United States Department of Agriculture | **Forest Service** | **Idaho Panhandle National Forests** | **3815 Schreiber Way Coeur d'Alene, ID 83815**

File Code: 1920
Date: April 22, 2005

Dear Interested Party:

We have completed the environmental assessment for the proposed forest plan amendment to the fisheries objectives, standards and monitoring requirements. A copy of the document has been mailed to you.

The purpose of this amendment is to modify or remove language in the 1987 Idaho Panhandle National Forests Land and Resource Management Plan (forest plan) that provides forest-wide direction for measuring and monitoring fry emergence. When the existing forest plan was developed in 1987, models for determining fry emergence were included in the forest plan to report on fry emergence success in various streams across the forest. Subsequently, forest plan monitoring and other research has shown that modeling fry emergence is not a good tool for determining stream health due to a high variability of results and a lack of reliability.

Two alternatives (Alternatives A and B) were developed and considered in our environmental analysis. **Alternative A** (No Action) would defer amending the forest plan at this time and retain all objectives, standards and monitoring requirements pertaining to fry emergence. **Alternative B** (the Proposed Action) would accomplish the proposed activities – modifying or removing those objectives, standards and monitoring requirements related to fry emergence. At this time, Alternative B is my preferred alternative.

The legal notice should be published in the *Spokesman Review* newspaper on April 23, 2005. This is the start date of a 30-day period that enables you to review the environmental assessment and provide comments on it. Your comments are very important in the completion of our analysis and ultimately, to my decision. We will provide our responses to all comments in an Appendix to the subsequent decision document, and we will make changes to the environmental assessment if we receive comments that warrant changing our analysis or consideration of other alternatives. For further information, please contact Shanda Dekome, Forest Fish Biologist, at (208) 765-7488.

To ensure my consideration of your comments, they must be postmarked or received by the 30th day of the comment period, which will be May 23, 2005. Please address your comments to Ranotta McNair, Forest Supervisor, Idaho Panhandle National Forests, 3815 Schreiber Way, Coeur d'Alene, ID 83815. As the Forest Supervisor of the Idaho Panhandle National Forests, I am the responsible official for this decision.

Sincerely,

/s/ Craig Bobzien (for):
RANOTTA K. MCNAIR
Forest Supervisor

United States Department of Agriculture
Forest Service
Northern Region

Fry Emergence Amendment

Environmental Assessment

April 2005

Idaho Panhandle National Forests

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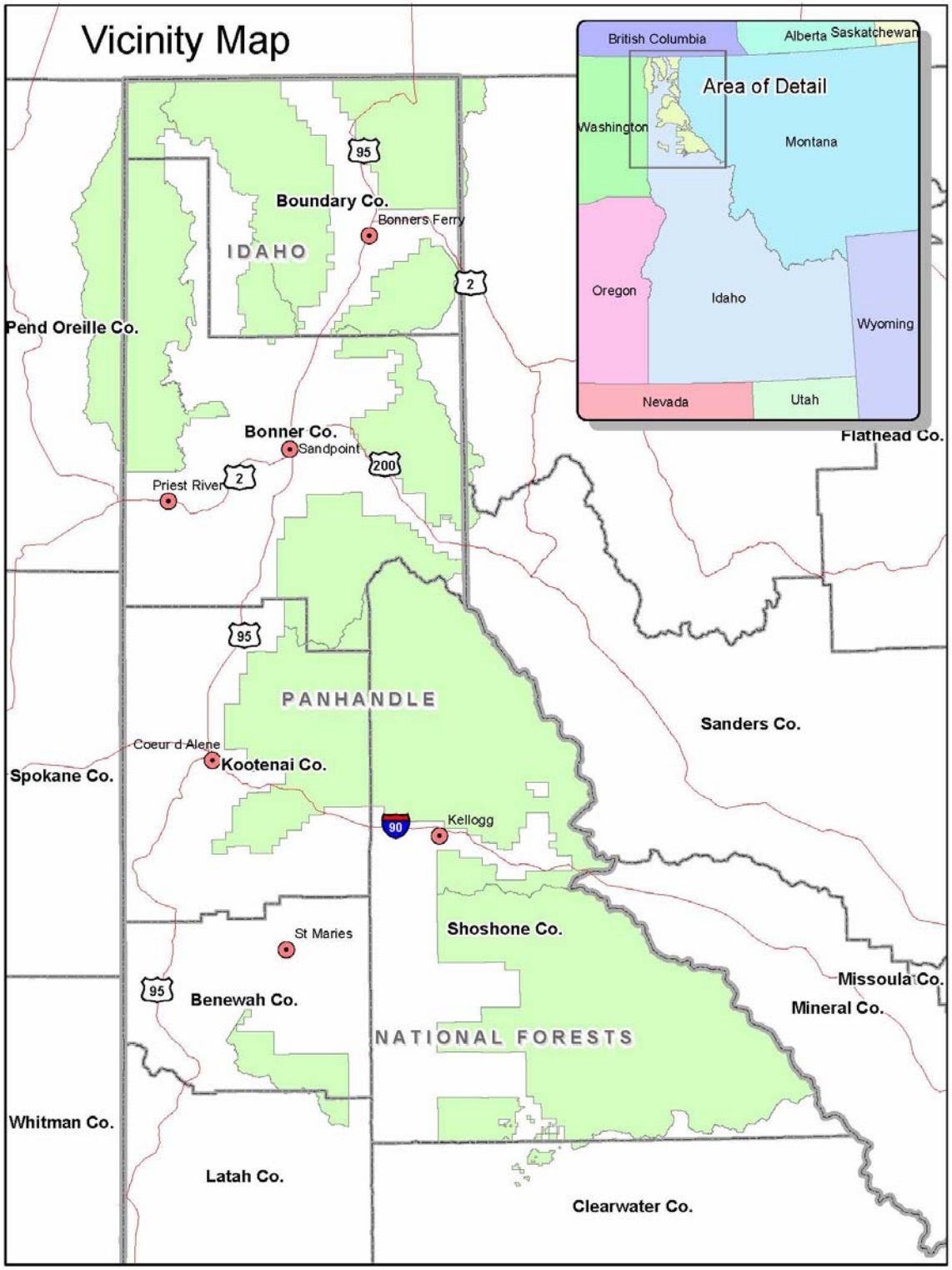
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Chapter One – Purpose and Need for Action

I. Introduction

This programmatic environmental assessment (EA) proposes to change the Idaho Panhandle National Forests Land and Resource Management Plan (Forest Plan) by amending fisheries objectives, standards, and monitoring requirements that pertain to fry emergence success within streams across the forest. The change is being done utilizing the procedures found in the 1982 National Forest System Land and Resource Management Planning Rule (36 CFR Part 219, Federal Register, Volume 47, No. 190).

Planning for units of the National Forest System involves two levels of decision-making. The first level, often referred to as programmatic planning, is the development or amendment of Forest Plans that provide management direction for resource programs, uses, and protection measures. Forest Plans and associated amendments are intended to set out Management Area prescriptions or decisions with goals, objectives, standards, and guidelines for future decision-making through site-specific planning. The environmental analysis accomplished at the Plan Amendment level guides resource management decisions and aids site-specific planning.

The second level of planning involves the analysis and implementation of management practices designed to achieve goals and objectives of the Forest Plan. This is commonly referred to as site-specific or project-level planning. It requires relatively detailed information and is most often accomplished at the ranger district (local) level.

II. Background

The watershed systems in the inland northwest evolved over millions of years under the influence of many forces and processes. These watershed systems have been subject to a wide array of disturbances and events. These disturbances have often been intense and cyclic in nature and may appear to recur somewhat randomly, but with predictable frequency. The watersheds and their aquatic species evolved under this disturbance regime.

Around the beginning of the 20th century, the influx of human populations began in the inland northwest along with the development of the land and resources to support those populations. This resulted in many new disturbances to the watershed systems. Roads can have some of the greatest effects to watersheds and aquatic biota. Within the Idaho Panhandle National Forests (IPNF), human activity has altered many stream channels by direct modification such as canalization, wood removal, diversion, dams, log drives, and encroaching structures such as roads, railways, bridges, and culverts.

Roads can change the runoff characteristics of watersheds, increase erosion and sediment delivery to streams, and alter channel morphology (Furniss et al. 1991). Although current BMPs for road construction are designed to minimize the effects to watersheds, many miles of road existing on the landscape were not built to these standards. As a result, these roads either continue to affect watersheds through erosion or are at risk for failure from crossings or locations on sensitive landtypes. These effects have lead to changes in habitats for fish and have affected aquatic species distribution and abundance from historic conditions. For example, bull trout are listed as Threatened under the Endangered Species Act and while westslope cutthroat trout are still widely distributed, remaining populations may be compromised by habitat loss and genetic introgression (Lee et al. 1997).

The 1987 IPNF Forest Plan included goals relating to providing sufficient habitat for the purposes of maintaining diverse and viable populations of fish species across the forest (USDA 1987b, pp. 11-1 and II-2) in order to meet our responsibilities under the National Forest Management Act (NFMA). The

objective was to manage to maintain and improve fish habitat capacities across the forest to achieve cooperative goals with the Idaho Department of Fish and Game and to comply with state water quality standards (ibid, p. II-7). To maintain fish habitat capacities, standards for managing activities potentially affecting fish and their habitat were developed (ibid, pp. II-29 to II-31). To improve fish habitat capacities, consistent with our responsibilities under NFMA, the IPNF has implemented numerous projects designed to reduce impacts to fish and their habitat from roads, as well as actively restoring fish habitat (see Chapter 3, section I).

Among the fish related standards included in the forest plan was a standard for measuring and maintaining fry emergence success. Fry emergence success is the ability of fish eggs to survive and hatch to become "fry" (baby fish), and emerge from the gravels. When the existing forest plan was developed in 1987, models for determining fry emergence based on fine sediment were popular and monitoring included in the forest plan (monitoring item G-1) required that we monitor and annually report on fry emergence success in various streams across the forest. The Forest Service did extensive sediment monitoring on the IPNF to determine fry emergence in 1988 and 1989 (project record, aquatics). After analyzing the resulting data on 25 streams using approximately 610 core samples, the conclusions were that:

- The relationship between sampled inter-gravel fines/embeddedness parameters and the amount of timber harvest and roading in a watershed was weak;
- Although there was a general trend for higher levels of inter-gravel fine sediment and embeddedness in developed watersheds, there was a lot of "scatter and variability" observed in the data;
- The emergence success levels or trends in relation to the 80 percent standard could not be determined;
- This was primarily due to too much variation with sampling techniques and natural variation of sediment within streams.

These findings that fry emergence success was not a good monitoring tool to report stream health was documented in the 1989 Forest Plan Monitoring and Evaluation Report (p. 14 and 15) and the fry emergence monitoring requirement was combined with monitoring requirements to validate fish habitat trends (monitoring item G-3), which includes a comprehensive array of fisheries and hydrology parameters.

A report by Chapman (1988) supports the above conclusions. The forest plan based fry emergence success solely on fine sediment (USDA 1987b, p. II-7), and models to predict it were initially developed based on laboratory studies (e.g., Bjornn 1969). In the field, however, fine sediment is one of many factors that can affect survival of fry. Changes in natural conditions (such as floods, temperature regimes, geology) and human-induced causes (including increased sediment inputs) can affect fry emergence. With natural and human-caused agents affecting habitat, it is difficult to determine what proportion of mortality is due to each cause. As a result, fry emergence is highly variable, and the underlying relationship between sediment in redds (fish nests) and survival is difficult to predict and often inconclusive.

Moreover, fry emergence was intended to address concerns associated with fine sedimentation. Fine sediments however are generally not a major concern on the IPNF and fry emergence is generally not a limiting factor in fisheries numbers. Sub Basin Assessment and TMDL of the North Fork Coeur d'Alene River. Idaho Department of Environmental Quality (2001).

By the 1990s, there was a growing concern over the viability of native fish communities and their habitat throughout the inland west and the need to develop an inland native fish habitat management strategy to protect native fish habitats was identified. This strategy resulted in the *Decision Notice and Finding of No Significant Impact for the Inland Native Fish Strategy* (INFISH) signed in 1995 by then Regional Foresters Hal Salwasser, Dale N. Bosworth, and John E Lowe. Their decision amended 22 forest plans within Forest Service Regions 1, 4, and 6 to include specific management direction pertaining to riparian goals, riparian management objectives, and monitoring. The IPNF Forest Plan was one of the plans amended by this decision notice.

