

Social and Economic Elements

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Introduction

Social and economic analysis is conducted by the Forest Service to determine what effects the agency's land management programs have on local communities and the people using the natural resources of the Forest. People using the Chugach National Forest are part of the ecosystem and have an important role in management decisions.

Legal and Administrative Framework

- The **National Environmental Policy Act of 1969 (NEPA)** - NEPA requires the integrated use of natural and social sciences, and the disclosure of the effects on the human environment.
- The **National Forest Management Act of 1976 (NFMA)** - NFMA requires the integration of social science knowledge into the Forest planning process, and the consideration of economic benefits and costs.

Affected Environment

In this section we describe economic and social aspects of the Forest and its surroundings that are relevant to the planning decision. An understanding of the general social and economic environment of Southcentral Alaska is essential in gauging the potential impact of planning decisions on local residents. Accordingly, the first section of this analysis provides a regional overview of social and economic conditions within the three boroughs/census areas surrounding the forest (the Municipality of Anchorage, the Kenai Peninsula Borough, and the Valdez-Cordova Census Area). There are numerous ways in which planning decisions may affect local residents, and the most obvious of these are the direct linkages through forest resource dependent activities such as timber harvest, commercial salmon fishing, and recreation activity. Following the regional overview, we concentrate on these activities and the industries they support.

Borough level statistics often miss important aspects of smaller settlements, and the next section of this analysis provides information specific to communities. Fifteen communities are considered: Anchorage, Chenega Bay, Cooper Landing, Cordova, Eyak, Girdwood, Hope, Kenai, Moose Pass, Seward, Soldotna, Sterling, Tatitlek, Valdez, and Whittier. The opinions of potentially affected residents are an important consideration in the planning decision, and the last section of the affected environment analysis presents findings from two opinion surveys conducted as part of the planning process. These surveys were designed to gain a better understanding of the ways in which communities perceived themselves, their views regarding the management of the Chugach National Forest and other public lands, and the role these lands play in helping to determine the quality of life for local residents. Much of the social and economic information presented here is drawn directly from a Social and Economic

Assessment that was conducted for the revision, and interested readers can see that report for a more detailed analysis (Crone et al. 2000).

We will refer to the three borough/census areas collectively as the study area or Southcentral Alaska, interchangeably. There are two additional boroughs, the Matanuska-Susitna (Mat-Su) Borough and the Kodiak Island Borough, which border and contain portions of the Forest but are not included in the following analysis. Communities within 100 miles of national forest lands are commonly considered to be within the study area in forest planning exercises. The communities within Mat-Su and Kodiak Island boroughs meet this criterion, and they may continue to qualify for community assistance programs sponsored by the Forest Service's State and Private Forestry division. Due to their geographical boundaries and limited access to forest resources, however, these communities are not likely to be significantly affected by economic and social impacts resulting from management decisions on the Chugach National Forest.

The Mat-Su Borough contains about 43,400 acres or 0.81 percent of the Forest, which is mostly rock and ice and is largely inaccessible. Kodiak Island Borough contains about 1,920 acres, or 0.04 percent of the Forest, located on Afognak Island. While these areas do not have significant forest resources or access by local communities, the Forest pays each borough a portion of total revenues based on Forest acreage within the borough boundaries. In 1998, the Mat-Su Borough received \$375 in payments, and the Kodiak Island Borough received \$168. These payments were respectively 1.1 percent and 0.5 percent of total payments from the Chugach National Forest to boroughs in the State of Alaska (USDA Forest Service 1999e).

Regional Overview

The following summary provides a description of current conditions and recent trends in social and economic environment in the planning area. The people living within the area, outside the area, and those making management decisions about the resources of the Forest should understand the social and economic context of the area most likely to be affected (positively or negatively) by these resource decisions. For a more comprehensive look at the social and economic information summarized here, readers are referred to the Social and Economic Assessment (Crone et al. 2000).

Demographics

With about 0.23 percent of the United States population and 16 percent of the country's total land base, Alaska is the Nation's largest state, but has the third smallest population base and the lowest population density. The Municipality of Anchorage, with slightly less than half of the state's total population, is the largest population center in Alaska. It is characterized by an urban economy and lifestyle which is quite different from the small and often isolated communities that are found on the Kenai Peninsula Borough and, especially, in the Valdez-Cordova Census Area. When looking at economic and social information for the study area as a whole, local conditions in these smaller places are overwhelmed by the size of the Municipality of Anchorage. In terms of numbers of potentially

impacted individuals, the Municipality of Anchorage is dominant, but impacts of planning decisions on people in rural areas are likely to be much more profound. For this reason, it is important to examine conditions and identify trends for each of the three areas individually.

Table 3-99 summarizes selected demographic statistics for the United States, Alaska, and the three Forest areas for 1990 and 1998. In terms of total population and population density, the Municipality of Anchorage and the Valdez-Cordova Census Area stand at opposite ends of the spectrum between urban and rural settlement patterns. The Kenai Peninsula Borough is somewhere between the situations presented by the Municipality of Anchorage and the Valdez-Cordova Census Area. The Valdez-Cordova Census Area has a higher proportion of Native American residents, reflecting, in part, the presence of several Native villages in the Census Area. Another point to notice in Table 3-99 is that all three areas display an increasing median age, a trend that is reflected in the statistics for the nation as a whole but which is especially pronounced in the case of the Kenai Peninsula Borough and the Valdez-Cordova Census Area. This aging of the population has important implications for understanding certain economic changes occurring in the study area.

Table 3-99: Population characteristics compared for the United States, Alaska, and Southcentral Alaska in 1990 and 1998.

Variable	United States		Alaska		Municipality of Anchorage		Kenai Peninsula Borough		Valdez-Cordova Census Area	
	1990	1998	1990	1998	1990	1998	1990	1998	1990	1998
Population	248,709,873	270,028,937	550,043	621,400	226,338	258,782	40,802	48,815	9,952	10,365
Percent of the State (%)	---	---	100	100	41	43	7	8	2	2
Caucasian (%)	84	83	76	74	82	78	91	90	83	81
Native American (%)	1	1	16	17	7	8	7	7	13	14
African American (%)	12	13	4	4	7	7	1	1	1	1
Asian-Pacific Islander (%)	3	4	4	5	5	7	1	2	3	4
Hispanic Origin, any race (%)	9	11	3	5	4	7	2	3	3	2
Persons per square mile	70.3	76.4	1.0	1.1	133.3	152.4	2.5	3	0.3	0.3
Persons per household	2.6	2.6	2.8	2.7	2.7	2.6	2.8	2.6	2.7	2.6
Median Age	32.8	34.9	29.2	32.4	29.6	32.1	31	35.4	31.8	36.6
Males to 100 females	95	96	111	108	106	105	112	109	122	115
Education, persons 25 or older										
High school degree or higher	75.2	82.8	86.6	NA	90.4	NA	87.2	NA	83.9	NA
Bachelors degree or higher	20.3	24.4	23	NA	26.9	NA	17.9	NA	18.5	NA

NA = not available.

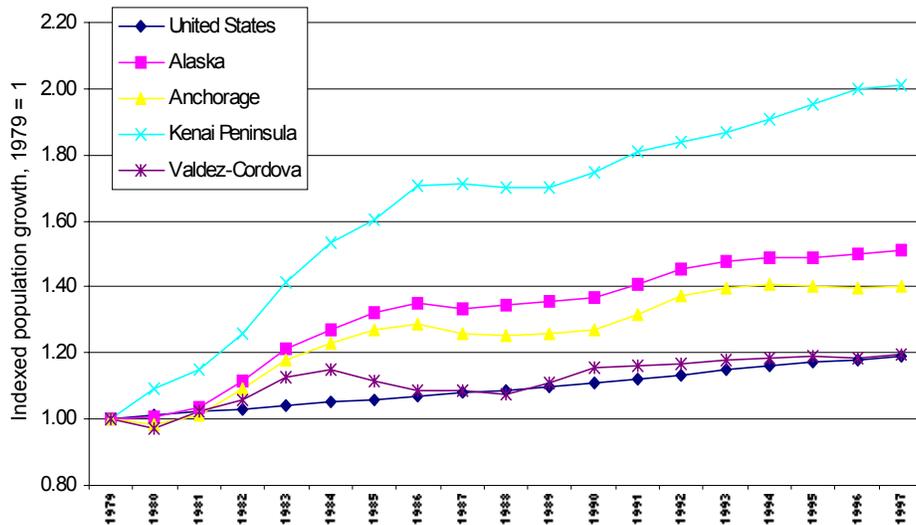
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Sources: Alaska Department of Labor, Research and Analysis 1999; U.S. Department of Commerce, Bureau of the Census 1990; U.S. Bureau of Economic Analysis 1999.

Figure 3-79 displays trends in resident population growth for 1979-97, indexed to 1979. The use of an index allows for comparisons of changes between areas on a relative scale rather than in absolute levels. The Kenai Peninsula Borough demonstrates an extremely rapid growth rate, estimated at 3.4 percent average growth per year, as compared to 1.9 percent for the Municipality of Anchorage

and 0.9 percent for Valdez-Cordova Census Area. The result is that the Kenai Peninsula Borough's population has doubled over the last twenty years. (Note, however, that if 1986 was chosen as a reference year, estimated population growth for the Kenai Peninsula Borough would be significantly less). While less than the Kenai Peninsula Borough, the Municipality of Anchorage's growth rate is nearly double that of the nation as a whole, resulting in a population level half again as large as it was in 1979. In absolute terms, the Municipality of Anchorage's population has increased by around 77 thousand residents as compared to 25 thousand for the Kenai Peninsula Borough and 1.5 thousand for the Valdez-Cordova Census Area. This population growth brings with it significant changes in both the magnitude and types of demands local residents place upon the Forest, and, once again, it highlights the differences between the three different regions encompassed by the study area.

Figure 3-79: Population growth, 1979-1997, indexed to 1979.

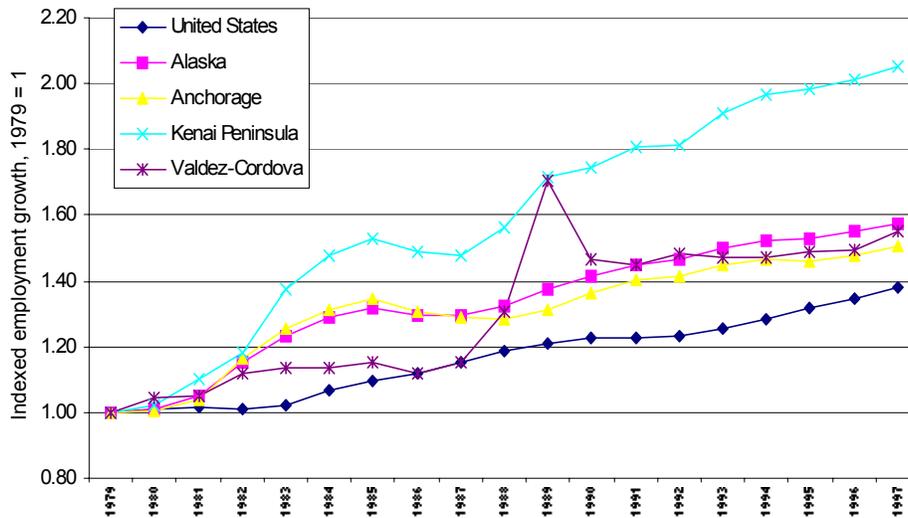


Source: U.S. Bureau of Economic Analysis 1999.

Employment

All employment estimates used in this portion of the document refer to average annual employment. Here, one employment unit is equivalent to 12 months of full or part-time work. Total employment growth in Municipality of Anchorage is equal to that of the nation, and growth in the Valdez-Cordova Census Area and, especially, the Kenai Peninsula Borough exceeds the national average by a significant amount (Figure 3-80). Boom and bust cycles are much more pronounced in the study area, especially in the Kenai Peninsula Borough and the Valdez-Cordova Census Area. This is not uncommon in less populated areas, as the smaller size of the local economy tends to result in greater instability (note the impact of the 1989 Exxon Valdez oil spill on employment in Valdez-Cordova Census Area).

Figure 3-80: Total employment trends, 1979-1997, indexed to 1979.



Source: U.S. Bureau of Economic Analysis 1999.

Long-term trends in employment are usually directly related to trends in population, and the relative magnitude of employment growth rates shown in Figure 3-80 closely match those shown for population (Figure 3-79). One important difference is that growth rates for employment are uniformly higher than those for population, and this is particularly true for the Valdez-Cordova Census Area where employment levels have increased by close to 60 percent over the 1979-97 period while population has increased by only about 20 percent. Either an increase in work-force participation, an increase in part-time employment, or both explains this trend.

Along with the growth in total employment levels have come significant changes in the mix of employment between different industry sectors. Table 3-100 displays current shares and average annual growth in employment by major sector for 1998, comparing the United States, Alaska and Southcentral Alaska. The distribution of employment by industry sector in Alaska shows some

significant differences from that of the United States as a whole. The agriculture-forestry-fishing (A.F.F.) sector percentage is relatively higher in Alaska as a whole and in Southcentral Alaska. This is due to the importance of commercial fishing in the state and region. The mining sector, which includes all hard rock mining as well as oil and gas operations, and the transportation, public utilities and communications (T.P.U.C.) sector, each comprise a larger percentage of employment in Alaska and Southcentral Alaska than in the United States. The largest difference in employment distribution, however, is in the government sector, which includes all local, state and federal employment. Alaska has 10 percent more of its total non-farm employment in this sector than the nation as a whole. This is a partial result of the military installations present in Alaska, but it is also a common characteristic of the sort of sparsely populated “frontier” regions that Alaska epitomizes.

As with the nation as a whole, most of the total growth in employment has been concentrated in the retail and service sectors, where, owing to their size, growth will have a relatively large absolute effect as compared to growth in smaller sectors. An expansion in recreation and tourism has commonly been cited as a major factor underlying this growth, but it should be noted that health care is the single largest component of the services sector in all three boroughs, and that growth in this category has likewise been considerably higher than in service sector as a whole (U.S. Bureau of Census, County Business Patterns 1999 and previous). This trend also follows national trends and is directly linked to the rising median age noted in the previous section on demographics.

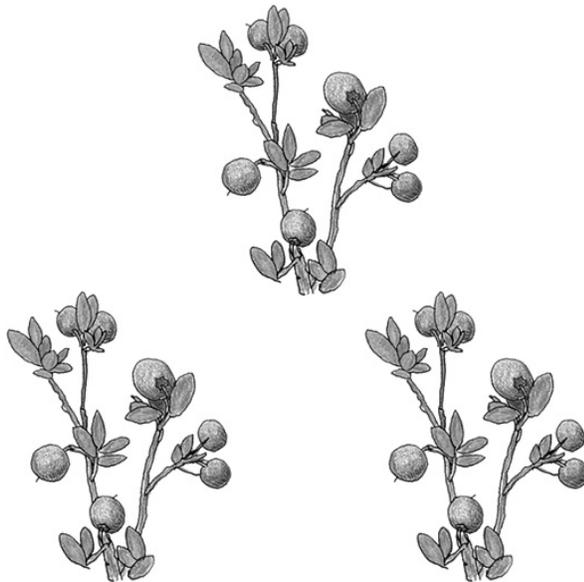


Table 3-100: 1998 Employment shares and average annual growth by industry, for the United States, Alaska, and Southcentral Alaska.

Nonfarm Employment by Sector ^a	United States		Alaska		Municipality of Anchorage		Kenai Peninsula Borough		Valdez-Cordova Census Area	
	Share	Growth ^b	Share	Growth ^b	Share	Growth ^b	Share	Growth ^b	Share	Growth ^b
A.F.F.	1.3	4.7	3.6	2.1	1.3	2.5	8.5	1.0	9.2	2.5
Mining	0.5	-2.9	3.0	2.2	2.6	2.5	4.6	2.2	1.0	4.8
Construction	5.6	2.3	5.2	0.2	5.4	0.1	6.6	2.1	6.5	0.1
Manufacturing	12.5	-0.4	4.4	2.3	1.6	1.1	7.7	1.8	8.7	4.6
T.P.U.C.	4.9	1.7	7.8	2.7	8.6	3.2	6.0	3.4	15.1	2.4
Wholesale trade	4.7	1.3	2.7	2.2	4.0	1.9	2.2	3.8	1.7	1.9
Retail trade	17.0	2.3	15.8	3.9	16.9	3.2	17.9	6.7	11.6	3.6
F.I.R.E.	7.8	1.7	5.9	-0.3	7.6	-1.2	4.7	0.0	3.7	1.3
Services	31.8	3.9	27.2	4.8	30.1	4.1	24.5	7.0	23.4	4.4
Government	14.0	1.1	24.2	0.9	21.9	0.7	17.3	4.6	19.1	0.5
Total (1,000 employees)	157,072	2.0	384	2.4	176	2.0	27	3.9	7	2.5

(D)= not available due to disclosure rules.

^a Sectors defined according to Standard Industry Classification Manual, 1987:

A.F.F. (Agricultural, forestry, and fishing services) includes businesses engaged in agricultural production, forestry, commercial fishing, hunting and trapping, and related services.

Mining includes the extraction of minerals occurring naturally, quarrying, well operations, milling, preparation at the mine site, and exploration and development of mineral properties.

Construction includes new work, additions, alterations, reconstruction, installations, and repairs of structures.

Total manufacturing includes the processing of materials (products of agriculture, forestry fishing, mining, and quarrying) into new products. Examples include food, textiles, lumber, wood products, furniture, paper, machinery, and appliances.

Retail trade includes selling goods for personal or household consumption and rendering services incidental to the sale of the goods. Examples include groceries, hardware, drug store, and other specialty stores.

Wholesale trade includes selling goods to retailers or other wholesalers. Wholesalers maintain inventories of goods, extend credit; physically assemble, sort, and grade goods in large lots, break bulk goods into smaller lots and advertise.

F.I.R.E. (Finance, insurance, and real estate) includes business that operate in the fields of finance, insurance, and real estate, such as banks, investment companies, insurance agents and brokers; real estate buyers, sellers, and developers.

Services include businesses engaged in providing a wide variety of services for individuals, business, government, and other organizations. Examples include hotels; health, legal, engineering, and professional services; and educational institutions.

T.P.U.C. (Transportation, public utilities and communications) includes passenger and freight transportation, communications services, electricity, gas, steam, water and sanitary services and all establishments of the United States Postal Service.

Government includes all federal, state, and local government employees involved in executive, legislative, judicial, administrative and regulatory activities.

