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Bull trout distribution and barriers information based on data collected up to November, 1995. Base layers from the Natural Resource Information System at the Montana State Library and digitized @ 1:100,000.

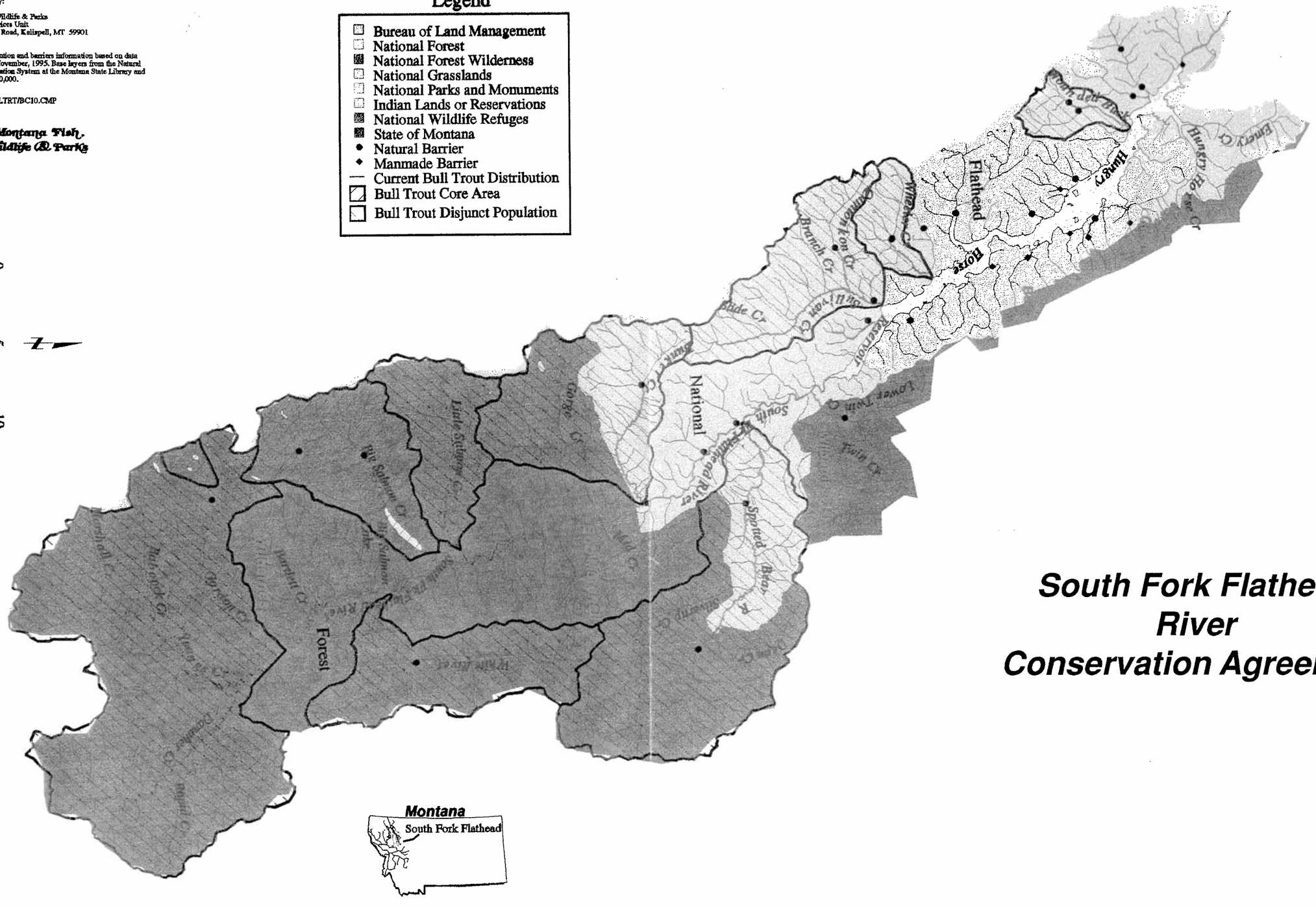
May 20, 1996
/GIS/JEFF/BULLTRT/BC10.CMP

Montana Fish, Wildlife & Parks

Legend

- Bureau of Land Management
- National Forest
- National Forest Wilderness
- National Grasslands
- National Parks and Monuments
- Indian Lands or Reservations
- National Wildlife Refuges
- State of Montana
- Natural Barrier
- Manmade Barrier
- Current Bull Trout Distribution
- Bull Trout Core Area
- Bull Trout Disjunct Population

0 5 10
Miles



South Fork Flathead River Conservation Agreement

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SIGNATORIES

We, the undersigned, enter into this Conservation Agreement to share the benefits derived by acting cooperatively in the protection and conservation of bull trout in the South Fork of the Flathead drainage. This document represents a reaffirmation of existing direction which has been proven to be successful in protecting bull trout in this drainage and is not new direction.

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CHAIR, TRIBAL COUNCIL
CONFEDERATED SALISH & KOOTENAI TRIBES

RALPH MORGENWECK
REGIONAL DIRECTOR
U.S. FISH AND WILDLIFE SERVICE

ALEXANDRA B. SMITH
VICE PRESIDENT, ENVIRONMENT
BONNEVILLE POWER ADMINISTRATION

JOHN KEYES
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FOREST SUPERVISOR, FLATHEAD NATIONAL FOREST
U.S. FOREST SERVICE

PATRICK GRAHAM
DIRECTOR
MONTANA FISH, WILDLIFE & PARKS

CONSERVATION AGREEMENT
AMONG
U.S.D.A. FOREST SERVICE, FLATHEAD NATIONAL FOREST
AND
MONTANA FISH, WILDLIFE AND PARKS
AND
CONFEDERATED SALISH AND KOOTENAI TRIBES
AND
BONNEVILLE POWER ADMINISTRATION
AND
U.S.D.I. BUREAU OF RECLAMATION
AND
U.S.D.I FISH AND WILDLIFE SERVICE

Conservation Agreement (the "Agreement") among the Flathead National Forest ("FNF"), Montana Fish, Wildlife and Parks ("FWP"), Confederated Salish and Kootenai Tribes ("CSKT"), Bonneville Power Administration ("BPA"), Bureau of Reclamation ("Reclamation") and Fish and Wildlife Service ("FWS") collectively referred to as either the "parties" or "Parties."

I. RECITALS

WHEREAS, the parties are committed to the conservation of the bull trout (*Salvelinus confluentus)* in the State of Montana in general and the South Fork of the Flathead Drainage ("South Fork") in particular;

WHEREAS, the Bull Trout Restoration Team has recommended the development of a conservation agreement for bull trout in the South Fork among the parties;

WHEREAS, the South Fork presents a unique situation due to the entirely federal land ownership in the drainage and the Bob Marshall Wilderness (Wilderness) designation for most of the drainage;

WHEREAS, several land, water, fisheries and recreation management plans have been developed, with the benefit of substantial public involvement, for or pertaining to the South Fork;

WHEREAS, an adaptive management approach to management of the various uses of the drainage has the best chance of success; and

WHEREAS, after consulting on the current scientific understanding of bull trout, the parties have agreed upon a set of reasonable and prudent management practices previously developed and incorporated into management plans and now combined in this agreement for coordinated implementation in the South Fork;

NOW THEREFORE, the Parties hereto agree:

II. STATED PURPOSES

A. Conservation of Bull Trout

1. The goal of the Parties is to conserve bull trout and allow the affected parties and the public to use and enjoy the land and waters within the South Fork. The purpose of the Agreement is to compile in one document management guidance that has been developed with the benefit of public involvement, which is currently found in several management plans, that will promote conservation of the South Fork bull trout population.

2. The actions taken as a result of this Agreement will benefit bull trout. The parties believe these actions will also benefit other aquatic species. Actions taken by the Parties for the benefit of bull trout should not adversely affect the South Fork native species assemblage.

3. Objectives and goals of this agreement include:

a. Ensure proactive involvement of concerned agencies/entities in addressing factors affecting bull trout in the South Fork.

b. Facilitate interagency communication and coordination for the identification, evaluation and resolution of factors affecting bull trout.

c. Provide a fishable population of bull trout in the South Fork drainage. As monitoring of the South Fork bull trout population continues, criteria will be developed that will be used to determine the conditions under which a fishing season for South Fork, or portions thereof, bull trout can be reestablished.

4. The Parties intent is to use an adaptive management approach to accomplish bull trout conservation in the South Fork.

III. MANAGEMENT GUIDELINES

The resources of the South Fork, including bull trout, are managed by several agencies/entities following certain authorities and various plans. This section briefly describes these authorities and plans and is organized by agency/entity.

A. Fish, Wildlife & Parks

1. Fisheries

a. Measures to Protect and Maintain Conditions For Bull Trout

i. Fisheries Management Plan for the South Fork Flathead Drainage (May 1991)

This document was developed by FWP, FNF and a citizen committee and approved May 10, 1991 by the FWP Commission. This plan outlines fisheries management direction for the South Fork Flathead River Drainage from the headwaters to Hungry Horse Dam. Within the plan are drainage-wide fisheries management goals that include: (1) maintain self-sustaining fish populations emphasizing bull trout and westslope cutthroat; (2) prevent hybridization of native species and improve genetic diversity where feasible; (3) provide a recreational fishery emphasizing quality of the experience over the quantity of harvest; (4) manage the fishery consistent with the FNF Wilderness management guidelines. The specific fisheries management goal for bull trout is to manage for a moderate increase in number and size of bull trout in the drainage.

ii. Fisheries Regulations for the South Fork Flathead Drainage

Bull trout regulations statewide and within the South Fork have become increasingly restrictive. This is in response to increased pressure and harvest and the operation of Hungry Horse Dam and the associated reservoir which impacts bull trout habitat. Prior to 1959, liberal fishing limits allowed 15 fish, not more than 10 pounds and one fish with an 18" minimum size on bull trout. The trend toward more restrictive regulations continued until 1994 when bull trout harvest was closed on all state waters except Swan Lake and Hungry Horse Reservoir where populations remained healthy. Tributaries to Hungry Horse Reservoir were also closed in 1994 to further protect migratory spawners that are highly susceptible to poaching and overharvest. Due to the potential impacts of deep reservoir drawdown on bull trout, Hungry Horse Reservoir was closed to the taking of bull trout under an emergency regulation in March of 1995. The entire South Fork is closed to the taking of bull trout.

b. Measures to Improve Conditions For Bull Trout

i. BPA funded Hungry Horse Dam Fisheries Mitigation

To date there have been no projects undertaken within this program for bull trout in the South Fork. However, the mitigation program may include such projects in the future.

ii. BPA Funded Deep Drawdown Mitigation at Hungry Horse Dam

As described in Section III.C.1.a., BPA is funding fisheries mitigation for deep drawdowns of Hungry Horse Reservoir that exceeded minimum elevations found in the Fish and Wildlife Program of the Northwest Power Planning Council (NWPPC). Fish, Wildlife and Parks (FWP), in cooperation with the CSKT have utilized this funding to undertake measures to improve conditions for bull trout. Efforts have included identifying and mapping important spawning and rearing habitat in tributaries surrounding the reservoir and monitoring of population strength and age structure within the reservoir pool. A cost-share arrangement to replace culverts, which functioned as fish barriers, was concluded. Replacement of these culverts will reconnect habitat for spawning and rearing westslope cutthroat and bull trout. Future mitigation projects include habitat restoration in three reservoir tributaries.

2. Reservoir Operations

FWP has developed Integrated Rule Curves (IRCs) for the operation of Hungry Horse Dam. These rule curves integrate operations for resident fish, anadromous fish, power generation and flood control. These rule curves have been developed based on ten years of empirical data collection and analysis and sophisticated modeling techniques. The result is a series of curves that can guide operation of Hungry Horse in such a way as to provide flows for anadromous salmonids, flood control and hydropower generation while still benefiting resident fish.

The IRCs were adopted by the NWPPC and incorporated into their Fish and Wildlife Program in 1994. The IRCs have not been implemented however as the reservoir is operated consistent with the National Marine Fisheries Service (NMFS) Biological Opinion as described in Section III.D.

FWP will continue to advocate for operations following the IRCs.

3. Recreation

Please refer to Section III.A.a.ii. which describes fishing regulations in effect on the South Fork of the Flathead River and Hungry Horse Reservoir.

4. Monitoring

Two primary techniques have been utilized to monitor the relative abundance and health of the bull trout population in the South Fork: bull trout redd counts in tributaries and reservoir fall gill netting. In the fall of 1993, an initial survey of 36 known or potential bull trout spawning streams was conducted to determine the extent of spawning in the entire drainage. This involved walking

each stream and counting actual "redds" or spawning sites constructed by adult fish. Spawning was observed in 15 of the 36 streams surveyed during this effort. From this survey, major "index" streams were selected that contained the majority of the spawning.

Index tributaries to the South Fork Flathead River within the Wilderness include: Little Salmon, Gordon and Young's creeks, and White River. Big Salmon Creek was included, however, this population is considered disjunct from the South Fork population. Index tributaries outside of the Wilderness draining directly into Hungry Horse Reservoir include the Spotted Bear River, Sullivan, Wheeler and Wounded Buck creeks.

Pending funding, the following specific monitoring will be continued to determine the relative abundance and health of the bull trout population.

a. Annual fall gill netting of Hungry Horse Reservoir in three areas: Emery, Murray, and Sullivan. Four double floating standard experimental and three standard experimental sinking gill nets per area.

b. Consecutive bull trout redd counts for a period of five years (beginning in 1993) in the aforementioned index streams (five Wilderness streams and four non-Wilderness streams). After five years of counts for baseline data determination (through 1997) we will revert to staggered interval counts on index streams which will key on new cohorts for differing age classes of bull trout.

c. Conduct estimates of juvenile bull trout abundance annually in two of the four non-Wilderness tributaries.

d. Determine spawning habitat quality and condition through McNeil coring in two Wilderness index streams (Little Salmon and Young's creeks) and two non-Wilderness streams. Frequency of monitoring in Wilderness streams will be coincident with redd counts, whereas monitoring in non-Wilderness streams will be dependent on future land management activity.

e. Additional FWP monitoring may also be developed through adaptive management principles to address parameters critical to bull trout life history.