The purpose of the INFISH decision was to protect inland native fish by reducing the risk of loss of populations and reducing potential negative impacts to aquatic habitat. The intent of the riparian management objectives was not to establish a ceiling for what constitutes good habitat conditions. Rather, actions that would reduce habitat quality, whether existing conditions are better or worse than the objective values would be inconsistent with the purpose of INFISH. As a result, projects on the IPNF can only be found consistent with existing forest plan direction for fish if the project does not contribute to a degradation of aquatic habitat.

In contrast to the purpose of the INFISH Forest Plan Amendment, the Forest Plan fry emergence standard currently within the IPNF Forest Plan does allow for degradation of aquatic habitat. First, it allows a degradation of up to 20% fry emergence success from pristine (or potential) condition. It then allows further degradation beyond 20% through direction contained in Appendix I. Appendix I of the IPNF Forest Plan details procedures forest fish biologists and hydrologists are to follow if the cumulative effect of a proposed action, in combination with other past actions is predicted to result in stream sedimentation levels that are greater than (exceed) a 20 percent reduction in fry emergence. In such instances the standard does not prohibit further impacts but merely requires a more detailed fishery/watershed analysis to be undertaken. There is no requirement that a project be modified to meet the standard (i.e. corrective action taken) prior to its implementation, rather:

> *Based upon this analysis, the specialists will provide the line officer with their best professional judgment on the significance of the project on the water resource. The officer will make a decision on the project incorporating socio-economic and multi-resource considerations. If there is a desire to pursue a project, which has been judged to have a significantly negative effect on water resources, it will be reviewed by the State for conformance with water quality standards prior to the final decision.* (USDA 1987b, p. I-2)

The *Decision Notice and Finding of No Significant Impact for the Inland Native Fish Strategy* stated that the INFISH standards and guidelines are to replace existing conflicting direction in the amended forest plans, except where forest plan direction provides for <u>more</u> protection for inland native fish habitat. Since 1995 and the amendment of the IPNF Forest Plan to include the INFISH standards and guidelines, it has consistently been the position of the Forest Service that INFISH standards and guidelines supercede the forest plan's fry emergence standard. Because the INFISH standards and guidelines do not allow for the implementation of projects that would result in aquatic habitat degradation, while the fry emergence standard does allow for such projects to be implemented, the direction contained in the INFISH amendment is more restrictive and therefore, more effective in achieving the forest plan's goal for maintaining diverse and viable populations of fish species across the forest.

Bull trout were listed by the USFWS as a threatened species in June of 1998. Subsequent to this listing the Forest Service in Regions 1, 4, and 6 entered into consultation with the USFWS over the effects on bull trout from continued implementation of their forest plans. After reviewing the current status of the bull trout, the environmental baseline, the effects of implementing the forest plans, and cumulative

effects, the USFWS determined that the continued implementation of these forest plans was not likely to jeopardize the continued existence of bull trout (USDI 1998). The consultation addressed the continued implementation of the forest plans as modified by interim strategies such as INFISH. Based on the fact that the fry emergence does permit degradation of fish habitat (*significantly negative effect on water resources)*, it is doubtful that the IPNF Forest Plan, absent the INFISH amendment, would have been found by the USFWS in 1998 not to jeopardize the continued existence of bull trout.

The IPNF has not been attempting to measure or implement the fry emergence standard since passage of the INFISH amendments in 1995. In March 2002 the United States District Court for the Eastern District of Washington in *Lands Council v. Vaught* upheld the Forest Service position that the fry emergence standard in the IPNF Forest Plan was superceded by the INFISH standards and guidelines. However, in August of 2004, the United States Court of Appeals for the Ninth Circuit in *Lands Council v. Powell* ruled that the two standards do not necessarily conflict and instructed the Forest Service to demonstrate consistency with both INFISH and the fry emergence standard.

III. Purpose and Need

The fry emergence objectives, standards and monitoring requirements currently in the IPNF Forest Plan do not contribute as well as INFISH objectives, standards, guidelines, and monitoring direction (the monitoring direction is required by the 1998 bull trout biological opinion) towards meeting the goals of providing sufficient habitat in support of maintaining diverse and viable populations of fish species across the forest. INFISH was designed to provide a means for passive restoration of degraded aquatic habitat conditions by preventing implementation of site-specific actions that would reduce aquatic habitat quality. Fry emergence direction allows for aquatic habitat degradation to occur from site-specific projects and it does not effectively preclude future additions of sediment when the stated threshold level is reached. Rather it allows for projects with significant negative effects on water resources to proceed at line officer discretion, provided state water quality laws are not violated. Existing standards for water quality in the IPNF Forest Plan (p. II-33) already provide for the requirement that our actions must meet or exceed state water quality standards.

The fry emergence standard is redundant when considering existing forest plan water quality standards and is contrary to the intent of INFISH by not preserving management options for fish species, by not reducing the risk of loss of fish populations, and by not reducing potential negative impacts to aquatic habitat of resident fishes (USDA 1995a, p. I-1). It is also inconsistent with Forest Service responsibilities under the Endangered Species Act (ESA) because by allowing potentially significant degradation of aquatic habitat it fails to contribute to the conservation of threatened and endangered species on the forest. The standard is also inconsistent with Forest Service responsibilities under NFMA because by permitting significant habitat degradation it fails to contribute to the maintenance of viable fish populations across the forest.

Additionally, forest plan monitoring and other independent research has shown that fry emergence models give highly variable results, have limited application, and do not reliably predict the effects of stream sedimentation on fry emergence success. The recent United States Court of Appeals for the Ninth Circuit finding that the INFISH standards and guidelines and fry emergence standard are not in conflict would require the Forest Service to determine, based upon monitoring data, if the fry emergence standard (maintain at least 80 percent fry emergence success) is being achieved in streams containing fish. Because of the limited application of the fry emergence models and their unreliability, and the inability to determine fry emergence success in the field due to high variability affected by multiple natural and human-caused factors, the Forest Service would not be able to state with any degree of certainty whether measures of fry emergence success are accurate or precise.

Regulations for implementing the National Environmental Policy Act (NEPA) [40 CFR 1500.1(b)] require that environmental information used to support conclusions made in our site-specific project decisions (fuel reduction projects, timber sales, recreation projects, watershed restoration projects, etc…) be of high quality and accurate. The National Forest Management Act (NFMA) [36 CFR 219.1 (b)] requires that our site-specific project decisions demonstrate compliance with the standards contained in our respective forest plan. In using the fry emergence model we cannot demonstrate that the model either provides high quality, accurate scientific information or supports consistency findings with forest plan fish standards.

Therefore, for the above stated reasons, there is a need for amending the IPNF Forest Plan to address the inconsistencies of the existing fry emergence objectives, standards and monitoring requirements with direction provided by the INFISH amendment, ESA, NFMA; as well as the lack of high quality information provided by the fry emergence model.

IV. Proposed Action

To achieve the above stated purpose and need, the Forest Service is proposing to amend the IPNF Forest Plan by removing from the forest plan or modifying the following sections that pertain to fry emergence:

1) Forest plan objectives for fisheries (p. II-7): The following sentences would be removed:

> *Sedimentation arising from land management activities will be managed so that in forest fisheries streams the objective is to maintain 80 percent of fry emergence success as measured from pristine conditions. Appendix I details the analysis process.*

2) Forest plan standards for fisheries (p. II-29): Standard #1 for fish, which reads as follows, would be removed:

> *Activities on National Forest lands will be planned and executed to maintain existing water uses. Maintain is defined as "limiting effects from National Forest activities to maintain at least 80 percent of fry emergence success in identified fishery streams." The percent is measured from pristine conditions. Current methodology will not detect an impact of less than 20 percent. During the life of the plan, new technologies may permit more precise assessments; however, the goal of this standard will remain as "to maintain 80 percent of fry emergence success.*

3) Forest plan standards for fisheries (p. II-30): Standard #2 for fish would be removed in its entirety:

> *Streams providing spawning and rearing habitat, which are considered critical to the maintenance of river and lake populations of special concern, will be managed at a standard higher than the 80 percent standard. Monitoring will be needed to detect this higher standard. The high value streams are:* (see the alternatives discussion for a list of high value streams listed in the forest plan).

4) Forest plan standards for fisheries (p. II-31): Standard #6 would be modified to delete the reference to Appendix I.

5) Table IV-2 of the forest plan (p. IV-11), which pertains to forest plan monitoring requirements would be modified to delete monitoring item G-1 – *Greater than 80% of potential emergence success*.

6) *Appendix I* would be removed from the forest plan.

V. Scope of the Proposed Action

Scope" is defined in 40 CFR 1508.25 as the range of actions, alternatives and impacts to be considered in an environmental analysis. The proposed amendment applies only to the Idaho Panhandle National Forests. The proposal to amend certain objectives, standards, and monitoring requirements is limited to those related to fry emergence. As an amendment, changes to the forest plan will remain in effect until the plan is revised, which is projected to be about one to two years. The programmatic management direction adopted through this amendment will not change the desired future conditions and land allocations of the forest plan. The amendment will not affect the forest-wide and management area desired future conditions already described in the existing forest plan. The temporary nature of this action (projected to be one to two years) together with the limited scope of this action would, therefore, limit its effects.

The INFISH standards and guidelines, which are to remain in the 1987 forest plan, would provide assurance that adequate environmental safeguards are incorporated in future projects and activities. All future projects will be carried out within the constraints of the forest plan and regional management direction (which both incorporate applicable law, regulation, and policy). The programmatic management direction adopted through this amendment would not change the physical environment; therefore, there would not be an irretrievable or irreversible commitment of resources. Any subsequent site-specific federal action that may change the environment, and that uses this direction to guide project design and implementation, would be subject to the National Environmental Policy Act and other relevant planning regulations.

To determine the scope of an environmental analysis, agencies consider three kinds of alternatives, three kinds of impacts and three kinds of actions, namely, connected, cumulative and similar actions.

Alternatives considered

The analysis evaluates three types of alternatives, including: 1) The no-action alternative, Alternative A; 2) The Proposed Action, Alternative B; and 3) Other reasonable courses of action.

Impacts considered

Three kinds of environmental impacts are possible, direct, indirect and cumulative. *Direct effects* are those that occur at the same time and place as the amendment. There are no direct environmental consequences of the amendment. The amendment is programmatic in nature, consisting of direction that would be applied to future management activities. It does not prescribe site-specific activities on the ground. Direct effects would be disclosed later at the project level, when site-specific decisions were made.

This analysis evaluates the *indirect* and *cumulative effects* of the Proposed Action and alternatives in Chapter 3.

Actions considered

Connected actions are those actions that are closely related. Actions are connected if: 1) they automatically trigger other actions that may require NEPA analysis; 2) they cannot or will not proceed unless other actions are taken previously or simultaneously; or 3) they are interdependent parts of a larger action and depend on that larger action for their justification. There are no known programmatic connected actions associated with this proposal.

Similar Actions are those which, when viewed with other reasonably foreseeable proposed actions, have similarities that provide a basis for evaluating their environmental consequences together, but are not necessarily connected. There are no known programmatic similar actions associated with this proposal.

Cumulative actions are those which, when viewed with past, other present and reasonably foreseeable actions, may have cumulatively significant impacts and should be discussed in the same environmental analysis. The 1987 IPNF Forest Plan was amended in 1995 by the *Decision Notice and Finding of No Significant Impact for the Inland Native Fish Strategy*. Additionally, the IPNF is currently in the process of revising its 1987 forest plan. These programmatic efforts are discussed in Chapter 3 where appropriate.

VI. Decision to be made

The decision to be made by the responsible official is whether to amend the forest plan by removing the language contained in objectives, standards, and monitoring requirements that pertains to fry emergence. If the responsible official decides to amend the forest plan, a determination will be made on whether the proposed amendment represents a significant change in the plan and a significant effect on the human environment, per the requirements of the National Forest Management Act and National Environmental Policy Act, respectively.

Chapter Two - Alternatives

This chapter describes and compares the alternatives considered for the environmental assessment. It includes a description of each alternative considered. This section also presents the alternatives in comparative form, defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Information used to compare the alternatives is based upon the design of the alternative and some of the information is based upon the environmental effects of implementing each alternative.

Alternatives were developed from the issues identified in public scoping. The interdisciplinary team grouped the alternatives into one of two categories based on their level of feasibility. These categories are "alternatives considered in detail" and "alternatives considered but eliminated from detailed study." Rationale has been provided for alternatives not studied in detail.