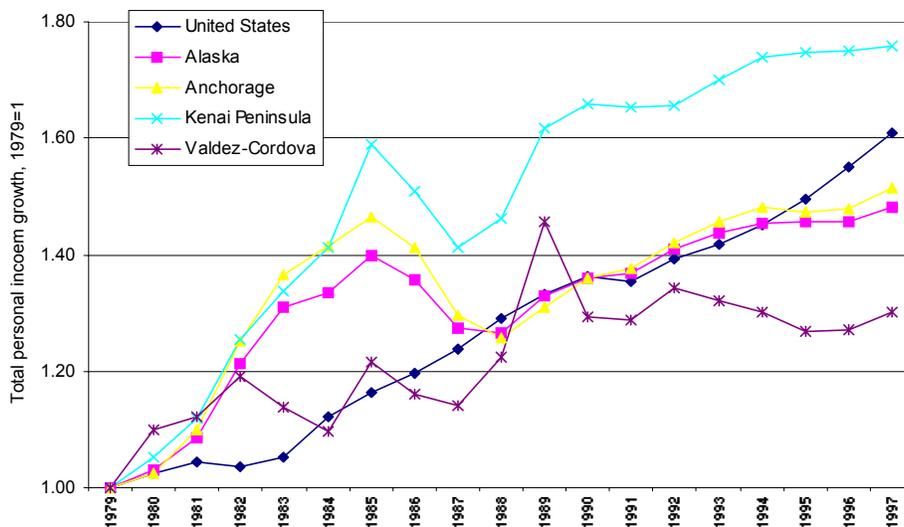
^b 1979-98 average annual growth in percent.

Source: U.S. Bureau of Economic Analysis 2000.

Personal Income

While employment statistics help us understand overall growth in economic activity and the job opportunities this growth creates, personal income statistics more directly measure the economic benefits residents receive. Personal income can be divided into two main categories. Earned income, the first category, includes all wage and salary earnings (including wages paid by self-proprietors to themselves). The second category, unearned income, includes all government transfer payments to individuals (social security, for example) and income from property or other investments. Capital gains, however, are not included.

Figure 3-81: Total personal income trends, 1979-1997, for the United States, Alaska, and Southcentral Alaska – in 1999 dollars, indexed to 1979.



Source: U.S. Bureau of Economic Analysis 1999, Economic Report to the President 2000.

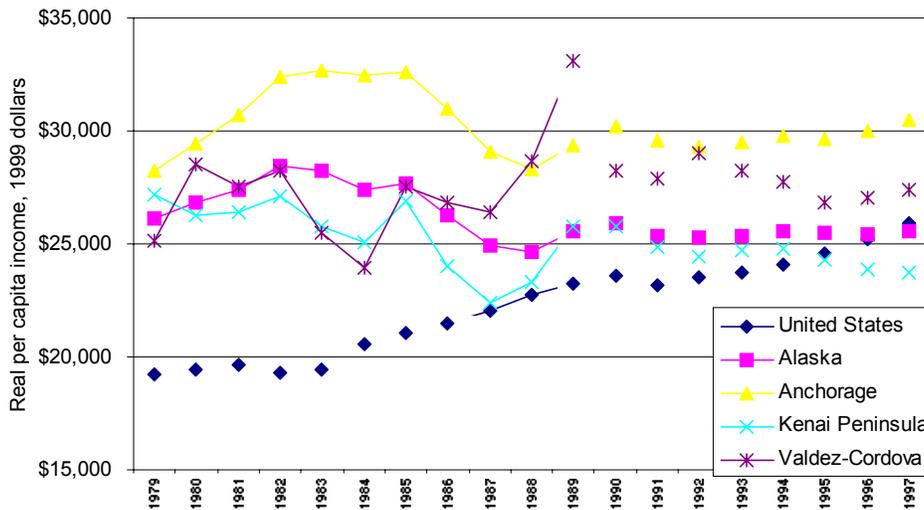
Personal income in Alaska fluctuated more than the fairly steady growth in United States personal income. A peak occurred in the mid-1980s when the state spent oil revenues on infrastructure throughout Alaska. When oil prices dropped in the late 1980s, state personal income fell as well. Recovering in the early 1990s, Alaska’s total personal income has seen fairly stable growth into the present. Personal income in the Municipality of Anchorage and the Kenai Peninsula Borough has roughly followed the same trends as the state, although it has grown proportionately faster in the Kenai Peninsula Borough.

The Valdez-Cordova Census Area is not in line with the other areas or with the state trends. The area shows more volatility in personal income through the early 1990s with the spike in 1989 associated with clean-up efforts related to the *Exxon Valdez* oil spill. Personal income increased after the spill, but has declined again in recent years. The higher volatility in income is likely a partial result of the smaller absolute size of economic activity in the Valdez-Cordova

Census Area, and recent declines in income may be a result of stronger ties to traditional resource extraction industries.

Per capita personal income is a measure that includes trends in population and total personal income. This measure is often used as an indicator of economic well being in an area. In the past, people from the lower 48 have been enticed to come and work in Alaska by the promise of higher wages and a higher standard of living. Over the years, the difference between average incomes in the United States and income in Alaska has decreased, although some areas maintain a larger gap. Figure 3-82 displays trends in per capita income for the United States, Alaska, and Southcentral Alaska from 1979-1997. These values have been adjusted for inflation, so the values of each year are comparable in 1999 dollars. It is easy to see the closing gap between Alaska per capita income and the United States per capita income. The United States displays an increasing trend, while Alaska fluctuates more with overall economic trends. More recently the per capita incomes at the state level and in Anchorage have remained fairly stable while the Valdez-Cordova Census Area and the Kenai Peninsula Borough have had slightly declining per capita income levels.

Figure 3-82: Indexed per capita income for the United States, Alaska, and Southcentral Alaska, 1979-1997 in 1999 dollars.



Source: U.S. Bureau of Economic Analysis 1999, Economic Report to the President 2000.

Table 3-101a displays 1998 levels and growth rates for real per capita personal income as well as its earned and unearned categories. This is simply total personal income divided by the 1998 population and then adjusted for inflation. Several striking facts are apparent from the table. First and foremost is that per capita incomes have been stagnant or declining in the study area. This can be compared to a 1.5 percent average annual growth rate for the nation as a whole. The reason for this is a marked decline in earned income, once again in contrast to the national average. While falling per capita incomes are certainly a cause for concern, it is important to remember that this has occurred in areas with relatively high rates of population and job growth and that current per capita income in the study area is still roughly equivalent to that of the United States in spite of depressed growth rates. Though this latter fact may be of small consolation to consumers facing the higher prices that are common throughout Alaska, it is evident that stagnating per capita incomes are not a sign of a stagnant local economy. Rather, they are likely the result of the relatively rapid growth in service and retail sectors, sectors that traditionally pay less than the resource and manufacturing jobs that were more prominent in the smaller and less diverse economy of Alaska's past.

Table 3-101a: 1998 Real per capita income and average annual growth, for the United States, Alaska, and Southcentral Alaska.

	United States	Alaska	Municipality of Anchorage	Kenai Peninsula Borough	Valdez-Cordova Census Area
Real 1995 Dollars					
Earned Income	17,247	17,649	21,523	14,978	18,333
Unearned Income	8,185	8,373	9,009	8,506	8,083
Total Income	25,431	26,022	30,532	23,484	26,416
Percent Average Annual Growth (1979-98)					
Earned Income	1.3	-1.7	-1.2	-1.9	-0.4
Unearned Income	2.2	3.4	3.7	3.1	3.6
Total Income	1.5	-0.6	-0.3	-0.7	-0.1

Source: U.S. Bureau of Economic Analysis, 2000.

Another important, but often overlooked fact evident in Table 3-101a is the increasing importance of unearned income in the study area and throughout the nation at large. Unearned income currently accounts for approximately one third of all income in each of the geographical areas shown in the Table, and growth rates for this income category have far exceeded those for earned income. Growth in unearned income in the study area has been significantly more rapid than the national average, rising from a base of approximately 15 percent of total per capita income to its current level. This is partially the result of the more rapid aging of the Alaska population, a demographic change that is closely linked to rising unearned income levels. The tendency for the Alaskan economy, as it grows and matures, to more closely resemble the national economy as a whole may also be partially responsible. Also note that "other benefit payments" (Table 3-101a) constitute a significant proportion of unearned income transfers to Alaskans. This is largely due to the Alaska Permanent Dividend Fund. This

Fund provides yearly dividends that in the \$1,000 to \$2,000 range for each Alaska resident.

Whatever the cause may be, the result of increasing unearned income is that a significant proportion of local income, as well as the additional economic activity this income generates, is not directly tied to any one specific industry. Another important consequence with more direct implications for forest planning is the fact that an increasing share of local income is linked to the residential decisions of people with incomes that are not tied to any specific location. Much of the benefits and investment income flowing to retirees, for example, can be received anywhere in the United States. In this case, the decision to reside in Alaska, and especially in rural Alaska, will be based on personal preference and local amenities rather than economic activity. For many Alaskans, proximity and access to natural environments and the various activities these environments support is a major amenity and a fundamental reason for their choice to live where they do. This becomes another important way in which the Chugach National Forest can contribute to local economies within the planning area.

These developments aside, it is important to note that some of the smallest and most isolated communities in the study area are still largely dependent on more traditional resource extraction and development activities, especially those associated with the fishing industry. Likewise, and as will shown in a subsequent section on communities, the economic changes seen in the region at large have not affected all communities equally, and significant differences in income are found between different localities.

Forest Resource Related Industries

The following section focuses on four industries that use forest-related resources in Alaska: commercial salmon fishing and processing, tourism and recreation, wood products, and minerals (excluding oil and gas). These are the four industries that are directly dependent on forest-related resources outputs and are the most likely to be impacted (positively or negatively) by Chugach National Forest management. These industries' production activities occur inside and outside the Forest, and in many cases, the Forest is not the only source of the resources upon which they rely.

Data for the following analysis were derived from several sources. The first data source is zip code level models developed through IMPLAN Pro, an input-output model commonly used by the Forest Service to estimate economic impacts of real or proposed forest management activities on local areas (MIG 1999). These data may be disaggregated so as to focus on a single community or any set of communities of interest and include detailed information not available from other state or federal data sources. One problem is that the latest data available is for 1996. Another problem is that, since a rather complex modeling process generates the data, its accuracy is limited. In the following analysis, the IMPLAN data was used to derive shares of employment by relevant sector for the year 1996. Data from a second set of sources, notably the U.S. Bureau of Economic Analysis' Regional Economic Information System (U.S. Bureau of Economic

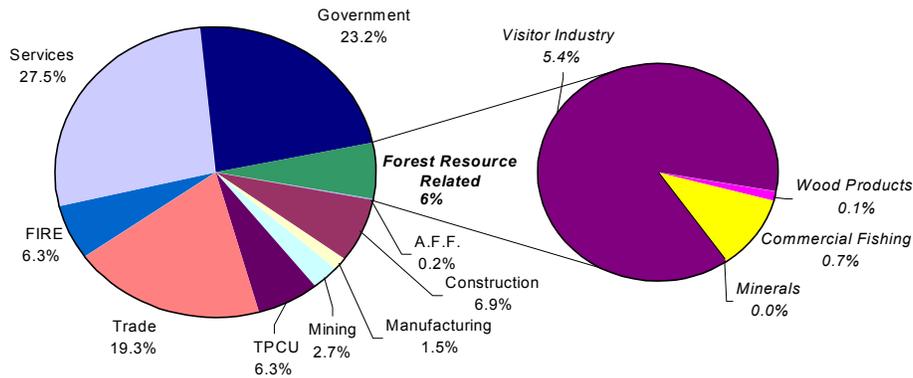
Analysis, 2000), is then used to determine recent trends in forest-dependent sectors as well as cross check the IMPLAN estimates.

For the IMPLAN analysis, the planning area has been divided into three smaller areas to be analyzed separately: (1) the Municipality of Anchorage; (2) the communities of Kenai and Soldotna (including Sterling) on the Kenai Peninsula; and (3) specific communities within or near the Forest boundary (Chenega Bay, Cooper Landing, Cordova, Girdwood, Hope, Moose Pass, Seward, Tatitlek, Valdez, and Whittier). These three groupings were chosen to prevent the larger Municipality of Anchorage and the communities of Kenai and Soldotna from overshadowing employment conditions in the smaller communities and to highlight differences in employment in the three areas. Note that the three groupings used in the IMPLAN analysis are not identical to those used with the Bureau of Economic Analysis data (which are consistent with the groupings used elsewhere in this Section).

Figures 3-83, 3-84, and 3-85 display IMPLAN derived estimates of direct employment by sector, with those industries that use forest-related resources summarized as a separate 'forest resource-related' category. The forest resource-related category is further divided into commercial fishing (commercial fish harvesting and seafood processing), wood products (logging and sawmills), minerals other than gas and oil, and the visitor industry. It is important to remember that, while this analysis estimates activity in forest-dependent industries, the firms that comprise these industries may, or may not, receive supplies from producers other than the Forest. Only a small proportion of tourists using Anchorage's airport, for example, will have traveled specifically for a recreation opportunity on the Chugach National Forest.

Since no one category or group of categories comprises the visitor industry, employment in this sector had to be estimated. In order to do this, we used a 1991 McDowell Group survey of Alaska businesses involved in providing goods and services to visitors (McDowell Group 1991, see Table in Economic Analysis in Appendix B for actual shares). Here, the average share of business activity in a specific sector that respondents attributed to visitor activity was used to derive estimated visitor-related activity and, ultimately, tourism-related activity for that sector. A similar approach, using the same reported shares, was used to derive estimates for tourism activity from the data provided by the Bureau of Economic Analysis. There are numerous potential sources of error in such an approach. One stems from the fact that relative growth in tourism will alter the actual share of business activity generated by tourism within a given sector. In the decade since the McDowell survey was conducted, it is likely that the shares have increased considerably along with the relative expansion of tourism. Another source of error is that the McDowell Survey could only consider a relatively small number of sectors. Many miscellaneous purchases by visitors may fall outside of the categories surveyed and thus fail to be counted. In either case, the error would be toward an underestimation of the tourism component of the local economy.

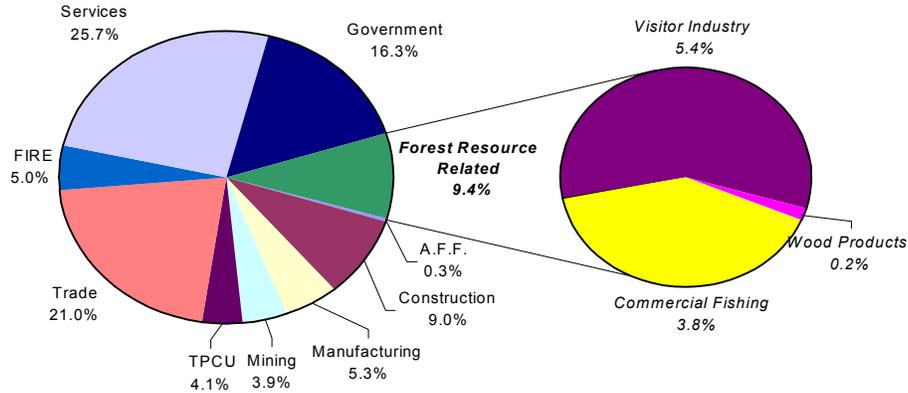
Figure 3-83: Municipality of Anchorage employment by sector highlighting forest resource related sectors 1996.



Source: MIG 1999, McDowell 1991.

The Municipality of Anchorage has both the largest population base and the largest workforce in Alaska. As displayed in Figure 3-83, in 1996 six percent of total employment was estimated to be in industries that use forest-related resources. Of this forest resource-related employment, the majority (5.4 percent of total employment) was within the visitor industry. Anchorage serves as a hub for tourism activity with extensive retail, service, and transportation businesses, including an international airport, and it is doubtful that forest planning decisions will impact this activity to any noticeable extent. Little of Anchorage's workforce is employed in manufacturing or related production activities that use forest-related resources; combined 1996 employment in the wood products and commercial fishing industries accounted for less than one percent of the total. Once again, these activities are not directly reliant on the Chugach National Forest. Owing to the small relative size of forest-dependent sectors, and their lack of a direct linkage to the Forest, it is unlikely that the overall level of economic activity in the Municipality of Anchorage will be significantly affected by changes in Forest management activities.

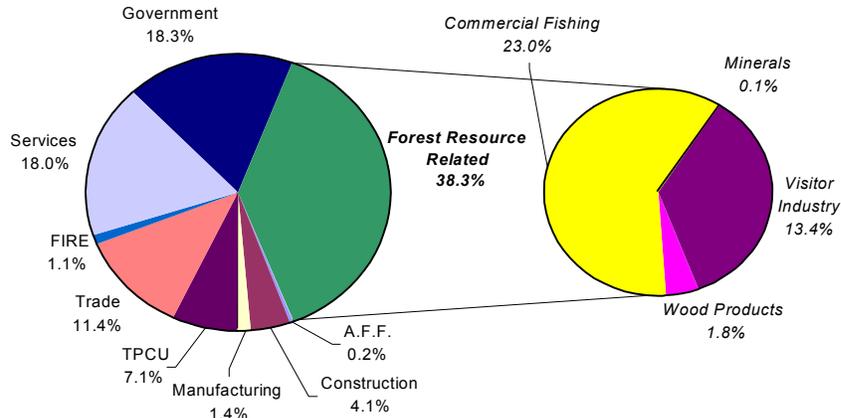
Figure 3-84: Kenai and Soldotna employment by sector highlighting forest resource related sectors, 1996.



Source: MIG 1999, McDowell 1991.

Together, the communities of Kenai and Soldotna also have a fairly large population base and serves as an economic hub to the smaller communities on the Kenai Peninsula. Figure 3-84 shows that the two communities have a larger proportion (9.4 percent) of total employment in forest resource-related industries than Anchorage. About 5.4 percent of total employment in 1996 was in the visitor industry, 3.8 percent was in the commercial fishing industry, 0.2 percent was in the wood products industry. These findings highlight both the world-class sport fishing opportunities (as partially reflected in the visitor industry numbers) and the well-established commercial salmon fishing fleet and seafood processing infrastructure in the area. Though decisions that significantly impact recreation activity in the surrounding area may have a marginal impact on activity in the visitor industry, changes in the management of the Forest would likely have only a limited impact on overall economic activity on these communities.

Figure 3-85: Other communities within or near the Chugach National Forest boundary employment by sector highlighting forest resource related sectors, 1996.



Source: MIG 1999, McDowell 1991.

