

**FOREST PLAN MONITORING
and
EVALUATION REPORT
Fiscal Year 1998
Kootenai National Forest**

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SUMMARY

INTRODUCTION

The Kootenai Forest Plan was approved on September 14, 1987. It established management direction for a 10-15 year period that began on October 1, 1987 (Fiscal Year (FY) 1988). This direction was the result of a comprehensive analysis of land capabilities, public issues, and environmental effects along with a balancing of legal requirements.

We have completed the monitoring of Forest Plan implementation for FY 98. This report evaluates the field data collected by the end of September 30, 1998 that pertain to the 17 monitoring items reported annually. Our monitoring and evaluation process is shown in Chapter IV of the 1987 Kootenai National Forest Land and Resource Management Plan (Forest Plan).

We have completed eleven years of implementing the Forest Plan. Information from our monitoring will help identify what we need to change during Forest Plan revision. We have found some methods work well, and some do not. We found that some of our projections were accomplished and some have not been. The summary explains the Forest Plan itself, describes the monitoring methods, and summarizes the results of the annual monitoring items.

FOREST PLAN DECISIONS

The Forest Plan is a set of decisions that guide management of the Forest. Taken broadly, it contains three types of decisions:

- **Goals, Objectives, and Desired Conditions** (pages II-1 through II-17 of the Forest Plan) provide general direction regarding where we should be headed as we put the Plan into practice.
- **Standards** (Pages II-20 through II-33, Chapter III of the Forest Plan, and Forest Plan amendments) tell us how to put the Plan into practice, or give us conditions we must meet while we implement the Plan.
- **Land Allocation - Management Areas** (MAs), as described in the Forest Plan Chapter III and displayed on the Forest Plan Map, are those areas of the Forest which are allocated for different types of land management and resource production.

MONITORING

As we've found over the last eleven years, land management occurs in complex and changing situations, and our results will not always be totally predictable, definitive, or certain. Management results are affected by many things, including natural events that cannot be predicted. The purpose of monitoring is to determine answers to the following questions: Are we doing what the Plan envisioned (implementation monitoring)? Are we seeing the effects and outputs predicted in the Plan (effectiveness monitoring)? Are the standards working (validation monitoring)? Do we need to adjust practices to meet the standards? Does the monitoring process need adjusting?

Monitoring data for most items is reported yearly by the District or responsible Staff areas at the Supervisor's Office. Monitoring forms are used to assist in collecting consistent data from the various sources.

Monitoring and evaluation information will be used as we begin Forest Plan revision. Part of the reason we decided to issue a "Notice of Intent" to revise the Forest Plan, which was issued in November, 1996, was because of our findings in the monitoring program.

SUMMARY OF MONITORING RESULTS

Elk Habitat (C-1b): Monitoring Item C-1 has been a five-year monitoring item. However, the Forestwide Blowdown Salvage decision modified C-1 to add a component (C1-b) for monitoring the effects of the Blowdown Salvage on elk habitat. The entire monitoring item (C1 a and b) will be reported in the 2002 monitoring report.

This monitoring item (C1-b) was established to help ensure that elk summer range habitat capability is maintained during projects implemented under the Forestwide Blowdown Salvage decision. Across the Forest there were five projects occurring in MA 12 that were implemented under the Forestwide Blowdown Salvage Decision during FY 98. Only two closed roads were opened. Project duration on the opened roads was less than 14 days in each case. All five projects complied with MA 12 open road density standards for MA 12. All projects were implemented in compliance with the Decision. Summer range habitat capability was maintained at existing levels.

Threatened and Endangered Species (C-7):

Grizzly Bear: The Kootenai National Forest contains portions of two grizzly bear recovery zones: the Cabinet-Yaak Ecosystem (CYE) and the Northern Continental Divide Ecosystem (NCDE). About 72 percent of the CYE is located on the western portion of the Forest and about 4 percent of the NCDE is located in the extreme northeast corner. Grizzly bear habitat effectiveness was maintained compared to FY 97, and is above the desired level of 70 percent Forestwide. One more BMU was brought into compliance for habitat effectiveness, although some BMUs still remain below the 70 percent level. Sightings of female grizzly bears was down in FY 98, but the six year average has increased, as has their distribution. There were no human caused mortalities. Based on this analysis

grizzly bear habitat is improving in condition and the population appears to be on a slow trend towards recovery.

The Environmental Assessment Decision Notice and FONSI for the Forestwide Blowdown Salvage project was approved on March 24, 1998. This decision established a special monitoring item to assure that the cumulative effects of projects implemented under this decision would meet management direction for grizzly bears. The focus of monitoring is on the opening of closed roads and the number of projects active at one time in each BMU. The decision requires that this item be reported for two years after the decision (starting in 1998 report). There were 5 projects implemented under this Blowdown decision in FY 98, but only one occurred in a Bear Management Unit. The project was in BMU 5, but there were no closed roads opened for the project. All management direction for grizzly bears was met.

Gray Wolf: There is one recovery area within or adjacent to the Kootenai Forest (the Northwest Montana Recovery Area). The recovery goal for this area is 10 wolf packs. A small portion of this recovery area (about 10 percent) is located in the northeast corner of the Forest, east of US Highway 93.

In 1998, reports of wolf sightings continued at slightly increased levels compared to recent years. Sightings were noted in areas on the Fortine, Libby, Three Rivers, and Cabinet Ranger Districts. Many of these were sightings of individuals from the Murphy Lake pack, or the two new packs (Graves Creek and Little Wolf) that were confirmed on the Kootenai in 1998. The USFWS trapping crew attempted to verify pack activity on the Three Rivers Ranger District, but they did not locate any wolves this year. Most of the components of wolf habitat on the Kootenai did not change significantly in 1998 compared to previous years. Since big game populations, which are the primary prey for wolves, declined during the severe winter of 1996-97, further monitoring will be needed to determine how this ultimately affects wolf populations.

Bald Eagle: Bald eagle habitat is generally within one mile of major lakes and rivers. Habitat quality and quantity on the Kootenai is stable, and may be increasing in the long term as potential nest trees mature. Mid-winter bald eagle sighting occur mostly along major watercourses both on the Forest and on adjacent ownerships. The survey results for 1998 indicate the lowest number of wintering bald eagles since monitoring started. The mild winter conditions, contributing to low numbers of vehicular killed deer and elk and very little big game mortality due to lack of ice on lakes and reservoirs, is the likely cause. Nesting surveys show the 1998 nesting eagle population at an all time high, as is the number of young fledged. The nesting population trend is up.

Peregrine Falcon: In FY 98 there were no peregrine falcons observed on the Kootenai National Forest. This is fewer than the average number of sightings over the past decade (2 per year). Suitable nesting habitat on the Kootenai is localized and not abundant. Due to the steep, cliffy nature of peregrine nesting habitat, activities which could lead to adverse impacts are rare. Although there were no sightings in 1998, peregrine falcons appear to be maintaining their presence on the Kootenai.

White sturgeon: The US Fish and Wildlife Service released a draft Recovery Plan for the Kootenai River white sturgeon in FY 97. The short-term goal of the Recovery Plan is to prevent extinction and to begin restoring natural reproduction in this population. The current population estimate from the

Idaho Department of Fish and Game indicates there are approximately 1,469 adult sturgeon in the population. Fish radio tagged in FY 98 migrated from Kootenay Lake, British Columbia into the Ferry Island Reach, Idaho. These fish are potential spawners. There was also one wild juvenile from the 1997 cohort that was captured indicating that there was successful spawning in 1997. Ages of wild fish captured in FY 98 ranged from 1 to 49 years. The populations of white sturgeon appear to be maintaining.

Bull Trout: The US Fish and Wildlife Service listed the Columbia River distinct population segment of bull trout as threatened on July 10, 1998. As a result the Kootenai National Forest was required to consult with the US Fish and Wildlife Service on all ongoing activities under Section 7(a)(1) of the Endangered Species Act. During FY 98 the Forest consulted on all ongoing activities and has received concurrence on all but four ongoing projects. The Kootenai National Forest is also preparing watershed assessments for the four sub-populations supported on Kootenai National Forest lands for submission to the US Fish and Wildlife Service. These assessments will provide baseline information to be included in a bull trout recovery plan.

Bull trout redd count numbers are increasing annually which indicates increases in the population. This information indicates the Forest Plan as amended by INFS is providing adequate protection to the aquatic threatened and endangered species and habitat found on the Forest. Based on this review, specific changes to the Forest Plan are not needed at this time.

Range Use (D-1): Livestock use on the Kootenai was anticipated to be about 12,600 Animal Unit Months (AUMs) per year. The FY 98 level of grazing use was 9,856 AUMs or 78 percent of the projected level. Monitoring indicates that riparian protection measures identified in the new grazing permits are being implemented. During the last eleven years, grazing use has averaged 91 percent of projected use which is within the range anticipated in the Plan. Permittee requests for non-use and Forest requests to defer grazing to prevent stream bank deterioration and overgrazing account for use levels being slightly lower than the Plan projected. In review of this monitoring item, no changes are needed to the Forest Plan at this time. During Forest Plan revision, the status of allotments should be reviewed.

Noxious Weeds (D-2): The Forest Plan states that noxious weed infestations will be monitored for increases in total acreage, increases in weed density and the introduction of new weed species on the Forest. Monitoring indicates that several noxious weeds have increased more than 10 percent in the numbers of acres affected and some have had a 10 percent or more increase in density of existing infestation since the Forest Plan was signed in 1987. In addition, with the discovery of several new invaders over the last several years, it is apparent that the diversity of noxious weed species has increased. Based on this, this monitoring item is outside the range prescribed in the Forest Plan. Prior to 1997 emphasis in weed control focused on the use of biological and cultural controls (cultural control uses plant competition to maintain or enhance desired plants) and the use of herbicides on the north end of the Forest. In 1996, a Noxious Weed Control Provision was added to the timber sale contracts. In 1997, the Herbicide Weed Control Decision Notice was issued giving the Forest another tool for control. These actions are occurring under the direction of the Forest Plan and should help improve the noxious weed situation on the Forest. Because of this, no changes are needed in the Forest Plan at this time.

Allowable Sale Quantity (E-1 and Appendix B): The Forest's projected total maximum timber sell volume for the decade from suitable management areas is 2,270 million board feet (MMBF), which is an

average of 227 MMBF per year. In addition, 60 MMBF was estimated to be sold from unsuitable management areas, averaging six MMBF per year. Sell volumes have declined from approximately 200 MMBF/yr to about 62 MMBF per year between FY 88 and FY 98. The average yearly amount sold has been 114 MMBF from suitable lands, and 1.5 MMBF from unsuitable lands. In total, this amounts to 1.3 billion board feet for the past eleven years. This actual sell volume is well below the ASQ limit as set in the Plan.

In the past 5 years, additional factors have influenced the timber sales program. The most significant was additional streamside protection measures as required by the Inland Native Fish (INFS) Decision of July, 1995. Also, the US Fish and Wildlife Service amended biological opinion for grizzly bear recovery was issued July, 1995, and changed how recovery processes would take place on the Forest. In general, in the past five years, it has become more difficult to plan and execute sales due to public controversy and scheduling requirements necessary to meet resource needs.

