IV. Summary of Current Management Situation

This section summarizes the results of individual reports for recreation and tourism, wildlife, fisheries, vegetation-timber, fire, roadless areas, wild and scenic rivers, minerals, and social and economic environment. The discussion that follows summarizes the situations where there is an identified "need to change" that may form the basis for revision alternatives. In some cases there are discussions about resource conditions that were not identified as preliminary issues. These resource discussions are felt to be important, because while they were not identified as preliminary issues, management direction may need to be strengthened or they may be major components of one or more alternatives. Other resource reports are listed in Section V. Those reports contain information that will be used to update the Forest Plan but at this time it does not appear they will drive alternative development.

A. Physical Elements of the Environment

No physical elements of the environment are discussed in the AMS. The Revised Forest Plan environmental impact statement will briefly discuss physical elements of the environment.

B. Biological Elements of the Environment

1. Biodiversity

Current Situation

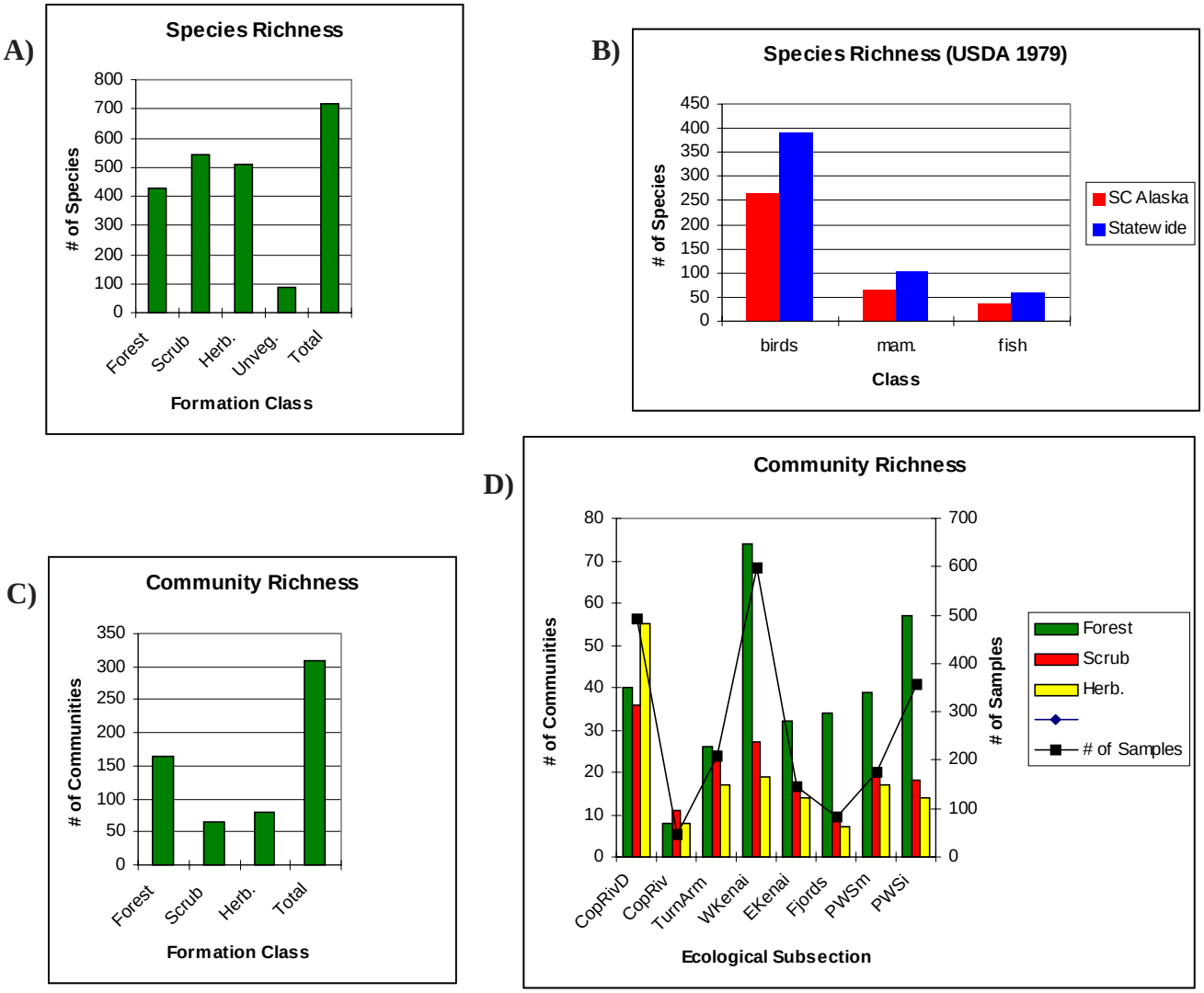
Biological diversity has been defined as "the variety of life-forms, the ecological roles they perform, and the genetic diversity they contain" (Wilcox 1984). The spatial scale of biological diversity includes genetic, species, community, and landscape levels. The biological elements of the environment considered in Forest Plan revision are components characterizing the biological diversity on the Forest.

The lands and waters of the Chugach are important reservoirs of biological diversity and include both species poor areas (e.g., icefields; sand dunes) and species rich areas (e.g., subalpine meadows, old-growth forests. For example, the range of plant species richness Forest-wide ranges from 85 occurrences in sparsely vegetated areas such as dunes and recently de-glaciated areas, to 540 in species rich areas such as shrub lands (Fig. 1A). In all, 45% of the total flora of Alaska (i.e., 720 of 1560 species) have been documented on the Forest. Similarly, Southcentral Alaska is estimated to include occur-

rences of 65% of the 550 birds, mammals, and fish species of Alaska (Fig. 1B; based on USDA 1979). Additionally, a total of 310 vegetation community types have been described on the Forest (Fig. 1C). The number of community types varies from 25 in the Copper River Ecological Subsection to 130 in the Copper River Delta subsection (Fig. 1D).

Although the current Forest Plan does not specifically use the term "biological diversity" (the term was not widely used until the mid 1980's) , it does indirectly address biological diversity through management direction aimed at "...maintaining viable populations of existing vertebrate species, maintaining and improving habitat of species that are indicators of the effects of management, and providing diversity of plant and animal communities." All alternatives will be evaluated as to their potential effects on biological diversity. These evaluations will include consideration of how closely we will attempt to manage biological diversity within the range of natural variability, how closely we mimic the natural processes driving biological diversity, and how much we let natural processes occur.

Figure IV-1: Vascular plant species richness (A); community richness (C & D) based on an estimated 2,300 vegetation plots; bird, mammal, and fish species richness (B) based on USDA (1979).



2. Vegetation - Timber

Current Management Situation

Vegetation plays a significant role in defining the character of the landscape both on the Chugach National Forest and in Southcentral Alaska. In order to understand how the forests in this region define that character, one must look at vegetation distribution patterns, species composition, and structure.

Vegetation Pattern
The Preliminary Land Cover Classification Map derived from satellite digital data provides the most current picture of broad scale vegetation distribution patterns at all analysis levels because it contains information for all ownership's within the exterior boundary of the Chugach National Forest, see **Map 3 - Preliminary Land Cover Classification.**

Seventy-eight percent of the gross area covering all ownership's (6,501,582 acres) within the forest boundary is classified in various non-forest cover types. Forested cover types which are predominantly conifer, account for 20 percent (1,305,432 acres) of the gross area and freshwater is found on 2 percent (142,583 acres) (Figure IV-2).