B. Forest Service

1. Forest Management Practices

a. Measures to Protect and Maintain Conditions For Bull Trout

i. Flathead National Forest Land and Resource Management Plan

The Flathead National Forest Land and Resource Management Plan (LRMP) signed in 1985, guides all natural resources management activities and establishes management standards for the Forest. It describes resource management practices, levels of resource production and management. The LRMP will be revised every 10-15 years with amendments as needed.

The FNF is committed to multiple-use management which attempts to strike a balance among resources. Goals have been established to strive for balance. It is the FNF's goal to "maintain high quality water which meets or exceeds State and Federal water quality standards to protect migratory and resident fisheries, water-based recreation opportunities, and public water supplies."

Fisheries standards are designed "to maintain and where feasible, improve fish habitat capabilities in order to achieve cooperative goals with FWP and to comply with the state water quality standards." (LRMP, p.11-21)

In addition to specific standards for fisheries, other resource standards such as roads and timber management are designed to minimize effects on fisheries particularly in riparian areas. For example, lands in riparian areas (MA 12) are "classified as unsuitable for timber management and timber harvest will not be scheduled." Furthermore, timber harvest may occur only if "fish and wildlife habitat values can be maintained or improved" while "new roads will not be constructed in riparian management areas except as needed to cross the area". These standards serve to protect most stream processes that could be affected from timber harvest and road construction.

During the next several years the LRMP will be revised as directed. The revised plan will continue to have language to protect, maintain and restore bull trout populations and habitat across the Forest.

ii. Amendments 3 and 19 to LRMP

Amendment #3 ensures protection for westslope cutthroat trout habitat. In addition, bull trout standards were amended to incorporate the latest scientific technical findings from Flathead Basin Commission studies.

The following standards pertain to critical or important bull trout spawning and/or rearing streams:

1. Sediment model techniques will be used to evaluate potential effects of proposed development on bull trout habitat. New information and technology from annual monitoring and research efforts (on and off FNF) will be used to refine sediment analyses.

2. The risk of stream sedimentation from management activities will be assessed by fisheries and watershed specialists in consultation with state fisheries biologists. Estimated increases in sediment delivery rates will be held to a level that does not pose a significant threat of sediment deposition in spawning and rearing habitat. A significant threat occurs when, in the

judgment of these professionals, an unacceptable risk to fish production is likely. Streams judged to have elevated levels of fine materials will be considered especially sensitive to increases in sediment delivery from human activities. Streams currently containing low sediment levels (<30% fines less than 1/4 inch) will be protected from incremental, but cumulatively significant sedimentation of fish habitat from management activities.

3. An inventory and evaluation for existing streambed condition and sediment sources will be required before undertaking any project involving significant ground disturbance in the sediment contributing zone. Appropriate rehabilitation of sediment sources will be required.

4. Debris barriers (log jams) will be opened as needed to maintain fish passage. Opportunities for expansion of migratory bull trout will be pursued.

Implementation note #10 (1992) helps define "unacceptable risk" as used in Amendment #3. The recommendations from the Flathead Basin Commission define "threatened streams" as those having greater than 35% fine sediment in spawning gravels, and "impaired streams" as those having greater than 40% fine sediment (median value). The recommendations include the following:

Threatened Streams

a) Take active precautions to minimize new sediment loading to the stream.
b) Steps also should be taken to ameliorate past roading or other human land disturbances that continue to contribute sediments to streams.

Impaired Streams

a) Take proactive steps to insure that no additional sediment loading occurs as a result of new land disturbance activity.
b) Stabilize all existing problem roads and/or past activities which are contributing to deliver sediment to streams.

Amendment 19 is specific to amending the LRMP objectives, standards, and guidelines that address timber production and grizzly bear management. Bull trout and other aquatic organisms will benefit through reclamation of FNF roads. Sediment source surveys were completed in 1995 by FWP in most bull trout watersheds which help prioritize which roads should be reclaimed first. Decreasing the drainage efficiency of roads will decrease sediment inputs and bank scouring flows and contribute toward watershed restoration.

iii. INFISH and Subsequent Direction from the Upper Columbia River Basin(UCRB) Environmental Impact Statement (EIS) Process

The Inland Native Fish Strategy (INFISH) was signed in July 1995 to provide interim

direction to protect habitat and populations of resident fish in eastern Oregon, eastern Washington, portions of Idaho and western Montana. The interim direction is in the form of riparian management objectives, standards and guidelines, and monitoring requirements. The action amends the management direction established in the Regional Guides and all existing LRMPs for the area covered by the assessment. Long term management direction will be provided by the UCRB EIS.

A primary feature of INFISH is Riparian Habitat Conservation Areas (RHCAs) which are portions of watersheds where riparian dependent resources, such as fisheries, receive primary emphasis and management activities are subject to specific standards and guidelines designed to protect and maintain aquatic resources.

RHCA widths have been developed from research to protect streams from non-channelized sediment inputs and provide shade, bank stability, and large woody debris recruitment. Protection of these stream processes will help achieve Riparian Management Objectives (RMOs) such as pool frequency, water temperature, amount of large woody debris, and width/depth ratios. These are measurable parameters that have been established to monitor stream health.

As indicated earlier, INFISH is an interim strategy. The UCRB EIS when finalized is expected to provide similar guidance for aquatic species.

b. Measures to Improve Conditions For Bull Trout

The FNF has initiated efforts to restore watersheds by reclaiming roads, stabilizing sediment sources, and adding large woody debris to stream channels in old harvest areas. Continuing these efforts in bull trout watersheds in the South Fork should help improve bull trout habitat and populations.

Watershed restoration will be an integral part of management decisions in bull trout watersheds outside Wilderness. Most bull trout drainages have been surveyed by FWP, while site plans need to be developed to mitigate adverse impacts to water quality, instream habitats, and riparian areas. For example, Sullivan Creek is listed as a water quality limited stream in the State Water Quality Division's 305(b) list of impaired streams. Measures, such as road reclamation, are being taken to bring this stream to State standards.

Current direction in INFISH calls for meeting large woody debris objectives, as well as other RMOs. Watershed restoration will include addition of large woody debris in certain stream channels to provide habitat complexity and reforestation of riparian areas where needed to meet these standards.

Measures are underway to provide fish passage for westslope cutthroat along several eastside tributaries. If additional fish passage barriers are identified, they will be replaced as funding becomes available to provide for fish passage. Lastly, those roads identified under Amendment 19 to provide for grizzly bear security will be reclaimed by removing culverts and stabilizing sediment sources as

funding becomes available.

2. Recreation

a. Measures to Protect and Maintain Conditions For Bull Trout

i. Bob Marshall, Great Bear, Scapegoat Wilderness Recreation Management Direction

This document amended the Flathead, Helena, Lewis & Clark and Lolo National Forest LRMPs in 1987 to provide specific direction with respect to managing components of Wilderness resources related to recreation within the Bob Marshall Wilderness Complex (BMWC). These components include visitor use, wildfire, insect and disease control, range, and wildlife/fisheries resources.

A key concept behind the direction is to distribute visitor use and limit change to resources that, if overused, would degrade the Wilderness experience and resource. The plan helps balance Wilderness recreation use with fish and wildlife management activities.

ii. The Bob Marshall Wilderness Complex Limits of Acceptable Change

Completed in 1991, this document was derived out of the above document. FWP developed this document in cooperation with the Forest Service to integrate wildlife/fisheries into recreation management direction.

The document establishes goals and strategies for wildlife/fish species. For example, the goal for bull trout is "to maintain at current or increased levels, the naturally reproducing populations of migratory bull trout in streams and lakes within the BMWC ecosystem. This goal includes providing an opportunity for anglers to catch a trophy fish in a Wilderness setting, but de-emphasizes harvest of this unique species." It goes on to list five strategies to help achieve this goal (pg. 153).

iii. Fish, Wildlife and Habitat Management Framework for the Bob Marshall Wilderness Complex

This framework establishes a standard process to include FWP participation for addressing management proposals in the Wilderness. It assures cooperation between the two agencies to protect aquatic resources in the Wilderness.

iv. Re-Issuance of Outfitter and Guides Permits

The FNF is currently reviewing outfitter and guide permits across the BMWC for reissuance.

This process provides FNF with an opportunity to determine if there are impacts on bull trout and, if so to make modifications in the permits to ameliorate effects, if any.

3. Monitoring

a. Measures to Protect and Maintain Conditions For Bull Trout

i. Continue to Monitor Water Quality, Habitat Conditions and Fish Populations.

FNF in cooperation with FWP will continue to monitor adult populations (redd counts), habitat conditions (McNeil core samples and substrate scores in two non-Wilderness tributaries) and water quality. Expansion of monitoring activities such as juvenile population estimates and McNeil core samples in other bull trout streams will be dependent on funding.

ii. Continue to Monitor Timber Harvest Activities

Timber harvest activities will be monitored to determine that they are not adversely affecting INFISH riparian management objectives. Activities will also be monitored to determine if best management practices were applied and effective.

iii. Continue to Monitor Recreational Use

Recreational use of the BMWC will be monitored to assure that limits of acceptable change thresholds are not surpassed.

C. Bonneville Power Administration

BPA is responsible for marketing the electric power produced by federal dams on the Columbia River and its tributaries, including the Hungry Horse Project, and for protecting, mitigating and enhancing fish and wildlife, including related spawning grounds and habitat affected by the Project, consistent with the NWPPCs Fish and Wildlife Program, pursuant to the Pacific Northwest Electric Power Planning and Conservation Act (Power Planning Act) (16 U.S.C. 839 et. seq.). Within the operating requirements and limits established by Reclamation as described in Section III.D., BPA coordinates with Reclamation to schedule and dispatch power.

1. Fisheries

a. Measures to Improve Conditions For Bull Trout

i. Hungry Horse Dam Resident Fish Mitigation

BPA is authorized under the Power Planning Act to fund fish and wildlife projects. In 1993 the Council adopted the Hungry Horse Dam Fisheries Mitigation Implementation Plan, which, for non-operational portions of the plan, FWP and CSKT are currently implementing in areas downstream of Hungry Horse Project as described in Section III.A.1.b. Reservoir operational measures to protect resident fisheries are described in Section III.D.1.

ii. Hungry Horse Dam Deep Drawdown Mitigation

In 1994, the Council's Fish and Wildlife Program contained Measure 903(b)(1)(d) which specified certain elevation limits for Hungry Horse Reservoir. In part, this program measure stated: "In years when the drawdown limit is exceeded for power purposes, BPA shall fund the mitigation of fish losses to the extent those losses are caused by power operations." For years 1988, 1989 and 1991 when drawdowns of Hungry Horse Reservoir occurred which exceeded the limit, BPA provided funding to FWP to mitigate for fisheries losses. The funds are provided under a 3-year agreement which will expire in 1998 and are used to support a variety of mitigation activities that are described in Section III.A.1.b.

2. Reservoir Operations

a. Measures to Protect and Maintain Conditions For Bull Trout

i. Implement reservoir operations according to the Biological Opinion on Operation of the Federal Columbia River Power System as described in Section III.D.

BPA is committed to working cooperatively with the Council, NMFS, and the other signers of this Agreement to develop a set of operational rules (i.e., Integrated Rule Curves or IRCs) for Hungry Horse Reservoir that provide for flood control, adequate power production, appropriate flow augmentation for downstream migration of juvenile salmon, and maintenance of acceptable habitat and production for resident fish and wildlife species, including conservation of bull trout. In the absence of IRCs acceptable to the parties listed above, BPA, in cooperation with the other Federal system operators, will continue to comply with the NMFS Biological Opinion as described in Section III.D.

D. Bureau of Reclamation

1. Reservoir Operations

a. Measures to Protect and Maintain Conditions For Bull Trout

Hungry Horse Reservoir is operated by Reclamation as part of the Federal Columbia River Power System (FCRPS). Authorized purposes of the project include irrigation, flood control, flow regulation of the South Fork of the Flathead River and power generation. The annual operation of

Hungry Horse Reservoir is affected by a variety of factors, commitments, and requirements. These include minimum and maximum seasonal flow levels and reservoir draft limits, called for in the NWPPC's Fish and Wildlife Program, system wide and local flood control requirements and requirements related to the protection of species listed under the Endangered Species Act of 1973 (ESA), as amended. These latter requirements currently have a significant influence over operations at Hungry Horse Reservoir.

In December 1994 Reclamation, along with the Corps of Engineers (Corps) and the BPA reinitiated consultation with NMFS relative to operation of the FCRPS and potential impacts on listed Snake River salmon. At that time they submitted a supplemental biological assessment to NMFS pursuant to Section 7 of ESA. In March 1995, NMFS issued a biological opinion and indicated that the subject operation would jeopardize the continued existence and recovery of listed Snake River stocks of salmon and proposed a reasonable and prudent alternative (RPA) for operation of the FCRPS. The RPA included requirements regarding operation of Hungry Horse Reservoir. In a March 10, 1995 Record of Decision, Reclamation agreed to adopt NMFS's proposed RPA and operate Hungry Horse to meet the requirements of the biological opinion.

