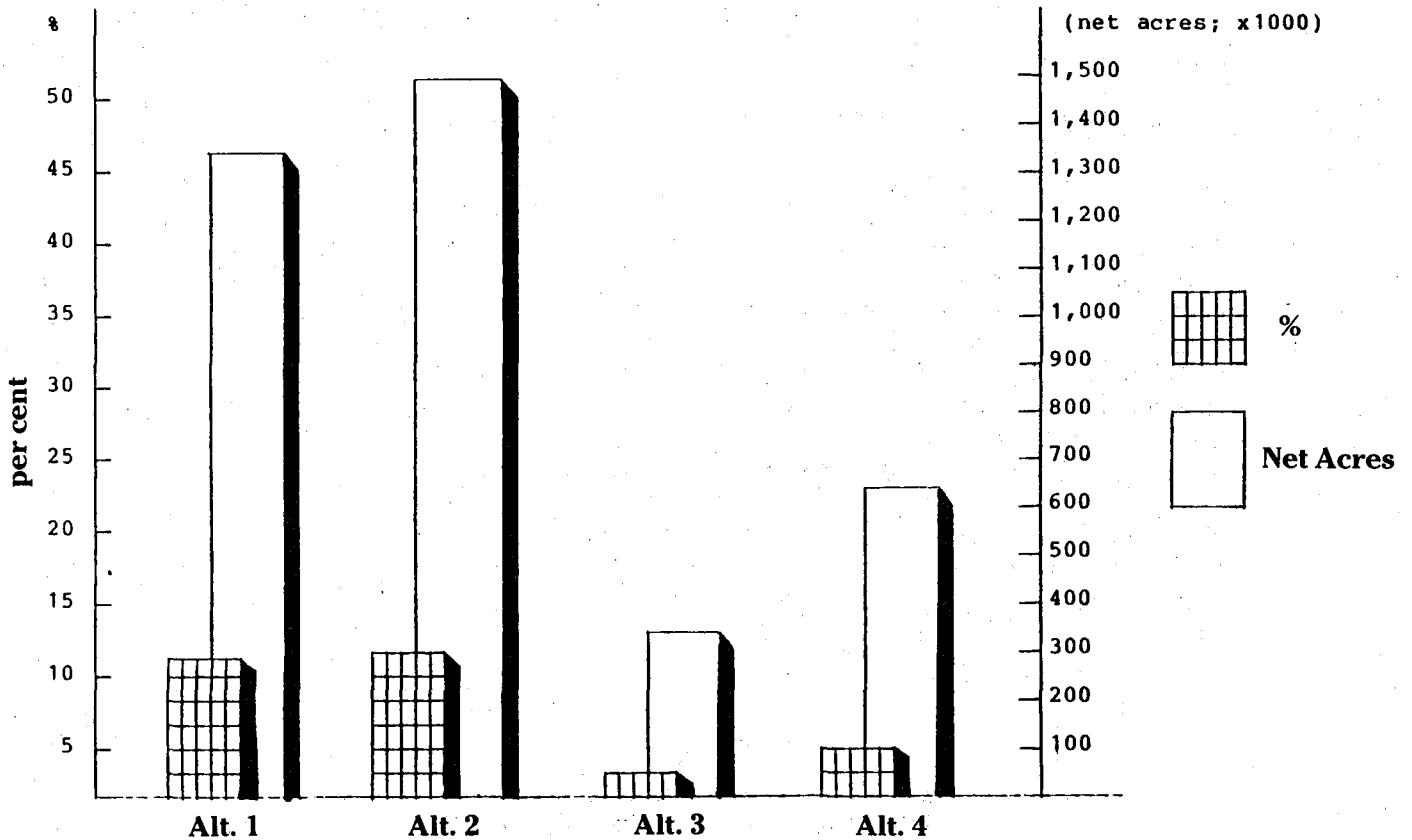
Alternative	1	2	3	4
Land designated for:				
Settlement	2,310,000	1,722,700	916,200	1,250,300
Agriculture	782,360	1,214,000	179,240	369,000
Total land sales	3,092,360	2,936,700	1,095,440	1,619,300
Lands with recreational value designated for sale in each alternative	252,650	252,650	50,950	60,240

The figures in Table 11 do not mean that there will necessarily be less recreation in Alternative 1 or more in Alternative 3. It does imply, however, that in Alternatives 1 and 2, private recreation will increase while state lands available for public recreation will decrease. Recreation will also be more affected by land sales in high value recreational areas. Pressure on the remaining public lands could cause a decrease in the quality of those areas. However, of the 3 million acres designated for sale in Alternatives 1 and 2, only 8 and 9%, respectively are lands with identified recreational value.

Alternative 3 retains the greatest quantity of land in public ownership, thus allowing more opportunities for recreation on state land. A smaller percentage of the lands with identified recreational value are offered for sale.

Alternative 4 provides only slightly less opportunity for recreation on public lands than Alternative 3. Although more land is designated for sale overall, the overlap with recreational lands is roughly equivalent to that of Alternative 3.

Figure 8.
PERCENT AND NET ACREAGE OF LAND NOT AVAILABLE FOR PUBLIC RECREATION DUE TO LAND SALE FOR SETTLEMENT OR AGRICULTURE
(100% = 12,474,093 ACRES)



(2) Quality of designated lands

A second measure of the lands designated for recreation in each alternative is the recreational quality of the land retained in public ownership. Policies on how these lands will be dealt with also affect the quality of recreational experiences.

The following chart shows the availability of various recreational resources for each alternative.

AVAILABILITY OF RECREATIONAL RESOURCES UNDER EACH ALTERNATIVE

Overall Diversity of Recreational Opportunities				Most Abundant
Privately Owned Recreational Parcels				Moderate Abundance
Back Country and Alpine Areas				Least Abundant
Publicly Owned Rivers, Lakes and Trails				
Alternative:	1 & 2	3	4	

Alternatives 1 and 2 sell a greater proportion of land, including waterfront land, than Alternatives 3 and 4. Although there would be less land available for public recreation, the opportunities for private recreation would increase under these alternatives. Private recreation is a qualitatively different experience and benefits fewer individuals per acre. In Alternatives 1 and 2 trails, greenbelts and river corridors are protected by easements. Many residents may feel this gives less protection than public retention of the corridor. The minimum width of the corridor varies according to the quality and intensity of the use being protected but is generally less than in Alternative 3.

Alternative 3 provides the greatest quantity of publicly owned recreation land. All of the areas with high value for recreation are retained, potentially giving more persons a greater diversity of places to recreate. Trails, greenbelts and river corridors are provided a greater degree of protection than in any of the other alternatives. They are retained in public ownership rather than protected by easements and the corridor widths are greater as is the quantity of open space on waterbodies. Shoreline protection is stressed. This alternative is geared more to wilderness experiences where more persons can benefit recreationally from large areas of public land.

Alternative 4 retains an intermediate amount of land with recreational values. There is some land sold for private recreation, but less than in Alternatives 1 and 2. The amount of land sold along waterfronts would be the same as in those alternatives. Trails, greenbelts and river corridors receive minimum protection as in Alternatives 1 and 2. However, this alternative allows trails to be upgraded to roads where necessary for access, possibly degrading their value for recreation. In this alternative, both wilderness and private recreational opportunities would be available in moderate amounts.

c. Effects of Designations on Supply Compared with Demand

Because the demand for general recreation is calculated for the Basin as a whole, not for specific sites, it is not possible to assess how the various alternatives meet the demand for public recreation lands. The noticeable effects will be an increase in use of remaining recreational sites. There will also be qualitative differences. Alternatives 3 and 4 may better meet the demand for wilderness recreation while Alternatives 1 and 2 better meet the demand for private recreation.

d. Economic Effects of Designations

According to the analysis in the Recreation Element Paper, total direct expenditures by both residents and tourists for recreation in the Basin is approximately \$27 million, including \$17 million from Basin residents and \$10 million from tourists. Indirect income from general recreation contributed another \$19 million to the Basin economy for a grand total of \$46 million. There are also a total of about 1360 jobs in the Basin (about 6% of total Basin employment) that result from general recreation. These effects, however, cannot be attributed solely to state lands and it is not known what proportion may be due to borough, federal or private lands within the Basin.

Without a correlation between use and specific sites it is not possible to determine how the specific areas retained or sold in each alternative will affect the income and employment resulting from general recreation on state land. Employment from general recreation could be as high as 5600 jobs by the year 2000 if no change occurs in either the areas available or the ratio of population to demand. However, as land is sold and recreation land becomes scarce, there may be fewer jobs or the locale may shift as the use concentrates in new areas.

6. EFFECTS OF ALTERNATIVES ON MINERALS

a. Introduction

Currently, precious metals, industrial and structural materials, coal, and exploration activities are the cornerstone of the mineral industry in the Tanana Basin. These activities generate an estimated \$198 million in income annually and over 1,300 jobs (or about 6% of the total employment in the Basin). Gold generates most of the producers benefits and the largest income effect while sand and gravel mining generates the most employment. (DRD, DNR 1983)

Areas in the Tanana Basin are defined as having high mineral potential if they have a concentration of claims, are underlain by a mineral terrane, or have known mineral occurrences.

As discussed in the Mineral Element Paper, areas with a concentration of claims and the highest potential are in the Bonnifield District northeast and east of Healy; in the Manley Hot Springs District around Tofty; in the Livengood District; in the Tok District between the Tok and Robertson Rivers; and in the Delta District just south of Fort Greely.

The level of mineral activity in the Basin depends primarily on world prices of the commodities and somewhat on the availability of financing. The demand for gravel and sand mines depends on the level of construction activity.

b. Areas open to mineral entry

In all alternatives, primary mineral use areas, forests, multiple use areas, and most habitat areas are open for mining. No existing claims will be closed. In all alternatives, access to mineralized areas will be protected through the use of easements or publicly owned corridors. Also, important sand and gravel sources will be retained in public ownership.

Figure 12 shows for each alternative the total acres and the percent of state land that is closed to mineral entry, or open for leasehold location. The acreages are summarized in Table 10.

The fourth alternative has the least amount of land closed to mineral entry. Under this alternative, 7.5% or 932,000 acres of state land in the Basin is closed to mineral entry due to disposals. Alternative 4 has the most land open for leasehold location since land which is closed to mineral entry in other alternatives is open for leasehold location in this alternative. The lands designated for leasehold location are important wildlife habitats. This alternative also has the greatest amount of land, 19.3% of total state land, designated primarily for mineral use.

The greatest amount of land is closed to mineral entry under Alternative 1 where over one-quarter of the plan area is closed and 8.5% is open to leasehold location. The areas subject to leasehold location are wildlife habitats.

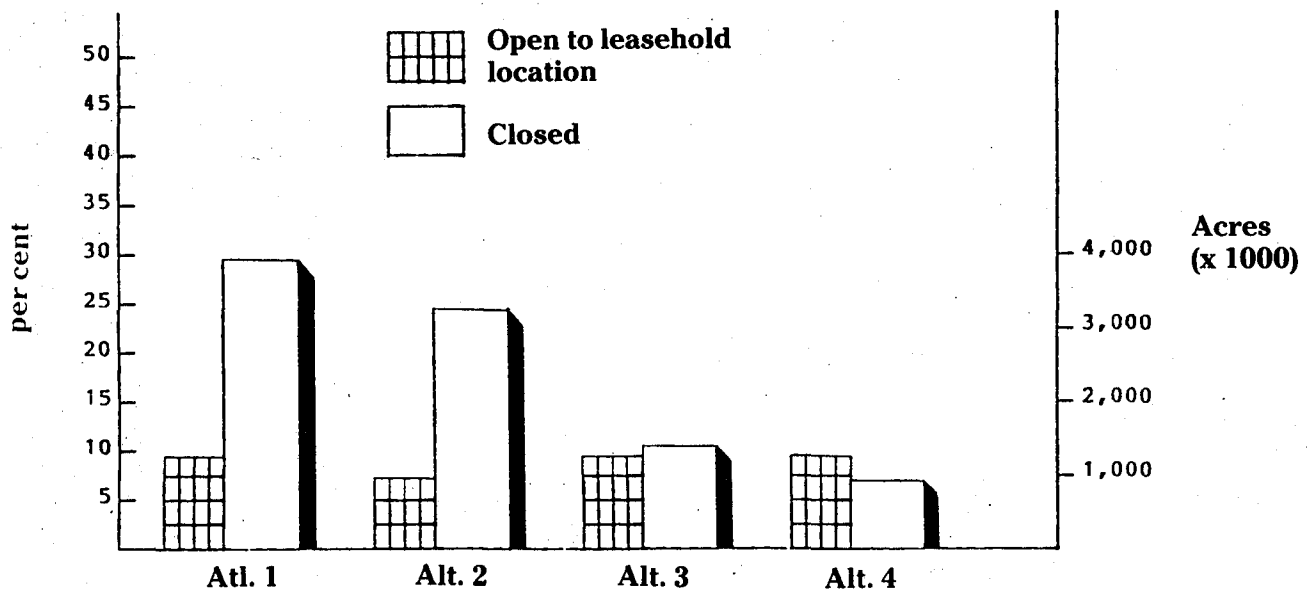
Under Alternative 2, almost as much area is closed as under Alternative 1, with 25.9% closed and 7.3% open for leasehold location. Of the closed area, 49% is closed for agriculture and the rest for land disposals.

Under Alternative 3, a substantial decrease in areas designated for disposal and agriculture leaves a greater amount of land open for mineral entry. In this alternative, 10.7% of the plan area is closed and 8.7% is open for leasehold location. About one-third of the land closed to mineral entry is in critical habitat and recreation areas, the rest is closed due to disposals. Most wildland areas open for leasehold location in other alternatives are closed in this alternative due to the impact on wildlife.

Table 12.
AREAS CLOSED TO MINERAL ENTRY OR OPEN TO
LOCATION UNDER EACH ALTERNATIVE

Alternative	Closed	Leasehold Location
Alternative 1		
- Acres	3,565,888	1,122,496
- % of Plan Area	28.6	8.5
Alternative 2		
- Acres	3,225,792	588,928
- % of Plan Area	25.9	7.3
Alternative 3		
- Acres	1,201,792	1,082,240
- % of Plan Area	10.7	8.7
Alternative 4		
- Acres	931,776	1,304,896
- % of Plan Area	7.5	10.5

Figure 9.
PERCENT AND TOTAL ACRES OF STATE LAND WHICH IS CLOSED AND
OPEN TO LEASEHOLD LOCATION UNDER EACH ALTERNATIVE
(100% = 12.5 MILLION ACRES).



c. Effects on production

The level of mining activity in the Tanana Basin depends primarily on the prices of the minerals. None of the alternatives will sufficiently change the supply of minerals to change these prices. Under all four alternatives, active claims are left open for mineral entry and virtually all areas of active exploration in the Basin are open. Thus under each alternative, the present rates of production are expected to continue and, because few of the high potential areas are closed to mineral entry, none of the alternatives are expected to have a significant effect on future production.