The remaining communities within the planning area are smaller, and as a group have significantly more employment in forest resource-related sectors when compared to Anchorage, Kenai and Soldotna. In 1996, 38.3 percent of total employment in these communities was in forest resource-related industries. Employment in the commercial fishing industry accounted for almost two thirds of the forest resource-related sector employment, and the visitor industry accounted for most of the remaining third. The communities of Cordova and Seward have large fishing fleets and several seafood processing plants. Even in the smaller, inland communities of Hope, Girdwood, Moose Pass and Cooper Landing, residents are involved in the commercial fishing industry. Although the visitor industry does not account for the majority of employment in forest resource-related industries, the percentage of total employment in the sector was actually larger in this group of communities than it was in Anchorage, Kenai and Soldotna. Several communities have large tourist attractions, such as the Alyeska Ski Resort in Girdwood, the Sealife Center in Seward, and the sport fishing opportunities near Cooper Landing. Though more prevalent in these communities than in Anchorage, Kenai and Soldotna, wood products employment constitutes only a small proportion of forest resource sector employment. Most of this employment is in logging and is primarily associated with harvests from Native corporation and other private lands.

Income data available from the U.S. Bureau of Economic Analysis provides a different and slightly more recent view of the forest resource-related sectors in the planning area. Table 3-101b displays 1998 income in the forest resource sectors as a share of total earned income. The spatial units here are the same boroughs and census areas that were considered in the regional overview, and they are not directly comparable with the 1996 shares presented in Figures 3-83

to 3-85. The reporting years are different and the geographical areas are different (most importantly, Seward is now combined with Kenai and Soldotna). Another important difference is that income is quite a different measure from employment, and the prominence of lower wage activities (such as are common in the tourism trade) will be significantly smaller when viewed in terms of income rather than employment. In deriving tourism income estimates, the same methodology was used as that described for the derivation of Tables 3-83 to 3-85.

Table 3-101b: 1998 Shares of resource-dependent industry income relative to total earned income (percent).

	Municipality of Anchorage	Kenai Peninsula Borough	Valdez-Cordova Census Area
Commercial Fishing	0.2	3.6	4.8
Food Manufacturing	0.1	2.4	5.2
Mining (net of energy)	0.1	0.1	0.0
Wood Products	0.1	1.4	na
Recreation and Tourism	4.4	4.2	3.9

Source: U.S. Bureau of Economic Analysis, 2000.

* Figures are for 1997.

Note: Earned income for this Table was measured on a place-of work basis, meaning that non-resident workers are included. Food manufacturing is included as a proxy for seafood processing (see text). Recreation and Tourism is estimated using methodology described in accompanying text and Appendix B.

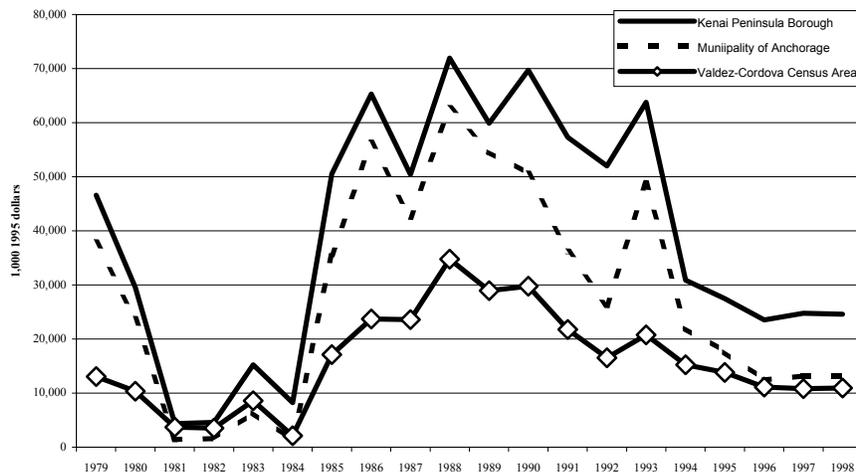
Despite of these discrepancies, the picture revealed by the income data is much the same as that displayed by employment. Anchorage exhibits little activity in the resource commodity sectors and a 4.4 percent share in the visitor industry (as compared to 5.4 percent for the employment measure in Figure 3-83). The commercial fishing and processing industry in Kenai Peninsula Borough has a combined 6 percent share of total earned income. Recreation and tourism accounts for a somewhat smaller proportion. In the Valdez-Cordova Census Area, commercial fishing and processing accounts for 10 percent of total earned income, and recreation and tourism for only 3.9 percent. Wood products income for the Census Area was not reported due to disclosure concerns, indicating that there is some activity in the sector but that less than three firms reported that year. Income was reported for the wood products sector in 1995 and 1996, and in those years it accounted for 4.6 percent and 3.4 percent of total income respectively.

The above statistics suggest that, when considered within the context of the Southcentral Alaska economy at large, the role that the Forest plays in providing employment opportunities is relatively small. This is partly a result of the overwhelming size of the Municipality of Anchorage, and to a lesser extent the Kenai Peninsula Borough, relative to the other communities in the study area. Many people in these smaller, more isolated communities are employed in forest resource-related industries, notably commercial fishing, and it is possible that planning decisions may have more dramatic affects when considered here at the local level.

Commercial Fishing

Commercial fishing is identified by the statistics presented above as the largest forest resource-related sector in Southcentral Alaska. Real income in the sector is displayed for the Municipality of Anchorage, the Kenai Peninsula Borough and the Valdez-Cordova Census Area. Perhaps surprisingly, all three boroughs show broadly comparable levels of commercial fishing income, and all three display extreme fluctuations including extremely low levels in the early 1980s quickly followed by peak levels in late 1980s that are close to ten times the previous lows. Fish processing income data was not available in time series due to disclosure holds, but the years that are reported indicate that processing income is approximately equivalent to commercial fishing income in the Valdez-Cordova Census Area and the Municipality of Anchorage, and approximately one third of fishing income in the Kenai Peninsula Borough. The severe volatility of commercial fishing income is indicative of an industry that is subject to various economic and ecological forces that extend well beyond the Forest's geographical boundaries and control. Nevertheless, much of the freshwater habitat for commercial fish species caught in the region, and especially in Prince William Sound, is found on the Chugach National Forest. Forest planning decisions have the potential to indirectly affect the commercial fishing industry, though the nature and magnitude of this impact is extremely difficult to predict. However, since the planning alternatives involve no extensive manipulation or disturbance of the landscape, any impacts to commercial fish harvests are likely to be small.

Figure 3-85a: Real income in the commercial fishing sector, 1979-98.



Source: U.S. Bureau of Economic Analysis, 2000.
 Note: 1998 levels for Anchorage and Kenai-Soldotna are estimates.

Mining and Wood Products

Wood products and mining (not including oil and gas) comprise only a very small proportion of economic activity in the study area. This by no means implies that jobs in these sectors are not important to the individuals who hold them, but it does mean that their importance to the regional economy as a whole is quite limited. Mining accounts for slightly less than 0.1 percent of total employment in the region and is mostly limited to placer mines and local sand pits or quarries. Interested entrepreneurs have mentioned the possibility of developing recreational gold mining opportunities for visitors, but any such efforts are in the early stage of planning, if they are currently being considered at all.

The wood products sector has been somewhat more active, and has included various small-scale loggers operating portable sawmills, and a mill in Seward that employed approximately 100 people in 1990. The mill closed, however, in the mid-1990s. Much of the timber harvested and processed in Southcentral Alaska comes from sources other than the Forest, and it is impossible to say that the industry as it now stands is dependent upon the supply of timber from the Chugach National Forest. This conclusion is further supported by the fact that Chugach harvests have been quite small and that, on average, only 22 percent of the timber volume offered for sale over the last 20 years has been bought and harvested. This does not mean that, under the right economic conditions, the Chugach National Forest could not supply greater volumes to the wood products sector, but it does mean that the potential negative impacts of planning decisions on current activity in the sector are extremely small.

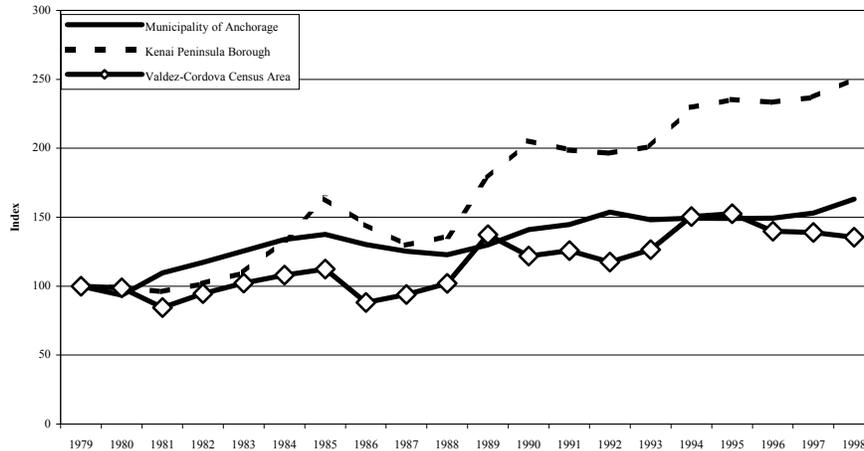
Recreation and Tourism

In the case of the visitor industry, the Forest Service may not be directly involved in providing employment opportunities, but it is a significant provider of resources such as scenery, recreation settings, and fish and wildlife habitat to the industry. Moreover, one of the major themes of the Revised Forest Plan is the allocation and management of recreation opportunities and activities. Consequently, it is in this area that the plan may have its most important economic impacts.

Figure 3-85b displays income in the visitor industry for the three boroughs in the study area. The figures were first adjusted for inflation and then indexed to 1979 so that they could be shown on the same scale. Growth in sector income has been impressive, especially for Kenai Peninsula Borough. Growth in the Municipality of Anchorage and the Valdez-Cordova Census Area is more modest, particularly in the Valdez-Cordova Census Area where fluctuations in growth rates have been extreme, but in either case sector income is approximately half again as large as it was in 1979. These rates of growth are considerably higher than overall income growth in any of the three areas. Moreover, visitor industry income was derived using the same methodology that was used for visitor industry employment in the previous section. Where the visitor industry expands more quickly than the regional economy at large, as is here the case, the share of specific industry activity attributable to visitors will be increasing, and estimates based on fixed shares will undershoot the true value. Consequently, the estimates presented here, which were based on 1991 survey responses, may be

considerably lower than actual income growth in sector. It is important to remember, however, that only portion of this growth (and a relatively small proportion for the Municipality of Anchorage) is attributable to the lands within the Chugach National Forest boundaries.

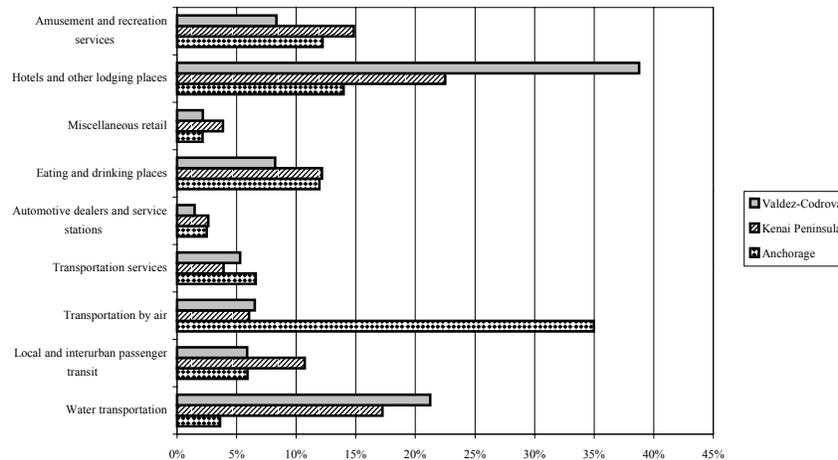
Figure 3-85b: Index of income in the visitor industry (adjusted for inflation), 1979-98.



Source: U.S. Bureau of Economic Analysis 2000. McDowell 1991.

As shown in Figure 3-85c, which displays visitor industry components as a share of total 1998 visitor industry income, transportation, hotels and other lodging, restaurants, and recreation services (including outfitters and guides) comprise the bulk of visitor industry activity. The actual distribution of activity varies considerably between each respective borough (or census area), with substantial concentrations of lodging activity in Valdez-Cordova Census Area and, to a lesser extent the Kenai Peninsula Borough. While water transportation is considerably higher in both of the outlying boroughs, air transportation is dominant in Anchorage owing, no doubt, to income associated with the Municipality’s international airport. As before, errors in these estimates are potentially high, especially for the Valdez-Cordova Census Area, because the shares from which they are developed represent statewide averages, and small communities may deviate considerably from these averages.

Figure 3-85c: Major components of visitor industry by share of total visitor industry income, 1998.



Source: U.S. Bureau of Economic Analysis 2000. McDowell 1991.

Only a small proportion of the visitor industry identified in this section is susceptible to impacts from Chugach National Forest planning decisions. Activity in Anchorage may be slightly impacted through small increases or decreases of purchases of equipment and supplies by residents recreating on the Forest, but such impacts will likely be extremely small if noticeable at all. Activity in the Kenai Peninsula Borough and the Valdez-Cordova Census Area is more susceptible to impact if planning decisions significantly alter the nature or magnitude of recreation occurring on the Forest. In this case, however, the impacts may be quite place-specific and not large enough to register in the borough level statistics.

It is clear however, that recreation and tourism does contribute substantially to the economy surrounding the Chugach National Forest. A number of studies have estimated the magnitude of this contribution:

- Haley and others (1999) estimated that in 1993 Alaska resident anglers took 387,119 fishing trips to the Kenai Peninsula and Prince William Sound area, spending about \$48.5 million dollars that supported an estimated 620 direct and indirect jobs in the region with an estimated payroll of over \$14 million dollars. The same group estimated that in 1993 nonresidents took 87,738 fishing trips to these areas, spending about \$32.9 million dollars that supported an estimated 649 jobs in the region with an estimated payroll of about \$12.5 million dollars. (All of the above estimates are in 1993 dollars.)

- McCollum and Miller (1994) estimated that Alaska resident hunters took 39,185 overnight big game hunting trips to Southcentral Alaska in 1991, spent about \$37 million dollars (1991 dollars) and supported an estimated 1,354 jobs in the area. The same authors estimated that nonresident hunters took 2,312 overnight big game hunting trips to Southcentral Alaska in 1991, spent about \$14 million dollars (1991 dollars) and supported an estimated 322 jobs in the region. In the same year the authors estimated that Alaska resident voters took 83,773 overnight trips to Southcentral with a primary purpose of viewing wildlife, spent about \$26 million dollars (1991 dollars) and supported an estimated 1823 jobs in the region.
- Miller and McCollum (1997) estimated that between May of 1993 and April of 1994 nonresidents took an estimated 23,072 overnight trips to Southcentral Alaska with the primary purpose of viewing wildlife. These visitors spent an estimated \$8 million dollars (1993 dollars) that supported an estimated 257 jobs.
- Maharaj and Carpenter (1999) used data collected in the 1996 National Survey of Fishing, Hunting, and Wildlife Associated Recreation (USDI 1997) to estimate the economic contributions of fishing, hunting and wildlife viewing activities that occur on national forest lands. There were an estimated 1,584,728 freshwater fishing days on Alaska Region forestland in 1996, and the associated expenditures supported an estimated 2,872 jobs and over \$60 million dollars in personal income. The authors estimated that 326,742 hunting days took place on Region 10 forestland in 1996. Expenditures associated with these hunting days supported an estimated 1,126 jobs and over \$22 million dollars in personal income. Finally, an estimated 372,113 wildlife viewing days took place on Region 10 forests and the associated expenditures were estimated to support 1,041 jobs and about \$20.5 million dollars in personal income. (All of the above estimates are in 1996 dollars.)
- Fletcher, Kern, Mercurieff, Voss, Williams and Selk (2000) estimated the annual total value of purchases of goods and services related to snowmobiles in the Anchorage and Mat-Su borough was \$56,175,606. (Estimate in 1999 dollars).

Each of the above studies indicates that considerable income is generated by recreation activities linked to the Chugach National Forest. In many cases, however, it is important to remember that recreationists may be able to substitute with non-National Forest System lands should their access to the Forest somehow be constrained. Thus a change in recreation opportunities on the Chugach National Forest may not directly lead to economic impacts in the area around the Forest.

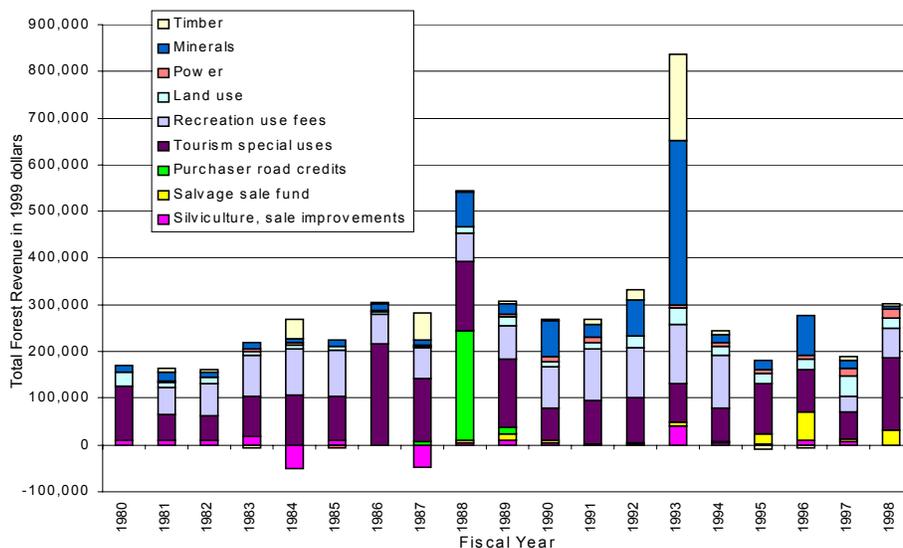
Payments to the State

Aside from providing a supply of forest-related resources to local industries, commercial use of the national forest has another benefit to surrounding communities. Under the National Forest Receipts Program authorized in 1908 (“the 25 percent fund”), national forests distributed 25 percent of total revenues earned from its activities to jurisdictions falling within forest boundaries for schools and roads.

