FISHERY INVENTORY

Great Bear Wilderness Study Area,

L.H. Dawson
Fisheries Biologist

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The fishery resource of the Great Bear Wilderness Study Area (hereinafter called the study area) consists of two separate and distinct fisheries systems. The geographical locations of these two systems are on either side of the north end of the Bob Marshall Wilderness and are discussed separately. The eastern area (hereinafter termed the eastern portion) is part of the Lewis & Clark National Forest and is situated on the east slope of the Rocky Mountain front range. This area drains to the Marias and Teton Rivers. The western area (hereinafter called the western portion) is entirely on Flathead National Forest land and drains to the Middle and South Forks of the Flathead River. This area is vitally important for natural reproduction by the migratory species of fish inhabiting the Flathead River system which includes Flathead Lake and Hungry Horse Reservoir.

There are 97 tributaries to the Middle Fork of the Flathead River totaling 415 stream miles. Approximately three-fourths of this stream mileage is within or is fed by watersheds within the study area.

The South Fork of the Flathead River has 28 tributaries which flow from the study area. In several instances only the headwaters of the streams are in the area boundary. Exceptions to this are Twin Creek, Lower Twin Creek and Riverside Creek. Dean Creek, a tributary to the Spotted Bear River, is also within the study area.

A list of named tributaries and stream mileage is included in the appendix.

Fisheries investigations have been conducted on streams and lakes in, and associated with, the entire study area, but most emphasis has been on the Flathead River. These long term investigations by the Montana Department of Fish and Game are continuing. Job progress and completion reports are published annually and specific documents are cited in this report.

A limited number of aquatic habitat inventories have been completed which describe physical conditions in streams on Flathead and Lewis and Clark National Forests. Table I lists the stream surveys which have been made within the study area. These surveys were completed by Forest Service personnel in accordance with direction provided by the Forest Service Wildlife Surveys Handbook (USDA-1973). A comprehensive inventory of lakes has been completed on Flathead National Forest (USDA-1973).

Table I. Stream surveys in the Great Bear Wilderness Study Area.

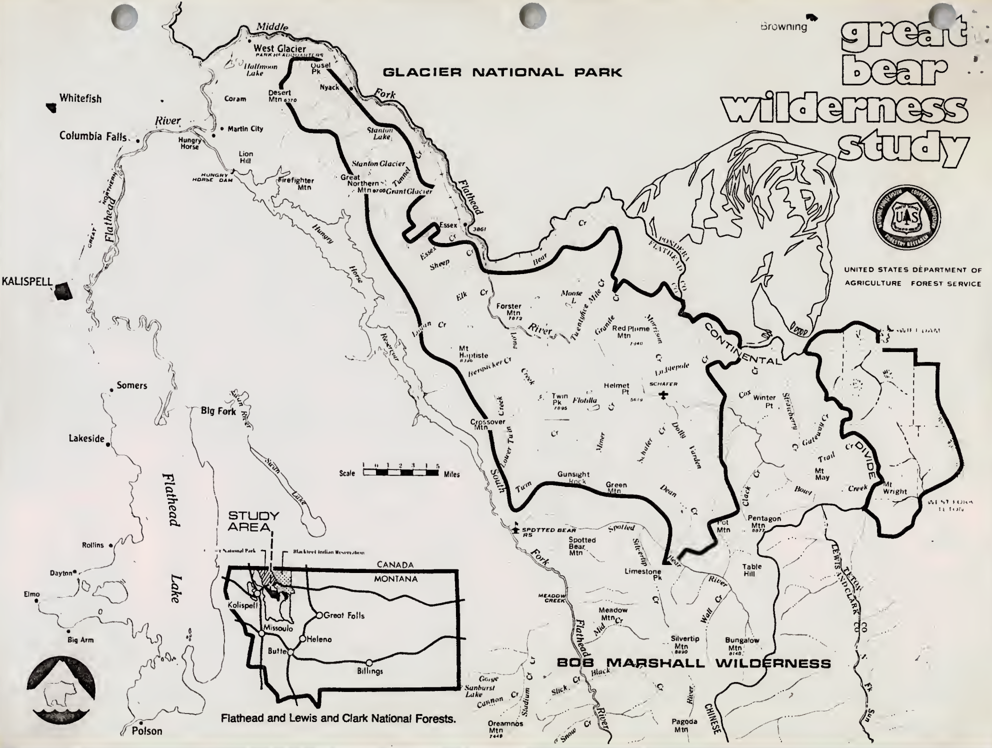
Stream Name	Year Surveyed	Remarks	Investigators
Lodgepole Creek	1966	Upper Middle Fork Drainage	Mefford & Howard
Schafer Creek	1966	"	"
Dolly Varden Cr.	1966	"	"
Morrison Cr.	1967	Upper Middle Fork Drainage	Howard & Robbins
Puzzle Cr.	1967	Trib. to Morrison	"
Middle & South Forks - Flathead River	1970	Wild & Scenic	Casey & Barce
Dean Cr.	1971	Trib. to Spotted Bear River	Barce & Nemeth
Whitcomb Cr.	1971	"	"
Olney Creek	1973	Teton River Drainage	Evans & Duff
North Fork-Teton River	1973	"	Dargon & Hansen
West Fork-Teton River	1973	"	Evans, et.al.