In general, under all alternatives, mineral terranes and concentrations of claims are open for mineral entry. Only small percentages of high value areas are closed under any alternative. The greatest impact is due to land disposals, which are closed to mineral entry.

Under Alternative 4, areas with a concentration of claims and mineral terranes are designated either Primary Mineral Use or Forests. The only conflicts with high value areas are a disposal at Sourdough Cr. near the Steese Highway and a disposal on coal bearing terrane on the Parks Highway north of Healy. In these cases, the design of the disposal is expected to avoid mining claims and thus minimize the impact on mining while providing private land in the area for the use of miners and others.

Within the Basin, most concentrations of claims are near population centers and highways. These areas are also of primary value for settlement and agriculture. This causes several conflicts in Alternative 1. Significant conflicts with high value mineral areas and disposals are along the Steese Highway, in the Bonnifield District west of Ferry, and in the Hot Springs District around Eureka. There is also a disposal area along the Parks Highway that is on coal bearing terrane. Conflicts with agriculture areas also occur. In the Livengood District along the Tolovana River and along the south side of the Steese Highway there are conflicts with areas with a concentration of claims. There are also conflicts with mineral terranes northeast of Tofty, along the Goodpaster River north east of Big Delta, and on Gardiner Cr. north of Northway Junction. The impact of these disposals on mining could be reduced to some extent through the design of the disposal.

Conflicts with high value mineral areas in Alternative 2 are about the same as in Alternative 1.

Alternative 3 has little conflict with mineral areas. The sparsity of land designated for disposal and agriculture leaves substantial areas open for mineral entry. Under Alternative 3 there are a few conflicts with critical habitats in the Bonnifield District. As in Alternatives 1 and 2, there are conflicts with disposals in the Bonnifield District east of Ferry and north of Healy along the Parks Highway. There is some conflict with agriculture areas in the Manley Hot Springs area.

d. Economic effects of designations

(1) Benefits and costs to miners

None of the alternatives should adversely affect miners at current production levels. Potential benefits could be affected, however, by the mineral closures which occur in either high value areas or areas where new discoveries are made.

(2) Benefits and costs to consumers

None of the alternatives will substantially affect the price or supply of gold, coal, or gravel. Therefore, benefits and costs to consumers are considered minimal.

(3) Benefits and costs to the state

State administrative costs may increase with the amount of land in leasehold location (due to the amount of monitoring and processing required). If so, then Alternative 4, which has the greatest amount of land in leasehold, would have the greatest direct impact on state administrative costs.

(4) Income and Employment Effects

Of the six resources examined, mineral development has by far the greatest income effect and a high employment effect on the Basin: mining generates \$198 million in income effects and almost 1100 jobs.

However, the effects of the alternatives on mining-related income and employment are not expected to be significant for the reasons discussed above (i.e. market forces will play the largest role in determining these effects since production is not expected to be significantly affected by any of the alternatives).

B. EFFECTS OF THE ALTERNATIVES ON OTHER FACTORS

1. OVERALL ECONOMIC EFFECTS OF EACH ALTERNATIVE

The purpose of this section is to summarize the economic effects of each alternative. The effect of an alternative is defined here as a change from the status quo in the net benefits, income and employment of each resource.

As shown in Table 13, the current annual contribution of each resource varies considerably, with minerals generating the greatest net benefits and income effects while fish and wildlife-related activities generate the most employment.

Table 13.
ESTIMATED CURRENT ANNUAL CONTRIBUTION OF EACH
LAND USE TO THE REGIONAL ECONOMY

Resource	Net Benefits (\$ x 1000)	Income Effects (\$ x 1000)	Employment Effects (person-years) ^a
Minerals	85,200	198,000	1070
Fish & Wildlife	20,260	66,000	1450
Settlement	Not Available	--Not Significant--	
Forestry	1,900	4,000	120
Recreation	Not Available	46,000	1340
Agriculture	---Not Available---		

^a Rounded to nearest ten.

How much each of these contributions will change in each of the alternatives is not easily predicted. Each alternative places constraints on where each land use can occur, but market forces will play the major role in determining whether or not development of a resource will actually take place.

The total economic effect of a given alternative is the sum of its effects on each resource. For example, under Alternative 1, the economic benefits to consumers from settlement may be higher than under the other alternatives, but the benefits from fish, wildlife, recreation, agriculture and mining are likely to be lower. It is not possible to predict the net economic effect of this alternative without knowing the magnitude of these changes on each resource. In fact, the net effects of the alternatives may not differ significantly because some resource uses may increase while others decrease.

The economic effect of Alternative 2 may be somewhat lower than that of the other alternatives if an export market does not develop. This is because each of the alternatives has more than enough land designated for agriculture to meet the estimated demand for self-sufficiency. The net economic effects of this alternative depend on the extent to which it decreases the benefits of the other resources. If the decrease in recreation, fish and wildlife, mining forestry and settlement exceed what may be limited near-term benefits of agriculture, then the net economic effect of this alternative may be negative.

Alternative 3 is likely to have positive benefits on the amount of employment, income and benefits generated by fish, wildlife and recreation. However, the consumer benefits from settlement are lower in this alternative, and some potentially valuable mineralized areas would be closed to mineral entry. Without additional information, it is not possible to determine if the positive economic effects of this alternative would offset the decrease in benefits due to other resource uses.

Under Alternative 4, the economic benefits from forestry and mining may be somewhat higher than under the other alternatives. However, they may not be significantly higher since most of the area valuable for minerals and/or forestry is open to these uses under the other alternatives.

2. FISCAL IMPACTS OF RESOURCE ALLOCATIONS ON THE STATE GOVERNMENT

Fiscal impacts are defined here as the indirect costs which the state may incur as a result of an alternative.

a. Fiscal Impacts of Likely Infrastructure Needs

This section concerns state investment in transportation systems and how the different alternatives may affect this investment. The transportation systems used in the Tanana Basin are airports, barges, the Alaska Railroad, and roads. Commodity processing systems are grain drying and meat packing facilities and public service utilities.

State involvement in airport construction and maintenance tends to center on service to communities and villages and not on private projects. The relationship of state airport expenditure to settlement disposals is addressed under fiscal impacts of disposals (section IIIA of this report).

Barge facility construction may be funded by the state depending on the type of project. Railroad line extensions may be funded by the state in the future to stimulate certain types of development but it is unlikely that the different alternatives presented in this report will have much effect on these investments. The state should, however, reserve access for these types of facilities where they are expected to be necessary. Market forces, such as mineral prices, will be the major influences on such projects. Consequently, railroads are not dealt with in this section. Agricultural product processing and storage facilities may be financed by the state. Utility investments are expected to be largely private. The different alternatives presented in this plan are not expected to influence state involvement in energy production or transmission projects.

Each resource has different transportation needs. Access to land disposed by the state for settlement is the responsibility of the purchaser and normally does not entail state expenditures prior to the disposal. The exception is the expenditure of state funds on preparation of road layouts for subdivisions. Once an area is disposed of, landowners may increase pressure on the state to build roads into these areas. Through the Department of Community and Regional Affairs, a revenue sharing program makes available to local governments an amount up to \$2500 per mile per year for maintaining their road network, dependent on funding levels.

Logging roads are subsidized by the state through discounts in the price charged for state-owned timber. The harvester builds the logging roads and receives a discount proportional to the length of road necessary to reach the timber.

Roads to major or established recreation areas can be financed by the State. Examples of these types of projects include the reconstruction of Chena Hot Springs Road, and the construction of the Birch Creek Access Road, Murphy Dome-Chatanika River Road and a number of Chena Recreation Area roads.

The state may participate in constructing mineral resource access roads but the maximum amount of funding is \$50,000 per project. The program is administered by DNR.

The state has provided access roads and maintenance to each parcel in its agricultural disposals. Because of this, access to agricultural areas and transportation systems for agricultural products will be the focus of this section as state investment in this area will probably be essential to this type of development and will be substantial in many instances.

An examination of road networks in existing agricultural areas provides a model for future needs. The Nenana-Totchaket area is unique within the Basin in that it has a large contiguous tract of high quality Class II and III soils. This makes access to agricultural parcels relatively efficient in terms of road construction needed to reach all plots. The Nenana-Totchaket plan calls for agricultural development on 147,400 acres. To serve this area, 41 miles of trunk roads and an estimated 30 miles of smaller feeder roads will have to be built within the agricultural area itself to provide access to each parcel, or an average of 2076 acres served by each road mile within the area.

More typical of conditions encountered in the Tanana Basin is the situation in the Delta area. High quality agricultural soils are interspersed with lower quality areas. This necessitates the use of smaller parcels and requires more miles of road per area served. The 25,000 acres of Delta II East are served by 27.5 miles of state roads or an average of 909 acres/road mile. Delta Creek has at least 33,000 acres of Class II and III soils, which will require 33 miles of road yielding a ratio of 1000 acres served by each road mile within the agricultural area.

In addition to access within agricultural areas, roads must be built to the areas to be developed. The mileage of these roads will vary with the distance of the parcels from the highways of the Basin.

Construction costs of the various roads to and within areas to be developed for agriculture will, of course, vary with the quality and width of road desired. The report Nenana Agricultural Transportation Systems estimated that main roads within the area could be constructed for \$275,000 to \$310,000 per mile. An estimate of \$80,000 per mile for smaller feeder roads is expected for the Nenana-Totchaket Area (Mike Vediner, DNR-DLWM, personal communication).

Maintenance on 41.3 miles of gravel road in the Delta area averaged \$2490/mile/year for FY 1979 and 1980. Had more maintenance funds been available, that figure might have been considerably higher.

Bridges will be required to reach many of the proposed agricultural areas. The 1981 Nenana Agricultural Transportation Systems report determined that bridges over West Middle Nenana River and East Middle River would require a clear span of 100 feet and have a 34' surface; construction of each was estimated at \$608,400. Construction of the largest bridge required for the Nenana project was estimated to be more than \$4 million and construction of a bridge over the Delta River has been estimated to cost nearly \$9 million.

b. Effects of each alternative

Table 14 shows the construction and maintenance costs associated with providing road access to the short-term agricultural areas designated under each alternative.

These are very conservative estimates for a number of reasons. No calculation of the cost of bridges was made. The construction and maintenance costs were the lowest found in the references used. The estimate of total miles of connector roads (those roads linking the designated agricultural areas with the highway network) is certainly a minimum as straight line map measurements were made which did not account for topography, soil suitability or management constraints.

Table 13 shows the considerable investment in transportation network construction and maintenance which will be required of the state if the agricultural areas designated in Alternative 2 are to be developed. The fourth alternative has the second highest amount of agricultural land designated for short-term development, followed by the first. Alternative 3 calls for the lowest level of agricultural development and thus has the lowest associated road costs.

It is possible that agricultural produce could be shipped using barges instead of truck/train transport. Although this would require a large initial investment in barges and loading facilities, the capital and operating costs of such a system would be lower than a highway system. This may be a relatively inexpensive way to develop high-quality agricultural land in the vicinity of large rivers. This approach certainly deserves consideration.

Table 14.
ROAD CONSTRUCTION AND MAINTENANCE COSTS ASSOCIATED WITH AGRICULTURAL DEVELOPMENT (EXCLUSIVE OF BRIDGES)

	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Priority Ag. Acres	295,640	582,000	163,000	256,000
Miles of Road				
trunk (1)	150	290	80	130
feeder (1)	150	290	80	130
connector (2)	60	120	35	50
Construction Cost (3) \$				
trunk	41,250,000	79,750,000	22,000,000	35,750,000
feeder	12,000,000	23,200,000	6,400,000	10,400,000
connector	16,500,000	33,000,000	9,625,000	13,750,000
TOTAL CONST.	69,750,000	135,950,000	38,025,000	59,900,000
Maintenance Cost (4) \$/yr				
trunk	450,000	870,000	240,000	390,000
feeder	390,000	754,000	208,000	338,000
connector	180,000	360,000	105,000	150,000
TOTAL MAINT.	1,020,000	1,984,000	553,000	878,000

(1) Number of miles of roads within agricultural areas- 1 road mile/1000 acres of cultivated land. This is an average of the figures for Delta II East and Delta Creek. It was further assumed that of this total, one-half would be trunk road mileage and the other half feeder roads.

(2) Number of miles of connector roads- The minimum mileage necessary to connect the agricultural areas of Alternative 2 to the existing road network was estimated using 1:250,000 base maps and the Alt. 2 overlay. The corresponding figure for the other three alternatives was derived by reducing this figure in proportion to the reduction in land designated for agriculture in each alternative relative to Alt. 2.

(3) Construction- \$275,000/mile for trunk roads within agricultural areas and the connector roads linking them with the highway net. \$80,000/mile for feeder roads within agricultural areas. All costs in 1980 dollars.

(4) Maintenance- \$3000/mile/year for trunk and connector roads. \$2600/mile/year for feeder roads.

C. Fiscal Impacts of Fire Management Needs

The purpose of this section is to estimate the impact of each alternative on fire management costs. It is not possible to estimate the exact costs of fire management under each alternative, but each can be ranked in terms of their general impact on costs.

The levels of fire management now used in the Basin are:

Critical- emphasizing protection of human life and property and calling for maximum suppression efforts.

Full- a designation for the protection of high value resource areas and calling for maximum suppression efforts. Full management areas are superceded in priority only by critical areas.

Modified- a flexible designation to allow aggressive fire attack during seasons of high fire risk and a reduced level in times when the danger of wildfire is low.

Limited- a designation in which the value of fire as a habitat enhancer is recognized and fire suppression efforts are relatively minor.

According to the Alaska State Fire Law, the state is responsible for protecting property from fire damage. The degree of protection provided may vary from critical coverage to extremely limited coverage. Until now, land disposed of for agriculture and settlement has received full or critical coverage. Barring a change in the state's fire laws, it is likely that future disposals will also be accorded this service. As such, the fiscal impact of settlement and agriculture on fire management is likely to be substantial.

An increase in the number of people in a remote area not only entails an upgrade in the level of fire management but also an increase in the frequency of fires. In these two ways, it increases the total expense of fire protection.

An examination of costs associated with firefighting in different fire management units within the Basin indicates the effect of increasing human population density on these costs. Table 15 presents two cost measurements for six fire management units. The cost information was compiled over a 27 year period.

