U.S. Department of the Interior
Bureau of Land Management

Alaska State Office
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BLM-Alaska Habitat Management Plan
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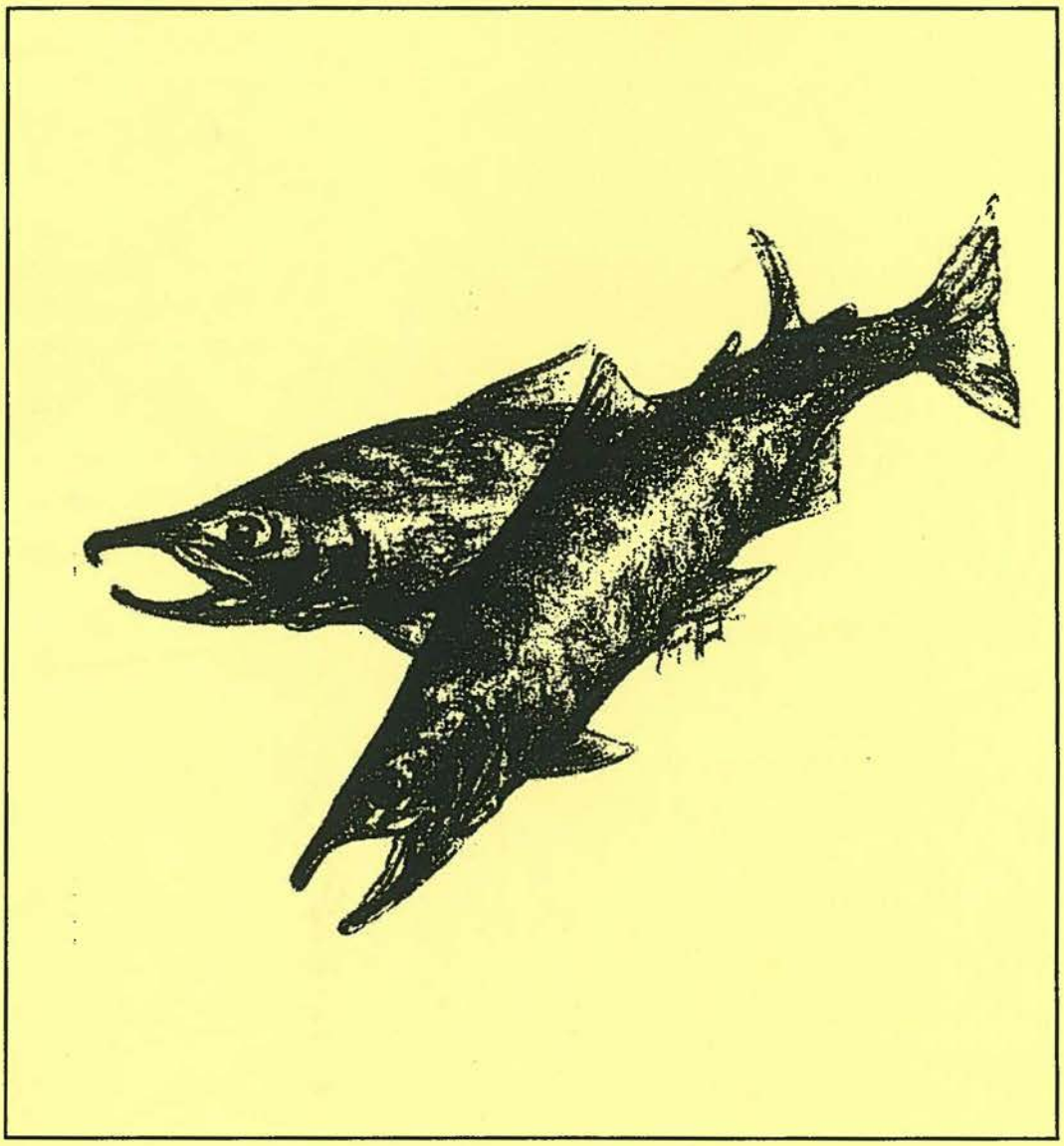
Hogatza ACEC Aquatic Habitat Management Plan



Hogatza ACEC Aquatic Habitat Management Plan

U.S. Department of the Interior
Bureau of Land Management
Kobuk District, Alaska

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Abstract

The Central Yukon Resource Management Plan (CYP) and Record of Decision (Prescription 9) designated 41% of the land within the combined watersheds of Clear, Caribou, and Bear Creek, tributaries of the Hogatza River, as an Area of Critical Environmental Concern (ACEC). The primary purpose of this special designation was to identify sensitive and valuable aquatic resources that require special management. The ACEC contains important chum salmon *(Oncorhynchus keta)* production habitats that could be impacted by land-use activities. This aquatic Habitat Management Plan (HMP) describes actions to establish baseline data, sets objectives, and establishes management guidelines for the maintenance and protection of chum salmon production habitat.

CONCURRENCE AND APPROVAL

This Habitat Management Plan, as written, meets with our concurrence and approval.

Helen M. Hankins June 9, 1994
Helen M. Hankins Date
Kobuk District Manager
Bureau of Land Management

Tom Kron 6/28/94
Tom Kron Date
Regional Supervisor
Commercial Fisheries Division
Alaska Department of Fish and Game

June 22, 1994
Alvin G. Ott Date
Regional Supervisor
Habitat Division
Alaska Department of Fish and Game

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

CHECKLIST FOR PREPARATION AND REVIEW OF HABITAT MANAGEMENT PLANS

State: Alaska
District: Kobuk
Resource Area:
HMP Name and Number: Hogatza ACEC BLM/AK/94/014/+6700+070
HMP Prepared by: Kretsinger et, al

REVIEW CHECKLIST	SURNAME	DATE
1. Master Memorandum of Understanding, Sikes Act Agreement and/or Supplemental with State Agency.	C. Kretsinger	8/3/83
2. Preliminary meeting(s) with State Agency (or other appropriate cooperators) to jointly discuss HMP objectives.	See Consultation: Review page 20	
3. Endangered Species Act Compliance completed by	AE Morkeit	8/2/94
4. Review by District/Resource Area Specialists		
Range	N/A	
Wild Horse and Burro	N/A	
~~Hydrologist~~ Watershed	[illegible]	8/2/94
Forestry	L. Field	8/2/94
Fisheries/Botanist/Wildlife Biologist	C. Kretsinger/AE Morkeit	8/2/94
Lands		
Minerals	[illegible]	8/2/94
Recreation	L. Field	8/2/94
Wilderness/ACEC	L. Field	8/2/94
Cultural	H. Smith	8/2/94
Visual	N/A	
Environmental Coordinator (reviews EAs)	[illegible]	8/02/94
Support(Chief of Operations/Fire Management)	[illegible]	8/2/94
Others Subsistence	AE Morkeit	8/2/94
5. Reviewed by ~~Area~~ Manager	N/A	
6. Reviewed by Chief of Resource Management	[illegible]	8/2/94
7. Draft HMP and EA reviewed by State Agency authorized officer (or other cooperators).	See Consultation & Review page 20	
8. Final review (if appropriate) by State Director	N/A	
9. Reviewed and approved by District Manager	Helen Hankins	6/9/94
10. Approved by State Agency authorized officer	See Concurrence & Approval page v	

Remarks:

Form 6780-1
(July 1981)
(formerly 6620-1)

INTRODUCTION

Background

One million eight hundred thousand acres of land within the Yukon River Basin were designated as an ACEC, for fishery values by the CYP (Appendix A). One unit within this group is the Hogatza ACEC, which is comprised of a portion of the Clear, Caribou, and Bear Creek watersheds (BLM 1986a; Figure 2). Together these watersheds constitute some of the most productive chum salmon production habitat within the Koyukuk River drainage, a major tributary to the Yukon River.

There are over 65 stocks of chum salmon in the Yukon River Basin and international attention is being focused on perpetuating the ability of the stocks and habitats within the basin to sustain production. The Yukon River Salmon Treaty, currently under negotiation between the United States (U.S.) and Canada, will be a major change agent affecting management in the Yukon Basin. Other impacting factors include economic and nutritional demands of a growing population of consumers, environmental, and political interest in both protecting and augmenting natural, wild salmon runs. The BLM will be directly involved as a major land manager in the basin. As a component of the Yukon Basin, the Hogatza ACEC will require special management attention in order to protect this major chum salmon production area from the potential impacts of placer mining and other surface disturbing activities.

The purpose of this Sikes Act HMP is to identify and approve specific management objectives for the protection of chum salmon production habitats within the Hogatza ACEC. This HMP is being prepared and implemented jointly with the Alaska Department of Fish and Game (ADF&G) under the authority of the Sikes Act, Title II, Public Law 93-452 (October 18,1974) and the Master Memorandum of Understanding between the BLM and ADF&G (AK-950-MU3-11, August 3,1983).

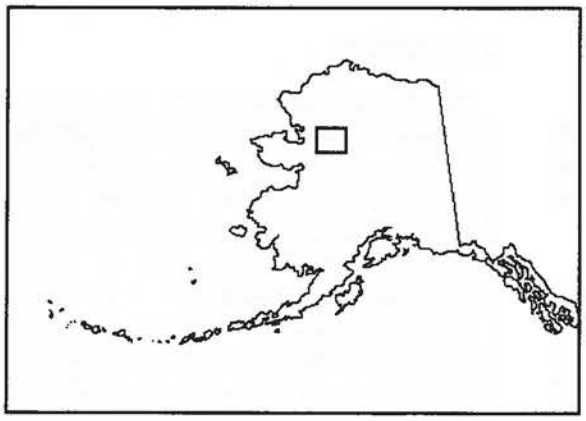

Figure 1. ACEC location.

Goal

The goal of this HMP is to ensure that the aquatic ecosystem within the combined watersheds of Clear, Caribou, and Bear creeks can sustain an estimated annual production of 5 million chum salmon fry, worth $3.8 million (1992 dollars) over a 10-year period (see Cost/Benefit Analysis). Providing for a sustained production of chum salmon requires that habitats used for spawning and rearing (production habitat) are protected and maintained in good to excellent condition. Condition and trend of chum salmon production habitat will also be used as an indicator of the overall health and condition of the aquatic ecosystem within the ACEC. Maintenance of a healthy aquatic ecosystem will provide benefit to other resources, including a significant grayling fishery, moose, bear, and non-game bird populations.

The goal of this plan is directly related to the Yukon River Salmon Treaty being negotiated between the U.S. and Canada. According to this proposed treaty, salmon production in the U.S. must be maintained in order to deliver Canadian origin salmon to the border without significantly disrupting Alaska's commercial and subsistence fisheries. The Department of the Interior and the ADF&G are currently engaged in developing a management strategy for the U.S. side of the Yukon River Basin.

Management Constraints

Approximately 41% (39,895 acres) of the land within the combined watershed of Clear, Caribou, and Bear Creek was included in the ACEC in order to protect salmon production habitat. However, the protection and optimal management of this habitat can be significantly affected by four factors: 1) the entire ACEC, with the exception of private land, is currently open to mineral location under the General Mining Laws (Appendix B); 2) approximately 1,440 acres along Clear, Aloha (tributary to Clear Creek), and Bear Creek are covered by active unpatented federal mining claims; 3) 2,617 acres along Clear, Aloha, and Bear Creek, within the ACEC, are privately owned; and 4) 92% of the combined Clear, Caribou, Bear Creek watershed has been state and Native selected.