INVENTORY OF THE FISHERY - WESTERN PORTION

Streams

Self-sustaining populations of native cold water fishes typify the Flathead River drainage which possesses one of the outstanding native fisheries for westslope cutthroat trout (Salmo clarki lewisi) and Dolly Varden (Salvelinus malma) in the United States (Casey, 1971). Other game fish which occur in the streams and lakes in this area include the native mountain whitefish (Prosopium williamsoni), the eastern brook trout (Salvelinus fontinalis), rainbow trout (Salmo gairdneri) the Yellowstone Cutthroat trout (Salmo clarki) and the kokanee salmon (Oncorhynchus nerka). Kokanee are not found in the South Fork-Flathead River above Hungry Horse Dam (USDA 1973). This dam blocks all migration from Flathead Lake, but native populations of Dolly Varden, westslope cutthroat and mountain whitefish are present in Hungry

great bear wilderness study



Flathead and Lewis and Clark National Forests.

UNITED STATES DEPARTMENT OF AGRICULTURE FOREST SERVICE

Horse Reservoir and migrate into tributary streams to spawn (Gaffney, 1959). Another species, the Arctic grayling (Thymallus arcticus), has been introduced into a few lakes where its chance for survival was determined to be good. This species is not common, but is present in the Flathead River and is taken only infrequently by anglers.

The importance of unrestricted fish passage from Flathead Lake into the Middle Fork and its tributaries and from Hungry Horse Reservoir into the South Fork and its tributaries cannot be over-emphasized. The Montana Department of Fish & Game estimates that 45 percent of the recruitment for Flathead Lake fisheries comes from the Middle Fork.

Both the westslope cutthroat and the Dolly Varden migrate into small tributary streams to spawn (Huston, 1958). Hanzel (1960) and Johnson (1961) stressed the extensive utilization of small tributaries by cutthroat trout. These fish move into the tributaries during April and spawning will occur into July during the high flow period (Brown, 1971). Little, if any, spawning by this species occurs in the main rivers. The non-migratory (resident) cutthroat populations remain in the stream year-round, but spawning occurs at the same times as for migratory fish. These resident trout occur mostly in the upper reaches of the Middle and South Forks. An effort is being made by the Montana Department of Fish and Game to maintain and extend the distribution of the westslope cutthroat trout in the State. Since rainbow will hybridize with cutthroat trout, the rainbow are no longer stocked in streams in the drainage (Schumacher, 1975). As previously stated, cutthroat trout populations are maintained by natural means.

Dolly Varden, the largest fish in the river system, are fall spawners and egg-laying may occur from September through mid-November. These large char have been tagged and migrations of over 100 miles observed. Cold headwater streams with clean gravel or rubble bottoms are preferred spawning areas. These fish are frequently observed by hunters and anglers in the fall, far up some small drainage spawning in water so shallow that their backs are exposed (Hensler, 1976). After spawning the adults move downstream to Flathead Lake and Hungry Horse Reservoir. The Montana Department of Fish and Game considered the Dolly Varden fishery of such high importance that a special regulation was placed in effect which closed specific tributary streams to all angling (State of Montana, 1953). The closed tributaries of the Middle Fork are Granite, Morrison, Lodgepole, and Long Creeks and their tributaries. These closures were placed in effect to provide spawning areas which would not be disturbed. Further action was taken to aid in perpetuating the species by the establishment of an 18 inch minimum size limit on Dolly Varden. These fish to not mature sexually until the fourth or fifth year of age at which time they are usually less than 18 inches long (Brown, op.cit.). This species is recognized as a highly valued and important game and food fish.

The mountain whitefish, another important native game fish in Montana, is a fall spawning species and is present throughout the drainage. It provides forage for Dolly Varden, year-round angling for the sportsman,

and is an excellent food and game fish. Most of the whitefish harvested by anglers are taken during the fall spawning run. Whitefish enter tributary streams in October and November where they are usually observed concentrated in deep holes in the lower reaches. Spawning sites exist wherever there is gravel and enough current to keep it clean. The adhesive eggs stick to sand and gravel which anchors them to the bottom. Hatching may require as long as five months, depending on water temperatures.

A few of the streams contain eastern brook trout, but these fish are not numerous. Brook trout are fall spawners and usually occur in the lower reaches of a few tributaries to the Middle Fork.

Kokanee salmon are abundant in the lower reaches of the Middle Fork only when they migrate from Flathead Lake to spawn. The greatest concentration of kokanee is usually near the outlet of McDonald Lake in Glacier National Park. A few kokanee have been taken by anglers as far upstream as Schafer Meadows on the Middle Fork, but these are rare occurrences. The greatest harvest of kokanee from the Flathead River system is by snagging during the fall spawning migration which usually peaks in October. If any spawning by this species does occur in the mouths of tributaries to the Middle Fork, it is probably limited.