**Table 15.
FIRE FIGHTING COSTS IN RELATION TO
POPULATION AND ACCESSIBILITY**

Unit	Cost/Acre	Cost/Acre Burned
Delta	7.47	37.33
Fairbanks	2.00	31.17
Tanana Flats	.86	4.94
Chena Dome	.68	11.33
Cache Mtn.	.68	21.37
Mount Debra	.29	13.94

In column 1, the high cost per acre is due to the fact that more fires start in areas of human settlement. In column 2, the high cost per acre burned reflects both the necessity of using the most expensive firefighting tactics within critical protection areas and the expense of reaching remote areas.

The highest costs occur in both the Fairbanks and the Delta units which are the most extensively developed units in the Basin. In contrast to these units, Mount Debra and Cache Mountain are relatively remote units where there are few people and thus the cost per acre is very low since fewer fires start in these units. The cost per acre burned is also lower than developed areas but due to the lack of access, there is still a substantial cost involved in fighting a fire in these areas once one starts.

In conclusion, increasing the level of settlement in an area will affect the cost of fire management in two important ways: 1) the level of fire management will increase (areas currently classified for limited fire suppression will be given full protection and 2) the number of fires started will probably increase. Remote lands which currently receive only limited protection will require full protection. The cost of fighting fires in remote disposal areas will be high and the frequency of such fires will also increase. Other land uses, such as mineral development or recreation, are not expected to significantly increase either the level of fire management or the number of fires.

Therefore, Alternatives 1 and 2 would have the largest impact on fire management costs.

3. SOCIAL EFFECTS OF EACH ALTERNATIVE

a. Introduction

Each of the alternatives will have an effect on the social environment of the communities both within and near the Basin. The magnitude of this effect depends largely on the population impacts which may occur as a result of the plan. Increasing the population of an area by a significant amount can cause changes in the social structure, racial mix, supply of resources and lifestyle of a community.

In the Tanana Basin, there are sixteen communities, some of which are quite small. These communities are often very close-knit with long-established ways of dealing with local problems and strong social and economic ties between residents. If a number of new people arrive on the scene, it is likely that local politics, education, social activities and economic ties will change as newcomers become involved in local affairs.

Change is obviously not always a negative factor. For some communities, new residents may mean more trade and the potential for greater prosperity. For others, the status quo is generally preferred and these areas seek to minimize the economic and social change in their areas.

Because each community has its own perspective on whether or not an increase in population is welcome, this analysis focuses strictly on estimating the likely degree of change and not on whether or not it will have positive or negative effects on an area.

In addition to estimating changes in population, this section also compares each alternative to local preferences for the use of state lands. Local preferences were estimated from comments heard at the first round of public meetings in March, 1982 and also from local land use recommendation maps which were submitted by several communities.

The final section of this report discusses the possible effects of each alternative on traditional, long-established uses of each area. These uses not only play a major role in local economies, but also form a vital part of the lifestyle.

On the basis of this analysis, it is likely that all of the alternatives could have social effects on the smaller communities. Under the "Low Scenario" of population changes, which is a conservative estimate, most towns would have population increases of from 28 to 300 per cent by the year 2000. This level of population change could substantially change local businesses, government, schools, social organization, and employment. It could also have a considerable impact on existing land use patterns and on the supply of resources such as fish and wildlife.

b. Population Increase

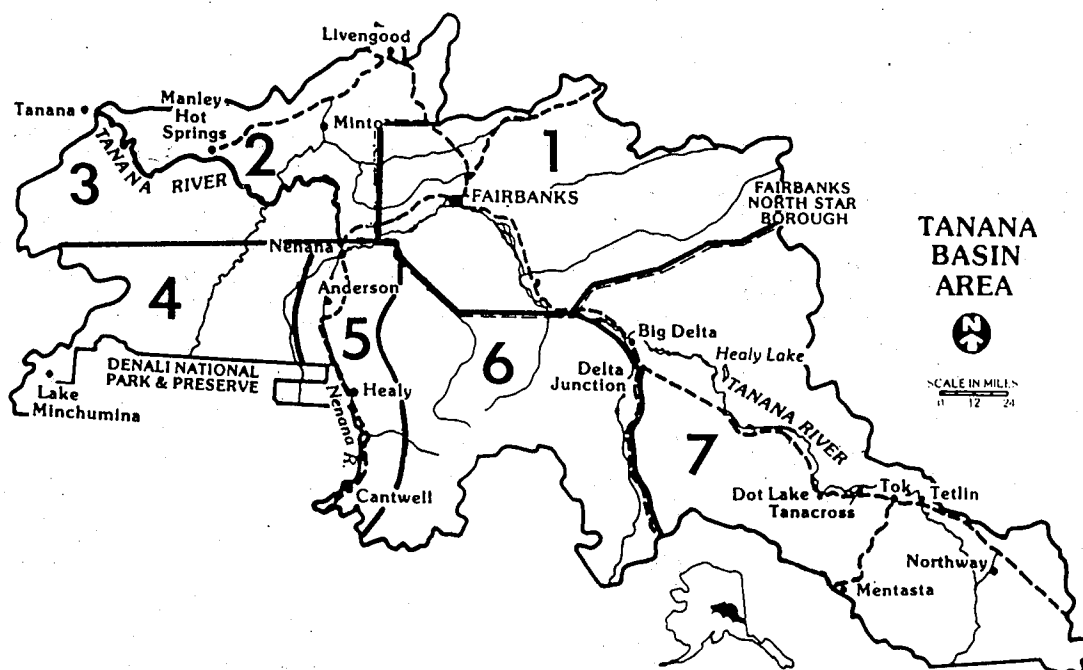
The primary factor that will cause increases in population of rural areas is the availability of jobs. Local employment opportunities will bring year round residents into the area, increasing the population of those communities. Employment opportunities outside of the local area, such as in Prudhoe can also cause an increase in population in certain communities. For example, Prudhoe Bay jobs allow some people to live nine months out of the year in the Manley Hot Springs area, in spite of limited local job opportunities. If there are limited job opportunities in the State and also in local areas, the population of an area is not likely to increase. Because it is difficult to say how the various alternatives will affect employment in the Basin (see Section III. B.1. of this analysis) it is not possible to estimate the population increase that will result from the different alternatives.

The other factor that will cause increases in the population of different regions is land sales. In the past, the state land disposal program has not in itself resulted in population increases; much of the state land that was purchased was never built on. This situation will change, however, with the new homesteading program.

The requirements of the homesteading program will affect the population in regions where land is sold. One method of receiving title to land under the homesteading bill is to build a house and live on the land for 25 months out of five years. The availability of jobs will play a role in whether these land sales will result in permanent population increases. If local job opportunities are not available, land owners are not likely to stay year-round after they have met the minimum requirements of the homestead bill.

Agricultural land sales also result in increases in population. Agricultural land sales have development schedules that require an area to be farmed. For this reason, the majority of agricultural parcels that are sold will have people living on them year round.

Recreational properties are likely to result in seasonal population increases in an area. Buyers usually have employment elsewhere and use the property seasonally. These people add to the population of an area only at certain times of the year and do not represent an overall net increase in the yearly population of an area. Nevertheless, a seasonal influx of people, especially during hunting and fishing seasons, can have significant social effects.



- Region 1. Fairbanks North Star Borough**
- Region 2. Elliott Highway Region**
- Region 3. South Tanana**
- Region 4. Minchumina**
- Region 5. Parks Highway**
- Region 6. Alaska Range**
- Region 7. Upper Tanana**

In this section of the analysis, the potential year round and seasonal increase in population that results from land sales is estimated. It is not possible at this time to determine what percentage of the population will be seasonal or year-round residents.

To facilitate the analysis, the area was subdivided into seven geographic areas as shown in Figure 13. The different regions are as follows: The Park Highway Region (Anderson, Healy, Cantwell); The Upper Tanana Region (Tok, Tanacross, Healy Lake, Tetlin, Northway, Mentasta Lake, Dot Lake); The Fairbanks North Star Borough; The Elliot Highway Region (Livengood, Minto, Manley, Tanana); and the Region Between the Parks Highway and Lake Minchumina.

To estimate population change, the number of parcels proposed for sale and the number of parcels which would actually be built on in each alternative was estimated. Using the estimated number of parcels which would actually be built on, it was possible to approximate the number of households which would settle in the area. The average household size in the Basin is 3.3 people, and thus it was possible to determine the number of people likely to settle in each region. Two scenarios were prepared -- a low, or conservative estimate, and a high estimate. The details of the analysis are presented in Appendix B of this report.

All scenarios assume that the parcels are not purchased by local residents, but by people from either other parts of the Basin or from other parts of the state. For the outlying regions, this is a very reasonable assumption; a study of purchases of land demonstrated that in these areas, most of the parcels are won by nonresidents of the locality (Gain, 1982). In the Fairbanks area, however, most of the parcels are purchased by local residents. Therefore, the estimates of the population impact on the Borough are probably high and are more likely to represent second homes or relocation of Borough residents.

Table 16.
COMPARISON OF NUMBER OF HOUSEHOLDS AND PARCELS SOLD

REGION	Estimated Current Number of Households	Number of Parcels Sold in Area 1979-1983	Alternative	Number of Settlement and Agriculture Parcels Proposed for Sale in Each Alternative
Fairbanks North Star Borough	16,060	1,171	1	6657
			2	4933
			3	2467
			4	4958
Parks Hwy.	306	389	1	3595
			2	2122
			3	870
			4	1852
Elliott Highway	190	156	1	2234
			2	2582
			3	1175
			4	2004
Upper Tanana	340	515	1	2757
			2	1367
			3	708
			4	1625

As shown in Table 16, the number of parcels proposed for sale in each Alternative greatly exceeds the existing number of households in every region except Fairbanks. Clearly, the local communities cannot utilize this number of parcels and therefore it is highly likely that newcomers will receive the majority of these lands. Although many of these parcels will be used for investment purposes, it is likely that a substantial number of them will be built and lived on within the next 20 years, particularly with the new homesteading requirements.

The table also shows the number of parcels which the state has sold in the area over the past four years. The Upper Tanana region has had the largest number of parcels sold relative to the current number of households.

Figures 10 through 13 summarize the population impacts of both scenarios under each alternative for the four most populated regions in the Basin.

As shown in Figure 10, the population of the Borough could increase somewhat under every alternative. However, not all of these buyers will be new to the Fairbanks area. It is more reasonable to assume that the majority of parcels will be bought by Borough residents, resulting in a redistribution of the population rather than an increase.

The communities along the Parks Highway could receive a significant impact (Figure 11). Even under the Low Scenario, the population is likely to almost double under each alternative. If the assumptions of the High Scenario are correct, the permanent and seasonal population of this area could increase by over 400% under Alternative 1.

The region which would be most affected is the Elliott Highway (the Livengood, Minto, Manley area). Under the low scenario, the population would increase the most under Alternative 2 (see Figure 12). This is due to the large amount of agricultural sales proposed for the area. The smallest impact would occur under the Low Scenario for Alternative 3, which indicates that the population could increase by about 65%. The largest effect would be under the High Scenario for Alternative 1 which could increase the permanent and seasonal population of this area by over 800% (this assumes that 90% of the proposed parcels sell and are lived on within the next 20 years).

The population impact on the Upper Tanana Region would be highest under the High Scenario for Alternative 1, where the region could sustain a 400% increase (see Figure 13). The smallest effect would be under the Low Scenario for Alternative 3, where the population would increase by almost 30% if the 708 parcels proposed for sale under Alternative 3 are purchased by nonresidents of the area.

In summary, each region within the Basin is likely to sustain some degree of increase in local population under all alternatives. The magnitude of this increase depends on the popularity of the disposals and on the number of people who actually will live on them within the next twenty years. This analysis indicates that even under conservative assumptions concerning the number of households who will live on their parcels, the impact on the local population could be substantial.

Whether such an increase would be viewed as positive or negative depends on the preferences of the current residents. However, it is likely that local businesses, government, schools and social ties could be affected as newcomers become involved in local affairs. Trade could increase as more population arrives, but the competition for both jobs and resources (such as fish and game) could also increase.

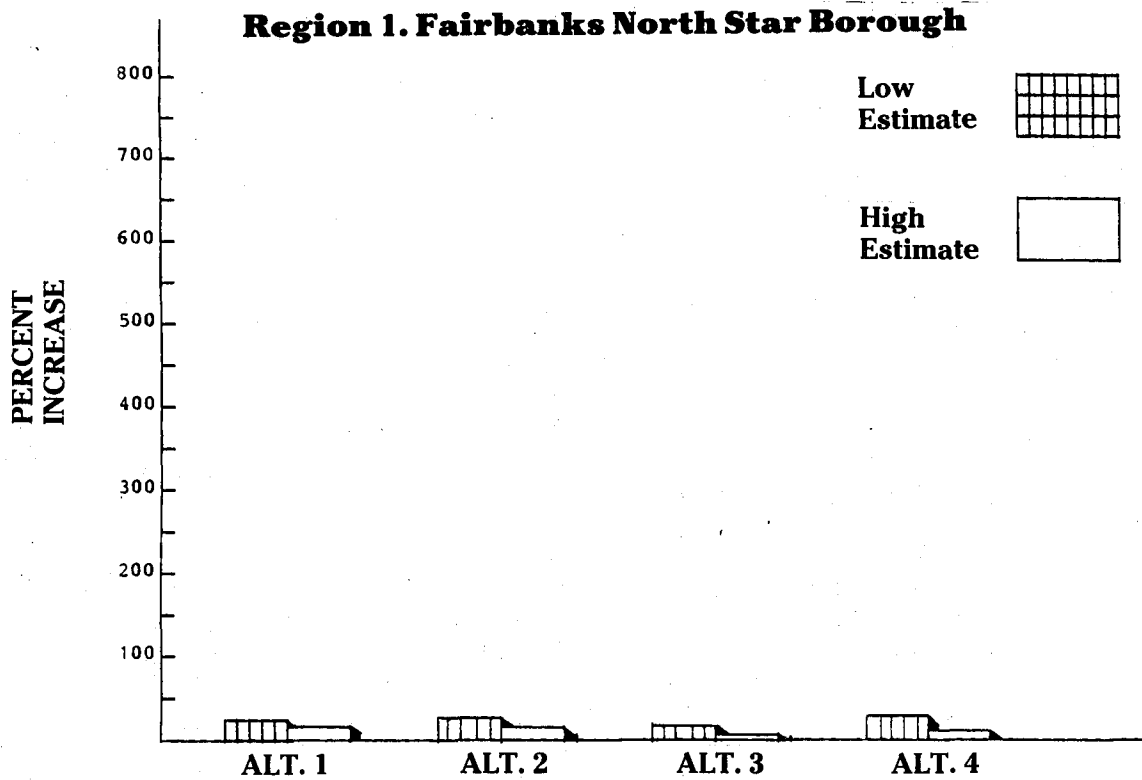


Figure 10.