Figure IV-2: Preliminary Vegetation Cover Types of the Chugach National Forest

Land Cover Name	TOTAL National Forest Acres	% of National Forest Acres	TOTAL Other Owner Acres	% of Other Owner Acres	TOTAL Acres	% of Total Acres
Forested Land						
Forest - Needleleaf - Closed	604,357	11%	223,667	26%	828,024	13%
Forest - Needleleaf - Open	121,548	2%	32,558	4%	154,106	2%
Forest - Needleleaf - Woodland	103,330	2%	22,622	3%	125,952	2%
Forest - Broadleaf - Closed	119,838	2%	39,422	5%	159,260	2%
Forest - Broadleaf - Open	9,462	0%	15,023	2%	24,485	0%
Forest - Mixed - Closed	8,222	0%	891	0%	9,113	0%
Forest - Mixed - Open	4,250	0%	242	0%	4,492	0%
Total Forested Land	**971,007**	**17%**	**334,425**	**39%**	**1,305,432**	**20%**
Non-Forested Land						
Scrub - Dwarf Tree - Open	26,930	0%	6,297	1%	33,227	1%
Scrub - Tall Shrub - Closed	501,313	9%	121,193	14%	622,506	10%
Scrub - Tall Shrub -Open	73,563	1%	6,980	1%	80,543	1%
Scrub - Low Shrub - Closed	293,469	5%	42,500	5%	335,969	5%
Scrub - Low Shrub - Open	141,140	3%	31,692	4%	172,832	3%
Subtotal Shrub	**1,036,415**	**18%**	**208,662**	**24%**	**1,245,077**	**19%**
Herb - Graminoid/Forb -Dry/mesic	375,342	7%	46,799	5%	422,141	6%
Herb - Graminoid/Forb -Wet	124,601	2%	19,922	2%	144,523	2%
Herb - Bryoid - Mosses	5,082	0%	126	0%	5,208	0%
Herb - Bryoid - Lichens	30,657	1%	29	0%	30,686	0%
Herb - Aquatic - Fresh	9,298	0%	44	0%	9,342	0%
Herb - Aquatic - Brackish	1,941	0%	154	0%	2,095	0%
Subtotal Herbaceous	**546,921**	**10%**	**67,074**	**8%**	**613,995**	**9%**
Barren - Bedrock	490,200	9%	52,500	6%	542,700	8%
Barren - Sand/Mud	117,825	2%	509	0%	118,334	2%
Subtotal Barren	**608,025**	**11%**	**53,009**	**6%**	**661,034**	**10%**
Other - Glacier/Snow/Clouds	1,916,040	34%	136,498	16%	2,052,538	32%
Other - Shadow	327,910	6%	29,737	3%	357,647	6%
Other - Sparsely Vegetated	92,251	2%	11,931	1%	104,182	2%
UNMAPPED		0%	19,094	2%	19,094	0%
Subtotal Other	**2,336,201**	**41%**	**197,260**	**23%**	**2,533,461**	**39%**
Total Non-Forested Land	**4,527,562**	**80%**	**526,005**	**61%**	**5,053,567**	**78%**
FRESH WATER	**136,564.0**	**2%**	**6,019**	**1%**	**142,583**	**78%**
Grand Total All Excluding Saltwater	**5,635,133**	**100%**	**866,449**	**100%**	**6,501,582**	**100%**

Source: 1992 Preliminary Vegetation Classification Map of the Chugach National Forest

Forest Type Description	National Forest Acres	% of NF Acres	Other Ownership (PVT) Acres	% of PVT Acres	Total All Acres	% of All Acres
Hemlock	602,816	11%	98,071	11%	700,887	11%
Sitka Spruce	175,227	3%	26,576	3%	201,803	3%
White Spruce	36,081	1%	6,483	1%	42,564	1%
Black Spruce	12,155	0%	6,201	1%	18,356	0%
Birch	11,908	0%	5,769	1%	17,677	0%
Aspen	14,147	0%	1,323	0%	15,470	0%
Cottonwood	17,405	0%	5,780	1%	23,185	0%
Mixed Hemlock-Spruce	286,037	5%	39,881	5%	325,918	5%
Mixed Hardwoods	5,217	0%	699	0%	5,916	0%

Vegetation (Species) Composition and Distribution
Total forest land on the National Forest is 1,160,993 acres or 21.3 percent of the total area (Figure IV-3). Sixty-three percent of the forested acreage is found in Prince William Sound, 19 percent is found on the Kenai Peninsula, and the remaining 18 percent is in the Copper River area.

Collectively, non-forest cover types dominate the landscape of the Chugach National Forest, covering 79 percent of the gross area. Forested lands cover the remaining 21 percent.

The No Data type (included in the non-forest type) accounts for 38 percent (2,379,270 acres) of the total acreage. This type is located almost exclusively in Prince William Sound and Copper River and represents acreage within the ANILCA additions, EVOS purchases, and large blocks of private land for which there is no Land/Vegetation type information at the present time.

At the Forest level, other predominate cover types include Rock/Ice/Snow covering 13 percent, hemlock forest covering 11 percent, and the alder/other shrubs type, grasses and alpine vegetation, and other non-forest types each covering 8 percent. Each remaining cover type is less than 5 percent of the total acres.

Forest land is almost exclusively conifer forest with the hemlock type most common (11%), followed by the mixed hemlock-spruce type (5%), Sitka Spruce (3%), and the white (Lutz) spruce type (1%), Figure IV-3. Hardwoods and mixed hardwoods and cottonwood types account for less than one percent of the total acreage.

Figure IV-4: Vegetation Structure Classes of the Chugach National Forest by Ownership

Vegetation Structure Classes	Total Forest					
	National Forest Acres	% of NF Acres	Other Ownership (PVT) Acres	% of PVT Acres	Total All Acres	% of All Acres
Forest Land						
Grass/Forb	1,108	0%	372	0%	1,480	0%
Shrubs/Seedling	18,088	0%	6,050	1%	24,138	0%
Sapling/Pole	133,293	2%	28,415	3%	161,708	3%
Mature Forest-Age 50-150 years	50,343	1%	6,350	1%	56,693	1%
Late Successional Forest-Age 150+ years	409,325	8%	73,290	8%	482,615	8%
Unclassified Forest (unproductive)	548,832	10%	76,306	9%	625,138	10%
Subtotal Forest Land	**1,160,992**	**21%**	**190,783**	**22%**	**1,351,775**	**21%**
Non-Forest Land						
Alder/Other Shrub	473,366	9%	6,228	1%	479,594	8%
Willow	157,870	3%	27,533	3%	185,403	3%
Subtotal Shrub	**631,236**	**12%**	**33,761**	**4%**	**664,997**	**11%**
Grasses & Alpine Veg	508,869	9%	5,751	1%	514,620	8%
Subtotal Grasses	**508,869**	**9%**	**5,751**	**1%**	**514,620**	**8%**
Rock/Ice/Snow	780,560	14%	19,692	2%	800,252	13%
Other Non-Forest	440,693	8%	43,860	5%	484,553	8%
Subtotal Sparsely Vegetated	**1,221,253**	**22%**	**63,552**	**7%**	**1,284,805**	**20%**
No Data (ANILCA Additions)	1,815,404	33%	563,866	65%	2,379,270	38%
Water	114,035	2%	6,944	1%	120,979	2%
Subtotal Other	**1,929,439**	**35%**	**570,810**	**66%**	**2,500,249**	**40%**
Subtotal Non-Forested Land/Water	**4,290,797**	**79%**	**673,874**	**78%**	**4,964,671**	**79%**
GRAND TOTAL	**5,451,790**	**100%**	**864,657**	**100%**	**6,316,447**	**100%**

Source: 1978 Land & Vegetaion Type Map of the Chugach National Forest

Vegetation Structure

As displayed in Figure IV-4 for all ownership's as a percent of all acres within the National Forest boundary, 38 percent of the acres have no information, 21 percent are forested, 20 percent are sparsely vegetated, 11 percent are in the shrub stage, 8 percent are in the grass/alpine vegetation stage, and 2 percent are freshwater.

Within the forested component, unproductive forest lacking structural information account for 10 percent of all acres, the late successional stage forest accounts for 8 percent of all acres, followed in descending order of abundance with sapling/pole stage (3%), mature stage (1%), and the combined shrub/seedling and grass/forb stages less than 1 percent.

Of the total 1,160,992 acres of forest land on the Chugach NF, 48 percent are unclassified for structural stage because they are unproductive forest lands, 35 percent of the acreage is in the late successional stage, 4 percent is in the mature stage, 11 percent is in the sapling/pole stage, 2 percent is in the shrub/seedling stage, less than 1 percent is in the grass/forb stage.