The Forest has not exceeded the ASQ in 10 years of implementation. However, large changes in the actual program levels versus the projections of the Forest Plan indicate that revision of the Plan will need to address the sustainability of the timber sale program. This will be a part of the initial issues for scoping during the revision of the Forest Plan.

Acres of Timber Sold for Timber Harvest (E-2): The Forest Plan projected 15,740 acres of annual regeneration harvests to achieve the ASQ. During FY 98, the general downward trend which had been apparent in most years remained in place. The acreage sold for regeneration harvest is highest for MA 15, while five other suitable timber MAs (11, 12, 14, 16, and 17) continued to be well below Forest Plan projected amounts. Additional harvest occurred in FY 98, but was either salvage or intermediate harvest that did not result in a regenerated stand.

Many of the factors affecting this monitoring item are similar to those affecting item E-1, Allowable Sale Quantity. As stated in the evaluation for that item, wildlife habitat management, watershed concerns, litigation, appeals, deferrals, and changes in management area designation based on ground verification have all affected the potential to meet the Plan's projected regeneration harvest. Since harvest has focused on MA 15 lands during the last ten years, it indicates that there are efficiencies present for that MA that are not present for the other MAs. Assessment work for Forest Plan revision will need to determine both future opportunities for MA 15 and the problems which prevented greater utilization of the other management areas for timber harvest.

It is apparent that the acres sold for harvest will not meet the acreage projected in the Forest Plan. This is a result of many factors which are influencing the Forest's timber sales program (see E-1 for details). The upcoming revision of the Forest Plan will provide the opportunity to assess appropriate levels of harvest volume and acreage.

Suitable Timber Management Area Changes (E-3): Management areas (MAs) are validated during site-specific project analysis. When inaccuracies are found, MA boundaries are corrected to keep the Forest Plan MA map and acreage current. The largest changes in FY 98 were net losses of 1,075 acres of MA 12 and 1,432 acres of MA 14. Total net loss in the suitable timber land in FY 98 was 3,229 acres.

The degree to which changes have been made to management area designations indicate continuing validation of Forest Plan MAs. The large change in the suitable management area category (nearly 60,000 acres over the last eleven years) amounts to approximately 3 percent of the total suitable base. At this time, it is not apparent that this is significant in terms of the calculation of the long term sustainability of the timber harvest program or ASQ. During revision of the Forest Plan, sustainability and ASQ calculations will be made using the validated management areas. This will allow for an assessment of the effect of changed management area designations.

Timber Harvest Deferrals (E-7): To determine the effect of harvest deferrals on the timber sale program, monitoring is done in two different categories. Category A deferrals are those that result from our project-specific conclusions. Category B deferrals are those that result from an externally imposed situation. In FY 98, 1,075 acres in Category A were deferred, and 154 were deferred in Category B. Deferrals took place due to a variety of reasons, including potential impact to watershed, fisheries, and roadless resources, economically infeasible harvest units, or difficulty in finding an appropriate logging system to fit the situation.

For the entire period from FY 88-98, 34,983 acres were deferred for both A and B categories. The largest amount for a single MA is 22,118 acres which were deferred in MA 12. This is the largest amount of all the MAs and is beyond the prescribed evaluation range of 10,000 acres. MA 14 and 15 also had large amounts of harvest deferred, although they did not exceed the 10,000 acre evaluation range.

This item indicates that many more factors affect harvest than was accounted for during the preparation of the Forest Plan. Since the Forest now has detailed records of such factors, it will be more able to assess those effects during Forest Plan revision. These factors will continue to be monitored, and brought forward in the revision process.

Clearcut Acres Sold (E-9): This monitoring item was established to help ensure that the amount of clearcut harvesting on the Forest is steadily reduced. Clearcut harvest acres sold steadily declined from FY 90 to FY 98 with the exception of FY 96. In FY 96, the amount of clear cutting increased, primarily due to emphasis on salvaging fire-killed timber created by the 1994 fires and dead lodgepole pine killed by the mountain pine beetle epidemic. In FY 98, the amount of clearcutting declined again. When it was possible to do so, the Forest reduced the amount of clear cutting. As a result, the Chief's goal for reducing clearcutting has been fully met.

Riparian Areas (C-9):

Miles of stream classes and/or stream categories identified and mapped: Almost 4,800 lineal miles of riparian habitat have been categorized and mapped since 1988. Over 2,700 of these miles are perennial streams (Stream Classes 1 and 2, INFS Categories 1 and 2). The rest are intermittent and ephemeral streams (Stream Classes III, INFS Category 4).

Determining whether INFS standards and guidelines were applied during projects: Twenty-three projects were evaluated in FY 98 to determine how INFS Riparian Habitat Conservation Areas (RHCAs) and Riparian Management Objectives (RMOs) were applied. All of the 23 projects either meet or exceed the default RHCA width. The default INFS RHCA width was used along 325 miles of streams.

RCHA activity tracking: In 1998, a little over 77 miles of RHCA had some level of activity. Most of the work was for road re-construction, improvement of road crossings and road drainage improvement.

Watershed and stream restoration activities: In 1998, watershed restoration activities were accomplished on over 60 miles of stream. Thirty-eight stream crossings were removed, and a total of 175 other small sites had improvements such as ditch relief culverts, stream channel veins (near bridges), or large woody debris (LWD) addition to reaches where woody debris is lacking. Since 1990, watershed restoration on the Forest has totaled over 6,500 acres.

Riparian Area BMP results: Implementation and effectiveness of applicable riparian Best Management Practices (BMPs) that were used during management activities in or near the riparian zone were evaluated in FY 98. Forty-three practices were evaluated and acceptable implementation was accomplished 100 percent of the time. Approximately 117 effectiveness evaluations were completed for this same period, of which 99 percent of the BMPs were deemed to be effective. For the 2,336 practices evaluated over the eight-year period, acceptable implementation was accomplished 91 percent of the time.

Over the eleven-years since FY 88, approximately 1,684 effectiveness evaluations were completed for this same period, of which 93 percent were deemed to be effective. The abnormal year was 1995 when only 83 percent of the implementation evaluations and 82 percent of the effectiveness evaluations were scored as acceptable. Results of Kootenai Forest BMP tracking and State audits are included in these eleven-year results.

We are effectively applying the Riparian Area Guidelines, INFS direction, and riparian BMPs on projects; therefore, we are on-track with the Forest Plan. Because of the new direction from INFS, no change to Forest Plan direction is needed at this time.

Fish Habitat and Populations (C-10): The Forest Plan indicated that stream surveys, streambed coring, water temperature, woody debris counts, redd counts, and/or embeddedness sampling could be used as data sources to assess the effects of implementation on fish and habitat. After FY 92 we added channel geometry, particle size distribution and riffle stability index (RSI) as data sources. We determined that data would be collected using these methods on a number of watersheds across the Forest including areas that had not been harvested or roaded. This monitoring item is to be reported every two years, however, it will be reported annually because of the relationship to Monitoring Item F-2, Sedimentation.

At this point in time we cannot determine whether implementation of existing Forest Plan prescribed practices results in stream conditions that are outside the variability limits set in the Plan. It is difficult to distinguish among a variety of possible causes for change in streams. Our ability to detect changes in streams and habitat and identify the cause using the C-10 monitoring data is low, and the risk of a faulty conclusion continues to be high. Also, many of the monitoring variables are much more variable than assumed, and thus the accuracy and reliability of C-10 data may be moderate at best. The 1998 monitoring results reinforce the conclusions that were previously disclosed in the 1996 and 97 reports, and indicate the need to change the monitoring requirements.

We have established a team to develop a new monitoring program for fish and fish habitat. We are still exploring options to evaluate these elements. We have revised the C-9 monitoring requirement to better track implementation of Best Management Practices and INFS standards and guides as recommended by the C-10 interdisciplinary team. We have also issued a Kootenai National Forest policy statement on how to site-specifically designate INFS riparian buffer strips to ensure Forest-wide consistency in this critical habitat protection strategy. We have also completed a Best Management Practices training program for all field personnel to improve our performance in watershed and habitat protection.

Habitat restoration efforts continue to focus on mitigation of sediment and woody debris impacts. These efforts are focusing on known sediment sources and areas lacking woody debris. We will continue restoration efforts where project analyses indicate a need.

Soil and Water Conservation Practices (F-1): About 69 separate projects were audited in FY 98 by KNF personnel. FY 98 implementation evaluations were completed for 180 BMPs and implementation evaluations met the requirement of acceptable 97 percent of the time. Effectiveness evaluations in FY 98 met the requirement of acceptable just over 96 percent of the time.

The one FY 98 State BMP Audit done on the Forest evaluated a total of 47 BMPs, a dramatic reduction from the 158 practices evaluated on four separate projects in 1996. Implementation evaluations met the requirements of acceptable or better 89 percent of the time while 10 percent were rated unacceptable or worse. Effectiveness evaluations met the requirements of acceptable or better 91 percent of the time and 8 percent were unacceptable or worse (see Table F-1-3). These two ratings are similar to, but slightly lower than the Statewide average of 94 percent acceptable or better for implementation and 96 percent acceptable or better for effectiveness.

The state BMP audit process separately evaluates sensitive or high risk BMPs and how particular results compare to the state wide average. In this sensitive-BMP category, implementation results for the KNF-audited sale were 57 percent acceptable compared to the Statewide average of 84 percent. Effectiveness results were also 57 percent acceptable compared to the Statewide average of 89 percent. These results are skewed by the fact that only one site was reviewed, but also indicate that this one sale had problems.

In review of this item, we are generally meeting State standards and protecting beneficial uses. Additional emphasis is needed on "high risk BMPs", particularly bringing existing roads up to BMP standards. With the continuing emphasis on BMPs, and further implementation of the new process, this item is on track with the Forest Plan.

Sedimentation (F-2): The Forest Plan identified seven streams that would be monitored for this item. They are Big, Sunday, Bristow, Red Top, Rock, Granite, and Flower Creeks. The data to be collected include bedload and suspended sediment concentrations and streamflow. Nearly all of the Forest's monitoring effort for this item has been dedicated to suspended sediment monitoring for timber harvest and road construction activities. This data is to be used to look for evidence of a change in streambed and water quality conditions, and thus probable effects on beneficial uses related to present management direction. After FY 92 we added channel geometry, particle size distribution, and riffle stability index (RSI) as data sources. We determined that data would be collected using these methods on a number of watersheds across the Forest including areas that had not been harvested or roaded.

At this point in time we cannot determine whether implementation of Forest Plan prescribed practices has resulted in stream conditions that are outside the variability limits set in the Forest Plan. It is difficult to distinguish between natural variation and management-induced changes in streams. As noted in C-10, an interdisciplinary team was formed in 1997 to recommend a course of action to change the C-10 and F-2 monitoring programs. Once we have evaluated what additional items we may need to monitor, what questions we are trying to answer, and how we can best collect the data to answer those questions, then we will develop a proposal to amend the Forest Plan.

We will continue to implement INFS. We will continue emphasis on BMP implementation to maintain a strong emphasis on our sediment prevention measures. In addition, we will continue habitat restoration efforts which are focused on restoration of known sediment sources.

Water Yield Increases (F-3): In FY 98, the water yield model was used to estimate the peak flow increase on 539,652 acres of both National Forest and private land. The major portion of these watersheds had been analyzed in previous years and include many acres of private land. Of the total area analyzed during this fiscal year, 40 percent of the acres exceeded Forest water yield guidelines. Channel damage has not necessarily occurred in watersheds shown to be exceeding water yield guidelines since this monitoring item is based on computer modeling and not field observations and measurements.