However, in October 2000, the Secure Rural Schools and Community Self Determination Act was enacted to stabilize federal payments for schools and roads. The new legislation fundamentally changed the way the Forest Service returns a portion of its annual receipts to states. For fiscal years 2001 through 2006, boroughs can elect to receive a “full payment amount” which is an average of the three highest payments made to the state between 1986 and 1999. For Chugach National Forest communities, the total annual full payment amount would be \$142,000. That amount will be distributed annually among the Municipality of Anchorage, Kenai Peninsula Borough, Kodiak Island Borough, Matanuska-Susitna Borough, City and Borough of Yakutat, Cordova, Valdez, Whittier, and the Chugach rural education assistance area.

The total revenue from the Forest from 1980 through 1998 in 1999 dollars is displayed in Figure 3-86. The 25 percent payment is based on two sources of revenue to the Forest - forest receipts and capital improvements. Forest receipts include the receipts the Forest collects from commercial uses of the Forest such as power production facilities, minerals, timber sales, tourism special uses, and for individual uses of facilities such as campground fees. Capital improvements revenue includes collections for activities such as salvage sales, silviculture, timber sale improvements, and purchaser road credits.

Figure 3-86. Chugach National Forest total revenue in 1999 dollars, fiscal years 1980-1998.



Source: USDA Forest Service 1999, Economic Report to the President 2000.

Community Social and Economic Conditions

The following section serves as a comparison and description of the social and economic conditions of the communities surrounding the Forest. In this analysis, 1990 census data is used as a baseline from which to compare more recent trends and information. The census is taken every ten years and is the only source of complete employment and income data available at the community level. Annual employment data that is available from the Alaska Department of Labor does not include self-employed people and is not reported at the community level. Income data is not releasable by the Department in any detail due to state disclosure laws, which are enforced to protect the privacy of individual firms. The data that is available is analyzed and presented to update census data.

Community Demographics

Table 3-102 illustrates the demographic diversity of the Forest communities of interest in terms of selected social and economic characteristics. In this Table their larger geographic area groups each of the 14 communities: Municipality of Anchorage, the Kenai Peninsula, and Prince William Sound.

Almost all of the communities have grown in population since 1990 with the Kenai Peninsula communities showing the largest percentage increases. Access to highways and road expansion tends to support greater growth in communities. Areas connected by highways to shopping and other amenities attract both residents and visitors. Such a pattern holds for the Municipality of Anchorage and the communities on the Kenai Peninsula. Seward, Hope, and Valdez, which are endpoints on highways, have slower population growth than the communities along highways. The communities in Prince William Sound have also increased in population, but not to the extent of those areas with highway access. Cordova's increase in population includes the annexation of the Native community of Eyak into the larger city in 1993.

Some communities have fairly low civilian unemployment, but a high percent of the population (16 years and older) not in the labor force. Cooper Landing, Hope, Chenega Bay, and Tatitlek had high levels of civilian unemployment and/or high levels of people not in the labor force. These communities have seasonal industries and often few employment opportunities. Chenega Bay and Tatitlek are small communities with little industry and whose remoteness isolates them from other communities and opportunities for commuting to other areas to work. Maintaining and creating local jobs in order to keep the younger population from leaving the area is often an issue of significant concern in these communities. Because the Chugach National Forest surrounds these areas, future employment opportunities are likely to be impacted by future planning decisions affecting access and resource use.

Table 3-102: Overview of community characteristics.

Community	1990 Population	1998 Population	1990 Median household income (dollars)	1990 Households below poverty level	1990 American Indian, Eskimo & Aleut	1990 Civilian unemployed	1990 not in labor force	Access	Subsistence preference
Municipality of Anchorage	226,338	258,782	43,946	7	6	7	26	Road	Non-rural
Girdwood	1,115	1,778				NA	NA	Road	Non-rural
Kenai Peninsula									
Cooper Landing	243	283	42,250	3	1	0	53	Road	Rural
Hope	161	135	17,250	33	3	38	50	Road	Rural
Kenai	6,327	7,058	42,889	7	8	12	38	Road	Non-rural
Moose Pass	81	134	22,083	0	11	25	25	Road	Non-rural
Seward	2,699	3,040	37,049	10	15	9	44	Road/Ferry	Non-rural
Soldotna	5,526	6,515	38,004	5	4	8	33	Road	Non-rural
Sterling	3,802	5,888	51,145	7	2	7	38	Road	Non-rural
Prince William Sound									
Chenega Bay ¹	94	69	22,083	26	69	14	42	Ferry	Rural
Cordova ²	2,110	2,571	46,304	4	11	3	23	Ferry	Rural
Tattletk	119	110	27,188	19	86	0	75	Ferry	Rural
Valdez	4,068	4,155	68,750	5	5	8	26	Road/Ferry	Non-rural
Whittier	243	288	33,636	13	12	8	37	Train/Ferry	Rural

NA = Not Available.

¹Chenega Bay was built in its present location in the mid-1980s, due to the destruction of the original village site in 1964.

² Cordova annexed Eyak in 1993.

Source: Alaska Department of Labor, Research and Analysis, 1999; Alaska Department of Labor and Workforce Development 1998; U.S. Department of Commerce, Bureau of the Census 1990; USDI Fish and Wildlife Service 1998.

Community Employment

The 1990 Census employment data is displayed in Table 3-103. The sectors used in the census are not directly comparable to those defined in the regional section of this assessment. Additionally, the census data is a measure of the people in each industry not the number of jobs as defined in the regional section. Employment can be used as an indicator of a community's economic structure and may also be useful in predicting how Forest management might affect future economic conditions. This analysis of 1990 employment data has been supplemented with employment trend data for 1990-96 from the Alaska Department of Labor. While this additional data does not include self-employed persons, and in some cases, is not available at the community level, it is useful in examining changes in employment trends.

Although some trends are common to most Southcentral Alaska communities, as discussed above in the regional section, each community may be impacted differently by these trends. The agriculture, forestry and fishing sector is primarily composed of fish harvesters in Southcentral Alaska. Because most people employed as fish harvesters are considered to be self-employed they are not included in the Alaska Department of Labor statistics, but they are included in the census figures in Table 3-103. Employment within fish harvesting fluctuates greatly with the market demand, price and condition of the various fisheries. Seafood processing is another large industry in Southcentral Alaska. Employment in this industry is included in the manufacturing sector in Table 3-103 as is employment in the wood products industry. Employment in seafood processing also fluctuates in response to global fish markets. After the Tyson Seafoods processing plant in Kodiak burned down in early 1996, employment increased in this sector in Southcentral Alaska (Mosher 1998). Communities with seafood-processing plants include Anchorage, Cordova, Kenai, Soldotna, Seward, Valdez, and Whittier. Chenega Bay and Tatitlek are both involved in seafood harvesting and processing, including some oyster farming.

Mining includes oil and gas as well as hard rock mineral activities. In Southcentral Alaska, most employment within the mining sector is related to oil and gas development and is concentrated in Kenai, Soldotna, Sterling, and Valdez with Anchorage serving as headquarters for several related companies. Employment opportunities within this sector fluctuate with markets and access to resources. Employment within the mining sector has declined within the Municipality of Anchorage, Kenai, and Valdez since 1990, whereas Sterling and Soldotna have had increases in mining employment as resource exploration and development continues in the area.

Construction sector employment levels depend on community needs, federal, state and local budgets for building infrastructure and repairing or upgrading existing structures. More recent trends highlight construction in Seward where several projects, including a dock, a prison and the Sealife Center have led to continued employment opportunities in this sector. Kenai, Soldotna and Sterling also have significant employment in construction due to both population growth and the development of several service/retail structures since 1990.

Environment and Effects 3

Table 3-103: Chugach National Forest 1990 economic sector employment by community (percent).

	A.F.F.*	Mining*	Construction*	Manufacturing*	T.P.U.C.*	Wholesale Trade*	Retail Trade*	F.I.R.E.*	Services*	Public Administration*	Shannon-Weaver Diversity Index*
Municipality of Anchorage											
Municipality of Anchorage	1	5	6	4	11	4	17	6	34	12	.93
Kenai Peninsula											
Cooper Landing	28	0	14	0	0	0	10	0	35	13	.60
Hope	0	0	11	15	0	11	34	0	28	0	.53
Kenai	4	13	5	12	5	4	20	3	27	7	.92
Moose Pass	26	0	0	0	0	0	74	0	0	0	.20
Seward	9	2	4	12	9	3	18	3	28	12	.91
Soldotna	2	7	5	5	4	3	24	4	37	9	.89
Sterling	1	11	12	5	7	4	20	1	32	9	.89
Prince William Sound											
Chenega Bay	56	0	0	8	0	0	0	0	25	11	.56
Cordova	25	0	6	12	11	2	11	3	23	7	.87
Tatitlek	0	0	0	0	0	0	0	0	47	53	.31
Valdez	3	5	10	4	23	2	12	2	31	9	.90
Whittier	11	3	10	2	26	0	8	7	21	11	.77

Source: U.S. Department of Commerce, Bureau of Census 1990.
 * For definitions see Table 3-100.

As mentioned above, the manufacturing sector includes logging and sawmill operations. Similar to the fishing industry, many people employed as loggers or who have portable sawmills are self-employed and not counted in the state statistics but are included in the census data in Table 3-103. Currently in Southcentral Alaska there are a few small mills on the Kenai Peninsula employing a few people. The sawmill in Seward employed over 100 people in 1990, but closed in the mid-1990s when increases in export log prices made exporting raw logs more profitable than processing them. A sizable proportion of people in Tatitlek are employed in logging, with smaller percentages in Anchorage, Cordova, Kenai, Seward, Soldotna, Sterling and Valdez. Logging employment can be transient. Communities with active timber harvesting will show a large amount of logging employment during harvest operations, but after the sale is over, the employment shifts to the next area.

The wholesale trade, retail trade, financial-insurance-real estate (F.I.R.E.) and services sectors have all increased in size, with retail trade and services increasing to a greater extent than the other sectors. This is a state as well as a national trend, arising from more people having more money to spend on goods and services. In Southcentral Alaska, the communities with highway access have shown the most growth since 1990 as these areas service more remote areas. Communities directly connected to tourism activities, such as Girdwood, Cooper Landing, Kenai, Soldotna, Sterling and Seward have experienced more than a 100 percent increase in retail trade and services sector employment since 1990. Even communities with little or no employment in these sectors in 1990, such as Chenega Bay, Moose Pass, and Tatitlek have seen increases in employment in these sectors. These trends highlight not only an overall increase in visitors demanding services, but also an effort on the part of communities to create a tourism industry.

People who are not necessarily attached to a single location for work as well as retirees with outside incomes are finding Southcentral Alaska communities attractive places to live and work. These people are creating employment opportunities in health and social services, as well as many other services.

Local education, which is included in the Services sector in Table 3-103, and the government sector are also important sources of employment in many of the Southcentral Alaska communities. In some of the smaller communities such as, Chenega Bay, Hope, Tatitlek, and Whittier, education offers one of the few permanent job opportunities in the community. Government employment tends to pay well and be year round – moderating some of the effects of seasonal and lower-wage employment within a community. Overall, government employment has been slowly declining as federal, state and local budgets decline.

The Shannon-Weaver (S-W) diversity index is a method of measuring how evenly a variable is distributed across the categories in which it is reported (Shannon and Weaver 1949). In this analysis the S-W method has been used to provide a measure of a community's employment diversity. The percent employment within an industry was measured relative to the total employment in the community. A community with employment in many different industries will

have a higher S-W score than a community with substantial concentrations of employment in a single industry. While no community, even an extremely diverse one, will have a perfect distribution of employment, the S-W index is useful in comparing communities within the same area. Analyzing the 1990 community population figures from Table 3-102 together with the employment diversity scores in Table 3-103 reveals that for the Forest communities of interest the two are closely correlated. The communities with the lowest employment diversity scores -- Moose Pass, Tatitlek, Hope and Chenega Bay -- also had the smallest populations in 1990. Similarly, Anchorage and Kenai had both the highest diversity scores and the largest populations. Whittier, Seward, and Valdez had higher employment diversity scores than their population sizes would suggest, which may be due to their favorable locations for transportation-related economic activity.

Community Surveys

In addition to available secondary social and economic data sources, the Forest accessed original information from local residents. In early 1998, Alaska Pacific University (APU) conducted a social survey, "Planning for the Future of the Chugach National Forest" (Alaska Pacific University 1998), of residents in 12 communities neighboring the Forest for the purpose of better determining the attitudes of residents regarding (1) specific forest management and allocation issues, (2) general forest uses, and (3) ecosystem values present in the Forest. The 12 communities surveyed were Anchorage, Cooper Landing, Cordova, Girdwood, Hope, Kenai, Moose Pass, Seward, Soldotna, Sterling, Valdez and Whittier. (Tatitlek and Chenega Bay, both Alaska Native villages in Prince William Sound, were also included in the survey; however, extremely low response rates for both resulted in excluding them from either individual or aggregate community findings.) More than 2,400 households from the 12 communities were surveyed using a mail questionnaire, with households selected at random from a sampling frame of all Alaska households with at least one State Permanent Fund Dividend (PFD) applicant in 1997. The overall response rate for the 12 communities surveyed was approximately 31 percent, ranging from a high of 44 percent for Moose Pass and Cooper Landing to a low of 23 percent for Whittier.

APU followed up with a similar survey in 1999, "Your Community's Quality of Life" (Alaska Pacific University 1999), which was directed toward determining community resident attitudes toward quality of life (QOL) in their communities and public land management affects it. The same 12 communities were again sampled using the state's PFD database. This second survey focused on (1) resident feelings about the importance of and satisfaction with a number of social, economic, and environmental attributes of their community, (2) preferences for growth in various economic sectors, and (3) evaluations of the resiliency of their community. This survey was mailed to approximately 2,200 residents, with an overall response rate of approximately 24 percent, ranging from a high of 34 percent for Cooper Landing to a low of 18 percent for Whittier.

It was more the aim of these two APU surveys to learn about the differences among the communities rather than to derive a single overall forestwide picture. Consequently, sampling plans for both surveys were prepared as individual random samples for each community, and thus were not stratified or weighted by community population when arriving at aggregated forestwide summary statistics. When aggregated forestwide results were calculated they were arrived at through simple equally weighted averages of the 12 communities. To weight the communities by their population would have strongly biased the results toward the attitudes of Anchorage residents since its population (1998 estimate of 259,000) accounts for approximately 90 percent of the total population of the 12 communities together.

The statistical significance of the results of the two surveys are difficult to assess and summarize for several reasons, including (1) small and differing population sizes and (2) diversity of statistical measures used and degrees of specificity in the questions themselves. For example, while one community may have had enough respondents to reach the intended level of significance, another community being compared to it might not. Another problem in trying to assign a single measure of significance or confidence level in survey results is that the required minimum sample size may differ by type of question phrasing. That is, the required sample size for questions determining averages may be different than that required for multiple-choice categorical response questions.

The actual response rates from the communities did not achieve the desired response rate. (There are a number of possible reasons why this did not occur. It is fair to note that Alaska residents in general may respond to surveys in fewer numbers than other states if response to the 1990 and 2000 national census household surveys are an indication. For both national censuses, Alaskan residents had the lowest response rate of any state or territory in the nation.) However, it is also worth noting that the response rates achieved for the APU surveys, while less than desired, were nonetheless comparable to other national social surveys regarding public attitudes toward the environment.

For the reasons stated above, some survey results may have achieved the desired significance and confidence levels (especially where sample variances were negligible, for example), while others (where sample variances were large, for example) may not have.

Because of the complexity of documenting which results are or are not statistically significant across communities, no attempt has been made to distinguish among the two in the following discussion of the survey results. Nevertheless, without other comparable, original information addressing the points covered in the APU surveys, the survey results do represent the best single estimates of how the residents of each community feel about a considerable range of subjects. The (1) external consistency of resident attitudes across communities, (2) internal consistency of residents within a community across related questions, and (3) the "face validity" of survey responses with other public comments received suggest that the survey results are valid. The risk of drawing grossly incorrect inferences from the survey results is felt to be

minimal. This is particularly true considering the results have not been used in connection with other mathematical formulas that determine amount or economic value of resources or public uses by alternative.

Lastly, it may be worth noting that differences among communities found in survey results may be significant from a statistical standpoint but not from a substantive, or practical, standpoint. For example, the attitudes of residents of one community may average 1.5 on a 5.0-point scale, while those of another community may average 1.6. The difference between the two communities may be statistically significant but not so different that they warrant the implementation of two different management strategies. Further, it may be next to impossible to incrementally adjust the implementation of a single management strategy across the two communities that somehow correspondingly reflect such small variations in resident attitudes.

“Planning for the Future of the Chugach National Forest” Survey

General results of the survey indicate that with regard to attitudes toward Forest management issues preferred Forest uses, and values of Forest ecosystems, the communities surrounding the Chugach Forest are generally comparable to a random sample of people elsewhere in Alaska. At the same time, when looking at more specific issues, no two communities are exactly the same in their attitudes towards or preferences for specific Forest activities. Survey results suggest that the geographic location of the communities and associated social and economic characteristics can influence, and in many cases help explain, observed similarities and differences between the attitudes of respondents of the 12 communities. A significant portion of the public is interested in how the Forest is managed and, especially, how it is managed for amenity values rather than commodity values.

“Your Community’s Quality of Life” Survey

The survey focused on community importance ratings for and satisfaction with 30 pre-selected quality-of-life elements. Those quality-of-life factors that are related to public lands, or may be directly affected by public land management decisions or activities are referred to as ‘public land factors’ (PLF). These are the factors over which the Forest may have the greatest influence although the degree of influence varies within this set of factors. Communities were also asked to rank, by importance and satisfaction, 19 pre-selected public land uses or opportunities.

Community resiliency is a concept used to describe a community’s ability to adapt and respond to change. Adopting a measure similar to that used by Harris and others (2000) in their study of communities in the interior Columbia River basin, resiliency scores were calculated for the 12 Forest communities based on responses to survey questions regarding community regional amenities, social organization, economic structure and civic leadership. Changes in land management policies may have greater or longer lasting effects on less resilient communities. Community resiliency rankings are reported below.

In most communities the majority of respondents felt that local community interests should be given more attention than national interests in public land use

planning near their community. In all communities at least 2 of the top 5 factors ranked most important to quality of life, were factors considered to be PLFs. This highlights the importance of the Chugach Forest and future management to the 12 surrounding communities.

The following section presents key findings of these two surveys, summarized by general issue or concern. For complete details and specific discussion, the reader is referred to the Social and Economic Assessment (Crone et al. 2000).