Site Disturbances

Alaska ecosystems are shaped by a variety of disturbances that vary in both type and intensity. Glaciation, earthquakes, volcanic eruptions, tidal waves, fire, flooding, wind throw, avalanches, landslides, and insect and disease outbreaks are natural agents of disturbance. Human caused disturbances include construction of roads, pipelines, powerlines, railroads and their corridors, wildfire starts; forestry

related activities such as timber harvest, thinning, site preparation, reforestation; wildlife habitat improvement activities such as prescribed burning and mechanical treatments of vegetation; permanent deforestation for agriculture, residential or commercial construction; mineral exploration and mining. These disturbances, large and small, are responsible for the way current landscapes appear and function today. Collectively, over time, these agents are responsible for creating, maintaining, or changing the dynamic mosaic of landscape vegetation patterns. They are briefly described in the following sections.

Natural Disturbances

Fire Disturbance
Less than 1 percent of fires this century are from natural causes. Current fuel loading data indicate increased chances for large stand replacing fire.

Insect and Disease Disturbance
Insect and disease-caused stresses may have long-lasting effects on forest stands because of their influences on species composition, diversity, density, nutrient cycling and plant succession (Zasada, Van Cleve, Werner, McQueen, Nyland 1977). On the Kenai Peninsula portion of the Chugach National Forest, insects and disease are major disturbance agents as indicated by 1987 inventory measures of annual mortality of growing stock (Figure IV-5) and sawtimber trees (Figure IV-6). The unknown class accounts for 24 percent of growing stock mortality and 25 percent of sawtimber mortality and is most likely caused by disease and/or suppression.

Figure IV-5: Annual Mortality of Growing Stock on Available Timberlands by Cause of Death and Tree Species in Net Cubic Feet

Mortality Cause	White Spruce	Black Spruce	Sitka Spruce	Mountain Hemlock	Total Softwoods	Total Hardwoods	Total All	Percent
Insects	1,825,992				1,825,992		185,992	66%
Disease	90,013	5,119		27,460	122,592		122,592	4%
Fire								
Animal	43,881				43,881	6,957	50,838	2%
Weather	79,762			27,135	106,897		106,897	4%
Suppression	201				201		201	0%
Logging								
Unknown	625,542		1,218	22,656	649,416	19,379	668,795	24%
Total	**2,665,391**	**5,119**	**1,218**	**77,251**	**2,748,979**	**26,336**	**2,775,315**	**100%**
% Softwood	**97%**	**0%**	**0%**	**3%**	**100%**			
% Hardwood						**100%**		

Figure IV-6: Annual Mortality of Sawtimber on Available Timberlands of the Kenai Peninsula by Cause of Death and Tree Species in Net Board Feet (Scribner)

Mortality Cause	White Spruce	Black Spruce	Sitka Spruce	Mountain Hemlock	Total Softwoods	Total Hardwoods	Total All	Percent
Insects	6,725,092				6,725,092		6,725,092	67%
Disease	377,437			63,227	440,664		440,664	4%
Fire								
Animal	173,386				173,386		173,386	2%
Weather	243,252			14,753	258,005		258,005	3%
Suppression	315				315		315	0%
Logging								
Unknown	2,405,764		6,637	57,168	2,469,569		2,469,569	25%
Total	**9,925,246**		**6,637**	**135,148**	**10,067,031**		**10,067,031**	**100%**
% Softwood	**99%**	**0%**	**0%**	**1%**	**100%**			
% Hardwood						**0%**		

Insects

Spruce Bark Beetle (SBB)
As agents of disturbance, spruce bark beetles are one of the most important mortality agents of mature spruce stands in Alaska. The Kenai Peninsula has experienced an ongoing spruce beetle epidemic for more than three decades and has resulted in widespread spruce mortality across all ownerships. Figure IV-7 displays the cumulative areas of spruce beetle infestation which have been annually mapped from the air within the exterior boundary of the Forest between 1957 and 1997. A total of 131,050 acres of National Forest and 29,590 acres of private land have been infested by SBB between 1957-1997, see **Map 4 Spruce Bark Beetle Infestation.**

Although not very common, 2,080 acres of the National Forest and 1,230 acres of private land were infested by SBB in Prince William Sound between 1957-1979. No additional acres have been identified and mapped since then.

Figure IV-7: Cumulative Spruce Bark Beetle Infestation by Watershed Association and Ownership on the Kenai Peninsula between the Period of 1957-1997

WA	SBB Infested 1957-1997 National Forest	SBB Infested 1957-1997 Private	Total Acres Infested
K01			
K02	26,710	340	27,050
K03	5,930	1,810	7,740
K04	1,200	80	1,280
K05			
K06	70		70
K07	5,320	980	6,300
K08	7,310	2,070	9,380
K09	14,130	1,550	15,680
K10	16,300	4,260	20,560
K11	9,280	7,200	16,480
K12	2,310	510	2,820
K13	3,030	5,710	8,740
K14	6,750	1,630	8,380
K15	10,000	10	10,010
K16	4,430	1,320	5,750
K17	8,180	750	8,930
K18	3,710		3,710
K19	500	1,280	1,780
K20			
K21			
K22			
K23			
K24	410	90	500
K25	1,160		1,160
K26	4,320		4,320
Total	**131,050**	**29,590**	**160,640**

Western Black-Headed Budworm
This native hemlock and spruce defoliator can cause growth loss, top-kill, and in severe cases, death of the host. Heavily defoliated trees may be more susceptible to other mortality agents. As a major forest defoliator, black-headed budworm ultimately influences both stand composition and structure in some areas (Figure IV-8).

Disease

Tree disease alters forest structure, composition, and plant succession and plays an essential role in recycling nutrients in forests. Different diseases can enhance diversity and wildlife habitat as well.

Disease information for the forest is not currently mapped, however, disease is a significant factor in economic volume loss in the late successional stands in Prince William Sound and the Copper River area.

Physical Disturbances

Wind throw Disturbance
While wind throw is a significant disturbance agent in old-growth forests of southeast Alaska, it does not appear to be a significant factor in any of the geographic areas of the forest currently (Figure IV-8).

Avalanche
Numerous snow avalanche's occur every year on the Chugach, however, the overall acreage impacted is unknown. Generally, avalances occur in the same area year after year.

Human Caused Disturbances

Fire
The major human caused disturbance agent on the Forest is fire. A total of approximately 1,400 fires burned a combined 75,000 acres on the Forest from 1914 to 1997 (Figs. IV-9 and IV-10, respectively). Over 99.5% of the burned acres are located on the Kenai Peninsula portion of the Forest, see **Map 5 - Fire History**. Human-caused ignition accounts for over 99% (Figs. IV-9 and IV-10) of all fires on the Forest.

Wildfires (> 600 acres) have not been very common on the Forest in the last 25 years, with only 2 fires recorded greater than 100 acres. However, there has been a large fire on the Peninsula every 10 to 20 years. Fire data summarized on the Forest from 1971-1992 reported "high fire years" in pairs in 1973 and '74 with 23 and 26 fire occurrences, respectively, and the years of 1983 and '84 had 10 and 13 fire occurrences, respectively (Rounsaville 1992). Fire data summarized for the present decade has 1993 and '94 with 35 and 24 fire occurrences, respectively. Presently, 1997 had 28 fires and 1998 is predicted to be another high fire season.

Present conditions on the Kenai Peninsula include increased fuel loads from beetle kill, a high frequency and potential for human-caused ignitions, and the possibility of favorable weather conditions for ignition may increase the risk of large scale fire occurrences. Drought conditions occur on the average once every five years on the Kenai Peninsula. "Red flag" weather conditions (high wind speed and <30% humidity) occur on the average once every five years. The odds of both events occurring simultaneously are between 1 in 10 and 1 in 20 years (estimated).