The RPA established flow targets in the Columbia River at McNary Dam and in the Snake River at Lower Granite Dam for listed stocks of Snake River salmon. It also identified reservoir operational criteria that would increase the probability of meeting those targets. One of these criteria concerned limiting fall and winter drafts to increase the likelihood that the reservoirs will be as full as permitted on April 20. For Hungry Horse Reservoir, NMFS indicated that drafting of the reservoir should be limited so that the probability that the reservoir would reach its proscribed flood control elevation on April 20 was 75% or higher. To accomplish this, Reclamation determined that the fall draft at Hungry Horse Reservoir should be limited to elevation 3515, 45 feet from full pool, through December 31. Drafts after December 31 would be based on official water supply forecasts and implementation of procedures that will maintain the 75% confidence level in reaching the April 20 flood control elevation. The RPA called for Hungry Horse Reservoir to fill in May and June as full as possible, consistent with flood control criteria. The RPA also called for potential summer drawdowns to meet the salmon flow targets. At Hungry Horse Reservoir the draft limit for summer drawdowns was set in the biological opinion, under most conditions, as elevation 3540 on August 31. The biological opinion recognized the potential impact of deep drawdowns on resident fish and wildlife, including bull trout, that may be affected by reservoir operations. Accordingly, the drawdown limits were identified as interim limits until better information could be developed. Reclamation is committed to continuing discussions about operations at Hungry Horse Reservoir, including the IRCs, that could benefit bull trout and other resident fish and still allow for implementation of the RPA.

The biological opinion also called for a Technical Management Team (TMT), comprising representatives from Reclamation, the Corps, BPA, NMFS, and the Fish and Wildlife Service, to coordinate in-season the implementation of the biological opinion actions. In 1996, representatives of the states of Idaho, Montana, Oregon and Washington were added to the TMT along with representatives from 14 Indian Tribes in the Columbia Basin. The TMT advises the operating

agencies on dam and reservoir operations to optimize passage conditions for juvenile and adult listed Snake River stocks. By April 15 of each year, the TMT develops a water management plan that will, in general, provide for refill of the reservoir by June 30. In about 2 years out of 3 the flood control criteria may delay refilling to as late as July 31. Then, if necessary, gradual drafting would follow to established drawdown limits or below, in some situations, to meet summer flow targets. The TMT also monitors and makes recommendations on in-season operations, in coordination with other interested parties in the Columbia Basin and taking their concerns about reservoir operation into account.

Other constraints are also applied to the operation of Hungry Horse Reservoir. These include the minimum flow releases necessary to maintain a year-round minimum flow of 3,500 cfs at Columbia Falls, a maximum flow constraint at Columbia Falls of 4,500 cfs from Oct. 15-Dec 15, and flood control requirements to provide local flood control on the Flathead River and system-wide flood control in the Columbia River basin. Flood control requirements include reducing reservoir releases to 145 cfs when the river stage at Columbia Falls reaches 12.5 feet.

E. Confederated Salish and Kootenai Tribes

Although CSKT is not responsible for on the ground work in the South Fork, the drainage is ceded territory and unclaimed land as described in the Hellgate Treat of 1855 and considered an important historical and present day tribal resource. CSKT directly influences resource management with involvement in hydropower mitigation for Hungry Horse Dam which directly influences the fisheries resources both on and off the Reservation.

1. Fisheries

a. Measures to Improve Conditions for Bull Trout

i. Integrated Rule Curves (IRCs)

CSKT fully supports the IRCs as developed by FWP research and are active in lobbying for their implementation in the appropriate arenas.

ii. Fisheries Regulations for the South Fork Flathead Drainage

CSKT Fisheries staff participate in FWP's Region 2 bi-annual regulation setting process and regulations are agreed upon in a consensus process.

b. Measures to Improve Conditions for Bull Trout

i. BPA Funded Hungry Horse Dam Fisheries Mitigation

CSKT identified the need and assisted in the implementation of genetic assessment of bull trout populations in the Flathead drainage, including the South Fork.

ii. BPA Funded Deep Drawdown Mitigation at Hungry Horse Dam

As described in Section III.C.1.a., BPA is funding fisheries mitigation for deep drawdowns of Hungry Horse Reservoir that exceeded minimum elevations found in the Fish and Wildlife Program of the NWPPC. CSKT and FWP jointly identified these drawdowns, pursued mitigation funding and identified appropriate activities. See activities associated with this mitigation under A.1.b.ii.

2. Reservoir Operations

CSKT fully supports the IRCs as developed by FWP research and are active in lobbying for their implementation in the appropriate arenas.

3. Recreation

Not applicable.

4. Monitoring

Advisory capacity.

IV. IMPLEMENTATION AND COORDINATION

(a) The Parties acknowledge that the principles of "adaptive management" should govern management within the South Fork. As such, new information gained from monitoring and research, conducted either within or outside the South Fork, will be reviewed on an annual or more frequent basis, as necessary, to determine if changes in management direction are appropriate. The Parties recognize the critical importance of adequately funded monitoring to this agreement. The Parties commit to work together to assure that sufficient funding is available to implement monitoring efforts. The Parties may choose to support such research by contributing to ongoing or future proposed bull trout research projects.

(b) The Parties shall meet annually, or more frequently, to report on the status of the South Fork bull trout population, activities occurring and proposed within the South Fork Flathead drainage, management actions of the Parties and shall inform the public and the Bull Trout Restoration Team of their findings.

© Nothing in this Agreement obligates any party to the expenditure of funds in excess of appropriations authorized by law. Where exchange of funds or other resources will be involved, an appropriate agreement or procurement arrangement will be developed, contingent upon the availability of funds.

V. TERM

This Agreement shall become effective as soon as signed by the subject parties and shall continue in force for 5 years after the effective date, at which time the Agreement must be reviewed and either modified, renewed or terminated.

If a party wishes to withdraw they must notify the other parties, in writing, 30 days prior to withdrawing.

ACRONYMS

BMWC - Bob Marshall Wilderness Complex

BPA - Bonneville Power Administration

cfs - cubic feet per second

Corps - U.S. Army Corps of Engineers

CSKT - Confederated Salish and Kootenai Tribes

ESA - Endangered Species Act

FCRPS - Federal Columbia River Power System

FNF - Flathead National Forest

FWP - Montana Fish, Wildlife and Parks

FWS - U.S. Fish and Wildlife Service

INFISH - Inland Native Fish Strategy

IRCs - Integrated Rule Curves

LRMP - Land and Resource Management Plan

NMFS - National Marine Fisheries Service

NWPPC - Northwest Power Planning Council

Reclamation - U.S. Bureau of Reclamation

RHCAs - Riparian Habitat Conservation Areas

RPA - Reasonable and Prudent Alternative

TMT - Technical Management Team

UCRB EIS - Upper Columbia River Basin Environmental Impact Statement

GLOSSARY OF TERMS

Adaptive Management - An approach to natural resource decision-making that utilizes testing of hypotheses through detailed experimental design, data collection and analysis.

Anadromous Salmonids - Members of the trout family that spend a portion of their life cycle in freshwater and migrate to the ocean to complete another portion of their life cycle.

Best Management Practices - A set of management practices that have been developed and adopted to minimize the environmental impact of land management activities such as timber harvest and livestock grazing. BMPs may be voluntary or required.

Bull Trout (Salvelinus confluentus) - A char (trout of the genus *Salvelinus*) native to western Montana and the Belly River drainage, as well as parts of Idaho, Nevada, Oregon, California and Washington.

Bull Trout Restoration Team - A panel of nine representatives appointed by Governor Marc Racicot to oversee the development of the Montana Bull Trout Restoration Plan.

Conservation Agreement - A formal written agreement among state and federal agencies and tribes to enable a coordinated approach to conservation of bull trout in the South Fork of the Flathead River. It documents the specific actions and responsibilities affecting bull trout conservation for which each party is responsible under existing management plans.

Disjunct - A disjunct population is one that is genetically isolated from surrounding populations. The Big Salmon Creek bull trout population is considered disjunct from the South Fork population.

ESA Biological Opinion - A document stating the opinion of the USFWS or NMFS on whether or not a federal action is likely to jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of critical habitat.

ESA Reasonable and Prudent Alternative - An alternative action identified during ESA formal consultation that can be implemented in a manner consistent with the intended purpose of the action, that can be implemented consistent with the federal action agency's legal authority and jurisdiction, that is economically and technologically feasible, and that the USFWS or NMFS believes will avoid the likelihood of jeopardizing the continued existence of the listed species or result in the destruction or adverse modification of critical habitat.

ESA Biological Assessment - Information prepared on major construction or management activities by or under the direction of a federal agency to determine whether the proposed federal action is likely to adversely affect listed or proposed species, or designated or proposed critical

habitat. The outcome of this biological assessment determines whether formal ESA consultation or a conference is necessary.

Flathead Basin Commission - A non-regulatory organization created by the Montana Legislature in 1993 with the purpose of protecting the "existing high quality of the Flathead Lake aquatic environment; the waters that flow into, out of, or are tributary to the lake; and the natural resources and environment of the Flathead Basin."

Integrated Rule Curves - IRCs were developed by Montana Fish, Wildlife and Parks. IRCs are variable rule curves that were designed to meet biological, power and flood control needs based upon water supply.

Large Woody Debris - Large tree branches, trunks and root wads that are found in a river or stream that provide hiding places for fish and geomorphic roughness to the stream.

McNeil Coring - A method of determining the size of the materials that compose the bed of a river or stream. A sample of the stream bed is removed using a McNeil coring device. The sample is dried and run through a series of sieves to determine the size distribution of the sample.

Mitigation - Avoiding, minimizing, rectifying, reducing, eliminating or compensating for the impact to the environment of an activity.

Native Species Assemblage - The community of organisms that inhabited an ecosystem prior to manipulation by European man.

Resident Fish - Fish that live, travel and migrate in streams, rivers and lakes and do not travel to the ocean.

Rule Curves - A schedule of water levels or elevations that guide daily, monthly and seasonal reservoir operation. Rule curves may be *fixed* or *variable*. *Fixed rule curves* do not vary from year to year. Reclamation's fall draft limits at Hungry Horse are fixed rule curves. *Variable rule curves* will change with respect to forecasted water supply--flood control rule curves are variable rule curves that call for deeper drafts as water supply forecasts increase.

South Fork of the Flathead Drainage (South Fork) - The watershed upstream of Hungry Horse Dam.

Water Quality Limited Stream - Stream Segments that do not meet water quality standards for one or more parameters.

REFERENCES

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Northwest Power Planning Council, 1994. Columbia River Basin Fish and Wildlife Program. (94-55). December 1994.

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USDA Forest Service. 1995. Inland Native Fish Strategy (INFISH), Environmental Assessment Decision Notice and Finding of No Significant Impact: Interim strategies for managing fish producing watersheds in eastern Oregon and Washington, Idaho, western Montana and portions of Nevada. Intermountain, Northern and Pacific Northwest Regions.

FISHERIES MANAGEMENT PLAN

FOR THE

SOUTH FORK FLATHEAD RIVER DRAINAGE

including Hungry Horse Reservoir, and the
South Fork Flathead River upstream from Hungry Horse Reservoir

MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

In cooperation with a citizen committee on
South Fork fisheries management and the
U.S. Forest Service

May 1991

The largest bull trout on record from the South Fork was 36 inches long and weighed 16 pounds.

Management Concerns

1. Bull trout mature in the reservoir and travel to the headwaters of the South Fork to spawn. Therefore, fish in the Wilderness and in Hungry Horse Reservoir belong to the same population.

2. Natural reproduction of the species is extremely sensitive to streambed siltation.

3. Spawning adults are visible and, therefore, vulnerable to poaching and angling pressure.

4. Bull trout are predators and a portion of their diet is composed of other gamefish including mountain whitefish and westslope cutthroat.

Management Direction

Objective: Manage for a moderate increase *in numbers and size of bull trout in the drainage.*

Specific Management Actions

- Increase enforcement patrols, particularly in the wilderness, which focus on suspected bull trout poaching sites. Increase cooperation between Department and U.S. Forest Service enforcement personnel.

- Focus education efforts on voluntary use of single barbless hooks when fishing for bull trout, particularly in the South Fork Flathead River system.

- Concentrate a portion of hydropower mitigation efforts on bull trout. If populations of other fish species on Hungry Horse Reservoir are increased, bull trout (a predator) will benefit.

- Other specific management actions listed for westslope cutthroat will indirectly benefit bull trout by providing more prey.

If these actions fail to reach the stated management objective, other actions (such as closing of spawning tributaries to angling) could be implemented.

Mountain Whitefish

Life History

Mountain whitefish are native to the South Fork Flathead drainage and are the most abundant fish in the drainage. Individuals grow to about 19 inches in length. Whitefish exhibit seasonal movements

associated with feeding, overwintering, and spawning behavior. In the river system, whitefish overwinter in deep pools. In the spring, whitefish gradually move into some tributaries to feed. Whitefish mature at 3 to 5 years of age and spawn from October through December, broadcasting their eggs over gravel and small rocks in shallow, fast flowing, midstream areas. Whitefish are prolific; one female can produce from 3,000

United States
Department of
Agriculture

Forest Service
Flathead
National Forest

Forest Plan

Forest Plan Flathead National Forest December 1985

The Forest will take into consideration in its multiple-use management process sites which are former or current ceremonial or religious sites. The Forest will continue to consult with local Native American groups with regard to the American Indian Religious Freedom Act.

Portrayals of Native Americans in brochures, displays, or at interpretive sites will be historically and scientifically accurate.

All cultural resource related activities will be conducted in consultation with the Montana State Historic Preservation Office.

F. WILDLIFE AND FISH*

1. INDICATOR SPECIES

"Indicator Species" have been identified for those species groups whose habitat is most likely to be changed by Forest management activities. The tree dependent group indicator species is the marten; the old growth dependent group is represented by the piliated woodpecker; and the riparian tree dependent group indicator species is the barred owl. These species will be monitored to determine population changes resulting from Forest management activities (refer to the Monitoring and Evaluation section of Chapter V). Other indicator species include the threatened or endangered species (grizzly bear, gray wolf, bald eagle and peregrine falcon); commonly hunted species (mule deer, elk, and whitetailed deer); and fish species (bull trout and cutthroat trout). These species are covered under separate standards below.

2. FISH

a. The Flathead National Forest will be managed to maintain and, where feasible, improve fish habitat capacities in order to achieve cooperative goals with the State Department of Fish, Wildlife, and Parks and to comply with State water quality standards.