PERCENT INCREASE IN POPULATION OF THE FAIRBANKS NORTH STAR BOROUGH (REGION #1) REGION DUE TO LAND SALES FOR SETTLEMENT AND AGRICULTURE UNDER EACH ALTERNATIVE.

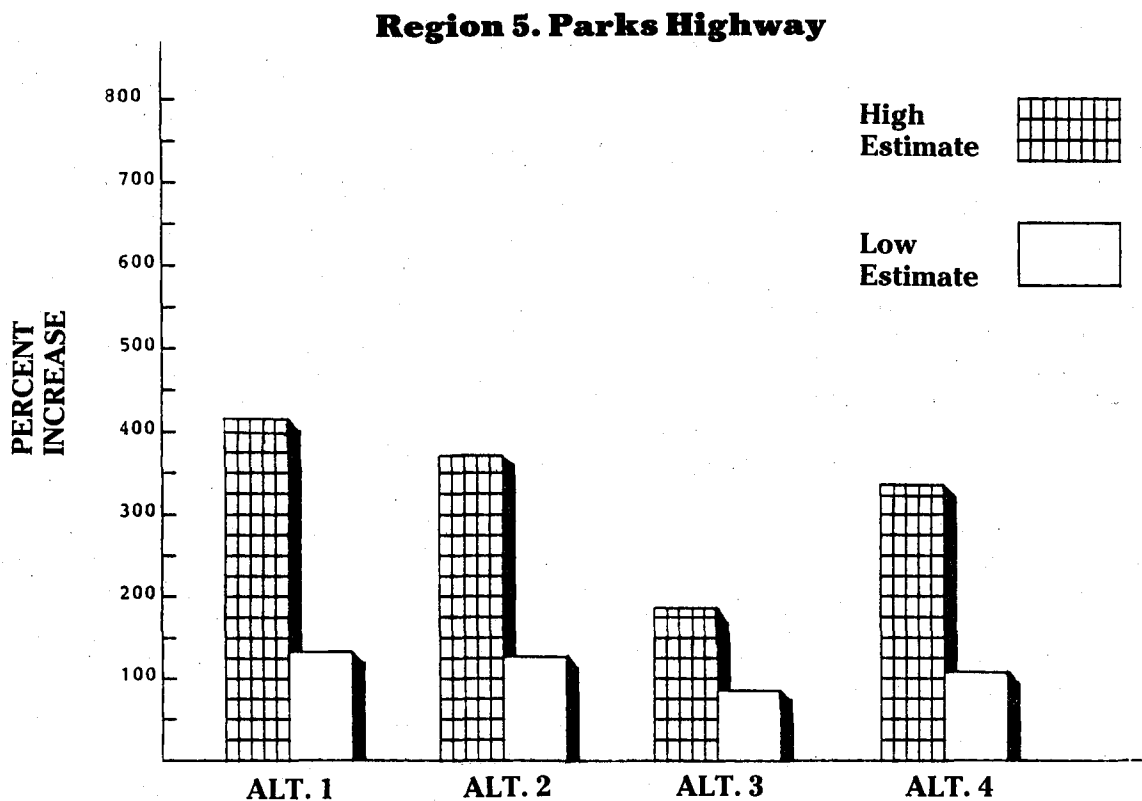


Figure 11.

PERCENT INCREASE IN POPULATION OF PARKS HIGHWAY REGION (#5) DUE TO LAND SALES FOR SETTLEMENT AND AGRICULTURE UNDER EACH ALTERNATIVE.

Regions 2 and 3. Elliott Highway

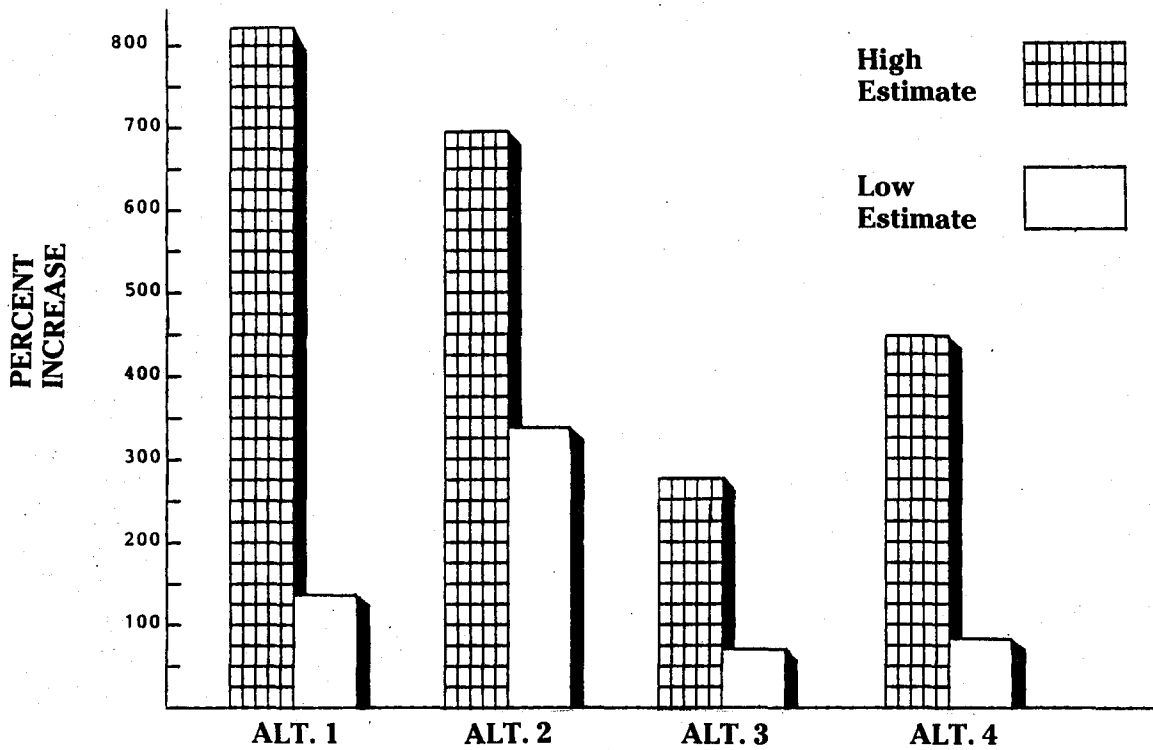


Figure 12.

PERCENT INCREASE IN POPULATION OF ELLIOTT HIGHWAY REGION (#2 AND 3) DUE TO LAND SALES FOR SETTLEMENT AND AGRICULTURE UNDER EACH ALTERNATIVE.

Region 7. Upper Tanana

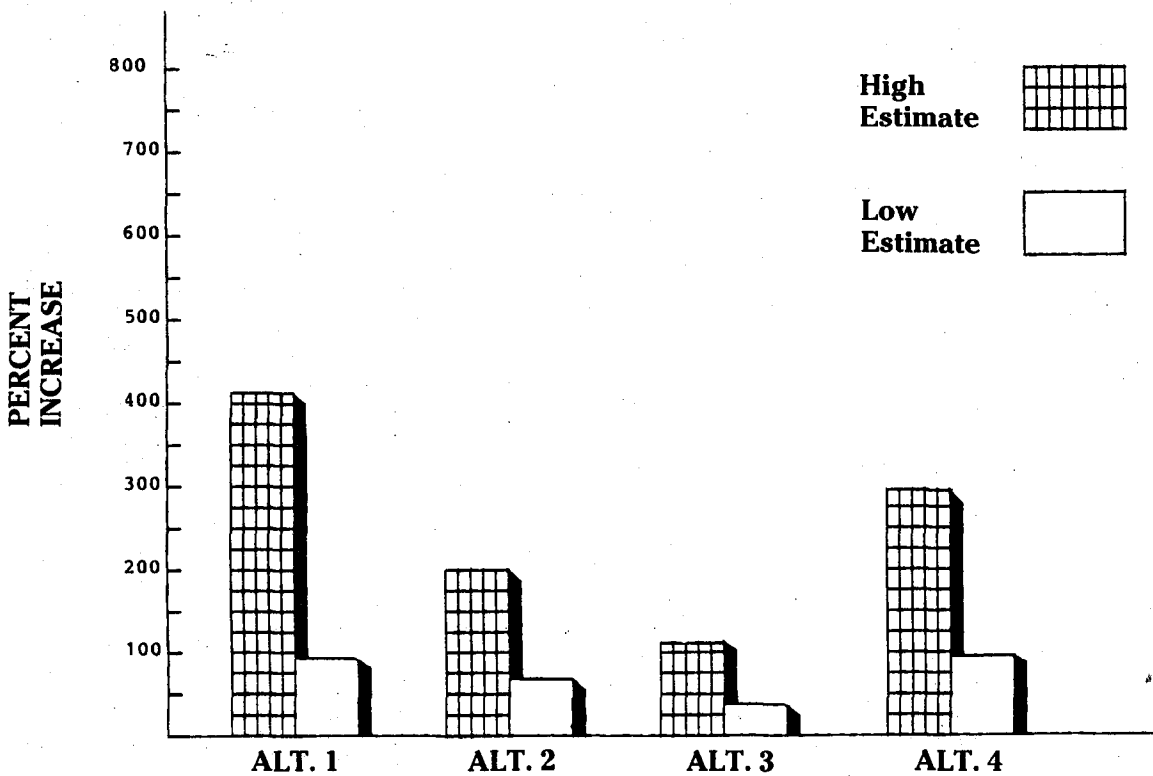


Figure 13.

PERCENT INCREASE IN POPULATION OF UPPER TANANA REGION (#7) DUE TO LAND SALES FOR SETTLEMENT AND AGRICULTURE UNDER EACH ALTERNATIVE.

Table 17.
ESTIMATED PERCENT INCREASE IN POPULATION DUE TO LAND SALES
FOR SETTLEMENT AND AGRICULTURE

Region	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Population Change	Percent Increase	Population Change	Percent Increase	Population Change	Percent Increase	Population Change	Percent Increase
Fairbanks North Star (1)								
Borough (Region 1)								
- High	13260	25%	15380	29%	5830	11%	10250	19%
- Low	3600	7%	2770	5%	1970	4%	2880	5%
(2)								
Elliott Highway Region								
(Region 2 and 3)								
- High	5120	818%	4420	708%	1710	274%	2970	475%
- Low	840	135%	2070	331%	400	64%	680	109%
(3)								
Parks Highway Region								
(Region 5)								
- High	4150	411%	3910	387%	1910	189%	3480	344%
- Low	1360	134%	1290	127%	940	93%	1140	113%
(4)								
Upper Tanana Region								
(Region 7)								
- High	4560	407%	2190	196%	1260	112%	3240	289%
- Low	970	87%	750	67%	320	28%	990	88%

1. The population of the Fairbanks North Star Borough is 53,000 (DRD, DNR, Socioeconomic Paper, 1982)
2. The population of the Elliott Highway Region is approximately 625 (DRD, DNR, Socioeconomic Paper, 1982).
3. The population of the Parks Highway Region is approximately 1010 (DRD, DNR, Socioeconomic Paper, 1982).
4. The population of the Upper Tanana Region is approximately 1120 (DRD, DNR, Socioeconomic Paper, 1982).

c. Consistency with Local Preferences

Local preferences have been estimated from two sources: (1) the public meetings held in each region, and (2) local land use plans that have been submitted to the Department of Natural Resources by some communities in the Basin.

In the spring of 1982, the Department of Natural Resources held a public meeting in each community in the Tanana Basin to discuss the Tanana Basin Area Plan. Comments were recorded during the meeting and compiled in a final report. These comments were then used by planning team members to determine how each community felt about the use of the team member's resource (see Chapter 2 of the Element Papers). The summaries that the team member wrote for each community were used to evaluate each alternative.

Several communities in the Basin have submitted land use proposals to the Department of Natural Resources. The land use proposals include maps identifying areas for different classifications. These recommendations, as well as the public meeting comments, were used as the basis for this evaluation.

There are limitations to evaluating each alternative based on this information. It is unclear how representative the comments heard at the meetings are of the entire population. The land use plans are likely to be more representative since they were, in most cases, developed by community or village councils that are structured to be representative of the people in the communities.

(1) The Fairbanks North Star Borough

The public meetings in Fairbanks indicated that for almost every issue there is a very vocal constituency. Because of this diversity of opinion it is difficult to tell how consistent each alternative is with local preferences.

The other possible source of information on local preferences in the Borough is the Fairbanks North Star Borough Comprehensive Plan. This plan is scheduled to be completed by October, 1983.

(2) Parks Highway Region

Public meetings were held in each of the communities along the Parks Highway. However, the comments received during the meetings do not provide a clear indication of local preferences because they were extremely diverse.

The Department has received a land use plan from only one community along the Parks Highway, the Yanert Revine community. The Yanert Revine Local Land Use Plan proposes that land disposals be limited to the area close to the Parks Highway and that the backcountry adjacent to the disposal be retained in public ownership and managed for fish and game and recreation.

Alternative 1 and 2 identifies a gross of 15,000 acres for land sales in the Yanert Revine area. Approximately 2/5 or 6,000 of these acres are in areas that were identified for land sales in the Local Plan. The other 3/5 of the land (9,000 acres) identified for sale are in areas that the Local Plan has recommended for public retention and fish and wildlife habitat management.

Alternative 4 also identifies land for settlement in areas identified for public retention by the Local Plan. Alternative 4 recommends that 4,000 acres of land be classified for settlement in areas recommended by the plan for public retention.

Alternative 3 is the most consistent with the local plan.

(3) Elliott Highway Region

Based on the public meetings and land use plan received from the communities of Manley Hot Springs, Minto and Tanana, it is clear that residents feel strongly about retaining their lifestyle and protecting the fish and game resources in the area. To meet this goal the local land use plan recommends that most land in the region be retained in public ownership. The land use plan identified areas that should be closed to land disposals and areas that should be retained in public ownership but where a low level of disposal might be acceptable.

Although it is not possible at this time to determine whether or not specific disposals are acceptable to the community, it can be assumed that the alternative with the least amount of land allocated to agriculture and settlement is likely to be the one preferred by residents. The bar graph shown below shows the gross acreages recommended for sale in the Elliott Highway Region under each alternative.