I. Public Involvement

The public scoping for the proposal began in March of 2005. Scoping letters were mailed to about 315 people, organizations, tribes, and agencies. A legal notice requesting public comment appeared in the *Spokesman-Review*, the forest's newspaper of record, on March 23, 2005. The project was listed on the forest's quarterly schedule of proposed actions beginning with the April 2005 quarter and the scoping letter was posted on the Idaho Panhandle National Forests website at http://www.fs.fed.us/ipnf/eco/manage/nepa/index.html.

Five public responses to the scoping letter were received, evaluated and summarized in a report called *Summary of Public Comments* (see the *Public Involvement* section of the project record). Three of the respondents were not supportive of amending the IPNF Forest Plan to remove or modify those objectives, standards, guidelines, and monitoring requirements related to fry emergence, while two respondents were not opposed to the removal of the fry emergence direction. However, four of the respondents stated that if direction to measure and monitor fry emergence is removed from the forest plan, the Forest Service should propose an alternate standard to replace it. The replacement standard should be quantitative in nature and provide a threshold level, above which further water quality or fish habitat degradation is precluded from occurring. The respondents didn't believe that the 1995 INFISH amendment to the IPNF Forest Plan provides the same level of protection necessary to ensure viability of fish species, as does the fry emergence direction.

Other topics receiving comment included:

- The propriety of carrying out such a significant amendment when the IPNF is currently in the process of revising its forest plan.
- The length of the scoping period was too short.

II. Issues

Section 102(2)(e) of the National Environmental Policy Act states that all Federal agencies shall "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflict concerning alternative uses of available resources." The scoping process is used not only to identify important environmental issues, but also to identify and eliminate issues that do not pertain to the action, narrowing the scope of the environmental documentation process accordingly. Therefore, impacts are discussed in proportion to their importance.

To identify issues specific to the proposed amendment, the interdisciplinary team reviewed public comments and research information pertaining to factors affecting measurement of the survival of fry. The team also reviewed the IPNF Forest Plan and other programmatic planning documents relevant to the proposed amendment to further develop a list of issues. Issues were potentially separated into two groups: significant and non-significant issues.

A. Significant Issues

Significant issues are those issues involving unresolved conflict concerning alternative uses of available resources. Under the proposed action, the INFISH standards and guidelines would remain in the forest plan. As previously discussed in Chapter One, INFISH management direction does not allow for implementation of site-specific projects that would contribute to a degradation of aquatic habitat conditions[1], while the fry emergence standard does allow such degradation to occur, including significant negative effects on water resources, provided state water quality laws are not violated (USDA 1987b, Appendix I, p. I-2).

Comments received from scoping indicated that a quantitative threshold standard for sediment should be retained in the forest plan because an amended forest plan applying INFISH alone would not provide the same level of protection for maintaining viable fish populations across the forest as with the fry emergence standard included. However, the objectives, standards, guidelines and monitoring requirements for fisheries and water quality (see Appendix A) retained in the forest plan, should the proposed action be implemented, is direction that: 1) Can be monitored and 2) Provides for an equal level of protection for fish and their habitat, when compared to the existing forest plan direction. This conclusion is based upon forest monitoring efforts and scientific research conducted since the development of the fry emergence model used in the 1987 IPNF Forest Plan (see Chapter 3, section II). Therefore, the interdisciplinary team was not able to identify any issues that would involve unresolved conflicts concerning alternative uses of available resources because fish and their aquatic habitat conditions across the forest would be unaffected by the proposed removal of the fry emergence direction from the forest plan. As a result, alternatives considered in detail consist of the proposed action and a no-action alternative, which would retain the fry emergence standard in the forest plan.

B. Analysis Issues

Issue – The need for a quantitive sediment standard in the IPNF Forest Plan

Commenters expressed the concern that if the proposed action were implemented, the Forest Service would not meet its NFMA responsibilities for maintaining viable populations of fish species across the forest, because our ability to monitor and assess the effects from sediment to water quality and fish habitat would be impaired. Should the fry emergence standard and its related monitoring requirement be amended from the forest plan, the Forest Service needs to replace this quantitative standard with another quantitative type standard that provides for a threshold sediment value, over which any further water quality or habitat degradation by site-specific project activities would be prohibited. The new standard should also be included in regularly scheduled monitoring of all forest streams.

The issue indicators used to measure the effect of the alternatives on this issue are 1) *the change in the ability of the Forest Service to monitor and assess effects to fish habitat and water quality* and 2) *changes in the ability of the Forest Service to provide for viable populations of management indicator fish species on the forest*.

[1] Short-term detrimental effects to individual fish or habitat are not the same thing as degradation of habitat, which is a downward trend in the condition of the habitat.

C. Non-significant Issues

Non-significant issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, forest plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Section. 1501.7 "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…" Issues identified as non-significant included the following:

Issue – Insufficient length of the public scoping process

During initial scoping, comment was received regarding the relatively short length of the scoping period (March 23, 2005 to April 8, 2005). Due to administrative constraints, the initial scoping period was shortened from the customary 30 days. However, a 30-day opportunity to comment has been provided during the review of this environmental assessment

This issue was determined to be non-key because it is already decided by agency regulations. There are several sections in the preparation of environmental documents where mandated time lengths for public comment can be found. There are specific time requirements found under forest planning regulations 36 CFR 219, forest plan appeal regulations 36 CFR 217, and under forest plan implementation project appeal regulations 36 CFR 215. This proposed amendment environmental assessment does not constitute a forest plan or regional guide (36 CFR 219.6 (g)), and as such is not bound by the 30-day comment period regulation. The proposed action *does not* fall under the appeal regulations found at 36 CFR 215, as it does not:

1) Implement a land management plan;
2) Require the preparation of an environmental impact statement (EIS);
3) Propose a non-significant amendment to a forest plan that is *included as part of a decision on a proposed action* for which an environmental assessment (EA) is prepared;
4) Propose revision of an existing EA; or
5) Proposed research activities to be conducted on National Forest System Lands (36 CFR 215.3).

Appeal regulations for amendments to forest plans, outside those attached to specific projects, can be found in the Code of Federal Regulations (CFR), Title 36, Part 217. There are no timelines associated with an environmental assessment in these regulations. Guidance on public scoping and comment periods is drawn from the overarching guidance in the NEPA implementing regulations found at 40 CFR 1500.

Issue – Significance of the amendment

Under NFMA, forest plans may be amended after final adoption and public notice. The NFMA implementing regulations at 36 CFR 219.10(f) state: "Based on an analysis of the objectives, guidelines, and other contents of the Forest Plan, the Forest Supervisor shall determine whether a proposed amendment would result in a significant change in the plan." Neither NFMA nor its implementing regulations define the term "significant." Instead, the regulations place full discretion to determine whether a proposed amendment will be significant in the hands of the Forest Service. Forest Service Manual (FSM) 1922.51 details those criteria that are non-significant:

1) Actions that do not significantly alter the multiple-use goals and objectives for long-term land and resource management;

2) Adjustments of management area boundaries or management prescriptions resulting from further on-site analysis when the adjustments do not cause significant changes in the multiple-use goals and objectives for long-term land and resource management; and
3) Minor changes in standards and guidelines
4) Opportunities for additional management practices that will contribute to achievement of the management prescription

Under NFMA and its regulations, an amendment that does not result in a significant change in a Forest Plan must be undertaken with public notice and appropriate National Environmental Policy Act compliance. If a change to a Forest Plan is determined to be significant, the Regional Forester must follow the same procedure required for the development of the Forest Plan, including preparation of an Environmental Impact Statement. Significant changes are those that may cause significant change to a forest plan, such as:

1) Changes that would significantly alter the long-term relationship between the level of multiple-use goods and services originally projected (36CFR219.10(e)); and
2) Changes that may have an important effect on the entire forest plan or affect land and resources throughout a large portion of the planning area during the planning period.

Since the proposed action simply removes unmeasurable, redundant objectives, standards, and monitoring requirements related to fry emergence, the proposed amendment will not change on-the-ground management; hence it will not affect significant change. This environmental assessment documents the effects the proposed action, and the alternatives, will have on the human environment and provides the documentation on the determination of significance (FSM 1922.5).

The Land and Resource Management Planning Handbook (Forest Service Handbook (FSH) 1909.12) provide more detailed guidance for exercising this discretion. This guidance offers a framework for consideration but does not demand mechanical application. No one factor is determinative, and the guidelines make it clear that other factors may be considered. Section 5.32 of FSH 1909.12 lists four factors to be used when determining whether a proposed change to a Forest Plan is significant or not: 1) timing; 2) location and size; 3) goals, objectives and outputs; and 4) management prescriptions. It also states that "[o]ther factors may also be considered, depending on the circumstances."

The determination of whether a proposed change to a Forest Plan is significant depends on analysis of all of these factors. The decision-maker must consider the extent of the change in the context of the entire Plan affected, and make use of the factors in the exercise of his or her professional judgment. The accompanying decision notice would include a decision on significance.

III. Alternatives

The National Environmental Policy Act requires that a full range of alternative methods for accomplishing the stated purpose and need be evaluated for each proposal. The courts have established that this does not mean every conceivable alternative must be considered, but that the selection and discussion of alternatives must permit a reasoned choice and foster informed public participation and decision-making.

Whether an alternative is *reasonable* is primarily determined by whether it meets the purpose and need and whether it represents a distinctly different approach in responding to issues. The range of alternatives presented in this chapter was determined by evaluating the comments and the purpose and need; and considering the level of scientific information available to warrant a different approach. Within these

parameters, the alternatives considered display a reasonable range to respond to the issues and meet the purpose and need for action.

In this environmental assessment, two alternative courses of action are ripe for consideration. The first is to continue with present management using existing objectives, standards and monitoring requirements as published in the 1987 IPNF Forest Plan and subsequently amended by the *INFISH Decision Notice and Finding of No Significant Impact*. The second is to remove or modify objectives, standards and monitoring requirements relating to fry emergence, which have been made redundant by the 1995 INFISH amendment to the IPNF Forest Plan.

When the alternatives were being developed, suggested objectives, standards and guidelines were considered if they addressed the primary issues or management concerns. These comments were screened to see if:

- They met the Purpose and Need, and if so
- Whether they provided approaches different from those already included in other alternatives.

Those that did not meet both tests are discussed later in this chapter, as *Alternatives not given Detailed Study* where the reasons are explained why they were not developed further. These partially developed alternatives contribute to the reasonable range and reasoned choice, even though they were eliminated from further consideration.

Under all alternatives, the Forest Service is compelled to follow agency regulations, as well as state and federal laws.

A. Alternatives Considered in Detail

1. Alternative A – No Action

Analyzing a no-action alternative is a requirement of NEPA at 40 CFR 1508.14(d), and Forest Service planning procedures and provides the baseline for comparison of alternatives. Alternative A would not amend the forest plan; therefore, all existing forest plan objectives, standards, and monitoring requirements pertaining to fry emergence would be retained. Appendix A contains a list of the current forest plan objectives, standards, guidelines and monitoring requirements. Individual site-specific projects would be evaluated consistent with NEPA and NFMA requirements for their consistency with the existing direction found in the 1987 IPNF Forest Plan.

The no-action alternative does include the objectives, standards, guidelines, and monitoring requirements found in the INFISH amendment (see Appendix A). Therefore, the analysis would consider the effects of the existing plan as written including the INFISH amendment.

2. Alternative B – Proposed Action

The proposed action is the preferred alternative and would amend the IPNF Forest Plan to remove or modify the following sections that pertain to fry emergence.

1) Forest plan objectives for fisheries (p. II-7): The following sentences from the first paragraph would be removed:

> *Sedimentation arising from land management activities will be managed so that in forest fisheries streams the objective is to maintain 80 percent of fry emergence success as measured from pristine conditions. Appendix I details the analysis process.*

The revised forest plan objective for fisheries would read as follows:

The Idaho Panhandle National Forests will be managed to maintain and improve fish habitat capacities in order to achieve cooperative goals with the State Fish and Game Department and to comply with state water quality standards.

Fishery and timber riparian management activities will be coordinated in order to maximize the contribution of riparian vegetation to aquatic habitats. An annual program of direct habitat improvement work will be pursued. Several unroaded stream and river segments will be managed as low public access areas to maintain a diversity of fishing experiences on the Forest.