Fire management on the Chugach National Forest portion of the Kenai Peninsula has focused on managing fuels around the "urban/wildland interface". Prescribed fires were evaluated to reduce hazardous fuel loading and maintain fuel breaks which play a important role reducing high intensity

Figure IV-8: Acres of Other Insect & Damaging Agents by Geographic Landscape Area, Ownership and Year

Year	Insect/Damage Name	National Forest Acres	Private Lands Acres	Total All Acres	Percent of Total
Kenai					
91	Black-Headed Budworm	220	0	220	4%
92	Black-Headed Budworm	2,840	1,410	4,250	77%
95	Flooding/High Water Damage	60	0	60	1%
95	Large Aspen Totrix	550	0	550	10%
97	Birch Defoliation	300	0	300	5%
97	Black-Headed Budworm	20	0	20	0%
97	Cottonwood Defoliation	30	0	30	1%
97	Fire Damage	30	0	30	1%
97	Ips Engraver Beetle	10	10	20	0%
97	Windthrow	10	0	10	0%
Subtotal Kenai		**4,070**	**1,420**	**5,490**	**100%**
Prince William Sound					
91	Black-Headed Budworm	2,370	4,170	6,540	26%
92	Black-Headed Budworm	940	470	1,410	6%
95	Conifer Defoliation	640	940	1,580	6%
95	Flooding/High Water Damage	10	0	10	0%
97	Black-Headed Budworm	7,490	8,310	15,800	62%
97	Windthrow	0	90	90	0%
Subtotal Prince William Sound		**11,450**	**13,980**	**25,430**	**100%**
Copper River					
91	Black-Headed Budworm	140	120	260	2%
92	Black-Headed Budworm	620	0	620	5%
97	Black-Headed Budworm	9,220	3,140	12,360	92%
97	Large Aspen Totrix	0	180	180	1%
Subtotal Copper River		**9,980**	**3,440**	**13,420**	**100%**
Forest					
91-97	Black-Headed Budworm	23,860	17,620	41,480	94%
91-97	Flooding/High Water Damage	70	0	70	0%
91-97	Large Aspen Totrix	550	180	730	2%
91-97	Birch Defoliation	300	0	300	1%
91-97	Cottonwood Defoliation	30	0	30	0%
91-97	Fire Damage	30	0	30	0%
91-97	Ips Engraver Beetle	10	10	20	0%
91-97	Windthrow	10	90	100	0%
91-97	Conifer Defoliation	640	940	1,580	4%
GRAND TOTAL		**25,500**	**18,840**	**44,340**	**100%**

Source: Annual Insect & Damage Detection Aerial Surveys by SP&F

Figure IV-9

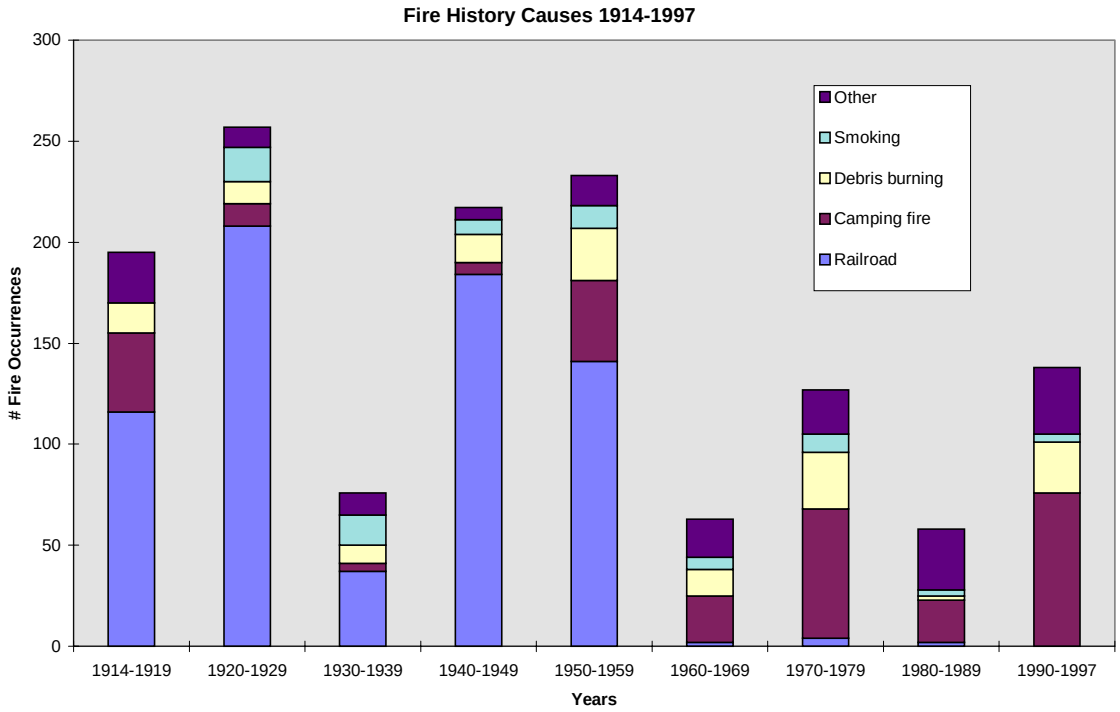
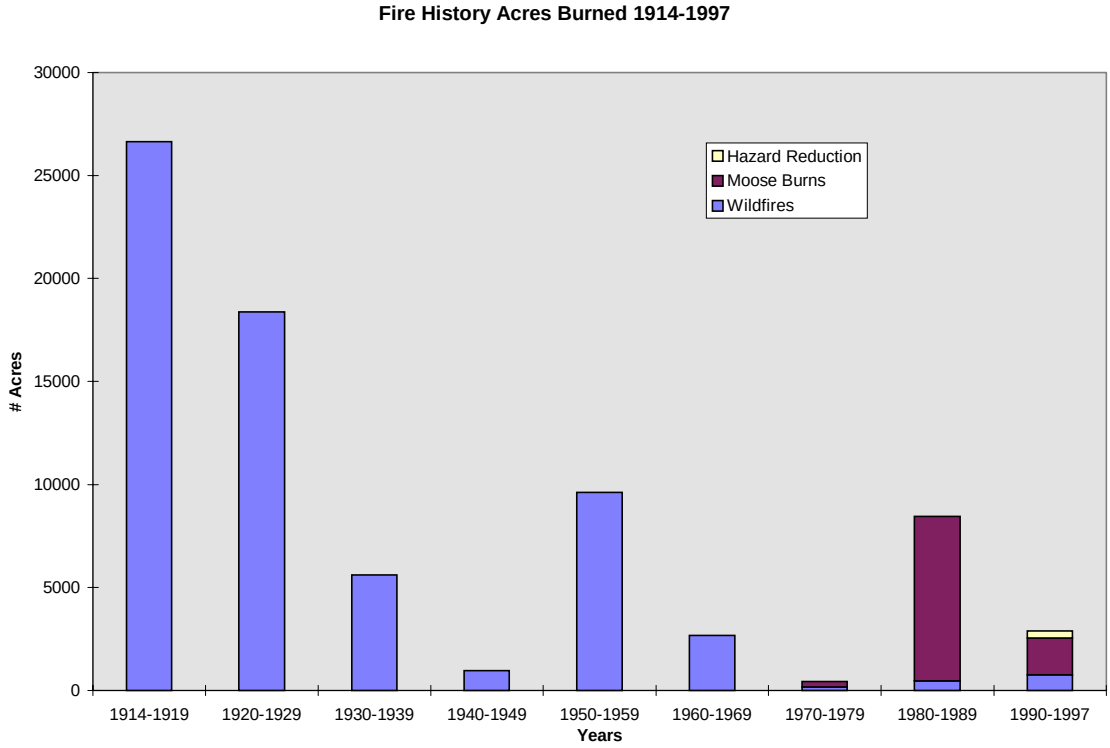


Figure IV-10



wildfires and potential losses of homes and businesses. The Chugach National Forest is concerned about managing the forest to reduce the threat to human life and property, particularly in Cooper Landing, Moose Pass, Crown Point and Hope townsite areas on the Kenai Peninsula. Given the generally unfavorable climatic conditions (annual precipitation exceeds 100 inches in many areas) the use of prescribed fire in the Prince William Sound and Copper River areas is likely to be limited.

From 1990, the Forests fire hazard reduction program has focused on fuel reduction (2,700 acres) of stands heavily impacted by Spruce Bark Beetles in the Cooper Landing area. The prescribed treatments included 350 acres of prescribed fire and 2,350 acres of mechanical fuel reduction. The Moose Pass, Crown Point and Hope areas also have an increase in fuel loading and fire hazard associated with the beetle killed spruce forests.