Sedimentation attributed to land management activities will be controlled so that unacceptable fish losses do not occur. Fish habitat and riparian management activities will be coordinated in order to provide suitable riparian vegetation to aquatic habitats. An annual program of direct habitat improvement work will be pursued.

b. The following management standards will be applied to important bull trout habitat on the Flathead National Forest:

1.) Sediment model techniques will be used whenever possible in the important bull trout streams listed below to predict changes in streambed composition due to proposed development.

* Includes rare plant species.

Cold Creek - Swan Lake Ranger District
Elk Creek - Swan Lake Ranger District
Goat Creek - Swan Lake Ranger District
Jim Creek - Swan Lake Ranger District
Lion Creek - Swan Lake Ranger District
Lost Creek - Swan Lake Ranger District
North Fork Lost Creek - Swan Lake Ranger District
Piper Creek - Swan Lake Ranger District
South Fork Lost Creek - Swan Lake Ranger District
Big Creek Glacier View Ranger District
Coal Creek Glacier View Ranger District
Hallowat Creek Glacier View Ranger District
Mathias Creek Glacier View Ranger District
Red Meadow Creek - Glacier View Ranger District
Shorty Creek - Glacier View Ranger District
South Fork Coal Creek - Glacier View Ranger District
Trail Creek - Glacier View Ranger District
Whale Creek - Glacier View Ranger District
Bear Creek - Hungry Horse Ranger District
Granite Creek - Hungry Horse Ranger District
Morrison Creek - Hungry Horse Ranger District

2.) Estimated increases in sediment will be held to a level at which spawning and/or rearing habitat remains at 85 percent to 95 percent of its potential at specific sites.

3. BIG CAME

Elk summer habitat* will be given appropriate protection and managed in accordance with the following selected recommendations from the Coordinating Elk and Timber Management, Final Report of the Montana Cooperative Elk-Logging Study, 1970-1985, January 1985 (Appendix DD).

Two components of summer elk habitat are identified. These are:

-- "Moist Sites," composed of specific habitat types, topographic situations, and elevations. Some of these have been tentatively mapped in the Flathead National Forest planning data base as summer habitat.

* Elk summer habitat, as defined above, encompasses about 30,000 acres of tentatively suitable timberland on the Flathead National Forest. Of the 30,000 acres, 6,500 are in riparian areas.

DECISION NOTICE
FINDING OF NO SIGNIFICANT IMPACT AND
NONSIGNIFICANT AMENDMENT M THE
FLATHEAD NATIONAL FOREST
LAND AND RESOURCE MANAGEMENT PLAN
FLATHEAD NATIONAL FOREST, MONTANA

AMENDMENT NO. 3
TROUT STANDARDS
FEBRUARY, 1990

DECISION NOTICE

Decision. It is my decision to select Alternative 4 as described in the February, 1990 Environmental Assessment on Amendment No. 3 to amend the LRMP by revising the existing standards for bull trout and to add habitat standards for cutthroat trout to the LRMP.

Rationale for the Decision. In this section I am stating why I believe Alternative 4 responds best to public concerns and the Chief's decision. I have considered reasonable alternatives and the possible environmental effects of alternatives in making my decision to approve this amendment. I have considered new information regarding cutthroat trout and sediment modeling to develop the new standards. I agree with the MFWP 1/23/89 comments relative to the need for establishment of standards for all cutthroat trout streams. I believe this amendment is responsive to the comments of the Montana Department of Fish Wildlife and Parks and other public comments on draft Amendment No. 3.

In making this decision, I considered recent scientific information which was not available when the LRMP was written to determine the amendments needed to meet the intent of the Chief's decision. Since the Chief directed that existing LRMP bull trout standards be applied to cutthroat habitat, I believe that it is appropriate to address standards for both trout species in this amendment. First, I will explain my rationale for cutthroat trout.

Cutthroat trout. Page VI-9 of the LRMP states, 'Four streams an the Forest contain essentially pure populations of westslope cutthroat trout." The Chiefs decision indicated that " ... the four streams with westslope cutthroat populations should be assigned to Management Area 12...". The Chief did not explain why the four streams should be assigned MA-12, but I believe it is possible that the Chief though that only four streams in the entire forest had westslope cutthroat trout, and since the streams were not named in the LRMP he had no way to know how they were allocated an *the* management area map. Thus, it would be logical for the Chief to conclude that such a scarce resource should be given every protection able. As a result of ongoing genetic testing since the LRMP was published, the list of streams now known to contain genetically pure westslope cutthroat

trout on the Flathead Forest currently stands at 50 streams. As a result of this new information, alternatives were examined that applied the Chief's direction in various ways.

First, the ID Team applied in Alternative 2, the concept of highlighting a "scarce" resource similar to the reason for monitoring the four streams in the LRMP. Alternative 2 applied the MA-12 designation only to the "secure" (protected by physical barriers from hybridization with non-native trout species) genetically pure westslope cutthroat trout populations since new information indicates that genetically pure westslope cutthroat are known to exist in 50 streams on the Flathead Forest alone. Thus the secure portion of that population is the "scarce" resource. It is reasonable to expect that additional genetic testing will find more pure populations in the future.

Second, the effects of designating all streams now known to contain genetically pure westslope cutthroat trout MA-12 was examined in Alternative 3. This would result in a reduction in the suitable timber base and allowable sale quantity. I believe this change in outputs would make selection of Alternative 3 a significant amendment (36 CFR 219.10 (f), and FSM 1922.51) even if the amount of change as a percent of the LRMP total is relatively small. I did not choose Alternatives 2 or 3 because I do not believe that the Chief s intent was to direct reallocation suitable lands based entirely on the arbitrary occurrence of genetic populations or whether the populations are secure from hybridization or not, and I agree with public comments on draft Amendment No. 3 that the additional standards should be applied to all cutthroat trout streams. I selected Alternative 4 because all four of the streams referred to in the Chief's decision are currently designated MA-12 in the LRMP and I agree that no change in management area designation is needed to protect trout habitat or productivity.

Finally, I selected Alternative 4 relative to westslope cutthroat trout because I believe the Chief's intent was to provide protection for cutthroat trout habitat and we have done that by developing standards based on cutthroat trout research and we are applying them to all cutthroat trout habitat This includes all 50 streams now known to contain pure westslope cutthroat as well as streams with hybrid populations thus ensuring that the entire cutthroat trout resource is protected and managed in a productive condition. In addition, I agree with our fisheries biologists that bull trout standards would not be appropriate for cutthroat trout habitat. I believe the standards in Alternative 4 provide reasonable standards based on habitat requirements for cutthroat trout documented in the scientific literature (See EA on Amendment 3).

I do not believe that any re-designation of MA-12 or MA-17 is needed to protect cutthroat trout habitat because the goal of both management areas emphasizes protection of water quality and trout habitat as the primary consideration of management. All cutthroat trout habitat is currently protected by one of these special riparian management prescriptions. The original riparian allocations were made as a result of a comprehensive integrated forest-wide analysis of multiple resource relationships and of specific stream reaches which best fit the multiple use goals of each management prescription. I do not believe the Chief's decision was intended to replace that process with re-designation based entirely on the presence or absence of a particular resource characteristic. I believe that any changes to the riparian management area should be based on evaluation of site

specific analyses and monitoring data as part of the next scheduled LRMP revision.

Bull trout Although the Chiefs decision primarily intended to deal with cutthroat trout habitat, the Chief thought the existing LRMP bull trout standards could be applied to cutthroat trout. I have already explained in the cutthroat section above, why bull trout standards are not applicable to cutthroat habitat. Since the Chief s decision does require the fisheries standards to be amended, and our experience indicates that the bull trout standards need to be amended, it is appropriate to address bull trout standards in Amendment 3. A more complete discussion of problems encountered in the application of the current bull trout standards is found in the Environmental Assessment for Amendment 3.

Our initial proposal for revised bull trout standards was criticized for dropping the quantitative standard in the LRMP and replacing it with a subjective standard based on professional judgement. I understand the desire to have an absolute measurable standard, but I can not support writing a standard in the LRMP which would assume that the natural condition is static and that no variation exists between streams. The bull trout standards I am approving in Alternative 4 were developed cooperatively with Montana Fish Wildlife and Parks fisheries biologists. I believe the direction provided by these new bull trout standards to involve FWP biologists in project analysis and to apply new research as it is developed will meet the intent of the Chiefs direction and the standards will provide for the future productivity of the bull trout resource on the Flathead National Forest

In summary I believe the new cutthroat trout standards and revised bull trout standards proposed in Alternative 4 provide state-of-the-art standards for fisheries habitat management on the Flathead National Forest and that they meet the intent of the Chief's appeal decision.

FINDING OF NO SIGNIFICANT IMPACT.

My decision consists of adding the cutthroat trout standards and revising the bull trout standards. The amendment will help implement the original intent of the LRMP and my decision will result in no impact to the environment.

This change in the LRMP standards will not result in any environmental effects nor will it change any environmental effects, including cumulative effects on fisheries disclosed in the LRMP FEIS. My consideration of 40 CFR 1508.27(b) criteria for determining if the Proposed Action is a significant Federal action is summarized below:

1. Significant impacts can be both beneficial and adverse. I believe that on balance my decision will have neither a significant beneficial or adverse impact different from that disclosed in the LRMP FEIS. Therefore my decision is not a significant Federal action.

2. My decision will not affect public health or safety.

3. My decision will not affect any unique areas such as cultural resources, park lands, prime farmlands, wetlands, Wild and Scenic Rivers or ecologically critical areas.

4. I believe that my decision will have little to no effect on the human environment. I believe that my decision will not be highly controversial.

5. My decision does involve highly uncertain, unique, or unknown risks.

6. I believe my decision will not establish a precedent for future actions with significant effects.

7. My decision on Amendment No. 3 is related to other similar actions for clarifying the language and management intent of the LRMP as proposed in a package of draft amendments mailed to interested people 12/12188. 1 believe that my decision on this amendment as an individual action of several amendments to respond to the Chief s decision on LRMP appeals will not have a cumulative impact on the environment

8. My decision will not affect any scientific, cultural, or historical resources.

9. My decision will not adversely affect habitat determined under the Endangered Species Act of 1973 to be critical to a species listed as endangered or threatened.

10. My decision will not cause threat of violation of any Federal, State, or local law or requirements imposed for the protection of the environment.

Based on this information, I have determined that this action is not a major Federal action and that there will be no significant effects on the quality of the human environment. As such, I have determined that an Environmental Impact Statement will not be prepared for this proposal.

FINDING OF NON-SIGNIFICANT NFMA AMENDMENT.

This decision will not alter any of the long-term relationships between the levels of goods and projected by the LRMP as documented in the EA and project file. Therefore, this amendment is non-significant as defined by NFMA (36 CFR 219.10(f), and Forest Service Manual 1922.51, Item 1 and 3.

IMPLEMENTATION DATE

This decision will be implemented upon public notice. This Decision Notice is public notice and will be sent to all those who have requested notice of LRMP amendments and those who have participated in this amendment process. In addition, notice of this decision will be published in local newspapers on March 05, 1990.

ADMINISTRATIVE APPEAL

This decision is subject to appeal pursuant to 36 CFR 217.3(l). A written notice of appeal must be filed within 45 days of the date of the decision to:

John Mumma, Regional Forester
Northern Region
200 East Broadway
P.O. Box 7669
Missoula MT 59801

Simultaneously a copy of the notice of appeal must be sent to the Deciding Officer, Jerry B. Reese, 1935 Third Ave. E. Kalispell, MT 59901. The notice of appeal must be filed in compliance with the procedures identified in 36 CFR 217 (54 FR 3357).

As a minimum, a written notice of appeal filed with the reviewing officer must: 1) List the name, address and telephone number of the appellant-, 2) Identify the decision about which the requester objects; 3) Identify the document in which the decision is contained by title and subject, date of the decision, and name and title of the Deciding Officer 4) Identify specifically that portion of the decision or decision document to which the requester objects; 5) State the reasons for objecting, including issues of fact, law, regulation, or policy and if applicable specifically how the decision violates Law, regulation, or policy, and; 6) Identify the specific change(s) in the decision that the appellant seeks (36 CFR 217.9(b)).

CONTACT PERSON.

Further information about this decision can be obtained from:

Roben G Hensler, Planning Staff Officer
Flathead National Forest
1935 Third Avenue East
Kalispell, MT 59901
(406) 755-5401

AMENDMENT NO. 3

The LRMP will be amended as follows:

Page II-22

Section b. is replaced with the following:

b. The fallowing non-wilderness streams are considered critical or important spawning and/or rearing habitat for bull trout on the Flathead National Forest. These streams are designated MA-12:

Swan Lake Ranger District
- Elk Creek
- Goat Creek
- Squeezer Creek
- Lion Creek
- Jim Creek
- Cold Creek
- North Fork Lost Creek
- South Fork Lost Creek
- Piper Creek

Glacier View Ranger District
- Whale Creek
- Shorty Creek
- Coal Creek
- South Fork Coal Creek
- Mathias Creek
- Trail Creek
- Big Creek
- Hallowat Creek
- Red Meadow Creek

Hungry Horse Ranger District
- Bear Creek
- Granite Creek
- Morrison Creek
- Puzzle Creek

The following pertains to the critical or important spawning and/or rearing bull trout streams listed above:

1.) Sediment model techniques will be used in these streams to evaluate potential effects of proposed development on bull trout habitat. New information and technology from annual monitoring and research efforts (on and off Forest) will be used to refine sediment analyses.

2.) The risk of stream sedimentation from management activities will be by fisheries and watershed specialists in consultation with state fisheries biologist. Estimated increases in sediment delivery rates will be held to a level that does not pose a significant threat of

sediment deposition in spawning and rearing habitat. A significant threat occurs when, in the judgement of these professionals, an unacceptable risk to fish production is likely. Streams judged to have elevated levels cf fine
materials will be considered especially sensitive to increases in sediment delivery from human activities. Streams currently containing low sediment levels (<30%) will be protected from incremental, but cumulatively significant sedimentation of fish habitat from management activities.

3.) An inventory and evaluation of existing streambed condition and sediment sources will be required before undertaking any project involving significant ground disturbance in the sediment contributing zone of these drainages. Appropriate rehabilitation of sediment sources will be required.

4.) Debris barriers (log jams) will be opened as needed to maintain fish passage in these streams. Opportunities for expansion of migratory bull trout habitat will be pursued.

A new section (c.) is added to page II-22 above "3. BIG GAME" as follows:

The following management standards will be applied to all streams that are known to contain westslope cutthroat trout on the Flathead National Forest:

1.) Management activities in riparian zones will be designed to provide at least 40 recruitable trees (greater than 10-inch DBH) per 1000 feet of stream per 30 year period (instream lifespan) for pool formation and instream cover.

2.) Stream canopy shading will be maintained so that maximum summer water temperatures do not exceed 17 degrees C for more than 4 hour-3 a day nor more than 14 days a year. Where water temperatures naturally exceed this level, planting exposed streambanks with shade-producing vegetation will be considered.

3.) Fish habitat will be protected by controlling sediment sources and/or limiting management activities. Before any significant ground disturbing activities are undertaken that could affect critical habitat in these drainages, surveys will be conducted to assess streambed condition and identify sediment sources. Appropriate rehabilitation of sediment sources will be required. Where analysis of existing conditions shows risk to future fish productivity, protection of fish habitat will become a management priority for subsequent actions.

4.) Opportunities for recovery of westslope cutthroat trout populations in Streams having non-native trout will be pursued.

Fisheries and watershed specialists from the Flathead National Forest and the Montana Department of Fish, Wildlife, and Parks will meet annually to review monitoring data and ensure " the above standards are being sufficiently applied. Where streambed monitoring records are available, a range

of one standard deviation from the mean value will define the present condition. Any greater increase in sediment will require further investigation and appropriate remedial action. New information and technology from ongoing research and monitoring will be incorporated into the above standards.

Page VI-9

Beginning at the second full sentence of the first paragraph, the remainder of the first paragraph is amended to read:

Eighteen streams on the Forest are closed to fishing because of their high quality spawning and nursery habitat. Twelve of these provide critical spawning and rearing habitat for bull trout and cutthroat trout and are essential to maintenance of these sport fisheries in Swan Lake and Flathead Lake. The remaining six streams provide critical habitat for other trout species or hybrids. [ ] Twelve other streams on the Forest contain secure populations of essentially pure genetic strain native westslope cutthroat trout.

[ ] Omission of the next to last sentence in the first paragraph, "In addition, four ... from Swan Lake.", was made because the four streams referenced were already in the list of the eighteen streams.

Jerry S. Reese
Acting Forest Supervisor

May 28, 1992
LRMP Implementation Note 110

SUBJECT: BULL TROUT HABITAT MANAGEMENT DIRECTION

ISSUE: What is the management direction for the Flathead National Forest regarding sediment in bull trout spawning streams?

FOREST POSITION: In February 1990, the Forest amended the LRMP (LRMP Amendment No. 3) to revise the existing standards for bull trout. LRMP Amendment Number 3 contains the following direction regarding sediment in relation to 'Critical or important spawning and/or rearing bull trout streams...."

1.) Sediment model techniques will be used in these streams to evaluate potential effects of proposed development on bull trout habitat. New information and technology from annual monitoring and research efforts (on and off Forest) will be used to refine sediment analyses.

2.) The risk of stream sedimentation from management activities will be assessed by fisheries and watershed specialists in consultation with state fisheries biologists. Estimated increases in sediment delivery rates will be held to a level that does not pose a significant threat of sediment deposition in spawning and rearing habitat. A significant threat occurs when, in the judgement of these professionals, an unacceptable risk to fish production is likely. Streams judged to have elevated levels of fine materials will be considered especially sensitive to increases in sediment delivery from human activities. Streams currently containing low sediment levels (<30%) will be protected from incremental, but cumulatively significant sedimentation of fish habitat from management activities.

In June of 1991, the Flathead Basin Commission released results and consensus recommendations for the Flathead Basin Forest Practices, Water Quality, and Fisheries Cooperative Program (FBCP). These results and recommendations help add definition to "unacceptable risk", as used in LRMP Amendment No. 3. The recommendations include the following:

Threatened Streams

When the following stream criteria are met,

* the percentage of fine materials in gravels in any given year is greater than 35% and/or
* the substrate score (measure of imbededness) is less than 10, the stream is considered threatened as a bull trout spawning and/or rearing stream.

If any disturbance activity is planned in the watershed, the land owner should:

a) Take active precautions to minimize new sediment loading to the stream.
b) Steps also should be taken to ameliorate past roading or other human land disturbances that continue to contribute sediments to streams.

Impaired Streams

When the following stream criteria are met,

* the percentage of fine materials in spawning gravels in any given year is greater than 40% and/or
* the substrate score (measure of imbededness) is less than 9, the stream is considered impaired as a bull trout spawning and/or rearing stream.

If any disturbance activity is planned in the watershed, the land owner should:

a) Take pro-active steps to insure that no additional sediment loading occurs as a result of new land disturbance activity.

b) Stabilize all existing problem roads and/or past activities which are continuing to deliver sediment to streams.

The recommendations define "threatened streams' as those having greater than 35% fine sediment in spawning gravels, and impaired streams' as those having greater than 40% fine sediment (median value). The management recommendations for threatened streams are similar to the existing LRMP standards for bull trout streams (Amendment 3): minimize new sediment loading and correct past disturbances that continue to contribute sediment to streams. For impaired streams, where bull trout egg survival is jeopardized, the recommendation is no additional sediment loading and a rigorous program of controlling sediment delivery from previous disturbances. This will require analysis and monitoring to assure that increased sediment loading does not occur as a result of "new' land management activity, and identification and correction of current sediment source problem sites.

Implementation of the cooperative recommendations require assessment of proposed activities that are likely to increase sediment delivery to major bull trout spawning streams. Specifically, sediment generating activities that occur inside the sediment contributing zone (SCZ) upstream from bull trout spawning areas would be deferred if spawning gravels have more than 40% fine materials for 2 consecutive years (median value of 8 or more samples). The SCZ is that portion of the drainage basin which is in close proximity to the perennial and ephemeral channel network, and is composed of landtypes that are likely to contribute sediment to those channels. Deferment of new sediment generating activities would be imposed until sediment levels declined below 40% for 2 consecutive years. Two consecutive years of data are required rather than one to appropriately determine stream status for evaluation of proposed management activities. This approach allows for consideration of the effects of drought years and subsequent "non-flushing" flows. However, in many cases, the first year of greater than 40% fines warrants concern for purposes of activity planning.

Timber harvest may continue from existing roads if effective erosion control measures are implemented. Road construction may be allowed outside sediment contributing zones only after careful evaluation. Limited construction within the sediment contributing zone, e.g., installation of stream crossings, may be acceptable if opportunities exist to offset new unavoidable sediment production with reductions of existing sediment sources.

FLATHEAD BASIN FOREST PRACTICES
WATER QUALITY AND FISHERIES
COOPERATIVE PROGRAM

FINAL REPORT

JUNE 1991

... and ameliorate those roads and associated cut slopes that are known to contribute sediment or pose a potential threat to contributing sediment to surface waters in the Flathead Basin. Strong consideration should be given to road surfacing and cut-slope stabilization on high risk roads, trunk roads designated for long-term use, and roads in the immediate vicinity of streams.

B. Minimize new road construction and limit construction of new roads to areas of the basin where the risk of increased sediment delivery to surface waters is low. Ensure use of BMPs and mitigation measures with the goal of eliminating undesirable sediment delivery associated with new road construction.

17. Bull trout and westslope cutthroat trout, Species of Special Concern in Montana, are native to the Flathead Basin. Both species are highly valued sport fishes that are very sensitive to degradation of spawning and rearing habitats resulting from increased sediment delivery to streams. Therefore we make the following recommendations:

A. Obtain information on fish species composition in drainages where management activities are planned and current status is unknown.

B. *Bull Trout:* Continue monitoring or begin monitoring streams having known bull trout spawning and rearing areas. A listing of these streams is available from the Montana Department of Fish, Wildlife and Parks. (See Appendix G.)

I. Threatened Streams.

When the following stream criteria are met,

the percentage of fine materials in spawning gravels in any given year is greater than 35% and/or
the substrate score (measure of imbeddedness) is less than 10,

the stream is considered threatened as a bull trout spawning and/or rearing stream. If any disturbance activity is planned in the watershed, the land owner should:

a) Take active precautions to minimize new sediment loading to the stream.
b) Steps also should be taken to ameliorate past roading or other human land disturbances that continue tocontiibute sediments to streams.

ii. Impaired Streams.

When the following stream criteria are met,
-the percentage of fine materials in spawning gravels in any given year is greater than 40% and/ or
the substrate score (measure of imbeddedness) is less than 9, the stream is considered impaired as a bull trout spawning and/or rearing stream.

If any disturbance activity is planned in the watershed, the land owner should

a) Take pro-active steps to insure that no additional sediment loading occurs as a result of new land disturbance activity.
b) Stabilize all existing problem roads and/or past activities which are continuing to deliver sediment to streams.

C. *Westslope Cutthroat Trout:* Continue or begin monitoring Flathead Basin streams having known areas of concentrated spawning by migratory westslope cutthroat trout. At present, the Montana Department of Fish, Wildlife and Parks has identified eight such streams in the basin. (See list in Appendix G.)

I. Threatened Streams.
When the following stream criterion is met,
-the percentage of fine materials in spawning gravels in any given year is greater than 35%, the stream is considered threatened as a westslope cutthroat trout spawning stream.
If any disturbance activity is planned in the watershed, the land owner should:

a) Take active precautions to minimize new sediment loading to the stream.
b) Steps also should be taken to ameliorate past roading or other human land disturbances that continue to contribute sediments to streams.

ii. Impaired Streams.
When the following stream criterion is met,
-the percentage of fine materials in spawning gravels in any given year is greater than 40%, the stream is considered impaired as a westslope cutthroat trout spawning stream.

If any disturbance activity is planned in the watershed, the land owner should:

a) Take pro-active steps to insure that no additional sediment loading occurs as a result of new land disturbance activity.
b) Stabilize all existing problem roads and/or past activities which are continuing to deliver sediment to streams.

D. Streams not supporting bull trout spawning and/or rearing or concentrated westslope cutthroat trout spawning.

I. There is currently insufficient data to establish thresholds for unacceptable percentages of fine material in spawning gavels used by fish species other than bull trout and westslope cut throat trout. Therefore, we recommend further study of sediment effects on the fish species found in these streams.

18. Ensure strict adherence to BMPs by regular inspection during harvest/site preparation activities followed by monitoring field audits on sales located in watersheds meeting criteria for threatened or impaired bull trout or cutthroat.

INLAND NATIVE FISH STRATEGY

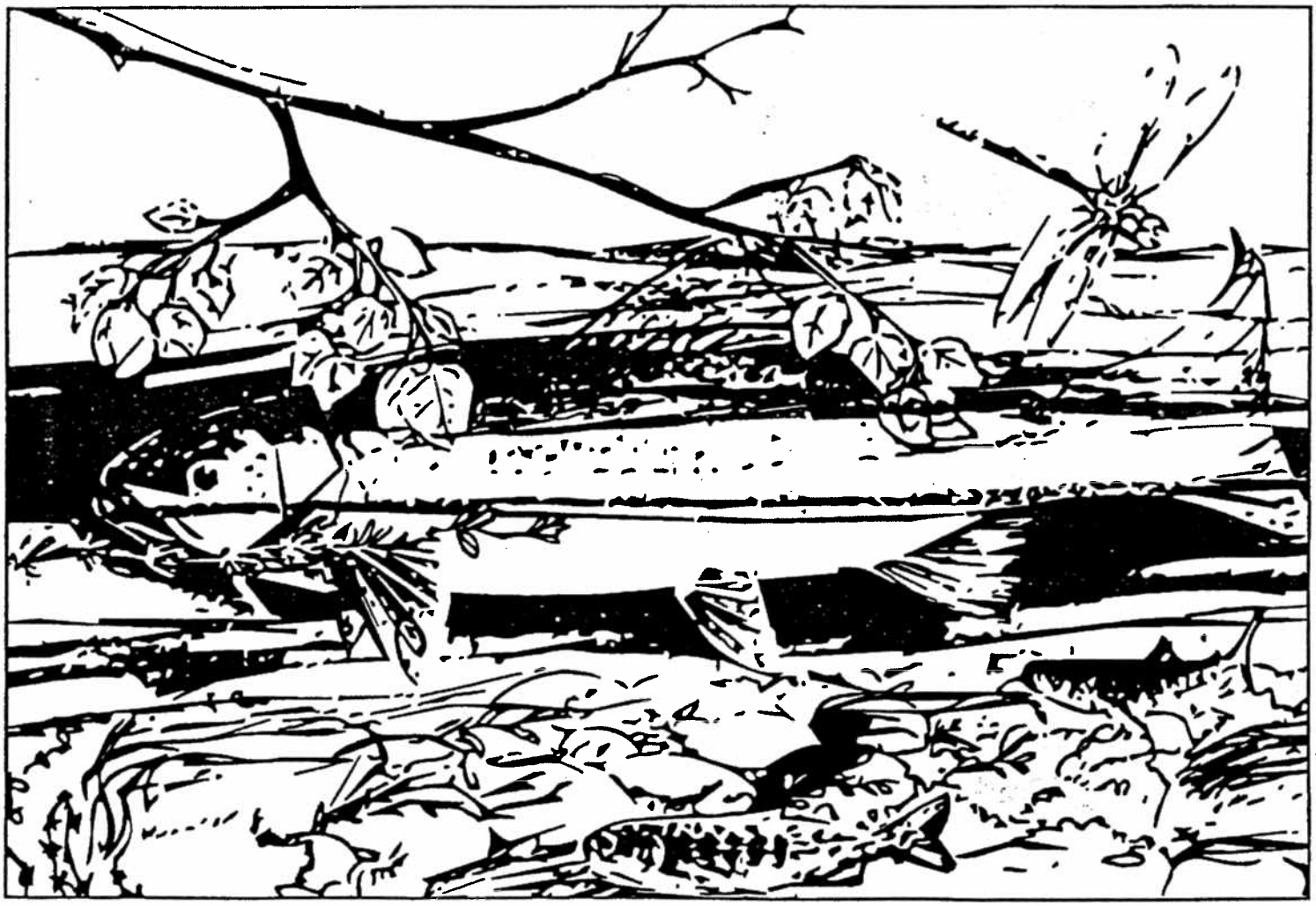
Environmental Assessment

United States
Department of
Agriculture

Forest Service

Decision Notice and Finding of No Significant Impact

1995



Intermountain, Northern, and Pacific Northwest Regions

ATTACHMENT A

INLAND NATIVE FISH STRATEGY
SELECTED INTERIM DIRECTION

Management Direction

Under the selected Alternative D, the Inland Native Fish Strategy will apply the following management direction to all 22 Forests except where PACFISH or the President's Plan apply. This is approximately 24.9 million acres.