2) Forest plan standards for fisheries (p. II-29): Standard #1 for fish, which reads as follows, would be removed in its entirety:

Activities on National Forest lands will be planned and executed to maintain existing water uses. Maintain is defined as "limiting effects from National Forest activities to maintain at least 80 percent of fry emergence success in identified fishery streams." The percent is measured from pristine conditions. Current methodology will not detect an impact of less than 20 percent. During the life of the plan, new technologies may permit more precise assessments; however, the goal of this standard will remain as "to maintain 80 percent of fry emergence success."

3) Forest plan standards for fisheries (p. II-30): Standard #2 for fish would be removed in its entirety:

Streams providing spawning and rearing habitat, which are considered critical to the maintenance of river and lake populations of special concern, will be managed at a standard higher than the 80 percent standard. Monitoring will be needed to detect this higher standard. The high value streams are:

High Value Streams

Upper Marble
Catspur
Foehl
Lund
Canyon (Avery R.D.)
Boundary
South Fork Granite
Blacktail (Priest Lake R.D.)
North Fork Granite (Priest Lake)
Trestle
North Fork Grouse
Lightning (below falls)
Beaver (Priest Lake R.D.)
Hughes Fork
Grass
Deer (Bonners Ferry R.D.)
Upper Priest
Upper Pack
Upper Grouse
East Fork Lightning
Skookum
Bird
Eagle (Avery R.D.)
Quartz (Avery R.D.)
Johnson
North Fork Hayden
East Fork Hayden
Granite (Sandpoint R.D.)
Gold (Sandpoint R.D.)
North Gold (lower portion)
Upper North Fork Coeur d'Alene (upstream of Iron Creek)
Upper Simmons
Upper Coeur d'Alene (upstream of Spruce Creek)
Marie
Upper Wolf Lodge
Cougar
West Fork, East Fork Steamboat
Brown
Trail

Porcupine
Wellington (below falls)
Rattle
Gold (Avery R.D.)
Upper Tepee (upstream of Trail Creek)
Big Elk
Savage

4) Forest plan standards for fisheries (p. II-31): Standard #6 would be modified to delete the reference to Appendix I. The modified standard, to be retained in the forest plan, would read as follows:

Coordinate management activities with water resource concerns as described in MA 16 and Appendix O.

5) Table IV-2 of the forest plan (p. IV-11), which pertains to forest plan monitoring requirements would be modified to delete the following monitoring item.

G-1	**Greater than 80% of potential emergence success**	58 streams monitored at 29 streams per year	2 years	Annually	When more than 10% of high value streams – below 80%. When more than 20% of important streams – below 80%. A 4 year declining trend on any stream

6) *Appendix I* (see Appendix B of this document) would be removed from the forest plan.

B. Alternatives Not Given Detailed Study

1. Alternative C – Replacement of the fry emergence standard with a similar quantitative threshold measure for sediment

An alternative for instream measure of sediment was considered in lieu of fry emergence. Such a measure would need to provide accurate and verifiable information related to existing levels of fine sediment in streams throughout the forest. As discussed in Chapter 3, based on numerous physical factors, there is considerable variability in a stream's capability to mobilize and transport fine sediment. These physical factors vary not only from stream to stream within the same basin, but also vary considerably within the same stream. This variability makes it nearly impossible to develop useful universal guidelines or criteria for protecting stream biota based on turbidity and fine sediment (Everest et al 1987).

In this analysis fine sediment refers to inorganic particles less than 6 millimeters in size (silt/sand). This material can be transported as suspended load or as bedload. Suspended sediment refers to that portion of the sediment in transport that is swept into the main body of the flow by the upward components of the turbulence and kept in suspension for appreciable lengths of time[2]. Bedload is defined as sediment in

[2] Vanoni, Vito a., Editor. 1975. Sedimentation Engineering. American Society of Civil Engineers, New York, NY. P19

transport that is sliding or rolling along the bed of the stream (also called *contact load*) or "saltating load" that is making short jumps, leaving the bed for short instants of time and returning either to come to rest or to continue in motion on the bed or by further jumps. The size of materials transported as bedload and suspended sediment will vary partially with the velocity of the streamflow and the turbulence of the flow. Fine sediments are generally transported by the stream during higher flow periods and tends to settle out in areas of slower moving water following the deposition of coarser sediments. This can result in a covering of fine sediment along a stream's pool bottoms and low gradient riffles. If large amounts of fine sediment are present, it can fill the pools and deposit around channel features smoothing out the bed, resulting in reduced spatial variability.

Most suspended sediment moves during infrequent high flows that collectively account for only a small portion of the measurement period. The associated high transport rates and variances dictate that most data be collected during high flows, but the infrequency and brevity of the high flow periods combined with measurement and access problems cause acute problems in collecting data.[3] MacDonald et al (1991) discussed the numerous difficulties associated with attempting to accurately measure sediment values.

1) Sediment values are highly dependent on stream discharge and representative samples can be difficult to obtain because sediment concentrations can vary tremendously over time and space. Calculating suspended sediment fluxes and loads results in an inherent uncertainty of at least 25-50 percent. Bedload samples taken from the same location at constant flow can also be expected to vary greatly over short time periods. Under normal field conditions, an accuracy of no better than 50-100 percent can be assumed.

2) Few monitoring studies can afford to intensively sample sediment. High year-to-year variation in sediment values, particularly for coarser bed materials, suggests that a relatively long-term record is needed to obtain a reliable estimate. Less frequent samples are useful only as a crude indicator and generally should be interpreted qualitatively rather than quantitatively.

3) While one can argue that some data are always better than no data, in the case of estimating bedload sediment it is questionable whether a limited amount of quantitative data has any real value for estimating sediment values.

4) It is difficult to directly relate specific bedload sediment values to adverse effects on the various designated uses such as salmonid habitat. Often monitoring parameters such as cobble embeddedness, residual pool depths, pool-riffle ratios, or cross-section profiles can more directly assess the effects of bedload on the designated uses. Although these parameters all have their own drawbacks, and it may be difficult to link observed changes to specific management activities, at least such measurements can be directly related to many of the important designated uses of forest streams. Most of the channel characteristic parameters also have the advantage of being considerably easier to measure than bedload sediment values.

On the IPNF, long-term stream hydrology monitoring stations have been established throughout the forest. Typically they are configured to measure and record continuous water level and discharge, suspended sediment as daily-integrated samples, and bedload sediment as intermittently manual collection samples.

[3] Thomas, Robert B. Measuring suspended sediment in small mountain streams. Gen. Tech. Rep. PSW-83. Berkeley, CA: Pacific Southwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture; 1985. 9 p.

Sediment loads as well as stream flows are derived from the entire watershed area above the subject stream reach, and therefore, they are subject to the extensive variability (in both time and space) of the physical watershed as well as the climatic factors that drive those hydrologic processes. Sediment disposition at a site or a reach that might be related to fry emergence is primarily a function of those three hydrologic parameters.

The variability of the stream gage data is demonstrated by statistics derived from three of the long-term stations located in different parts of the forest and with each containing different levels of cumulative watershed developments. The variability of each station's discharge measurements were typically more than 100 percent as represented by the datasets' coefficients of variability (CV) (CV = standard deviation divided by the mean). Even when comparing the average annual discharge for a station, the CV exceeded 33 percent.

The variability of the sediment measurements and annual load determinations is more profound. Suspended sediment CV ranges between 150 and 1,400 percent between measurements for a station and 85 to 165 percent between years. Bedload, which is not related as well to stream flow, ranges up to 600 percent between samples; and over 110 percent between years at a station.

This large and wide range of variability for the hydrologic parameters would be amplified when they are related to sediment disposition over time at a site since they would only explain a part of the variability of sediment deposition. When biological responses, such as fry emergence, are factored in, the variability is exaggerated even more.

For these reasons, at least in part, sediment cannot provide quantitative standard for non-point sources under the Clean Water Act or State Water Quality Standards. Sediment is appropriately addressed as a performance-based standard, such as Best Management Practices (BMP). Sediment loads can be used as objectives and basis for comparison as well as for validation and effectiveness monitoring, but not for compliance measures. The situation is similar for biological measures related to stream flows and sediment loads from non-point sources in wildland watershed situations.

While the IPNF evaluated other forests that have threshold sediment standards in their forest plans (e.g., Clearwater National Forest and the Challis portion of the Salmon-Challis National Forest), a review of recently revised forest plans demonstrates the trend towards performance-based standards (as opposed to threshold standards) for watershed, riparian, and fisheries habitat (e.g., Sawtooth NF, Payette NF, Boise NF, Dakota-Prairie Grassland, Wasatch-Cache NF, White River NF). None of these revised plans has a threshold standard for sediment.

Because of the above enumerated difficulties associated with accurately determining sediment values, an alternative that would replace the fry emergence standard with a similar quantitative threshold sediment standard was not considered to be viable and therefore, not given further detailed study.

IV. Comparison of the Effects of the Alternatives

The comparison of alternatives focuses on the change in the ability of the Forest Service to monitor and assess effects to fish habitat and water quality that result from removing or modifying those objectives, standards, and monitoring requirements pertaining to fry emergence.

Table 1. Alternative Comparison

Aquatic Habitat	Ability to monitor and assess effects to fish habitat and water quality	No change – the information generated from fry emergence monitoring would not accurately or precisely determine whether there is 80 percent fry emergence success on the IPNF; however, all other forest or above-forest level monitoring such as INFISH implementation and effectiveness monitoring, IPNF forest sediment monitoring, and other aquatic habitat and species inventory and monitoring would continue	No change – Other than fry emergence, all other forest or above-forest level monitoring such as INFISH implementation and effectiveness monitoring, IPNF forest sediment monitoring, and other aquatic habitat and species inventory and monitoring would continue
	Providing for viable populations of threatened, endangered, sensitive, and management indicator fish species	No change because of the provided protections from INFISH and other laws and regulations and because of the continuing restoration activities on the IPNF	No change because of the provided protections from INFISH and other laws and regulations and because of the continuing restoration activities on the IPNF

Chapter Three – Affected Environment and Environmental Consequences

I. Introduction

The IPNF provides habitat for fish and other aquatic biota across the forest. The National Forest Management Act (NFMA) requires forests to manage fish and wildlife habitat to "maintain viable populations of existing native and desired non-native vertebrate species in the planning area" (36 CFR 219.19). Bull trout, cutthroat trout, and rainbow trout are the aquatic management indicator species (MIS) for the IPNF. Bull trout and westslope cutthroat trout and interior redband (a strain of rainbow trout) are native to the IPNF; other strains of cutthroat trout and rainbow trout have been stocked in waters on the IPNF and may be considered desired non-natives. These species are found across the forest. Bull trout occur in streams within 67 percent of the large (i.e., 4th field HUCs[4]) on the IPNF. Cutthroat trout and rainbow trout are found in streams within 100 percent and 75 percent of large watersheds, respectively.

At the time the IPNF Forest Plan was written (circa 1987), the emphasis was on developing a commodity production strategy while minimizing impacts to watersheds and aquatic resources, including fish. The strategy for watershed management was constructed in the forest plan as a "maintenance" objective. In some situations, thresholds, or "minimum impact" standards, such as the fry emergence standard, defined the criteria for maintenance. To ensure that watersheds and aquatic resources are maintained during forest management activities, Best Management Practices (BMPs) were applied.

The early years of the planning cycle[5] had less protection for fisheries resources than later years yet had the highest levels of management activities such as timber harvest and road construction (Table 2 and Table 3, respectively). Despite the threshold standards and BMPs, the condition of fish habitat on the forest was declining, primarily due to timber harvest and road building activities (IPNF 1992). The IPNF developed habitat action plans for bull trout and cutthroat trout in 1991 (IPNF 1991b, c). The IPNF also developed a draft Aquatic Conservation Strategy, a precursor to INFISH (IPNF 1994).

[4] 4th field HUCs (hydrologic unit code) are large watersheds on the order of Priest River, Pend Oreille Lake, North Fork Coeur d'Alene River, or St. Joe River. There are 12 4th Code HUCs wholly or partly within the boundaries of the IPNF.
[5] 1987 to present.