Timber Harvest
During plan implementation, timber harvest has not been a significant disturbance factor on the Forest. Between 1985 and 1997, approximately 3,400 acres have been harvested (Figure I-1). With the exception of the Montague Road right-of-way timber clearing, almost all harvest has occurred on the Kenai Peninsula.

Need to Establish or Change Management Direction

The Forest Plan permitted vegetation/timber management on approximately 22,150 acres during first decade of plan implementation or an annual average of 2,215 acres per year to improve wildlife habitat, reduce fuel loads, maintain and enhance the scenic quality of forested landscapes, and to provide forest products for commercial, personal, and Alaska free uses. During the first decade of implementation, the plan called for using prescribed fire (9,850 acres), precommercial thinning (1,800 acres), and timber harvest (10,500 acres) to achieve these objectives. After Forest Plan Amendment #1, the amended plan allowed prescribed fire (9,850 acres), precommercial thinning (1,800 acres), and timber harvest (5,250 acres) to achieve the same objectives in the first decade.

Compared to what the Forest Plan envisioned and what vegetation management has actually been accomplished over the last 13 years, very little vegetation management has occurred on the Forest. Revision needs to re-evaluate the overall level of timber/vegetation management that is needed with respect to fuels reduction, improvement of wildlife habitat and commercial, personal and free use.

There is a need to obtain current fuel load information and update fuel models for the Kenai Peninsula portion of the Forest. Present fuel load data is inadequate and existing fuel model data is more than five years old. There is a need to reevaluate current fire management in relation to the following concerns:

1. The increased fuel loads and increased fire hazards,
2. The increased risk of fires caused from human ignitions,
3. Wildlife habitat enhancement to sustain desired populations, and
4. Public concerns about the use of fire in national forest management.

Perhaps the most important need is for a prescribed fire program focusing on the reduction of fuels, making wildfires less damaging to the urban/wildland environment and more easily controlled.

Revision Decision Space

Alternatives can span a range from no acres of vegetation management to a maximum level needed to meet other resource objectives.

Figure IV-11: Chugach National Forest miles of documented fish habitat

Geographic Area	Anadromous Habitat (miles)	Coho	Chum	Cutthroat	Dolly Varden	King	Pink	Sockeye
Kenai Peninsula	395	133	341	0	122	146	183	269
Prince William Sound	708	230	215	34	30	9	598	81
Copper & Bering Rivers	688	84	601	191	429	181	142	549
TOTAL	**1,791**	**447**	**1,157**	**225**	**581**	**336**	**923**	**899**

3. Fish Habitat

Current Management Situation

Fish are a major component of the overall biodiversity of the Chugach National Forest. Abundant rain fall, streams of glacial origins, and watersheds with high stream densities provide an unusual number and diversity of freshwater fish habitats. Aquatic systems on the Chugach provide spawning and rearing habitat for the majority of wild fish produced in Prince William Sound, the Copper River Delta, the Bering River, and the northwest section of the Kenai Peninsula. The annual spawning migrations of anadromous fish are necessary for the function of many riparian plant and animal communities. Anadromous fish are a keystone species, with dozens of birds and mammals consuming salmon or salmon eggs. Animals such as black and brown bear and bald eagles are known to have significant dependence on spawning salmon, or their carcasses for overwinter survival.

The Forest includes approximately 7,900 miles of mapped perennial streams and 150,100 acres of lakes ranging from a few acres to the 13,900 acre Kenai Lake. Anadromous fish have been documented on 1,800 miles of Forest stream and 48,100 acres of lakes. Another 2,000 miles of smaller stream channels are suspected to contain anadromous or resident fish populations, but are not currently documented. Approximately 100,000 acres of lakes provide habitat for non-anadromous resident fish habitat. The amount of fish habitat important for sport, subsistence, personal, and commercial fisheries use is described in the following figure.

To assess this habitat the Forest has developed an intensive stream channel characterization system. All 7,900 miles of known streams have been mapped and identified using the Chugach National Forest Stream Channel Type System. Channel type designations allow quick identification of the physical, and hydrological processes occurring or which may occur within a given segment of a stream. The channel types describe the relative sensitivity of the streams to management disturbances and will provide a template for establishing ecologically based management standards and guidelines for riparian habitats.

Current habitat conditions on the Forest are at near 100 % of natural productivity. Management actions detrimental to fish habitat have occurred on limited amounts of stream habitat. Management actions, most of which predate the existing Forest Plan, have reduced the productivity of less than three percent of anadromous streams. Water withdrawal from behind dams, and subsequent dewatering streambeds has also affected a very small percentage of stream habitats, less than 5 miles of fish producing streams. In addition, mining has impacted a small, though currently unknown, percentage of stream habitat within the Forest.

The Forest fish habitat enhancement program has shifted from emphasis on production of numbers of fish to one that emphasizes the protection, maintenance and improvement of habitat conditions needed for full habitat productivity for wild fish. The program has focused on enhancing habitat to increase the capacity of the aquatic ecosystem or to mitigate degraded habitat. Projects have included spawning bed improvement or development, fish pass construction, lake and stream stocking, rearing pond development, placement of in-stream structures, lake fertilization, and stream bank stabilization.

Need to Establish or Change Management Direction

The current goals and objectives, and standards and guidelines need to be evaluated and updated to reflect current knowledge and science. The standards and guidelines should provide for natural watershed function and channel process.

The Forest Plan needs to address an overall strategy for managing wild fish habitat on the Forest to meet the demand for commercial, subsistence, and sport harvest needs. The Revision will need to emphasize the role of the Forest Service in managing fish habitat with the goal of protecting wild fish populations. Enhancement or rehabilitation efforts will be focused on specific fish populations where an increased demand from subsistence, sport, or commercial fishing is negatively impacting the populations.

Revision Decision Space

Best management practices and water quality requirements establish some of the sideboards for managing and protecting aquatic habitat. The Forest Plan provides additional protection for fisheries resources and direction for managing the resource.

4. Wildlife

Introduction

New management issues have developed and other issues have changed relative to management of wildlife and their habitats on the Chugach National Forest since the Chugach Land Management Plan (Forest Plan) was developed. An assessment is needed of the direction in the current land management plan for management of wildlife habitats and populations to determine if it is responsive to present and future management needs.

Current Management Situation

Threatened, Endangered, and Sensitive Species
The current Forest Plan does not specifically address issues related to or provide direction for identification, recovery, and conservation of threatened, endangered, or sensitive wildlife species.

Management Indicator Species (MIS)
The current Forest Plan identifies 21 species which are to be used as wildlife MIS, see Figure IV-12.

Viable, Well-Distributed Populations of Wildlife
Current management is aimed at maintaining viable populations of existing vertebrate species, maintaining and improving the habitat of species that are indicators of the effects of management, and providing diversity of plant and animal communities.

Wildlife Habitat Management
Most visible in the wildlife program described in the Forest Plan are the prescribed burns to improve moose habitat and habitat improvement activities on the Copper River Delta especially for waterfowl.

Need to Establish or Change Management Direction

Threatened, Endangered, and Threatened Species
At the time the Forest Plan was developed, there was limited concern for threatened, endangered, or sensitive species on the Chugach National Forest. Since that time several species of concern, occurring

on the Chugach National Forest, have been identified by the Fish and Wildlife Service, National Marine Fisheries Service, or the State of Alaska. The Alaska Region of the Forest Service has also designated several sensitive species on the Forest.

Management Indicator Species (MIS)
Only 7 of the 21 designated species and 1 species guild were used in the Environmental Impact Statement for the current plan for evaluation of alternatives. Monitoring has been consistently accomplished for only 5 of these species (USDA Forest Service 1995).

Viable, Well-distributed Populations of Wildlife
The NFMA regulations require that viable, well distributed populations of wildlife species be maintained on the Forest.

Wildlife Habitat Management
Since the Chugach Land Management Plan was developed, the following New management issues have developed and other issues have changed relative to management of wildlife and their habitats on the Chugach National Forest:

- Significant environmental changes resulted from the *Exxon Valdez* oil spill in Prince William Sound.
- The infestation of forests on the Kenai Peninsula with the spruce bark beetle and subsequent death of trees over large areas has changed ecological relationships in this area.