General forest values and attitudes:

- Among 13 different forest ecosystem values recognized as present in the Forest, (1) recreation, (2) life support, (3) aesthetic, and/or (4) subsistence values are more consistently rated high among respondents in all communities. Cultural, historic, and spiritual values are more consistently ranked low among respondents in all communities.
- Among 19 different forest uses, a majority of respondents in 11 of the 12 communities (excepting Seward) generally favor nonconsumptive, low impact forest uses (e.g., fish and wildlife habitat, camping and picnicking, and nonmotorized recreation) over consumptive, higher impact forest uses (e.g., commercial mining, oil and gas, and logging)—although no uses were substantially opposed.

Forest resource use and management:

- Majorities in all communities indicate a preference for an annual timber harvest at or below 2.1 million board feet (the average annual cut on the Forest over the past 13 years). Among a variety of possible reasons to log in the Forest:
 - removal of dead or infested trees;
 - fire prevention and protection of life and property; and,
 - creation of wildlife habitat

are the most acceptable reasons to respondents in all communities.

Considering all public land value responses from the 12 communities surveyed,

- Of 19 public land uses (opportunities) the uses with the highest average importance ratings across communities are:
 - fishing;
 - hunting; and,
 - undeveloped land/wilderness.

- The lowest average importance ratings are for:
 - trapping;
 - ATV/ORV (OHV) areas; and,
 - scenic drives.
- Of 19 public land uses (opportunities) the uses with the highest average satisfaction ratings across communities are:
 - scenic landscapes; and,
 - viewing wildlife.
- The lowest average satisfaction ratings are for:
 - jobs from logging and mining;
 - access for disabled people; and,
 - ATV/ORV (OHV) areas.
- In 8 of 12 communities, the response chosen most often regarding the desired future level of economic activity in the forestry/forest products sector in their community was “no change.” In every community a larger percentage of respondents favored an increase over a decrease in this sector.
- The response chosen most often in every community regarding activity of the mining sector was no change from current levels. Cooper Landing, Hope-Sunrise, Moose Pass and Soldotna had larger percentages of respondent’s favoring a decrease over an increase in mining activity in their communities.
- In the communities of Kenai, Sterling and Soldotna the largest percentage of respondents favored an increase in oil and gas activity in their communities, while in all other communities the response chosen most often was for no change in the level of activity in this sector.

Recreation and Tourism

- A majority of respondents in 8 of the 12 communities (excepting Anchorage, Kenai, Soldotna, and Sterling) indicate that the proper Forest response to increased use of Prince William Sound due to the new Whittier Road is to develop minimal new facilities to mitigate impacts rather than more facilities to enhance use.
- Whittier, Anchorage, Cordova, Valdez and Girdwood each had a majority of respondents favoring an increase in the tourism services sector, while all other communities had a majority of respondents favoring no change in this sector in their community. The communities of Soldotna, Seward and Sterling each had more

respondents favoring a decrease in tourism services than an increase.

Special Designations

- Wild and Scenic River recommendations will be considered in the Forest Plan revision. A majority of respondents in all communities indicate that they prefer as many as five or more rivers in the Forest be congressionally designated as Wild and Scenic.
- Wilderness recommendations will also be considered in the Forest Plan revision. A majority of 9 of the 12 communities (excepting Hope-Sunrise, Soldotna, and Sterling) indicate that they prefer as much as 1.7 million acres or more of the Forest be congressionally designated as Wilderness.

Forest access

- A majority of respondents in all communities indicate a preference for five or less new roads in the Forest. Among a variety of possible reasons to construct new roads in the Forest, vegetation management was the reason chosen most often by respondents in 9 of the 12 communities (excepting Cordova, Valdez, and Whittier).
- A majority of respondents in 10 of the 12 communities (excepting Sterling and Valdez) indicate a preference for the current amount of open area and season in the Forest for snowmachine use. More communities secondarily prefer increased access than prefer decreased access.
- A majority of respondents in 10 of the 12 communities (excepting Anchorage and Valdez) indicate a preference for the current amount of open area and season in the Forest for off-road vehicle use.

Community quality of life values

Considering all responses from the 12 communities surveyed,

- The three most important public land factors (PLFs) to quality-of-life are:
 - 1) clean air & water;
 - 2) beauty of the surrounding area; and,
 - 3) open undeveloped areas.
- The three PLFs ranked lowest in importance are:
 - 1) subsistence gathering;
 - 2) subsistence hunting and fishing; and,
 - 3) sport hunting and fishing.

- The three PLFs respondents were most satisfied with are:
 - 1) beauty of the surrounding area;
 - 2) clean air and water; and,
 - 3) open, undeveloped areas.
- The three PLFs ranked lowest in terms of satisfaction are:
 - 1) the roads/transportation system;
 - 2) access to and use of public lands; and,
 - 3) subsistence hunting and fishing.
- The largest divergence between satisfaction and importance ratings for the PLFs occur for:
 - 1) job/employment opportunities;
 - 2) the roads/transportation system; and,
 - 3) clean air and water.
- Whittier, Kenai, Anchorage and Valdez appear to be the most in favor of additional growth in their communities. Hope-Sunrise, Cooper Landing, Girdwood and Moose Pass have the smallest percentage of respondents in favor of additional growth.
- The self-assessed overall average quality-of-life and community resiliency rankings (from highest to lowest) by community for the Forest communities of interest are:

Community quality of life	Community resiliency
Girdwood	Cooper Landing
Cooper Landing	Moose Pass
Moose Pass	Anchorage
Hope	Girdwood
Sterling	Seward
Anchorage	Hope
Cordova	Cordova
Seward	Soldotna
Kenai	Kenai
Valdez	Valdez
Soldotna	Sterling
Whittier	Whittier

Most of the above key findings vary by community, so to analyze the effects of land management activities in particular locations it may be important to look at the specific results for communities located near the proposed activities.

Environmental Consequences

Economic Effects

This section describes the projected economic effects of each of the eight Forest plan alternatives. The analysis is divided into two main sections: impact analysis and efficiency analysis. Impact analysis refers to the estimation of employment levels and income associated with projected implementation of a given alternative in forest-related resource industries. Efficiency analysis attempts to measure all of the costs and benefits to society, both future and present, of a planning alternative. These benefits are not restricted to cash transactions, but also include non-market benefits. The concepts and methodologies used in each of these analyses are described in detail in the following subsections.

Impact and efficiency analyses measure different things and are not directly comparable. Planning alternatives with positive impacts on jobs and income will not necessarily entail high benefits under efficiency analysis. This is because impact analysis views employment as a benefit, while efficiency analysis views wages to employees as a cost that reduces the net benefits to society.

Recreation and tourism, mining, and salmon harvesting, while important in the calculation of both employment levels and the values associated with efficiency analysis, either do not vary significantly between alternatives or cannot be quantified with currently available data. Since timber is the only resource output projected to vary in any significant and easily quantifiable manner among the alternatives, it is the only resource quantified in the impact and efficiency analysis. While recognizing that recreation and other non-priced or non-market values do support economic opportunity and are a major component of the total value society derives from the Forest, the nature and potential importance of these values will be discussed only qualitatively.

Economic Impacts Analysis

Economic impact analysis examines the impacts of the alternatives on the economies most likely to be affected by the management of the Chugach National Forest. These impacts result from the economic opportunities increased or decreased as a result of the plan decisions. As this section will describe the economic opportunities sustained by the plan are not expected to vary substantially among the alternatives. The areas most affected by the plan are Recreation and Tourism, Wood Products, Commercial Fishing and Mining. Most of the effects are described in terms of employment and income; or in a more general narrative when employment or income differences cannot be identified.

Recreation and Tourism. Recreation and tourism is projected to increase at the same rate in all alternatives over the next ten years. The Recreation and Tourism section of this document projects that this increase will lead to approximately 25 percent more recreation visits in the next decade on the Chugach (summary effect of Table 3-56d). This implies an annual growth rate of slightly more than 2 percent. This compares to an estimated increase in summer

visitors to Alaska of nearly 60 percent experienced from 1990 to 1998 or an annual increase of 6 percent per year (McDowell Group May 1999). It is anticipated that the increase in recreation and tourism recently experienced by the Chugach National Forest will continue but at a lesser rate than that experienced in the 1990s.

Employment in the aggregate economic sectors most associated with recreation and tourism (Transportation, Retail Trade and Services) has also expanded over the past same period in the Municipality of Anchorage, the Kenai Peninsula Borough and the Valdez-Cordova Census Area. These annual growth rates have been roughly 3 percent for the Municipality of Anchorage, 3.5 percent for the Kenai Peninsula Borough, and slightly less than 3 percent for the Valdez-Cordova Census Area (Source Bureau of Economic Analysis, Regional Economic Information System). These high rates of employment growth are not expected to continue, although continuing annual increases in employment in these sectors on the order of 1.5 to 2.5 percent are likely for the future. Recreation and Tourism activity is particularly dependent upon trends in the broader economy. The nineties was a period of sustained economic growth that supported tourism opportunities. Recession or economic difficulties in the national and international economies pose risks for decreased growth or even declines in tourism activity and visitation. Tourism employment in Alaska has a seasonal nature concentrated in the summer months. During the winter months, recreation by Alaska residents supports most of the recreation/tourism opportunities.

With the exception of the employment in the transportation sector, most of the jobs related to tourism and recreation pay relatively lower salaries than those in other sectors. Thus while it is likely that there will be continuing growth in tourism and recreation employment in the future, many of these opportunities are not expected to provide family wage incomes and may be quite seasonal in nature. Recreation and tourism does provide opportunities for the formation of a number of small independent businesses.

In order to estimate employment impacts associated with recreation several elements are necessary to conduct a reasonable and meaningful analysis:

- Variation in the magnitude of recreation use between the alternatives needs to be estimated. As discussed in the recreation section, the supply of recreation opportunities on the Forest is expected to exceed the demand for such opportunities across all alternatives for the next ten years. As Table 3-56d indicates total recreation in 2010 is projected to be 10.2 million visits. Of these visits, 3.6 million are expected to be in developed sites and 6.6 million dispersed visits. The only real difference between the alternatives is a partitioning of this dispersed use between areas recommended as Wilderness and those that are not recommended as Wilderness. This differentiation does not provide enough information for economic impacts to vary by alternative.

- Even if there were significant variations, in order to generate estimates of the impacts associated with each alternative, estimates of the variation in resident and nonresident visitation for each type of recreation activity (developed camping, snowmachining, mountain biking, backpacking, etc.) by alternative is necessary.
- Expenditure estimates must match or be easily converted to match the units of measurement and categories in which the visitation data are recorded. For example, for each fishing visit, what is the average amount of purchases for fish equipment?
- The visitation and expenditure data should be collected with as much geographic specificity as possible, so that expenditures and the resultant associated economic activities are attributed as closely as possible to the areas where they are actually occurring.

Since none of these elements were adequately met for the recreation and tourism activities presently taking place on the Forest, no impact analysis is quantified. However, differences in the alternatives are likely to affect direct economic opportunities and these are qualitatively described by alternative as follows:

Common to all alternatives are the following:

- Existing developed recreation facilities including campgrounds, cabins, trails and roads remain unchanged. Economic impacts based on such current facilities will continue across all of the alternatives
- Recreational businesses that are emphasized or limited in the alternatives will have a group of associated impacts that can be expected to occur in the broader economy, particularly in the Anchorage area which is the major retail center for the region. Examples are the use of transportation (rentals) and overnight lodging by visitors in Anchorage prior to or after participating on a driving or sea kayak tour; or residents who purchase ski or snowmobile equipment for their activities to the extent that they occur in the alternatives.
- Continuation of traditional activities in Wilderness and other designated areas and subsistence activities will continue in all alternatives. These activities by their nature provide important economic benefits. However, they do not include commercial enterprises that are the primary focus of the following discussion.

The **No Action Alternative** will support a mix of recreational employment opportunities. The Kenai Peninsula would be dominated by road-supported and motorized recreation opportunities favoring businesses that supported these uses such as roadside lodges and stores, snowmachine supplies and day use guiding or tours. The Whittier portal and much of Prince William Sound

accessible from Whittier will support limited recreational developments and businesses such as day kayaking, boating, and support businesses in Whittier. Large wilderness areas in the north and south of Prince William Sound provide opportunities for businesses supporting low impact wilderness recreation, such as longer kayak or boat tours and remote wilderness tours. Although remote from population areas, the east side of Prince William Sound and Montague Island provide for a broader range of recreational activities. This creates opportunities for businesses integrating transportation with various recreational opportunities including motorized and potentially road-based opportunities such as heli-skiing or cruises to remote locations for overnight stays. Most of the Copper River Delta offers opportunities for similar types of businesses integrating transportation with some recreational developments such as OHV accessed hunting or fishing, and heli-hiking. Road corridors, along the Copper River Highway and the Carbon Mountain Road in the Copper River Delta, provide for some increase in businesses that support road accessed recreation.

The **Preferred Alternative** will support a mix of recreational employment opportunities. The Kenai Peninsula would favor road-supported recreation opportunities from existing highways benefiting businesses that supported these uses such as roadside lodges and stores. Summer nonmotorized and a mix of winter motorized and nonmotorized recreation provide business opportunities for a range of businesses such as snowmachine supplies and day use guiding and tours. The Whittier portal and much of Prince William Sound accessible from Whittier will support limited recreational developments and businesses such as day kayaking, boating, and support facilities in Whittier. There are two locations to support groups in the Prince William Sound creating opportunities for businesses that can assemble groups to take advantage of these sites. Large wilderness areas in the north and south of the Prince William Sound provide opportunities for businesses supporting low impact wilderness recreation such as longer kayak or boat tours and remote wilderness tours. The east side of Prince William Sound and the Copper River Delta provide primarily for similar remote kinds of recreation, although motorized opportunities encourage some businesses integrating motorized access such as helicopter and OHV with recreational opportunities. Recreation developments along the Copper River Highway and the Carbon Mountain Road will be continued and expanded; thus supporting road related businesses.

Alternative A will favor recreational employment related to motorized recreation, tourism facilities and road-supported recreation. The Kenai Peninsula would be dominated by road-supported and motorized recreation opportunities favoring businesses that supported these uses such as roadside lodges and stores, snowmachine supplies, and day use guiding or tours. The Whittier portal and much of Prince William Sound would be available for recreational developments such as docks and campgrounds and businesses that supported this recreational activity such as camping/fishing supplies, road or boat accessible hiking, and day use tours. The Copper River Delta would also have increased opportunities for road related and motorized recreational businesses based on developments along the Copper River Highway and Carbon Mountain Road. However, given

the current limited highway access to the area, businesses would have a limited ability to take advantage of these opportunities. This alternative will still provide for economic opportunities related to nonmotorized dispersed recreation such as tours and kayaking in remote nonwilderness settings, but these will be subordinate to more intensive motorized recreation.

Alternative B will favor recreational employment related to motorized recreation, recreation facilities and road-supported recreation. The Kenai Peninsula would be dominated by road-supported and motorized recreation opportunities favoring businesses such as roadside lodges and stores, snowmachine supplies, and day use guiding or tours. The Whittier portal and some of Prince William Sound would be available for recreational developments such as campgrounds and docks favoring businesses such as camping/fishing supplies, boats to accessible hiking or day use kayak/boat tours. Much of the Prince William Sound will provide for business opportunities related to nonmotorized dispersed recreation such as tours and kayaking in remote settings. The east side of the Prince William Sound and the Copper River Delta would also have increased opportunities for road related and motorized recreational businesses such as OHV/snowmachine tours, heli-skiing and roadside lodges and stores.

Alternative C will support a mix of recreational employment opportunities. The Kenai Peninsula would favor road-supported recreation opportunities from existing highways such as roadside lodges and stores. An emphasis on summer nonmotorized and winter motorized opportunities provide business opportunities for a range of businesses such as snowmachine supplies and day use guiding and tours. The Whittier portal and much of Prince William Sound accessible from Whittier will support limited recreational developments and businesses such as day kayaking, boating, and support facilities in Whittier. Large wilderness areas in the north and south and nonmotorized backcountry in the east side of Prince William Sound provide opportunities for businesses supporting low impact recreation such as longer kayak or boat tours and remote wilderness tours. The focus on a number of scattered facilities to support groups throughout Prince William Sound creates opportunities for business that can assemble groups to take advantage of these sites and then access remote locations. The west side of the Copper River Highway and some locations on the east side of Prince William Sound provide summer and winter opportunities on the west side encouraging businesses integrating motorized access such as heli-skiing and OHV or snowmachine tours. Recreation developments along the Copper River Highway will be continued and possibly expanded, thus supporting road related businesses such as roadside lodges and stores.

Alternative D emphasizes more remote dispersed opportunities and limits motorized recreation. On the Kenai Peninsula, an emphasis on summer and winter nonmotorized opportunities provide business opportunities for day use guiding, ski touring, and more remote wilderness and backcountry recreation tours. The Whittier portal and the area immediately accessible from Whittier will support limited recreational developments and businesses such as day kayaking, boating, and support facilities in Whittier. Large wilderness areas and

backcountry nonmotorized areas predominate both sides of Prince William Sound providing opportunities for businesses supporting low impact wilderness recreation such as longer kayak or boat tours and remote wilderness tours. Large wilderness areas on the east side of the Copper River Delta provide a similar situation. There are some locations to support groups in Prince William Sound creating opportunities for businesses that can assemble groups to take advantage of these sites. There are areas on the west side of the Copper River Delta, the eastern part of Prince William Sound and some locations in the Kenai that provide summer and winter motorized recreation opportunities encouraging businesses integrating motorized access such as heli-skiing and OHV or snowmachine tours. The Kenai Peninsula and the Copper River Delta would provide a narrow corridor along existing highways supporting businesses such as roadside lodges and stores.

Alternative E emphasizes more remote dispersed opportunities and limits motorized recreation. The magnitude of formal wilderness may serve as a greater attraction for nonresidents seeking such opportunities. On the Kenai Peninsula an emphasis on summer nonmotorized and winter nonmotorized opportunities provide business opportunities for day use guiding, ski touring, and more remote wilderness and backcountry recreation tours. The Whittier portal and the area immediately accessible from Whittier has opportunities to support limited recreational developments and businesses such as day kayaking, boating, and support facilities in Whittier. Large wilderness areas and backcountry nonmotorized areas predominate both sides of the Sound providing opportunities for businesses supporting low impact wilderness recreation such as longer kayak or boat tours and remote wilderness tours. Large wilderness areas and Wild River designation on both sides of the Copper River Delta provide a greater emphasis for similar types of wilderness-based businesses. There are two locations to support groups in Prince William Sound creating opportunities for businesses that can assemble groups to take advantage of these sites. There are a few areas that provide winter and a few summer motorized recreation opportunities supporting businesses integrating motorized access such as heli-skiing and OHV or snowmachine tours. The Kenai Peninsula and Copper River Delta highway corridors would remain essentially in their current condition, supporting road related businesses such as roadside lodges and stores.