The arctic grayling is present in the Flathead River drainage, but is seldom taken by anglers in the Middle Fork. This species is native to the Missouri River drainage and has been introduced into a number of lakes on both sides of the Continental Divide. Grayling are spring spawners and utilize the small tributary streams for this purpose. Conditions required for spawning are similar to those required for trout.

Another introduced species, the rainbow trout, is present in minor numbers in a few streams, and was stocked in many lakes in earlier years. Where this species is self-perpetuating, it is allowed to exist. No stocking of rainbow is being done now because it hybridizes with the cutthroat.

Non-game fish species present in the drainage include northern squawfish, peamouth, redside shiner, longnose and largescale sucker, and sculpins.

Table II is a list of streams and the fish species known to be present. This list is not intended to be comprehensive, but rather to show general stream fishery composition.

Table II. Streams in the study area and sport fish species present.[1/]

Stream	Fish Species
Bear Creek	WCT, DV, EB, MWF, Cottus[2/]
Bradley Creek	WCT
Charlie Creek	WCT
Cy Creek	WCT
Dean Creek	WCT
Deerlick Creek	MWF, WCT,EB
Dirtyface Creek	DV, WCT
Elk Creek	DV, WCT
Essex Creek	DV, RB
Granite Creek	DV, WCT, MWF
Java Creek	WCT
Lodgepole Creek	DV, WCT
Logan Creek	WCT
Long Creek	DV, WCT
Marion Creek	WCT, RB, WCTxRB
McInernie Creek	WCT
Middle Fork of the Flathead River	DV, WCT, KOK, RB, EB, MWF
Morrison Creek	DV, WCT, EB
Murray Creek	WCT
Riverside Creek	WCT (Resident population), MWF below barrier
Schafer Creek	WCT
Sheep Creek	WCT
Stanton Creek	WCT, RB, MWF
Twentyfive Mile Creek	WCT
Tunnel Creek	DV, WCT
Twin Creek	DV, WCT, MWF
Upper Twin Creek	WCT (Resident population above falls), MWF

1/ These data from Montana Dept. of Fish and Game stocking and fishery inventory records.

2/ Sculpins (Cottus) are common to most of the region's streams. Not a sport fish.

Lakes

The lakes in this Study Area are considered to be high-mountain lakes of the oligotrophic subalpine type (Welch, 1952). They are characterized by being deep, having cold water with little organic material and low fertility, and having a high dissolved oxygen content.

Many of the smaller lakes are too shallow to support a year-round fishery. The Montana Department of Fish and Game has conducted high-mountain lake surveys which included several of these lakes (Domrose, 1969). The lakes were investigated to determine basin morphology, basic water chemistry, dissolved oxygen and temperature profiles, composition of fish population, and whether natural reporduction could sustain the fishery or if stocking would be required.

In the past, lake management activities attempted to establish and maintain various species of salmonids through stocking. These species included eastern brook trout, rainbow, Yellowstone cutthroat, westslope cutthroat, and grayling. Complications were encountered when the Yellowstone cutthroat and rainbow trout hybridized with the westslope cutthroat. The offspring were ultimately less adaptable to the waters in question than native fish and the hybrids are known to produce eggs of poorer quality. Thus, stocking of these non-native species has since been discontinued.

The present policy of the Montana Department of Fish and Game is to maintain and extend the range of the westslope cutthroat trout. In lakes this is done by stocking to establish the species, followup investigation to determine survival and reproduction, and subsequent stocking if reproduction is not observed. In streams imprint stockings of cutthroat fry are used to establish the species.

Cutthroat trout living in high mountain lakes prefer inlet streams, but will spawn in the outflow streams of these lakes and many of the young produced move downstream rather than back into the lakes. Thus, any lake having a trout population and draining into a stream is capable of placing a resident population of that species in the stream. In years of low precipitation it is possible that newly hatched fish are lost when outflow streams go dry. In high mountain lakes self-sustaining trout populations are usually found in those lakes having adequate depth and with areas of suitable inlet and outlet streams for spawning.

There are fifteen lakes suitable for fish management in this study area. Most of these lakes now have a fish population and the species most frequently caught by anglers is the westslope cutthroat. The lakes are usually accessible by hiking trails. This ease of accessibility, coupled with an outstanding scenic location, make these lakes highly desirable for anglers seeking a fishing-recreation experience.

Level 3 lake surveys have been completed for nearly all lakes on Flathead Forest. These surveys were completed in accordance with specifications of the Forest Service Manual. This type of survey assembles all available lake information from a search of Forest file material, aerial photographs, and State Fish and Game Department records. Information for these surveys include size, depth, accessibility, location, type of lake, elevation, and shoreline. Standard survey forms are completed for each body of water. Table III is a listing of the major fishing lakes in the study area.

Table III. Major fishing lakes in the Great Bear Wilderness Study Area.