Figure IV-12: Managment Indicator Species selected for implementation of the Chugach National Forest land management plan.

Habitat	Major Ecosystems on the Chugach National Forest		
	Kenai Peninsula	**Prince William Sound**	**Copper River Area**
Early forest succession	Moose	Savannah sparrow	Moose
	Savannah sparrow	White-crowned sparrow	Snowshoe hare
	White -crowned sparrow	Orange-crowned sparrow	Dusky Canada goose
	Orange-crowned sparrow		Trumpeter swan
Late forest succession	Black Bear	Sitka black-talied deer	Balck bear
	Red squirrel	Black bear	Spruce grouse
	Spruce grouse	Red Squirrel	Bald eagle
	Townsend's warbler	Bald eagle	Townsend's warbler
		Townsend's warbler	
Alpine	Mountain goat	Mountain goat	Mountain goat
	Dall sheep	Willow ptarmigan	Willow ptarmigan
	Willow patrmigan		
Special (snags, riparian)	Northern three-toed	Northern three-toed	Northern three-toed
	woodpecker	woodpecker	woodpecker
	Pine siskin	Pine siskin	Pine siskin
	Boreal chickadee	Boreal chickadee	Boreal chickadee
	Tree swallow	Tree swallow	Tree swallow
		River otter	River otter

- The increased demand for developed and dispersed recreation opportunities throughout the Chugach National Forest is influencing all resources on the Forest.

- Location and management of private lands interspersed throughout the Chugach National Forest has changed significantly in recent years.

- The cumulative impact of management actions on and off the Chugach National Forest must be evaluated and the results presented.

- Habitat loss and degradation of habitat quality were the two most frequently cited problems associated with wildlife and were the greatest concern of all management issues identified by

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Potential to Resolve Issues

Threatened, Endangered, and Threatened Species
The Revision process should be used to incorporate the needs for recovery of identified threatened or endangered species into the management program for the Chugach National Forest. The needs for maintaining and increasing populations of sensitive species must also be addressed in the Revision process. Consideration should also be given for establishing a process during Revision for listing and delisting sensitive species on the Chugach National Forest .

Management Indicator Species (MIS)
A reassessment of the current MIS with an intent to reduce the total number to a more manageable set of species that may be monitored and evaluated meaningfully is appropriate for the Forest plan revision effort. Ten to 12 species are generally considered the maximum number of MIS that can be effectively used in Forest plan development and implementation.

Development of Assessment Criteria

The NFMA planning regulations offer guidance on the selection of MIS (USDA Forest Service 1982:43048). Species are to be selected whose population changes are believed to indicate the effects of management activities. Species in the following categories are to be considered during selection of MIS: 1) endangered and threatened species on State and Federal lists, 2) species with special habitat needs that may be affected by proposed management activities, 3) commonly hunted or trapped species, 4) non-game species of special interest, and 5) species that are biological or ecological indicators.

Although a limited number of the current MIS were used for evaluation of alternatives in the original plan and few were subsequently monitored during implementation of the Forest plan, it is valuable to consider these species for the revision effort to ensure continuity of information. Sidle and Suring (1986) developed and implemented a process for identifying potential MIS at the Regional level. Their work also provides a basis for selection of MIS. Species listed as threatened or endangered under the Endangered Species Act, species of concern identified by the U. S. Fish and Wildlife Service and the State of Alaska, and species identified as sensitive by the USDA Forest Service all may have special habitat requirements that need to be considered during forest plan revision and are appropriate to be evaluated as potential MIS (USDA Forest Service 1984, USDA Forest Service 1994, Alaska Department of Fish and Game 1996, US Fish and Wildlife Service 1996). The *Exxon Valdez* oil spill in 1989 significantly reduced populations of a number of species in Prince William Sound (*Exxon Valdez* Oil Spill Trustee Council 1996). Many of those species require specific management actions to assist in recovery of their populations and may be appropriate to consider as MIS.

Species that occurred in these categories were listed and were assigned one point for each of the following characteristics: proposed Alaska Region MIS, current Chugach National Forest MIS, Federal sensitive, threatened, or endangered, US Fish and Wildlife Service species of concern, State of Alaska species of concern, and species designated as injured as a result of the *Exxon Valdez* oil spill (Figure IV-14). Two criteria developed by Suring and Murphy (*in prep.*) were used to evaluate the potential effects of habitat and access management on these species. Suring and Murphy's scores for these two criteria were combined resulting in potential scores ranging from 0 to 6. Low scores indicated limited potential effects on populations as a result of habitat management and/or increased human access to habitats. High scores in this range indicated that populations may be affected by habitat alteration resulting from management activities and that the species is sensitive to increased human access.

The NFMA planning regulations stipulate that population trends of MIS will be monitored and that MIS response to habitat changes will be determined (USDA Forest Service 1982:43048). It is therefore desirable that species designated as MIS have established monitoring techniques that are not difficult or

Figure IV-14: Selection criteria for managment indicator species on the Chugach national Forest, south-central Alaska.

Species Considered	Selection Criteria								Sum of Criteria Values
	Region Proposed MIS (*a*)	Current Chugach MIS (*b*)	Threatened, Endangered, or Sensitive (*c*)	FWS Species of Concern (*d*)	Alaska Specise of Concern (*e*)	*Exxon Valdez* Oil Spill Injured Speices (*f*)	Potential for Management Effects (*g*)	Degree of Monitoring Difficulty (*h*)	
Mountain goat (*i*)	1	1					6	3	11
Dusky Canada goose (*i*)	1	1	1				5	3	11
Marbled murrelet (*i*)				1		1	5	3	10
Beaver	1	1					4	3	9
Black bear	1	1					5	2	9
River otter	1	1				1	5	1	9
Sitka black-tailed deer (*i*)	1	1					4	3	9
Moose (*i*)	1	1					4	3	9
Northern goshawk	1			1	1		5	1	9
Bald eagle	1	1				*(Recovered)*	4	3	9
Steller sea lion			1		1		4	2	8
Brown bear (*i*)	1						5	2	8
American marten	1						6	1	8
Dall sheep	1	1					3	3	8
Trumpter swan	1	1	1				2	3	8
Black oystercatcher						1	5	2	8
Harlequin duck				1		1	5	1	8
Montague tundra vole			1	1			2	3	7
N. American lynx				1			5	1	7
Gray wolf	1						5	1	7
Common murres						1	4	2	7
Common merganser	1						4	2	7
Spruce grouse	1	1					3	2	7
Harbor seal						1	3	2	6
Red squirrel	1	1					2	2	6
Common loon						1	4	1	6
Willow ptarmigan	1	1					2	2	6
Cormorants						1	2	2	5
N. 3-toed woodpecker		1					3	1	5
Hairy woodpecker	1						3	1	5
Tree swallow		1					2	2	5
Brown creeper	1						3	1	5
Orange-crowned warbler	1	1					1	2	5
Kittlitz's murrelet				1		1	0	2	4
Pine siskin		1					2	1	4
Olive-sided flycatcher				1			2	1	4
Gray-cheeked thrush					1		2	1	4
Boreal chickadee	1						1	2	4
Savannah sparrow	1						1	2	4
White-crowned sparrow	1						1	2	4
Townsend's warbler	1						2	1	4
Sea otter						1	0	2	3
Blackpoll warbler					1		1	1	3

(a) From: Sidle and Suring (1986).
(b) From: USDA Forest Service (1984).
(c) From: USDA Forest Service (1994).
(d) From: U.S. Fish and Wildife Service (1996).
(e) From: Alaska Department of Fish & Game 1996).
(f) From: *Exxon Valdez* Oil Spill Trusteed Council (1996).
(g) Form: Suring and Murphy (*In Prep*). Potential values franged from 0 to 6
(h) 1-monitoring techniques not available, not fully developed, or difficult & espensive to implement; monitoring results may not provide statistically valid population trend information.
2-monitoring techniques have been developed and successfully applied, may be expensive to implement; monitoring results generally provide statistically valid population trend information.
3-monitoring techniques are fully developed and have been successfully applied in south-central Alaska; monitoring results provide reliable population trend information.
(i) Recommended management indicator species.

expensive to implement. It is also advantageous if these techniques have been used to establish base line population levels prior to implementation of the revised Forest plan. In order to address this aspect, the following criteria and associated scores were developed and applied to the list of species:

1. Monitoring techniques not available, not fully developed, or difficult and expensive to implement; monitoring results may not provide statistically valid population trend information.