The adoption of Alternative D as the Inland Native Fish Strategy could lead to deferring or suspending some resource management projects and activities within priority watersheds within the Riparian Habitat Conservation Areas (RHCAS, described below) or that degrade RHCAs during the interim period. Adoption of these requirements during the interim period is *not* to be considered a "lockout" of any project or activity from the RHCAS. However, proper analysis is required proper to initiation of projects. See the discussion below on priority watersheds and watershed analysis.

In addition, we will be testing the concepts and philosophies of alternatives C and E as described in the Decision Notice for this project The direction for alternatives C and E are included with this package but are only to be used within the watersheds assigned for the testing. More detail will be sent out as to how and where the testing will be accomplished.

Riparian Goals

The goals establish an expectation of the characteristics of healthy, functioning watersheds, riparian areas, and associated fish habitats. Since the quality of water and fish habitat in aquatic systems is inseparably related to the integrity of upland and riparian areas within the watersheds, The strategy identifies several goals for watershed, (riparian, and stream channel conditions. The goals are to maintain or restore:

(1) water quality, to a degree that provides for stable and productive riparian and aquatic ecosystems;

(2) stream channel integrity, channel processes, and the sediment regime (including the elements of timing, volume, and character of sediment input and transport) under which the riparian and aquatic ecosystems developed;

(3) instream flows to support healthy riparian and aquatic habitats, the stability and effective function of stream channels, and the ability to route flood discharges;

(4) natural timing and variability of the water table elevation in meadows and wetlands;

(5) diversity and productivity of native and desired non-native plant communities in riparian zones;

(6) riparian vegetation, to:

(a) provide an amount and distribution of large woody debris characteristic of natural aquatic and riparian ecosystems;

(b) provide adequate summer and winter thermal regulation within the riparian and aquatic zones; and

© help achieve rates of surface erosion, bank erosion, and channel migration characteristic of those under which the communities developed.

(7) riparian and aquatic habitats necessary to foster the unique genetic fish stocks that evolved within the specific geo-climatic region; and

(8) habitat to support populations of well-distributed native and desired non-native plant, vertebrate, and invertebrate populations that contribute to the viability of riparian-dependent communities.

Riparian Management Objectives

In the development of PACFISH, landscape-scale interim Riparian Management objectives (RMOS) describing good habitat for anadromous fish were developed, using stream inventory data for pool frequency, large woody debris, bank stability and lower bank angle, and width to depth ratio. Applicable published and non-published scientific literature was used to define favorable water temperatures. All of the described features may not occur in a specific segment of stream within a watershed, but all generally should occur at the watershed scale for stream systems of moderate to large size (3rd to 6th order streams).

This material was reviewed in regard to its applicability to Inland native fish. It has been determined that the Riparian Management Objectives described in PACFISH are good indicators of ecosystem health. The analysis that led to development of the RMO's involved watersheds in Oregon, Washington, and Idaho that include inland native fish as well as anadromous fish. With the exception of the temperature objective, which has been modified, the RMO's represented a good starting point to describe the desired condition for fish habitat.

Under the Inland Native Fish Strategy, these interim RMO's would apply where watershed analysis has not been completed. The components of good habitat can vary across specific geographic areas. Interim RMO's are considered to be the best watershed scale information available; National Forest managers would be encouraged to establish site-specific RMO's through watershed analysis or site specific analysis.

RMOs should be refined to better reflect conditions that are attainable in a specific watershed or

stream reach based on local geology, topography, climate, and potential vegetation. Establishment of RMO's would require completion of watershed analysis to provide the ecological basis for the change. However, Interim RMO's may be modified by amendment in the absence of watershed analysis where watershed or stream reach specific data support the change. In all cases, the rationale supporting RMO's and their effects would be documented.

The interim RMOs for stream channel conditions provide the criteria against which attainment or progress toward attainment of the riparian goals is measured. Interim RMOs provide the target toward which managers aim as they conduct resource management activities across the landscape. It is not expected

that the objectives would be met instantaneously, but rather would be achieved over time. However, the intent of interim RMOs is not to establish a ceiling for what constitutes good habitat conditions. Actions that reduce habitat quality, whether existing conditions are better or worse than objective values, would be inconsistent with the purpose of this interim direction. Without the benchmark provided by measurable RMOS, habitat suffers a continual erosion.

As indicated below, some of the objectives would apply to only forested ecosystems, some to non-forested ecosystems, and some to all ecosystems regardless of whether or not they are forested. Objectives for six environmental features have been identified, including one key feature and five supporting features. These features are good indicators of ecosystem health, are quantifiable, and are subject to accurate, repeatable measurements. They generally apply to 3rd to 6th order watersheds.

Under the strategy, interim RMO's would apply to watersheds occupied by inland native fish. Application of the interim RMOs would require thorough analysis. That is, ff the objective for an important feature such as pool frequency is met or exceeded, there may be some latitude in assessing the importance of the objectives for other features that contribute to good habitat conditions. For example, in headwater streams with an abundance of pools created by large boulders, fewer pieces of large wood might still constitute good habitat. The goal is to achieve a high level of habitat diversity and complexity through a combination of habitat features, to meet the life-history requirements of the fish community inhabiting a watershed.

Many people commented on the draft what it meant to not retard the attainment of the RMOs. For the purposes of analysis, to 'retard' would mean to slow the rate of recovery below the near natural rate of recovery ff no additional human caused disturbance was placed on the system. This obviously will require professional judgement and should be based on watershed analysis of local conditions.

Table A-1. Interim Riparian Management Objectives.

Habitat Feature	Interim Objectives
Pool Frequency (kf[1]) (all systems)	Varies by channel width (see Table A-2).
Water Temperature (sf[2])	No measurable increase in maximum water temperature (7-day moving average of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive 7-day period). Maximum water temperatures below 59F within adult holding habitat and below 48F within spawning and rearing habitats.
Large Woody Debris (sf) (forested systems)	East of Cascade Crest in Oregon, Washington, Idaho, Nevada and western Montana: >20 pieces per mile; >12 inch diameter; >35 foot length.
Bank Stability (sf) (non-forested systems)	>80 percent stable.
Lower Bank Angle (sf) (non-forested systems)	>75 percent of banks with <90 degree angle (i.e., undercut).
Width/Depth Ratio (sf) (all systems)	<10, mean wetted width divided by mean depth

[1] Key feature.
[2] Supporting feature.

Table A-2. Interim objectives for pool frequency.

Wetted width (feet)	10	20	25	50	75	100	125	150	200
Pools per mile	96	56	47	26	23	18	14	12	9

Riparian Habitat Conservation Areas

Interim Riparian Habitat Conservation Areas (RHCAs) would be delineated in every watershed on National Forest System lands within the geographic range of the strategy.

Riparian Habitat Conservation Areas are portions of watersheds where riparian-dependent resources receive primary emphasis, and management activities are subject to specific standards and guidelines. Riparian Habitat Conservation Areas include traditional riparian corridors, wetlands, intermittent streams, and other areas that help maintain the integrity of aquatic ecosystems by (1) influencing the delivery of coarse sediment, organic matter, and woody debris to streams, (2) providing root strength for channel stability, (3) shading the stream, and (4) protecting water quality (Naiman et al. 1992).

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The Riparian Habitat Conservation Areas under the strategy would be nearly identical to those under the Idaho Conservation Strategy (Idaho Department of Fish & Game Commission's Bull Trout Conservation Strategy, 1995). The main difference is that, under the Idaho Conservation Strategy, Riparian Habitat Conservation Areas would apply only in key watersheds. Since their key watersheds are large and cover much of the National Forest System lands in Idaho, there would be little difference between the two Strategies in regard to Riparian Habitat Conservation Areas within occupied bull trout habitat

Widths of interim Riparian Habitat Conservation Areas that are adequate to protect streams from non-channelized sediment inputs should be sufficient to provide other riparian functions, including delivery of organic matter and woody debris, stream shading, and bank stabilize (Brazier and Brown 1973, Gregory et al. 1984, Steinblums et. al 1984, Beschta et al. 1987, McDade et al. 1990, Sedell and Beschta 1991, Beft et al. 1992). The effectiveness of riparian conservation areas in influencing sediment delivery from non-channelized flow is highly variable. A review by Beft et al. (1992) of studies in Idaho (Haupt 1959a and 1959b, Ketcheson and Megehan 1990. Burroughs and King (1985 and 1989) and elsewhere (Trimble and Sartz 1957, Packer 1967, Swift 1986) concluded that non-channelized sediment flow rarely travels more than 300 feet and that 200-300 foot riparian "filter strips" are generally effective at protecting streams from sediment from non-channelized flow.

Interim RHCA widths would apply where watershed analysis has not been completed. Site-specific widths may be increased where necessary to achieve riparian management goals and objectives, or decreased where interim widths are not needed to attain RMOs or avoid adverse effects. Establishment of RHCA's would require completion of watershed analysis to provide the ecological basis for the change. However, interim RHCAs may be modified by amendment in the absence of watershed analysis where stream reach or site-specific data support the change. In all cases, the rationale supporting RHCA widths and their effects would be documented.

Standard Widths Defining Interim RHCAs

The four categories of stream or water body and the standard widths for each are:

Category 1 - **Fish-bearing streams:** Interim RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the older edges of the 1 00-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet, including both sides of the stream channel, whichever is greatest.

Category 2 - **Permanently flowing non-fish-bearing streams:** Interim RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year flood plain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance (300 feet, including both sides of the stream channel, whichever is greatest.

Category 3 - **Ponds, lakes, reservoirs, and wetlands greater than 1 acre:** Interim RHCAs consist of the body of water or wetland and the area to the other edges of the riparian vegetation, or to the extent of the seasonally saturated soil, or to the extent of moderately and highly unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetlands pond or lake, whichever is greatest.

Category 4 - **Seasonally flowing or Intermittent streams, wetlands less than I acre, landslides, and landslide-prone areas:** This category includes features with high variability in size and site-specific characteristics. At a minimum the interim RHCAs must include:

a. the extent of landslides and landslide-prone areas

b. the intermittent stream channel and the area to the top of the inner gorge

c. the intermittent stream channel or wetland and the area to the outer edges of the riparian vegetation

d. for Priority Watersheds, the area from the edges of the stream channel, wetlands landslide, or landslide-prone area to a distance equal to the height of one site-potential tree, or 100 feet slope distance, whichever is greatest

e. for watersheds not identified as Priority Watersheds, the area from the edges of the stream channel, wetlands landslide, or landslide-prone area to a distance equal to the height of one-half site potential tree, or 50 feet slope distance, whichever is greatest

In non-forested rangeland ecosystems, the interim RHCA width for permanently flowing streams in categories 1 and 2 is the extent of the 100-year flood plain.

Standards and Guidelines

Project and site-specific standards and guidelines listed below would apply to all RHCAs and to projects and activities in areas outside RHCAs that are identified through NEPA analysis as potentially degrading RHCAS. The combination of the standards and guidelines for RHCAs specified below with the standards and guidelines of existing forest plans and Land Use Plans would provide a benchmark for management actions that reflects increased sensitivities and a commitment to ecosystem management.

Under the strategy, the standards and guidelines listed below would be applied to the entire geographic area for the project. Due to the short-term duration of this interim direction, provisions for development and implementation of road/transportation management plans and the relocation, elimination, or reconstruction of existing roads, facilities, and other improvements (i.e., RF-2 c, RF-3 a and c, RF-4, RF-5, GM-2, RM-1, and MM-2) would be initiated but would be unlikely to be completed during the interim period. Where existing roads, facilities, and other improvements found to be causing an unacceptable risk cannot be relocated, eliminated, or reconstructed, those improvements would be closed. Also, due to the short-term duration of this direction, adjustments to management not within the sole discretion of the Agencies (i.e., RF-1, LH-3, RA-1, WR-2, FW-3, and FW-4) would be initiated but would be unlikely to be completed during the interim period.

The standards and guidelines under the Inland Native Fish Strategy have the same intent as the 38 standards and guidelines under the Idaho Conservation Strategy. The Inland Native Fish Strategy has one additional standard and guideline (RA-4), related to storage of fuels and refueling in RHCA'S.

Many people commented on the draft what it meant to not retard the attainment of the RMOS. For the purposes of analysis, to 'retard' would mean to slow the rate of recovery below the near natural rate of recovery ff no additional human caused disturbance was placed on the system. This obviously will require professional judgement and should be based on watershed analysis of local conditions.