Lake Name	Fish Species[1/]	Remarks
Almeda Lake	WCT	Fish stocking records from as early as 1942 indicate that both fingerlings and eyed eggs of various species have been stocked in lakes and streams.
Bergsicker Lake	WCT	
Castle Lake	WCT	
Cup Lake	WCT	
Dickey Lake	WCT	
Elk Lake	WCT	
Flotilla Lake	YCT	Eyed eggs could withstand longer periods of handling provided water temperatures were kept cold. Present day stocking is usually by helicopter or truck and the fish are usually fingerling size.
Marion Lake	CT	
Scott Lake	WCT	
Stanton Lake	MWF, FSU CT, EB	
E. Tranquil Lake	WCT	
W. Tranquil Lake	WCT	
Tunnel Creek Lake	WCT	
Upper Sheep Lake	WCT	

1/ Abbreviations used for fish names:

YCT Yellowstone cutthroat trout
WCT Westslope cutthroat trout
EB Eastern brook trout
RB Rainbow trout
MWF Mountain whitefish
FSU Longnose sucker

Management of the high mountain lakes by the Montana Department of Fish and Game is accomplished by means of fishing regulations establishing seasons and limits, enforcement of the regulations, lake surveys, and fish stocking. Early lake stocking (State of Montana, 1942) was accomplished by carrying fish eggs in on pack animals. The present day method is much more efficient, since helicopters are used to stock live trout fry.

During the high mountain lake surveys some of the lakes were found to have no apparent fish population, but the habitat was suitable for fish survival. Westslope cutthroat trout were stocked and resurveys in following years indicated that is was doubtful these lakes could maintain a fish population by relying on natural reproduction. Continued periodic stocking of these lakes is desirable because of the unique angling and recreation experience these lakes provide.

INVENTORY OF THE FISHERY - EASTERN PORTION

Most of the permanently flowing streams in this portion of the study area support cold water fish populations. With the exception of the Dolly Varden and the kokanee salmon, the same species of game fish occur in both portions of the study area. Therefore, the same basic fishery requirements exist in both segments.

Rainbow trout have been stocked in all major drainages of the eastern area and are the most common game fish present. Both rainbow and brook trout occur in the same streams either with the cutthroat or separated by a barrier (Hill, 1976). In his planning unit report, Evans (1976) states:

"Remnant populations of cutthroat trout occur in several drainages including the South Fork Two Medicine Creek, Badger Creek, Birch Creek, Dupuyer Creek, and the Teton River (Hanzel, 1959). It is questionable whether these are pure strains of cutthroat since rainbow trout, with which they readily hybridize, are also present in these streams. There may be some pure cutthroat populations isolated above waterfalls or other natural barriers. A thesis by Roscoe (1974) identifies the cutthroat trout of this area to be the westslope (lewisi) subspecies."

The cutthroat trout of the eastern area are further differentiated from those of the western area by the Montana Department of Fish and Game (Holton, 1977). The designation used is appended to the scientific name as follows:

westslope cutthroat trout (Salmo clarki lewisi), upper Missouri River race.

There are only a few high mountain lakes in the eastern area and these are considered to be marginal for fish. As a result, these lakes are not managed for sport fishing.

Swift Reservoir is situated just off the eastern boundary of the study area and is fed by the three forks of Birch Creek. Cold water fish inhabiting this impoundment can migrate into the streams. The reservoir proper can provide only marginal fish habitat due to water level fluctuations. Road access to the reservoir is on the north side which is on the Blackfeet Indian Reservation. Fishing and use of boats both require a tribal permit. A small area of BLM land is adjacent to the south side of the reservoir and anglers on foot or on horses can gain access to the reservoir there.

Natural reproduction is sustaining the fisheries in these east slope streams at present. However, due to the limited habitat, it is estimated that the streams probably could not withstand a significant increase in fishing pressure. Table IV lists the major stream fisheries in this portion of the study area.

Table IV. Major streams and fish species present in the eastern portion of the Great Bear Wilderness Study Area.*

Stream	Species	
No. Fork Birch Cr.	CT	(RB and CT below barriers on all
Mid. Fork Birch Cr.	CT	three forks - Birch Creek)
So. Fork Birch Cr.	CT	Introduced 1974
Sheep Cr.	CT, EB	
No. Fork Dupuyer	CT, EB	
So. Fork Dupuyer	CT	
Blackleaf Cr.		Intermittent stream. Very low fisheries value.
No. Fork-Teton River	CT, RB, EB	
Bruce Creek		Appears favorable for CT
West Fork-Teton River	CT, RB, EB	

*From: Hill, William, 1976. Montana Dept. of Fish & Game Records.

REQUIREMENTS FOR AQUATIC LIFE

The requirements for fish life will vary with the season of the year, since spawning and migration occur from May through November. Probably the greatest volume of water is required for propagation during the May-November period. During the winter months of cold water temperatures and fish inactivity, less water is required to maintain the fishery.

Flows greater than the average minimum are required for adequate summer-time nursery areas. Long periods of low flow reduce the amount of available fish food (aquatic insects). Although fish populations can withstand short periods of low water, a constant low flow will produce a smaller aquatic biota (fish food) and consequently a smaller fish population.

FISHERMAN USE OF THE AREA

Fishing pressure in the Great Bear Wilderness Study Area is generally light for the overall period of use (May-October). However, more than 95% of the fishing pressure occurs in July and August. During 1975 fisherman creel census (see appendix) revealed that 61% of the total pressure occurred in the month of August alone. The area receives varying degrees of pressure with the lower, more accessible sites receiving most of the fisherman use. U.S. Highway No. 2 parallels the lower Middle Fork up to its confluence with Bear Creek. Fishermen can drive to Bear Creek, park their cars, and hike upstream along the river. Probably, the Middle Fork proper receives more actual fisherman use than its tributaries. In addition, lakes close to the highway where a

one or two mile hike is required receive more fishing pressure than do those lakes requiring extensive foot travel. Fisherman use on the Middle Fork of the Flathead River is summarized in Table V.

Table V. Estimate of fishing pressure on the Middle Fork of the Flathead River drainage. 1/

	1968	1975
Number of Anglers	7,041	7,373

1/ These data from Montana Department of Fish and Game's postal card survey of anglers (Hanzel, 1977).

PROBLEM AREA

Certain drainages in the study area have unstable mantle materials which annually place heavy sediment loads in the streams. The condition is attributed to the type of bedrock material in the area which produces unstable surface mantles and erodable soils (Childers, 1963; Johns, 1971). These conditions exist in portions of the upper Middle Fork of the Flathead River drainage where glacial faulting and scouring have produced oversteepened landforms. Unstable mantles on these landforms result in high natural erosion.

During flood periods and peak flows erosion is accellerated and vegetation is removed when the stream bank is scoured. New vegetation cannot reestablish itself in a short time because of this scouring and soil instability. Consequently, bank cover is lacking along these streams. Interbedded shales and sandstones are common to the area north and east of the Middle Fork and are a primary source of sediments. Specific drainages where these landforms have been identified include Twenty-five Mile Creek, Granite Creek, Morrison Creek, and Lodgepole Creek (Martinson, 1976). The land type inventory for the study area includes an overlay which shows the four major geologic types present. This overlay, when superimposed on the base map, clearly indicates the high erosion hazard of the silty area which is present in the north and east of the western portion.

The fisheries inventory for the Wild and Scenic River Study noted that where slow current existed pool bottoms were covered with silt. Both Dolly Varden and westslope cutthroat trout spawn in gravel having some current, which tends to keep spawning areas free of silts. However, because the Dolly Varden utilizes high elevation streams for spawning in the fall when current is usually much reduced it is possible that sediments could smother the eggs in the gravel. In the Environmental Analyses Report (E.A.R.) for the Puzzle Creek Timber Sale (USDA - Forest Service, 1973) it states that the bottom materials in the creek contained more fine material than is usually found in good trout spawning habitat.

The Forest Service's Regional Office review of this E.A.R. emphasizes the unstable nature of the soils in the drainage and the damage to streams from sedimentation and erosion (USDA - Forest Service, 1973).

The remainder of the western portion lies in the Flathead range west of the Middle Fork. The Flathead Range contains tributaries to the South Fork on its west side. Mantle materials in these mountains are more stable and present a lower erosion hazard than those east of the Middle Fork.

In the eastern portion the topography is characterized by steep sided drainages and sharp well defined ridges. Parallel reefs divided by narrow tributary drainages are common. All these drainages were damaged to varying degrees by severe flooding in 1964 and 1975. The narrow canyon sections were scoured and flood damage varied considerably depending on storm intensity, stream gradient, and vegetative cover on the watershed at the time of flooding.

Fishery habitat is considered to be medium for the entire study area with the poorest habitat situated on the soils with greatest sediment production potential.

SUMMARY

A. Conclusions

The fishery in this study area is unique since it is a spawning and nursery area for native Dolly Varden and westslope cutthroat trout. The Middle Fork of the Flathead River, within this area, is designated as a Wild River and is a major passage to spawning areas by these species. This drainage provides 45 percent of the natural reproduction by Dolly Varden and westslope cutthroat trout in the Flathead System. In the eastern portion the westslope cutthroat, Upper Missouri River race, is unique to the area.

Fisherman access is generally available during the period May through October. Weather, and the fact that the area is unroaded severely restricts winter use. Fisherman use of the area is light during the time the area is accessible. It is anticipated that overall fishing pressure will increase in the future as more leasure time becomes available to people and they in turn seek recreation in mountain environments.

Potential sources of water quality degradation do exist. The Schafer Work Center has pit toilets and drainfields which could possibly cause bacterial contamination of the streams if use is increased significantly. The same potential for degradation exists from the outfitter camps and public camping areas at each end of the airstrip. The heaviest use of this area is during the late summer and fall months, but at present this

level of usage does not appear to be causing water pollution problems. Another potential source of water quality depradation is from trails. Horses and people use the trails in the area for recreational and work purposes. Lake shorelines are especially susceptible to this type of impact. In addition to simply pulverizing the trail beds from high use (very apparent in some areas), animal excrement is deposited on the trails. Runoff from rains and the spring thaw tends to wash this material toward and into streams and this is a source of fecal coliform bacteria and viruses.

Fishery habitat in the study area is considered to be of medium productive quality. Serious erosion problems in the area east of the Middle Fork, flood damage in the eastern portion, and the generally pure, but low nutrient content of the water are factors primarily restricting the fishery. Barriers to fish passage are continually being placed in the streams due to unstable soils and natural processes. Food organisms of desirable types are present, but due to low mineral and nutrient content of the water these organisms do not become abundant.

B. Potential for Improvement

The principle limiting factors on the fish habitat of the study area are available food and water temperature. Attempts to change existing conditions in the Middle Fork would probably impose a negative effect on the downstream fishery. Increasing nutrients to provide food in the river would add nutrients to Flathead Lake which is already displaying increased levels of organic enrichment (Nunnalee, 1976). Thus, these types of habitat improvement projects should not be anticipated for the Middle Fork proper.

The tributary streams do present some opportunities for fish habitat improvement. Stream surveys indicate that numerous log and debris barriers exist in several streams. Hungry Horse Reservoir tributaries have both natural and man-made obstructions to fish passage. Road culvert barriers are present on several streams entering the east side of the reservoir. Natural waterfalls are barriers to fish passage on Upper Twin creek.

The boundary of the study area is situated so that many of the streams flowing out of the north and west extension are first and second order. Many of these high altitude streams probably would not have sufficient water to support a fishery in late summer. However, these drainages are critical in importance for helping to maintain high quality water.

Stocking programs 2323.35a - Forest Service Manual states:

> "Fish-stocking programs needed to meet wilderness management objectives shall be developed in cooperation with the States and shall be coordinated with overall wilderness management objectives. The

probability of increased visitor use at stocked waters and their full impact and effect on the wilderness resources will be recognized and considered. Practices will be directed at achieving quality fishing. Regional Foresters should develop with each of the respective States a supplement to the State--Forest Service memorandum of understanding (FSM 2611.1) which will establish a stocking policy for each wilderness as a basis for a stocking plan. Basic decisions will be spelled out in the management plan for each wilderness.

Where fish stocking is a desirable part of wilderness management, it will be done by primitive transport, except that Regional Foresters may authorize dropping of fish from aircraft where this was an established practice before the area was included in the National Wilderness Preservation System."

C. Recommendations

1. Maintain the area streams in a natural state to protect the existing native fishery. Natural reproduction rather than fish stocking is what maintains the stream fish populations at present.

2. High mountain lake management will continue to depend on periodic fish stocking. When this activity is a desirable part of Wilderness management it will be done by primitive transportation except that the Regional Forester may authorize dropping of fish from aircraft where this was an established practice prior to wilderness designation (Forest Service policy).

3. The Schafer Work Center and air strip should be maintained for administrative and management functions.

4. Barrier removal from streams should be accomplished only where migratory fish passage to spawning areas is blocked.

5. Continued and expanded fishery inventory is necessary to further define the fishery management needs in the area.

D. Suggestions for Consideration in Developing Alternatives for the Environmental Impact Statement

It may be more practical to designate only part of the area as Wilderness. This way present methods of fishery management could be continued in that portion outside the designated wilderness area. In the western portion of the study area an example of this would be to designate as wilderness the area from U.S. Highway 2 upstream on the Middle Fork to the Bob Marshall Wilderness. The remainder of the western portion, which includes many high mountain lakes, could continue under present management concepts.

Public attention will be drawn to the area if it is designated as wilderness. This undoubtedly would mean an additional increase in fishing pressure. The location of the area in proximity to U.S. Highway 2 and Glacier National Park insures that more people would be aware of it.

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APPENDIX

1. Tributaries and Stream Mileage - South Fork of the Flathead River - Great Bear Wilderness Study Area.*

	Stream Name	Miles
1.	Dean Cr. (Spotted Bear River Drainage)	8
2.	Twin Cr.	15
	Head Cr.	3
	Spy Cr.	2
	Grouse Cr.	2
	Nanny Cr.	3
	South Cr.	3
	North Cr.	3
3.	Lower Twin Cr.	10
	Tanner Cr.	2
4.	Dry Park Cr.	2
5.	Flam Cr.	3
6.	Brush Cr.	2
7.	Peters Creek	3
8.	Deadhorse Cr.	3
9.	Baptiste Cr. (H.H.)	3
10.	Hoke Cr.	3
11.	Devils Corkscrew Cr.	2
12.	South Fork Logan Cr.	4
13.	Logan Cr.	4
14.	Paint Cr.	3
15.	Felix Cr.	4
	Unawah Cr.	3
16.	Harris Cr.	3
	Emma Cr.	1

Stream Name	Miles
17. Canyon Cr.	3
18. Clorinda Cr.	3
19. Deep Cr.	3
Ruby Cr.	1
20. McInernie Cr.	3
21. Murray Cr.	3
22. Riverside Cr.	4
23. Tent Cr.	2
Dudley Cr.	3
Ryle Cr.	2
Seagrid Cr.	3
Lost Hair Cr.	2
24. Ada Cr.	1
25. Spring Meadow Cr.	2
26. Fire Cr.	2
27. Hungry Horse Cr.	6
Lost Mare Cr.	3
Tiger Cr.	4
Turmoil Cr.	2
Margaret Cr.	4
28. Emery Cr.	6
Oliver Cr.	2
Remmington Cr.	2
Royal Cr.	2
Striff Cr.	2
TOTAL	164

*From Records of Montana Dept. of Fish and Game, Regional Office, Kalispell, Montana.

2. Tributaries and Stream Mileage - Middle Fork of the Flathead River - Great Bear Wilderness Study Area.*

Stream Name	Miles
1. Dolly Varden Cr.	10
Argosy Cr.	4
Schafer Cr.	8
Rambler Cr.	1
Capitol Cr.	1
Rogue Cr.	1
Roaring Cr.	4
2. Morrison Cr.	12
Lodgepole Cr.	6
Brush Shack Cr.	2
Drumming Cr.	2
Whistler Cr.	3
Puzzle Cr.	4
3. Porter Cr.	2
Miner	
4. Lake Cr.	3
Bone Cr.	0.5
Guard Cr.	0.5
5. Bradley Cr.	2
6. Dryad Cr.	3
7. Granite Cr.	7
Sign Cr.	1
Dodge Cr.	2
Challenge	3
Tumbler Cr.	2.2
8. Castle Cr.	2
9. Twenty-five Mile Creek	6
Ear Cr.	2
Lynx Cr.	2
Moose Cr.	3
Goat Cr.	1
Cascade Cr.	1
10. Cy Cr.	4

Stream Name	Miles
11. Lynch Cr.	2
12. Vinegar Cr.	2
13. Long Cr.	7
Nye Cr.	2
Toboggan Cr.	2
Bergsicker Cr.	5
13. Charlie Cr.	4
Spruce Lake Cr.	2
14. Spruce Cr.	2
15. Elk Cr.	5
Dirtyface Cr.	2
16. Bear Cr. (to Park boundary)	7
Giefer Cr.	4
Snake Cr.	2
Grizzly Cr.	2
Mule Cr.	2
Stannard Cr.	2
Skyland Cr.	5
Devil Cr., West Fork	4
17. Java Cr.	5
18. Sheep Cr.	6
19. McDonald Cr.	2
20. Tank Cr.	1
21. Essex Cr.	6
Marion Cr.	2
22. Dickey Cr.	6
South Fork Dickey Cr.	2
23. Paola Cr.	4
24. Pinnacle Cr.	3

Stream Name	Miles
25. Tunnel Cr.	5
Grant Cr.	2
26. Disbrow Cr.	2
27. Stanton Cr.	5
Hidden Cr.	3
28. Crystal Cr.	3
29. Cascadilla Cr.	2
30. Wahoo Cr.	2
31. Rescue Cr.	2
32. Cascade Cr.	2
33. Skiumah Cr.	3
34. Great Bear Cr.	7
Deerlick Cr.	4
Pyramid Cr.	2
Moccasin Cr.	4
34. Ousel Cr.	3
35. Kootenai Cr.	3
TOTAL	338.2

*From records - Montana Dept. of Fish and Game, Regional Office, Kalispell, Montana. Does not include tributaries flowing out of Glacier National Park.

3. Approximate Stream Miles for Principal Streams within the Eastern Portion - Great Bear Wilderness Study Area.*

Stream Name	Miles
Birch Cr.	
No. Fork	6.0
Blind Cr.	1.4
Middle Fork	4.0
South Fork	8.2
Phone Cr.	5.0
Happy Cr.	2.2
Pinto Cr.	0.2
Crazy Cr.	1.5

Stream Name	Miles
Sheep Cr.	1.1
No. Fork Dupuyer Cr.	2.1
Hay Gulch Cr.	1.2
So. Fork Dupuyer Cr.	1.2
Teton River	
North Fork	5.2
Nanny Cr.	1.3
Bruce Cr.	2.5
East Fork Cr.	1.3
West Fork	5.4
Porcupine Cr.	1.6
Olney Cr.	1.5
Wright Cr.	10.0
TOTAL	53.9

*Measured from 1"/Mile Forest Service maps.

Table 1. Fisheries Data for the Middle Fork Flathead River Compiled by Montana Department of Fish and Game, Fisheries Division, Kalispell, Montana, 1975.