2. Monitoring techniques have been developed and successfully applied, may be expensive to implement; monitoring results generally provide statistically valid population trend information.

3. Monitoring techniques are fully developed and have been successfully applied in Southcentral Alaska: monitoring results provide reliable population trend information.

Results of Applying the Selection Criteria

Summing the criteria scores and sorting the resulting totals provides a basis for selection of MIS (Figure IV-14). Seventeen species had sums that were >50% of the total potential score (i.e., 15). Three of those species had a high degree of monitoring difficulty and were dropped from further consideration (i.e., river otter, American marten, and harlequin duck) (Figure IV-15). Species whose habitat within the Chugach National Forest is not primarily managed by the Forest Service were also removed from consideration (i.e., Steller's sea lion and black oystercatcher).

Species that are currently managed for subsistence harvests (i.e., mountain goat, Sitka black-tailed deer, and moose) were recommended for MIS selection (Figure IV-15). The Forest Service manages habitats and populations of these species and must ensure that its management practices maintain subsistence harvests while also providing for sport harvests.

The remaining species were evaluated relative to current or potential issues or concerns associated with

Figure IV-15: Evaluation of managment indicator species (MIS) for revision of the Chugach National Forest Land Management Plan.

Species Considered	Species with low to Moderate Monitoring Difficulity	Species whose Habitat is Primarily under National Forest Management	Subsistence Species	Species Currently Associated with Management Issues	Recommended MIS
Moutain goat	X	X	X	X	X
Dusky Canada goose	X	X		X	X
Marbled murrelet	X	X		X	X
Northern goshawk	X	X			X
Beaver	X	X			
Black bear	X	X			
River otter		X			
Sitka black-tailed deer	X	X	X		X
Moose	X	X	X		X
Bald eagle	X	X			
Stellar sea lion	X				
Brown bear	X	X		X	X
American marten		X			
Dall sheep	X	X			
Trumpter swan	X	X			
Black oystercatcher	X				
Harlequin duck		X			

management of their habitats or populations on the Chugach National Forest (Table 3). beaver, black bear, bald eagle, Dall sheep, and trumpeter swans have not been associated with specific management issues on the Forest.

Essentially the entire population of Dusky Canada geese nest on the Chugach National Forest (Pacific Flyway Council 1997). Habitat changes on the breeding grounds have resulted in significant population declines leading to concerns for the viability of this subspecies. Population trends of the Dusky Canada geese will be a prime indicator of the success of the Forest Service management. Dusky Canada geese are recommended as a MIS.

Marbled murrelet populations have declined significantly in the southern portions of their range and are considered threatened under the Endangered Species Act in California, Oregon, and Washington (Ralph *et al*. 1995). Although populations are still large within the Chugach National Forest, numbers have declined due to injury from the *Exxon Valdez* oil spill and potentially from changes in nesting habitat (Piatt and Naslund 1995). Protecting and managing nesting habitat on the Forest will be a primary factor in the recovery of this species. Marbled murrelets are recommended as a MIS.

Northern goshawks are closely associated with mature and old-growth forests; populations respond negatively to loss of nesting habitat (Reynolds 1989). Nesting habitat has been modified in Southcentral Alaska through timber harvest practices and as a result of spruce bark beetle infestations. Rehabilitation of previously harvested timber stands and forested stands infested by spruce bark beetles will be a major challenge to the Forest Service. Opportunities exist to manage these landscapes to benefit northern goshawks and other species associated with mature and old-growth forests. Population trends of the northern goshawk may indicate progress of the Forest Service in this endeavor. Northern goshawks are recommended as a MIS.

Brown bear populations on the Kenai Peninsula and large islands in Prince William Sound have potential viability concerns (Suring and Murphy *in prep.*) as a result of population reductions and loss of habitat (Suring *et al.* in press). Brown bears are sensitive Forest Service management actions, primarily related to access management. Brown bears are recommended as a MIS.

Viable, Well-distributed Populations of Wildlife

The Revision effort provides an appropriate framework for establishing and applying methodology to assess the viability and distribution of wildlife on the Forest. Suring and Murphy (*in prep.*) developed and implemented a process to evaluate the risk to viability to wildlife species occurring on the Chugach National Forest.

Selection of species for review

Distributions of mammals (Hall 1981), birds (American Ornithologists' Union 1957, 1983), and amphibians (Hodge 1976) were reviewed to determine species and endemic subspecies that occur on the Chugach National Forest in Southcentral Alaska. Each species presence on the Forest was verified, when possible, with specimens collected on, or near, the Forest (University of Alaska Museum; University of Alaska Fairbanks). Species that occur here only accidentally or casually (i.e., primarily birds) (Isleib and Kessel 1973, Armstrong 1990) were not considered in this analysis. Species taxonomy and naming conventions follow those of Banks et al. (1987).

Evaluation criteria

Numerous rating systems have been developed to evaluate the concern for and direct management attention to wildlife species (e.g., Sparrowe and Wight 1975; Niemi 1982; Thompson 1984). Several of these were summarized and discussed by Millsap *et al*. (1990). We were specifically interested in an analysis of the vulnerability to extinction or extirpation of populations of wildlife in Southcentral Alaska. A process necessary to achieve this required information on: (1) the physical and biotic environment of the individual and the population, (2) the species' life history and habitat requirements, and (3) the structure of the population (Gilpin and Soule 1986). We modified the approach developed by Millsap *et al*. (1990) for setting wildlife conservation priorities to address the situation in Southcentral Alaska and our specific objectives.

Twelve criteria were developed to describe aspects of vulnerability for wildlife species in Southcentral Alaska (Figure IV-12). A numerical level of concern, ranging from 0 (no concern) to 3 (high concern) was associated with each criterion for each species. This was based on information available on the species in the published literature. A concern level of 2 was assigned in those situations when available information was not adequate to establish a rating.

1. Seasonal occurrence in Southcentral Alaska. This criterion primarily functioned as a screen to determine the residence status of a species in Southcentral Alaska. Management practices in Southcentral Alaska may have a limited effect on species that migrate through this area. Potential effects of land management practices will be much greater on those species that breed in Southcentral Alaska or are year-round residents. Species status was determined from published accounts of species distribution and natural history (e.g., Isleib and Kessel 1973)

2. Geographic distribution within Southcentral Alaska. Species that are present in only a few locations in Southcentral Alaska have a high risk of extirpation. Interchange of individuals between subpopulations is limited and subpopulations are more vulnerable to local events (e.g., disease, storms) that may cause extinction. The USDA Forest Service has developed a National hierarchical framework of ecological units (McNab and Avers 1994) that has been further developed for the Chugach National Forest (Davidson 1997). Under this framework, 13 ecological subsections occur on the Forest. Distribution of wildlife species by subsection was used as a basis for evaluation of this criterion. Local and regional accounts of species distributions (e.g., Isleib and Kessel 1973, Manville and Young 1965) and general habitat associations by subsection were used to assign species to ecological subsections.

3. Geographic distribution outside of Southcentral Alaska. Species (or subspecies) which occur only in Southcentral Alaska, or have limited distribution outside of Southcentral Alaska warranted a high level of concern. A species (or subspecies) that is mostly restricted to Chugach National Forest with a distribution outside of this area limited to an area 50-100% as large as Chugach National Forest would have a moderate level of concern. This is because the risk of extinction associated with activities in the Chugach National Forest is moderated by the limited populations adjacent to the Chugach National Forest. A species whose range includes the Chugach National Forest and adjacent areas up to double the size of the Chugach National Forest would have a low level of concern. A species with a

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describe a level of concern in terms of a species' population size. Estimates of population sizes were taken from inventory and monitoring reports (e.g., Hicks 1996a), quantitative population estimates (e.g., Isleib and Kessel 1973), and qualitative population estimates (e.g., Armstrong 1990).