Table 2. Timber Volumes Offered and Sold (MMBF) And Total Acres Sold, 1991-2003

1991	201.6	163.2	13,989
1992	127.2	108.0	10,508
1993	109.4	124.3	13,939
1994	44.9	16.4	4,283
1995	64.1	37.5	8,437
1996	75.4	42.9	8,631
1997	79.3	108.3	10,914
1998	76.3	90.3	6,974
1999	63.4	30.3	8,751
2000	76.3	78.2	7,332
2001	65.8	40.7	5,626
2002	57.2	55.4	5,383
2003	42.2	22.1	3,282

Table 3. Miles of Road Construction and Reconstruction, 1988 - 2003

1988	103	233
1989	134	130
1990	83	140
1991	46	107
1992	65	109
1993	57	233
1994	2	43
1995	12	54
1996	1	41
1997	16	202
1998	12	276
1999	5	74
2000	2	373
2001	3	<1
2002	1	24
2003	4	64

In 1995, the forest plan was amended to include the Inland Native Fish Strategy (INFISH, USDA 1995). The implementation of INFISH gave greater protection to aquatic resources, especially riparian-dependent systems. INFISH was intended to be an interim measure to maintain and protect aquatic resources until a long-term strategy could be developed during Forest Plan revision. INFISH contains goals for healthy, functioning watersheds, riparian areas, and associated fish habitats; Riparian Management Objectives (RMOs), and performance-based standards and guidelines for land management activities (i.e., timber, roads, grazing, recreation, minerals, fire/fuels, lands, riparian area management, watershed restoration, fisheries and wildlife restoration).

INFISH has led to improvement in the condition of aquatic resources by offering greater protections to the critical riparian areas. In addition, INFISH allows for and encourages watershed restoration. Restoration has occurred over the years across the IPNF. Over 1,300 miles of roads have been decommissioned on the IPNF from 1991-2003 (Table 4), including 10.5 miles of recontoured roads in Trestle Creek, the most important bull trout spawning stream in the Pend Oreille Lake watershed. Habitat improvement projects across the forest have been going on for decades. Over 95 miles of stream restoration projects have been done on the the Coeur d'Alene RD alone since the 1980s. Habitat improvement projects on the forest include:

- Restoring stream channels,
- Improving instream habitat (e.g., installation of habitat structures such as large woody debris),
- Reconnecting fragmented habitat (e.g., removal or upgrades of road crossings), and
- Removing threats to native fish. For example, Lake Pend Oreille Bull Trout Problem Assessment (PBTTAT 1998) lists threats to bull trout, many of which the IPNF, in partnership with other agencies and groups, has been addressing. Recent examples include cleaning up past mining operations and repair of the Kickbush Gulch slide in the Gold Creek watershed (the second most important bull trout spawning in the Lake Pend Oreille watershed), and completing a watershed assessment of Lightning Creek, which prioritizes restoration needs in this important bull trout watershed that will guide future IPNF restoration activities in this watershed.

Many research projects on the IPNF have contributed to the knowledge and protection of local populations of threatened, endangered, and sensitive fish species (some recent examples include Quintela 2004, Epifano et al. 2003, Wells et al. 2003, Dunnigan et al. 1998).

Table 4. Miles of Roads Decommissioned on the IPNF, 1991-2003

1991	0	8.0	8.0
1992	141.8	28.3	170.1
1993	115.2	27.6	142.8
1994	119.3	59.9	179.2
1995	95.9	25.7	121.6
1996	58.9	14.3	73.2
1997	79.2	1.1	80.3
1998	71.5	2.8	74.3
1999	51.9	58.3	110.2
2000	91.8	23.0	114.8
2001	107.0	29.2	136.2
2002	40.2	19.0	59.2
2003	22.6	24.6	47.2
TOTAL	**995.3**	**321.8**	**1,317.1**

In the later years of the planning cycle there has been greater protection for fish and fish habitat through INFISH, the Clean Water Act (e.g., State TMDLs, Antidegradation Policy), the Endangered Species Act, and improvement of BMPs while the level of management, especially timber harvest and road building, has declined. Through restoration activities and habitat protection, the IPNF has managed fisheries habitat to maintain viability of native and desired non-native fish across the forest.

Inventory and monitoring help determine conditions and trends of aquatic resources. A variety of inventory and monitoring efforts have been implemented on the IPNF (Table5).

Table 5. Examples of IPNF aquatic resources inventory and monitoring efforts

Forest Watershed Monitoring (G-2)	Long term flow and sediment monitoring (IPNF 2003, 2002, 2001, 2000, 1999, 1998, 1997, 1996, 1995, 1993, 1992, 1991, 1990, 1989)
Water Temperature Monitoring (G-3)	Season-long temperature monitoring in many streams across the forest (IPNF 2003)
Fish Habitat Inventory and Monitoring (G-3)	Currently using R1/R4 Fish Habitat Inventory Methodology (Overton et al. 1997) to quantify fish habitat; other methodologies used in the past. (IPNF 2003, 1998, 1997, 1996, 1995, 1992, 1989)
Fish Population Monitoring (G-4)	Cooperative with Idaho Department of Fish and Game. Examples include bull trout redd counts, snorkeling, and electrofishing. (IPNF 2003, 2002, 2000, 1998, 1997, 1996, 1993, 1992, 1990)
INFISH Implementation Monitoring	Large-scale implementation monitoring effort that primarily addresses grazing. Two years of implementation monitoring for vegetation, minerals, and recreation projects. (USDA 2003)
INFISH Effectiveness Monitoring	Large-scale monitoring effort described in more detail below under *INFISH Monitoring*. (Kershner et al. 2004)

II. The Fry Emergence Standard

A. History

The detrimental effects to fish and their habitat by increases in sediment delivery to streams have been widely observed, studied, and documented (see Waters 1995, Hicks et al. 1991, Everest et al. 1987, Platts et al. 1989, and many others). The effects of fine sediment on reproductive success of salmonid fishes have been studied since the 1920s (Chapman 1988). Research has concluded that fine sediment can reduce the transport of oxygen to eggs, leading to embryo mortality, and can block the movement of fry

[6] Items in parentheses refer to Water/Fish Monitoring Requirements in the IPNF Forest Plan (USDA 1987b, pages IV-11 and 12).

from spawning beds. Mortality was shown to increase as fines increased. Several studies aimed to refine the relationship between percentage of fines in redds and emergence success of fry. Relationships based on Bjornn 1969 and McCuddin 1977 were used to estimate fry emergence as part of the analysis for the 1987 IPNF Forest Plan (USDA 1987a, Appendix 9).

The fry emergence-sediment relationship was incorporated into the IPNF Forest Plan in the form of an objective and two standards, which read as follows:

> *Sedimentation arising from land management activities will be managed so that in forest fisheries streams the objective is to maintain 80 percent of fry emergence success as measured from pristine condition. Appendix I details the analysis process. (USDA 1987b, Objectives, p. II-7).*
>
> *Activities on National Forest lands will be planned and executed to maintain existing water uses. Maintain is defined as "limiting effects from National Forest activities to maintain at least 80 percent of fry emergence success in identified fishery streams." The percent is measured from pristine conditions. Current methodology will not detect and impact of less than 20 percent. During the life of the plan, new technologies may permit more precise assessments; however, the goal of this standard will remain as "to maintain 80 percent fry emergence success." (USDA 1987b, Standards, p. II-29).*

An additional standard was added for high value streams:

> *Streams providing spawning and rearing habitat, which are considered critical to the maintenance of river and lake populations of special concern, will be managed at a standard higher than the 80 percent standard. Monitoring will be needed to detect this higher standard. [High Value Streams are listed] (USDA 1987b, Standards, p. II-30).*

The fry emergence standard was to be applied at the forest level, based on the requirement for forest plan monitoring (G-1, USDA 1987, p. IV-11), as well as the project level, based on the wording in the standard and Appendix I.

B. Application of the Fry Emergence Standard

The fry emergence standard is to maintain 80 percent of fry emergence success as measured from pristine or potential condition. Pristine or potential condition is not defined, but is assumed to mean conditions found in streams that have not been managed by humans. However, natural processes (e.g., fire, floods, soil mass movement) can deliver large amounts of sediment into streams that have not been managed, confounding the definition of what is pristine in terms of applying the fry emergence standard (Reeves et al 1995, Swanston 1991).

Coefficients used by the IPNF during development of the 1987 Forest Plan based pristine on the base sediment on the associated graph (USDA 1987a, Appendix 9). For example, in belt geology streams, fry emergence would be 60 percent at pristine condition. In streams with glaciated granite geology, pristine conditions would yield less than 50 percent fry emergence. The standard then initially allows 20 percent less fry emergence. This would that mean fry emergence success of approximately 48 percent and 38 percent, respectively; in belt and glaciated granite stream geologies would meet the standard. Based on the coefficient, an increase in sediment of approximately 215 percent over the baseline would still meet the fry emergence standard in belt geology streams (project file, aquatics). Further increases in sediment (and, presumably, decreases in fry emergence success) could then be allowed through implementing Appendix I.

1. Factors Affecting Fry Emergence Success

It became apparent that the fry emergence standard could not be accurately or precisely determined for the following reasons:

- Fry emergence success is not based solely on the amount of sediment present in spawning habitat (Chapman 1988, Everest et al. 1987);
- Amount of sediment in spawning habitat may not be indicative of the amount of sediment in redds (Chapman 1988).

Although the amount of fine sediment can affect the successful incubation of embryos and emergence of fry, it is just one of many complex, potentially interacting variables. Other variables include dissolved oxygen content, water temperature, biochemical oxygen demand of material carried in the water and deposited in redds, substrate size, channel gradient, channel configuration, water depth above the redd, surface water discharge and velocity, permeability and porosity of gravels in the redd and surrounding streambed, and velocity of water through the redd (Bjornn and Reiser 1991; Chapman 1988). The complexity of factors make it difficult to determine the true intragravel conditions in redds (Chapman 1988).

Other factors can mitigate effects of sediment on incubation and emergence success (Everest et al. 1987). When salmonid fishes spawn, they move streambed gravels, deposit eggs and sperm, and cover the embryos with other gravels. During this construction of redds, fine sediment and organic materials are washed downstream. This reduces sediment levels in redds and makes the environment in redds as favorable as possible for embryos (Bjornn and Reiser 1991). This removal of sediment during redd construction both increases intragravel permeability, water flow, and oxygen transport, and reduces potential for entrapment by emerging fry (Everest et al. 1987). The way redds are constructed then tend to minimize deposition of fine sediments in the areas that embryos are incubating (Everest et al. 1987). The fact that fish "clean the gravels" prior to spawning was not considered in the models developed to predict fry emergence success (Chapman 1988).

Other behaviors by fish can also mitigate effects of sediment on success of incubation and fry emergence. Fish tend to select suitable sites for spawning. The heterogeneous characteristics of streambeds, like those found on the IPNF, allow fish to choose areas that have less fines from the microhabitats available in the stream (Everest et al. 1987). These and other behavioral adaptations help fish to significantly improve their chances of reproductive success (Everest et al. 1987).

Because of all these factors, the underlying assumption in the standard (that fry emergence success can be accurately and precisely estimated based on sediment) does not apply to all streams or in all situations (Chapman 1988). Models based on sediment produce an estimate of the percent of fry emergence success but the relationship to true fry emergence success is likely poorly predicted (Chapman 1988). Therefore, whether fry emergence success is at 80 percent of pristine conditions in IPNF streams (and higher in high-value streams) will be difficult to estimate for individual streams and these estimates will be imprecise.

2. Detecting Change through Sediment Monitoring

The number and complexity of factors that must be considered to determine fry emergence success is further complicated by the variability of the attributes that affect it. Sediment, the surrogate used to determine fry emergence success in the IPNF Forest Plan, is among the most variable and difficult to monitor (Roper et al. 2002).

Detecting changes in sediment in streams due to land management activities is the basis for the fry emergence standard. While increases in sediment may only partially explain variability in fry emergence success, fine sediment in streams has been shown to have detrimental effects on aquatic biota and habitat (Hicks et al. 1991). So while fry emergence is not an appropriate and measurable standard there is no question that minimizing the long-term effects of sediments in streams is appropriate. The recognition of the many ways increased sediment levels can affect fish and aquatic habitat has led to numerous methodologies to measure and monitor sediment (Bunte and Abt 2001). The difficulty is in measuring the variability of fine sediments at many different scales. There is variability between streams, within streams, and within a single riffle in a stream (Roper et al. 2002, Olsen et al. in press). There is additional

variability associated with data collection, including observer variability (Archer et al. 2004, Roper et al. 2002, Bunte and Abt 2001). The complexity associated with how different streams move and store sediment over time adds temporal variability to the problem of monitoring changes in sediment levels, relating changes to forest management activities, and quantifying the effects of those changes on habitat and species (Bunte and Abt 2001, MacDonald et al. 1991, Everest et al. 1987).

Variability of sediment in terms of concentration, loading, and deposition in streams on the IPNF has been demonstrated through various monitoring efforts. The first forest plan monitoring effort to determine fry emergence success at the forest level described a two year effort measuring intergravel fines or embeddedness by taking approximately 610 core samples on 25 streams forest-wide. The following conclusions were reported in the 1989 IPNF Forest Plan Monitoring and Evaluation Report:

> *After examining the data, it is apparent that the relationship between sampled intergravel fines/embeddedness parameters and the amount of timber harvest and roading in a watershed (from the IPNF sediment model) is weak. Although the general trend is for higher levels of intergravel fine sediment and embeddedness in the developed watersheds, there is a lot of scatter and variability observed. We are unable to report on the emergence success levels or trends in relation to the 80 percent standard from this monitoring effort.*
>
> *Sediment accumulates in gravel deposits in response to a number of physical processes and relationships. There appears to be too much variation with sampling techniques and naturally to make any conclusions.*

Long-term stream hydrology monitoring stations have been established throughout the forest. They typically measure and record water level and discharge continuously, suspended sediment integrated daily, and bedload measured intermittently using manual collection methods.

Sediment loads as well as stream flows are derived from the entire watershed area above the subject stream reach, and therefore they are subject to the extensive variability (in both time and space) of the physical watershed as well as the climatic factors that drive those hydrologic processes. Sediment disposition at a site or a reach that might be related to fry emergence is primarily a function of those three hydrologic parameters.

The variability of the stream gage data is demonstrated here by statistics derived from three of the long-term stations from different parts of the Forest and with different levels of cumulative watershed developments. The variability of each station's discharge measurements were typically more than 100 percent as represented by the datasets' coefficients of variability (CV, standard deviation divided by the mean). Even when comparing the average annual discharge for a station, the CV exceeded 33 percent.

The variability of the sediment measurements and annual load determinations is more profound. Suspended sediment CV ranges between 150 and 1,400 percent between measurements for a station; and 85 to 165 percent between years. Bedload, which is not related as well to stream flow, ranges up to 600 percent between samples, and over 110 percent between years at a station.

This large and wide range of variability of for the hydrologic parameters would be amplified when they are related to sediment disposition over time at a site since they would only explain a part of the variability of sediment deposition. When biological responses, such as fry emergence, are factored in, the variability is exaggerated even more.

For these reasons, sediment cannot provide an appropriate quantitative standard for nonpoint sources under the Clean Water Act or State Water Quality Standards. Sediment is appropriately addressed through a performance-based standard, such as Best Management Practices (BMP) or INFISH standards and guidelines. Sediment loads can be used as objectives and bases for comparison as well as for validation and effectiveness monitoring, but not for compliance measures. The situation is similar for

biological measures related to stream flows and sediment loads from nonpoint sources in wildland watershed situations.

Some forests have threshold sediment standards in their forest plans (e.g., Clearwater NF, Challis NF); however, a review of recently revised forest plans demonstrates the trend towards performance-based standards for watershed, riparian, and fisheries habitat (e.g., Sawtooth NF, Payette NF, Boise NF, Dakota-Prairieland NF, Wasatch-Cache NF, White River NF). None of these revised plans has a threshold standard for sediment.

Although quantitative standards for sediment cannot be provided, sediment monitoring can be useful for detecting trends and conditions if studies are well designed and variability accounted for. This can be difficult, requiring careful consideration of methodologies, and usually takes very large sample sizes (Bunte and Abt 2001). Archer et al. (2004) determined it would take 1,003 samples of deposited sediment to detect a 10 percent difference in fine sediment in pool tails (792 samples to detect the same level of change in surface fine sediment in riffles) in order to account for both observer variability and stream heterogeneity. Roper et al. (2002) concluded that the three substrate attributes they studied (D_{50}, percent fines, and pool tail fines) would not be useful in discerning differences in streams subject to different treatments.

There are many methodologies for sampling sediment, substrate, and other indicators of watershed condition (Bunte and Abt 2001, Beechie 2001, Emmett and Wolman 2001). Long-term sediment monitoring programs on other forests have been useful in detecting trends in watersheds (e.g., Nelson et al. 2004, SCNF 2003).

III. The Inland Native Fish Strategy (INFISH)

The goal of INFISH is to support healthy, functioning watersheds, riparian areas, and associated fish habitats. The strategy does this by protecting the structure and function of riparian and aquatic systems through the establishment of Riparian Management Objectives (RMOs), Riparian Habitat Conservation Areas (RHCAs), and Standards and Guidelines (USDA 1995).

A. Sediment and INFISH

RMOs in INFISH were based on those developed for the PACFISH[7] (USDA and USDI 1994). The interim RMOs described “good habitat”, using attributes that were “good indicators of ecosystem health and are easily quantified and subject to accurate, repeatable measurements” (USDA and USDI 1994). Protecting streams from increased sediment was the main concern in the establishment of the interim RHCAs (USDA 1995, page A-5). Defined as portions of watersheds where riparian-dependent resources receive primary emphasis, and management activities are subject to specific standards and guidelines, RHCAs include riparian corridors, wetlands, intermittent streams, and other areas that help maintain the integrity of aquatic ecosystems (USDA 1995). Widths of the interim RHCAs were based on distances determined to be adequate to protect streams from non-channelized sediment inputs. The width needed to protect streams from non-channelized sediment inputs was determined to be sufficient to provide for other riparian functions as well (USDA 1995).

Increases in sediment can be detrimental to fish and aquatic habitat in many ways; therefore, the goal should be to limit increases in sediment delivery from forest management activities. Unlike the “threshold” approach of the fry emergence standard (allowing degradation to the limits of the standard), the INFISH strategy aims to prevent increased sediment delivery to streams from management activities. Besides establishing RHCAs, INFISH set forth standards and guidelines that apply to all RHCAs, and all projects and activities outside of RHCAs that could potentially affect RHCAs. Many of the standards and

[7] Interim Strategies for Managing Anadromous Fish Producing Watersheds on Federal Lands in eastern Oregon and Washington, Idaho, and Portions of California

guidelines are directly and indirectly tied to preventing or limiting increased sediment delivery to stream channels (USDA 1995).

B. Stream Protections Prior To and Following INFISH

Prior to INFISH, the main protection for fish, aquatic habitat, and water quality on the IPNF came in the form of Stream Protection Zones as defined in the Idaho Forest Practices Act Stream Protection Zones, State Best Management Practices, and Forest Service Handbook 2509.22 (Soil and Water Conservation Practices). The protection came in the form of attempts to minimize effects on aquatic resources from management activities, especially timber harvest and associated activities.

Comments received during scoping state that the fry emergence standard offered protection to fisheries because of the "threshold" of no more than 20 percent degradation from pristine condition. However, the forest plan allowed for degradation further than 20 percent from pristine condition if the line officer decision was to approve the project after reviewing its effects on fish and water resources, and as long as the State agreed that the project did not violate state water quality standards (Appendix I, USDA 1987b). This allowance of long-term reduction in productivity is less protective than INFISH, which requires long-term maintenance or improvement.

INFISH took a different approach. Instead of allowing some "acceptable" level of effects on riparian and aquatic systems, it aimed to protect those resources from detrimental effects. It gave riparian-dependent resources priority over other resources in the RHCAs, so that while RHCAs are not "lock out" zones, activities that occur in them must either benefit riparian and aquatic resources or at least "not slow the rate of recovery below the near natural rate of recovery if no additional human caused disturbance was placed on the system" (USDA 1995). As opposed to "threshold" standards, which allow degradation down to the standard (Bisson et al 1997), INFISH states, "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" (USDA 1995). Standards and guidelines under INFISH are performance-based rather than threshold-based and seek to optimize aquatic and riparian resources rather than manage to the threshold.

Many comments received during scoping stated that without a "threshold" standard the IPNF will not know when cumulative effects from management activities have gone too far and the Forest will therefore continue to degrade streams and aquatic habitat. However, by implementing INFISH there should not be continued degradation of these systems. INFISH is designed to keep projects and activities from continuing to degrade riparian and aquatic systems, and to instead allow riparian and stream systems to restore themselves.

A related comment received during scoping suggested that, without a numeric standard, "the decision-maker relies on the judgment of the professionals who usually declare no further measurable degradation"…based in part on the effectiveness of INFISH (KEA, April 8, 2005). That is the purpose of INFISH, and the science behind INFISH supports it. A summary of forested streamside research over the last 10 years supports the science used to establish INFISH, with no known new science that contradicts the science used to develop the INFISH strategy (K. Overton, R1/R4/RMRS, Fisheries Technology Transfer Specialist, personal communication, 2005). Without the protections provided by INFISH it is unlikely the professionals could declare no further measurable degradation, there likely would be continued degradation, and intensive project-specific monitoring would be needed.

C. INFISH Priority Watersheds

The INFISH strategy applies to all fish-bearing streams, non-fish-bearing streams, ponds, lakes, reservoirs, seasonally flowing or intermittent streams, wetlands, landslides and landslide-prone areas on the IPNF (USDA 1995), whether or not they are "priority" or "high value". When INFISH amended the forest plans in 1995, Forests were to apply INFISH direction to all proposed or new projects and activities. However, in priority watersheds INFISH was also applied to *ongoing* projects and activities,

where such activities might pose an unacceptable risk to inland native fish (USDA 1995, page 2). The IPNF priority watersheds are listed in Table 6. This list was based on the focal watersheds[8] identified in the IPNF Aquatic Ecosystem Strategy (IPNF 1994). Figure 1 displays High Value Streams listed in the 1987 forest plan and INFISH priority watersheds. Besides which activities INFISH applied to in 1995, there were few differences between priority and other watersheds (Table 7).

Table 6. IPNF INFISH Priority Watersheds

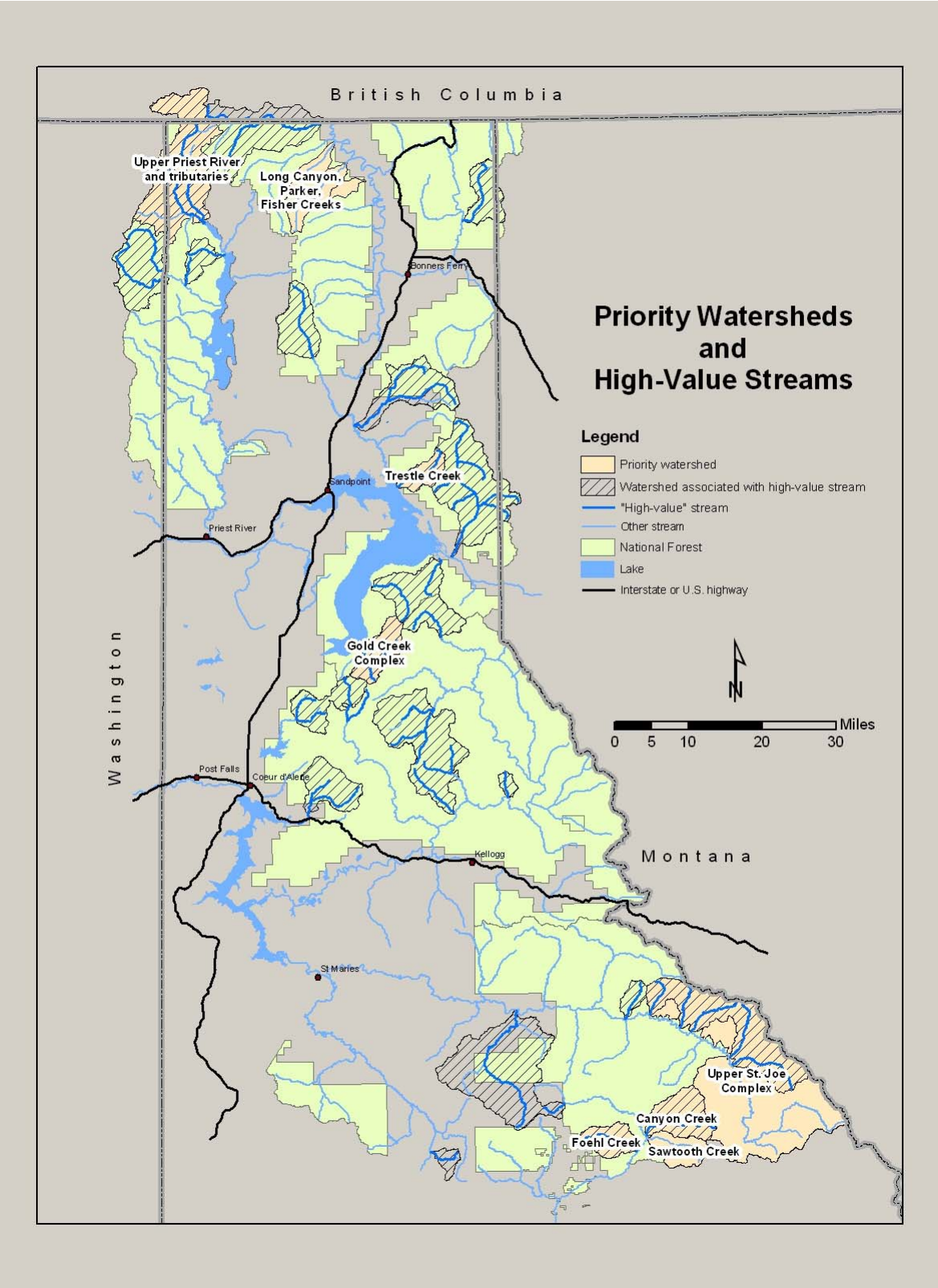
Pend Oreille Ecosystem	Trestle Creek Gold Creek Complex
Spokane Ecosystem	Upper St. Joe Complex
Priest Lake Ecosystem	Upper Priest River and tributaries
Kootenai River Ecosystem	Long Canyon Creek Parker Creek Fisher Creek
Little North Fork of the Clearwater	Canyon Creek Sawtooth Creek Foehl Creek