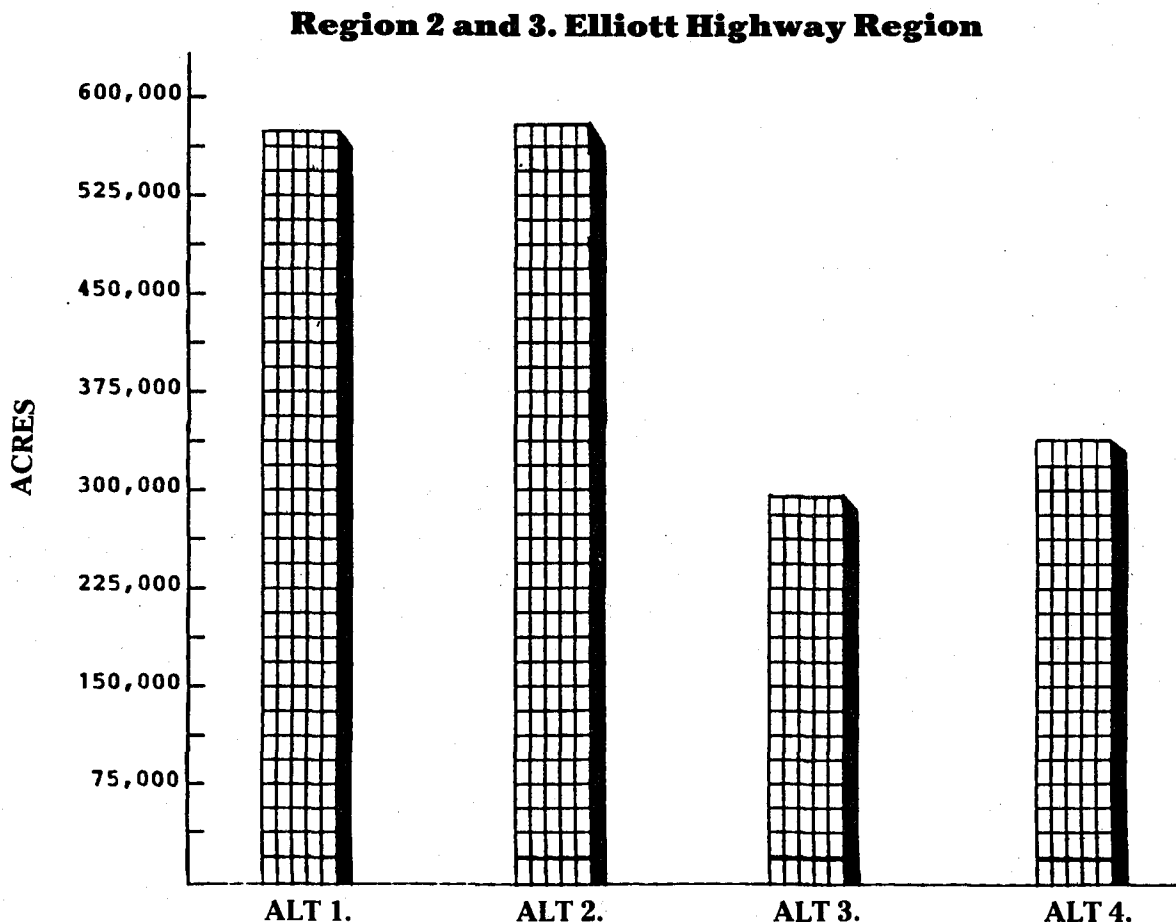


Figure 14.
GROSS ACRES RECOMMENDED FOR SETTLEMENT OR AGRICULTURE IN THE ELLIOTT HIGHWAY REGION THAT ARE IN AREAS RECOMMENDED FOR PUBLIC RETENTION BY LOCAL LAND USE PLANS.

(4) Upper Tanana Region

Residents who attended the public meetings held in the Upper Tanana Region voiced a strong concern about the protection of the fish and game resources and the rural lifestyle of the region. Residents at the meeting felt that the land disposals pose the greatest threat to the values that they find in the area. Residents seemed to feel that a certain level of land sales would be acceptable for community expansion near Tok but that further remote sales in outlying areas would be acceptable.

The Department of Natural Resources has received a land use plan for the Upper Tanana Region. The plan was endorsed by the Village Corporation and Council of each community, as well as the Regional Advisory Council. The plan recommends that all state land in the area be retained in public ownership and that if land sales are to occur that they be concentrated in the Tok area.

Based on this information, Alternative 3 is the most consistent with local preferences. Alternative 3 recommends that a total of 103,000 acres be disposed of for either agriculture or settlement in areas identified in the local plan for public retention. This total is significantly less than in the amount recommended for sale in the other 3 alternatives.

The bar graph below shows the amount of land recommended for sale by each alternative that is located in areas recommended by the local land use plan for public retention.

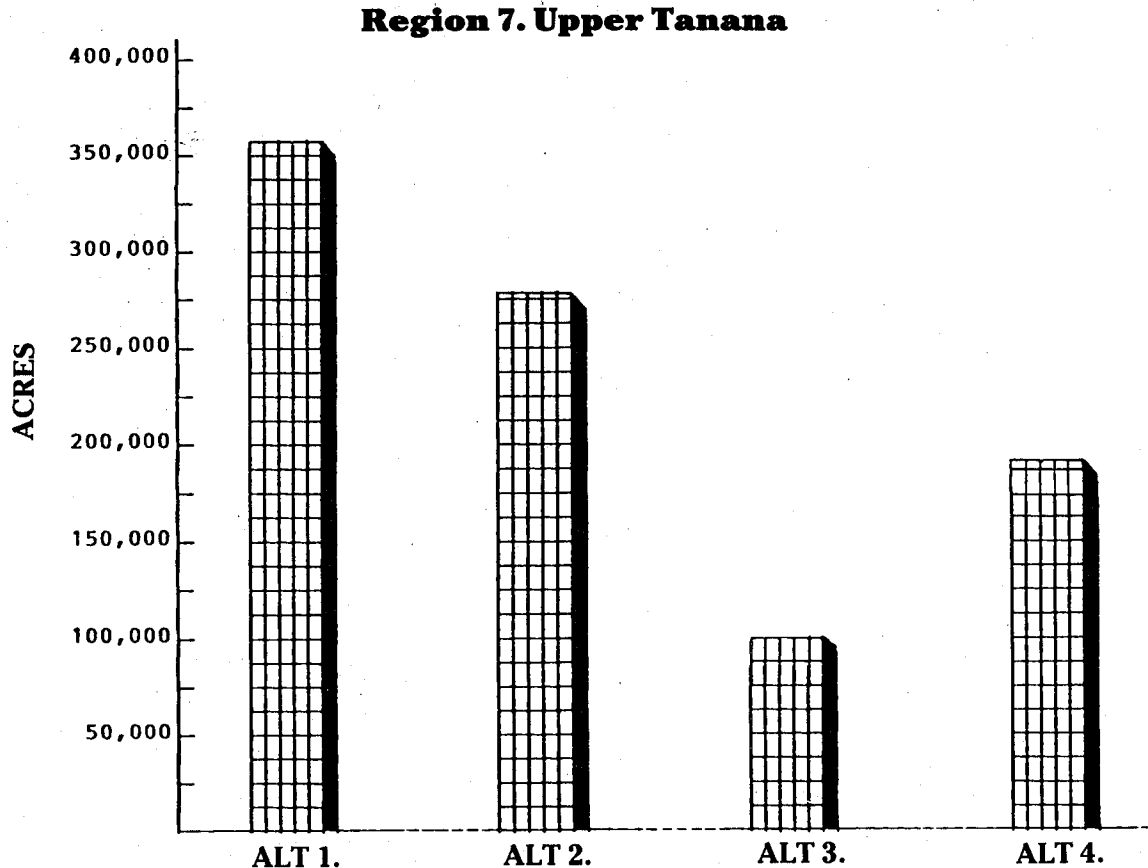


Figure 15.
GROSS ACRES RECOMMENDED FOR SETTLEMENT OR AGRICULTURE IN THE UPPER TANANA REGION THAT ARE IN AREAS RECOMMENDED FOR PUBLIC RETENTION BY LOCAL LAND USE PLANS.

(5) Minchumina - Kantishina Region

Residents at the public meeting held at Lake Minchumina voiced a strong concern about fish and wildlife and opposition to further land sales in their area. They also encouraged the Department to adopt the local land use plan that they submitted several years ago.

The land use plan makes classification recommendations for state land within 2 miles of the lake. The plan recommends that all state land be retained in public ownership. The plan identifies areas around the lake for forestry, fish and game and public recreation.

Each of the four alternatives is consistent with the local plan. Each alternative recommends that land in the vicinity of the lake be retained in public ownership and allows for woodcutting on these lands. The local plan however deals only with land in close proximity to the lake.

In the area south of Lake Minchumina that is not covered by the local land use plan, each of the four alternatives recommend some level of disposals. Residents during the public meeting expressed opposition to any further disposals in the area. Alternative 1 and 2 identify a net acreage of 13,000 acres for sale; Alternative Three - 400 acres and Alternative Four - 12,000 acres.

4. IRREVERSIBLE COMMITMENTS OF RESOURCES

The purpose of this section is to examine which land use options, if any, are precluded by each of the alternatives. Because they are potentially irreversible, these decisions should be given closer scrutiny than many of the other recommendations.

There are two ways in which the decisions made in the plan would be largely irreversible: (1) if the plan recommends that an area be sold; and (2) if the plan recommends a land use which would physically alter the area to the point where it could not be used for some other purpose. Under this definition, the major recommendations which may be irreversible are those which designate land for settlement and agriculture. Unless roads are constructed, most of the other designations are not irreversible should conditions or resource needs change. These designations are also not expected to cause the physical destruction of other resources.

a. Settlement

Of the recommendations made in the alternatives, settlement is only precluded where land is sold for agriculture. Although none of the alternatives call for disposals in the other designations (such as resource management or recreation), these designations are not irreversible and they do not alter the land to such an extent that it would be unusable for eventual sale as settlement land.

Furthermore, most of the designations, including forestry, minerals, resource management and some habitat areas allow cabin permits, commercial leases and the sale of scattered small tracts. These designations therefore do contribute in a small way to the amount of land available for settlement.

Based on this assessment, the option to sell land for settlement would be precluded on 1,134,000 acres of agricultural land in the first alternative, 1,597,000 acres in the second, 217,000 acres in the third and 369,000 acres in the fourth.

b. Agriculture

In the long term, the option to sell Class II and III soils for large scale agriculture is only precluded where these soils are sold for settlement. In other designations, the soil values should remain in good condition and be available if additional land for agriculture were needed.

Therefore, the option to sell land for agriculture would be precluded on approximately 432,000 acres of Class II and III soils which are slated for settlement in Alternative I. The amount of overlap between settlement and agriculture in the other alternatives is not possible to determine at this time.

c. Forestry

The option to manage state lands for forestry is precluded on lands sold for settlement or agricultural development. The other designations generally allow forest harvesting, and if they do not, they still do not foreclose the option of eventually managing the area for timber if the values are there and the resource is needed.

It is possible that areas sold for settlement could be used for forest management. However, experience elsewhere has shown that long-term timber management is much more difficult in areas where most of the land is privately owned and in small parcels because individuals do not know how to manage their stands for maximum production and tend to opt for short-term returns. Forest management on agricultural areas in the Basin would also be difficult for both this reason and the fact that agricultural

development schedules currently require that woodlots be cleared for planting.

Therefore, the option to manage state land for forest development is basically precluded on 3,444,000 acres in Alternative 1, 3,320,000 acres in Alternative 2, 1,133,000 acres in Alternative 3, and 1,619,000 in Alternative 4.

d. Fish and Wildlife

The effect of different allocations on wildlife is more a matter of degree than of totally precluding management of the resource. However, settlement is not expected to benefit the resource and in those areas where the settlement density is high, wildlife management may be virtually precluded. Although farming may benefit deer in the lower 48 states, the principal game species in this area are not expected to be benefitted by agriculture. Some areas where intensive mining occurs may also interfere with the habitat to such an extent that use of the area by wildlife is essentially precluded. These areas are usually small however. In summary, if the option to manage land for wildlife habitat is precluded by any of the allocations, it is most likely to be due to settlement, agriculture and mineral development.

This analysis cannot predict where mineral development is going to occur, because this will be determined more by market forces than by anything which the plan will recommend. However, the areas to be sold for settlement and agriculture which could be precluded from use for habitat are as follows in each alternative: 3,444,000 acres in Alt. 1; 3,320,000 in Alt. 2; 1,133,000 in Alt. 3; and 1,619,000 in Alt.4. As discussed on page 26, many of these areas are of high value for wildlife.

Of the remaining allocations, (recreation, forestry and resource management), none preclude wildlife management although several of the designations may not optimize the resource.

e. Minerals

In each alternative, mineral development is precluded where areas are sold for either settlement or agriculture. The same acres which are precluded for forestry and wildlife management are also precluded from mineral development. With a few exceptions, this acreage is not located in areas of high mineral potential, but this does not eliminate the possibility that these areas contain valuable minerals.

In Alternative 3, approximately 365,000 acres of critical habitat are recommended to be closed to mineral entry. However, this will not affect the value or the location of minerals so that if it is in the state or national interest to explore or mine in the area, this designation would be more easily reversed than mineral closures due to settlement or agriculture where a third party interest is involved.

f. Recreation

Many types of public recreation are precluded both by short term agriculture and settlement. This amounts to 2,621,000 acres of land in Alt.1, 2,323,000 in Alt. 2, 1,079,000 acres in the third alternative and 1,506,000 in the fourth.

Long-term agriculture may allow recreation values until such time as the land is actually scheduled to be sold. Mineral development may preclude recreation by disturbing or destroying amenity values. However, it may also create recreational or historic landmarks in the long-term.

Recreation is not precluded on lands designated for wildlife, forestry or on resource management lands. In most cases, these resources are recommended for joint use of an area.

5. ENVIRONMENTAL EFFECTS OF ALTERNATIVES

a. Introduction

The environmental effects of different land uses have many impacts, both direct and indirect, on the quality of life. Clean water, uncluttered scenery, abundant fish and game and ample access to recreational areas all contribute significantly to the enjoyment of life in the Tanana River Basin.

While the complexity of environmental change makes it difficult to make precise quantitative predictions, the alternatives can be broadly compared and ranked as to their probable impact on the environment.

Each alternative map presents the area suitable for development of the resource emphasized. Alternative 2, for example, portrays a case of very high agricultural use. The fourth alternative gives greatest emphasis to mineral and forestry development. However, the actual amount of development of a resource which will occur is almost certainly less than that shown in its map. The maps show different ways the Basin's land may be used, but market forces will play a large role in whether or not this land is eventually developed.

In the analysis which follows three areas of environmental concern are addressed: water quality, wetlands and scenic values. This analysis indicates that, for each of these concerns, Alternatives 1 and 2 had the highest negative impact on the resources addressed, Alternative 3 had the lowest and Alternative 4 fell somewhere in between. All effects which deal with wildlife habitat are discussed under that section of this paper.