Alternative F essentially has the same effects as Alternative E. The major additional emphasis is that it focuses on a much greater amount of wilderness. As suggested under Alternative E, such a magnitude of wilderness may serve as to attract national and international visitors seeking wilderness, but discourage others seeking a greater mix of dispersed recreation opportunities such as motorized use.

Wood Products. To provide a reference for comparing the alternatives, the No Action alternative has been included in all analysis. These figures represent the potential employment and labor income for the wood products industry if the current situation continued into the future, using 2010 as the target year. All

income figures are presented in 1999 dollars to be consistent with previous information.

Estimates of direct and total employment and income for the wood products industry for each alternative are presented in Table 3-104. These estimates represent the projected annual employment and labor income in 2010.

Table 3-104: Estimates of annual wood products employment and income by alternative.

	No Action		Preferred		Alt A		Alt B		Alt C		Alt D		Alt E		Alt F	
Timber harvest (MMBF)	9.70		1.51		19.00		8.61		1.71		1.00		0.80		0.70	
	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total
	average annual jobs															
Logging employment	30	36	5	6	59	71	27	32	5	6	3	4	3	3	2	3
Sawmill employment	54	65	8	10	106	128	48	58	10	11	6	7	4	5	4	5
Total employment	153	203	24	32	300	398	136	180	27	36	16	21	13	17	11	15
	average annual labor income in millions of 1999 dollars															
Logging labor income	1.43	1.60	0.22	0.25	2.80	3.13	1.27	1.42	0.25	0.28	0.15	0.16	0.12	0.13	0.10	0.12
Sawmill labor income	1.92	2.28	0.30	0.35	3.75	4.46	1.70	2.02	0.34	0.40	0.20	0.23	0.16	0.19	0.14	0.16
Total labor income	8.40	11.45	1.31	1.78	16.45	22.43	7.45	10.16	1.48	2.02	0.87	1.18	0.69	0.94	0.61	0.83

Source: MIG 1999.

In this analysis, the direct employment estimates represent those jobs supported by Forest timber harvest within the logging and sawmill sectors. Total employment estimates include direct employment and the indirect and induced employment associated with the wood products industry. Employment figures include all full-time, part-time and seasonal positions. These figures represent current jobs within the study area that will continue to be supported by Forest activity, as well as new positions created by additional wood products activity. Total figures include the Forest Service positions required to support and implement the timber program.

Average levels of employment per million board feet (MMBF) used in this analysis were based on the 1990-94 period of employment for logging and lumber in Southeast Alaska. This period includes both high levels of production in 1990 (resulting in low levels of employment per unit output) and significantly lower levels in the last two years. Consequently, the averages used here represent a fair estimate of the of employment per product output assuming no change in labor productivity, and that conditions in Southeast Alaska are similar to those in Southcentral Alaska. This assumption applies for the ten-year time horizon used in this portion of the analysis. In the long-term, however, increased labor productivity from technology gains could reduce the amount of direct jobs generated by a given level of output.

As would be expected, the higher the volume harvested on the Forest, the more employment that would potentially be supported within the study area. Given that the Forest has only been able to harvest 22 percent of its total sale offer in the past 20 years (see Table 3-83), the employment and income estimates assume a high market situation. A market situation typical of the past 20 years would reduce the employment and income supported by the timber program by roughly 80 percent. Even more unfavorable market conditions could reduce these levels to zero. Given these qualifications, Alternatives A, B and the No Action Alternative have significantly higher timber harvest levels, and therefore, more job and income opportunities than the other alternatives. Alternatives C, D, E, F, and the Preferred Alternative all have very limited commercial harvest, and most harvest would be a byproduct of forest restoration activities. In these cases, personal and free use would be a large component of the harvest and could support some small local logging, transportation, and portable sawmill operations.

The input/output economic model used for this analysis assumes fixed amounts of inputs for a given unit of output as well as fixed wages, so while average annual job figures change by alternative, the average annual salary is consistent among all alternatives. Table 3-105 highlights these annual labor income figures.

Table 3-105: Study area average annual labor income (1999 dollars) for the wood products industry.

Sector	Direct	Total
Logging	\$47,170	\$44,101
Sawmill	\$35,420	\$34,909
Total	\$54,790	\$56,307

While average logging income is significantly higher than sawmill income, both logging and sawmill direct jobs have higher average wages than the indirect and induced jobs associated with the wood products sector.

Input/output models and IMPLAN in particular, have certain limitations when used in this type of analysis. One is that input/output models represent the nature of an economy’s interactions for a single period and it cannot represent or project dynamic changes that are occurring over a longer period of time. A second, especially pertinent to IMPLAN, is that IMPLAN is based on an aggregate input/output model for the United States economy, where these types of economic interactions are then calibrated for the local economy under analysis. These calibrations still retain the basic behavior of the parent national model that may not accurately represent the local conditions. The smaller the economy under consideration, the greater these problems are likely to be.

Current trends in the wood products jobs associated with Native corporation, other private and state harvests are not likely to be impacted by any alternative. In 1995, Native corporation, private and state timber harvest accounted for over 650 logging jobs. Native corporation harvest has been declining since 1995, and is expected to continue to decline (Brooks and Haynes 1997).

Salmon Harvesting and Processing. While it is recognized that there is some risk of fish habitat reduction over the next ten years, no significant change in commercial fisheries employment attributable to Forest activities is expected. This is due to the following reasons: (see Aquatic Ecosystems and Essential Fish Habitat Section of this chapter).

- New management activities should not cause additional degradation of freshwater fish habitat. Productive habitat will continue to be well distributed across the Forest. Habitats that are currently degraded will recover or be moving toward recovery. Riparian protection coverage in these watersheds will likely mitigate many effects of management activities on the fisheries resource.
- Site-specific risks to fish habitat, such as adverse effects of sedimentation from unplanned events such as road failures or washouts of culverts and bridges, the failure of culverts and bridges to pass fish, and stream bank damage from recreation use, increase with miles of roads, acres of ground disturbance, and intensive resource development. Differences between the alternatives in these factors are quite small. Over the next ten years such risks are likely to be localized and should not affect region-wide fish harvest.
- There is no production function to relate forest management activities to levels of fish produced and ultimately harvested.

Since we have assumed no significant impact over the next decade, we have not attempted to estimate employment or income associated with future commercial salmon fishing activity. The long-term industry trends will be played out beyond the direct control of Forest management.

Mining. No significant change in mining employment associated with Forest activities is expected under any of the alternatives over the next 10 years. This is due to the following reasons: (from the Minerals section of this chapter).

- Although the number of acres where mineral exploration and development are allowed varies by alternative, the amount of locatable minerals activity is expected to continue at about the same intensity as the past 10 years with 80 plans of operation across all alternatives.
- For leasable minerals, given the oil and gas potential and the level of industry interest in these resources on the Forest, it is unlikely that the Forest will see any significant oil and gas leasable activity in the near future. Similarly, development of coal resources seems unlikely.
- Salable minerals may be sold for fair market value or disposed of through free use in any of the alternatives. This category is widely available across the Forest. Although some prescriptions would

not allow the extraction of salable minerals, none of the alternatives would result in significantly affecting the supply since there are large volumes of these minerals on private and state lands that could meet public needs.

Long-term opportunities for employment in hardrock minerals activity could be affected by the alternatives that withdraw areas of mineral potential through Wilderness designation. Tables 3-95 and 3-96 compare the long-term minerals availability of the alternatives. Alternative A retains nearly all long-term mineral development opportunities. Alternatives B and C retain approximately 80 percent of these opportunities including 95 percent of the most favorable identified resources. The Preferred Alternative and the No Action Alternative retain 60-70 percent of these opportunities including 90 percent of the most favorable identified resources. With increasing amounts of Wilderness, Alternatives D, E and F respectively retain lesser amounts of these opportunities with roughly 60 percent, 47 percent and 19 percent of the potential opportunities and 85 percent, 70 percent, and 66 percent of the most favorable identified resources.

Payments To The State

As outlined earlier in this section, commercial use of the national forest results in a payment to the boroughs or local communities surrounding the Forest. Of the total revenues taken in by the Chugach from commercial uses including timber sales, recreation special use permits, minerals, power, and other commercial land uses, 25 percent is paid back to boroughs and census areas based on acreage of National Forest System lands within their boundaries. These payments are to be used specifically for local roads and education.

In the short term payments to local governments are expected to be constant for the next few years. This is a result of legislation passed in 2000 that guarantees a set payment level for a limited period of time. (Secure Rural Schools and Community Self Determination Act of 2000).

In the long term without further adjustment of legislation, alternatives that increase or encourage commercial uses and operations would result in higher payments to the state. Those alternatives that allow more commercial recreation and tourism development and use, or those alternatives with higher commercial timber harvest levels would result in larger payments. Mineral development is likely to be the same in all alternatives. Commercial fishing and a large portion of the sport fishing use would not add revenues to the Forest Service. Alternatives A, B and C have some potential to substantially increase these payments. The No Action Alternative, Preferred Alternative, and Alternative D would probably maintain the current levels of payments. Alternatives E and F may lead to some reduction of payments, at least in the short term, as some permittees may be required to terminate or severely modify their existing operations.

Economic Efficiency Analysis

Efficiency analysis seeks to measure all of the costs and benefits associated with a given planning alternative and summarizes them in the form of a "Present Net Value" (PNV). In deriving PNV figures, costs are subtracted from benefits to

yield a net value. "Future values" (i.e., benefits received in the future) are discounted using an appropriate discount rate to obtain a "present value." The PNV of a given alternative is the discounted sum of all benefits minus the sum of all costs associated with that alternative. Following Forest Service standard procedures, a four percent discount rate is used.

In the following analysis, we have provided quantitative PNV estimates for the timber program. For reasons discussed below no attempt was made to estimate PNV values for commercial fishing, mining or recreation and tourism. Neither are the PNV of nonuse (or "passive use") values or opportunity costs quantified. Nonuse or passive use values represent societal values associated with maintaining the existence of certain characteristics associated with natural environments or to maintain future options to either for preservation or development of the same environment. Opportunity costs represent the PNV foregone by not developing an area for certain economic benefits. Given the difficulty of estimating PNV for fishing, mining and recreation and tourism, there is no practical way to estimate the opportunity cost. This cost is the PNV foregone by not developing an area.

Although estimates of the expected financial costs are provided in Chapter 2, they do not vary significantly between the alternatives. An inability to identify differences in output production and an inability to quantify the value of the benefits means that any calculation of PNV would not provide meaningful information to distinguish between the alternatives. Given that the only output with varying production levels between the alternatives is timber, only timber has PNV estimates across the alternatives. The inability to estimate significant differences among the other major uses: recreation, fishing, or mining means that an integrated PNV for the alternatives cannot be done. A discussion of the situation of each of these resources follows. The nonuse values are qualitatively discussed in both the local preferences and national interests sections that follow under social effects

Timber. PNV estimates for timber for the three alternatives that have commercial timber harvests are presented in Table 3-106, and the derivation of these estimates is detailed below.

Table 3-106: Present net value for timber.

Alternative	Present Net Value (Millions of 1999 dollars)
No Action	6.71
A	16.43
B	5.84

Alaska's timber producers are price-takers with no significant ability to impact prices for timber in national and international markets. Volumes produced by the region are comparatively small and, unlike the Pacific Northwest, a large reduction in Alaska harvests would not be expected to have a significant impact on lumber prices in the consuming regions. In this PNV calculation net timber program return is equal to pond log value in a high market minus total logging

and marketing costs and timber program management cost (includes harvest administration costs, road maintenance costs, site preparation and reforestation costs). Net timber program revenues were calculated for the next 50 years. Future revenues were discounted at four percent using 1999 as a base year and assuming full implementation of the given alternative beginning in 2001. All estimates are based on the assumption that the high market allowable sale quantity (ASQ) is harvested. A low market assumption would lead to a situation where the PNV associated with timber might lead to a failure to harvest these trees with a negative PNV as a result of the administrative costs incurred. The actual PNV would be likely to occur between a negative estimate and the estimate provided in Table 3-106.

Salmon Harvesting and Processing. No PNV estimates for the commercial salmon industry were undertaken for this report. There are three main reasons for this omission. First, no quantifiable variation in estimates of projected catch is available for the planning alternatives. If impacts do occur they are not expected to affect the aggregate catch. The second reason is that the ability to prepare a forest based cost-production function does not exist. With no variation in either the production levels of salmon resulting from the Chugach or any ability to cost these different production levels, there is no ability to project changes in costs, outputs or benefits.

Mining. Estimates of mining PNV also were omitted from this analysis. Since mining activity is not projected to vary significantly by alternative, this omission will have no substantive effect on the results. Moreover, estimates of PNV for mineral deposits will vary greatly with current and future mineral prices. To attempt a PNV estimate for this industry was felt to be inappropriate within the context of this analysis.

Recreation and Tourism. Estimates of PNV also were not calculated for recreation. The major reason for this is that the total amount of recreation use does not vary between the alternatives. This consistency includes an assumption that there will be no difference between the alternatives for all of the various recreation activity types. The only variation that has been identified is the partition of this total level of dispersed recreation between wilderness and nonwilderness.

Nonmarket values for recreation opportunities have remained a consistent source of controversy. There have been values identified for different types of recreation, including different values for wilderness and nonwilderness recreation. However, applying these recreation values to suggest differences in the economic value of recreation between the alternatives without an analysis that also clearly differentiates the production of this recreation would lead to a determination of PNV based solely on these differences in nonmarket values.

Application of such differential values without more detailed information in the anticipated levels of recreation use and activities is not an adequate basis for a reasonable estimation of economic efficiency.

Social Effects

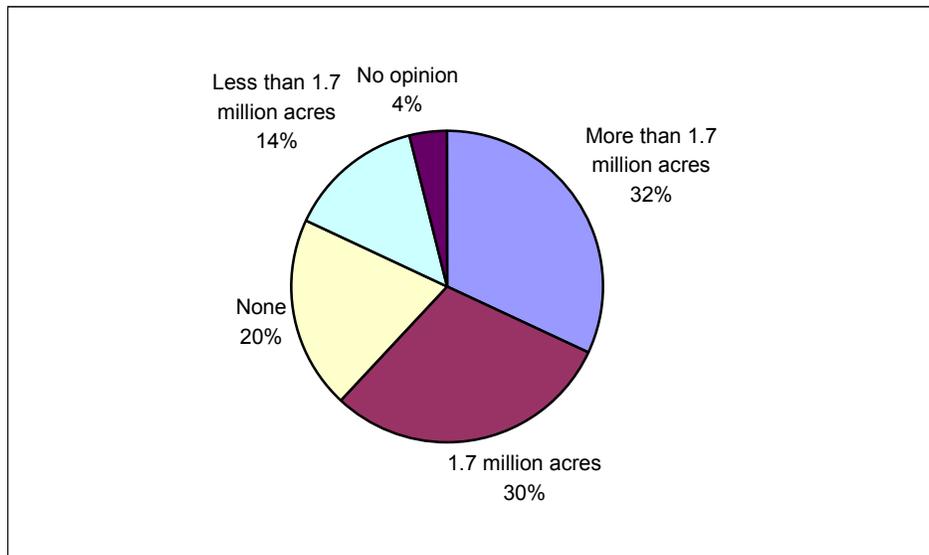
Local Preferences

In this section, the alternatives are compared in terms of how well they reflect the preferences, interests, or desired outcomes of local citizens as expressed by their responses to the two community surveys discussed in the affected environment section. This approach is inherently subjective and carries with it the implicit assumptions that the survey respondents were a well informed and representative random sample of the local public, who understood the questions, asked and responded in a truthful manner. Despite these caveats, the sample results provide a better metric of the interests of the general local public than is usually available in the Forest Plan revision process. All survey percentages reported are based on a pooled sample of all Forest communities of interest respondents.

Wilderness

Figure 3-87 displays community residents' preferences regarding the amount of Wilderness that should be recommended in the Revised Forest Plan.

Figure 3-87: Preference for the amount of designated Wilderness.



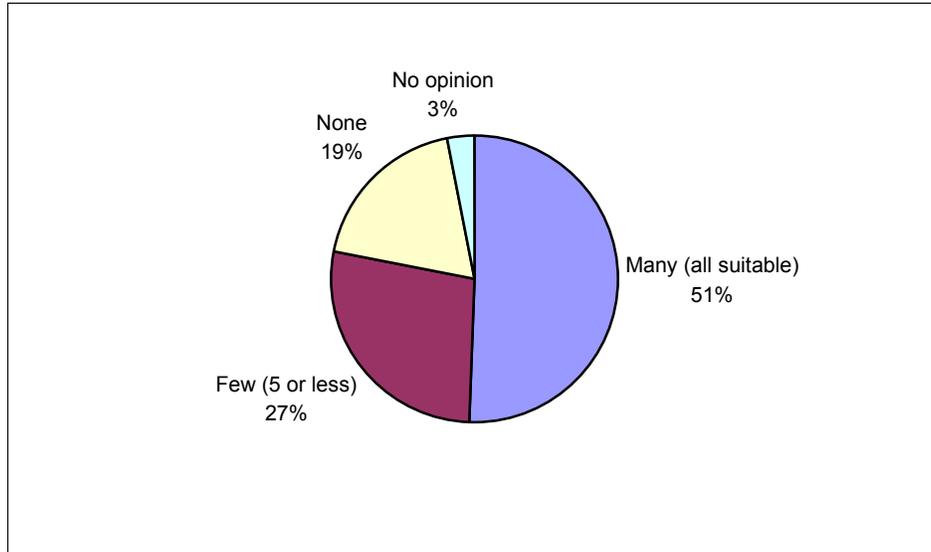
Source: "Planning for the future of the Chugach National Forest", Alaska Pacific University, 1998.

Based on the recommended Wilderness acreage totals presented in the Wilderness Section of this chapter, the Preferred Alternative, the No Action Alternative and Alternative D, appear to most closely match local public preferences. Alternatives A, B, and C probably do not recommend enough Wilderness acreage, given that 62 percent of the respondents preferred 1.7 million acres or more. Similarly, Alternatives E and F probably recommend too much Wilderness acreage, given that 64 percent of the respondents preferred 1.7 million acres or less.

Wild and Scenic Rivers

Figure 3-88 displays community residents' preferences regarding the amount of Wild and Scenic Rivers that should be recommended in the Revised Forest Plan.