Table 7. Differences between INFISH priority watersheds and other watersheds

1. Category 4 (Seasonally flowing or intermittent streams, wetlands less than 1 acre, landslides, and landslide-prone areas) RHCA delineation:
   - Priority watersheds: …distance equal to the height of one site-potential tree, or 100 feet slope distance…
   - Other watersheds: …distance equal to the height of one-half site-potential tree, or 50 feet slope distance…
2. Complete watershed analysis prior to conducting the following activities in priority watershed RHCAs:
   - Salvage cutting (TM-1)
   - Construction of new roads or landings (RF-2a)
3. Avoid sidecasting of soils or snow in all watersheds. Sidecasting of road material is prohibited on road segments within or abutting RHCAs in priority watersheds. (RF-2f)

[8] Focal watersheds were identified for each of the five ecosystems on the IPNF (Kootenai, Priest Lake, Pend Oreille, St. Joe and Coeur d'Alene, and Little North Fork of the Clearwater) that "presently sustain strong native fish populations and bull char" (IPNF 1994).

Figure 1 – High Value Streams and INFISH Priority Watersheds



D. INFISH Monitoring

PACFISH amended fifteen forest plans and INFISH amended 22 forest plans, as well as numerous BLM land use plans throughout the upper Columbia River Basin. Through direction in Biological Opinions on the effects to bull trout and steelhead trout from continued implementation of these plans, large-scale implementation and effectiveness monitoring efforts were developed and are ongoing (USDA 2003 and Kershner et al. 2004, respectively). The emphasis of the implementation monitoring program has been on livestock grazing. The effectiveness monitoring program originally focused on livestock grazing but was expanded to cover all managed lands in 2001 (PIBO 2004).

The primary goal of the effectiveness monitoring project is "to evaluate the effect of land management activities on aquatic and riparian communities at multiple scales and to determine whether PACFISH/INFISH management practices are effective in maintaining or improving the structure and function of riparian and aquatic conditions at both the landscape and watershed scales on Federal lands throughout the upper Columbia River Basin" (Kershner et al. 2004). Three objectives were defined (PIBO 2004):

1) Determine whether key biological and physical attributes, processes, and functions of upland, riparian, and aquatic systems are being degraded, maintained, or restored across the PIBO landscape[9].
2) a) Determine the direction and rate of change in riparian and aquatic habitats over time as a function of management practices.

   b) Determine whether riparian and aquatic habitat conditions at integrator reaches are reflective of conditions throughout the watershed.
3) Determine whether specific Key Management Practices (KMPs) for livestock grazing are effective in maintaining or restoring riparian structure and function.

This project is a long-term monitoring effort led by the USFS National Fish Ecology Unit. To meet the objectives, the team was charged with developing an effectiveness monitoring plan that is cost-effective, practical, and incorporates the principles of adaptive management, as well as an effectiveness monitoring framework that incorporates measurable, repeatable methods that will be useful in answering monitoring questions on federal lands at different scales (PIBO 2004). Monitoring is occurring on twenty national forests, including the IPNF. As part of this monitoring effort, 47 6th field HUC watersheds have been sampled on the IPNF from 2000-2004 (PIBO 2005).

Watersheds are randomly selected. According to the sample design, over half of the possible watersheds will be sampled (1,300 watersheds throughout the PIBO area). Data collected includes a combination of 23 commonly measured in-channel (including substrate), 11 riparian vegetation, and nine macroinvertebrate variables at each integrator reach[10] (PIBO 2005). Most reaches are scheduled to be sampled every five years. Some reaches (called sentinel reaches; the IPNF has two sentinel reaches on Hughes Creek and Lamb Creek) are sampled annually. It will take three rotations to definitively determine the effectiveness of PACFISH and INFISH strategies, but trends should be detectable after two rotations (Eric Archer, PIBO Field Team Leader, personal communication, April 12, 2005).

[9] PIBO is an acronym for PACFISH and INFISH Biological Opinions; the PIBO landscape refers the federal lands in the Upper Columbia River Basin that are covered under the PACFISH and INFISH strategies.
[10] Also known as a response reach, the downstream-most low gradient (<3%) reach within a 6th field HUC.

IV. Environmental Consequences

A. Alternative A – Retaining the Fry Emergence Standard

Under this alternative, the fry emergence standard will remain in the IPNF forest plan.

1. Direct Effects*:*

The alternative represents programmatic decisions and therefore will have no direct effects on forest resources, including water quality, fish and other aquatic biota, and their habitat.

2. Indirect Effects*:*

There would be no indirect effects to fish from implementing this alternative. Due to the performance-based direction in INFISH, and protections provided by other policies, laws, and direction, there will be no indirect effects to forest resources, including water quality, fish and other aquatic biota, and their habitat. There will be no effect on viability of native and desired non-native fish species because of the provided protections and the continuing restoration activities on the IPNF.

The consequences at the forest plan level involve attempting to monitor fry emergence success across the Forest. Based on the information presented above in Affected Environment – *Factors Affecting Fry Emergence Success and Detecting Change through Sediment Monitoring*, the information generated would not accurately or precisely determine whether there is 80 percent fry emergence success on the IPNF.

At the project level, fry emergence success would be calculated for streams potentially affected by proposed activities. Biologists could use coefficients used in the 1987 Forest Plan analysis and/or the process described in Stowell et al. (1983) to generate percent fry emergence success. Limitations of these models would be disclosed, concluding that the number generated may be neither precise nor accurate, and that it is unknown if the fry emergence success is really 80 percent of pristine. This would then lead to the use of Appendix I, which is basically the NEPA process (i.e., describe the existing condition, analyze the effects of the project on aquatic resources in detail, report findings to the decision-maker). A field determination of fry emergence success would be generated and reported with the caveat that the information may not be accurate or precise.

If a project were affecting a stream calculated to be at pristine condition, degradation of up to 20 percent (or more under Appendix I) would be allowed according to the standard; however, other forest plan direction, laws, and policy preclude this. INFISH does not allow long-term degradation, and short-term detrimental effects are allowed only when there are long-term benefits to riparian or aquatic resources. Provisions under the Clean Water Act require TMDLs for 303(d)-listed streams for pollutants of concern, including sediment, and requires no net increase of pollutants (e.g., sediment) in listed streams that do not have TMDLs. Long-term degradation is inconsistent with the State's Antidegradation policy (IDAPA 58.01.02.051). In streams containing bull trout habitat, long-term degradation of habitat is inconsistent with recovering species under the Endangered Species Act.

At the project level, detailed analysis of direct, indirect, and cumulative effects (including effects of sediment) to aquatic resources would continue to as required by NEPA, including effects to beneficial uses such as aquatic biota and salmonid spawning. Findings of consistency with the Clean Water Act, NFMA, and Endangered Species Act will continue as required by NEPA. All other forest plan direction, policy, and laws would continue to be implemented. INFISH direction (Appendix A), including standards and guidelines would be implemented. Retaining the fry emergence standard and attempting to predict compliance with the standard in project level analysis would lead to a large degree of uncertainty in the analysis and a need to explain why an inadequate and unmeasurable standard is being retained. It is also likely to lead to public confusion regarding the standard, the associated NEPA analysis of the standard, and hence the project as well.

This alternative will have no effect on other aquatic monitoring at the project, forest, or above-forest level: INFISH implementation and effectiveness monitoring, IPNF forest sediment monitoring, and other aquatic habitat and species inventory and monitoring are expected to continue.

3. Cumulative Effects

There will be no cumulative effects from this alternative because there are no direct or indirect effects.

B. Alternative B – Removing the Fry Emergence Standard

Under this alternative, the fry emergence standard and its various references would be removed from the IPNF Forest Plan.

1. Direct Effects*:*

The alternative represents programmatic decisions and therefore will have no direct effects on forest resources, including water quality, fish and other aquatic biota, and their habitat.

2. Indirect Effects:

There would be no indirect effects to fish from implementing this alternative. Due to the performance-based direction in INFISH, and protections provided by other policies, laws, and direction, there will be no indirect effects to forest resources, including water quality, fish and other aquatic biota, and their habitat. There will be no effect on viability of native and desired non-native fish species because of the provided protections and the continuing restoration activities on the IPNF.

At the forest level, there would be no requirement to monitor trends in fry emergence success. All other forest or above-forest level monitoring such as INFISH implementation and effectiveness monitoring, IPNF forest sediment monitoring, and other aquatic habitat and species inventory and monitoring (see Table 5) will not be affected and are expected to continue.

At the project level, INFISH direction will remain in place. INFISH standards and guidelines will continue to be applied to projects and activities. Additional protections provided by the Clean Water Act, including the State's Antidegradation Policy and TMDLs, the Endangered Species Act, and other policies, laws, and direction will remain. Removal of Appendix I will have no effect because the process described (detailed description of the existing condition, analysis of effects of the project on aquatic resources, and reporting findings to the decision-maker) is required by NEPA. Detailed analysis of direct, indirect, and cumulative effects (including effects of sediment) of proposed activities on aquatic resources will continue as required by NEPA, including effects to beneficial uses such as aquatic biota and salmonid spawning. Findings of consistency with the Clean Water Act, NFMA, and Endangered Species Act will continue as required by NEPA.

3. Cumulative Effects

There will be no cumulative effects from this alternative because there are no direct or indirect effects.

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Appendix A

Existing Forest Plan Objectives, Standards, Guidelines, and Monitoring Requirements related to Fisheries and Water

Fisheries Objectives and Standards

Objectives (IPNF Forest Plan p. II-7):

The Idaho Panhandle National Forests will be managed to maintain and improve fish habitat capacities in order to achieve cooperative goals with the State Fish and Game Department and to comply with state water quality standards.

Fishery and timber riparian management activities will be coordinated in order to maximize the contribution of riparian vegetation to aquatic habitats. An annual program of direct habitat improvement work will be pursued. Several unroaded stream and river segments will be managed as low public access areas to maintain a diversity of fishing experiences on the Forest.

Standards (IPNF Forest Plan pp. II-29 to II-31):

[1] The 80 percent limitation is based upon accuracy of the assessment methodology. Reductions less than 20 percent are not detectable with current models. During the life of the Plan, new technologies may allow more precise assessments; however, the objective will remain "maintain 80 percent of potential."

Denotees existing language for objectives, standards and monitoring requirements to be modified or deleted from the forest plan under the proposed action.

North Fork Grouse

Upper North Fork Coeur d'Alene (upstream of Iron Creek)

Standard 3: The stream and river segments listed below will be managed as low access fishing opportunities to maintain a diversity of fishing experiences for the public and to protect sensitive fish populations. Special road management provisions will be used to accomplish this objective.

Low Access Fishing Streams

LNF Clearwater River (downstream of Mowich Cr.)	Foehl Cr.
Canyon Cr. (Avery R.D.)	Declaration Cr.
Sawtooth Cr.	Marie Cr.
Long Canyon Cr.	Blacktail Cr.
Upper Priest River	FW Slate Cr.
Upper Coeur d'Alene (between Tepee and Martin)	Marble Cr. (upstream of Hobo Cr.)
Independence Cr.	Clear Cr.
St. Joe River (between Red Ives and Heller Cr.)	Siwash Cr.
Freezout Cr.	Black Prince Cr.
WF Big Cr.	Skookum Cr.
EF Big Cr.	MF Big Cr.

Standard 4: Provide fish passage to suitable habitat areas, by designing road crossings of streams to allow fish passage or removing in-stream migration barriers.

Standard 5: Utilize data from stream, river, and lake inventories to prepare fishery prescriptions that coordinate fishery resource needs with other resource activities. Pursue fish habitat improvement projects to improve habitat carrying capacities on selected streams.

Standard 6: Coordinate management activities with water resource concerns as described in MA 16, , and Appendix O.

Water Objectives and Standards

Objectives (IPNF Forest Plan p. II-9):

Management activities will comply with state water quality standards. This will be accomplished through the use of the Best Management Practices. The outcome of these best management practices will be monitored to determine their effectiveness. Water quality that is below Forest standards will

be improved through restoration projects and through the scheduling of timber harvest and road building activities where appropriate.

Lands within public water systems, as identified on the Management Area Map, will be managed for multiple-uses within the water quality standards for public water supplies.

The application of appropriate conservation practices will ensure that the quality of individual water bodies will not be significantly affected by sediment production.

Standards (IPNF Forest Plan pp. II-33):

Standard 1: Management activities on Forest lands will not significantly impair the long-term productivity of the water resource and ensure that state water quality standards will be met or exceeded.

Standard 2: Maintain concentrations of total sediment or chemical constituents within State standards.

Standard 3: Implement project level standards and guidelines for water quality contained in the Best Management Practices (Appendix S), including those defined by State regulation or agreement between the State and Forest Service such as:

a. Idaho Forest Practices Rules
b. Rules and Regulations and Minimum Standards for Stream Channel Alternations.
c. Best Management Practices for Road Activities.

Standard 4: Cooperate with the states to determine necessary instream flows for various uses. Instream flows should be maintained by acquiring water rights or reservations.

Standard 5: Manage public water system plans for multiple use by balancing present and future resources with public water supply needs. Project plans for activities in public water systems will be reviewed by the water users and the State.

Streams not defined as public water systems, but used by individuals for such purposes, will be managed to the standards staed below or to the fisheries standards whichever is applicable.

Standard 6: Activities within non-fishery drainages, including first and second order streams, will be planned and executed to maintain existing biota. Maintenance of existing biota will be defined as maintaining the physical integrity of these streams. Best Management Practices (Appendix S), Appendix O, and riparian guidelines will be used to accomplish this objective.

Standard 7: It is the intent of this plan that models be used as a tool to approximate the effects of National Forest activities on water quality values. The models will be used in conjunction with field data, monitoring results, continuing research and professional judgment, to further refine estimated effects and to make recommendations.

Monitoring Requirements for Fish and Water (IPNF Forest Plan, pp. IV-11 and IV-12):

Item Number	Standards, Practices, Activities, Outputs or Effects to be Monitored	Data Source	Frequency of Measurement	Reporting Period	Threshold to Initiate Further Action
G-2	**Validate R1/R4 model**	11 streams	Annually	Annually	Actual more than plus or minus 20% of model prediction, adjust model
G-3	**Validate fish habitat trends**	Stream surveys	Annually	5 years	A declining trend in habitat quality
G-4	**Fish population trends – cutthroat trout**	Cooperative with Idaho Fish and Game	2 years	2 years	Downward trend

INFISH Monitoring Requirements [from the Bull Trout Biological Opinion (USDI 1998)]

Through interagency coordination, develop stratified monitoring plans (e.g. at the watershed or subbasin scales) to evaluate impacts of management actions to bull trout. The management program areas to address and a schedule for their development will be agreed to by the interagency team. The plans should address, at a minimum, both compliance and effectiveness monitoring.

a. Develop these plans by subbasin, through use of an interagency group, to maximize the utility of monitoring information through a coordinated effort and a defensible sampling design. The interagency groups should establish objectives for the monitoring plans in accordance with PACFISH and INFISH.
b. Goals for the monitoring plans should in clued maximizing the effectiveness of limited monitoring funds, identifying appropriate scales and levels of monitoring necessary to determine if management actions are meeting PACFISH and INFISH direction, allowing for flexibility as funding and activities change and identifying how monitoring results should be used to make management adjustments.
c. Fully implement the monitoring plans by ensuring monitoring schedules are developed and implemented, with agreement between the USFS, BLM and the Service. If these mutually agreed upon schedules cannot be followed, an alternative approach will be developed and agreed to by the interagency group.

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 prior 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

(c) 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 analyis 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, if 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 if 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).

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 stability (Brazier and Brown 1973, Gregory et al. 1984, Steinblums et. al 1984, Beschta et al. 1987, McDade et al. 1990, Sedell and Beschta 1991, Belt et al. 1992). The effectiveness of riparian conservation areas in influencing sediment delivery from non-channelized flow is highly variable. A review by Belt 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 outer edges of the 100-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 outer 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 wetland, pond or lake, whichever is greatest.

Category 4 - **Seasonally flowing or intermittent streams, wetlands less than 1 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, wetland, 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, wetland, 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 if 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 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 cancelled, 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 it 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.

ALTERNATIVE C

The following information on Alternative C is supplied for the testing efforts. It is not for general application.

Alternative C is based on the "National Forest Riparian and Aquatic Habitat Management Strategy (FISH 2000)" developed by the Northwest Forest Resource Council in January, 1995. FISH 2000 was submitted by many commentors as an alternative that should be evaluated in detail. Following are the key elements of the strategy. FISH 2000 is included in the planning record.

This alternative does not establish generalized Riparian Management Objectives or Riparian Habitat Conservation Areas. Rather these are established through assessment of key processes related to the forest canopy and shade, large woody debris recruitment, sediment from surface erosion, sediment from mass failures, and gravel recruitment. As described in FISH 2000 (page iv), the process is implemented in three steps:

1. *Watershed scale riparian function assessment would establish current riparian conditions, riparian input processes, areas not functioning within ecological potential, and appropriate riparian goals.*

2. *Project and site-specific assessment determines the extent to which riparian functions are currently provided and identify management actions that would maintain them.*

3. *Where riparian function relationships and management needs remain unclear, FISH 2000 requires a more comprehensive watershed analysis be conducted to adjust RHCA's, RMO's, and Standards and Guidelines.*

This alternative articulated several goals for watershed, riparian, and stream channel conditions. These goals are the same as those described for the strategy and are listed above.

FISH 2000 provides standards and guidelines only for the management of resources within the RHCA's. For the purposes of this alternative, the current Forest Plan management direction for other resources and any existing State Best Management Practices would be considered the management direction to be applied.

Refer to Table A-3, below, for the Standards and Guidelines guiding project development under Alternative C.

ALTERNATIVE E

The following information on Alternative E is supplied for the testing efforts. It is not for general application.

Alternative E would be similar to the strategy, in that it would apply the same riparian goals, interim Riparian Management Objectives, Riparian Habitat Conservation Areas, and standards and guidelines for the entire area of the project. Based on the results of scoping, it was determined that another alternative was needed to provide stronger direction in the following areas:

1. *A Riparian Management Objective for sediment substrate would be established to be less than 20 percent fine sediment in spawning habitat.*

2. *A Riparian Management Objective for streambank stability would be established ensuring that at least 90 percent of all streambanks would be stable.*

3. *Watershed analysis, although conducted as described for the strategy, must be completed in Priority Watersheds prior to initiation of any new projects and activities therein.*

4. *Subject to valid existing rights, prohibit all road construction and timber sales in unroaded areas 1,000 acres or larger or unroaded areas smaller than 1,000 acres that are biologically significant.*

5. *All watershed analysis findings that would change Resource Management Objectives, Riparian Habitat Conservation Areas, or standards and guidelines would undergo peer review.*

Table A-3. Interim standards and guidelines design considerations.

Function	RHCA Requirements	Activity	Timber Management Considerations
Water/bank stability: constrained channels	Up to 20 feet	Harvesting, Grazing[1]	20-ft. no-cut zone around all fish-bearing streams; selectively harvest 20 ft. up to 100 ft. Small streams, leave trees <8 inches dbh[2]
Water/bank stability: unconstrained channels	Up to 1 effective tree height around all active channel migration zones.	Harvesting, Grazing	20-ft. no-cut zone around all fish-bearing streams; selectively harvest 20 ft. up to 100 ft. Small streams, leave trees <8 inches dbh
Canopy	Up to 75 feet	Harvesting, Grazing	Selectively harvest trees not required for shade and temperature control according to locally applicable models (e.g., WA canopy-elev-temp model for E. WA).
Large Woody Debris (LWD)	Up to 1 effective tree height. Around all active channel migration zones.	Harvesting	Selectively harvest trees not required for LWD recruitment. For example, see Oregon Forest Practices Rules for standing leave-tree needs.
Litter	100 feet for medium to large streams, 50 feet for small streams. Around all active channel migration zones.	Harvesting	Selectively harvest trees in accordance with requirements for shade and LWD.
Nutrients	100 feet for medium to large streams, 50 feet for small streams. Around all active channel migration zones.	Harvesting, Grazing, Roads, Slash Disposal	No piling and burning of slash. Minimize broadcast burning consistent with ecosystem management fire ecology. Minimize soil disturbance.
Sediment from Surface Erosion	Roads: 150 feet. Ground-based skidding: 50 feet.	Harvesting, Grazing, Roads	Selectively harvest within 75 ft. of large streams, 20 ft. of small streams. No ground-skidding equipment within 50 ft. Minimize subsoil disturbance. Minimize location of roads within 150 ft. and mitigate erosion.
Sediment from Mass Failures	High risk sites.	Harvesting, Grazing, Roads	Stabilize fills, carefully maintain culverts and drainage systems. Locate and construct roads only when failures will not occur. Remove trees when slope instability will not result.
Fuel Loads/Wildfires Vegetative Community	Riparian and stream-adjacent sites	Harvesting, Thinning, Prescribed Burning	Prevent catastrophic wildfires. Return RHCAs to a more healthy species mix, density and lower fuel load.
Gravel	Bank erosion and mass failure sites.	Harvesting, Grazing, Roads	Conduct management activities so as not to prevent natural process from providing necessary gravels.

[1] Grazing is a key riparian management consideration, but grazing standards and guidelines are not included within this table.
[2] Diameter at breast height.

Appendix B

Appendix I

FISHERY/WATERSHED ANALYSIS

To implement the direction in the Forest Plan the projected effect of proposed land management activities on the fishery resource will be evaluated and quantified during the environmental assessment process. In the event that the cummulative effects of the proposed and past activities on stream sedimentation are projected to result in greater than a 20 percent reduction in fry emergence, a more detailed fishery/watershed analysis will be undertaken by Forest fishery and watershed professionals. This analysis should be completed before the environmental assessment is approved and will be used to confirm or alter the results of the Forest's fishery/watershed model. All prefered alternatives resulting in greater than a 20 percent reduction in trout habitat quality must be subjected to the more detailed analysis.

The analysis should evaluate and where applicable quantify the following points on a drainage-specific basis.

1. **Fish Habitat/Hydrologic Conditions**

   a. Field measurements of spawning site composition and associated estimates of trout emergence success.

   b. Equivalent clearcut acres total and those to be harvested within one decade of the proposed units.

   c. Water yield analysis, relationship of projected conditions to thresholds of concern.

   d. Field measurements of sediment load (if available).

   e. Stream survey results (if available).

2. **Transportation System**

   a. Road miles per square mile of drainage area.

   b. Road standards and management (closures, removal of crossing structures etc.).

   c. Road conditions including revegetated roads and specific washout areas.

   d. Location of proposed roads.

   e. Proposed mitigation measures.

3. **Harvest Units**

   a. Regeneration in existing units.

   b. Location of past and proposed units in the drainage.

   c. Harvest systems, past and proposed.

4. **Environmental Setting**

   a. Vegetative conditions, diseases and mortality.

   b. Fire history and natural succession.

   c. Identified sediment sources.

   d. Geology and soil characteristics.

Based upon this analysis, the specialists will provide the line officer with their best professional judgment on the significance of the project on the water resource. The officer will make a decision on the project incorporating socio-economic and multi-resource considerations. If there is a desire to pursue a project which has been judged to have a significantly negative effect on water resources, it will be reviewed by the State for conformance with water quality standards prior to the final decision.