There is little difference between the alternatives as far as the level of mining which will be allowed. Likewise, the amount of forestry called for under the different alternatives is roughly equivalent. Therefore, the major difference between alternatives involves the designation of land for settlement and agriculture. These activities involve a relatively permanent change in the environment: they require extensive land clearing and development, the construction of road networks and an increase in the level of fire suppression, all of which have considerable environmental impact. Forestry and mining also involve these changes, but the level of both of these land uses is about the same for all of the alternatives. Consequently, they do not contribute to differences between the alternatives in terms of environmental impacts.

b. Erosion and Water Quality

(1) Background

Water quality is affected in a variety of ways by different land uses. Land clearing activity, which exposes soil to erosive runoff water, can result in siltation of streams, rivers and lakes. The resulting increase in the level of suspended solids in these waters impedes the respiration and feeding of many forms of aquatic life.

Tree cover is the best protection against erosion. Thus, any land use which decreases the extent of forest cover will probably increase erosion. Settlement can greatly increase erosion through both land clearing and road building. In many settlement areas the level of fire suppression activities increases and with it fire roads and firebreaks, which are highly susceptible to erosion, may be established. In addition, contamination of surface and ground water can occur due to improper sewage and waste disposal.

Agricultural development clears large areas of land and requires the construction of roads, both of which can cause erosion and water quality problems. Careful planning and farming practices can reduce but not eliminate this erosion. Chemicals used in herbicides and fertilizers also degrade water quality after they are washed into streams and rivers.

Of the alternatives considered here, agriculture and settlement have the highest potential for long-term erosion and water quality problems due to the degree of land clearing, road building and fire suppression which accompany them. None of the alternatives is likely to have a substantial effect on mining or forestry, which are other intensive land uses which could cause erosion.

Where forestry occurs in each alternative, the major contribution to erosion will be from logging roads. Different methods of harvest vary greatly in their impact on the soil but all harvest activities in forests increase erosion to some extent. Fire suppression efforts demand the construction of fire roads and firebreaks which also add to the erosion problem. Silvicultural chemicals used in intensive forest management can enter the water system and degrade it.

Placer mining contributes directly to the sedimentation of waterways. Even with extensive efforts to reduce this effect, the sediment load and turbidity of the water are very difficult to eliminate. Arsenic levels in water used for placer mining are frequently increased due to exposure of arsenic-bearing minerals to flowing water.

High density recreation can also result in water pollution due to both waste disposal and the use of gasoline powered engines. Off road vehicles also disturb the soil, especially in fragile environments such as tundra. Land uses which increase the area accessible to these forms of recreation will increase these negative effects.

(2) Effects of Each Alternative

Amounts of erosion and water quality degradation possible under each alternative are difficult to measure precisely. Factors outside the scope of the plan will influence development of certain kinds. The amount of agriculture and mining which will occur in the Basin in the future is largely dependent on market conditions. However a rough comparison can be made.

Alternative 1 calls for the highest degree of land disposal and the second highest level of agricultural development. If the maximum allowed acreage of agriculture and settlement is developed, the result will be a large increase in land clearing and roadbuilding activity for homesites and farms. Alternative 2 emphasizes agricultural use and has slightly less settlement area than the first alternative. These two alternatives are likely to result in similar degrees of erosion and water quality problems. These alternatives will also open the greatest amount of land to such activities as high density, motorized recreation through the establishment of roads in previously inaccessible areas.

Alternative 3 has the lowest level of agriculture and settlement. In addition, under this option, buffer zones around bodies of water are twice as wide as those prescribed in the other three alternatives. These wider buffers will help reduce negative impacts on water quality. In calling for a lower overall level of development and mitigating measures (see policies and guidelines) to reduce negative impacts on waterways, this alternative will probably result in the lowest overall amount of erosion and water pollution.

Alternative 4 has a relatively low amount of settlement and agricultural development but roughly the same amount of mineral and forest use. Under this option, a lower total area of land will be cleared, fewer roads will be built and a lower level of fire suppression will be required than in the first two alternatives. This being the case, the overall level of erosion and water quality degradation resulting from this alternative will likely be lower than that for Alternatives 1 or 2. However, the level of water pollution and erosion due to forestry or mining will be about the same in all alternatives.

c. Environmental Effects of Fire Management Requirements

(1) Background

The development of the Tanana River Basin will require an increase in firefighting efforts. The level of such efforts and their environmental effects vary according to the type and amount of each land use. Fire suppression must be increased in areas which are developed for intensive human use. Fire is generally considered to be beneficial to wildlife as it increases habitat diversity and favors certain game species such as moose. Fire is a component of the natural ecosystem of the Basin and suppressing it below its natural level has a negative influence on the quality of the area for many types of wildlife habitat. In addition, certain chemicals used in firefighting can degrade water quality. Firefighting involves the establishment of fire roads and firebreaks with their attendant erosion potential.

As discussed under fiscal impacts, the levels of fire management used in the Basin are critical, full, modified and limited.

(2) Effects of each alternative

The major source of difference between the four alternatives in the level of fire management they will require relates to the amount of agriculture and settlement lands they prescribe. The other land use designations do not inherently require an upgrading of firefighting efforts whereas conversion of land to agriculture and settlement normally does.

Alternatives 1 and 2, with their relatively high level of land devoted to agriculture and settlement would require the highest level of fire suppression and its negative environmental effects.

The third alternative would allow the most land to remain in the limited fire management category. With its low level of development requiring fire suppression, it would have the least negative effects relating to fire suppression.

The fourth alternative falls between the first two and the third in the level of development and its required fire suppression. It would therefore have an intermediate fire management impact.

d. Wetlands

(1) Introduction

Wetlands are areas that are periodically or permanently covered by water and which support certain types of vegetation characteristic of moist habitat.

These lands perform important hydrologic and ecological functions and therefore deserve special attention. They filter excess nutrients and silt from runoff waters thereby purifying them. By absorbing large amounts of water during flooding and recharging ground water during dry periods, they serve to stabilize the water supply and reduce flood damage. Wetlands also serve as important habitat for both wildlife and vegetation; they are essential to many types of waterfowl.

Wetlands are sensitive to hydrologic changes and can be easily degraded. Alteration of the amount or rate of inflow and outflow can decrease their ability to perform the functions described above. Agriculture and settlement and their associated land clearing and paving change drainage patterns and result in more rapid flow of water through wetlands. By diverting water for human use, development can also alter the flow of water into or out of wetlands thereby degrading their quality. Areas of wetland may be drained, destroying both the habitat and the ecological functions of the wetland. Exposure to chemicals associated with these activities can affect the biological quality of wetlands.

(2) Effects of each alternative

Major wetland areas in the Tanana River Basin were identified using a waterfowl habitat map supplied by the Alaska Department of Fish and Game and the U.S. Geological Survey topographical maps. Because neither of these sources depicts the entire distribution of wetlands, the results may underestimate the actual effects of the alternatives. Using this method, the total area of wetland habitat on lands affected by the plan was estimated to be 1,248,000 acres. Wetlands were mapped and compared with each alternative to examine the degree of effect of the different options on the resource. Given that many wetland areas are too small to be examined using this method, the figures in Table 16 represent a minimum measure of the area affected. This table should be viewed simply as a relative measure of the differences between the alternatives. Figure 16 shows the estimated percentage of total wetland area affected by each alternative.

As can be seen in Table 18, Alternatives 1 and 2 involve developing about 20% of the wetlands in the Basin. Alternative 2, with its emphasis on agriculture, may have a greater total impact on wetlands since agriculture involves much land clearing, water flow alteration and chemical pollution.

Alternative 3 calls for no agricultural development in the major wetlands and a greatly reduced degree of settlement and thus largely avoids the problems associated with Alternatives 1 and 2.

The fourth alternative falls midway between the first two and the third options and is likely to have an intermediate effect.

Table 18.
ACREAGE OF WETLANDS AFFECTED BY EACH ALTERNATIVE

Land Uses	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Agriculture short term	51,040	58,080	0	26,880
long term	37,120	56,960	0	5,760
Settlement	146,880	109,120	56,000	112,640
Minerals	5,120	5,120	0	5,120
Total	240,160	229,280	56,000	150,400

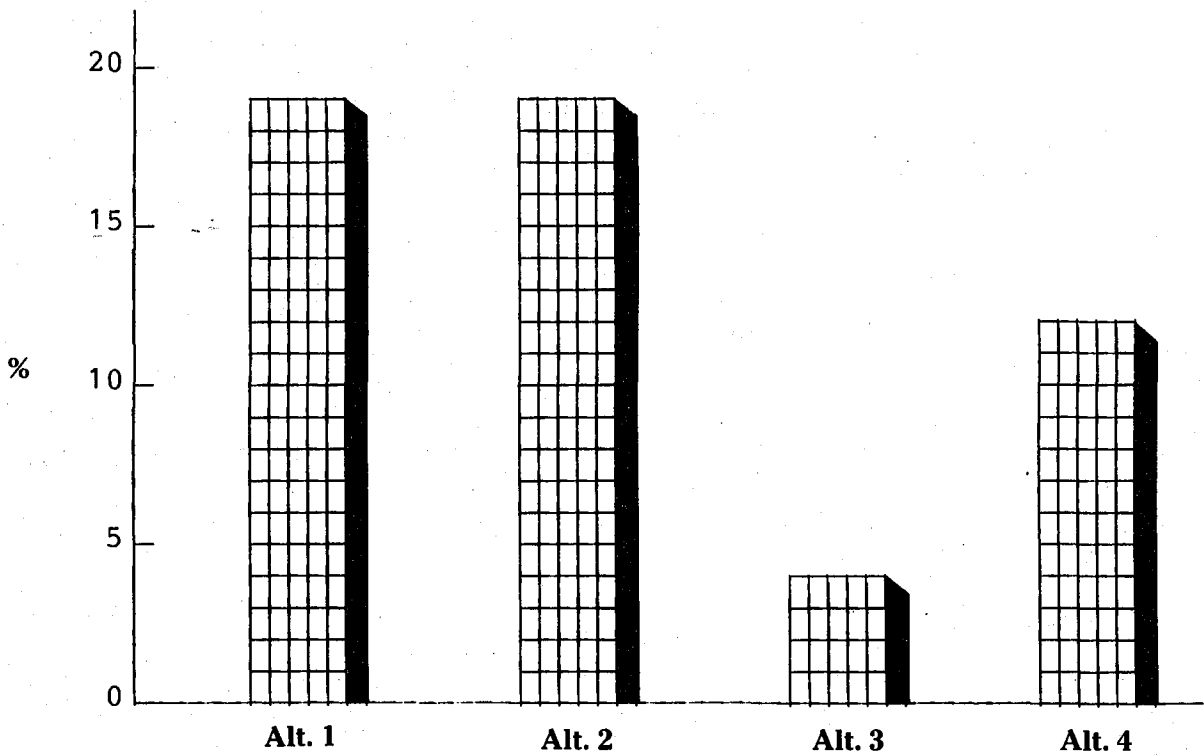


Figure 16.
PERCENT OF TOTAL WETLAND AFFECTED BY AGRICULTURE, SETTLEMENT AND MINERAL DEVELOPMENT IN EACH ALTERNATIVE (100% = 1,248,000 ACRES).

e. Scenic Values

(1) Introduction

Scenic quality is important not only in encouraging tourism but also as a component of the basic quality of life in the Basin and must be considered in management decisions.

The underlying quality of visual resources in the Basin relies on natural landforms- mountains, rivers, forests, etc. Unobstructed views of these natural features are essential to high scenic quality. Some degree of development may serve to increase visual diversity but to maintain high scenic quality these changes must be kept harmonious with the overall setting.

Threats to scenic values include obstruction or cluttering of views by structures, roads, land clearing and improper waste disposal.

A study available on scenic values in the Basin is the report, "Scenic Resources Along the Parks Highway" (DRD, DNR, 1981). This document will be used in developing that portion of the plan that involves the Parks Highway corridor. Studies for other areas are not available.

(2) Effects of each alternative

All of the alternatives have potential for negative visual quality impact but in each case these effects can be avoided through careful case by case design and execution of development projects. As such, this discussion is intended to point out the degree of effort necessary to mitigate visual quality loss for each alternative.

Assuming that the level of scenic value impact is proportional to the area exposed to intensive human activity (which includes settlement, agriculture, mining, forestry and high density recreation), then the different alternatives can be compared.

Alternatives 1 and 2 are similar in the relatively high degree of development they call for throughout the plan area. These options have the highest potential for scenic impacts and would require the most careful management to preserve visual resources.

Alternative 3 involves the smallest area in intensive human use. It also calls for the widest buffer strips along highways, streams, rivers and around lakes. For these reasons this alternative has the lowest potential of the four for scenic quality impact.

The fourth alternative has a lower level of settlement and agriculture than the first two but the highest level of mineral and forestry development. The visual impact of this option is highly dependent on the location and style of development. Large clearcut areas of forest or intensive mineral extraction activities have a high scenic impact. The total area affected by development under this alternative is lower than in Alternatives 1 and 2 but the nature of the uses called for may have as great an impact on visual resources overall.

6. EFFECTS OF POLICIES WHICH VARY BY ALTERNATIVE

As discussed in Section I of this report, there are several land management issues which the plan should address in addition to land allocations. The purpose of this section is to examine some of the advantages and disadvantages of each of the policies which vary by alternative (see Section III for a discussion of each of these policies).

a. Management of Floodplains

Many people are willing to accept the risks of floods in order to live near the waterfront. Alternatives 1, 2 & 4 provide this opportunity by allowing settlement in the floodway fringe (but not in the active floodway). The disadvantages of allowing settlement in the floodway fringe are increased hazards to homeowners and the extremely high potential costs to the state government if disaster relief is required.

The floodway fringe is also an area of valuable habitat. Alternative 3 protects this habitat and minimizes the settlement risks by disallowing most development in the floodway fringe as well as the active floodway.

b. Guidelines for Management of River Corridors, Trails and Lakefronts

There are conflicting demands for the use of land along waterbodies and trails. These lands are valuable for residential development as well as habitat and recreation. All of the alternatives reserve some land for public use along trails, river corridors and lakefronts. However, in Alternatives 1, 2 & 4 these are protected by 60 foot easements across private lands, while in Alternative 3 they are retained in public ownership with wide corridors of 300 feet or more.

Some people believe that easements do not provide adequate protection of the public use of trails, rivers and lakefronts and that public ownership of these areas is the only way to ensure public access. They believe that small easements may inhibit access to the backcountry. However, many others prefer to build near the waterfront or otherwise use the land close to trails and water. For them wide corridors in public ownership are believed to preclude these uses.

c. Agricultural Timber Salvage

Under all alternatives timber having high or moderate value for commercial or personal use on state lands to be cleared for agricultural development is managed to ensure the public is compensated for the timber resource values.