Figure 3-88: Preference for the amount of designated Wild and Scenic Rivers.



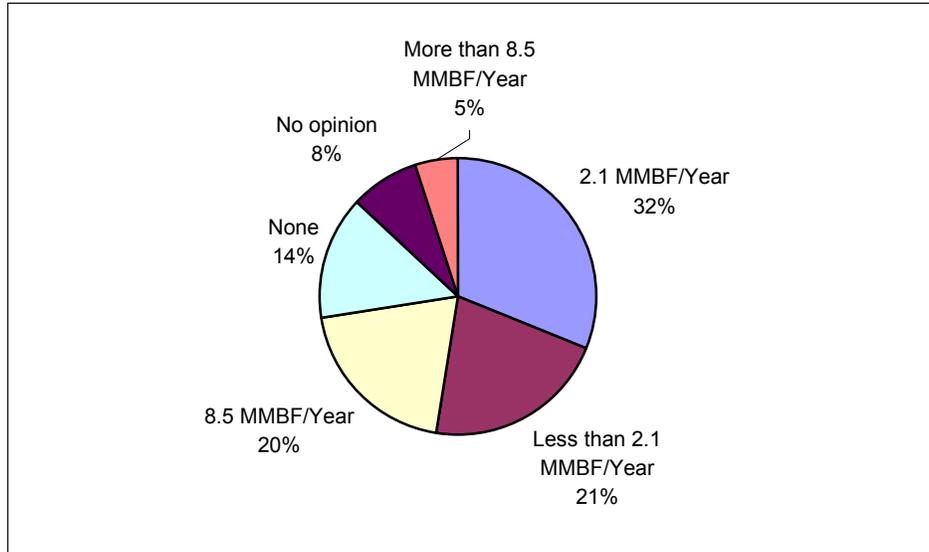
Source: "Planning for the future of the Chugach National Forest", Alaska Pacific University, 1998.

Based on the recommended Wild and Scenic Rivers totals presented in that section of this chapter, Alternatives D, C and the Preferred appear to most closely match local public preferences. The No Action, A and B Alternatives probably recommend too few Wild and Scenic Rivers, given that 51 percent of all respondents preferred that many (all suitable) rivers be recommended. Similarly, Alternatives E and F probably recommend too many Wild and Scenic Rivers, given that 48 percent of all respondents preferred that 5 or fewer rivers be recommended.

Timber Harvest

Figure 3-89 displays community residents' preferences regarding the amount of timber harvesting that should be allowed in the Revised Forest Plan.

Figure 3-89: Preference for the amount of timber harvest.

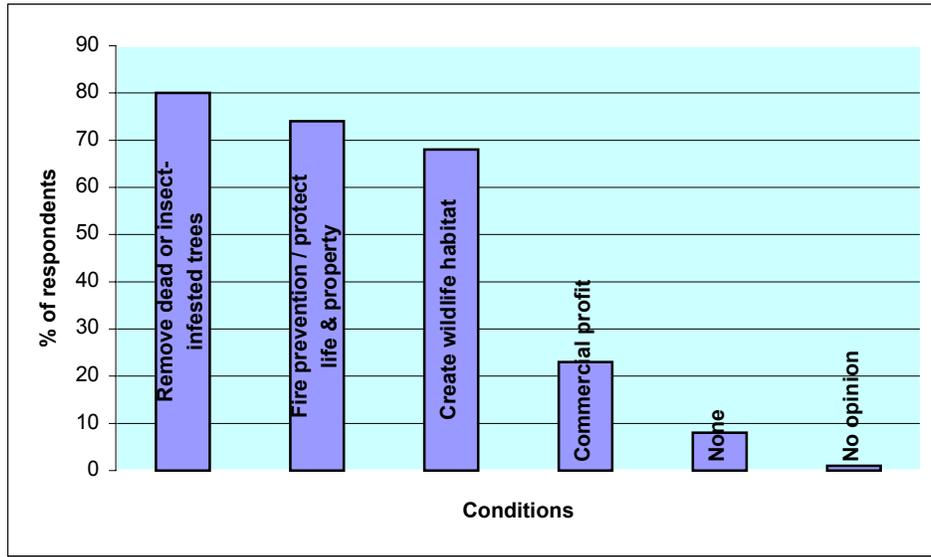


Source: "Planning for the future of the Chugach National Forest", Alaska Pacific University, 1998.

Based on the total timber program quantities (assuming a high market and the full-funding level) reported in the timber section of this chapter, Alternatives D, B and the Preferred appear to most closely match local public preferences. Alternative A and the No Action Alternative probably allow too much timber harvest, given that 67 percent of all respondents preferred harvests of 2.1 MMBF or less. Similarly, Alternatives E and F probably allow too little harvest, given that 57 percent of all respondents preferred harvests of 2.1 MMBF or more.

Figure 3-90 displays community residents' feelings regarding acceptable conditions for timber harvesting. Only Alternatives B, A and the No Action Alternative have harvests specifically for commercial profit. All other harvests are for the removal of dead or insect infected trees, for fire prevention or the protection of life and property and may be part of the free or personal use program. No harvests are planned specifically for the creation of wildlife habitat.

Figure 3-90: Acceptable conditions for timber harvest.



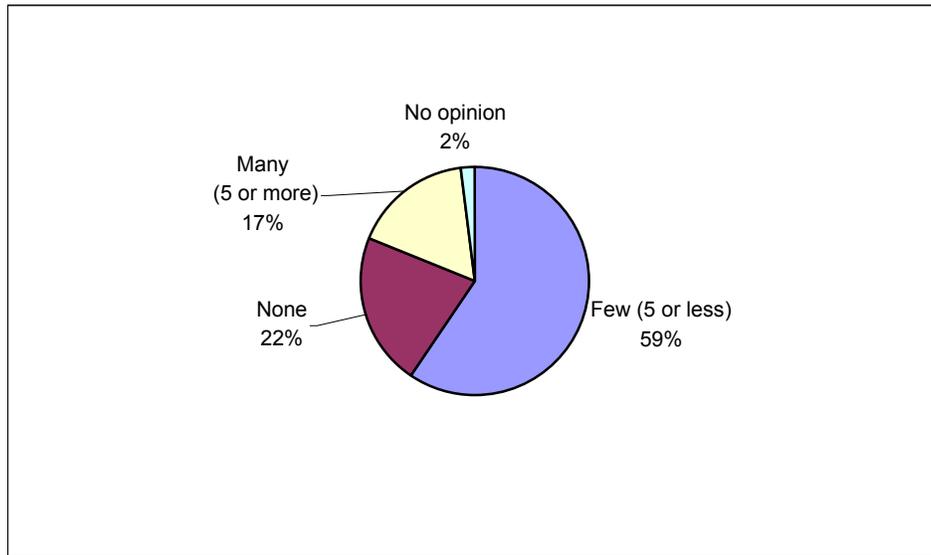
Source: "Planning for the future of the Chugach National Forest", Alaska Pacific University, 1998.



Roads

Figure 3-91 displays community residents' preferences for the amount of new roads to be constructed on the Forest in the next 10-15 years. Since no definition was given in the survey as to what exactly was meant by the term road (e.g., a 30-mile paved road or a 0.1-mile gravel spur road), it is very difficult to evaluate the alternatives in this regard. The number of new road miles by the end of the first decade under Alternatives A, B, No Action, the Preferred, C, D, E, and F are 113, 81, 66, 32, 29, 22, 16 and 13 respectively. Most of these roads are very short and would be built to provide access to new recreation facilities such as campgrounds, trailheads and day use sites.

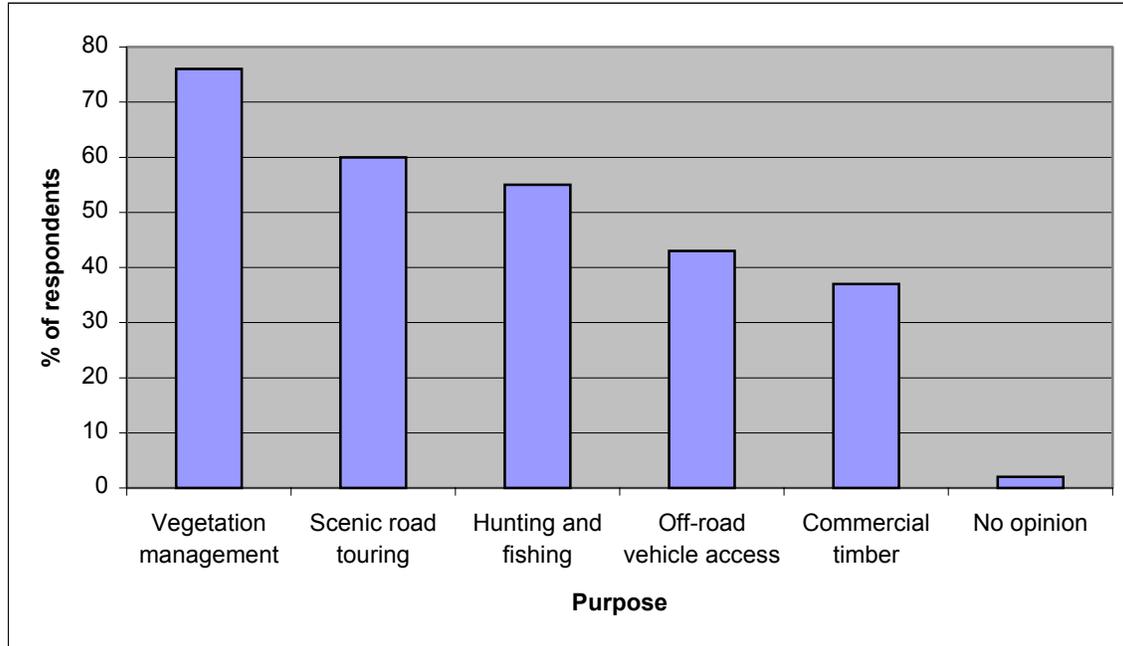
Figure 3-91: Preference for the amount of new roads.



Source: "Planning for the future of the Chugach National Forest", Alaska Pacific University, 1998.

Figure 3-92 displays community residents' feelings regarding acceptable conditions for new road building on the Forest.

Figure 3-92: Acceptable purposes for road construction.



Source: "Planning for the future of the Chugach National Forest", Alaska Pacific University, 1998.

The annual average new road miles associated with access to new recreational facilities over the next 10 years for Alternatives A, the Preferred, B, C, D, No Action, E, and F are 3.2, 3.2, 3.1, 2.8, 2.2, 1.6 and 1.3. The annual average new road miles associated with timber harvest over the 10 years for Alternatives A, No Action and B is 8.1, 4.4, and 3.4 respectively. The other alternatives have no new roads associated with timber harvest. Alternative B would also construct 1.6 miles/year to improve access to the Forest. There are no other plans to build roads for the specific purposes of vegetation management, scenic road touring, hunting and fishing, or off-highway vehicle access, although once built most of the roads built for other purposes could be used for these purposes.

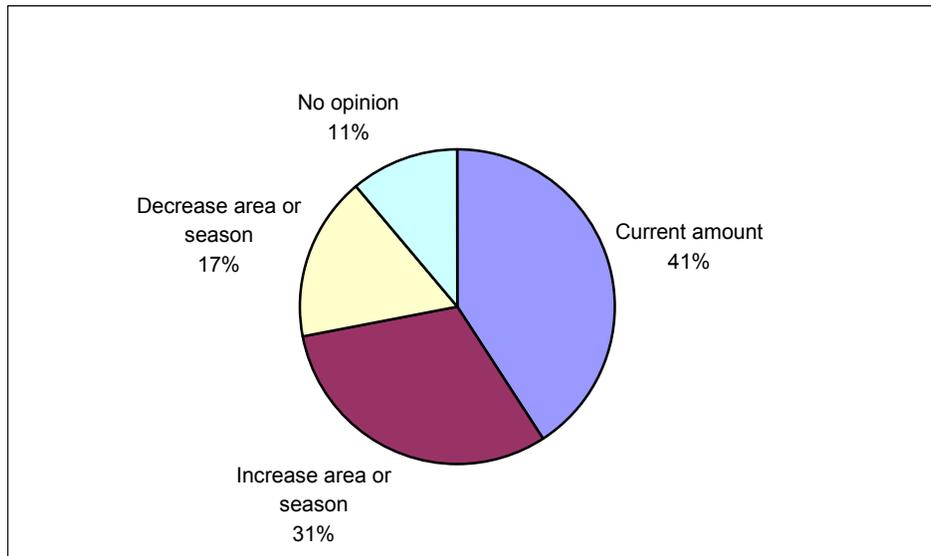
Snowmachine and OHV use.

Figure 3-93 displays residents' preferences for the amount of the Forest that should be open for snowmachine use.

At the end of the first decade, the miles of trail available for snowmachine use in Alternatives B, A, the Preferred, C, E, F, D and No Action are 686, 639, 639, 573, 452, 426, and 361, respectively. All Alternatives have more than the current amount of trails available for snowmachine use. The amount of acres (in thousands) on which snowmachine use is allowed in Alternatives A, F, E, D, B, the No Action, C, and the Preferred is 5,387, 5,109, 5,032, 4,848, 4,719, 4,709,

4,432, 4,226, and 2,342, respectively. The No Action Alternative represents the current amount of acres available, thus all alternatives except D, C and the Preferred have more area open then the current amount open. Not all areas are open for use for the same amount of time in all alternatives, but acreage-season length totals have not been calculated.

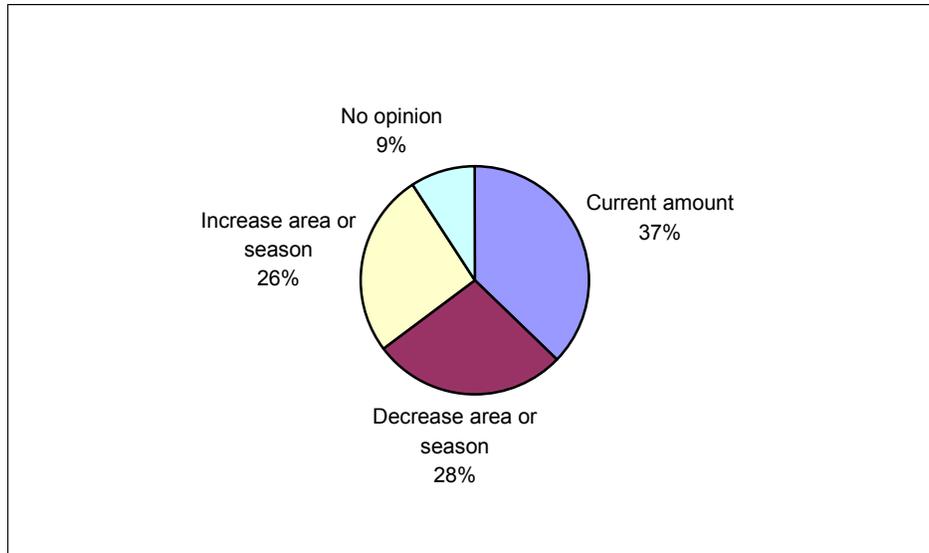
Figure 3-93: Preference for open areas for snowmachine use.



Source: "Planning for the future of the Chugach National Forest", Alaska Pacific University, 1998.

Figure 3-94 displays residents' preferences for the amount of the Forest open for OHV use.

Figure 3-94: Preference for open areas for off highway vehicles.



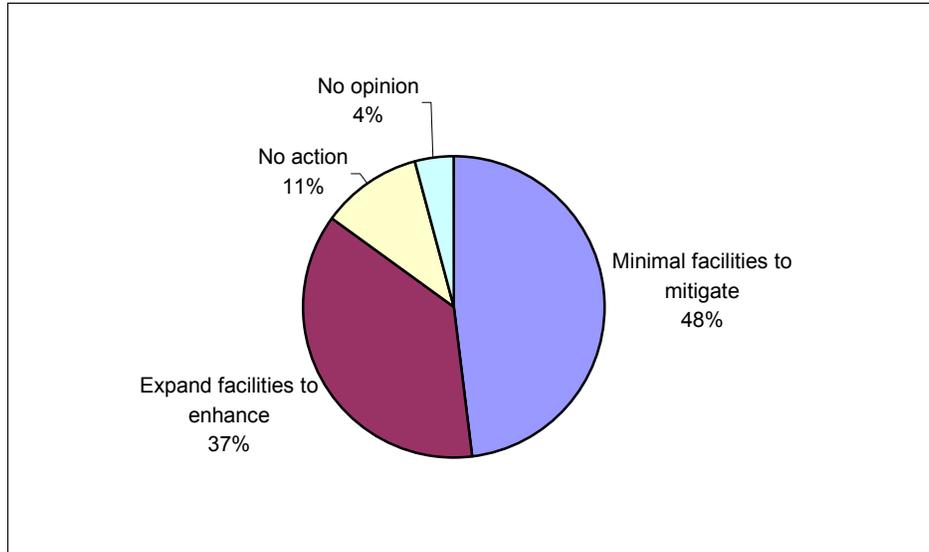
Source: "Planning for the future of the Chugach National Forest", Alaska Pacific University, 1998.

At the end of the first decade, the miles of trails available for winter motorized use would be: Alternative B, 954; Alternative C, 944; Alternative D, 874; Alternative A, 868; the Preferred Alternative, 868; Alternative E, 758; the No Action Alternative, 737; and, Alternative F, 692. At the end of the first decade, the miles of trail available for summer motorized use would be: Alternative B, 282; Alternative C, 135; Alternative A, 77; the Preferred Alternative, 77; the No Action Alternative, 52; Alternative D, 9; Alternative F, 7; and, Alternative E, 6. The amount of acres (in thousands) on which winter motorized use is allowed would be: Alternative A, 5,386; Alternative B, 3,744; the No Action Alternative, 2,777; Alternative C, 1,720; the Preferred Alternative, 1,290; Alternative D, 1,171; Alternative E, 967; and, Alternative F, 487. The amount of acres (in thousands) on which summer motorized use is allowed would be: Alternative A, 5,387; Alternative F, 4,897; the Preferred Alternative, 4,831; Alternative B, 4,639; Alternative E, 4,616; the No Action Alternative, 4,442; Alternative D, 4,116; and, Alternative C, 4,028.

Response to Whittier Road

Figure 3-95 displays respondents' preferences for Forest management response to the Whittier access road to Prince William Sound.

Figure 3-95: Preference for management response to the Whittier road.



Source: "Planning for the future of the Chugach National Forest", Alaska Pacific University, 1998.