A. Monthly fishing effort and success as determined by field censusing.

	Angler /party	No. of Anglers	Hours/ Angler	Total Hours	Total Fish	Fish/ Hour	% Fish Kept
July	2.234	208	3.207	667.1	215	0.3228	70.78
Aug.	1.843	339	3.498	1186.2	691	0.5825	70.22
Sept.	1.667	7	2.500	16.7	7	0.4192	71.43
Total		554		1870.0	913	0.4882	70.36

B. Total Fish Pressure and Harvest Estimates (Middle Fork = 72 miles).

	Est. man-days of Fishing	Average Hours/Angler	Total Hours	Average Fish/Hour	Est. Fish Harvest
Summer	3,039	3.3754	13,663	0.4882	6,656
Winter	3,334*	--	--	--	--

*Only fishing pressure data available for this season.

C. Estimate Number of Fish by Species and Season Caught.

	Species[1/]					
	DV	Ct	Wf	Rb	Kok	Others	Total
Summer	751	4,454	649	95	547	160	6,656
Winter	--	--	--	--	--	--	--

D. Species Composition, Percent and Total Fish Caught Per Month

	DV	Ct	Wf	Rb	Kok	Others	Total
July	18.6	69.8	8.8	2.8	--	--	215
Aug.	9.1	65.9	10.0	1.0	10.9	3.2	691
Sept.		85.7	14.3	--	--	--	7
Summer Total	11.3	66.9	9.8	1.4	8.2	2.4	913

1/ DV=Dolly Varden; Ct=cutthroat trout; Wf=mountain whitefish; Rb=rainbow, Kok=kokanee; Other=grayling, largemouth bass, lake trout, brook trout, yellow perch

Table 2 Monthly percent of catch found in angler's creels of Dolly Varden and cutthroat trout for the Flathead, North & Middle Fork Rivers, 1975

River	May	June	July	Aug.	Sept.	Oct.	Seasonal Total	Percent
				Dolly Varden				
Flathead River	34.5	27.3	31.7	6.0	--	0.4	249	(53.7)
North Fork	--	2.8	52.3	41.3	3.64	--	109	(23.5)
Middle Fork	--	--	38.7	61.3	--	--	106	(22.8)
Rivers Combined	18.5	15.3	38.1	26.9	0.9	0.2	464	
				Cutthroat				
Flathead River	9.9	4.3	30.9	42.0	5.7	7.3	648	(22.8)
North Fork	--	0.1	52.6	46.8	0.5	--	1583	(55.6)
Middle Fork	--	--	24.9	74.1	1.0	--	614	(21.5)
Rivers Combined	2.2	1.1	41.7	51.6	1.8	1.7	2845	

Table 3. Percent of fishing pressure as determined by field censusing on the Flathead, North Fork and Middle Fork Rivers, 1975 (length of river sections given in miles in parenthesis)

	Percent of fishing pressure by river section				River Length Miles
	1	2	3	4	
Flathead River	10.0(19)	73.1(14)	7.1(13)	9.7(9)	(55)
North Fork River	62.6(18)	15.2(16)	21.9(25)	0.3(40)*	(59)
Middle Fork River	24.8(14)	32.6(25)	41.5(20)	1.2(15)	(72)
Total Miles					(186)

* This section of the North Fork River is in Canada and data from this section was excluded from the analysis totals.

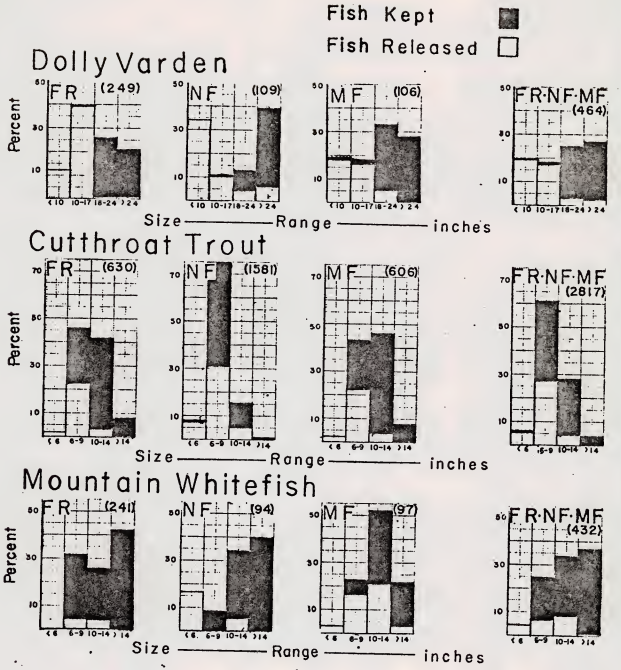

Figure 1

Size composition of Dolly Varden, cutthroat trout and mountain whitefish caught by anglers in the Flathead (FR), North Fork (NF), Middle Fork (MF) and rivers combined (FR NF MF) during the 1975 season. Ratio of fish kept to those released is shown by shaded area in each frequency interval. Total number of fish checked are in parenthesis.

Data from: Montana Dept. of Fish and Game, Fisheries Division, Kalispell, Montana, 1975.