Timber Management

TM-1 Prohibit timber harvest, including fuelwood cutting, in Riparian Habitat Conservation Areas, except as described below.

a. Where catastrophic events such as fire, flooding, volcanic, wind, or insect damage result in degraded riparian conditions, allow salvage and fuelwood cutting in Riparian Habitat Conservation Areas only where present and future woody debris needs are met, where cutting would not retard or prevent attainment of other Riparian Management Objectives, and where adverse effects can be avoided to inland native fish. For priority watersheds, complete watershed analysis prior to salvage cutting in

RHCAS.

b. Apply silvicultural practices for Riparian Habitat Conservation Areas to acquire desired vegetation characteristics where needed to attain Riparian Management Objectives. Apply silvicultural practices in a manner that does not retard attainment of Riparian Management Objectives and that avoids adverse effects on inland native fish.

Roads Management

RF-1 Cooperate with Federal, Tribal, State, and county agencies, and cost-share partners to achieve consistency in road design, operation, and maintenance necessary to attain Riparian Management Objectives.

RF-2 For each existing or planned road, meet the Riparian Management Objectives and avoid adverse effects to inland native fish by:

a. completing watershed analyses prior to construction of new roads or landings in Riparian Habitat Conservation Areas within priority watersheds.

b. minimizing road and landing locations in Riparian Habitat Conservation Areas.

c. initiating development and implementation of a Road Management Plan or a Transportation Management Plan. At a minimum, address the following items in the plan:

1. Road design criteria, elements, and standards that govern construction and reconstruction.

2. Road management objectives for each road.

3. Criteria that govern road operation, maintenance, and management.

4. Requirements for pre-, during-, and post-storm inspections and maintenance.

5. Regulation of traffic during wet periods to minimize erosion and sediment delivery and accomplish other objectives.

6. Implementation and effectiveness monitoring plans for road stability, drainage, and erosion control.

7. Mitigation plans for road failures.

d. avoiding sediment delivery to streams from the road surface.

1. Outsloping of the roadway surface is preferred, except in cases where outsloping

would increase sediment delivery to streams or where outsloping is infeasible or unsafe.

2. Route road drainage away from potentially unstable stream channels, fills, and hillslopes.

e. avoiding disruption of natural hydrologic flow paths.

f. avoiding sidecasting of soils or snow. Sidecasting of road material is prohibited on road segments within or abutting RHCAs in priority watersheds.

RF-3 Determine the influence of each road on the Riparian Management Objectives. Meet Riparian Management Objectives and avoid adverse effects on inland native fish by:

a. reconstructing road and drainage features that do not meet design criteria or operation and maintenance standards, or that have been shown to be less effective than designed for controlling sediment delivery, or that retard attainment of Riparian Management Objectives, or do not protect priority watersheds from increased sedimentation.

b. prioritizing reconstruction based on the current and potential damage to inland native fish and their priority watersheds, the ecological value of the riparian resources affected, and the feasibility of options such as helicopter logging and road relocation out of Riparian Habitat Conservation Areas.

c. closing and stabilizing or obliterating, and stabilizing roads not needed for future management activities. Prioritize these actions based on the current and potential damage to inland native fish in priority watersheds, and the ecological value of the riparian resources affected.

RF-4 Construct new, and improve existing, culverts, bridges, and other stream crossings to accommodate a 100-year flood, including associated bedload and debris, where those improvements would/do pose a substantial risk to riparian conditions. Substantial risk improvements include those that do not meet design and operation maintenance criteria, or that have been shown to be less effective than designed for controlling erosion, or that retard attainment of Riparian Management Objectives, or that do not protect priority watersheds from increased sedimentation. Base priority for upgrading on risks in priority watersheds and the ecological value of the riparian resources affected. Construct and maintain crossings to prevent diversion of streamflow out of the channel and down the road in the event of crossing failure.

RF-5 Provide and maintain fish passage at all road crossings of existing and potential fish-

bearing streams.

Grazing Management

GM-1 Modify grazing practices (e.g., accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of Riparian Management Objectives or are likely to adversely affect inland native fish. Suspend grazing if adjusting practices is not effective in meeting Riparian Management Objectives.

GM-2 Locate new livestock handling and/or management facilities outside of Riparian Habitat Conservation Areas. For existing livestock handling facilities inside the Riparian Habitat Conservation Areas, assure that facilities do not prevent attainment of Riparian Management Objectives. Relocate or close facilities where these objectives cannot be met.

GM-3 Limit livestock trailing, bedding, watering, salting, loading, and other handling efforts to those areas and times that would not retard or prevent attainment of Riparian Management Objectives or adversely affect inland native fish.

GM-4 Adjust wild horse and burro management to avoid impacts that prevent attainment of Riparian Management Objectives or adversely affect inland native fish.

Recreation Management

RM-1 Design, construct, and operate recreation facilities, including trails and dispersed sites, in a manner that does not retard or prevent attainment of the Riparian Management Objectives and avoids adverse effects on inland native fish. Complete watershed analysis prior to construction of new recreation facilities in Riparian Habitat Conservation Areas within priority watersheds. For existing recreation facilities inside Riparian Habitat Conservation Areas, assure that the facilities or use of the facilities would not prevent attainment of Riparian Management Objectives or adversely affect inland native fish. Relocate or close recreation facilities where Riparian Management Objectives cannot be met or adverse effects on inland native fish can not be avoided.

RM-2 Adjust dispersed and developed recreation practices that retard or prevent attainment of Riparian Management Objectives or adversely affect inland native fish. Where adjustment measures such as education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific site closures are not effective in meeting Riparian Management Objectives and avoiding adverse effects on inland native fish, eliminate the practice or occupancy.

RM-3 Address attainment of Riparian Management Objectives and potential effect on inland native fish in Wild and Scenic Rivers, Wilderness, and other Recreation Management plans.

Minerals Management

MM-1 Minimize adverse effects to inland native fish species from mineral operations. If a Notice of Intent indicates that a mineral operation would be located in a Riparian Habitat Conservation Area, consider the effects of the activity on inland native fish in the determination of significant surface disturbance pursuant to 36 CFR 228.4. For operations in a Riparian Habitat Conservation Area ensure operators take all practicable measures to maintain, protect, and rehabilitate fish and wildlife habitat which may be affected by the operations. When bonding is required, consider (in the estimation of bond amount) the cost of stabilizing, rehabilitating, and reclaiming the area of operations.

MM-2 Locate structures, support facilities, and roads outside Riparian Habitat Conservation Areas. Where no alternative to siting facilities in Riparian Habitat Conservation Areas exists, locate and construct the facilities in ways that avoid impacts to Riparian Habitat Conservation Areas and streams and adverse effects on inland native fish. Where no alternative to road construction exists, keep roads to the minimum necessary for the approved mineral activity. Close, obliterate and revegetate roads no longer required for mineral or land management activities.

MM-3 Prohibit solid and sanitary waste facilities in Riparian Habitat Conservation Areas. If no alternative to locating mine waste (waste rock, spent ore, tailings) facilities in Riparian Habitat Conservation Areas exists, and releases can be prevented and stability can be ensured, then:

a. analyze the waste material using the best conventional sampling methods and analytic techniques to determine its chemical and physical stability characteristics.

b. locate and design the waste facilities using the best conventional techniques to ensure mass stability and prevent the release of acid or toxic materials. If the best conventional technology is not sufficient to prevent such releases and ensure stability over the long term, prohibit such facilities in Riparian Habitat Conservation Areas.

c. monitor waste and waste facilities to confirm predictions of chemical and physical stability, and make adjustments to operations as needed to avoid adverse effects to inland native fish and to attain Riparian Management Objectives.

d. reclaim and monitor waste facilities to assure chemical and physical stability and revegetation to avoid adverse effects to inland native fish, and to attain the Riparian Management Objectives.

e. require reclamation bonds adequate to ensure long-term chemical and physical stability and successful revegetation of mine waste facilities.

MM-4 For leasable minerals, prohibit surface occupancy within Riparian Habitat Conservation Areas for oil, gas, and geothermal exploration and development activities where contracts and leases do not already exist, unless there are no other options for location and Riparian Management Objectives can be attained and adverse effects to inland native fish can be avoided. Adjust the operating plans of existing contracts to (1) eliminate impacts that prevent attainment of Riparian Management Objectives and (2) avoid adverse effects to inland native fish.

MM-5 Permit sand and gravel mining and extraction within Riparian Habitat Conservation Areas only if no alternatives exist, if the action(s) would not retard or prevent attainment of Riparian Management Objectives, and adverse effects to inland native fish can be avoided.

MM-6 Develop inspection, monitoring, and reporting requirements for mineral activities. Evaluate and apply the results of inspection and monitoring to modify mineral plans, leases, or permits as needed to eliminate impacts that prevent attainment of Riparian Management Objectives and avoid adverse effects on inland native fish.

Fire/Fuels Management

FM-1 Design fuel treatment and fire suppression strategies, practices, and actions so as not to prevent attainment of Riparian Management Objectives, and to minimize disturbance of riparian ground cover and vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management actions could perpetuate or be damaging to long-term ecosystem function or inland native fish.

FM-2 Locate incident bases, camps, helibases, staging areas, helispots, and other centers for incident activities outside of Riparian Habitat Conservation Areas. If the only suitable location for such activities is within the Riparian Habitat Conservation Area, an exemption may be granted following a review and recommendation by a resource advisor. The advisor would prescribe the location, use conditions, and rehabilitation requirements, with avoidance of adverse effects to inland native fish a primary goal. Use an interdisciplinary team, including a fishery biologist, to predetermine incident base and helibase locations during presuppression planning.

FM-3 Avoid delivery of chemical retardant, foam, or additives to surface waters. An exception may be warranted in situations where overriding immediate safety imperatives exist, or, following a review and recommendation by a resource advisor

and a fishery biologist, when the action agency determines an escape fire would cause more long-term damage to fish habitats than chemical delivery to surface waters.

FM-4 Design prescribed burn projects and prescriptions to contribute to the attainment of the Riparian Management Objectives.

FM-5 Immediately establish an emergency team to develop a rehabilitation treatment plan to attain Riparian Management Objectives and avoid adverse effects on inland native fish whenever Riparian Habitat Conservation Areas are significantly damaged by a wildfire or a prescribed fire burning out of prescription.

Lands

LH-1 Require instream flows and habitat conditions for hydroelectric and other surface water development proposals that maintain or restore riparian resources, favorable channel conditions, and fish passage, reproduction, and growth. Coordinate this process with the appropriate State agencies. During relicensing of hydroelectric projects, provide written and timely license conditions to the Federal Energy Regulatory Commission (FERC) that require fish passage and flows and habitat conditions that maintain/restore riparian resources and channel integrity. Coordinate relicensing projects with the appropriate State agencies.

LH-2 Locate new hydroelectric ancillary facilities outside Riparian Habitat Conservation Areas. For existing ancillary facilities inside the RHCA that are essential to proper management, provide recommendations to FERC to assure that the facilities would not prevent attainment of the Riparian Management Objectives and that adverse effects on inland native fish are avoided. Where these objectives cannot be met provide recommendations to FERC that such ancillary facilities should be relocated. Locate, operate, and maintain hydroelectric facilities that must be located in Riparian Habitat Conservation Areas to avoid effects that would retard or prevent attainment of the Riparian Management Objectives and avoid adverse effects on inland native fish.

LH-3 Issue leases, permits, rights-of-way, and easements to avoid effects that would retard or prevent attainment of the Riparian Management Objectives and avoid adverse effects on inland native fish. Where the authority to do so was retained, adjust existing leases, permits, rights-of-way, and easements to eliminate effects that would retard or prevent attainment of the Riparian Management Objectives or adversely affect inland native fish. If adjustments are not effective, eliminate the activity. Where the authority to adjust was not retained, negotiate to make changes in existing leases, permits, rights-of-way, and easements to eliminate effects that would prevent attainment of the Riparian Management Objectives or adversely affect inland native fish. Priority for modifying existing leases, permits, rights-of-way, and easements would be based on the current and potential adverse effects on inland native fish and the ecological value of the riparian resources

affected.

LH-4 Use land acquisition, exchange, and conservation easements to meet Riparian Management Objectives and facilitate restoration of fish stocks and other species at risk of extinction.

General Riparian Area Management

RA-1 Identify and cooperate with Federal, Tribal, State and local governments to secure instream flows needed to maintain riparian resources, channel conditions, and aquatic habitat.

RA-2 Trees may be felled in Riparian Habitat Conservation Areas when they pose a safety risk. Keep felled trees on site when needed to meet woody debris objectives.

RA-3 Apply herbicides, pesticides, and other toxicants, and other chemicals in a manner that does not retard or prevent attainment of Riparian Management Objectives and avoids adverse effects on inland native fish.

RA-4 Prohibit storage of fuels and other toxicants within Riparian Habitat Conservation Areas. Prohibit refueling within Riparian Habitat Conservation Areas unless there are no other alternatives. Refueling sites within a Riparian Habitat Conservation Area must be approved by the Forest Service or Bureau of Land Management and have an approved spill containment plan.

RA-5 Locate water drafting sites to avoid adverse effects to inland native fish and instream flows, and in a manner that does not retard or prevent attainment of Riparian Management Objectives.

Watershed and Habitat Restoration

WR-1 Design and implement watershed restoration projects in a manner that promotes the long-term ecological integrity of ecosystems, conserves the genetic integrity of native species, and contributes to attainment of Riparian Management Objectives.

WR-2 Cooperate with Federal, State, local, and Tribal agencies, and private landowners to develop watershed-based Coordinated Resource Management Plans (CRMPS) or other cooperative agreements to meet Riparian Management Objectives.

Fisheries and Wildlife Restoration

FW-1 Design and implement fish and wildlife habitat restoration and enhancement actions in a manner that contributes to attainment of the Riparian Management Objectives.