Under Alternatives 1 and 2, which would include the value of the timber in the price of the agricultural rights, the price of the parcels would be higher, but the farmer would have more flexibility in deciding how to clear the land and use the timber resource.

Alternatives 3 & 4, which require timber salvage prior to the sale of the land provide the parcel at less cost to the farmer and also ensure that the timber will be used rather than chained and burned.

d. Guidelines for Management of Grazing Areas

Grazing is a concern to many people in the Basin. Several farmers are interested in grazing animals on state lands within the Basin. However, there are no natural grasslands in the Basin, and therefore the vegetation would need to be cleared and grasses planted before the land could be grazed. Alternatives 1 and 2 provide the greatest flexibility for those interested in grazing leases on state land.

Some of the disadvantages of grazing are that it may affect water quality, soil stability and fish and wildlife habitat. In addition, rangelands may contribute to disease transmission and predator conflicts. The location of grazing lands therefore could have a significant impact on the wildlife populations of an area. Alternative 3 provides the greatest protection to wildlife populations.

e. Agricultural Development Schedules

Development schedules ensure that the land will be put into production within a reasonable time period and that the land will not be used just for speculation. However, it is difficult to monitor the development schedules and they allow the purchaser less flexibility in how they use the land. They can also put a considerable financial burden on the purchaser as they require land clearing at a time when there is likely to be no cash flow from the farm. At the public meetings on the Tanana Basin Plan held in 1982, many people pointed out that another disadvantage of development schedules is that they preclude the use of their land for woodlots since they were required to clear the timber rather than manage it.

Alternatives 1 & 4 would not require development schedules on farms less than 80 acres in size and therefore these parcels are more likely to be used for investment or for large estates, but they also leave more flexibility for the owner.

Alternatives 2 and 3 would require development schedules on all parcels and therefore they avoid the problem of speculation, but also preclude timber management on the parcels and they could put a financial drain on the operation.

f. Where Mineral Entry Will Be Allowed

Mineral entry can create conflicts with surface landowners. Policies regarding mineral entry are attempts to minimize those conflicts. For this reason settlement and agriculture lands are closed to mineral entry in alternatives 1, 2 and 3.

Alternative 4 is more favorable to mineral development by leaving agriculture lands open to mineral entry and by reopening unsold remote disposals without reclassification.

Conflicts can also occur between minerals and other resources. Fish and wildlife and recreation values can be significantly disturbed or degraded by mining activity. Alternative 3 attempts to deal with these problems by closing some habitat areas and by using leasehold location to define mining activity in others.

Appendices

Table A-1.
NET ACREAGE IN EACH ALTERNATIVE COMPARED TO THE ESTIMATED
LAND REQUIREMENTS FOR BUILDING NEEDS

	LAND USE TYPE									TOTAL
	Residential			Recreational			Remotes			
	By 1990	1990-2000	Total	By 1990	1990-2000	Total	By 1990	1990-2000	Total	
Projected Land Requirements	7,077	6,117	13,194	2,359	2,039	4,398	944	816	1,760	19,352
Alternative 1 Net Acreage	32,642	54,968	87,610	9,977	16,793	26,770	168,877	284,243	453,120	567,500
Alternative 2 Net Acreage	22,139	37,280	59,419	5,475	9,214	14,689	107,776	181,402	289,178	363,286
Alternative 3 Net Acreage	15,162	25,522	40,694	7,173	12,073	19,246	38,656	65,064	103,720	163,660
Alternative 4 Net Acreage	26,906	45,308	72,214	4,094	6,890	10,984	89,398	150,470	239,868	323,066

Table A-2
ESTIMATED NET ANNUAL
FISCAL IMPACTS OF DISPOSALS
WITHIN THE FAIRBANKS
NORTH STAR BOROUGH

Alternative	Disposal Program	Number of Parcels To Be Offered (a) 1985-2000	FISCAL IMPACT SCENARIO		
			Minimum	Moderate (in dollars)	Maximum
1	Subdivisions	2,501	700,280 (b)	-2,450,980 (c)	-3,151,260 (d)
	Remotes, Ag & Large Tract	4,040	565,600 (e)	-80,800 (f)	-5,171,200 (g)
	Total	6,541	1,265,880	-2,531,780	-8,322,460
2	Subdivisions	1,851	518,280	-1,813,980	-2,332,260
	Remotes, Ag & Large Tract	2,947	412,580	-58,940	-3,772,160
	Total	4,798	930,860	-1,872,920	-6,104,420
3	Subdivisions	1,523	426,440	-1,492,540	-1,918,980
	Remotes, Ag & Large Tract	925	129,500	-18,500	-1,184,000
	Total	2,448	555,940	-1,511,040	-3,102,980
4	Subdivisions	2,150	602,000	-2,107,000	-2,709,000
	Remotes, Ag & Large Tract	2,764	386,960	-55,280	-3,537,920
	Total	4,914	988,960	-2,162,280	-6,246,920

(a) Assumes ave. 5 acres/parcel for subdivisions (all Type A); 40 acres/parcel for remotes, small ag., and large tract. All scenarios assume 100% of parcels are both sold and built on.
(b) +280 net revenue per parcel (see Settlement Element Paper for further discussion); (c) -980 net cost per parcel;
(d) -1260 per parcel; (e) +140 per parcel; (f) -20 per parcel; (g) -1280 per parcel.

Table A-3
ESTIMATED NET ANNUAL
FISCAL IMPACTS OF
DISPOSALS OUTSIDE THE
ORGANIZED BOROUGH

Alternative	Disposal Program	Number of Parcels To Be Offered (a) 1985-2000	FISCAL IMPACT SCENARIO		
			Minimum	Moderate (in dollars)	Maximum
1	Subdivisions	1,540	-154,000 (b)	-2,094,400 (c)	-2,525,600 (d)
	Remotes, Ag & Large Tract	8,823	000 (e)	-617,610 (f)	-23,292,720 (g)
	Total	10,363	-154,000	-2,712,010	-25,818,320
2	Subdivisions	980	-98,000	-1,332,800	-1,607,200
	Remotes, Ag & Large Tract	5,994	000	-419,580	-15,824,160
	Total	6,974	-98,000	-1,752,380	-17,431,360
3	Subdivisions	550	-55,000	-748,000	-902,000
	Remotes, Ag & Large Tract	2,595	000	-181,650	-6,850,800
	Total	3,145	-55,000	-929,650	-7,752,800
4	Subdivisions	1050	-105,000	-1,428,000	-1,722,000
	Remotes, Ag & Large Tract	4,895	000	-342,650	-12,922,800
	Total	5,945	-105,000	-1,770,650	-14,644,800

(a) Assumes ave. 5 acres/parcel for subdivisions (all Type A); 40 acres/parcel for remotes, small ag., and large tract. All scenarios assume 100% of parcels are both sold and built on.
(b) - \$100 net cost per parcel (see Settlement Element Paper for further discussion). (c) - \$1360 net cost per parcel;
(d) - \$1640 per parcel; (e) no costs or revenues; (f) - \$70 per parcel; (g) -\$2,640 per parcel

Table B-1
POPULATION INCREASE DUE TO LAND SALES
ALTERNATIVE 1
Region 1: Fairbanks North Star Borough

	A Net Acres For Sale 1985 - 2000	B Average Parcel Size	C Total # Parcels For Sale (A/B)	D Proportion of Total Parcels Sold	E Total # Parcels Sold (Cx D)	F Proportion of Parcels Sold That Are Built On	G Total # Parcels Built On (Ex F)	H Total Population Increase (G x 3.3) ⁹
Settlement								
Subdivisions:				(4)		(6)		
- High	12505	5.0	2,501.00	.95	2,375.00	.95	2,257.00	7,448.00
- Low	12505	5.0	2,501.00	.95	2,375.00	.40	950.00	3,136.00
Remotes:				(4)		(7)		
- High	161600	40.0	4,040.00	.60	2,424.00	.70	1,696.00	5,599.00
- Low	161600	40.0	4,040.00	.15	606.00	.12	72.00	239.00
Agriculture:	0	160.0	000 00	1.0	000 00	1.0	000 00	000 00
Agriculture								
High Priority:	(1) 23654	(3) 400.0	59.00	(5) .95	56.00	(8) 1.0	56.00	185.00
Medium Priority:	22809	400.0	57.00	.15	8.00	1.0	8.00	28.00
TOTAL								
								13260
								3589

See next page for footnotes

FOOTNOTES

1. The agricultural areas on the alternative maps were identified from the Exploratory Soil Survey. The Survey identifies broad areas within which can be found a certain amount of productive agricultural soils. Not all of the land identified however is likely to have high agricultural value. A conservative estimate would indicate that around 2/3 of the areas identified on the alternative maps have good soils. Therefore in this analysis, 2/3 of all the land identified for agriculture of the various maps are assumed to be considered for sale.
2. The average size of a small scale agricultural parcel that has been sold to date is 160 acres. (Division of Agriculture, DNR).
3. The average size of large and small scale agricultural parcels that have been sold to date is 400 acres. (Division of Agriculture).
4. Not all parcels that the state offers for sale will be sold. The Division of Land and Water estimates that the majority of subdivision land will eventually be sold. However, the land disposal program is new and information is not yet available that allows the percentage to be predicted with any accuracy. For this reason a range of percentages were used.

The different percentages used were determined from the Department's experience to date with the land disposal program. The Department has found that on the average 15% of the total net acreage offered for sale is staked. For this reason, 15% was used for the low end of the spectrum in this analysis.

This estimate could be slightly low however. In Alternative 1 the Division of Land and Water has identified for disposal better quality land than has been offered in the past. The Division believes that because of this change, the remote disposal program will become more popular. For this reason, the high end of the spectrum regarding land sold is 60%.

6. Many of the subdivisions and homesteads that are sold may never cause an increase in population. Many of the purchasers may not prove up on the homesteading requirements or build on the subdivisions. To predict the population increase that results from land sales it is therefore necessary to know the percentage of parcels sold that are build on. Here again, information is not available, so a range is used to predict this.

The Division of Land and Water expects that 95% of the high quality subdivisions that are close to communities will eventually be built on. Building will likely occur as access and services become available. For this reason 95% is the high range that is used. However, some subdivisions are held for investment purposes and will not be built on for some time. Therefore, the low range used in this analysis is 40%.

7. Under the Open to Entry disposal program in the 1960s, only 1 in 8 parcels sold in remote areas were built on and surveyed within 15 years (Disposal Section, DLW, DNR). Based on this information, the low range used in this analysis for homesteads actually built on is 12%.
8. The Division of Agriculture requires development schedules with all agriculture land sales. For this reason it is assumed that over the next 20 years 100% of the land sold will be built on.
9. The average household size in the Tanana is 3.3 people. (DRD, DNR, Socioeconomic Paper, 1982).

**Table B-2
POPULATION INCREASE DUE TO LAND SALES
ALTERNATIVE 1
Region 2 and 3: Elliott Highway.**

	A Net Acres For Sale 1985 - 2000	B Average Parcel Size	C Total # Parcels For Sale (A/B)	D Proportion of Total Parcels Sold	E Total # Parcels Sold (Cx D)	F Proportion of Parcels Sold That Are Built On	G Total # Parcels Built On (Ex F)	H Total Population Increase (G x 3.3) ⁹
Settlement								
Subdivisions:				(4)		(6)		
- High	200	5.0	40.00	.95	38.00	.95	36.00	119.00
- Low	200	5.0	40.00	.95	38.00	.40	15.00	50.00
Remotes:				(4)		(7)		
- High	128300	40.0	3,207.00	.60	1,924.00	.70	1,347.00	4,445.00
- Low	128300	40.0	3,207.00	.15	481.00	.12	57.00	190.00
Agriculture:	17000	160.0 ⁽²⁾	106.00	1.0	106.00	1.0	106.00	350.00
Agriculture								
High Priority:	(1) 12408	(3) 400.0	31.00	(5) .95	29.00	(8) 1.0	29.00	97.00
Medium Priority:	84480	400.0	211.00	.15	31.00	1.0	31.00	104.00
TOTAL								
HIGH:								5115
LOW:								841

**Table B-3
POPULATION INCREASE DUE TO LAND SALES
ALTERNATIVE 1
Region 5: Parks Highway**

	A Net Acres For Sale 1985 - 2000	B Average Parcel Size	C Total # Parcels For Sale (A/B)	D Proportion of Total Parcels Sold	E Total # Parcels Sold (Cx D)	F Proportion of Parcels Sold That Are Built On	G Total # Parcels Built On (Ex F)	H Total Population Increase (G x 3.3) ⁹
Settlement								
Subdivisions:				(4)		(6)		
- High	1900	5.0	380.00	.95	361.00	.95	342.00	1,131.00
- Low	1900	5.0	380.00	.95	361.00	.40	144.00	476.00
Remotes:				(4)		(7)		
- High	64500	40.0	1,612.00	.60	967.00	.70	677.00	2,234.00
- Low	64500	40.0	1,612.00	.15	241.00	.12	29.00	95.00
Agriculture:	24410	160.0	152.00	1.0	152.00	1.0	152.00	503.00
Agriculture								
High Priority:	(1) 36326	(3) 400.0	90.00	(5) .95	86.00	(8) 1.0	86.00	284.00
Medium Priority:	0	400.0	000 00	.15	000 00	1.0	000 00	000 00
TOTAL								
								4152
								1358

**Table B-4
POPULATION INCREASE DUE TO LAND SALES
ALTERNATIVE 1
Region 7: Upper Tanana Region.**

	A Net Acres For Sale 1985 - 2000	B Average Parcel Size	C Total # Parcels For Sale (A/B)	D Proportion of Total Parcels Sold	E Total # Parcels Sold (Cx D)	F Proportion of Parcels Sold That Are Built On	G Total # Parcels Built On (Ex F)	H Total Population Increase (G x 3.3) ⁹
Settlement								
Subdivisions:				(4)		(6)		
- High	2600	5.0	520.00	.95	494.00	.95	469.00	1,548.00
- Low	2600	5.0	520.00	.95	494.00	.40	197.00	652.00
Remotes:				(4)		(7)		
- High	81120	40.0	2,028.00	.60	1,216.00	.70	851.00	2,810.00
- Low	81120	40.0	2,028.00	.15	304.00	.12	36.00	120.00
Agriculture:	3000	160.0	18.00	1.0	18.00	1.0	18.00	61.00
Agriculture								
High Priority:	(1) 6758	(3) 400.0	16.00	(5) .95	16.00	(8) 1.0	16.00	53.00
Medium Priority:	70118	400.0	175.00	.15	26.00	1.0	26.00	86.00
TOTAL								
								4558
								972