Management Potential

The CYP proposed land withdrawals along Clear, Caribou, and Bear Creek where salmon spawning and rearing has been documented (Figure 3). Under the proposed land withdrawals, new mineral entry and location under the 1872 Mining Law would not be allowed nor would withdrawn lands be open to Federal Land Policy and Management Act (FLPMA) leases and sales. The withdrawals would include the stream bed and 300 feet on both sides of the stream's mean high water line in: Clear Creek T10N, R15 and 16E; Caribou Creek and Bear Creek T9N, R15 and 16E Kateel River Meridian. The withdrawal would not apply to valid and existing rights. Currently, no mining claims exist on the 16 miles of Caribou Creek or 5 miles of Bear Creek proposed for withdrawal and no mining claims are recorded for approximately 13 of the 15.5 miles of Clear Creek proposed for withdrawal. Additional conflicts could be avoided by amending the land withdrawals through amendment of the CYP to include any newly-documented chum salmon spawning habitat identified through future inventory efforts.

Eight issues were identified as having the potential to influence management of or cause harm to chum salmon production habitat within the ACEC. The issues are: access, leases and permits, fire suppression, forestry, mineral development, subsistence, navigability, and the Yukon River Salmon Treaty. For the purposes of this plan, chum salmon production habitat is defined as the physical and chemical properties required by salmon during their life cycle from egg deposition to the out migration of the fry. This takes into consideration, but is not limited to, water quality, stream discharge, substrate composition, stream-channel geometry, and the watershed plant community including riparian vegetation. These factors all play a role in determining the suitability of the aquatic environment to chum salmon.

Objectives

The following objectives were designed to guide the management of lands within the ACEC, as well as fulfill the goal and intent of the Central Yukon Plan ACEC designation.

1. Maintain the capability of aquatic habitat within the ACEC to sustain the annual production potential of 5 million chum salmon fry.
2. Maintain the existing quantity and quality of salmon spawning habitat to support a minimum annual escapement of 8,000 chum salmon spawners in Clear Creek and 9,000 chum salmon spawners in Caribou Creek (these numbers are interim escapement objectives established by the Alaska Department of Fish and Game and were established and are monitored using aerial survey technology.
3. Maintain or restore the natural substrate composition, stream type and geometry (as defined by Rosgen 1993), on all streams within the ACEC.
4. Maintain the minimum stream discharge necessary for the maintenance of aquatic life, natural stream channel configuration, and habitat composition of all streams within the ACEC.
5. Maintain, restore, or improve the existing stream bank stability, riparian cover, woody debris and other instream cover on all streams within the ACEC.
6. Maintain the water quality within the ACEC to standards established by the Alaska Department of Environmental Conservation (18 AAC 70) for fresh water use classes (1)(A), (1)(B), and (1)(C).

Planned actions to accomplish these objectives are described later in the document. Values for objectives 3 through 5 will be determined following an aquatic inventory of the ACEC. At that time, objectives within this plan will be amended to include these values.

ECOSYSTEM DESCRIPTION

The Hogatza ACEC is located in the southwest corner of the Hughes subdistrict of the Central Yukon Planning Area approximately 35 miles west of the village of Hughes. The ACEC consists of a portion of the combined watersheds of Clear, Caribou and Bear Creek, which originate in the Zane Hills and flow eastward to their confluence with the Hogatza River. The following ecosystem description is derived from the Final Environmental Impact Statement for the Central Yukon Planning Area (BLM 1986b) unless stated otherwise.

Vegetation

Elevations range from 250 feet on the eastern border along the Hogatza River to 1,000 feet along the northern and western boundaries of the ACEC. The Zane Hills, from which Clear, Caribou and Bear Creek originate, have elevations exceeding 4,000 feet. Well-drained, hilly, or southerly-exposed sites are forested with a mixture of white spruce (*Picea glauca*) and deciduous species such as paper birch (*Betula papyrifera*). Lowlands, poorly-drained sites and gentle slopes are dominated by open black spruce (*P. mariana*) forest. On the depositing slopes of smaller meandering streams,

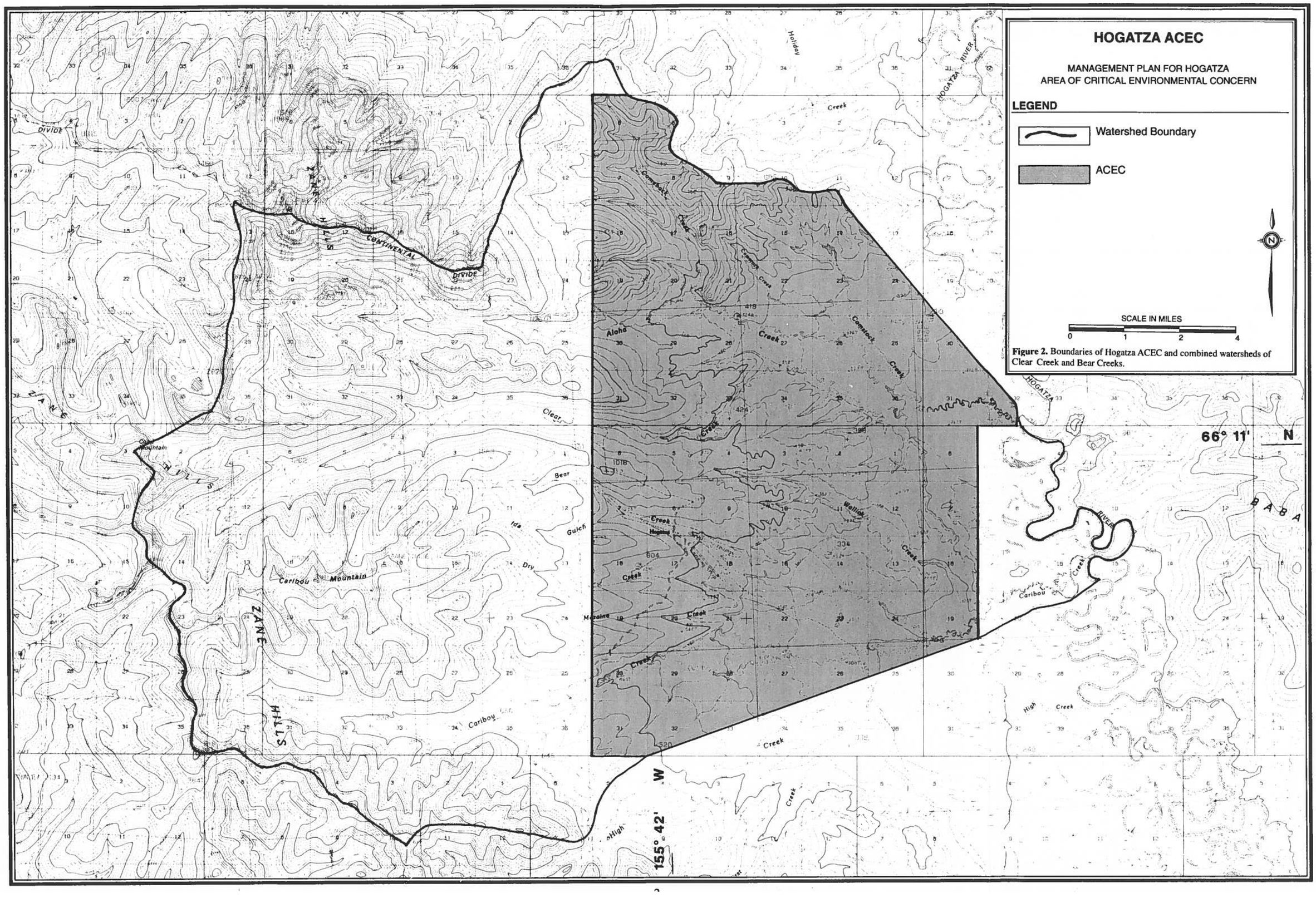

Figure 2. Boundaries of Hogatza ACEC and combined watersheds of Clear Creek and Bear Creeks.

the forest is largely white spruce, quaking aspen (*Populus tremuloides*), willows (*Salix* spp.), and balsam poplar (*P. balsamifera*). Treeline is about 1,000 feet on north-facing slopes and 1,500 feet on south-facing slopes. Elevations greater than 2,000 feet are generally tundra.

Climate

Climatological records are not available for the area covered by the ACEC, however, records are available for the nearby village of Hughes. For the period 1941-1970, temperature extremes ranged between -68° and 90°F. Average monthly summer (June-September) temperatures ranged from 42.3° to 60.1°F and average monthly winter (November-April) temperatures ranged from -9.8° to 22.7°F (Leslie 1986). The ACEC falls within an area having a mean annual precipitation of 20 inches (Lamke 1979).

Geology

The Hogatza ACEC is located in the Hughes District of the CYP, a district drained by the Koyukuk River and its tributaries below the Kanuti River. The mountains are underlain mainly by Late Jurassic and Early Cretaceous marine and nonmarine clastic and volcanic rocks. The unit is further described by Patton and Miller (1966) as consisting chiefly of andesitic crystal-bearing lithic tuff, tuff breccia, and agglomerate intercalated with porphyritic pyroxzene andesite and trachyandesite flows. Some basalt flows are also present. Subordinates include volcanic graywacke, mudstone, and fossiliferous limestone; the unit is thermally altered near granitic plutons and a narrow zone of hornblende hornfels next to the contact grades outward into a broad band of incipiently re-crystallized rock which contains abundant chlorite, epidote, calcite, and sodic plagioclase and probably belongs to the albite-epidote hornfels facies. Some fresh-appearing tuff and tuff breccia near Hog Landing may be as young as Late Cretaceous or Tertiary. Zones of thermal metamorphoses occur throughout the area (Patton and Miller 1966).

The surficial deposits in the area are characterized by undifferentiated older glacial drift and alluvium. This includes discontinuous areas of highly modified glacial till and outwash, broad alluvial terraces mantled chiefly with silt, and hillslopes covered by colluvium and loess. Glacial erratics have been found in the adjacent Hogatza Hills to an altitude of 1,600 feet.

A lode occurrence for uranium exists in the Zane Hills from which Clear, Caribou, and Bear Creeks drain and placer deposits of gold exist (Cobb 1973; J. Deininger, BLM, pers. comm).

Soils

The dominant soil is Histic Pergelic Cryaquepts, loamy, nearly level to rolling association. This soil is developed in loess or silty colluvium and is generally poorly drained and underlain by a shallow permafrost table and has severe limitations for any intensive use or development.

Cultural

The ACEC is within an area utilized historically and ethnographically by Koyukon Athapaskan people, as well as, both Kovagmiut Eskimo people from the upper Kobuk and Nunamiut people from the Anaktuvuk Pass region. Caribou, fish and volcanic material for tools were the primary attractions of the country to these various groups. Archeological sites, including villages, hunting and fishing sites, and quarry sites indicate prehistoric use of the country. In addition, the country provides a network of routes via rivers and low passes which allowed for the establishment of an important trading network for the exchange of coastal and interior resources and later trade goods.

Wildlife

The ACEC falls within the general range of many species of wildlife. Some of the more common mammals include: moose (*Alces alces*), grizzly bear (*Ursus arctos*), beaver (*Castor canadensis*), otter (*Lutra canadensis*), fox (*Vulpes vulpes*), marten (*Martes americana*), and wolf (*Canis lupus*). Many passerine birds and a few raptor species may be found within the ACEC; some examples of these are: raven (*Corvus corax*), gray jay (*Perisoreus canadensis*), common redpoll (*Carduelis flammea*), white-crowned sparrow (*Zonotrichia leucophrys*), red-tailed hawk (*Buteo jamaicensis*), rough-legged hawk (*Buteo lagopus*), bald eagle (*Haliaeetus leucocephalus*), and osprey (*Pandion haliaetus*).

Fisheries

The ACEC falls within the general range of several species of fish including: arctic grayling (*Thymallus arcticus*), northern pike (*Esox lucius*), longnose sucker (*Catostomus catostomus*), slimy sculpin (*Cottus cognatus*), and whitefish (Coregonid spp.). In addition, Clear and Caribou Creek are major producers of chum salmon *(Oncorhynchus Keta)*.

Chum Salmon Life History

Two distinct runs of chum salmon occur in the Yukon River drainage: a summer run and a fall run. Those fish destined for the Clear, Caribou, and Bear Creek are summer run fish which enter the Yukon River in early June, making it to the spawning grounds by early July. The peak of spawning takes place between mid to late July, and a majority of the spawning is complete by early August (Winters 1983, Barton 1984b).

Chum salmon within the Yukon River drainage return to their natal streams to spawn at ages ranging from three to six years, with four-year-olds predominating (Regnart et al. 1966 in Groot and Margolis 1991). Following spawning, the eggs incubate in the stream gravels for several months. In the more southerly parts of the range, hatching occurs from December to February, with the fry emerging 60 to 90 days later (Morrow 1980). The fry migrate to the ocean during their first year of life. In the Yukon River drainage downstream migration occurs from ice break-up in late spring to fall, with the principal out migration taking place in June and July (Martin et al. 1986 in Groot and Margolis 1991).

Table 1. Combined summer chum salmon aerial escapement counts for Clear and Caribou Creeks (Hogatza River), 1975-1991 (ADF&G 1992a).

Year	Number of Summer Chum Salmon
1975	22,355
1976	20,744
1977	10,734
1978	5,102
1979	14,221
1980	19,786
1981	not available
1982	4,984[a]
1983	28,141
1984	not available
1985	22,566
1986	not available
1987	5,669[a]
1988	6,890
1989	not available
1990	2,177[a]
1991	9,947

[a] Incomplete survey and/or poor survey timing or conditions resulted in minimal or inaccurate count.

Abundance

The ADF&G has used Clear and Caribou Creek as an index to monitor the annual escapement of summer chum salmon into the Hogatza River drainage since 1975. The combined chum salmon aerial escapement counts for Clear and Caribou Creeks have ranged from a high of 28,566 to a low of 2,177 during the period 1975 through 1991 (Table 1). The low count in 1990 was attributed to an incomplete survey or poor survey conditions.

Interim escapement objectives for chum salmon have been set by ADF&G at 8,000 and 9,000 fish for Clear and Caribou Creeks respectively (Barton 1991 and ADF&G 1992a). These escapement objectives represent an average of historic point estimates obtained using aerial survey technology and are considered to be the the minimum number of spawners necessary to maintain the reproductive potential of each stock. The actual number of fish represented by these interim escapement objectives is about 3 x 17,000 fish or 51,000 fish. The basis for the 3.0 expansion factor is that aerial surveys are generally conducted on or near peak spawning and do not represent total escapement or even a consistent portion of total escapement, due to variability in spawning timing and duration. Aerial counts are at best an index of escapement based on a usually unknown proportion of the total spawning population and should be treated as such (Cousens et al. 1982). ADF&G has found that aerial survey counts of fall chum on the Fishing Branch and Sheenjek River must be expanded by a factor of 2.7 and 2.9 respectively in order to approximate total escapement estimates derived using sonar and weir technology (Lou Barton, ADF&G, pers. comm.).

In addition to the chum salmon runs on Clear and Caribou Creek, chum salmon have also been documented in two smaller tributaries within the ACEC. Barton (1984a) counted 179 live and five dead adult chum salmon in the lower three miles of Bear Creek on July 18, 1984 and Gary Bamford (1987), a local trapper, reported " salmon at end of Clear Creek runway and Aloha Creek extremely thick" on July 13, 1981.

Habitat

The upstream extent of chum salmon spawning was reported to be approximately 18 and 20 stream miles up from the mouth of Clear and Caribou Creek respectively (Webb 1987; Figure 3). Barton (1984a) reported that a large beaver dam appeared to act as a barrier to fish passage at three-mile Bear Creek.

Information concerning the current physical and chemical characteristics of chum spawning habitat within the ACEC is limited. Winters (1983) and Barton (1984a) documented turbidity levels for Caribou and Bear Creek (Table 2). These turbidity measurements show the detrimental effect of the Bear Creek mining operations on water quality in Bear and lower Caribou Creek. Mining was active in 1983 and inactive in 1984. In addition, Barton (1984a) found the substrate within Bear Creek and Caribou Creek, downstream of the confluence of Bear Creek, to be very embedded and heavily compacted. Barton attributed the heavy siltation to the mining operation on Bear Creek since no other activities had taken place within this area at the time that accounted for the increased sediment yield.

Other water quality sampling efforts within the ACEC include a detailed contaminant baseline study by the USFWS (1992) and grab samples collected from Bear Creek by U.S. Geological Survey (1978; Appendix C).

Values

Chum salmon produced within the ACEC area contribute to downstream subsistence, commercial and sport fisheries within the Yukon River Basin. The majority of the harvest occurs during the subsistence and commercial fisheries. The 1991 commercial harvest of summer chum salmon, from the mouth of the Yukon to the village of Koyukuk (that portion of the Yukon River downstream of the ACEC), was 327,509 fish. The 1990 subsistence harvest of summer chum salmon for this same area was 86,471 fish (ADF&G 1992a). Summer chum salmon are not a highly sought after sport fish. Mills (1991) reported that the 1990 summer chum salmon sport catch for the entire Yukon River drainage was 2,149 fish.

Table 2. Turbidity values for Caribou and Bear Creek, 1983-1984 (Winters 1983 and Barton 1984a).

Location	Turbidity	(NTU)
	Aug. 1983	July 1984
Caribou Creek (near mouth)	360	n/a
Caribou Creek (above Bear Cr.)	0.75	4.8
Bear Creek (near mouth)	1200	4.6
Bear Creek (above mine)	2.2	0.35

The village of Huslia located approximately 135 river miles downstream from the ACEC is probably one of the primary users of summer chum salmon produced within the ACEC. In 1990, 7,368 summer chum salmon were harvested for subsistence purposes by the residents of Huslia (ADF&G 1992a).

The chum salmon that return annually to spawn in streams within the ACEC are also important to local wildlife. The returning spawners provide prime foraging opportunities for raptors and bears.

LAND STATUS AND ADMINISTRATION

The proposal to designate the combined watersheds of Clear, Caribou, and Bear Creek as an ACEC was published in the Federal Register Notices (Vol. 51, No. 72, April 15, 1986). The proposed designation was approved in the CYP on September 26, 1986. The area within the ACEC was estimated to be 39,895 acres using a digital plannimeter on the land boundary as described in Appendix D. The CYP reported 35,000 acres for this ACEC. The discrepancy between the two acreage estimations for the ACEC is due to the inclusion of the Comstock Creek watershed. The original USGS 1:250,000 scale Hughes Subunit Resource Management Plan Map in the CYP did not show Comstock Creek as a tributary to Clear Creek and, therefore, did not include the Comstock Creek watershed within the ACEC boundary as shown in the CYP. A more recent USGS 1:63,360 scale topographic map, and infrared aerial photos of the area show Comstock Creek as a tributary to Clear Creek. Prescription 9 within the CYP mandates that the combined watersheds of Clear, Caribou, and Bear Creeks be designated as an ACEC. In addition, the Decision Record (BLM 1986:7) stated: "Watershed ACECs have been established for all portions of the watershed lying above the lower limit of the above identified river withdrawals;" therefore, the ACEC boundary, as shown in the CYP, was expanded to include the Comstock Creek watershed.

BLM currently has management authority over approximately 97% (94,395 acres) of the combined watersheds of Clear, Caribou, and Bear Creek. This includes all lands within the combined watershed area with the exception of 2,617 acres of private patented mining claims within the ACEC. Approximately 54,500 acres outside of the ACEC but within the watershed have been selected by Doyon Limited.

During preparation of this HMP, additional State selections have been identified. These selections include approximately 35,052 acres within the ACEC. In the event the state and Native selections are conveyed, approximately 4,843 acres (5%) of the land within the combined watershed would remain with BLM, including a four-mile section of Clear Creek and a two-mile section of Caribou Creek.

The following is a summary of the land status and approximate acreage within the combined watersheds of Clear, Caribou, and Bear Creek (Figure 4):

- Total watershed area ..... 97,012 ac.
- Doyon Limited selected land (outside of ACEC) ..... 54,500 ac.
- ACEC (all land within boundary)..... 42,512 ac.
- Patented land within ACEC ..... 2,617 ac.
- State selected land (within ACEC) .... 35,052 ac.
- Non-selected BLM managed land ..... 4,843 ac.

MANAGEMENT ISSUES

Eight issues were identified as having the potential to influence management of, or cause harm to, chum salmon production areas within the ACEC. The effects of each of the issues are outlined below.

Access

The use of stream beds as roads and the construction of new roads and trails have the potential to adversely impact salmon spawning and rearing habitat in a variety of ways. Examples include: direct physical injury to eggs and alevins, removal of riparian vegetation and other vegetation that stabilizes soils, increased erosion and sediment input into streams, and creation of barriers to fish passage. New road and trail construction would be done primarily in association with mineral development or development of transportation systems. Currently, about four miles of unimproved road, several miles of trails, and an airstrip (located on a federal claim) are located within the ACEC. The Alaska Statehood Omnibus Act (1959) does not list the road or trails as being deeded to the State of Alaska from the federal government: however, the potential for the road and trails to be asserted under R.S. 2477 still exists.

Leases and Permits

This issue was identified primarily in response to the potential impacts associated with the location of long-term field camps or construction of structures associated with shelter and storage. Examples of potential impacts include leakage of hazardous materials such as fuel and stove oil; increased erosion due to the clearing of campsites, cabin sites, or trails; and alterations in water quality due to improper gray water and solid waste disposal. Currently, no permits or leases have been issued for commercial or subsistence activities within the ACEC.

Fire Suppression

The primary impact associated with fire suppression ~~is that of fire line construction~~, which can lead to erosion problems and increased sediment yield. Lands within the ACEC and the watershed area outside of the ACEC boundary have been assigned the Limited Action fire suppression option. Within the ACEC, fires will be contained only to the extent required to prevent an undesirable escape of that fire from the immediate area, with the exception of Critical Protection Areas (Alaska Interagency Fire Management Plan 1993).

Forestry

Removal of trees adjacent to the stream can reduce stream shading, increase stream temperatures, and remove potential sources of instream cover (fallen trees). In addition, road and trail construction conducted in conjunction with logging activities can lead to increased erosion. Currently, commercial or subsistence harvest of trees within the ACEC is not known to occur.

Mineral Development

Some of the impacts associated with mineral development include: direct loss of aquatic habitat brought about by modification or relocation of the stream channel, increased sediment yield, reduced water quality, increased water temperatures, reduced water availability and introduction of hazardous and solid wastes. A general description of mineral exploration and development activities with impacts that would likely happen can be found in BLM (1986b).

As with many surface disturbing activities, one of the most detrimental impacts associated with mining is increased sediment yield. Significant increases in sediment yield can lead to alteration of stream channel morphology, substrate composition, and surface-groundwater interaction. It can also lead to decreased survival of fish in the egg and

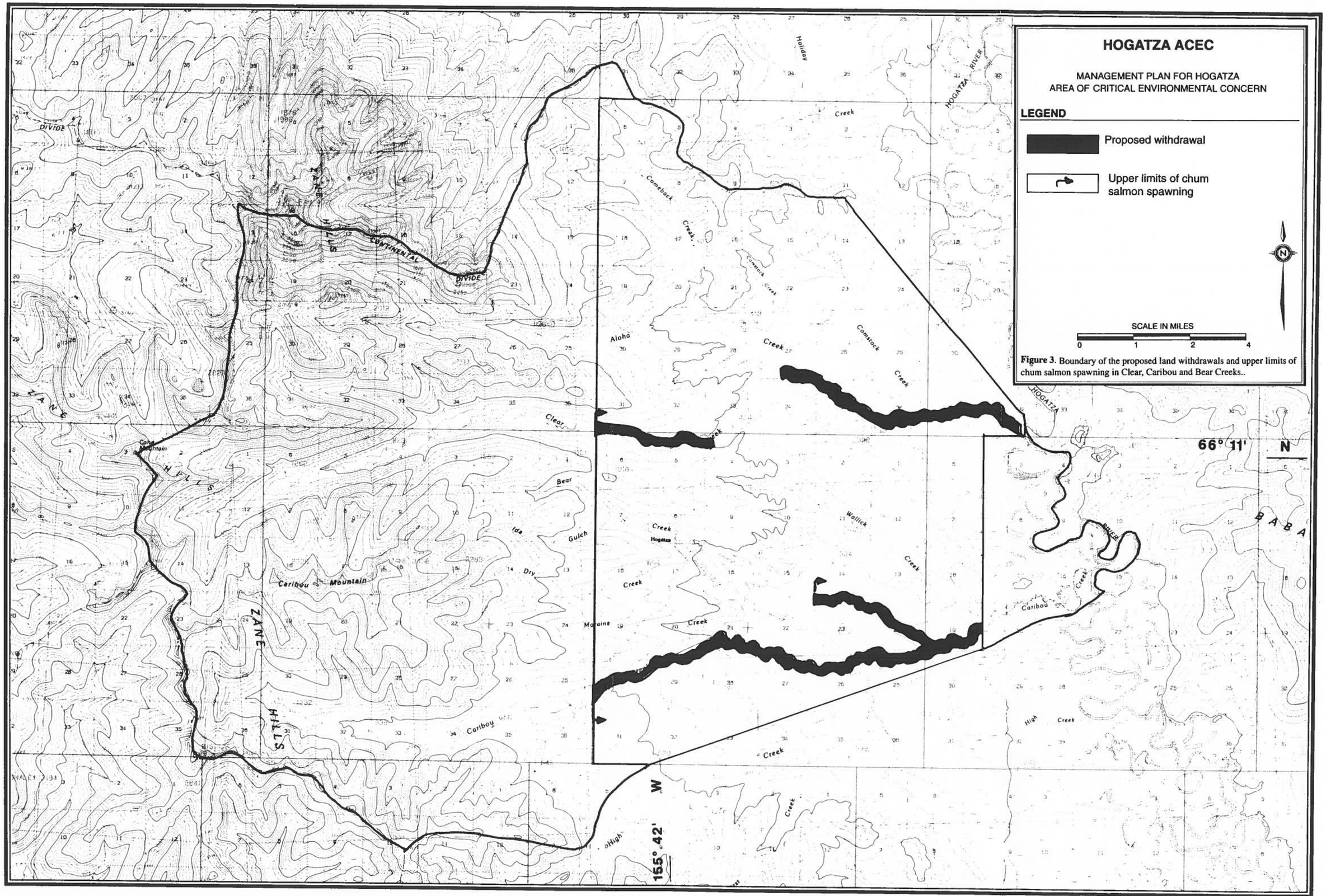

Figure 3. Boundary of the proposed land withdrawals and upper limits of chum salmon spawning in Clear, Caribou and Bear Creeks..

young-of-the-year stages; changes in macro- invertebrate community structure; and decreased primary production (Madison 1981, Van Nieuwenhuyse 1983, Weber and Post 1985, Bjerklie and LaPerriere 1985, Lloyd *et al.* 1987, Reynolds *et al.* 1989, Buhl and Hamilton 1990).

In the late 1960s, prior to the use of settling ponds, sediment-laden water coming from the Bear Creek mine was noticeable at the mouth of the Hogatza River, approximately 34 miles downstream (U.S. Dept. of Interior Fed. Water Poll. Cont. Admin. 1969).

Oil and Gas: No known testing for oil and gas has been conducted nor is proposed within the ACEC or in the watershed area outside of the ACEC (BLM 1986b) and no resource specific recommendations have been considered at this time.

Lode Mining: A lode occurrence for uranium exists in the Zane Hills from which Clear, Caribou, and Bear Creek drain However the potential for lode development in the ACEC is thought to be minimal due to the poor economics of the uranium market. Currently, there are no lode claims within the ACEC or within the combined watershed of Clear, Caribou and Bear Creek.

Placer Mining: The only documented placer mining activity within the ACEC has been conducted by the Alaska Gold Company or its predecessor. This company has been actively prospecting and mining in the Hogatza River area since 1939 when a drilling program was initiated. All operations were stopped during the war years, and in 1954 plans were made to proceed with a dredging operation on Bear Creek. During 1955 and 1956, roads, a camp, and a barge landing were all constructed, and a bucket-line dredge was dismantled and moved from Livengood and reassembled on Bear Creek. The dredge started digging in May of 1957, and continued digging through 1975, a total of 19 seasons. The dredge was reactivated in 1981 and remained active through 1983 when mining was completed for all the mapped reserves (Alaska Gold Co. 1985 and Cobb 1973).

After six years of no activity, the Taiga Mining Company, Inc., of Anchorage re-mined dredge tailings on patented claims along Bear Creek during the 1990-91 seasons. Work continued on Bear Creek during 1992-93 and current plans call for limited drilling and bulk sampling along previously drilled lines on both federal and patented claims on Clear and Aloha Creek during the 1993 season. (BLM casefiles AKFF090602 and AKFF090577)

There are currently 54 federal mining claims within the combined watershed area of Clear, Caribou, and Bear Creek. As of July 1992, 28 of the claims comprising 740 acres were within the ACEC boundary and 26 claims covering 700 acres were outside of the ACEC. In addition, 2,617 acres of land has been patented within the ACEC (BLM 1992; Figure 5).

Subsistence

Chum salmon produced within the ACEC contribute significantly to downstream subsistence harvest. A loss of quality or quantity of chum salmon production habitat due to foreseeable land-use activities occurring within the ACEC would result in diminished production capability and ultimately could restrict subsistence use.

Navigability

Navigability determinations are required to determine whether the state, the federal government, or a third party owns the submerged lands. Waters determined to be navigable are under the management jurisdiction of the State of Alaska. This includes the streambed up to the ordinary high water mark. Under the Alaska Constitution, the state also has authority over water appropriations and water quality regardless of navigability.

The upper 24 miles of the Hogatza River have been formally designated non-navigable. The lower river, from the mouth up to Clear Creek, and possibly up to Kobuk Portage, may be considered navigable although no formal designation has been made. No determinations have been made for Hogatza river tributaries, which include Clear, Caribou, and Bear Creek (Arndorfer 1987), and with the exception of private in-holdings, BLM has management authority for the beds of these streams.

Yukon River Salmon Treaty

One of the factors influencing the management of chum salmon stocks within the Yukon River Basin is the gradual diminishment of production habitat. As more and more habitat is lost due to various land-use activities, it will become increasingly difficult to meet the demands of Alaska's commercial, subsistence, and sport fishing interests and yet fulfill international obligations and escapement goals. It is the goal of this HMP to

ensure that the aquatic ecosystem within the combined watersheds of Clear, Caribou, and Bear Creek can sustain an estimated annual production of 5 million chum salmon fry.

MANAGEMENT GUIDELINES

Proposals for surface-disturbing activities within the Hogatza River ACEC above the level of casual use would require an environmental assessment. Project-specific environmental assessments would analyze proposed actions and impacts to the ACEC in relation to the purpose and objectives of this HMP. When developing mitigation measures for environmental documents, BLM shall consider the management guidelines listed in Appendix E.

PLANNED ACTIONS

The planned actions within this HMP are to: (1) establish a serialized case file for the ACEC and amend the Master Title Plats to show the ACEC boundary, (2) obtain large scale aerial photography of streams within the ACEC, (3) collect channel geometry from representative reaches of Clear, Caribou, Bear, and Aloha Creek (topographic surveys), (4) conduct aquatic habitat inventories on Clear, Caribou, Bear, and Aloha Creek, and (5) conduct annual compliance inspections of mining and other surface disturbing land-use activities occurring within the ACEC to ensure protection of the aquatic resources.

INVENTORY AND MONITORING

The following inventory and monitoring plan was based on four criteria:

1. The management goal and objectives set forth in the Introduction.

2. The designated use of water within the ACEC. The Alaska Administrative Code, 18 AAC 70.050, designates the waters within the ACEC as having the following freshwater use classes: water supply; water recreation; and the growth and propagation of fish, shellfish, and other aquatic life, and wildlife.

3. The potential impacts associated with the issues identified in this plan, particularly those of surface disturbing activities which may physically alter the stream channel or increase sediment yield.

4. The cost of conducting inventory and monitoring within this ACEC. Budgetary considerations included: access, equipment, frequency of sampling, data analysis, and man-power.

Inventory

Initial inventory efforts will focus on four elements:

1. Obtaining aerial photography for use in mapping habitat types and discrete spawning concentrations of chum salmon, as well as, aid with stream channel classification. The existing riparian vegetation cover and condition along streams within the ACEC will also be documented using aerial photography.

2. Collecting channel geometry from representative reaches of all target streams. Data on the physical stream channel features will provide a model for channel design and reclamation standards. In addition, stream channels will be typed according to the Rosgen (1993) stream classification system allowing comparisons between altered and unaltered channels.

3. Obtaining aquatic habitat data on all target streams. Aquatic habitat inventory (level 3, BLM Aquatic Habitat Manual 6720) will allow for the evaluation post-mining reclamation and identify habitat deficiencies within reclaimed channels. Aquatic habitat inventory will also document the quanity and quality of existing habitat and provide a basis for instream flow evaluations.

4. Collection of stream flow data to be used for channel design, as a component of the monitoring program, and to determine instream flow requirements within the ACEC.

The initial target streams are those portions of Caribou, Clear, Bear, and Aloha Creek that lie within the ACEC boundary. Other streams within the ACEC may be included at a later date.

Inventory Methods

Large scale aerial photography (1:6,000) will be taken of all target streams within the ACEC according to procedures outlined by the BLM Branch of Mapping Science.

A topographic survey using an automatic level shooting stadia will be used to collect information concerning stream geomorphology. Features surveyed will be those as defined by Rosgen (1993) and will include bank-full width, flood-prone width, water edge, and upper and lower limits of

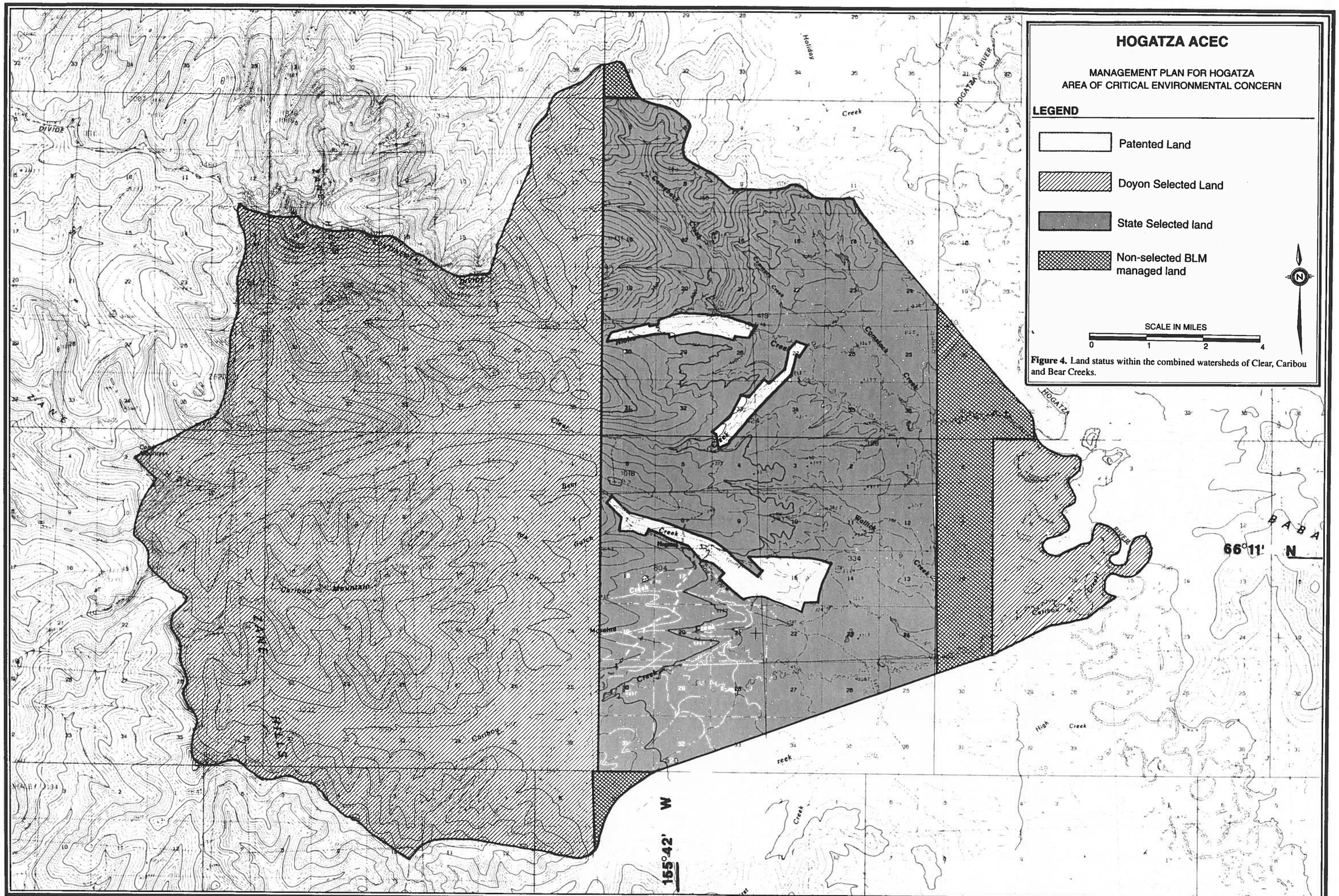

Figure 4. Land status within the combined watersheds of Clear, Caribou and Bear Creeks.

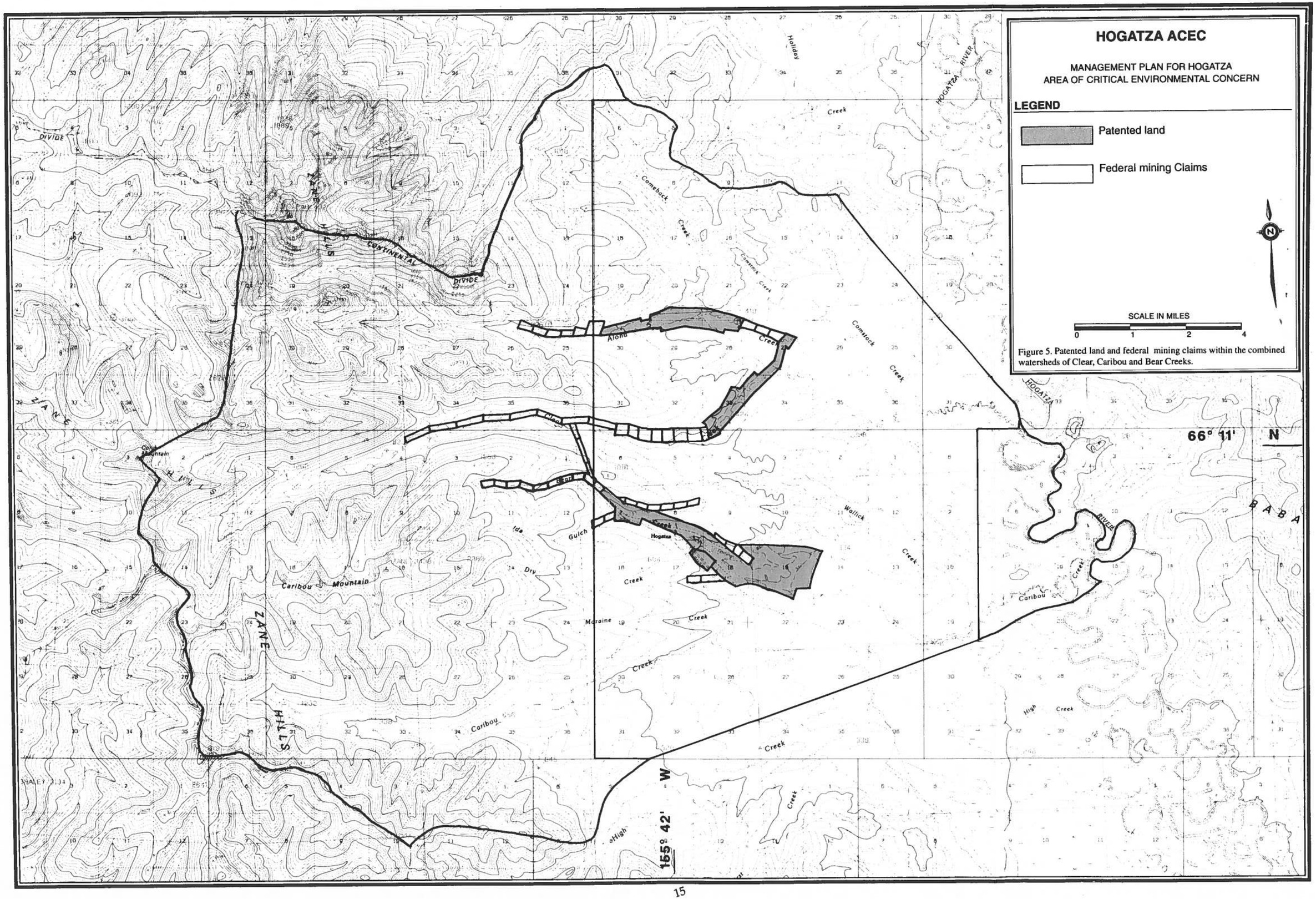

Figure 5. Patented land and federal mining claims within the combined watersheds of Clear, Caribou and Bear Creeks.

pools. These surveys will be plotted as plan views, cross sections, and longitudinal views. Information as to the streams entrenchment, width:depth ratio, sinuosity, gradient, meander geometry, riffle/pool sequence, bank erosion potential, and stream type will be obtained from survey data. In addition, a pebble count based on the procedure described by Wolman (1954) will be used to determine bed material particle size distribution.

Aquatic habitat will be inventoried according to procedures described by Bisson *et al.* (1982). Bisson's method of classifying habitat types has become a standard within the Bureau and is commonly referred to as the Basin Wide Method. Using the Basin Wide approach, the stream is stratified habitat type which are then quantified by length, width, depth, substrate type, and cover type. Stream discharge will be recorded during the habitat inventory and will provide a reference stage.

Stream flow data will be measured using conventional direct flow measurement techniques at various stage heights. In addition, a stage recorder will be used to provide a continuous measurement of water surface elevation on Clear Creek. The stage recorder will be operated from approximately May through October each year, for a period of five years. Crest gauges may be installed to assist in determining peak flows. It is assumed peak flows will have to be measured by indirect methods due to limited access.

Monitoring

The land-use activities occurring within the ACEC will dictate the frequency and level of monitoring. Three levels of monitoring are described below:

1. Base Level. This monitoring level will be initiated in the event that only casual use activities or activities not considered to be a threat to aquatic resources are occurring within the ACEC. Monitoring under this level will consist of repeating aquatic habitat surveys every ten years on all target streams.

2. Mid-Level. This monitoring level will be initiated in the event that land-use activities are occurring within the ACEC that have the potential to adversely impact aquatic resources. Monitoring at this level will consist of collecting stream discharge, turbidity, and suspended sediment data using a paired watershed approach. Activities under this level of monitoring are to be conducted on an annual basis during periods of active placer mining within the ACEC.

3. Evaluation Level. Monitoring at this level will involve evaluation of reclamation work on federal mining claims and other surface disturbing activities under permit. Topographic and aquatic habitat survey methods, as well as visual inspections will be used to determine if bonding requirements have been met. This level of monitoring will be continued on an annual basis until bonding requirements have been met.