Approximately 1,979,800 acres have been analyzed for water yield conditions on the Kootenai since 1988. Of this total, 1,505,500 acres (76 percent) were found to be at or below the guidelines and 474,301 acres (24 percent) were found to be over guidelines according to the most recent analysis in each area, which could be up to ten years ago.

This monitoring item continues to be off-track with the Forest Plan. It is important to note, however, that when projects are proposed in watersheds that are over the standard, they are designed to improve the long-term watershed condition, rescheduled, or dropped (See Monitoring Items E-1 and E-7). This monitoring item shows that water yield calculations and stream channel analysis is an important part of the analysis needed before projects can be implemented.

Emerging Issues (H-2): This item identifies those issues that appear to be developing since the Forest Plan was initiated, and also monitors the original Forest Plan issues that are still of concern. Emerging issues include: road obliteration, road closures, providing access to private land, noxious weeds, the amount and type of timber being offered, the lack of ability to modify riparian habitat conservation areas, opening sizes and disturbance patterns, downsizing of budgets and workforce, firewood availability, prescribed burning, and use of fire and timber harvest in old growth. Forest Plan issues that are still current concerns include: grizzly bear management, timber supply (local economic impact), road management and public access, potential mineral development, visual (scenic) quality, and community stability (in the broader sense of using the natural resources of National Forest lands to provide jobs related to recreation, tourism, and forest products other than timber). These emerging issues will be reviewed during Forest Plan revision to determine if and how they should be resolved.

Forest Plan Costs (H-3): Timber sale costs are about four times greater than projected, which is well outside the +/-10 percent range prescribed in the Forest Plan. This increase is due to the increasing complexity in timber sale preparation along with a concurrent decrease in the amount of timber volume being sold. Since unit costs have increased significantly in timber sale preparation, timber roads, and

reforestation, there will be a need to factor in such changes during Forest Plan revision. The Forest's accounting systems are continuing to effectively track these trends. During the revision process, cost efficiency analysis will include these elements and others as appropriate.

Forest Plan Budget Levels (H-4 and Appendix A): As in prior years, there is a great deal of variation in the level of funding for various program areas in comparison to the projected amounts. Notable areas where funding has increased beyond expected are fire suppression, fuels management, range, law enforcement, tree improvement, salvage sales and trails. Most other program areas are remaining at budget levels below those projected. However, given major trends now seen since 1988, it is apparent that many programs and costs have changed substantially, and the Forest Plan predictions are no longer fully valid. This analysis will be helpful in budget analysis for Forest Plan revision.

Project Specific Amendments (Appendix C): Project specific amendments are changes in a standard that only apply to that project. They do not change the standard for the long term. The Forest Plan states, "If it is determined during project design that the best way to meet the goals of the Forest Plan conflicts with a Forest Plan standard, the Forest Supervisor may approve an exception to that standard for the project." Approximately 46 project decisions were issued in FY 98. Eight project specific amendments were approved for five different projects in FY 98 for the following reasons: to allow higher open road densities during activities in MA 12 (big game summer range); to allow harvest within movement corridors (MA 12); to suspend the requirement of retaining all cavity habitat in MA 10 (big game winter range); and to allow timber harvest in old growth.

Programmatic Forest Plan Amendments (Appendix D): Two Programmatic Forest Plan Amendments were approved in FY 98. One modified MA 24 to permit domestic livestock grazing. The second amendment modified the open road density requirements in MA 12, in the Beaver Creek watershed.

WILDLIFE & FISHERIES: Elk Habitat; Monitoring Item C-1b

ACTION OR EFFECT TO BE MEASURED:

Changes in elk habitat capability from implementation of Forestwide Blowdown Salvage project.

VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:

Any downward trend in elk summer range habitat effectiveness, due to non-compliance with project design criteria.



Purpose: Monitoring Item C-1 has been a five-year monitoring item. However, the Forestwide Blowdown Salvage decision modified C-1 to add a component (C-1b) for monitoring the effects of the Blowdown Salvage on elk habitat. The entire monitoring item (C-1 a and b) will be reported in the 2002 monitoring report.

This monitoring item was established to help ensure that elk summer range habitat capability is maintained during projects implemented under the Forestwide Blowdown Salvage decision. The Decision Notice for the Forestwide Blowdown Salvage project requires that this item be reported annually for two years. The expected precision and reliability of the information are high.

Background: The Decision Notice for the Forestwide Blowdown Salvage project was approved on March 24, 1998. This decision established a special monitoring item to assure big game (especially elk) summer range habitat effectiveness (based on open road densities) would be maintained. The focus of monitoring is on the opening of closed roads in summer range (MA-12). The decision requires that this item be reported for two years after the decision (starting in FY 98).

Evaluation: Across the Forest there were five projects implemented in MA 12 under the Forestwide Blowdown Salvage Decision during FY 98. Only two closed roads were opened. Project duration on the opened roads was less than 14 days in each case. All five projects complied with MA-12 open road density standards for MA 12.

C-1-1: Elk (MA 12) Blowdown Salvage Monitoring Summary			
Number of Projects	Number of Closed Roads Opened for Projects	Road Miles Opened	Average Days Closed Roads Open
5	2	7.0	7

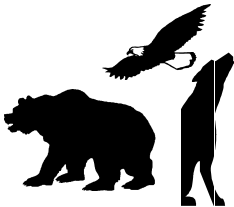
Summary: All projects were implemented in compliance with the Decision. Summer range habitat capability was maintained at existing levels.

Recommended Action: Continue monitoring projects implemented under the Forestwide Blowdown Salvage Decision to assure compliance with project design criteria and maintenance of elk habitat capability.

WILDLIFE & FISHERIES: T & E Species Habitat; Monitoring Item C-7

ACTION OR EFFECT TO BE MEASURED: Provide habitat adequate to ensure Kootenai NF's contribution to recovery of Threatened and Endangered (T&E) Species including: Peregrine Falcon, Gray Wolf, Bald Eagle, Grizzly Bear, Bull trout & White sturgeon.
Provide habitat adequate to ensure grizzly bear recovery from implementation if the Forestwide Blowdown Salvage decision.

VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION: Any downward population trend. Any Forest-wide decrease in habitat quantity or quality. Failure to meet recovery plan goals for the Kootenai NF. Failure to meet Forestwide Blowdown Salvage requirements.



Purpose: This monitoring item was established to help ensure that the Kootenai National Forest contributes to the recovery of listed threatened and endangered species. The Forest Plan requires that this item be reported annually. The expected precision and reliability of the information are high and moderate, respectively.

Evaluation:

Peregrine Falcon: There are no specific recovery goals for the Forest, but the goal for Montana is 20 nesting pairs (USFWS, 1984).

In FY 98 there were no peregrine falcons observed on the Kootenai National Forest. This is fewer than the average number of sightings over the past decade (2 per year). Suitable nesting habitat on the Kootenai is localized and not abundant. Due to the steep, cliffy nature of peregrine nesting habitat, activities which could lead to adverse impacts are rare.

Gray Wolf: The Wolf Recovery Plan (USFWS, 1987) provides guidance for the recovery of the gray wolf. There is one recovery area within or adjacent to the Kootenai Forest (the Northwest Montana Recovery Area). The recovery goal for this area is 10 wolf packs. A small portion of this recovery area (about 10 percent) is located in the northeast corner of the Forest, east of US Highway 93.

In previous years, the Forest had one confirmed wolf pack, the Murphy Lake pack. In FY 98, the Forest has two additional confirmed wolf packs, the Grave Creek and the Little Wolf packs.

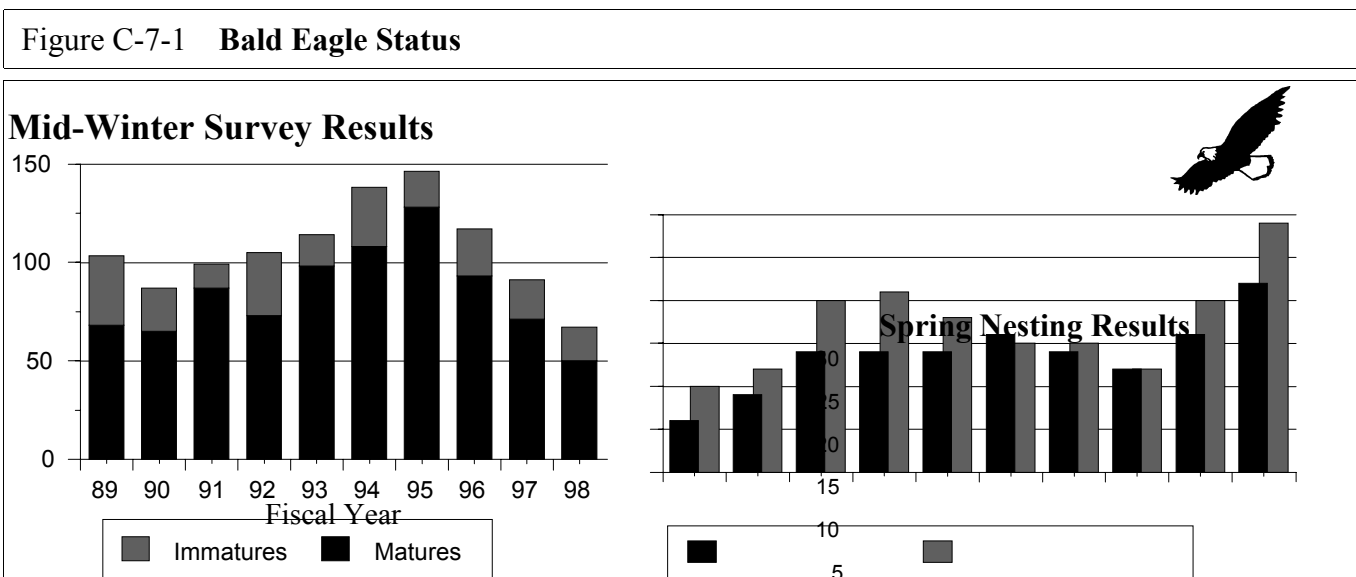
In 1998, reports of wolf sightings continued at slightly increased levels compared to recent years. Sightings were noted in areas on the Fortine, Libby, Three Rivers, and Cabinet Ranger Districts. Many of these were sightings of individuals from the Murphy Lake pack, or the two new packs (Graves Creek and Little Wolf) that were confirmed on the Kootenai in 1998. The USFWS trapping crew attempted to verify pack activity on the Three Rivers Ranger District, but they did not locate any wolves this year. Most of the components of wolf habitat on the Kootenai did not change significantly in 1998 compared to previous years. Since big game populations, which are the primary prey for wolves, declined during

the severe winter of 1996-97, further monitoring will be needed to determine how this ultimately affects wolf populations.

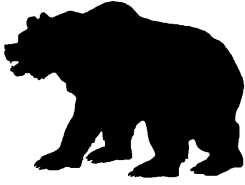
Bald Eagle: The Montana Bald Eagle Management Plan (MBEWG, 1994) and the Pacific States Bald Eagle Recovery Plan (USFWS, 1986) provide guidance for bald eagle recovery. These plans call for the establishment of 52 nesting pairs within Recovery Zone 7, which is the Montana section of the upper Columbia River Basin. This recovery zone includes all public and private land west of the continental divide in Montana, and the Kootenai Forest area is about 15 percent of the zone.

Bald eagle habitat is generally within one mile of major lakes and rivers. Habitat quality and quantity on the Kootenai is stable, and may be increasing in the long term as potential nest trees mature. Table C-7-1 shows the results of mid-winter bald eagle surveys. Sightings occur mostly along major watercourses both on the Forest and on adjacent ownerships. Results are highly variable from year to year due to varying weather conditions.

The survey results for 1998 indicate the lowest number of wintering bald eagles since monitoring started. The mild winter conditions, contributing to low numbers of vehicular killed deer and elk and very little big game mortality due to lack of ice on lakes and reservoirs, is the likely cause. Numbers of active eagle nests and young eagles fledged are also shown in Table C-7-1. Nesting surveys show the 1998 nesting eagle population at an all time high, as is the number of young fledged. The nesting population trend is up.



¹ Beginning in FY 96, eagle nest results reflect only nests occurring on National Forest lands. Previous years' data reflect nests on other ownerships as well as National Forest.



Grizzly Bear: The Kootenai National Forest contains portions of two grizzly bear recovery zones: the Cabinet-Yaak Ecosystem (CYE) and the Northern Continental Divide Ecosystem (NCDE). About 72 percent of the CYE is located on the western portion of the Forest and about 4 percent of the NCDE is located in the extreme northeast corner (see Map C-7-1). Each of these ecosystems are further subdivided into smaller areas for analysis and monitoring, known as bear management units (BMUs).

The Forest's primary efforts in grizzly bear recovery are in habitat management, cooperating in grizzly bear studies within the Yaak River area, assisting with bear augmentation tests and monitoring in the Cabinet Mountains, and working with local citizens and interest groups to achieve understanding and consensus on grizzly bear management issues.

Recovery goals for each recovery zone are based on the Grizzly Bear Recovery Plan (USFWS, 1993). Three main criteria are used to evaluate grizzly bear recovery. These are: 1) the number of unduplicated sightings of females with cubs averaged over a six-year period; 2) the distribution of females with cubs, yearlings, or two-year-olds measured as the number of BMUs occupied over a six-year period; and 3) the level of known human-caused mortality measured as a percentage of the estimated population average for the past three years. Habitat is also an important factor in grizzly bear recovery, and the Forest monitors habitat effectiveness in each BMU as an indicator of habitat trend.

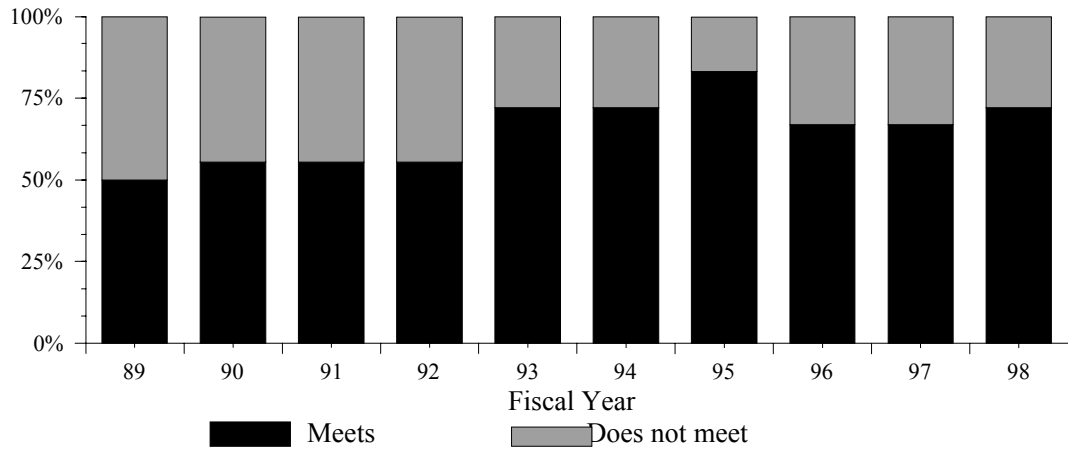
Habitat Effectiveness: Table C-7-2, Table C-7-2a and Map C-7-1 show habitat effectiveness values for each of the BMUs evaluated during fiscal years 1988-98. Effectiveness is based on the percent of habitat available to bears and the desired level is 70 percent or more. Habitat effectiveness went down in five BMUs and up in five BMUs in FY 98 compared to FY 97. Some minor changes were due to more accurate reporting rather than actual changes. The major declines were due to watershed restoration through road obliteration (BMU 12), salvage harvest of timber killed in the 1994 wildfires, and other timber harvest. These BMUs will show improvement once those activities are completed. In FY 98, 13 of the 18 BMUs were at or above the desired 70 percent level (one more than in FY 97), and the Forest-wide average for all BMUs was 71 percent (a 1 percent decline from FY 97).

Figure C-7-2

Grizzly Bear Habitat Effectiveness



Number of BMUs that meet 70 percent H.E.

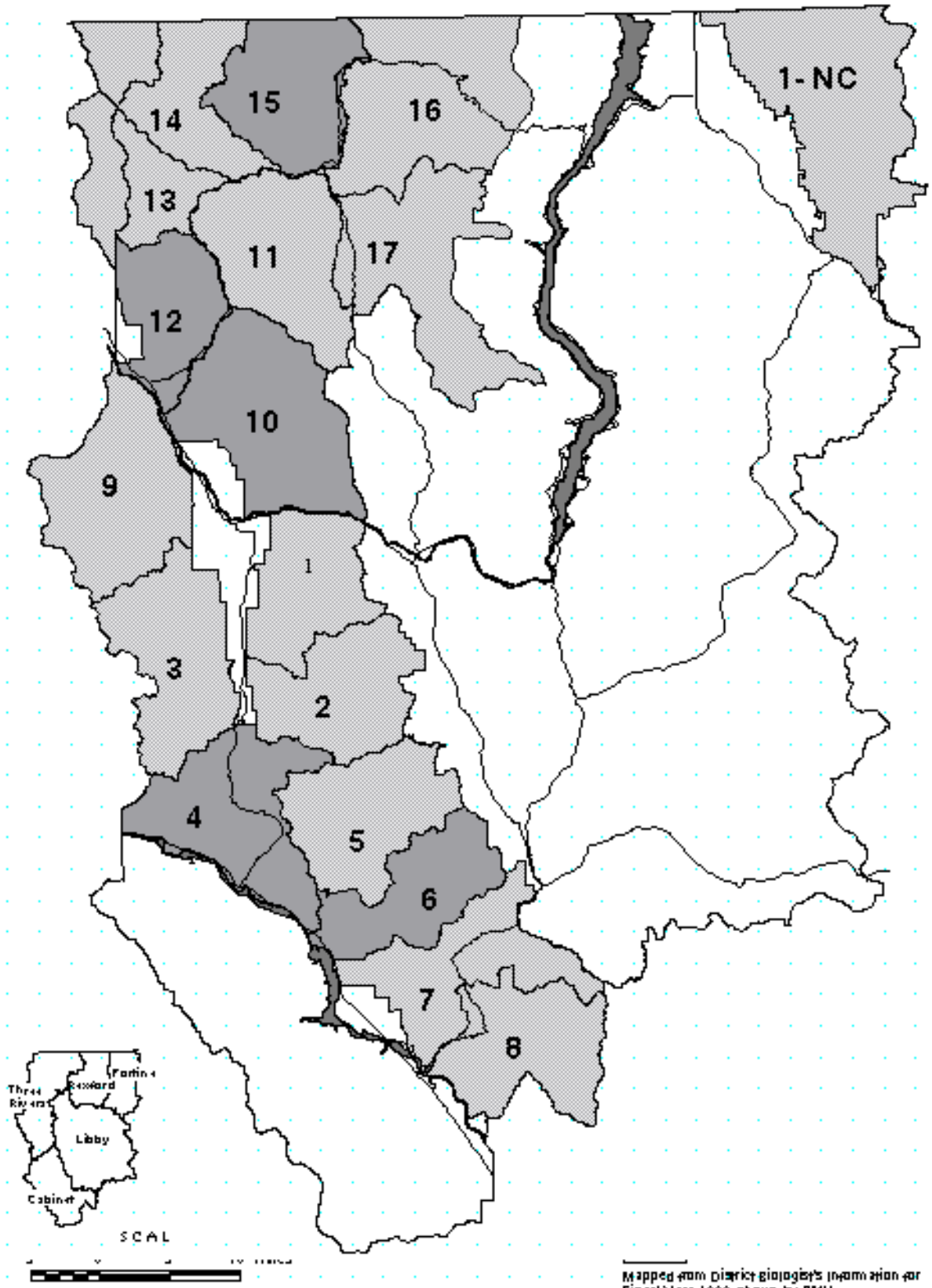


C-7-2a Grizzly Bear Habitat Effectiveness by Fiscal Year

RD:	BMU: Grizzly Bear Management Unit	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98
3	NC1 Murphy Lake	79%	78%	78%	78%	78%	78%	78%	76%	76%	76%
(4) 5	#1 Cedar	81%	81%	82%	79%	79%	86%	81%	81%	86%	85%
4 (5) 7	#2 Snowshoe	82%	82%	81%	82%	82%	84%	85%	85%	85%	83%
4	#3 Spar	71%	70%	70%	79%	78%	77%	77%	78%	76%	78%
7	#4 Bull	78%	80%	80%	80%	92%	64%	63%	63%	62%	62%
(5) 7	# 5 Saint Paul	77%	79%	80%	78%	81%	75%	74%	73%	74%	75%
(5) 7	# 6 Wanless	74%	72%	74%	76%	76%	71%	72%	66%	66%	68%
(5) 7	# 7 Silver B/Fisher	87%	87%	87%	87%	82%	82%	82%	82%	81%	81%
7	#8 Vermilion	80%	80%	73%	73%	71%	71%	74%	77%	77%	77%
4	#9 Callahan	55%	62%	67%	70%	74%	74%	76%	76%	76%	73%
(4) 5	#10 Pulpit	47%	62%	62%	54%	65%	65%	70%	68%	57%	57%
(4) 5	#11 Roderick	59%	66%	68%	66%	70%	70%	70%	74%	74	70%
4	#12 Newton	42%	43%	53%	53%	49%	49%	49%	62%	57%	44%
4	#13 Keno	68%	72%	72%	69%	70%	72%	73%	72%	72%	72%
4	#14 Northwest Pk	61%	68%	68%	68%	72%	74%	72%	74%	74%	74%
4	#15 Garver	47%	62%	62%	54%	65%	65%	70%	68%	63%	66%
1 (4)	#16 E Fork Yaak	46%	59%	61%	62%	64%	64%	73%	72%	70%	70%
(1) 4 5	#17 Big Creek	58%	58%	63%	64%	68%	70%	68%	68%	68%	71%
	Forestwide Average	66%	69%	71%	71%	73%	72%	72%	73%	72%	71%

(Shaded entries indicate BMUs that were below 70 percent Habitat Effectiveness standard for that Fiscal Year)

* BMU NC1 Murphy Lake is in the Northern Continental Divide Ecosystem. All other BMUs are in the Cabinet Yaak Ecosystem.



Unduplicated Sightings of Females with Cubs: In FY 98, there were no confirmed unduplicated sightings of female grizzly bears with cubs in the Kootenai portion of the CYE. There were two confirmed unduplicated sightings of female grizzlies with cubs in the Kootenai portion of the NCDE in FY 98. This is down over the past 6 year average.

Distribution of Females with Young: Four of the 17 BMUs on the Kootenai portion of the CYE were occupied by females with young in FY 98, as was the one BMU in the Kootenai's portion of the NCDE. This is about average over the past six years.

Mortality: There were no known mortalities in the Kootenai National Forest portion of the CYE in FY 98 and none in the Kootenai's portion of the NCDE.

Sightings of females with cubs of the year, distribution of females with young, and human-caused mortalities are summarized for the past six years in Table C-7-3.

Table C-7-3 Grizzly Bear Females with Cubs, Distribution of Females with Young, and Human-Caused Mortalities						
Fiscal Year	NCDE			CYE		
	# Females with Cubs of the year	#BMUs Occupied by Females with Young	# Human Caused Mortalities	# Females with Cubs of the year	# BMUs Occupied by Females with Young	# Human Caused Mortalities
1993	1	1	0	2	4	0
1994	0	1	0	1	3	0
1995	1	1	1	1	3	0
1996	0	1	0	1	4	0
1997	2	1	1*	3	7	1
1998	2	1	0	0	4	0
Six-year Average	1	1	0.3	1.3	4.2	0.2

* Outside Recovery Zone

Efforts continued in FY 98 to implement Interagency Grizzly Bear Committee (IGBC) access management direction. The IGBC manager's subcommittees for the CYE and NCDE are currently working to develop access management direction for the ecosystems based on the latest scientific information on the effects of human access on local grizzly bear populations. The interim options for analyzing access management parameters were tentatively approved by these groups in December of 1998. No project monitoring results are available to report at this time, however the baseline parameters are provided in this report for use in comparisons in future years. The interim monitoring elements include: core area, open motorized route density (OMRD), and total motorized route density (TMRD).

Core area: For all Priority 1 BMUs, the goal is to achieve 55 percent core area over the next three years. Where factors such as existing road jurisdiction, ownership patterns, and other conditions prevent

achievement of a 55 percent core area, consultation with the USFWS will establish the appropriate core area amount. Table C-7-4 summarizes the existing baseline conditions. Core area will not apply for BMUs with less than 75 percent Federal ownership.

Table C-7-4 Baseline conditions of Interim Access Management monitoring items (S/CY BMUs)				
Biological Rating *	BMU	Core %	% BMU OMRD >1mi/sqmi	% BMU TMRD >2mi/sq.mi
1	** Snowshoe -2			
1	*** Bull - 4	60.2	39	28
1	Wanless - 6	51.0	37	35
1	Silver Butte/ Fisher - 7	65.0	27	22
1	Roderick -11	52.3	32	31
1	** Newton - 12			
1	Keno - 13	57.8	34	23
1	Northwest Peak- 14	57.8	31	24
1	Garver -15	34.7	32	45
1	E Fork Yaak -16	38.3	38	45
2	Cedar - 1	69.0	23	16
2	Saint Paul - 5	60.4	29	23
2	** Callahan - 9			
2	Pulpit - 10	42.0	50	41
2	Big Creek - 17	32.0	43	44
3	** Spar -3			
3	Vermilion - 8	54.0	39	41

(Shaded entries indicate Priority 1 BMUs that were below 55 percent core area)

* biological rating: 1 = high priority, 2 = moderate, 3 = low (S/CY Subcommittee Access Management Rule Set : 12/98)

This rating is based on known grizzly bear use (especially females with cubs), if BMU is adjacent to a BMU that has a female with cubs, and if human caused mortality has occurred in BMU.

** missing baseline data will be provided if and when a project is proposed in the BMU.

*** Per ASARCO Rock Creek Biological Assessment 7/98

Motorized access route density: objective is for no net increase in OMRD and TMRD on National Forest Lands within the recovery area, as measured by the Moving Windows program. **There are no new standards for OMRD or TMRD during the interim period** (3 years or until the Forest Plan is revised).

Salvage Sales: The Decision Notice for the Forestwide Blowdown Salvage project was approved on March 24, 1998. This decision established a special monitoring item to assure that the cumulative effects of projects implemented under this decision would meet management direction for grizzly bears. The focus of monitoring is on the opening of closed roads and the number of projects active at one time in each BMU. The decision requires that this item be reported for two years after the decision (starting in FY 98). There were 5 projects implemented under this Blowdown decision in FY 98, but only one occurred in a Bear Management Unit. The project was in BMU 5, but there were no closed roads opened for the project. All management direction for grizzly bears was met.

Summary: Grizzly bear habitat effectiveness was maintained compared to FY 97, and is above the desired level of 70 percent Forest-wide. One more BMU was brought into compliance for habitat effectiveness, although some BMUs still remain below the 70 percent level. Sightings of female grizzly bears was down in FY 98, but the six year average has increased, as has their distribution. There were no human caused mortalities and the trend is down. Based on this analysis grizzly bear habitat is improving in condition and the population appears to be on a slow trend towards recovery.



White Sturgeon -- The US Fish and Wildlife Service Recovery Plan for the Kootenai River white sturgeon has yet to be finalized. The short-term goal of the Plan continues to be to prevent extinction and to begin restoring natural reproduction in this population. This stock of fish can be considered for downlisting to threatened status after 10 years only if natural reproduction occurs in three different years prior to 2006; the estimated population is stable or increasing; enough captive-reared juveniles are added to the population for 10 consecutive years that 24 to 120 juveniles survive to maturity; and a long-term Kootenai River Flow strategy is implemented that ensures natural reproduction. Delisting of this population is estimated to take at least 25 years.

The draft Recovery Plan for the white sturgeon outlines a comprehensive set of actions needed to begin the recovery process. The Plan does not identify actions or objectives that directly affect management of the Kootenai National Forest. However, under the Endangered Species Act (Section 7(a)(1)), the Forest is obligated to use its authorities to aid in the recovery process and to consult with the Fish and Wildlife Service on all proposed or authorized activities. All projects and activities evaluated by the Forest in FY 98 were found to have No Effect on the species.

The current population estimate from the Idaho Department of Fish and Game indicates there are approximately 1,469 adult sturgeon in the population. Fish radio tagged in FY 98 migrated from Kootenay Lake, British Columbia into the Ferry Island Reach, Idaho. These fish are potential spawners. There was also one wild juvenile from the 1997 cohort that was captured indicates that there was successful spawning in 1997. Ages of wild fish captured in FY 98 ranged from 1 to 49 years.

Bull trout -- The US Fish and Wildlife Service listed the Columbia River distinct population segment of bull trout as threatened on July 10, 1998. As a result the Kootenai National Forest was required to consult with the US Fish and Wildlife Service on all ongoing activities under Section 7(a)(1) of the Endangered Species Act. During FY 98 the Forest consulted on all ongoing activities and has received concurrence on all but four ongoing projects. The Kootenai National Forest is also preparing watershed assessments for the four sub-populations supported on Kootenai National Forest lands for submission to the US Fish and Wildlife Service. These assessments will provide baseline information to be included in a bull trout recovery plan.

Under Section 7(a)(1), the Kootenai National Forest consulted on 82 ongoing projects that had effects determinations of May Affect but were Not Likely to Adversely Affect bull trout. The Forest is currently consulting on the four remaining projects that were identified as Likely to Adversely Affect bull trout. These projects are mining and irrigation diversions which are also subject to other legislation.

There were two new projects that were evaluated by the Forest that May Affect but are Not Likely to Adversely Affect bull trout. The remainder of new projects evaluated were determined to have No Effect on the species. As consultation progresses so will the recovery process. The Forest is working closely with Montana Fish Wildlife and Parks as well as the US Fish and Wildlife Service to determine distribution and abundance of bull trout within the boundaries of the Kootenai National Forest. From this data the US Fish and Wildlife Service will determine present status of the four affected subpopulations on the Forest.

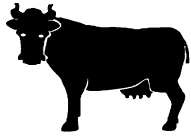
Recommended Actions: The wolf, bald eagle, and grizzly bear have had increased sightings during the last ten years of monitoring. All of the threatened and endangered species' habitats being monitored appear to be maintaining or improving. The information shows that the Kootenai National Forest is progressing toward providing adequate habitat for threatened and endangered species recovery. Based on review of this item, specific changes to Forest Plan direction are not needed at this time.

As with the terrestrial species, the two ESA-listed species of fish on the Forest appear to be increasing in number. Ongoing population research on the white sturgeon determined that there was successful spawning in 1997 as well as establishing a higher estimate of individuals in the population. Bull trout redd count numbers are increasing annually which indicates increases in the population. This information indicates the Forest Plan as amended by INFS is providing adequate protection to the aquatic threatened and endangered species and habitat found on the Forest. Based on this review, specific changes to the Forest Plan are not needed at this time for the further protection of threatened and endangered aquatic species.

RANGE: Range Use; Monitoring Item D-1

ACTION OR EFFECT TO BE MEASURED: Determine if the grazing use measured in Animal Unit Months (AUMs) meets Forest Plan projections.

VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION: +/- 20 percent of anticipated AUMs.



Purpose: This monitoring item was established to track grazing use on the Forest. The Forest Plan requires that this item be reported annually. The expected accuracy and reliability of the information are both high.

Background: Livestock use on the Kootenai was anticipated to be about 12,600 Animal Unit Months (AUMs) per year. At the time the Plan was approved, there were 41 active allotments located mostly in the northeastern portion of the Forest on the Rexford and Fortine Ranger Districts.

Currently, the Forest has 45 grazing allotments, of which 25 are active (four allotments have been split since 1987). Most of these allotments have a 10 year grazing permit with many permits. In FY 96, nine of the allotments had NEPA analysis completed and decisions signed. In FY 97 the following allotments had NEPA analyses completed and decisions signed: Pinkham Ridge, Fairview, Five Mile, Warland, Cripple Horse, Canyon Creek, Elliot/Cowell and Green Mountain. The Swamp Creek allotment no longer exists because it was part of a land exchange. In 1998, we approved one allotment, West Kootenai Grazing. From the efforts in FY 96 through FY 98, 18 of the 25 active allotments have new 10 year grazing permits.

The NEPA analyses completed for the eighteen allotments showed few, if any, effects resulting from current grazing activities. Some localized effects were noted in riparian areas. As a result, the NEPA decisions for re-issuing term grazing permits included implementation of riparian area protection measures to reduce or eliminate cattle use of these site-specific impacted areas. Some of these protection measures included such things as modified turnout dates, placement of physical barriers, and water developments to attract cattle away from critical riparian areas and wetlands.

Results: The FY 98 level of grazing use was 9,856 AUMs or 78 percent of the projected level (see Table D-1-1). Monitoring indicates that riparian protection measures identified in the new grazing permits are being implemented.

Table D-1-1 Range Use in AUMs			
Item	Forest Plan Projected Use	FY 98	11 year Average
AUMs	12,600	9,856	11,428
Percent	100%	78%	91%

Evaluation: During the last eleven years, grazing use has averaged 91 percent of projected use which is within the range anticipated in the Plan. Permittee requests for non-use and Forest requests to defer grazing to prevent stream bank deterioration and overgrazing account for use levels being slightly lower than the Plan projected.

Recommended Actions: In review of this monitoring item, no changes are needed to the Forest Plan at this time. During Forest Plan revision, the status of allotments should be reviewed. This item will continue to be monitored.

RANGE: Noxious Weed Infestations; Monitoring Item D-2

ACTION OR EFFECT TO BE MEASURED: Determine acreage infested with noxious weeds.

VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION: 10% increase in number of acres infested, 10% increase in density of existing infestations or a change in the diversity of noxious weed species



Purpose: This monitoring item was established to identify the changes in noxious weed infestations on the Forest. The Forest Plan requires that this item be reported annually. The expected accuracy and reliability of the information are in the moderate to high range.

Background: The Plan states that noxious weed infestations will be monitored for increases in total acreage, increases in weed density and the introduction of new weed species on the Forest. Weed infestations have been established along many roadsides, railroad and powerline rights-of-way and other disturbed areas such as gravel pits. Spotted knapweed and others have started to migrate away from the road rights-of-way onto undisturbed hillsides, especially within the drier vegetation types. Most of the weeds are brought here attached to machinery, automobiles, railcars, etc. They are further moved around on the Forest by all types of vehicles, machinery, and animals. The Kootenai Forest classifies weeds into four categories which closely follows the system used by Lincoln County. Table D-2-1 shows the noxious weeds that occur on the Forest as well as Potential Invaders that are known to exist on nearby land areas. In FY 97, the Forest prepared an Herbicide Weed Control Environmental Assessment (EA) which documents when and where herbicides can be applied on the Forest.

Table D-2-1 Noxious Weeds on the Kootenai National Forest				
Category	Status	Threat	Goal	Species Included*
Group Ia. Potential Invaders	not known to exist	high probability of causing severe economic or environmental damage	prevention, eradication	yellow starthistle (<i>Centaurea solstitialis</i>), common crupina (<i>Crupina vulgaris</i>), Dyer's woad (<i>Isatis tinctoria</i>), purple loosestrife (<i>Lythrum salicaria</i>), eurasian milfoil (<i>Myriophyllum spicatum</i>)
Group Ib. New Invaders	small populations at limited sites	high probability of causing severe economic or environmental damage	eradication	whitetop (<i>Cardaria draba</i>), musk thistle (<i>Carduus nutans</i>), meadow knapweed (<i>Centaurea pratensis</i>), Russian knapweed (<i>Centaurea repens</i>), rush skeletonweed (<i>Chondrilla juncea</i>), leafy spruce (<i>Euphorbia esula</i>), tansy ragwort (<i>Senecio jacobaea</i>)
Group IIa. Existing Infestations	large, widespread populations	high probability of causing environmental or economic damage	containment within already infested areas, reduction of plant populations	diffuse knapweed (<i>Centaurea diffusa</i>), spotted knapweed (<i>C. maculosa</i>), oxeye daisy (<i>Chrysanthemum leucanthemum</i>), Canada thistle (<i>Cirsium arvense</i>), hound's tongue (<i>Cynoglossum officinale</i>), orange hawkweed (<i>Hieracium aurantiacum</i>), meadow hawkweed (<i>H. pratense</i>), St. John's-wort (<i>Hypericum perforatum</i>), dalmation toadflax (<i>Linaria dalmatica</i>), yellow toadflax (<i>L. vulgaris</i>), sulfur cinquefoil (<i>Potentilla recta</i>), Japanese knotweed (<i>Polygonum cuspidatum</i>)
Group IIb. Existing Infestations (Watch)	small populations at limited sites	unknown but high probability of causing environmental or economic damage	containment within already existing areas, reduction of plant populations, monitor	absinth wormwood (<i>Artemisia absinthium</i>), meadow knapweed (<i>Centaurea pratensis</i>), chicory (<i>Cichorium intybus</i>), poison hemlock (<i>Conium maculatum</i>), field bindweed (<i>Convolvulus arvensis</i>), kochia (<i>Kochia scoparia</i>), Scot's broom (<i>Cytisus scoparius</i>), spotted cat's-ear (<i>Hypochaeris radicata</i>), common tansy (<i>Tanacetum vulgare</i>), common speedwell (<i>Veronica officinalis</i>), Germander speedwell (<i>V. chamaedrys</i>),

*Nomenclature for vascular plants follows Hitchcock and Cronquist (1973) and for bioagents follows Rees et al. (1996).

Evaluation

Introduction: All the weed species listed in Table D-2-1 are of concern on the Kootenai National Forest. This list includes the State of Montana and Lincoln County lists as well as other weed species that the Forest deems important. The State of Montana and Lincoln County are very concerned about new invaders, especially two relatively new weed invaders--tansy ragwort and rush skeletonweed. There is a strong desire to keep these two species from moving east of the Continental Divide into the large farming areas of eastern Montana. The State has provided added monies for surveys and spraying to contain the expansion of these species. Strong emphasis was placed on these two species in 1998, although concern remains high for all the weed species. Treatments for all weed species include one, or a combination, of the following: biological--release of bioagents; mechanical--hand pulling, hoeing, clipping of seed heads or mowing; chemical--application of herbicides; and cultural--establishment of desirable plants as competition.

Existing weed infestations have expanded significantly over the past 10 years. The most common weed on the KNF is spotted knapweed. In 1995, county weed specialists estimated that knapweed infested over 200,000 acres across the Forest (Hirsch and Leitch 1996). Two-thirds of the total infestations are in rangelands, wildlands, or forest lands; the remaining third was in road or railway corridors. The most widespread infestations are in the Clark Fork, Fisher River, and Kootenai River valleys. Knapweed is less widespread in the Tobacco Valley because of weed control programs that include the use of herbicides (1986 Noxious Weed Treatment Program Final Environmental Impact Statement has allowed the use of herbicides on the Rexford and Fortine Ranger Districts). KNF specialists estimate that approximately 224,000 acres are at moderate or high risk of infestation by spotted knapweed.

Inventory: Table D-2-2 below shows the total percent of surveys with each noxious weed species as well as the predominant infestation size and cover class, or density, of each species. Weeds listed on the table below are those currently being tracked by the Kootenai National Forest. This list tiers to the Montana and Lincoln County Noxious Weed Lists and includes other species of concern on the Forest. Two types of surveys were conducted last summer. One was a road survey specifically looking for rush skeletonweed. The presence or absence of other weed species was also noted. This survey is conducted over the entire Forest. The second survey type was an area survey confined to the upper Little Wolf Creek drainage/Island Lake areas, specifically to locate tansy ragwort plants.

These surveys were conducted along both open and closed roads. Infestation sizes were noted and characterized as one of the following: <.1 acre, .1 to 1 acre, 1 to 5 acres, and > 5 acres. Cover classes (plant densities) were characterized as either trace (<1 percent), low (1 to 5 percent), medium (6 to 25 percent), or high (>25 percent). The FY 98 road surveys identified 17 noxious weed species. Eight additional species are also known to occur on the Forest. Eight new sites of rush skeletonweed were located. Over 900 miles of road were inventoried. Approximately 4,500 acres were surveyed and mapped for tansy ragwort. Even though the actual survey for tansy was confined, a plant was located in the Fortine Creek drainage (approximately 20 miles to the north of the known population), a plant was found around Stone Hill, and several sites are found south of Libby in the Libby Creek valley. Both the size and density were noted which determined the basis for the spraying of tansy.

Table D-2-2 Results of Noxious Weed Surveys

Species (<i>Six Letter Code</i>)	% of Surveys with this Species	Predominant Infestation Size	Predominant Cover Class
------------------------------------	--------------------------------	------------------------------	-------------------------

Potential Invaders			
Yellow starthistle (<i>Censol</i>)	--	--	--
Common crupina (<i>Cruvul</i>)	--	--	--
Dyers woad (<i>Isatin</i>)	--	--	--
Purple loosestrife (<i>Lytsal</i>)	--	--	--
Eurasian milfoil (<i>Myrspi</i>)	--	--	--
New Invaders			
Whitetop (<i>Cardra</i>)	--	--	--
Musk thistle (<i>Carnut</i>)	<1	.1 - 1 acre	trace
Russian knapweed (<i>Cenrep</i>)	--	--	--
Rush skeletonweed (<i>Chojun</i>)	5	<.1 acre	trace
Blue weed (Viper's bugloss) (<i>Echvul</i>)	--	--	--
Leafy spurge (<i>Eupesu</i>)	*	--	--
Japanese knotweed (<i>Polcus</i>)	*	--	--
Tansy ragwort (<i>Senjac</i>)	3	<.1 to 1-5 acres	high
Existing Infestations			
Diffuse knapweed (<i>Cendif</i>)	*	--	--
Spotted knapweed (<i>Cenmac</i>)	97	>5 acre	medium
Oxeye daisy (<i>Chrleu</i>)	74	>5 acres	medium
Canada thistle (<i>Cirarv</i>)	89	<.1 acre	medium
Hound's-tongue (<i>Cynoff</i>)	9	.1 - 1 acre	medium
Orange hawkweed (<i>Hieaur</i>)	52	<.1 acre	high
Meadow hawkweed (<i>Hiepra</i>)	42	<.1 acre	trace
St. John's-wort (<i>Hypper</i>)	62	>5 acres	medium
Dalmatian toadflax (<i>Lindal</i>)	7	<.1 acre	trace
Yellow toadflax (<i>Linvul</i>)	1	<.1 acre	trace
Sulfur cinquefoil (<i>Potrec</i>)	7	<.1 acre	trace
Watch Species			
Absinth wormwood (<i>Artabs</i>)	16	.1 - 1 acre	low
Meadow knapweed (<i>Cenpra</i>)	1	<.1 acre	low
Chicory (wild succory) (<i>Cicint</i>)	*	--	--
Field bindweed (<i>Conarv</i>)	*	--	--
Poison hemlock (<i>Conmac</i>)	--	--	--
Scot's broom (<i>Cytsco</i>)	*	--	--
Spotted cat's-ear (<i>Hyprad</i>)	2	<.1 acre	trace
Kochia (<i>Kocscs</i>)	--	--	--
Common Tansy (<i>Tanvul</i>)	42	<.1` acre	trace
Germander speedwell (<i>Vercha</i>)	*	--	--
Common speedwell (<i>Veroff</i>)	*	--	--

* Species known to occur on the KNF or Lincoln County but not noted on any surveys.

Change over time can be measured by observing changes in percent of surveys with each species present, and by observing changes in the most common size and density of those populations.

Table D-2-2 also shows that spotted knapweed, St. John's-wort, Canada thistle, and oxeye daisy were the most common weed species recorded on the Kootenai National Forest during the 1998 survey, all having been recorded on over 60 percent of the surveys conducted. Orange hawkweed, meadow hawkweed, and common tansy are also common having been recorded on more than 40 percent of the surveys. Tansy ragwort, rush skeletonweed, and leafy spurge are considered new invaders for Lincoln and Sanders County. Rush skeletonweed is classified in the eradicate category. Tansy ragwort and leafy spurge are

classified in the eradicate all periphery sites and containment in the core areas. Spotted knapweed is the most common noxious weed species on the Forest, showing up on 97 percent of all surveys.

Many weed species are just becoming established on the Kootenai National Forest, such as rush skeletonweed, meadow knapweed, dalmation and yellow toadflaxes, blue weed, and spotted cat's-ear. Field bindweed and Japanese knotweed are known to exist in Lincoln County, but have not been seen on Forest land. St. John's-wort, orange hawkweed, rush skeletonweed, and oxeye daisy all appear to be more common on the west side of the Forest, whereas hound's-tongue, musk thistle, and tansy ragwort are more common on the east side. Blue weed, leafy spurge, and Scot's broom have been found on the Forest, but were not recorded in this year's surveys. Common and Germander speedwells and chicory were not on this year's inventory forms, but are included in this report because they are known to exist and they have the potential to expand.

Table D-2-3 Percentage of Weed Populations in Each Infestation Size and Density by Weed Category								
Weed Category	Infestation Size				Infestation Density			
	% <.1 acre	% .1-1 acre	% 1-5 acres	% >5 acres	% Trace	% Low	% Med	% High
Potential Invaders	0%	0%	0%	0%	0%	0%	0%	0%
New Invaders	81%	19%	0%	0%	81%	13%	0%	6%
Existing Infestations	38%	22%	18%	22%	17%	18%	42%	23%
Watch Species	65%	22%	4%	8%	43%	21%	25%	11%
Overall Average	41%	22%	16%	21%	20%	19%	41%	21%

Table D-2-3 describes the average infestation size and density for each of the weed categories (New Invader, Existing Infestation, etc.) and then gives the overall average for all weeds tracked by the Forest. This table shows that the majority of weed populations noted (41 percent) are found in populations of less than .1 acre and 41 percent were found in densities of medium. However, weeds in the existing infestation category are more evenly spread throughout the size and density categories, showing that they have not remained in the smaller size classes and densities, but rather trend toward larger populations and higher densities if left unchecked.

This table was calculated by dividing the total number of recorded weed infestations in each category, size class, and density class by the total number of recorded weed infestations in that weed category. This gives a percentage of the total weeds in each category found in each size and density classes. The same was done to calculate the overall average, adding up weed infestations in all categories by their infestation sizes and densities, and dividing by the total weed infestations recorded. This table will also be valuable for displaying the changes in weed populations over time.

Biological Control Agents

Implementation: The KNF's present weed management program is an Integrated Pest Management (IPM) approach that combines prevention, education, and biological, mechanical, cultural, and chemical control of weeds. Biological control (biocontrol) has been the primary method of weed control across much of the Forest. Since 1987, the KNF, in cooperation with the Western Agricultural Research Center (WARC), has made approximately 100 releases (Table D-2-4) of biocontrol agents. Most of these releases have been targeted at control of spotted and diffuse knapweed, though several biocontrol agents

for St. John's-wort and toadflax have also been released. The releases have been made in approximately 75 different locations. Some releases have been repeated at the same sites. The intent is to help build the populations faster in these areas to try to stay up with the increase in the weed populations. The only bioagents released in 1998 were at Troy where one release was made for Canada thistle.

The banded gallfly (*Urophora affinis*) was released in Montana and Oregon in 1973. This bioagent attacks the seed heads of spotted knapweed. It has survived and become established to the point where it can be found throughout much of the Forest.

The effect of these releases has been minimal thus far, although the bioagent populations have been building and the increase in weeds has slowed in some areas. Biocontrol has not measurably reduced populations of knapweed, St. John's-wort, or toadflax on the KNF, probably because populations of biocontrol agents are still very small relative to the size of the weed infestations. There is observational evidence that seedhead flies have slowed the rate of knapweed spread and, with continued releases and reproduction, these and other biocontrol insects may, over time, begin to reduce existing weed populations. However, it is unlikely that biocontrol agents will cause any widespread reduction of spotted knapweed for at least the next 10 years, during which time knapweed, St. John's-wort, toadflax, and other existing infestations will continue spreading (USDA 1997).

Biocontrols have advantages and disadvantages. If biocontrols become established, they will increase in number and continue to attack the target organism. These controls are generally species or species group specific. Other vegetation and resources are not harmed. However, many years are required for biocontrol populations to become large enough to impact the host weed. Biocontrols may also be preyed upon by other insects and animals. Some biocontrols may be limited by climatic and environmental conditions (rainfall, cold, shade, etc.). Biocontrols usually do not eradicate the host weed and are often required in very large numbers to significantly affect the host. Thus, biocontrols are best used on existing, wide-spread weed infestations and not on new invader species for which the goal is eradication (USFS 1997). Biological control agents do not effectively control new infestations because populations are generally small and scattered or because effective biocontrol agents have not been found (USFS 1997). Biological controls are best used to decrease the density or vigor of established noxious weed infestations, but are generally not effective at stopping the spread of new invaders.

Effectiveness: No monitoring of the effectiveness of biological control agents was accomplished by the Forest in FY 98. Various spot checks have shown that larvae of the released bioagents can readily be found. The Regional Office Cooperative Forestry and Forest Health Protection department monitored the survival of *Agapeta zoegana* releases last summer. Of the 11 bioagent release sites checked, all had larvae and/or adults of the bioagent present. Only 1 larvae (4 sites) of *Cyphocleonus achates* was located. There have been many less releases of *Cyphocleonus* than *Agapeta*.

Herbicide Application

Implementation: In FY 98 a total of 1,673 acres were treated with herbicides to control rush skeletonweed, spotted knapweed, leafy spurge, and tansy ragwort specifically. These applications also reduce populations of diffuse knapweed, wormwood, sulfur cinquefoil, oxeye daisy, Dalmation and yellow toadflax, St. John's wort, orange and meadow hawkweed, and Canadian thistle. In the last seven

years 4,940 acres have been sprayed specifically for spotted knapweed, leafy spurge, dalmation toadflax, rush skeletonweed, tansy ragwort, Russian knapweed, and diffuse knapweed.

Special effort was made again in FY 98, in the Little Wolf drainage, in conjunction with the County, to control the spread of tansy ragwort. Several actions occurred, including inventory, spraying, hand-clipping, washing all operational machinery leaving the area, and closing the road to traffic to prevent the spread of this species. Efforts will continue in FY 99, as well as close monitoring of this species.

As in other years, all known populations of rush skeletonweed are marked and chemically treated. Return visits are made to previously known sites to determine the effectiveness of the previous year's action and to again treat the plant, if still present.

Effectiveness: No specific plots were established to monitor the effectiveness of herbicide applications, although monitoring of the rush skeletonweed populations by the county has shown that Tordon 22K is effective against this species. Follow-up spraying of individual plants that were not sprayed because they were missed earlier, or germinated later in the year, has been found to be a key element in the control of this species. Monitoring effectiveness of herbicide applications is planned for 1999 as time and funding allow. This monitoring will be in the form of photo points within treated areas before and after treatments and will continue for 10 years after treatment.

The KNF has used herbicides to control noxious weeds with some success. The 1986 Noxious Weed Treatment Program Final Environmental Impact Statement allowed the use of herbicides on the Rexford and Fortine Ranger Districts. Spraying of roadsides, administrative sites, and gravel pits on these Districts in recent years has visibly reduced weed populations in many areas and prevented weeds from spreading to uninfested areas. Except for emergency spraying at the Troy and Libby Airports after the 1994 fires, and for rush skeletonweed starting in 1993, the KNF has only been spraying on a larger scale since 1998. Lincoln, Sanders, and Flathead Counties have sprayed roadsides which cross NFS lands where the county has clear rights-of-way. The Forest completed an Herbicide Weed Control EA in 1997. The purpose of this EA is to provide an additional tool for eradicating new invaders and limiting the spread of existing noxious weeds.

Mechanical

Implementation: Seed heads of tansy ragwort were clipped along several hundred yards of roadway. Approximately 10 acres of dalmation toadflax were hand pulled. These plants were then burned.

Effectiveness: Clipping tansy ragwort has proven successful if it occurs after the seedhead has formed. However, generally the KNF's mechanical and cultural control efforts have not proven effective at containing or reducing widespread noxious weed infestations. Some forms of mechanical and cultural control, such as tilling and mulching, have not been tried because they are not practical on the steep, forested hillsides which comprise much of the Forest. Roadside mowing has not prevented knapweed from flowering and going to seed.

Hand-pulling, which is the principal method of mechanical control used on the KNF, has been effective on individual plants of some species or very small, isolated weed populations. Attempts to hand-pull large infestations of knapweed and toadflax have provided only temporary control because seeds remain

viable in the soil for up to 12 years. Hand-pulling is completely ineffective on weeds with deep taproots and weeds which reproduce through runners or shoots, such as rush skeletonweed and leafy spurge. Pulling these species stimulates growth in the roots and fragments which remain in the soil, resulting in more plants instead of less (USDA 1997).

Most soil-disturbing activities on the KNF require reseeding of exposed soil. Though reseeding is done principally to prevent erosion, it does inhibit invasion of disturbed sites by noxious weeds. The KNF requires seed to be certified noxious "weed free". In addition, the KNF has established a native seed bank to assist in restoring disturbed sites. Reseeding and revegetation has prevented weeds from spreading onto many disturbed sites. However, these practices have not prevented existing infestations from spreading into wildlands and forests and also have not reduced existing infestations. In 1996 a clause, Noxious Weed Control Provision C(T) 6.26, was added to timber sale contracts. This is a mandatory provision that applies to all new sales and will be included when sales are modified or extended. The clause requires off-road equipment such as tractors, skidders, and processors to be washed prior to operating. This clause will help prevent bringing in new weeds to disturbed sites.

Conclusion: Monitoring indicates that several noxious weeds (see Table D-2-2) have increased more than 10 percent in the numbers of acres affected and some have had a 10 percent or more increase in density of existing infestation since the Forest Plan (September, 1987) was signed. In addition, with the discovery of several new invaders over the last several years, it is apparent that the diversity of noxious weed species has increased. Based on this, the monitoring item is outside the range prescribed in the Forest Plan.

Recommended Actions: Prior to 1997, emphasis in weed control focused on the use of biological and cultural controls (cultural control uses plant competition to maintain or enhance desired plants) and the use of herbicides on the north end of the Forest. In 1996, a Noxious Weed Control Provision was added to the timber sale contracts. In 1997, the Herbicide Weed Control EA was issued giving the Forest another tool for control. These actions are occurring under the direction of the Plan and should help improve the noxious weed situation on the Forest. Because of this no changes are needed in the Forest Plan at this time.

TIMBER: Allowable Sale Quantity (ASQ); Monitoring Item E-1

ACTION OR EFFECT TO BE MEASURED:	Determine if the sell volume meets the projections of the Forest Plan, including other permissible sale volumes.
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	+/- 5 percent deviation for the ASQ volume, and +/- 10 percent deviation for the other permissible volumes.



Purpose: This monitoring item was established to help ensure that the ASQ stated in the Forest Plan is not exceeded and, if the ASQ is not attained, why. The Plan requires that this item be reported annually. The expected accuracy and reliability of the information are both high.

Background: The ASQ is a projected maximum or ceiling and not a target to be reached at the expense of other considerations. The Forest's projected total maximum timber **sell** volume for the decade from suitable management areas is 2,270 million board feet (MMBF), which is an average of 227 MMBF per year (see Forest Plan, Appendix 11). In addition, 60 MMBF was estimated to be sold from unsuitable management areas, averaging six MMBF per year. These two components of suitable and unsuitable sell volumes comprise the total potential timber sale program of 2.3 billion board feet for the decade, which is an average of 233 MMBF per year.