FW-2 Design, construct, and operate fish and wildlife interpretive and other user-enhancement facilities in a manner that does not retard or prevent attainment of the Riparian Management Objectives or adversely affect inland native fish. For existing fish and wildlife interpretive and other user-enhancement facilities inside Riparian Habitat Conservation Areas, assure that Riparian Management Objectives are met and adverse effects on inland native fish are avoided. Where Riparian Management Objectives cannot be met or adverse effects on inland native fish avoided, relocate or close such facilities.

FW-3 Cooperate with Federal, Tribal, and State wildlife e management agencies to identify and eliminate wild ungulate impacts that prevent attainment of the Riparian Management Objectives or adversely affect inland native fish.

FW-4 Cooperate with Federal, Tribal, and State fish management agencies to identify and eliminate adverse effects on native fish associated with habitat manipulation, fish stocking, fish harvest, and poaching.

Priority Watersheds

Priority watersheds have been designated in Oregon, Idaho, Montana, Nevada, and Washington. Criteria considered to designate priority watersheds in the 22 National Forests were:

1. *Watersheds with excellent habitat or strong assemblages of inland native fish, with a priority on bull trout populations.*
2. *Watersheds that provide for meta-population objectives.*
3. *Degraded watersheds with a high restoration potential.*

The intent of designating priority watersheds is to provide a pattern of protection across the landscape where habitat for inland native fish would receive special attention and treatment. Areas in good condition would serve as anchors for the potential recovery of depressed stocks, and also would provide colonists for adjacent areas where habitat had been degraded by land management or natural events. Those areas of lower quality habitat with high potential for restoration would become future sources of good habitat with the implementation of a comprehensive restoration program. Priority watersheds would have the highest priority for restoration, monitoring and watershed analysis.

Within priority watersheds, ongoing activities have been screened. This screening effort is a way to monitor ongoing activities to categorize the extent of risk they represent to bull trout habitat or

populations. Projects determined to be a high or medium risk must be reviewed by Forest Supervisors and, subject to valid existing rights, they have three options to pursue:

1. *Modify the action to reduce the risk.*
2. *Postpone the action until the final direction is issued.*
3. *Cancel the action.*

Forest Supervisors will submit to their respective Regional Foresters an action plan for how high and moderate risk projects will be modified to avoid an unacceptable risk. This action plan will be submitted within one month. Modifications for moderate and high risk projects should be initiated within two months with high risk projects having the highest priority. If there are compelling reasons why a project can not be modified, delayed, or canceled, the Forest Supervisor will include in the action plan written documentation of the rationale for such action and what other mitigating measures will be implemented to assure there is not an unacceptable risk. For low risk projects, Forest Supervisors must provide an action plan by March 1, 1996 for means to assure there is not an unacceptable risk.

Watershed Analysis

Watershed analysis is a systematic procedure for determining how a watershed functions in relation to Its physical and biological components. This is accomplished through consideration of history, processes, landform, and condition. Generally, watershed analysis would be initiated where the interim RMOs and the interim RHCA widths do not adequately reflect specific watershed capabilities, or as required in the standards and guidelines before specific projects are initiated. The guidelines and procedural manuals being developed by the Interagency Watershed Analysis Coordination Team and other potentially relevant procedures (e.g., the Cumulative Watershed Effects Process for Idaho, etc.) would be considered and used, where appropriate, in development of a watershed analysis protocol. Eventually, any watershed analysis would follow the final Ecosystem Analysis at a Watershed Scale. Additional information will be sent out when it is available.

Watershed analysis is a prerequisite for determining which processes and parts of the landscape affect fish and riparian habitat, and is essential for defining watershed-specific boundaries for Riparian Habitat Conservation Areas and for Riparian Management Objectives. Watershed analysis can form the basis for evaluating cumulative watershed effects; defining watershed restoration needs, goals and objectives; implementing restoration strategies; and monitoring the effectiveness of watershed protection measures, depending upon the issues to be addressed in the watershed analysis. Watershed analysis employs the perspectives and tools of multiple disciplines, especially geomorphology, hydrology, geology, aquatic and terrestrial ecology, and soil science. It is the framework for understanding and carrying out land use activities within a geomorphic context, and is a major component of the evolving science of ecosystem analysis. Forests should utilize local fish and game department, tribal staff, or other local groups whenever possible to increase the knowledge base and expertise for watershed analysis.

Watershed analysis consists of a sequence of activities designed to identify and interpret the processes operating in a specific landscape. Since the concept of watershed analysis was first introduced, there has been much discussion as to the procedures and detail that a watershed analysis should complete. It is recognized that the components and intensity of the analysis would vary depending on level of activity and significance of issues involved. Following are the general process steps for watershed analysis currently being considered:

1. *Characterization of the Watershed.*
   a. *Place the watershed in a broader geographic context.*
   b. *Highlight dominant features and processes with the watershed.*

2. *Identification of Issues and Key Questions.*
   a. *Key questions and resource components.*
   b. *Determine which issues are appropriate to analyze at this scale.*

3. *Description of Current Condition.*

4. *Description of Reference Conditions.*
   a. *Establish ecologically and geomorphically appropriate reference conditions for the watershed.*

5. *Interpretation of Information.*
   a. *Provide a comparison and interpretation of the current, historic, and reference conditions.*

6. *Recommendations.*
   a. *Provide conclusions and recommendations to management.*

The process described above is significantly streamlined to allow managers to focus watershed analysis to address specific issues and management needs. This can include modification of RMO'S, RHCA'S, or identification of restoration and monitoring needs. The state-of-the art for watershed analysis is still developing and the processes would need to flexible.

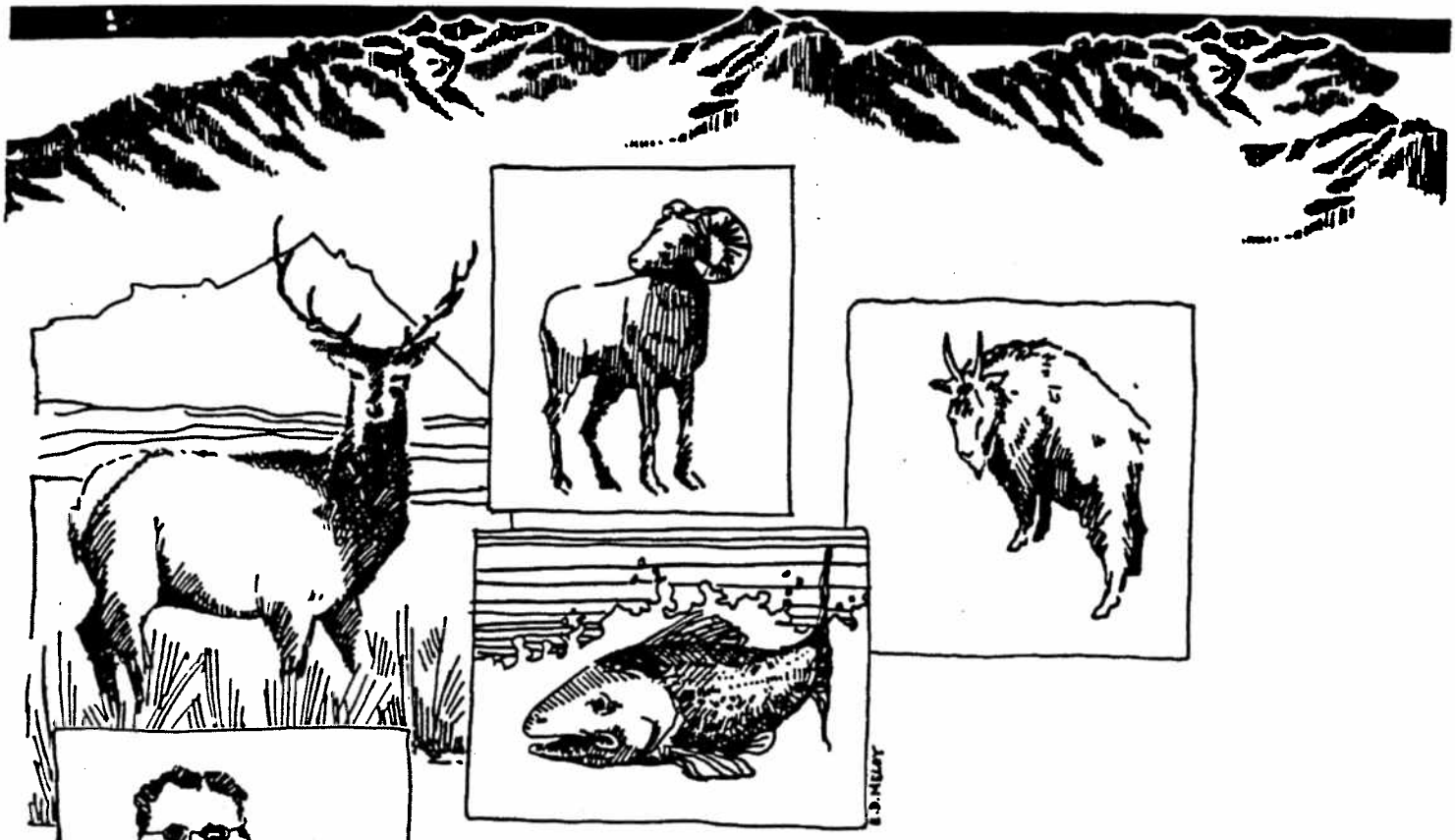
Watershed Restoration

Watershed restoration comprises actions taken to improve the current conditions of watersheds to restore degraded habitat, and to provide long-term protection to natural resources, including riparian and aquatic resources. The strategy does not attempt to develop a restoration strategy given the short time period for implementation of this interim direction. It is expected that Forests would utilize the information from watershed analysis and project development to initiate restoration projects where appropriate and funds are available. Priority watersheds would have the highest priority for restoration efforts.

Monitoring

Monitoring is an important component of the proposed interim direction. The primary focus is to verify that the standards and guidelines were applied during the project implementation. Monitoring to assess whether those protective measures are effective to attain Riparian Goals and Management Objectives would be a lower priority given the short time frame for this interim direction. Complex ecological processes and long time frames are inherent in the RMOS, and R is unrealistic to expect that the planned monitoring would generate conclusive results within 18 months. Nevertheless, it is critical to begin monitoring. Forests are urged to utilize current Forest Plan monitoring efforts, and Section 7 Monitoring results from PACFISH areas where on the same Forest to establish a baseline for determining the effectiveness of these standards and guidelines. Priority watersheds would have the highest priority for monitoring efforts.

A third type of monitoring (validation monitoring) is intended to ascertain the validity of the assumptions used in developing the interim direction. Because of the short-term nature of the management direction, no specific requirements are included for validation monitoring.



Fish & Wildlife Plan

The Bob Marshall Wilderness Complex

Limits of Acceptable Change In Wilderness 1991

Posewitz, Fraley, Joslin and Riley

Montana Department of Fish, Wildlife & Parks

in cooperation with REGION ONE U.S. FOREST SERVICE

7. Increase enforcement of angling regulations through a cooperative effort between the USFS and MDFWP.

Bull Trout

The goal of this plan is to maintain, at current or increased levels (as indicated by redd counts), the C ecosystem. This goal includes providing an opportunity-for anglers to catch a trophy fish in a wilderness setting, but de-emphasizes harvest of this unique species.

This population of bull trout, living in a natural lake and migrating into an extensive and still largely accessible and unaltered headwater tributary system, is probably the only one of its kind left in the United States. Streams within the BMWC provide some of the most important spawning and nursery habitats for migratory bull trout in Flathead Lake and Hungry Horse Reservoir. Because of the ecological relationships within these expansive aquatic systems, management must be sensitive to conditions both within and beyond the BMWC. The goal for bull trout will be pursued with the following strategies:

1. Maintain the current angling limit of one fish per day and in possession. Consider an education program to encourage voluntary catch and release of only one mature fish per day. The stress of migration and spawning render this species very sensitive to angling. If necessary, further restrictions will be considered.

2. Protect fisheries habitat within and in areas draining into the BMWC. It is important to ensure no further degradation in vulnerable areas such as the Middle Fork Flathead River.

3. Locate trail crossings away from important spawning areas and maintain primitive or difficult access to critical habitat areas.

4. Increase enforcement of angling regulations through a cooperative effort between the USFS and MDFWP.

5. Encourage management of bull trout in a manner consistent with this goal outside the BMWC. Sound management of this species in Flathead Lake, Hungry Horse Reservoir and the river corridors is required to protect the species within the BMWC ecosystem.

Other Game Fish

The goal of this plan is to emphasize recreational opportunity, primarily east of the continental divide, on populations of rainbow trout, brook trout, Yellowstone cutthroat trout and mountain whitefish.

The primary emphasis of the fishery program is to favor native species in the BMWC. In this instance, it is done by focusing angling pressure on non-native fish. The whitefish is an underutilized

native fish that could absorb more angling pressure. The objective is to reduce the taking of native cutthroat and bull . trout. Rainbow trout, brook trout, Yellowstone cutthroat trout and whitefish should be able to support increased angling pressure,, provide more recreational opportunity and perhaps reduce pressure on westslope cutthroat and bull trout. The goal for these species will be pursued through the following strategies:

1. Consider increasing the angling limit on rainbow trout in the Sun River drainage.

2. Develop and implement an education program to emphasize harvest of mountain whitefish for a subsistence experience within the BMWC.

3. Ensure that the management and education programs for these fish species are developed complimentary to the dominant fishery goal of preserving the westslope cutthroat and bull trout fish populations.

WILDERNESS USER PERCEPTIONS

The goal of this plan is to devise a methodology to address and deal with human perceptions of wilderness and the wilderness experience.

Most of the effort committed to this process has been directed toward the physical (land condition) and biological (fish and wildlife) resources of the BMWC ecosystem. Just as beauty and its identification belong to each person individually, the perception of what wilderness is and the experiences we seek there vary across a wide spectrum. If we are to follow Leopold's suggestion that, "To promote perception is the only truly creative part of recreation engineering", then we must devise ways to deal with...