5. Population trend throughout the species' range. The best indication that viability of a species may be at risk is a persistent downward trend in population size. Declining populations were an indication of concern even if current population size was large. If a species population trend was unknown, trends in the availability and condition of the species' habitat were considered to be indicative of a population trend. Results of National monitoring programs were often used to assign values for this criterion (e.g., Sauer et al. 1996, The Nature Conservancy 1996).

6. Population trend of the species in Southcentral Alaska. Although similar to criterion 5, this criterion provided an evaluation of population trends within Southcentral Alaska which may be different than the species' range-wide trend and which may be related to specific land management activities on the Chugach National Forest. Local or regional monitoring efforts provided information for this criterion (e.g., Hodges et al. 1996).

7. Vulnerability of habitats in Southcentral Alaska to modification as a result of land management activities currently implemented or proposed for implementation. The primary causes of habitat modification in Southcentral Alaska has been urban and rural development, timber harvest, and associated road construction. The primary effects of these activities are the loss and fragmentation of habitat which reduces the availability and heterogeneity of original habitats (Lehmkuhl and Ruggiero 1991). Human developments and timber harvests tend to be concentrated in those areas that also have high habitat values (e.g., low elevation, high volume stands). This criterion evaluated the potential effects of habitat modification on wildlife species. Information upon which values for this criterion were based generally came from accounts of species' habitat use patterns (e.g., Kuletz et al. 1995, Matsuoka et al. 1997).

8. Vulnerability of the species to road construction and increased access. Land management activities in Southcentral Alaska are usually accompanied by road construction. Roads can contribute to increased fragmentation of habitats. However, the most significant impact associated with roads is the potential for increased access for humans which results in increased disturbance and/or mortality for many wildlife species. Improved access to Prince William Sound and increased densities of boats may also increase disturbance and harvest of species in this area. Published assessments of the effects of human disturbance or increased mortality were used to evaluate this criterion (e.g., Brody and Pelton 1989, Henson and Grant 1991).

9. Capability of a species to disperse. Dispersal of individuals from a population may be limited because a species has low vagility or because barriers to dispersal exist. Barriers may be induced through management practices resulting in areas unsuitable as habitat between residual tracts of preferred habitat. Barriers to dispersal may also occur naturally such as water bodies, mountain ranges, or ice fields. Species that are mobile and for which dispersal is not limited by unsuitable habitats generally did not have a concern assigned under this criterion (e.g., Divoky and Horton 1995). Species for which dispersal is limited by behavioral patterns, capability, or unsuitable habitat were assigned a high level of concern (e.g., West 1982).

10-11. Demographic characteristics of the species. Life history factors, such as low reproductive rates, that result in slow rates of increase in a species' numbers have a significant influence on a species' ability to recover from population declines. A species with a slow rate of increase carries a high risk because it may not be able to rebound from natural– or management–induced population reductions. Two characteristics that significantly affect rate of increase were evaluated: (1) average number of eggs or live young produced per breeding female per year, and (2) minimum age of first reproduction in females (Henny *et al.* 1970).

12. Knowledge about the species in Southcentral Alaska. When knowledge of a species' distribution, life history, demographics, and habitat requirements is limited, the risks to that species associated with management actions are increased.

The level of concern scores for each criterion for each species were summed to provide an overall evaluation value for each species. The highest total score possible for species evaluated using these criteria was 36. The individual species sums were divided by 36 to obtain a percentage of total possible points. The species were ranked in descending order based on this percentage. Species that were assigned a total score greater than 60% of the maximum score were considered to have a high concern for continued viability (after King and Sanger 1979). This standard was verified by comparing it to the mean score of species designated as Threatened or Endangered under the Endangered Species Act, Sensitive by the USDA Forest Service (USDA Forest Service 1994), or as Species of Concern by the US Fish and Wildlife Service (US Fish and Wildlife Service 1996) or by the Alaska Department of Fish and Game (Alaska Department of Fish and Game 1996).

Species on the Chugach National Forest

The Chugach National Forest in Southcentral Alaska provides habitat for 189 bird species, 78 mammal species and endemic subspecies, and two species of amphibians. This represents 15 orders and 37 families of birds. The range of one subspecies (i.e., Kenai song sparrow) is restricted primarily to the Chugach National Forest. Six orders and 13 families of mammals occur on the Forest. The ranges of seven subspecies of mammals are restricted to the Kenai Peninsula (one of these seven is extinct—gray wolf); one subspecies occurs primarily on the Kenai Peninsula but its range extends to Palmer, Alaska. Three subspecies of small mammals are restricted to the islands and mainland of Prince William Sound.

Ranking of Species

Nine species or subspecies occurring on the Chugach National Forest received ratings exceeding 60% of the total possible score for the evaluation criteria. These species generally had restricted distribution, experienced a documented population decline or had a high likelihood for a population decline, and were sensitive to land management activities. Five of these were subspecies endemic to the Chugach National Forest with limited distribution.

Figure IV-16: Wildlife species identified as having potential concerns for viability or distribution on the Chugach National Forest

Species	Scientific Name	Evaluation Score
Montague Island hoary marmot	*Marmota caligata sheldoni*	75
Dusky Canada goose	*Branta canadensis occidentalis*	69
Wolverine	*Gulo gulo katschemakensis*	67
Brown bear	*Ursus arctos*	64
Steller sea lion	*Eumetopias jubatus*	64
Black oystercatcher	*Haematopus bachmani*	64
Gray wolf	*Canis lupus pambasileus*	61
Northern red-backed vole	*Clethrionomys rutilus insularis*	61
Montague Island tundra vole	*Microtus oeconomus elymocetes*	61

Recommendations

Completion of conservation assessments is recommended for the top four species recognized as having viability or distribution concerns (i.e., Montague Island hoary marmot, Dusky Canada goose, Kenai Peninsula wolverine, and brown bear) (Fig.IV-16). Initial emphasis is recommended to be placed on Dusky Canada goose and brown bear on the Kenai Peninsula to respond to immediate management issues that require attention in revision of the Chugach National Forest Land and Resource Management Plan (e.g., see Suring et al. *In press* and Pacific Flyway Council 1997). Recovery of threatened Steller sea lion populations is being managed by the National Marine Fisheries Service; additional efforts by the Chugach National Forest for assessment and conservation planning are not required. The remaining four species on the list may have viability or distribution concerns and should be monitored closely to evaluate their populations' status. This information will help to determine if additional efforts are needed to maintain their viability on the Chugach National Forest.

Wildlife Habitat Management

A demand analysis for wildlife resources, conducted within the context of Forest Plan Revision, will provide a clear picture of the public's expectations of the Forest. Such an analysis will also provide the basis for a review of how well the current wildlife program on the Forest is addressing those expectations and how Revision may be used to implement any changes needed in the program.

The Forest Plan standards and guidelines is an appropriate place to establish the habitat management objectives called for in the NFMA regulations. The current Forest Plan only contains specific objectives for moose habitat improvement on the Kenai Peninsula. Additional objectives are needed which reflect a more comprehensive wildlife habitat management program on the Chugach National Forest to be in compliance with the NFMA regulations. This will be accomplished through the Revision process.

Conclusions

The issues identified associated with management of threatened, endangered, and sensitive species are easily resolvable during revision of the Chugach Land management Plan by developing processes to list and delist sensitive species and by providing management direction for the conservation and recovery of identified species.

Maintenance of viable, well-distributed populations of wildlife on the Chugach National Forest will be an issue during the revision process. The Forest Service can demonstrate that viability will be maintained with adequate analysis and documentation.

A comprehensive wildlife habitat management program will need to be developed during the revision process that is responsive to the public's desires and has measurable objectives.

C. Use and Occupancy of the Forest

1. Wild and Scenic Rivers

Current Management Situation

The Wild and Scenic Rivers Act establishes that it is national policy to "preserve... selected rivers or sections thereof in their free-flowing condition to protect water quality of such rivers and to fulfill other vital national conservation purposes." The Act also states that these rivers "shall be preserved in a free flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations".