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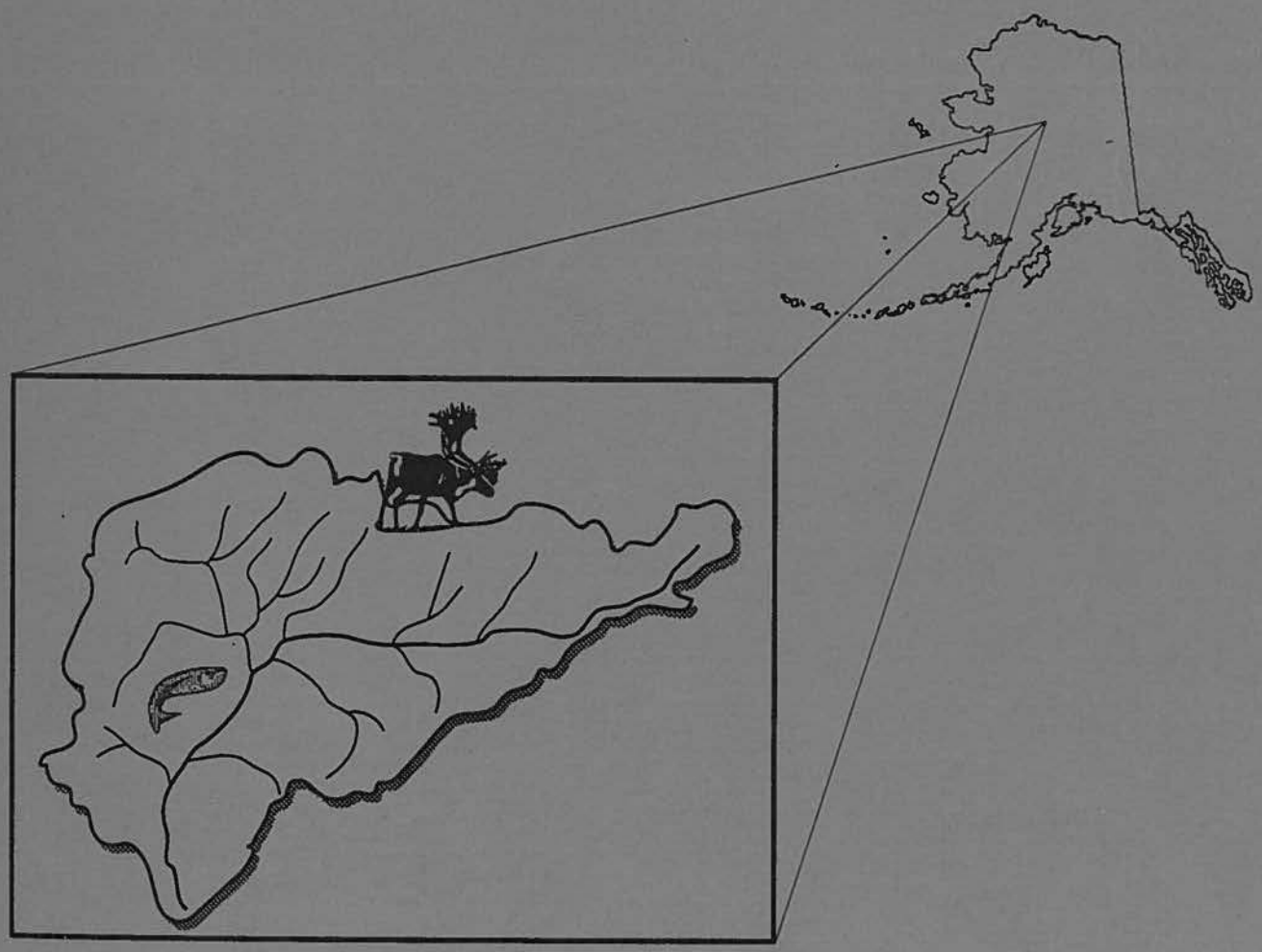
Watershed Activity Plan

Tozitna River Watershed Area of Critical Environmental Concern



Watershed Activity Plan

for the

Tozitna River Watershed Area of Critical Environmental Concern

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

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List of Acronyms and Terms

ACEC	Area of Critical Environmental Concern
BLM	Bureau of Land Management
CFS	Cubic Feet Per Second
EIS	Environmental Impact Statement
FLPMA	Federal Land Policy and Management Act of 1976
NTU	Nephelometric Turbidity Units
PPM	Parts Per Million
RMP	Resource Management Plan
RNA	Research Natural Area
USGS	U.S. Geological Survey
WAP	Watershed Activity Plan

Tozitna Watershed Activity Plan

I. Introduction

A. Purpose

The Federal Land Policy and Management Act (FLPMA) and other federal statutes and executive orders direct the Bureau of Land Management (BLM) to prevent undue degradation of public lands and to maintain and improve soil and water conditions on those lands. Vegetation for wildlife food and cover, as well as human subsistence uses, is dependent upon the soil's inherent productivity. Good quality surface water is important for wildlife, fisheries, subsistence and recreational uses and is dependent on the maintenance of vegetation cover.

The need for a watershed activity plan (WAP) is identified in Management Prescription 9 (page 51) of the "Central Yukon Resource Management Plan" (RMP), which designates the public lands in the Tozitna River watershed as an area of critical environmental concern (ACEC). The boundary of the watershed is shown in Figure 1. The designation of this watershed as an ACEC was prompted by a need to provide special emphasis management to protect spawning habitat for the salmon fishery in the Tozitna River and its tributaries by minimizing the potential impacts of land usage. This fishery has been identified as having high commercial and subsistence economic values. See Appendix A for the definition of an ACEC.

B. Objectives

The specific management objectives of this plan are:

1. Maintain a healthy watershed cover to provide water that is free of abnormal silt levels for fisheries, subsistence and recreation uses.
2. Control surface-disturbing activities to prevent degradation of watershed cover and resultant erosion and sedimentation.
3. Prevent siltation of salmon spawning beds.
4. Obtain baseline water data for assessment of the impacts of future development on water quality.

C. Constraints

The only constraints from other plans or regulations that need to be considered in the initiation of this plan are from the Central Yukon RMP. These are discussed later in this document.

D. Authority

Management Prescription 9 of the RMP designates the Tozitna watershed as an ACEC. BLM policy requires stopping or preventing the deterioration of the public lands and waters due to accelerated erosion, which will significantly affect the water quality of the streams draining these land areas. This policy is supported by several federal statutes and executive orders, among them the Watershed Protection and Flood Control Act of 1954, Alaska National Interest Lands Conservation Act, Federal Land Policy and Management Act of 1976, Anadromous Fish Conservation Act, Federal Water Pollution Control Act, Executive Order 11644 amended by Executive Order 11989—Off-Road Vehicles on the Public Lands, Executive Order 11988—Floodplain Management and Executive Order 11990—Protection of Wetlands.

E. Summary of Activities

The activities proposed under this plan are solely managerial. No physical treatments are proposed.

II. Ecosystem Description and Background

A. Location and Administration

The Tozitna River is 100 to 150 miles northwest of Fairbanks, Alaska, and is a northern tributary of the Yukon River. It drains the southern slopes of the Ray Mountains, the northern and western slopes of a chain of unnamed hills just north of the Yukon River and the eastern slopes of Moran Dome. The Tozitna watershed is about 65 miles from east to west and 50 miles from north to south and is approximately 1,050,000 acres (1,640 square miles) in size. The majority (90 percent) of the land is in federal ownership (approximately 950,000 acres) and is managed by the BLM. Most of the lands in the watershed have not been surveyed. Approximately 58,000 acres or six percent of the watershed is patented or tentatively approved to the State of Alaska and 47,000 acres have been selected by the State. Of these selected lands 8,000 acres have also been selected by the native corporations Tozitna Limited and Doyon Limited. About 48,000 acres of lands have been selected by the Native corporations and approximately 43,000 acres (four percent of the watershed) interim conveyed to the native corporations. Additionally BLM records show lands patented as listed below:

Jack Blume	(United States Survey 7102)	4.99 ac.
Bill Fliris	(United States Survey 6976)	4.99 ac.
Tom Fogg	(United States Survey 6595)	4.99 ac.
Karen Kohout	(United States Survey 6494)	4.99 ac.
OFT Ltd.	(United States Survey 7472)	80 ac.
Russ Wood	(United States Survey 6907)	4.99 ac.
Stan Zuray	(United States Survey 6598)	4.99 ac.

Jack Blume, Karen Kohout and their son Robin own OFT Limited which operates Tozikaket Bush Camp (see Section K, Recreation).

Within the watershed all lands will be open to FLPMA sales and leases except two areas which have been designated as Research Natural Areas (RNAs) and a strip extending back 300 feet from mean high water line on either side of the Tozitna River. This strip is designated to protect 15,776 acres of anadromous fish spawning habitat. The strip is also closed to mineral location but it is open to mineral leasing with no surface occupancy.

Approximately 3,990 acres on McQuesten Creek have been set aside as an RNA for the study of the hot spring in Township 10 North, Range 20 West, Section 35 and the surrounding ecosystem. The Spooky Valley RNA containing 10,800 acres at the head of Kobuk Creek, a tributary of Gishna Creek, was designated for the study of alpine tundra ecosystems. Maps and preliminary reports are on file in BLM's Kobuk District Office in Fairbanks.

Two areas in the vicinity of the Tozitna watershed were designated by the Central Yukon RMP to protect caribou habitat. The Tozitna North ACEC is outside the watershed. The Tozitna South ACEC is mostly within the Tozitna watershed. The total acreage in that ACEC is 61,120 acres, with about 53,400 acres in the watershed. More information is available in the 1988 "Final ACEC Management Plan for the Tozitna North and Tozitna South ACECs" on file in the Kobuk District Office.

Land status for the watershed is shown on Figure 1 and on the land status overlay available for viewing in the Kobuk District Office.

See Appendix B for a legal description of lands in the watershed.

B. Climate

The climate is continental and varies considerably depending on elevation. The mean annual temperature for the area is 23 degrees Fahrenheit. Estimated temperature extremes vary from the high 80s in the summer to the minus 60s in the winter. Precipitation probably varies from 12 to 30 inches, including 50 to 75 inches of snowfall, depending on location and elevation within the watershed. Data from the Tozikaket snow course at 600 feet elevation indicates

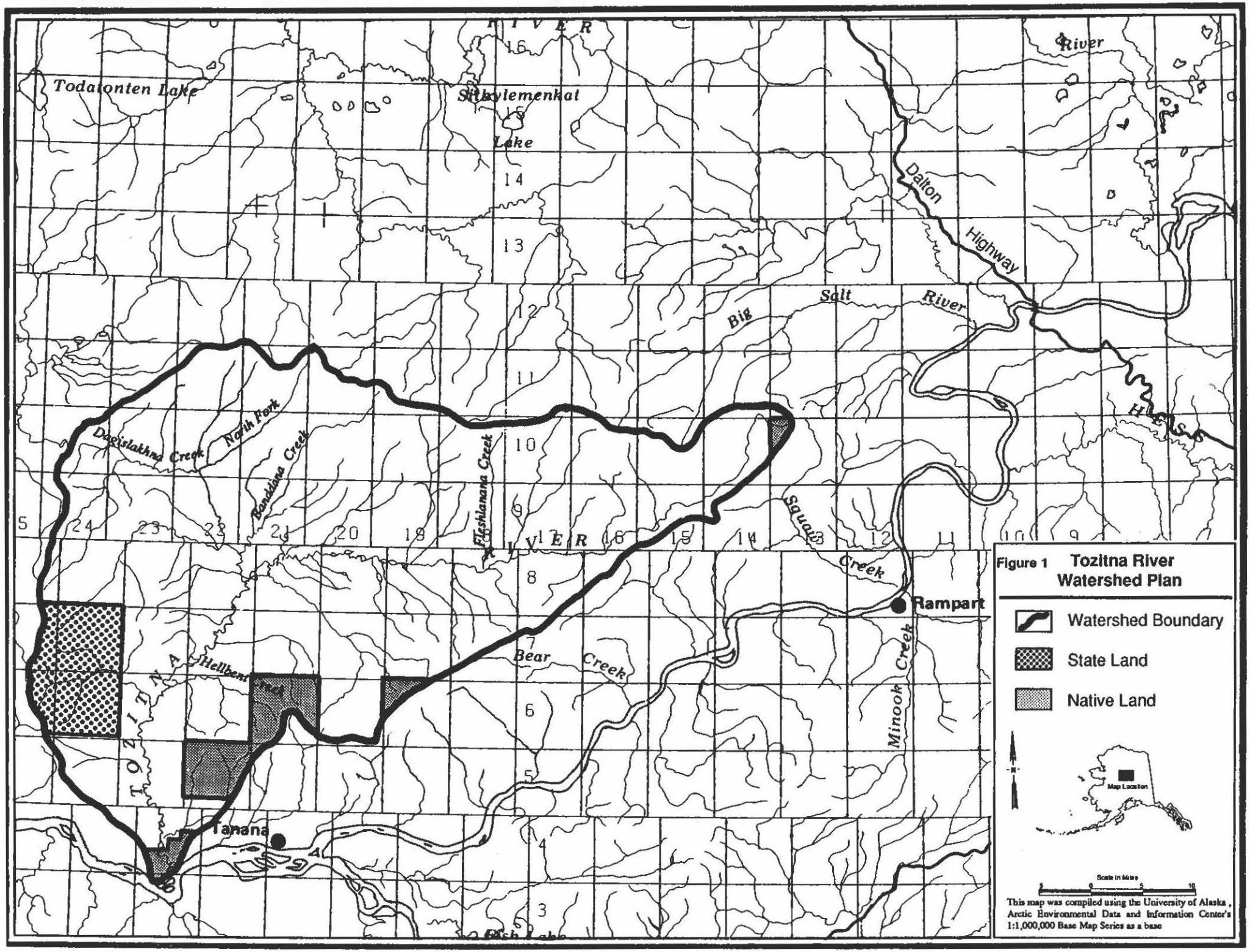

Figure 1 Tozitna River Watershed Plan

Watershed Boundary

State Land

Native Land

an average of 22 inches of snow on the ground in April with a water equivalent of 4.7 inches.

The nearest weather data sources are at Tanana (10 miles south of the watershed at 226 feet elevation), Rampart (65 miles east of the watershed at 275 feet elevation) and Bettles Field (80 miles north of the watershed at 643 feet elevation). All of these are river bottom communities at relatively low elevations and provide little applicable information for the higher elevations of the BLM-administered portions of the watershed which vary from slightly below 400 feet up to 5,519 feet.

C. Topography

The topography varies from almost flat where the major creeks join the Tozitna River in the central basin at elevations of 500 to 600 feet to almost vertical slopes found between 2,000 and 5,500 feet in the central and eastern Ray Mountains. The majority of the lands in the watershed are on slopes exceeding 20 percent.

D. Soils

Soils in the planning unit are variable because of differences in location on the landscape, drainage, aspect, elevation, parent material, soil temperatures, fire history and climate. The soils have developed under a cold temperature regime in which biological and chemical transformations are slow and in which soil horizons, the results of these processes, are subject to physical dislocations as a result of the freeze-thaw process.

The Exploratory Soil Survey of Alaska indicates the watershed has five different soil mapping units within its boundaries, each hundreds of thousands of acres in size. This 1979 survey is very general, having been done on a aerial photo base at a scale of 1:500,000 (about eight miles to the inch). Each soil mapping unit contains two to five major soil types and several minor ones. The mapping units are shown on the Soils Overlay. The survey contains more detailed information than is presented here and is available at the Kobuk District Office.

The five soil mapping units in the watershed are:

IQ2—Histic Pergelic Cryaquepts, loamy, nearly level to rolling association. Ice-rich permafrost in the dominant soils provides severe limitations for any intensive use or development. Approximately 20 percent of the soils in the hilly portions of this association are rated as highly erodible if denuded. Another five percent are very susceptible to thermokarsting.

IQ25—Pergelic Cryaquepts—Pergelic Cryochrepts, very gravelly, hilly to steep association. The dominant soils are poorly drained. Generally this association is too wet and steep for machinery operation and has only scattered areas of trees suitable for harvesting. Most of the soils have severe limitations for use as construction sites.

IR6—Typic Cryochrepts, loamy, hilly to steep—Histic Pergelic Cryaquepts, loamy, nearly level to rolling association. The dominant soils are too steep or too wet for equipment operation or commercial forestry, but some of the well-drained soils on south-facing slopes are potentially suitable for forestry and have the fewest limitations for construction and other intensive uses. Forty percent of the area is rated highly erodible and 10 percent very susceptible to thermokarsting.

IR12—Typic Cryochrepts, very gravelly, hilly to steep—Histic Pergelic Cryaquepts, loamy, nearly level to rolling association. The dominant soils of the association are not suitable for vehicle operation and have severe limitations for construction. Some gently sloping to nearly level sites at low elevations have only moderate limitations for construction. Most moderate to well-drained sites supporting forests of white spruce, paper birch and aspen are capable of producing commercial timber.

RM2—Rough mountainous land—Lithic Cryorthents, very gravelly, hilly to steep association. Soils are too steep for cultivation or forestry. Steep slopes and permafrost pose severe limitations for most kinds of construction.

The soils vary with the topography. Generally, organic horizons are thick and the active layer deep but still less than 30 inches. The soils of the Kokrine-Hodzana Highlands are almost neutral pH silt loams. In the southern portion, loess is a significant part of the gray, fine-textured soils. The moderately well-drained soils on slopes usually have fine-textured upper horizons over gravelly subhorizons. Gravelly, granite-derived materials are commonly found in the uplands. Broad valley bottoms are commonly occupied by sedge or sedge-tussock meadows with scattered to heavy stands of willow and have organic or very poorly drained mineral soils with thick organic horizons.

In the mountainous areas below tree line, mass movement of soils on steep slopes produces complexes of poorly drained, gray mottled silt loams, gravelly-textured acid soils with thin organic horizons, and similar poorly drained soils with thick organic horizons. The seasonal thaw layer is usually less than 20 inches except on ridge crests and coarse textured terraces where deeper thawing permits development of well drained soils with oxidized horizons.

On well drained, gravelly sites, soils have well developed horizons and thick active layers.

The presence of permafrost limits the use of heavy machines to times of the year when the ground is frozen and snow covered. Most of the soils have a high potential for erosion, subsidence, and slippage if the vegetation mat is removed or disturbed and permafrost begins to thaw. This is particularly true of those soil types with ice-rich, fine-grained materials which thaw when the vegetation mat is compressed, disturbed or removed. Because of these conditions cross-country movement of track or wheeled vehicles during the thaw season frequently creates deep ruts and severe erosion.

E. Water Resources

The Tozitna River is a tributary of the Yukon River. The Tozitna's main stem is 103 miles long with a drainage area of approximately 1,640 square miles. There are approximately 1,290 miles of stream in the watershed. Estimated mean annual runoff is less than one cubic foot per second per square mile. Mean annual peak runoff is estimated to be slightly more than 10 cubic feet per second per square mile. The Tozitna, like other river systems in the Central Yukon Subregion, probably carries about 100 milligrams per liter of suspended solids throughout the summer.

The headwaters of this system are clear and swift, with two to four foot deep pools occurring commonly. Bedrock stream bottoms are common high in the drainages. At lower elevations the gradients are flatter and the streams tend to meander, frequently cutting off oxbows that form curved lakes to the side of the main streams. Pools 10 to 15 feet deep are common. Stream bottoms are usually composed of gravel or cobbles.

Most stream banks are relatively stable but this can change rapidly. Accelerated bank erosion occurs on the outer banks of bends and in places where the bank vegetation is disturbed by man's activities or high water flows. The banks frequently undercut then cave in or develop head cuts. The outer edges of bends usually continue to be an active cutbank during high water periods. Other bank areas eventually reach a point of stability and revegetate. If the banks are composed of ice rich materials (permafrost) the disturbance can result in massive changes as the ice thaws and the banks cave in and material is washed away. Healing may occur as a result of the thawing bank materials sloughing out from under the vegetation mat allowing it to cover the eroding area thus helping to stabilize the bank.

Lack of basic resource data is a major problem. There are no established water data gathering stations except a snow course at Tozikaket, near the confluence of Dagislakhna Creek with the Tozitna River in the western third of the watershed. U.S. Geological Survey records indicate no data stations in the past. Water quality and quantity are assumed to be adequate for present uses, based on casual observation, but are essentially unknown except for occasional random samples. There is a need to establish long-term water data collection sites to build a baseline of data for use in making resource decisions and determining federal water needs.

The major streams and rivers are shown on Figure 1 (page 3) and delineated on the Water Resources Overlay on file in the Kobuk District Office.

There are no gauging stations in the Tozitna drainage. The only available data specific to the Tozitna River is from grab samples taken July 7-12, 1983.

Water temperature	54 to 62 F
pH	7.5 to 8.0
Total Hardness	51 to 68 ppm
Total Alkalinity	34 to 51 ppm
Dissolved Oxygen	10 ppm
Turbidity	0 to 1.5 NTU

Total dissolved solids vary considerably with the flows. Chemical quality tends to be better during the summer when the flows are higher and the impurities are diluted. All waters are of the calcium bicarbonate type.

In July of 1983 the Tozitna River had an estimated flow of approximately 300 cubic feet per second (cfs) at river mile 72 near the mouth of Fleshlanana Creek and 445 cfs at river mile 23 immediately above Tozimoran Creek.

Surface water quantity and quality varies with the season. Generally maximum discharge occurs during spring breakup which usually happens in May. Stream discharge rates peak during snow melt and summer rains. The presence of permafrost decreases infiltration thus increases runoff peaks but reduces base flow rates. In the fall and winter much of the precipitation and runoff are in a frozen state and stream flows decline. Seasonal snowpack is the most important annual water storage component in the hydrologic cycle. River icings (aufeis) also store considerable quantities of water.

Giardia lamblia, an intestinal parasite carried by mammals, is present in the waters of the planning unit. This is also known as "beaver fever."

Consumptive water use should be minimal due to the small number of users. There is one household of three people living most of the year in the watershed. Other users include several trappers and unknown numbers of hunters and fishermen.

Ground water resources are difficult to access due to discontinuous permafrost. Permafrost restricts recharge, discharge and movement and confines water under artesian pressure. One well is known to exist in the watershed. This well is in the unfrozen alluvium along the Tozitna River at Tozikaket and is used by the family mentioned above.

There are hot springs in several places to the north and east of the watershed. Only one hot spring is known in the watershed. McQuesten Hot Spring, on BLM-administered land near the northern edge of the watershed in the Ray Mountains, is at an elevation of approximately 1,500 feet. This is a low-grade geothermal hot spring with a water temperature of 85 degrees Fahrenheit. The RMP provides that no undeveloped hot springs will be leased for developmental purposes. This protection is provided in the form of designation as an RNA because there are very few undisturbed hot springs available for study.

The inferred and known major floodplains have been roughly delineated in the Regional Profiles produced by the State of Alaska. The floodplains for most streams and rivers are too small to show at the scale used for the base map. No site-specific floodplain determinations have been made in the Tozitna watershed.

Riparian areas have not been mapped, however, the U.S. Fish and Wildlife Service is presently working on a project to map wetlands in Alaska. This project will include many of the riparian areas in the planning unit. Estimated completion date is unknown.

F. Vegetation

The watershed cover in the Tozitna watershed is typical of interior Alaska. The area includes a wide variety of plant communities because it encompasses lands from the Yukon River at elevation 400 feet to mountain peaks up to 5,500 feet. Very little floral

collecting has been done in the watershed. Most collections have come from the Ray Mountains and are due to studies involving potential Natural Resource Areas and educational projects.

The most definitive vegetation map available is a 1984-1986 manual interpretation of Landsat imagery for fire fuels with five mapping units:

1. Black spruce forest
2. Graminoid tussocks, grasslands
3. Riparian white spruce
4. Deciduous forest, mixed coniferous-deciduous forest, shrubland
5. Alpine tundra, barrenland, ice

These mapping units are delineated on the Watershed Cover overlay on file in the Kobuk District Office. Additional delineation of vegetation types will be necessary in some areas to provide information for definitive resource management. This would primarily involve separating out brushlands and alpine tundra. An additional need is to determine the acreages of vegetation type by township. The National Wetlands Inventory has not been completed for the Tozitna drainage. No wetland maps are available.

Each of the map units is discussed below and the unit names are related to "The 1986 Revision of the Alaska Vegetation Classification," by Viereck, Dyrness and Batten. The units are numbered by degree of flammability, with the most flammable first.

Map unit 1. Black spruce forest is characterized by extensive almost pure stands of black spruce *(Picea mariana)* with occasional small stands or single trees of birch *(Betula papyrifera)*, aspen *(Populus tremuloides)* and alder *(Alnus)*. This unit may contain open or closed needleleaf forest or needleleaf woodland. The forest floor is covered with a thick mat of mosses, lichens, grasses and shrubs such as willow *(Salix)*, dwarf birch *(Betula nana)*, blueberries *(Vaccinium)*, and Labrador tea *(Ledum)*. The black spruce forest is commonly found on poorly drained soils, with permafrost close to the surface, on foot slopes, valley bottoms and north-facing slopes.

Map unit 2. Graminoid tussocks and grasslands are best represented by the herbaceous classification. Herbaceous vegetation types are found throughout the Tozitna watershed. They are most noticeable as sedge tussock meadows. Also included are lowland grass or sedge meadows in the forests and ridgetop swales, and patches of alpine sedge and dwarf shrub tundra on ridges and peaks of the higher country in the watershed. The meadows are characterized by bluejoint grass *(Calamogrostis canadensis)* or sedges *(Carex)* with scattered willows, dwarf birch *(Betula nana* and *glandulosa)*, ericaceous shrubs, forbs, mosses and lichens. The alpine tundra includes patches of low-growing mats of Dryas, prostrate willows, other forbs, sedges and lichens.

Map unit 3. Riparian white spruce forest is a tall, relatively dense forest which occurs along major rivers and streams. Generally this is a closed needleleaf forest. The primary species is white spruce *(Picea glauca)* with scattered stands and isolated trees of balsam poplar *(Populus balsam-ifera)*. Meadows of tall grass with willows occur in periodically flooded areas. Undergrowth is usually dense scrub, including alder, willow, prickly rose *(Rosa acicularis)*, Labrador tea and blueberries. Ferns, bluejoint grass, fireweed *(Epilobium)*, horsetails *(Equisetum)*, and other herbs, lichens and mosses cover the forest floor. This forest occurs on level floodplains, low river terraces, and more deeply thawed south-facing slopes of major rivers in the interior. It is commonly found along major tributaries up to elevations of 2,500 feet in higher valleys.

Map unit 4. Deciduous forest, mixed coniferous-deciduous forest,and shrubland are combined into one mapping unit. This unit could contain 12 to 13 of the forest and scrub classifications. Paper birch and aspen dominate the well to excessively drained south-facing slopes. Mixed forests of white spruce with scattered stands of paper birch and aspen occur on moderate east, south and west-facing slopes, while northern exposures and poorly drained flat areas are mostly black spruce. Paper birch and aspen stands, an early stage of succession after fire, are usually even-aged and more uniform in size than spruce stands. The

understory consists of moss and low shrubs, with prickly rose, currants *(Ribes)*, Labrador tea and blueberries on the cool moist slopes, grass on dry slopes, and willows, alders and dwarf or resin birch in the high open forests near treeline. White spruce up to 80 feet high occur in mixed stands on south-facing slopes and well-drained soils and may form pure stands near streams.

Shrubland includes tall scrub, low scrub and dwarf scrub vegetation. Tall scrub consists of dense thickets of willow and alder greater than 5 feet in height with a number of lower shrubs, herbs, grasses, ferns and mosses in the understory. This type usually occurs on floodplains, but can be found along many stream channels in the uplands. Associated shrubs include buffaloberry *(Shepherdia canadensis)*, roses, raspberry *(Rubus idaeus)* and thimbleberry *(Rubus parviflorus)*. Newly exposed gravel bars are invaded by pioneer species such as willow, horsetails, bluegrasses and fireweed. Islands and bars of the major rivers are usually bordered by pure stands of willow, often in zones or strips according to age.

Low scrub is composed of vegetation communities in which the dominant species are between 8 inches and 5 feet high. In the planning unit the most common shrubs are willow, dwarf birch, alder, prickly rose and Labrador tea. The understory contains a variety of dwarf shrubs, herbs, grasses, mosses and lichens. These types may be intermixed with forest types and are major components of the association of vegetation types known as tundra when they are located north and west of treeline or above treeline in elevation.

Dwarf scrub is usually found at the higher elevations in the alpine tundra. It includes continuous or discontinuous low growing mats of Dryas, prostrate willows, various forbs, sedges and lichens.

Map unit 5. Alpine tundra, barrenland,and ice includes herbaceous, low scrub, and dwarf scrub as well as the bog types discussed below. Barrenlands are not a vegetation type. These map units represent exposed bedrock in the mountains and on ridgetops throughout the foothills, and unvegetated alluvial deposits of sand and gravel in active floodplains.

Shrub bogs and bogs are found in each of the mapping units. These types are too small to be mapped separately at the 1:125,000 scale used for the mapping project. These communities are dominated by ericaceous shrubs, but stunted black spruce and dwarf birch are commonly found too. Shrub bogs occur on wet sites, usually underlain by permafrost, and have a thick organic mat. This community is frequently found as an inclusion in the lowland black spruce forest and low scrub. Shrub cover is greatly reduced on the wetter sites, and sphagnum moss dominates.

There is no continuing commercial use of natural vegetation in the watershed. Local residents and the recreating public take small amounts of wood for personal use as fuel. Timber has been cut for house logs. Berries and herbs are used for subsistence.

G. Fire

Wildfire has been and continues to be a very common occurrence in the watershed. Most of the black spruce, mixed forest and shrub types below 1,200 feet elevation in the watershed have been burned at least once since 1954. These types have also burned above 1,200 feet in much of the western and southwestern portions of the watershed. This is approximately 45 percent of the watershed. These vegetation types are considered fire dependent and they normally burn at 50- to 150-year intervals. The riparian white spruce forests along the waterways usually do not burn in years with normal moisture conditions. Fires are generally started by lightning. The heaviest occurrence of fire starts is in mid-July although the largest fires, contributing 90 percent of the burned area, have started in late June.

The effects of fire on the ecosystems in the watershed are generally beneficial. Fires do not burn to mineral soil over large areas and erosion is usually not a problem on burned areas. Cold soil and air temperatures slow decomposition of organic material from vegetation and organic materials, insu-lating the ground and progressively decreasing the thickness of the seasonal thaw layer. This results in a less productive ecosystem for wildlife and food and subsistence uses.

In addition to promoting a deeper thaw layer, the fires release nutrients from the burned vegetation and organic mat which further enhances the growth of new vegetation. There has been no documentation of significant degradation of water quality caused by fires. In interior Alaska most of the erosion and related water quality problems associated with fires have been caused by fire suppression activities.

H. Wildlife

The watershed is a part of the habitat for a small group (500+) of caribou *(Rangifer tarandus)* and also contains moose *(Alces alces)*, grizzly bears *(Ursus arctos)*, black bears *(Ursus americanus)*, wolves *(Canus lupus)*, furbearers, rock ptarmigan *(Lagopus mutus)*, and several non-game species. Detailed information can be found in Farquhar and Schubert (1980), Robinson (1985a) & 1985b) and BLM (1986).

I. Fisheries

The primary reason for the designation of the Tozitna watershed as an ACEC is for the protection of the Tozitna River's salmon spawning habitat which has been identified as having high economic values for commercial, sport and subsistence fishing. Annual escapement counts by the Alaska Department of Fish and Game indicate both summer chum and king salmon vary considerably in relative numbers from year to year. Escapement counts are listed in Appendix C. No population determinations have been made.

An inventory of the Tozitna River in 1983 indicated chum salmon *(Onchorhynchus keta)* and king salmon *(Onchorhynchus tshawytscha)* spawn in the Tozitna River from Tozimoran Creek upstream to river mile 70, almost two miles below Fleshlanana Creek. The RMP proposes to close the Tozitna River to mineral location from just below the mouth of Hellbent Creek upstream to approximately river mile 80. This closure would extend 300 feet from mean high-water line on either side of the river. It is reasonable to assume there is spawning downstream from Tozimoran Creek and there may be spawning occurring in Dagislakhna Creek and other tributaries of the Tozitna River.

There is a fair arctic grayling *(Thymallus arcticus)* fishery in the Tozitna River up to about river mile 70. Other species found in the river include northern pike *(Esox lucius)*, burbot *(Lota lota)*, dolly varden *(Salvelinus malma)*, round whitefish *(Prosopium cylindraceum)*, longnose sucker *(Catostomus catostomus)* and slimy sculpin *(Cottus cognatus)*.

J. Mining

The RMP proposes that all BLM lands in the drainage will be available for mineral location under the 1872 Mining Law or leasing under the Mineral Leasing Act of 1920, except for the Spooky Valley RNA and the McQuesten Creek Hot Spring RNA. A strip extending 300 feet from mean high water line on both sides of the Tozitna River is closed to mineral location and open to non-surface-disturbing mineral leasing with no surface occupancy to protect 15,776 acres of anadromous fish spawning habitat.

There are no active mining operations on BLM-administered lands. There was an active placer gold operation in upper Tozimoran Creek during the early 1980s (not operating in 1987 or 88). This operation was on State claims, on lands tentatively approved or patented to the State of Alaska. Mining records and field observations for the BLM-administered lands in the watershed do not indicate any significant mining activity in the past.

A block of 680 tin-tungsten lode claims that could involve up to 13,600 acres were staked on the crest of the Ray Mountains. Part of this block is in the headwaters of Banddana Creek. The claims were last held by Anaconda Copper Co. in 1984. Currently they are closed as no assessment work has been filed on them. Should the claims be filed again and actual development begin, BLM will need a knowledge of vegetation cover in the area and water quality in Banddana Creek to use as a baseline to measure changes against.

There is placer tin in many of the creeks coming off

Tozimoran Dome.

Managanese has been found along the southern edges of the Ray Mountains.

Coal is found on the gravel bars between Fleshlanana and McQuesten creeks. It is estimated that 40 to 45 square miles (105 to 130 square kilometers) of the Tozitna valley downstream from Gishna Creek is underlain by coal-bearing strata.

K. Recreation

There is a limited amount of recreational use in the watershed. Fishing and hunting are the main activities. There are occasional float trips, but probably no more than an average of one per year.

The Tozikaket Bush Camp operated from 1972 through 1979. The camp primarily supported backpacking activities. Present plans include reactivation of the business and an expansion of facilities.

Access into the area is by foot, aircraft, boat, dogsled or snow machine depending on the season of the year.

III. Problem Identification and Proposed Treatments

A. Management Considerations

Most of the area will be open to mineral location or leasing and mineral development. The exceptions have been discussed in section II J. The area will also be open to FLPMA sales and leases except in the 300-foot zone on either side of the Tozitna River and the RNAs.

Presently there are no significant development problems which threaten water quality in the portions of the watershed managed by BLM. There are no active mining operations or construction projects. There is no accelerated erosion occurring. Sedimentation is confined to natural levels. We have an opportunity to collect baseline data in an essentially undisturbed situation.

If an increase in surface disturbing activities occurs, such as minerals exploration and development or road construction, more detailed information about vegetation cover, water quality and quantity will be needed than is presently available. There will not be time to gather adequate information when the demand for development occurs.

Subsistence uses must be protected and scenic values will be maintained. This plan will have no significant restriction to subsistence uses and resources in the area. Subsistence resources will be enhanced by protection of the salmon spawning habitat and restriction of surface disturbances. A Section 810 determination was done for the Central Yukon RMP. This plan does not cause any changes to the subsistence resources or to the traditional accessibility of those resources as provided for in the RMP.

The RMP stipulates that permits are required for off-road vehicles in excess of 1,500 pounds gross vehicle weight. All surface-disturbing activities will be conducted under permit or, for mining, under an approved plan of operations. The designation of the Tozitna watershed as an ACEC further provides that all surface-disturbing activities will be limited to protect this habitat from siltation or other forms of physical or chemical pollution.

Wildfire will be managed according to the Alaska Interagency Fire Management Plan. The plan stipulates *limited action* for the drainage north and east of a line running down Hellbent Creek and up the ridge forming the north boundary of Tozimoran sub-watershed. This fire suppression option provides for fire containment only to the extent necessary to prevent undesirable escape from this area. South of that line the suppression option is *full protection* which provides that fires will be controlled through immediate and aggressive action.

The Alaska National Guard had a one-year maneuver permit on approximately 50,000 acres on the south side of the watershed. The permit contained restrictions designed to preclude damages to the resources. The permit expired in September 1988 and is currently going through a renewal process.

Section 201 of FLPMA states "The Secretary shall prepare and maintain on a continuing basis an inventory of all public lands and their resource and other values, *giving priority to areas of critical environmental concern.* This inventory shall be kept current so as to reflect changes in conditions...." BLM policies require essentially the same inventories. Adequate water (with the exception of snow surveys) and vegetation inventories have not been accomplished.

Both the amount of water flowing down the Tozitna River and the chemical quality of the water is critical to the salmon. Both the quality and quantity of the water are unknown. Presently we have no monitoring system in effect to detect a change in the water condition and no baseline water data to compare it to. A minimum of five years' data is required for viable baseline water data.

The location and extent of individual hardwood, mixed forest and shrubland vegetation types in the Tozitna watershed is unknown. Current mapping has them consolidated into one type. We cannot determine which areas have forest cover and which have only shrub cover. This is a basic requirement for determining areas that can be used with minimal disturbance.

There are soils in the watershed rated as highly erodible if the vegetation is removed or disturbed and the permafrost is degraded. Rough locations of these soils may be estimated by description of terrain in the soil survey. They are not mapped. This information is necessary for the evaluation of proposed uses if they are to be done with minimal disturbance.

B. Management Actions

This plan proposes to acquire baseline resource data to be used in making future management decisions and to provide management guidelines to prevent actions that would degrade the water quality of this watershed. This plan will provide guidance on maintenance of water quality to protect the high quality salmon spawning beds on BLM administered lands. To determine what kinds of development can be allowed and where, we will have to determine sensitive areas, establish baseline water data, monitor water quality and quantity, and control surface disturbing-activities on the BLM-administered lands.

The only sensitive areas known at present are the spawning beds on the main stem of the Tozitna River. There is no information about spawning beds on Dagislahkna or Banddana Creeks. Areas of easily erodible soils have not been identified. To facilitate management decisions these sensitive soils need to be delineated on maps. The combined hardwood forest, mixed forest and shrubland vegetation typing needs to be separated into components.

There is a need for water resource data to establish a baseline for future comparisons and for resource management decisions. Necessary actions include:

- Establish hydrological cross sections for water flow determinations near the mouths of Banddana and Dagislakhna creeks, on the Tozitna River near Tozikaket, and below the mouth of Fleshlanana Creek. Install water level stage recorders at each site. This will allow daily monitoring of water quantity.

- Collect basic water quality information at these stations for high, low and average summer flows. The baseline water inventory would require data gathering for a minimum of five years. Data gathered would include pH, hardness, alkalinity, dissolved oxygen, water velocity, and turbidity.

- Continue snow surveys at Tozikaket for depth, water quantity and acid precipitation.

Different levels of activity in the watershed will require different levels of data collection and monitoring. The levels proposed here are basic needs.

The following decisions shall be observed to control surface-disturbing activities:

- All mining activity will require an approved plan of operations prior to starting any surface-disturbing activities other than those described as casual use by 43 CFR 3809.

- Require permits for all cross-country moves of equipment or vehicles weighing in excess of 1,500 pounds. Moves shall be made on frozen ground and a minimum of 10 inches snow cover.

- Limit timber harvesting to local subsistence use.

IV. NEPA Process

A. Environmental Assessment

This plan was mandated by the Central Yukon RMP. An environmental impact statement was prepared for the RMP.

The purpose of this plan is to maintain the present condition of spawning beds and water systems. There are no proposals to accomplish physical changes in the environment. The activities taking place will be inventory and monitoring which are categorical exclusions in the NEPA process. See Appendix D for a categorical exclusion justification statement.

B. Consultation and Coordination

Bureau of Land Management

Kobuk District Staff:

- Herb Brownell—Supervisory Realty Specialist
- Cathie Jensen—Realty Specialist
- Boyce Bush—Realty Specialist
- Jim Deininger—Geologist
- Steve Storo—Geologist
- Bob Barnes—Supervisory Natural Resource Specialist
- Scott Robinson—Wildlife Biologist
- Joe Webb—Fisheries Biologist
- Larry Field—Natural Resource Specialist
- Howard Smith—Natural Resource Specialist

Dave Vogler—Hydrologist, Steese/White Mountains District

Ron Huntsinger—Hydrologist, Alaska State Office

Other Agencies and Public

Matt Robus—Alaska Department of Fish & Game Habitat Division

Louis Barton—Alaska Department of Fish & Game Commercial Fisheries Division

Jack Blume—area resident

Karen Kohout—area resident

Jay Worley—commercial pilot

Tanana Fish and Game Association

C. Public Affairs Plan

This management plan was subject to public review before it was final. In December 1988, draft copies of this plan were sent to interested publics, who were asked to submit either written or oral comments during a 30-day review period ending Jan. 30, 1989. In addition, news releases requesting comments and announcing the final product were issued.

Only two comments were received from outside BLM. The comments are considered in this final version.

V. Monitoring Plan

Once data sites have been established and actual baseline data gathered, there will be a need to track water quality, monitor snow and acid precipitation, and record water level stages. The monitoring plan will be developed during the fifth and sixth years of the plan.

Monitoring could be at a variety of levels and frequencies depending on information gained during baseline data gathering and the location and level of development occurring. For example, if a developer were to begin physical development on the tungsten deposits at the head of Banddana Creek, the monitoring of water quality parameters on Banddana Creek and Tozitna River below the confluence with Banddana Creek should be increased to monthly sampling (weekly for the first year of production). Development of coal mining in the southeastern portion of the watershed would necessitate increased monitoring of the upper Tozitna River and data collection in the associated tributaries.

Information collected will be entered into BLM's automated database.

The anticipated maintenance needs would be on data gathering sites and equipment. The annual costs would be primarily for employee time and transportation.

VI. Project Schedule

Four alternative inventory options were developed, each covering a six year period, ranging from a continuation of the present situation to full required data gathering. Synopses of the four options are presented below:

Option 1: This option will provide data that can be used for establishing instream flow water rights, but does not include water data from above the spawning beds. It does allow modifying the land cover mapping to differentiate presently consolidated typing when opportunities arise. This option does not include determining the location of highly erodible soils. This means we would continue to guess when faced with a situation needing specific soils locations. The funding is based on the assumption that everything will go according to plan. If weather prevents completion of a flight or high water washes out a data sensor, we will have to obtain funding elsewhere or lose data. Lost data will require extension of the project for another year to obtain.viable baseline information. The six-year cost of this option would be $23,800 for 5.5 workmonths and $39,150 for equipment acquisition and operations.

Option 2: This option provides sufficient funding to give reasonable assurance of collecting accurate information with built-in checks to safeguard loss of information. It provides water information from above the known spawning beds as well as from lower sites. This option will provide information that can be used for establishing instream flow water rights. This includes looking at the soils to locate highly erodible areas and provides for modifying the land cover mapping to differentiate presently consolidated typing. The six-year cost of this option would be $32,450 for 7.5 workmonths and $63,250 for equipment acquisition and operations.

Option 3: This option represents a median approach to the job. With this option there is an increased risk of losing data because it provides fewer on-site visits. It provides water information from above the spawning beds as well as the lower sites. This option will provide information that can be used for establishing instream flow water rights. This includes locating highly erodible soil areas and providing for modifying the land cover mapping to differentiate presently consolidated typing, but does not provide time and funds for field checking changes in soil and vegetation mapping. The six-year cost of this option would be $23,800 for 5.5 workmonths and $57,850 for equipment acquisition and operations.

Option 4: This represents a continuation of the present level of activity. Snow data would continue to be gathered twice a year. No water quantity or quality data would be taken. The soil data would not be upgraded and knowledge of vegetation cover would not be enhanced. The cost would not increase above present level, approximately $1,000 per year.

Of the four alternative inventory options, option 3 best meets the needs of the data requirements to management the area as required by the RMP. Option 3 is selected as the preferred course of action and is presented below:

Project Schedule—Option 3

First year: Acquire electronic water level stage recording equipment for the four sites listed in III.B. These sites are near the mouth of Banddana Creek, near the mouth of Dagislakhna Creek, on the Tozitna River near Tozikaket, and below the mouth of Fleshlanana Creek. Note: gathering data at or near Fleshlanana Creek will require a helicopter.

Locate sites and survey stream cross sections and install water level recorder data pods. This will require the services of a hydrologist, either from the BLM Alaska State Office, another district, or from another agency. Take initial readings. Near the end of September return to the sites, collect data from the data pods and remove the sensors.

While gathering level data, take a water flow reading and collect the following water data at the four sites:

Dissolved Oxygen
Carbon Dioxide
pH
Free Acidity
Total Acidity
Alkalinity
Total Hardness
Air Temperature
Water Temperature

Continue snow surveys at Tozikaket for depth, water quantity and acid precipitation.

Second year: Set out water level recorders after breakup. Collect flow and water chemistry data at beginning of the season and end of season. At end of season collect water level data and remove recorders.

Continue snow surveys at Tozikaket for depth, water quantity and acid precipitation.

Using Landsat imagery, modify vegetation mapping and separate the brushland, deciduous forest and mixed coniferous-deciduous forest type into separate types. Field check vegetation types and deliniate highly erodible soil areas over the next few years while using a helicopter.

Third through fifth years: Annually set out water level recorders after breakup. Collect flow and water chemistry data at beginning of the season and end of season. At end of season collect water level data and remove recorders. Continue snow surveys for depth, water quantity and acid precipitation at Tozikaket.

Sixth year: Evaluate data collected and determine needs for future data collection. Develop monitoring plan for continued collection of data on water quantity and quality. Continue data collection as necessary based on the evaluation.

VI. Project Budget

First year:

Water level recorder equipment (4 sites)	$ 8,500
Manpower - 2 workmonths ($4,300 each)	$ 8,600
Aircraft - fixed wing (4 trips)	$ 4,000
- helicopter (2 trips)	$ 3,000
Boat rental with operator (6 days @ $75/day)	$ 450
Per diem - (2 persons, 7 days @ $100/day)	$ 1,400
Total	$25,950

Second year:

Manpower - 1 workmonth ($4,300 each)	$ 4,300
Aircraft - fixed wing (4 trips)	$ 4,000
- helicopter (2 trips)	$ 3,000
Boat rental with operator (4 days @ $75/day)	$ 300
Per diem - (2 persons, 4 days @ $100/day)	$ 800
Total	$12,400

Third year:

Manpower - .5 workmonth ($4,300 each)	$ 2,200
Aircraft - fixed wing (4 trips)	$ 4,000
- helicopter (2 trips)	$ 3,000
Boat rental with operator (4 days @ $75/day)	$ 300
Per diem - (2 persons, 4 days @ $100/day)	$ 800
Total	$10,300

Fourth year:

Manpower - .5 workmonth ($4,300 each)	$ 2,200
Aircraft - fixed wing (4 trips)	$ 4,000
- helicopter (2 trips)	$ 3,000
Boat rental with operator (4 days @ $75/day)	$ 300
Per diem - (2 persons, 4 days @ $100/day)	$ 800
Total	$10,300

Fifth year:

Manpower - .5 workmonth ($4,00 each)	$ 2,200
Aircraft - fixed wing (4 trips)	$ 4,000
- helicopter (2 trips)	$ 3,000
Boat rental with operator (4 days @ $75/day)	$ 300
Per diem - (2 persons, 4 days @ $100/day)	$ 800
Total	$10,300

Sixth year:

Manpower - 1 workmonth ($4,300 each)	$ 4,300
Aircraft - fixed wing (4 trips)	$ 4,000
- helicopter (2 trips)	$ 3,000
Boat rental with operator (4 days @ $75/day)	$ 300
Per diem - (2 persons, 4 days @ $100/day)	$ 800
Total	$12,400

Grand totals

5.5 workmonths	$ 23,800
operations	$ 57,850
	$ 81,650

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Appendix A—Definition of Areas of Critical Environmental Concern (ACEC)

(This definition taken from the Central Yukon RMP-EIS, pages 389-390)

The objectives of 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 (FLPMA) 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—Legal Description

NOTE: Includes only those portions of the listed sections that are inside the watershed.

Fairbanks Meridian

T.4N., R.23W., Sec.5, 6, 7.
R.24W., Sec.1-23, 27-29.
R.25W., Sec.1, 12.
T.5N., R.22W., Sec.6.
R.23W., Sec.1-35.
R.24W., Sec.1-36.
R.25W., Sec.1-17, 24, 25.
T.6N., R.20W., Sec.3-9, 17, 18.
R.21W., Sec.1-18.
R.22W., Sec.1-21, 29-31.
R.23-25W., All
R.26W., Sec.1-4, 10-15, 23-25, 36.
T.7N., R.18W., Sec.6.
R.19W., Sec.1-12, 17-19.
R.20W., Sec.1-35.
R.21-25W., All
R.26W., Sec.1, 12, 13, 24-26, 34-36.
T.8N., R.17W., Sec.4-7.
R.18W., Sec.1-23, 26-31.
R.19-25W., All
R.26W., Sec.1, 12, 13, 23-26, 36.
T.9N., R.15W., Sec.3-7, 15-20.
R.16W., Sec.1-21, 30.1
R.17W., Sec.1-36.
R.18-24W., All
R.25W., Sec.1-4, 9-16, 21-29, 32-36.
T.10N., R.14W., Sec.4-9, 17-20, 30.
R.15W., Sec.1-35.
R.16W., Sec.6, 7, 12-36.
R.17W., Sec.1-36.
R.18W., Sec.1-36.
R.19W., Sec.1-36.
R.20-24W., All
R.25W., Sec.1-3, 9-15, 21-28, 32-36.
T.11N., R.14W., Sec.30-33.
R.15W., Sec.25-29, 32-36.
R.17W., Sec.30-34.
R.18W., Sec.25-27, 33-36.
R.19W., Sec.29-32.
R.21W., Sec.5-8, 13-36.
R.22W., Sec.1-36.
R.23W., Sec.1-4, 7-36.
R.24W., Sec.13, 14, 21-36.
R.25W., Sec.25, 5, 36.
T.12N., R.21W., Sec.31, 32.
R.22W., Sec.31, 32, 36.
R.23W., Sec.33, 36.

The areas described aggregate approximately 1,050,000 acres. This includes Native- and state-selected lands as well as Native interim-conveyed and state tentatively approved lands.

Appendix C—Tozitna River Salmon Escapement Surveys, 1974 to 1987.

Escapement index taken on the Tozitna River from Dagislakhna Creek to Fleshlana Creek by Alaska Department of Fish and Game, Commercial Fisheries Division.

YEAR		No. KINGS		No. CHUMS
1974		----		1,823
1975		202		3,512
1976	INCOMPLETE	42	SURVEY	725
1977		123		761
1978		194		2,262
1979	NO SURVEY			
1980		257		580
1981	NO SURVEY			
1982		51		874
1983		388		1,604
1984	NO SURVEY			
1985		86		1,030
1986		222		1,778
1987	NO SURVEY			

This data is from aerial counts taken at the peak of the run. Sort of a point estimate; it is a reflection of trend or relative abundance.

Fall chums have been observed but have not been counted.

From a phone conversation with Louis Barton, Alaska Department of Fish & Game Commercial Fisheries Division, May 1988.

Appendix D—Decision Record: Categorical Exclusion

Type of Action: Inventory and Monitoring
Serial Number: None
District: Kobuk

Environmental Compliance

We have reviewed the Tozitna Watershed Management Plan and have determined the action will have no significant effect on the quality of the human environment, and will not involve unresolved conflicts concerning alternative uses of available resources. These actions as listed in 516 Departmental Manual 6, Appendix 5.4A(1,2), are categorically excluded from the NEPA process. The nine exceptions to a categorical exclusion as listed in 516 DM 2.3A(3) do not apply, and an Environmental Analysis (or Environmental Impact Statement) is not required.

District Manager:

Roger Boldstad

Date: 8/31/89