Based on the prescriptions within a "day use" radius of Whittier, the level of facilities development allowed in Alternatives E, F, No Action, the Preferred, C, B, and A is few, few, low, low, moderate, high and high, respectively.

Quality of life factors affected by public land management.

This section evaluates the alternatives in terms of effects on the five public land factors rated most important to survey respondents' quality of life.

1. Clean air and water.

Air - In terms of risks to clean air associated with prescribed fires, the ranking of alternatives from least to highest risk is: E, F, D, the Preferred, C, No Action, B, and A. In terms of risks to clean air associated with unpaved roads, the ranking of Alternatives from least to highest risk is: F, E, D, the Preferred, C, No Action, A, and B. In terms of risks to clean air associated with unpaved roads, the ranking of Alternatives from least to highest risk is: E, F, the Preferred, D, No Action, C, A, and B. Despite these relative risk ratings, all areas on the Forest are currently in compliance with National Ambient Air Quality Standards, and none of alternatives would substantially change the existing air quality on the Forest.

Water - The ranking of alternatives in terms of risk of adverse cumulative effects to the water resource are from least to highest risk: F, E, D, the Preferred, C, No Action, B and A.

2. Beauty of the surrounding area.

Based on the information presented in the Scenery section of this chapter the ranking of the alternatives in terms of the percentage of total acres in the High or Very High Scenic Integrity Objective (SIO) classes is (from highest to lowest): F, E, D, the Preferred, C, B, No Action, and A.

3. Open, undeveloped areas.

Using the amount of acreage in Category 1 prescriptions as a proxy for the potential amount of open, undeveloped areas, the alternatives are ranked as follows (from highest to lowest amount of acreage): F, E, D, the Preferred, No Action, C, B, and A.

4. Access/use of nearby public lands.

In terms of total Forest acres available for any to all noncommercial uses the ranking of the alternatives is (from most to least): A, B, No Action, the Preferred, C, D, E, and F. This same ranking holds for total Forest acres available for any to all noncommercial and commercial uses.

As discussed in the Access Management section of this document, a key element for nonmotorized access is the ease in getting to a nonmotorized area. Alternative D and the Preferred would provide the most nonmotorized opportunities near existing access and communities.

5. Local recreational trails.

As presented above the ranking of alternatives in terms of total trail miles available for winter and/or summer use at the end of the first decade is (from most to least): C, B, D, the Preferred, A, E, No Action and F.

Public uses of the Forest

This section evaluates the alternatives in terms of effects on the five public uses of the Forest that survey respondents most favored.

1. Fish and wildlife habitat.

Fish habitat - (From the Fish Habitat section) In terms of the potential risk of site-specific adverse effects to fish habitat the ranking of alternatives is (from least to most risk): F, E, D, the Preferred, C, No Action, B and A. However, productive habitat is predicted to continue to be well distributed across the Forest, or the historic range of the species within the Forest, under all alternatives.

Wildlife habitat - (From the Wildlife Habitat section) All alternatives represent a low level of risk to maintaining viable populations of wildlife. Habitat is of sufficient quality, distribution, and abundance

to allow the species to maintain breeding populations distributed across the Forest. However, some local populations are more ephemeral because of reduced population levels and increased susceptibility to environmental extremes and stochastic (random) events associated with reduced habitat abundance and distribution. Vacated habitats may become recolonized in the future.

2. Camping and picnicking.

Based on historic Forest recreational use data, 75 percent of camping and picnicking visits are estimated to take place in dispersed or undeveloped settings while 25 percent are estimated to occur in developed sites. The amount of dispersed visits is predicted to be the same across all alternatives, while the amount of developed visits is predicted to be constrained by the available capacity. The ranking of alternatives in terms of developed capacity at the end of the first decade is (from highest to lowest): B, A, C, No Action, D, the Preferred, E, F.

3. Nonmotorized recreation.

(From the Recreation section of this document). Alternatives A and B offer the most modified settings and emphasize more motorized activities. Alternatives E and F offer the least modified settings and emphasize more nonmotorized activities. The Preferred and Alternatives C and D are in the middle.

4. Wildlife viewing.

Based on historic Forest recreational use data, 70 percent of wildlife viewing is estimated to occur in dispersed areas while 30 percent is estimated to occur at developed sites. Again, the amount of dispersed visits is predicted to be the same across all alternatives, while the amount of developed visits is predicted to be constrained by the available capacity. The ranking of alternatives in terms of developed capacity at the end of the first decade is (from highest to lowest): B, A, C, No Action, D, the Preferred, E, F.

5. Gathering forest products.

The amount of acreage on which forest products can be gathered is the same across all alternatives. Since only 6 percent of forest products gathering visits are estimated to occur at developed sites, the amount of developed capacity is probably not a limiting factor for this activity.

Overall Alternative Compatibility with Ecosystem Values

Using a specially designed and detailed experimental modeling process, each management alternative was subjectively but consistently analyzed and rated in terms of its overall compatibility with ecosystem values. (The ecosystem values included (based on Rolston 1988): recreation, life support, aesthetic, biological

diversity, future, economic, subsistence, therapeutic, intrinsic, learning, historic and cultural.)

The multi-step process to estimate compatibility utilized a systematic combination of public opinion of (1) the importance and (2) geographic distribution of ecosystem values throughout the Forest (obtained from survey respondents) and ID Team estimation of (3) whether a management activity would adversely or beneficially affect the ecosystem values and (4) how much it would be emphasized in the prescription. Due to the nature of the survey, the process addressed compatibility at the watershed management scale rather than the planning unit scale.

Because each management alternative is a unique combination of management prescriptions across management units, it was possible to estimate (1) the “best fit” combination of management prescriptions for each management unit as well as (2) the differences in the overall compatibility of all alternatives considered. Each alternative was rated on a standardized scale from 0 to 100 percent, where 0 indicated the least compatible with ecosystem values and 100 the most compatible. (Thus, the ratings were more relative than absolute. The only alternative that could be assured to score 100 would be an idealized (“best fit”) one where each management unit in the alternative was assigned the management prescription determined by the process to be most compatible.)

Of the alternatives considered, the No Action Alternative was rated highest in terms of overall compatibility with ecosystem values with a score of 80 percent, followed in order by Alternative B (79 percent), Alternative C (74 percent), Alternatives A, E, and F (70 percent), and Alternative D (69 percent). The Preferred Alternative compatibility score was 74 percent. The relatively small variation observed in the range of alternative compatibility scores suggest that the distribution of ecosystem values was (1) diverse and/or (2) that a number of management prescriptions were more or less equally compatible when combined at the alternative scale.

Community Resiliency, Subsistence and Environmental Justice

Community Resiliency--As stated above changes in land management policies may have greater or longer lasting effects on less resilient communities. Of the five communities with the lowest resiliency scores Kenai, Soldotna, Sterling, and Valdez had the highest populations (excluding Anchorage) in 1998 and also had some of the highest median incomes in the study area in 1990. The low resiliency scores in these communities are driven by lower regional amenity, civic leadership and social organization ratings rather than by economic structure problems. It is unlikely that any of the alternatives would affect these communities in ways that would lead to decreasing resiliency in the future.

Whittier, which had both the lowest community resiliency and quality of life score, is also the community likely to face the greatest change in the near future. This change is driven by the opening of the new road to Whittier, which will occur regardless of the alternative chosen. Alternatives that allow for at least some expansion of facilities on the Forest to accommodate the increased use of areas

near Whittier would probably mitigate some of the congestion and associated problems this community will endure as both locals and tourists funnel through the area.

Subsistence -- The opportunity to participate in subsistence activities reinforces a variety of cultural and related values in both Native and non-Native communities. Distribution of fish and wildlife contributes to cohesion of kinship groups and to community cohesion through the sharing of resources derived from harvest activities. Subsistence resources play an important role in the ceremonies and social and religious traditions of Alaska Natives. "Human survival, the economy and the means of establishing prestige and maintaining peace have all involved the consumption, transfer, and exchange of fish, game and of products made thereof, since time immemorial" (Brown and Burch 1992).

Most subsistence communities have mixed cash-subsistence economic systems in which residents divide their time between participation in wage earning activity and subsistence activity. This situation provides a means to estimate the economic value of subsistence activity by examining the trade-off in terms of wage earnings foregone when individuals engage in subsistence activity. Using this approach, Wolfe and Walker (1987) estimated a trade-off of about \$118 (1982 dollars) per pound of subsistence harvest. Duffield (1997) compared the results from this hedonic approach to that from an application of the Brown-Burch model in which he used market replacement price as a proxy for market value and travel cost-based recreational sport fishing value as a proxy for the activity value of participation in subsistence hunting and fishing to estimate damages to subsistence users from the *Exxon Valdez* oil spill. Both methods yielded estimates of a similar magnitude.

The Subsistence section in this chapter concluded that there would be no significant restrictions to subsistence activities in any of the alternatives. Since reliable estimates regarding possible variations in the pounds of subsistence resources harvested by alternative are not possible, it is not possible to quantitatively evaluate the alternatives in terms of subsistence values. However, general results from Wolfe and Walker suggest that subsistence productivity increases with distance from population centers, decreases with road access, and decreases as the percentage of non-Natives increases in a community's population.

Environmental Justice -- Within a socioeconomic context, ecosystems are viewed as providing a wide variety of goods and services that enhance well-being and benefit a range of human wants and needs. Federal natural resource policy is expected to not only provide economic opportunities, but also to maintain our natural and cultural heritage. Some of these expectations have been expanded in the last five years by the growing interest in environmental justice (see Salazar 1996 and Weinberg 1998). These concerns have resulted in an Executive Order (number 12898) that requires federal agencies to analyze the environmental effects, including human health, economic and social effects of their actions on minority communities and low-income communities, addressing

instances where the effects on these communities may be disproportionately high and adverse.

Environmental justice as it relates to land management issues is described by Salazar (1996) as a melding of concerns for environmental protection, democracy, and social justice. Social justice issues include fair procedures to allocate natural resources, fair distribution of the benefits and costs of resource management and equal access to public resources. Salazar believes an important tenet of the environmental justice movement is the notion that environmental issues must be considered within their political economic context, that status and power are key determinants of the quality of a person's environment, and that a person's status and power are influenced by his/her social class and skin color.

To evaluate the alternatives in terms of environmental justice, the following factors were used to determine Forest communities of concern: employment diversity score, percentage of households below poverty level, median household income, the percentage of the population that is Native, the civilian unemployment rate and the percentage of adults not in the labor force. Using these criteria the communities of Chenega Bay, Tatitlek and Hope are areas where environmental justice effects might occur. These three communities had the lowest median household income in 1990 and each has subsistence preference. Based on the results from the Wolfe and Walker study much of the lower income levels in these three areas may be a reflection of the higher value community members place on engaging in subsistence activities rather than wage-earning activities as evidenced by the high amount of subsistence use in these areas (especially Tatitlek and Chenega Bay). This being said alternatives that result in lower subsistence resources in these areas could result in effects on these communities that are disproportionately high and adverse. Efforts have been made to gather comments from these communities and keep them involved in the planning process through both formal consultation with the Native leaders of Chenega Bay and Tatitlek and public meetings held in all three locations.

National Interests

Peterson and Brown (1999), write:

Because of market failure and imperfection, inclusion of information about non-market factors in forest management decisions is absolutely essential. The state of the art for accomplishing this end is also imperfect and controversial, however, and we must not pretend that the economic paradigm is or ever will be the ultimate decision machine. The economic approach is just one of several important but imperfect information systems that offer useful advice to managers who must, nevertheless, make decisions not as omnipotent and omniscient kings, but mere participants in a complex process of political conflict resolution filled with risk and uncertainty. . . .

The limitations of economics include institutional incentives beyond the manager's control, implicit political assumptions that are not universally acceptable, inability to measure some important values in economic terms, questions about the validity and credibility of measured values, failure of consumer sovereignty to serve long-term human welfare, and failure of economics to account adequately for intergenerational values. Further, controversy surrounds available methods for measuring non-market values, such as the contingent valuation method, and the cost of application often exceeds the cost of being wrong.

The authors go on to state that while credible and valid monetary valuation of all non-market values is not possible, forest managers need to pay attention to the economic information system when the cost of the information does not exceed the cost of being wrong, while at the same time paying attention to complimentary information systems that look at non-market factors in non-monetary terms.

In light of these remarks, no attempt is made here to empirically estimate the market and non-market values associated with the flow of goods and resource services emanating from the Forest under each of the alternatives. Instead the results of two studies designed to measure some of the values society at large places on Alaska natural areas are summarized as an indication of the magnitude of these values. Next, two general results from other studies that are likely to apply to Alaska are mentioned. This is followed by a discussion of the probable opportunity costs and changes in use and nonuse values associated with making areas on the Forest Wilderness versus placing them under other management prescriptions. Included here is an interpretation of what wilderness advocates and nonwilderness advocates are revealing regarding both their risk attitudes and their trust of Forest managers.

Estimates of national values for Alaskan natural areas – Walsh and others (1996) surveyed a national sample of 380 households regarding the amount of natural area they would like to see protected in each of five regions of the nation, including Alaska. Respondents were also asked the maximum annual amount of money they would be willing to pay to preserve these areas. The average amount of natural area respondents wanted protected in Alaska was 88.5 percent of all natural area in the state. The average annual amount of money respondents were willing to pay to protect natural areas in Alaska was \$61.74 (1994 dollars). This average amount was higher than respondents were willing to pay to protect natural areas in any other region of the nation. The amount of natural area in Alaska is much greater than the amount remaining in other areas and no estimates were made of willingness to pay on a per acre basis. However, the authors did find that as more natural areas are designated for protection, the willingness to pay for additional area decreases in each of the five regions.

Respondents were also asked to rate the quality of the natural areas in the region where they live and other regions according to a 5-point scale, with (1) very low quality, (2) low, (3) medium, (4) high, and (5) very high, for 13 attributes

and services. For 12 of the 13 attributes, respondents rated the quality of natural areas in Alaska significantly higher than areas in other regions. The only exception was with respect to convenient location and accessibility (2.98), for which all other regions rated higher. Alaska quality was rated highest in: providing scenic beauty of a natural landscape unaltered by man (4.31); protecting rare and endangered species (4.28); knowing that future generations will have natural areas (4.21); protecting air and water quality (4.17); knowing natural areas exist for their own sake (4.12); knowing that in the future they have the option to go there if they choose (4.02); conserving natural areas for education and scientific study (4.00); preserving unique plant and animal ecosystems and genetic diversity (3.96); providing uncrowded hiking, camping, fishing, hunting, wildlife viewing, etc. (3.88); providing jobs and income from the tourist industry (3.69); and providing spiritual inspiration (3.42). Although, only 10 percent of the respondents reported they had ever been to natural areas in Alaska, 82 percent expressed interest in seeing Alaskan natural areas in the future.

Carson and others (1992) used a nationwide contingent valuation survey of 1,043 households to estimate the loss of passive use values resulting from injuries to natural resources caused by the *Exxon Valdez* oil spill. They estimated that the median household willingness to pay for a plan to prevent such a spill in this area in the future was \$31. Multiplying this estimate by the number of English speaking U.S. households in 1992 (this was the population sampled) resulted in an estimate of passive use losses of \$2.8 billion dollars (1992 dollars).

Brown (1993) reviewed 31 contingent valuation studies, conducted between 1980 and 1993, in which nonuse values were estimated. He found that respondents in most studies indicated that nonuse value exceeds use value. Further, several studies found that nonuse value was higher for users of the good than for nonusers of the good, which suggests that basing nonuse value solely on the responses of nonusers will underestimate nonuse value.

Wilderness versus nonwilderness prescriptions -- Wilderness designation in Alaska differs from this designation in other areas because ANILCA provides for motorized access and mechanized equipment related to traditional activities, subsistence activities, equipment use related to the taking of fish and wildlife, and administrative needs and activities. Subject to existing rights on valid claims, Wilderness would be withdrawn from all forms of mineral entry. Timber harvest is not allowed, however the amount of suitable acres for timber harvest is small. As detailed in the Wilderness Section of this chapter, the biggest foregone opportunity would be the exploration and development of mineral resources. At this time the mineral potential of much of the Forest is unknown.

To estimate the opportunity cost of placing areas under less protective management prescriptions, we need to understand the effects of these prescriptions on both the use and nonuse values people attach to wilderness. Results presented in other sections of this chapter suggest that even in the alternatives that allow the greatest development opportunity, the risks to clean air

and water, biodiversity, viable populations of plants and animals, scenery, opportunities for primitive recreation experiences and other use and nonuse services are small. In terms of supply, as stated in the Wilderness Section of this Chapter, the Forest is almost surrounded by lands that are managed for their wilderness or roadless values. While the Copper River Delta is truly a unique area, this area has already been congressionally recognized as an area to be managed for its fish and wildlife. In the opinion of the ID Team wildlife biologist more protection is afforded potentially sensitive species under some nonwilderness prescriptions, because under Wilderness designation management activities to improve the viability of these species could not be undertaken until after they were listed as Threatened, Endangered or Sensitive. The de facto amount of ecosystem protection associated with nonwilderness prescriptions on the Forest is probably higher than in other areas of the country because of the remoteness, difficulty of terrain, and shortness in seasons of use. In summary, although none of the Forest has yet been designated Wilderness, most of the Forest retains wilderness-type attributes.

Risk Behavior. In most areas, if the past is any prediction of the future, little development is likely to occur on the Forest regardless of the prescriptions applied. Based on the current situation, the opportunity costs associated with either a Wilderness designation or a nonwilderness prescription are not great for most areas on the Forest. What advocates on either side of the issue are probably revealing are their attitudes towards risk and their trust, or lack thereof, in Forest managers. Uncertainty regarding mineral deposits, future mineral prices, technological improvements, population increases and associated increases in tourists and recreational users, as well as the possibility of political changes and future restrictions on traditional and subsistence use in areas designated as Wilderness contribute to risk adverse behavior by nonwilderness advocates. These same types of uncertainties, as well as those associated with the effects of increased activity on the functioning of ecosystem processes and the resources and species (including humans) that depend on these processes lead wilderness advocates to adopt the same risk adverse behavior.

Barker (1994) writes, "From their inception, policies regarding national forestry have been set by the social values of the day, not by foresters and forest science." Bengston and Fan (1999) add, "Developing a policy that more accurately reflects current and emerging social values would be enormously simplified if there were widespread agreement about those values." With regards to the Revised Forest Plan, in choosing an alternative the decision maker will inevitably make some groups and individuals better off and others worse off in terms of their perceived values from the decision. Hopefully, the information presented in this section will be helpful in evaluating the trade-offs to be made from a social and economic perspective.