Monitoring Methods

Base level and evaluation level monitoring methods will be the same as those described under Inventory Methods. Under the Mid-Level monitoring scenario, stream discharge data will be collected using a stream flow recorder. Turbidity and suspended sediment samples will be collected using ISCO water samplers and analyzed using standard procedures as outlined by the EPA (1983).

Data Storage and Availability

Inventory and monitoring data collected in conjunction with this HMP will be stored on a data base in the BLM Kobuk District Office. The data will be available in either electronic or hard copy format.

Progress Report

Implementation of the HMP will be tracked on an annual basis using the form in Appendix F.

COORDINATION AND COOPERATION

The implementation of this HMP shall be in cooperation with ADF&G. The role and responsibilities of ADF&G are as follows:

1. The Commercial Fisheries Division is responsible for monitoring the annual escapement of chum salmon into streams within the Hogatza ACEC;
2. the Habitat Division is responsible for the issue and compliance of Title 16 permits; and
3. the BLM shall be responsible for implementation of the management guidelines and inventory and monitoring activities set forth in this HMP. Meetings between BLM and ADF&G shall be held as necessary to discuss concerns and exchange data. The HMP shall be amended as necessary to include any fu-

Table 3. Estimated five year cost and implementation schedule for the Hogatza ACEC Aquatic Habitat Management Plan.

Cost Item	Estimated work months (WM) and operations dollars ($000)									
	year 1		year 2		year 3		year 4		year 5	
	# WM	$000	# WM	$000	# WM	$000	# WM	$000	# WM	$000
Administration and preparation (incl. updating, revision and reports)	4.0	-	6.0	-	3.0	-	1.0	-	1.0	-
Large scale aerial photography of Clear, Caribou, Bear and Aloha Creek	-	-	1.0	7.5	-	-	-	-	-	-
Topography survey and channel typing on Clear, Caribou, Bear, and Aloha Creek (incl. mid-level monitoring)	-	-	1.0	16.5	-	-	-	-	-	-
Collection of stream flow data on Clear, Caribou, Bear and Aloha Creek	-	-	-	-	-	-	1.0	22.0	1.0	15.0
Aquatic habitat inventory on Clear, Caribou and Aloha Creek	-	-	-	-	1.0	20.5	1.0	15.0	1.0	15.0
Maintenance	-	-	-	-	-	-	-	-	-	-
Research	-	-	-	-	-	-	-	-	-	-
Equipment	-	-	-	-	-	7.5	-	1.0	-	1.0
Total BLM costs	4.0	0*	8.0	24.0	4.0	27.5	3.0	38.0*	3.0	31.0*
Estimated ADF&G Commercial Fish Division cost for escapement survey and reporting	0.5	2.0	0.5	2.0	0.5	2.0	0.5	2.0	0.5	2.0
ADF&G Habitat Division cost of issue and compliance of Title 16 permits (expenditures not necessarily on an annual basis-dependant on development activity)	0.25	0.5	0.25	0.5	0.25	0.5	0.25	0.5	0.25	0.5

*Detail of BLM Operations Dollars:

Year 2 - four days helicopter time ($8,000); fuel delivery and fixed-wing support ($7,500), round trip personnel and gear transport Fairbanks to Galena ($500); flight time, pilot per diem, fuel, film costs for aerial photo. ($7,500), miscellaneous equipment and per diem ($500).

Year 3 - three days helicopter time ($6,000); purchase of two 12 ft. pack canoes ($1,500); per diem and miscellaneous equipment ($1,000); fuel delivery and fixed-wing support ($7,500), round trip personnel and gear transport Fairbanks to Galena ($500); two work months for seasonal ($5,000); purchase of stream stage recorder and assoc. hardware (6,000).

Year 4 - four days helicopter time ($8,000); six days fixed-wing time (winter access for instream flow work- $7,500); fuel delivery and fixed-wing support ($8,000); round trip personnel and gear transport Fairbanks to Galena ($500); two work months for seasonal ($5,000); costs associated with administrative site ($7,000); per diem and miscellaneous equipment ($2,000).

Year 5 - four days helicopter time ($8,000); six days fixed-wing time (winter access for instream flow work- $7,500); fuel delivery and fixed-wing support ($8,000); round trip personnel and gear transport Fairbanks to Galena ($500); two work months for seasonal ($5,000); per diem and miscellaneous equipment ($2,000).

The cost estimate for the HMP and associated project work was carried out for five years. The year in which a particular project is iniated may vary due to budgetary limitations.

ture projects requiring cooperative funding or use of personnel.

IMPLEMENTATION COSTS

The cost estimate (Table 3) was based on the following assumptions:

1. The use of a helicopter for access at an estimated $2,000 per day.
2. Implementation of Mid-Level monitoring on Bear Creek due to the Taiga Mining Company operation proposed for 1993-1994.
3. Workmonths cost of $4,500.

COST/BENEFIT ANALYSIS

The commercial value of summer chum salmon produced within the ACEC over a 10-year period was estimated to be $3.8 million. The estimated implementation cost for the HMP over a similar period is $395,000, or 10% of the resource value. For the purpose of generating a monetary value of the resource this estimate assumes that the entire harvestable surplus would be available for commercial harvest and does not consider a subsistance harvest. It is important that the reader understand that if social, cultural, and environmental values of these fish are considered, that the overall value of the resource would be much greater than the $3.8 million estimate.

The following outlines the procedure used to calculate the commercial value of summer chum salmon produced within the ACEC. Applying an expansion factor of 3.0 to the combined interim escapement objective established for Clear and Caribou Creek, we have 51,000 fish (3.0 expansion factor x 17,000 fish) as a basis for our analysis (see Ecosystem Description Fisheries Abundance for explanation of the 3.0 expansion factor). Assuming half of these fish are females and that each female produces 2,500 eggs (Trasky 1974, Regnart et al. 1966 in Groot and Margolis 1991), we have the potential for producing 63.8 million eggs (51,000 fish x 1 female/2 fish x 2,500 eggs/female). If 7.8 % of eggs survive to be fry and 2.8% of the fry survive to become adults, we have 139,230 fish (63.8 million eggs x 0.078 fry/egg x 0.028 adult/fry; Parker 1962 in Groot and Margolis 1991). Minus the escapement goal of 51,000 fish for Clear and Caribou Creek, we are left with 88,230 fish as a harvestable surplus. Assuming each fish weighs 6.7 pounds, we have 591,141 pounds of fish worth $0.18 per pound (Upper Yukon price) or $106,405 (ADF&G 1992a). In addition to the price paid for the fish, summer chum salmon produce high quality caviar. Again, assuming half of the harvestable surplus are females and each female produces 1.5 pounds of roe and the value of roe is $4.21 per pound (88,230 fish x 1 female/ 2 fish x 1.5 pounds roe/ female x $4.21/pound roe) we arrive at an additional value of $278,586 (ADF&G 1992a). The estimated annual commercial value for summer chum salmon produced within the ACEC is the sum of $106,405 and $278,586 or $384,991. Over a 10 year period this equals $3.8 million at a 1992 dollar value.

NEPA PROCESS

The environmental assessment (EA) Decision Record and Finding of No Significant Impact for this HMP was approved on May 15,1994. Prior to approval the EA was subject to public comment. On January 30, March 5, August 6 and 25, and September 1, 1993, a notice stating that an EA for the Hogatza HMP was being prepared was published in the Anchorage Daily News. No public comment was received.

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LITERATURE CITED

Alaska Department of Fish and Game. 1992a. Salmon Fisheries in the Yukon River, Alaska. Regional Information Report No. 3A92-01. Alaska Department of Fish and Game, Division of Commercial Fisheries, AYK Region, Anchorage, Alaska. 36p.

_____. 1992b. Temporary resident fish stream bypass design guidelines (Draft). Alaska Department of Fish and Game, Habitat Division, Fairbanks, Alaska. 10p.

Alaska Gold Company. 1985. Public comment concerning the proposed Resource Management Plan for the Central Yukon Planning Area. Page 302 in Bureau of Land Management: Proposed Resource Management Plan and final Environmental Impact Statement for the Central Yukon Planning Area. Document No. BLM-AK-PT-86-010-1610-026, FF-085208. Kobuk District Office, Fairbanks, Alaska; 1986.

Alaska Interagency Fire Management Council. 1993. Alaska Interagency Fire Management Plan. Operational draft. Alaska Interagency Fire Management Council working group, Fairbanks, Alaska. 80p.

Arndorfer, R.W. 1987. Navigability determinations for water bodies in the Alatna River Group survey area (282), Window 1653. Memorandum No. Hughes-GS-FY87-#1, Survey Pass-GS-FY'87-#1, F-15196 (2620), (961). Bureau of Land Management, Alaska State Office, Anchorage Alaska. 10p.

Bamford, G. 1987. Letter to BLM-Kobuk District Fisheries Biologist Joe Webb concerning chum salmon spawning in the Hogatza River drainage. 6p.

Barton, L.H. 1984a. Examination of Bear and Caribou Creeks - Hogatza River mining area. Memorandum. Alaska Department of Fish and Game, Division of Commercial Fisheries, Fairbanks, Alaska. 4p.

_____. 1984b. A catalog of Yukon River Salmon Spawning Escapement Surveys. Technical Data Report No. 121. Alaska Department of Fish and Game, Juneau, Alaska.

_____. 1991. Yukon River Salmon Escapement Surveys, 1990. Regional Information Report N0. 3F91-09. Alaska Department of Fish and Game, Division of Commercial Fisheries, AYK Region, Anchorage, Alaska. 25p.

Bisson, P.A., J.L. Nielsen, R.A. Palmson, and L.E. Grove. 1982. A system of naming habitat types in small streams with examples of habitat utilization by salmonids during low streamflow. Pages 62-73 in N.B. Armantrout, editor. Acquisition and utilization of aquatic habitat inventory information. American Fisheries Society, Western Division, Bethesda, Maryland.

Bjerklie, D.M. and J.D. LaPerriere. 1985. Gold-mining effects on stream hydrology and water quality, Circle quadrangle, Alaska. Water Resources Bulletin 21:235-243.

Buhl, K.J. and S.J. Hamilton. 1990. Comparative toxicity of inorganic contaminants released by placer mining to early life stages of salmonids. Ecotoxicology and Environmental Safety 20:325-342.

Bureau of Land Management. 1986a. Resource Management Plan and Record of Decision for the Central Yukon Planning Area. Document No. BLM-AK-PT-86-031-1610-026, FF085208. Kobuk District Office, Fairbanks, Alaska. 66p.

_____. 1986b. Proposed Resource Management Plan and Final Environmental Impact Statement for the Central Yukon Planning Area. Document No. BLM-AK-PT-86-010-1610-026, FF-085208. Kobuk District Office, Fairbanks, Alaska. 425p.

_____. 1992. Township file extracts for Township and Range: 9N,14E; 9N,15 E; 10N,14E; 10N, 15E; Kobuk District Office, Fairbanks, Alaska. 7p.

Cobb, E.H. 1973. Placer deposits of Alaska. U.S. Geological Survey Bulletin 1374. 216p.

Cousens, N.B.F., G.A. Thomas, C.G. Swann, and M.C. Healey. 1982. A review of salmon escapement estimation techniques. Canadian Technical Report of Fisheries and Aquatic Sciences No. 1108. Nanaimo, British Columbia. 122p.

Environmental Protection Agency. 1983. Methods for chemical analysis of water and wastes. Technical Report No. EPA 600-4-79-020, Environmental Monitoring and Support Laboratory, Office of Research and Development, U.

S. Environmental Protection Agency, Cincinnati, Ohio. 464p.

Groot, C. and L. Margolis. 1991. Pacific Salmon Life Histories. University of British Columbia Press, Vancouver. 564p.

Lamke. R. L. 1979. Flood characteristics of Alaskan streams. U. S. Geological Survey Water-Resource Investigations 78-129. 61p.

Leslie, L.D. 1986. Alaska Climate Summaries. Alaska Climate Center Technical Note No. 3. Arctic Environmental Information and Data Center, University of Alaska, Anchorage.

Lloyd, D.S., J.P. Koenings, and J.D. LaPerriere. 1987. Effects of turbidity in fresh waters of Alaska. North American Journal of Fisheries Management 7:18-33.

Madison, R.J. 1981. Effects of placer mining on hydrologic systems in Alaska. BLM-Alaska Technical Report 7. Bureau of Land Management, Anchorage, Alaska. 32p.

Martin, D.J., D.R. Glass, C.J. Whitmus, C.A. Simenstad, D.A. Milward, E.C. Volk, M.L. Stevenson, P. Nunes, M. Savvoie, and R.A. Grotefendt. 1986. Distribution, seasonal abundance, and feeding dependencies of juvenile salmon and non-salmonid fishes in the Yukon River Delta. U.S. Dep. Comm. NOAA OCSEAP Final Report 55(1988):381-770.

Mills, M.J. 1991. Harvest, catch, and participation in Alaska sport fisheries during 1990. Alaska Department of Fish and Game, Division of Sport Fisheries, Anchorage, Alaska. 183p.

Morrow, J.E. 1980. The freshwater fishes of Alaska. Alaska Northwest Publishing Company, Anchorage, Alaska. 248p.

Nelson, R.K., K.H. Mautner, and G.R. Bane. 1982. Tracks in the wildland, a portrayal of Koyukon and Nunamiut subsistence. Walsworth Publishing Company, Marceline, Missouri. 426p.

Parker, R.R. 1962. A concept of the dynamics of pink salmon populations, p. 203-211. In: N.J. Wilimovsky (ed.) Symposium on Pink Salmon. H. R. Mac Millan Lectures in Fisheries. Institute of Fisheries, University of British Columbia, Vancouver, BC.

Patton, WW., Jr. and T.P. Miller. 1966. Regional Geologic map of the Hughes Quadrangle, Alaska. Miscellaneous Investigations Map I-459. U.S. Geological Survey, Washington, DC.

Regnart, R.I., P. Fridgen, and M. Geiger. 1966. Age, sex and size compositions of arctic and subarctic Alaska stocks of chum and sockeye salmon.(Submitted to the annual meeting International North Pacific Fisheries Commission, Vancouver, BC, November 1966.) Alaska Department of Fish and Game, Division of Commercial Fisheries, Juneau, Alaska. 9p.

Reynolds, J.B., R.C. Simmons, and A.R. Burkholder. 1989. Effects of placer mining discharge on health and food of arctic grayling. Water Resources Bulletin 25:625-635.

Rosgen, D.L. 1993. A classification of natural rivers. Draft. Wildland Hydrology, Pagosa Springs, Colorado. 66p.

Trasky, L.T. 1974. Yukon River anadromous fish investigations. Anadromous Fish Conservation Act completion report for period July 1, 1973 to June 30, 1974. Alaska Department of Fish and Game, Commercial Fisheries Division, Juneau, Alaska. 111p.

U.S. Department of the Interior, Federal Water Pollution Control Administration. 1969. Effects of placer mining on water quality in Alaska. U.S. Dept. of Interior, Fed. Water Pollution Control Administration, Northwest Region, Alaska Water Laboratory, College, Alaska.

U.S. Fish and Wildlife Service. 1992. Contaminant data for water, sediments, and fish of Koyukuk National Wildlife Refuge and the northern unit of Innoko National Wildlife Refuge. Technical Report NAES-TR-92-04. U.S. Fish and Wildlife Service, Fairbanks, Alaska. 78p.

U.S. Geological Survey. 1978. Water Resources Data for Alaska Water Year 1977. Water-Data Report AK-77-1. Water Resource Division, Anchorage, Alaska. 439p.

Van Nieuwenhuyse, E.E. 1983. The effects of placer mining on the primary productivity of interior Alaska streams. Master's thesis. University of Alaska, Fairbanks, Alaska.

Webb J. 1987. Hogatza River Investigations. Unpublished report. Bureau of Land Management, Kobuk District Office, Fairbanks, Alaska. 4p.

Weber, P. and R. Post. 1985. Aquatic habitat assessments in mined and unmined portions of the Birch Creek Watershed. Technical Report No. 85-2. Alaska Department of Fish and Game, Division of Habitat, Juneau, Alaska. 65p.

Winters J. 1983. Trip to Bear Creek; August 5, 1983. Memorandum. Alaska Department of Fish and Game, Habitat Division, Fairbanks, Alaska. 2p.

Wolman, M.G. 1954. A method of sampling coarse river-bed material: American Geophysical Union Transactions 35 (6):951-956.

Appendix A. Area of Critical Environmental Concern definition and process (BLM 1986 6b).

The objectives of an ACEC designation are to identify, designate, and manage areas within the public lands where special management attention is required to protect (a) important historic, cultural and scenic values, fish and wildlife resources and other natural systems and processes; and (b) human life and property from natural hazards.

Authority and Mandate.

The Federal Land Policy and Management Act of 1976 contains the following key provisions regarding Areas of Critical Environmental Concern.

Definition.

An "Area of Critical Environmental Concern" is an area "within the public lands where special management attention is required (when such areas are developed or used, or where no development is required) to protect and prevent irreparable damage to important historic, cultural or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards" (Sec. 103[a]).

Identification Priority and Effect.

Identification of potential ACECs shall be given "priority" in the "inventory of all public lands and their resources and other values," and identification "shall not, of itself, change or prevent change of the management or use of public lands" (Sec. 201[a]);

Designation Priority and Process.

The designation of ACECs shall be given "priority" in the "development and revision of land use plans" (Sec. 202[c][3]), and

Special Management Priority.

The protection of ACECs shall be given "priority" (Sec. 202[c][3]) in applying the required special management attention.

The ACEC Process is Part of Multiple-Use Management.

The ACEC identification, designation, and management process is an integral part of BLM's on-the-ground multiple-use planning and management processes. Through the ACEC process, BLM has a mandate to both:

(a) provide special management attention that will protect important environmental resources, and protect human life and property from important natural hazards; and

(b) do this without unnecessarily or unreasonably restricting users of these lands from uses that are compatible with that protection.

Development May Occur in Some ACECs.

As the Senate Committee Report on FLPMA (Senate Report 94-583) said, "Unlike wilderness areas . . . (ACECs) are not necessarily areas in which no development can occur. Quite often, limited development, when wisely planned and properly managed, can take place in these areas without unduly risking life or safety or permanent damage to historic, cultural or scenic values or natural systems or processes." Thus, a particular ACEC designation may provide for a range of multiple-use activities, including specified kinds and degrees of development and commodity-production activities, provided that the important environmental resources within that area, or human property or lives, are not damaged or endangered.

The ACEC Process Is Part of the Planning Process.

Identification of potential ACECs and designation of ACECs will be done through BLM's on-the-ground planning process, in accord with BLM's procedures for preparation, approving, and revising Resource Management Plans. This planning process incorporates environmental analysis pursuant to the National Environmental Policy Act. An ACEC is designated through approval by a BLM District Manager of a Resource Management Plan. This designation decision is made after review and concurrence by the BLM State Director. Where a proposed ACEC contains an environmental resource of multi-State, national, or international significance, concurrence by the BLM Director and, in some cases by the Secretary, also may be required.

ACEC Designations May Complement Other Forms of Management.

ACEC and other special management area designations are not necessarily mutually exclusive.

An ACEC may overlay another form of designation, in whole or in part, so as to complement the management provided through the other form — for example, a unit of the National System of Wild and Scenic Rivers, within the public lands.

Opportunity for Public Involvement Is Provided at Each Step.

Opportunity for public participation at each phase of the ACEC process will be provided by BLM officials, pursuant to FLPMA and the National Environmental Policy Act, the Department of the Interior's policy on public participation in decision making, and BLM's resource management planning regulations.

Appendix B. Definition of Mining Laws as per 43 CFR 3809.0-5 (e).

"Mining laws" means the Lode Law of July 26, 1866, as amended (14 Stat. 251); the Placer Law of July 9, 1870, as amended (16 Stat. 217); and the Mining Law of May 10, 1872, as amended (17 Stat. 91); and all laws supplementing and amending those laws, including among others the Building Stone Act of August 4, 1892, as amended (27 Stat. 348); and the Saline Placer Act of January 31, 1901 (31 Stat. 745).

Parameter	Value
Instant. Discharge (cfs)	6.0
Sp. Conductance (Micromhos)	70
Temperature(°C)	15.0
Color (Platinum Cobalt Units	8
Hardness (CA, MG) (mg/l)	42
Non carbonate Hardness (mg/l)	5
Dissol. Calcium (CA) (mg/l)	12
Dissol. Magnesium (MG) (mg/l)	2.9
Dissol. Sodium (NA) (mg/l)	1.9
Dissol.Potassium (K) (mg/l)	0.4
Bicarbonate (HC03) (mg/l)	45
Dissol. Sulfate (SO_4) (mg/l)	3.9
Dissol. Chloride (CL) (mg/l)	9.1
Dissol. Floride (F) (mg/l)	0.1
Dissol. Silica ($S10_2$)	9.9
Dissol. Solids (Residue at 180°C) (mg/l)	63
Dissol. Solids (Sum of Constituents) (mg/l)	63
Dissol. Nitrite Plus Nitrate (N) (mg/l)	0.05
Dissol. Ortho. Phosphorus (P0 9mg/l)	0.05
Total Arsenic (AS) (ug/l)	0
Dissol. Iron (FE) (ug/l)	490
Dissol. Manganese (MN) (ug/l)	60
Total Mercury (HG) (ug/l)	0
Susp. Sediment (mg/l)	3
Susp. Sediment discharge (T/Day)	0.05

Appendix C. Bear Creek water quality data collected August 8, 1977 (U.S. Geological Survey 1977).

Appendix D. Boundary description for the Hogatza ACEC.

The following metes and bounds description describes an area within the Kateel River Meridian, Alaska which will hereafter be referred to as the Hogatza ACEC. The metes and bounds description is as follows: Beginning at the intersection of the Hogatza River and the south boundary of section 32, T10N R16E; proceed west to NW corner of section 5, T9N R16E; thence south 4 miles to SE corner of section 19, T9N R16E; thence at a bearing approximately south 72 degrees west approximately 6.3 miles, continue to the SE corner of section 31, T9N R15E; thence approx. west 1 mile to SW corner of section 31, T9N R15E; thence north approx. 12 miles to NW corner of section 6, T10N R15E; thence east approx. 1 mile to NE corner of section 6, T10N R15E; thence follow the ridge line at bearing approximately south 62 degrees east approx. 0.8 miles, to peak 910 ft in section 5, T10N R15E; thence continue at bearing approx. south 12 degrees west approx. 0.8 miles to hilltop 825 ft in section 5, T10N R15E; thence continue along ridge top bearing approx. south 55 degrees east approx. 1.1 miles to hilltop 892 ft within section 9, T10N R15E; thence continue east approx. 1.0 miles to hilltop 695 ft within section 10, T10N R15E; thence continue at bearing approx. south 80 degrees east approx. 1.1 miles to hilltop 517 ft within section 11, T10N R15E; thence continue at a bearing of approx. south 39 degrees east to Hogatza River within SE 1/4 section 32, T10N R16E; thence south approx. 0.2 miles to the intersection of the Hogatza River and the south boundary of Section 32, T10N R16E and the point of beginning. This description describes an area containing approximately 42,512 acres of federal land as depicted on Figure 2.

Appendix E. Management Guidelines.

Management of the Hogatza ACEC is guided by several different sources. The regulations, handbooks, and policy for permitting actions under Rights-of-Ways (43 CFR 2800), Land Use Actions (43 CFR 2920), or the General Mining Laws (43 CFR 3809), in addition to other federal and state regulations, must be referred to prior to permitting any of these activities on BLM land. The Central Yukon Resource Management Plan/Environmental Impact Statement established the ACEC,

the purpose and goals for the ACEC, and identified withdrawals to be implemented to meet those goals (primarily for the protection of salmon habitat). This Habitat Management Plan and Environmental Assessment are the next step in the BLM planning hierarchy to provide for more specific identification and protection of the fisheries habitat within the ACEC.

BLM shall consider the following management guidelines during the development of environmental documents pertaining to land use activities occurring within the ACEC.

General

1. All surface disturbing activities, including fire suppression, mining, road construction, and others should be conducted so as to minimize impacts to aquatic life, in particular spawning and rearing salmon and their habitat.

2. Surface disturbing activities conducted within the boundaries of the ACEC should be bonded.

3. Handling of fuels, hazardous and toxic materials will be in compliance with DEC/EPA standards. In addition, with the exception of boat refueling, all fuel storage, transfer, or refueling operations should be conducted outside of the proposed land withdrawals on Clear, Caribou, and Bear Creek and a minimum of 150 feet from other water bodies.

4. Compensatory mitigation for disturbance of aquatic habitat should be considered by BLM prior to permitting any surface disturbing activity.

Access

1. All roads, trails, and airstrips should be located and constructed so as to minimize erosion and sedimentation and impacts to riparian areas according to the stipulations outlined in BLM Manual H-2801-1 for Right of Way Plans of Development and Grants and other BLM manuals and guidance. For example:

a. Streams that serve as critical spawning and rearing habitat should not be used as roads or trails. No vehicles, other than boats and snow machines, should be operated within stream channels except at existing or authorized road and trail crossings.

b. Vehicles should be restricted to established or approved roads and trails during periods in which snow cover is less than one foot in depth and soils are not frozen in order to protect the vegetation mat and minimize erosion.

c. Saturated soils are susceptible to slides and slumps, excessive settlement, severe erosion, and soil creep. Areas having saturated soils should be avoided during thawed periods.

d. Roads should be put to bed following the completion of the land-use activity unless otherwise authorized. Proper, well protected drainage and common revegetation practices should be used to prevent erosion.

e. Material sites should not be located within the active flood plain of any stream within the ACEC.

2. Culverts and bridges should be designed to optimize fish passage and minimize harm to aquatic life. Measures should be taken to maintain natural stream gradients and ensure stream-channel stability. Fill material for drainage structures should not be placed within the active flood plain without authorization.

Leases and Permits

The following measures apply to leases and permits for long-term field camps used in conjunction with commercial and subsistence activities, including camps used in conjunction with mining. For the purposes of this plan a long-term field camp is defined as a camp which is used for 15 or more days during the year.

1. All activities should be conducted so as to avoid or minimize disturbance to vegetation. Campsites and structures should be located outside of the proposed withdrawals on Clear, Caribou, and Bear Creek. The proposed withdrawals include the streambed and 300 feet on both sides of the stream's mean high water level. Campsites, in areas other than those adjacent to the proposed withdrawals, should be located a minimum of 100 feet from water bodies. Removal of vegetation will be under conditions specified in a permit.

2. Gray water and human waste should be disposed of on land, outside of the proposed withdrawals on Clear, Caribou, or Bear Creek and 100 feet from other water bodies. Solid waste

may be burned pursuant to state standards (Alaska Administrative Code, 18 ACC 50); items which cannot be burned or are left as a residue from burning should be back hauled at the end of the season.

3. All applicable permittees will be expected to complete and submit a written Post Use Report annually according to BLM Handbook H-8372-1.

Fire Suppression

Within the ACEC fires will be contained only to the extent required to prevent an undesirable escape of that fire from the immediate area with the exception of Critical Protection Areas (Alaska Interagency Fire Management Council 1993).

1. Fire suppression activities within the ACEC should be based on fire management policies and suppression constraints identified in the Alaska Interagency Fire Management Plan (AIFMP).

2. Heavy equipment should be used for fireline construction only after completion of an Escape Fire Situation Analysis report and upon authorization by the District Manager. Other methods such as fireline explosives or handlines are preferred (AIFMP).

Forestry

Timber harvest will be restricted to an area outside of the proposed withdrawal area along Clear, Caribou, and Bear Creek as per prescription in the Central Yukon Resource Management Plan.

Mineral Development

All mining operations within the Hogatza ACEC will be conducted in compliance with the 43 CFR 3809 regulations and reasonable measures shall be taken to ensure undue and unnecessary degradation to aquatic life does not occur, for example:

1. A reclamation bond will ensure that reclamation work restores an approximation of the pre-disturbed habitat complexity and channel configuration (based on topographic survey and aquatic inventory data) and that the stream channel is stable under natural events such as high flows and aufeis conditions. The bond will be released at the end of a five-year evaluation period or upon demonstration that the area reclaimed is stable and approximates the desired habitat prior to the completion of the five year evaluation period (e.g., if a 50-year stream flow event occurred two years after reclamation and the channel appeared to be stable and approximate the desired habitat the bond may be released after only a two-year evaluation period).

2. Mining within known salmon production areas or production areas documented during future inventory should not be allowed until July 1 of the initial disturbance year to allow recently hatched fish to outmigrate from the area.

3. Bypass channel construction should be done in a manner that ensures fish passage and does not result in excessive erosion. The bed and banks of the bypass channel should be constructed of material that will not significantly erode and create a fish passage barrier. In order to decrease bank erosion, the side slopes of bypass channels should be contoured to a 3:1 slope unless slope material consists of bedrock or material having a similar resistance to erosion. Other measures that may be required to stabilize stream bypass channels are: energy dissipating structures and structures to maintain stream gradient above and below the bypass channel (e.g. vortex rock weirs). Guidelines established by ADF&G for Temporary Resident Fish Stream Bypass Design Guidelines for Placer Mining Operations (1992b) should be used in the event that stream channel geometry data is not available for the site.

4. Prior to mining a new segment of stream and constructing a new bypass channel, operators will be expected to plug and backfill the old bypass channel with suitable, erosion resistant material. The streambed and stream banks should be reconstructed in the lowest part of the valley using data collected during topographic surveys and Rosgen (1993) stream channel classification. This step may be omitted if a suitable channel was constructed prior to mining and the channel is stable and approximates the desired habitat.

5. Settling ponds should be placed to allow for stream relocation in the lowest part of the valley in a natural meander configuration.

6. Reclamation of mined sites may include: redistribution of vegetation removed prior to mining, planting of willow cuttings or plugs, and the application of fine mesh geo-textile matting or straw over disturbed areas.

Subsistence

In determining whether to lease, or otherwise permit the use, occupancy, or disposition of public lands under any provision of law authorizing such actions, the head of the Federal agency having primary jurisdiction over such lands or his designee shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for the purpose sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition or public lands needed for subsistence purposes (Section 810 ANILCA, 16 USC 3120).

Other Guidelines

Future administration or management actions such as the signing and ratification of the Yukon River Salmon Treaty may require amendment of this HMP.

Appendix F. Hogatza ACEC aquatic Habitat Management Plan progress report.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

HABITAT MANAGEMENT PLAN PROGRESS REPORT

OBJECTIVES	DATE COMPLETED	PLANNED ACTIONS	DATE COMPLETED	EVALUATION/MONITORING	DATE COMPLETED
•Maintain the capability of aquatic habitat within the ACEC to sustain the annual production potential of 5 million chum salmon fry. •Maintain the existing quantity and quality of salmon spawning habitat to support a minimum annual escapement of 8,000 chum salmon spawners in Clear Creek and 9,000 chum salmon spawners in Caribou Creek (these numbers are interim escapement objectives established by the Alaska Department of Fish and Game and were established and are monitored using aerial survey technology. •Maintain or restore the natural substrate composition, stream type and geometry (as defined by Rosgen 1993), on all streams within the ACEC. •Maintain the minimum stream discharge necessary for maintenance of aquatic life, natural stream channel configuration, and habitat composition on all streams within the ACEC. •Maintain , restore, or improve the exisiting stream bank stability, riparian cover, woody debris and other instream cover on all streams within the ACEC. •Maintain the water quality within the ACEC to standards established by the Alaska Department of Environmental Conservation (18 AAC 70) for fresh water use classes (1)(A), (1)(B), and (1)(C).		• Establish habitat specific management objectives for fisheries resources in the ACEC. • Establish management guidelines for mining and other surface disturbing land-use activities within the ACEC. • Establish a serialized case file for the ACEC and amend the Master Title Plats to show the ACEC boundary. • Obtain large scale aerial photography of Clear, Caribou, Bear, and Aloha Creeks. • Collect channel geometry from representative reaches of Clear, Caribou, Bear, and Aloha Creek (topographic surveys). • Conduct aquatic habitat inventory on Clear, Cariou, Bear, and Aloha Creeks. • Conduct annual compliance inspections of mining and other land-use activities occurring within the ACEC to ensure protection of aquatic resources.		• Monitor the aquatic resources within the ACEC at the appropriate level (base, mid, or evaluation level).	

INSTRUCTIONS

1. List specific HMP objectives from RMP/MFP planning documents or as otherwise approved
2. List specific planned actions to be initiated to meet each specific objective.
3. List scheduled evaluation/monitoring study(s) planned to evaluate accomplishments.
4. Enter completion date for each objective, action, or evaluation/monitoring study as accomplished.

Form 6780-2
(July 1981)
(formerly 6620-3)