**Table B-5
POPULATION INCREASE DUE TO LAND SALES
ALTERNATIVE 2
Region 1: Fairbanks North Star Borough.**

	A Net Acres For Sale 1985 - 2000	B Average Parcel Size	C Total # Parcels For Sale (A/B)	D Proportion of Total Parcels Sold	E Total # Parcels Sold (CxD)	F Proportion of Parcels Sold That Are Built On	G Total # Parcels Built On (ExF)	H Total Population Increase (G x 3.3) ⁹
Settlement								
Subdivisions:				(4)		(6)		
- High	9255	5.0	1,851.00	.95	1,758.00	.95	1,670.00	5,512.00
- Low	9255	5.0	1,851.00	.95	1,758.00	.40	703.00	2,321.00
Remotes:				(4)		(7)		
- High	117915	40.0	2,947.00	.60	1,768.00	.70	1,238.00	4,085.00
- Low	117915	40.0	2,947.00	.15	442.00	.12	53.00	175.00
Agriculture:	0	(2) 160.0	000 00	1.0	000 00	1.0	000 00	000 00
Agriculture								
High Priority:	(1) 31257	(3) 400.0	78.00	(5) .95	74.00	(8) 1.0	74.00	244.00
Medium Priority:	22809	400.0	57.00	.15	8.00	1.0	8.00	28.00
TOTAL								
								15381
								2768

**Table B-6
POPULATION INCREASE DUE TO LAND SALES
ALTERNATIVE 2
Region 2 and 3: Elliott Highway Region.**

	A Net Acres For Sale 1985 - 2000	B Average Parcel Size	C Total # Parcels For Sale (A/B)	D Proportion of Total Parcels Sold	E Total # Parcels Sold (Cx D)	F Proportion of Parcels Sold That Are Built On	G Total # Parcels Built On (Ex F)	H Total Population Increase (G x 3.3) ⁹
Settlement								
Subdivisions:				(4)		(6)		
- High	200	5.0	40.00	.95	38.00	.95	36.00	119.00
- Low	200	5.0	40.00	.95	38.00	.40	15.00	50.00
Remotes:				(4)		(7)		
- High	68940	40.0	1,723.00	.60	1,034.00	.70	723.00	2,388.00
- Low	68940	40.0	1,723.00	.15	258.00	.12	31.00	102.00
Agriculture:	17000	160.0	106.00	1.0	106.00	1.0	106.00	350.00
Agriculture								
High Priority:	(1) 183750	(3) 400.0	459.00	(5) .95	436.00	(8) 1.0	436.00	1,440.00
Medium Priority:	101798	400.0	254.00	.15	38.00	1.0	38.00	125.00
TOTAL								
								4422
								2067

**Table B-7
POPULATION INCREASE DUE TO LAND SALES
ALTERNATIVE 2
Region 5: Parks Highway.**

	A Net Acres For Sale 1985 - 2000	B Average Parcel Size	C Total # Parcels For Sale (A/B)	D Proportion of Total Parcels Sold	E Total # Parcels Sold (Cx D)	F Proportion of Parcels Sold That Are Built On	G Total # Parcels Built On (Ex F)	H Total Population Increase (G x 3.3) ⁹
Settlement								
Subdivisions:				(4)		(6)		
- High	1700	5.0	340.00	.95	323.00	.95	306.00	1,012.00
- Low	1700	5.0	340.00	.95	323.00	.40	129.00	426.00
Remotes:				(4)		(7)		
- High	61500	40.0	1,537.00	.60	922.00	.70	645.00	2,130.00
- Low	61500	40.0	1,537.00	.15	230.00	.12	27.00	91.00
Agriculture:	24410	160.0	152.00	1.0	152.00	1.0	152.00	503.00
Agriculture								
High Priority:	(1) 33330	(3) 400.0	83.00	(5) .95	79.00	(8) 1.0	79.00	261.00
Medium Priority:	4224	400.0	10.00	.15	1.00	1.0	1.00	5.00
TOTAL								
								3911
								1286

**Table B-8
POPULATION INCREASE DUE TO LAND SALES
ALTERNATIVE 2
Region 7: Upper Tanana Region.**

	A Net Acres For Sale 1985 - 2000	B Average Parcel Size	C Total # Parcels For Sale (A/B)	D Proportion of Total Parcels Sold	E Total # Parcels Sold (CxD)	F Proportion of Parcels Sold That Are Built On	G Total # Parcels Built On (ExF)	H Total Population Increase (G x 3.3)9
Settlement								
Subdivisions:				(4)		(6)		
- High	0	5.0	000 00	.95	000 00	.95	000 00	000 00
- Low	0	5.0	000 00	.95	000 00	.40	000 00	000 00
Remotes:				(4)		(7)		
- High	43470	40.0	1,086.00	.60	652.00	.70	456.00	1,506.00
- Low	43470	40.0	1,086.00	.15	163.00	.12	19.00	64.00
Agriculture:	3000	160.0	18.00	1.0	18.00	1.0	18.00	61.00
Agriculture								
High Priority:	(1) 74764	(3) 400.0	186.00	(5) .95	177.00	(8) 1.0	177.00	585.00
Medium Priority:	30835	400.0	77.00	.15	11.00	1.0	11.00	38.00
TOTAL								
								2190
								748

**Table B-9
POPULATION INCREASE DUE TO LAND SALES
ALTERNATIVE 3
Region 1: Fairbanks North Star Borough.**

	A Net Acres For Sale 1985 - 2000	B Average Parcel Size	C Total # Parcels For Sale (A/B)	D Proportion of Total Parcels Sold	E Total # Parcels Sold (Cx D)	F Proportion of Parcels Sold That Are Built On	G Total # Parcels Built On (Ex F)	H Total Population Increase (G x 3.3) ⁹
Settlement								
Subdivisions:				(4)		(6)		
- High	7615	5.0	1,523.00	.95	1,446.00	.95	1,374.00	4,535.00
- Low	7615	5.0	1,523.00	.95	1,446.00	.40	578.00	1,909.00
Remotes:				(4)		(7)		
- High	37000	40.0	925.00	.60	555.00	.70	388.00	1,282.00
- Low	37000	40.0	925.00	.15	138.00	.12	16.00	54.00
Agriculture:	0	160.0 ⁽²⁾	000 00	1.0	000 00	1.0	000 00	000 00
Agriculture								
High Priority:	0 ⁽¹⁾	400.0 ⁽³⁾	000 00	.95 ⁽⁵⁾	000 00	1.0 ⁽⁸⁾	000 00	000 00
Medium Priority:	7603	400.0	19.00	.15	2.00	1.0	2.00	9.00
TOTAL								
								5826
								1972

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**Table B-10
POPULATION INCREASE DUE TO LAND SALES
ALTERNATIVE 3
Region 2 and 3: Elliott Highway Region.**

	A Net Acres For Sale 1985 - 2000	B Average Parcel Size	C Total # Parcels For Sale (A/B)	D Proportion of Total Parcels Sold	E Total # Parcels Sold (Cx D)	F Proportion of Parcels Sold That Are Built On	G Total # Parcels Built On (Ex F)	H Total Population Increase (G x 3.3) ⁹
Settlement								
Subdivisions:				(4)		(6)		
- High	200	5.0	40.00	.95	38.00	.95	36.00	119.00
- Low	200	5.0	40.00	.95	38.00	.40	15.00	50.00
Remotes:				(4)		(7)		
- High	37500	40.0	937.00	.60	562.00	.70	393.00	1,299.00
- Low	37500	40.0	937.00	.15	140.00	.12	16.00	55.00
Agriculture:	1500	160.0 ⁽²⁾	9.00	1.0	9.00	1.0	9.00	30.00
Agriculture								
High Priority:	25766 ⁽¹⁾	400.0 ⁽³⁾	64.00	.95 ⁽⁵⁾	61.00	1.0 ⁽⁸⁾	61.00	201.00
Medium Priority:	50265	400.0	125.00	.15	18.00	1.0	18.00	62.00
TOTAL								
								1711
								398

**Table B-11
POPULATION INCREASE DUE TO LAND SALES
ALTERNATIVE 3
Region 5: Parks Highway Region.**

	A Net Acres For Sale 1985 - 2000	B Average Parcel Size	C Total # Parcels For Sale (A/B)	D Proportion of Total Parcels Sold	E Total # Parcels Sold (CxD)	F Proportion of Parcels Sold That Are Built On	G Total # Parcels Built On (ExF)	H Total Population Increase (G x 3.3) ⁹
Settlement								
Subdivisions:				(4)		(6)		
- High	1000	5.0	200.00	.95	190.00	.95	180.00	595.00
- Low	1000	5.0	200.00	.95	190.00	.40	76.00	250.00
Remotes:				(4)		(7)		
- High	18800	40.0	470.00	.60	282.00	.70	197.00	651.00
- Low	18800	40.0	470.00	.15	70.00	.12	8.00	27.00
Agriculture:	32010	160.0 ⁽²⁾	200.00	1.0	200.00	1.0	200.00	660.00
Agriculture								
High Priority:	0 ⁽¹⁾	400.0 ⁽³⁾	000 00	.95 ⁽⁵⁾	000 00	1.0 ⁽⁸⁾	000 00	000 00
Medium Priority:	0	400.0	000 00	.15	000 00	1.0	000 00	000 00
TOTAL								
HIGH:								1906
LOW:								937

**Table B-12
POPULATION INCREASE DUE TO LAND SALES
ALTERNATIVE 3
Region 7: Upper Tanana Region.**

	A Net Acres For Sale 1985 - 2000	B Average Parcel Size	C Total # Parcels For Sale (A/B)	D Proportion of Total Parcels Sold	E Total # Parcels Sold (Cx D)	F Proportion of Parcels Sold That Are Built On	G Total # Parcels Built On (Ex F)	H Total Population Increase (G x 3.3) ⁹
Settlement								
Subdivisions:				(4)		(6)		
- High	800	5.0	160.00	.95	152.00	.95	144.00	476.00
- Low	800	5.0	160.00	.95	152.00	.40	60.00	200.00
Remotes:				(4)		(7)		
- High	20080	40.0	502.00	.60	301.00	.70	210.00	695.00
- Low	20080	40.0	502.00	.15	75.00	.12	9.00	29.00
Agriculture:	3000	160.0 ⁽²⁾	18.00	1.0	18.00	1.0	18.00	61.00
Agriculture								
High Priority:	(1) 1689	(3) 400.0	4.00	(5) .95	4.00	(8) 1.0	4.00	13.00
Medium Priority:	9715	400.0	24.00	.15	3.00	1.0	3.00	12.00
TOTAL								
HIGH:								1257
LOW:								315

**Table B-13
POPULATION INCREASE DUE TO LAND SALES
ALTERNATIVE 4
Region 1: Fairbanks North Star Borough.**

	A Net Acres For Sale 1985 - 2000	B Average Parcel Size	C Total # Parcels For Sale (A/B)	D Proportion of Total Parcels Sold	E Total # Parcels Sold (Cx D)	F Proportion of Parcels Sold That Are Built On	G Total # Parcels Built On (Ex F)	H Total Population Increase (G x 3.3) ⁹
Settlement								
Subdivisions:				(4)		(6)		
- High	10750	5.0	2,150.00	.95	2,042.00	.95	1,940.00	6,403.00
- Low	10750	5.0	2,150.00	.95	2,042.00	.40	817.00	2,696.00
Remotes:				(4)		(7)		
- High	110560	40.0	2,764.00	.60	1,658.00	.70	1,160.00	3,830.00
- Low	110560	40.0	2,764.00	.15	414.00	.12	49.00	164.00
Agriculture:	0	160.0	000 00	1.0	000 00	1.0	000 00	000 00
Agriculture								
High Priority:	(1) 0	(3) 400.0	000 00	(5) .95	000 00	(8) 1.0	000 00	000 00
Medium Priority:	17740	400.0	44.00	.15	6.00	1.0	6.00	21.00
TOTAL								
HIGH:								10254
LOW:								2881

**Table B-14
POPULATION INCREASE DUE TO LAND SALES
ALTERNATIVE 4
Region 2 and 3: Elliott Highway Region.**

	A Net Acres For Sale 1985 - 2000	B Average Parcel Size	C Total # Parcels For Sale (A/B)	D Proportion of Total Parcels Sold	E Total # Parcels Sold (Cx D)	F Proportion of Parcels Sold That Are Built On	G Total # Parcels Built On (Ex F)	H Total Population Increase (G x 3.3) ⁹
Settlement								
Subdivisions:				(4)		(6)		
- High	200	5.0	40.00	.95	38.00	.95	36.00	119.00
- Low	200	5.0	40.00	.95	38.00	.40	15.00	50.00
Remotes:				(4)		(7)		
- High	66860	40.0	1,671.00	.60	1,002.00	.70	702.00	2,316.00
- Low	66860	40.0	1,671.00	.15	250.00	.12	30.00	99.00
Agriculture:	0	160.0	000 00	1.0	000 00	1.0	000 00	000 00
Agriculture								
High Priority:	(1) 59136	(3) 400.0	147.00	(5) .95	140.00	(8) 1.0	140.00	463.00
Medium Priority:	58713	400.0	146.00	.15	22.00	1.0	22.00	72.00
TOTAL								
HIGH:								2970
LOW:								684

**Table B-15
POPULATION INCREASE DUE TO LAND SALES
ALTERNATIVE 4
Region 5: Parks Highway Region.**

	A Net Acres For Sale 1985 - 2000	B Average Parcel Size	C Total # Parcels For Sale (A/B)	D Proportion of Total Parcels Sold	E Total # Parcels Sold (CxD)	F Proportion of Parcels Sold That Are Built On	G Total # Parcels Built On (ExF)	H Total Population Increase (G x 3.3) ⁹
Settlement								
Subdivisions:				(4)		(6)		
- High	1700	5.0	340.00	.95	323.00	.95	306.00	1,012.00
- Low	1700	5.0	340.00	.95	323.00	.40	129.00	426.00
Remotes:				(4)		(7)		
- High	52700	40.0	1,317.00	.60	790.00	.70	553.00	1,826.00
- Low	52700	40.0	1,317.00	.15	197.00	.12	23.00	78.00
Agriculture:	23010	160.0 ⁽²⁾	143.00	1.0	143.00	1.0	143.00	474.00
Agriculture								
High Priority:	21120 ⁽¹⁾	400.0 ⁽³⁾	52.00	.95 ⁽⁵⁾	50.00	1.0 ⁽⁸⁾	50.00	165.00
Medium Priority:	0	400.0	000 00	.15	000 00	1.0	000 00	000 00
TOTAL								
HIGH:								3477
LOW:								1143