Results: Table E-1-1 shows that sell volumes have declined from approximately 200 MMBF/yr to about 62 MMBF per year between FY 88 and FY 98. The average yearly amount sold has been 114 MMBF from suitable lands, and 1.5 MMBF from unsuitable lands. In total, this amounts to 1.3 billion board feet for the past eleven years. This actual sell volume is well below the ASQ limit as set in the Plan.

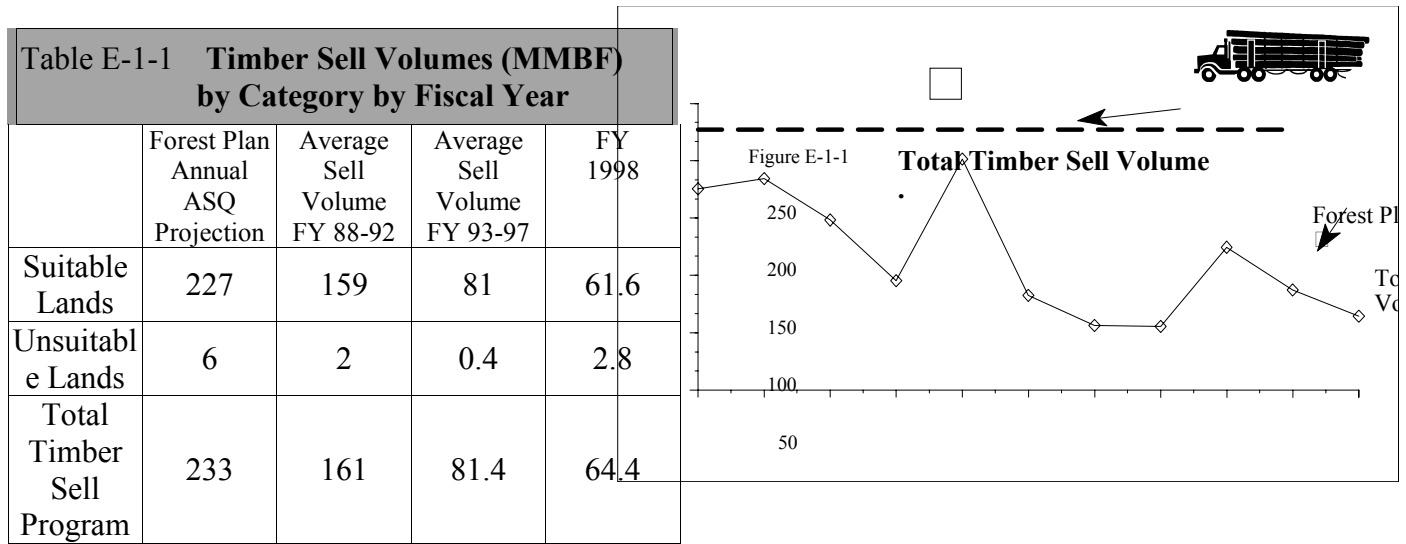
Evaluation: After 11 years of implementation, the trend of decreasing sell volume is continuing. In the FY 92 and FY 97 Monitoring Reports, the Forest reported in detail on a number of factors which caused this decrease. Most of these factors are still influencing the sell volume. The first five years of implementation, sell volume was relatively high, averaging 161 MMBF/year (see the FY 92 Monitoring Report). During the second five years of implementation, sell volume averaged about 81 MMBF/year (see Appendix B). The volume sold in FY 98 is slightly lower than that for the preceding five years.

In November, 1995, the Chief of the Forest Service issued a decision on a Forest Plan appeal related to a technical error in the calculation of the Forest's ASQ. The issue centered on how timber age classes were cataloged in the inventory information used to calculate ASQ. A description of the problem is in the FY 92 Monitoring Report. The decision required that the Forest is not to exceed a sell volume of 150 MMBF per year until the Plan is either amended or revised. In response, in November, 1996 the Forest issued a Notice of Intent to revise the Forest Plan. Since that time, the Forest has been preparing data and training personnel to facilitate formal preparation of a revised Plan.

In the past few years, additional factors have influenced the timber sales program. The most significant was additional streamside protection measures as required by the Inland Native Fish (INFS) Decision of July, 1995. Also, the US Fish and Wildlife Service amended biological opinion for grizzly bear recovery was issued July, 1995 and changed how recovery processes would take place on the Forest. In general, it

has become more difficult to plan and execute sales due to public controversy and scheduling requirements necessary to meet resource needs.

The evaluation limit for this monitoring item is plus or minus 5 percent for suitable volumes and plus or minus 10 percent for unsuitable volumes. These limits have been exceeded, and this indicates that evaluation of these factors which started in the FY 92 Monitoring Report will need to continue during the revision of the Forest Plan.



Recommended Actions: The Forest has not exceeded the ASQ in 11 years of implementation. However, large changes in the actual program levels versus the projections of the Forest Plan indicate that revision of the Plan will need to address the sustainability of the timber sale program. This will be a part of the initial issues for scoping during the revision of the Forest Plan.

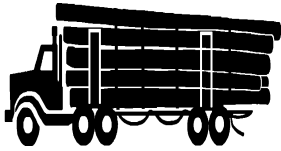
TIMBER: Acres of Timber Sold for Timber Harvest; Monitoring Item E-2

ACTION OR EFFECT TO BE MEASURED:

Determine if the regeneration harvest acres meet Forest Plan projections by management area.

VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:

+/- 10% by management area.



Purpose: This monitoring item was established to help ensure that harvest acreages and volumes sold are closely correlated. The Forest Plan requires that this monitoring item be reported annually. The expected accuracy and reliability of the information are both high.

Background: The acres to be harvested as projected by the Plan are located in six different management areas (MAs). Since each MA has different objectives and management standards, the expected costs of timber harvest will vary. Any significant deviation from the expected harvest acreage for each MA could indicate possible changes in costs, benefits, budget requirements, or environmental effects. (For more information on the Forest Plan MA requirements, see Chapters II and III of the Plan.)

The Plan projects 15,740 acres of annual regeneration harvests to achieve the ASQ. Regeneration harvests include clear cut, seed tree, and shelterwood cutting methods. Salvage and sanitation cuts are not included in the acreage figure.

Results: Table E-2-1 shows the acres sold for regeneration harvest by MA for the first ten years of implementation and for FY 98. During FY 98, the general downward trend which had been apparent in most years remained in place. The acreage sold for regeneration harvest is highest for MA 15, while five other suitable timber MAs (11, 12, 14, 16, and 17) continued to be well below Forest Plan projected amounts. Additional harvest occurred in FY 98, but was either salvage or intermediate harvest that did not result in a regenerated stand.

For the first eleven years of implementation, MA 11 and 15 were closest to the projected harvest amounts while MA 12, which is managed for a combination of timber and big game habitat, has the largest average acreage deviation. MA 14 and 16 show large percentage differences between projected and actual, although the acreage planned for regeneration harvest in these areas is much less than that planned for MA 12. Very little regeneration harvest was accomplished in MA 17 lands; however, relatively little was projected. As additional monitoring continues, it will be possible to see if the second decade of implementation is different than the first.

Evaluation: Many of the factors affecting this monitoring item are similar to those affecting item E-1, Allowable Sale Quantity. As stated in the evaluation for that item, wildlife habitat management, watershed concerns, litigation, appeals, deferrals, and changes in management area designation

(particularly designation of old growth management areas from suitable timber harvest MAs) have all affected the potential to meet the Plan's projected regeneration harvest.

Table E-2-1 Acres of Timber Sold for Harvest by Fiscal Year (Regeneration Harvest Methods Only)				
MA	FP Projection	10-Yr Average (1987 - 1997)	% of Projected (1987 - 1997)	FY 98
11	690	430	62%	11
12	8,800	3,270	37%	593
14	1,220	251	21%	0
15	2,050	2,184	107%	975
16	2,520	469	19%	0
17	460	56	12%	0
Total	15,740	6,661	42%	1,579

Since harvest has focused on MA 15 lands throughout the implementation of the plan, it indicates that there are efficiencies present for that MA that are not present for the other MAs. Assessment work for Forest Plan revision will need to determine both future opportunities for MA 15 and the problems which prevented greater utilization of the other management areas for timber harvest.

Recommended Actions: It is apparent that the acres sold for regeneration harvest will not meet the acreage projected in the Forest Plan. This is a result of many factors which are influencing the Forest's timber sales program (see E-1 for details). The upcoming revision of the Plan will provide the opportunity to assess appropriate levels of harvest volume and acreage.

TIMBER: Suitable Timber Management Area (MA) Changes; Monitoring Item E-3

ACTION OR EFFECT TO BE MEASURED:	Determine if significant cumulative changes are occurring in the suitable timber base by tracking management area boundary changes.
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	+/- 5,000 acre cumulative total change in any suitable timber management area.



Purpose: This monitoring item was established to help ensure that the suitable timber base was being validated before any projects were authorized and to determine what influence any significant changes have on the ASQ. The Forest Plan requires that this item be reported annually. The expected accuracy and reliability of the information are both high.

Background: The allowable sale quantity (ASQ) calculated for the Plan is partially dependent on the amount of suitable timber acreage. This acreage is located within MAs 11, 12, and 14-17. These MAs are validated during site-specific project analysis. When inaccuracies are found, an MA boundary correction is made to keep the Forest Plan MA Map and acreage current. MA boundary changes can result in gains or losses in MA acreage, depending on the conditions found. The important items to track are the total changes by MA and the net gains or losses in suitable timber acreage. The most common conditions that cause an MA map change are mapping and drafting errors found on the original maps, non-productive forest land located within an MA mapped as productive (the reverse situation is also found), big-game winter range habitat is non-existent where originally mapped (the reverse is also found), or additional acreage is designated to meet the 10 percent minimum old growth standard. Differences in calculating acreages also occurred in FY 95-96 when the Management Areas were converted to GIS.

Evaluation: Table E-3-1 displays the net MA acreage changes in suitable timberland for the last eleven years (FY 88-98) and the net change in all suitable timberland. The largest changes in FY 98 were net losses of 1,075 acres of MA 12 and 1,432 acres of MA 14. Total net loss in the suitable timber land in FY 98 was 3,229 acres. Table E-3-1 shows this information for the largest unsuitable MAs. Most of these MA changes were made in the process of designating MA 13 and other old growth management areas. The pattern of change has been fairly consistent in both magnitude and direction. This monitoring item is outside the prescribed range for MAs 11, 15 and 16 (more than 5,000 acres of change). The remaining suitable timber MAs are within evaluation limits (MAs 12, 14, 17).

Recommended Actions: The degree to which changes have been made to management area designations indicate continuing validation of Forest Plan data. The large change in the suitable management area category (over 60,000 acres) amounts to approximately three percent of the total suitable base. At this time, it is not apparent that this is significant in terms of the calculation of the long term sustainability of the timber harvest program or ASQ. During revision of the Forest Plan, sustainability and ASQ calculations will be made using the validated management areas. This will allow for an assessment of the effect of changed management area designations.

Table E-3-1 Net Acreage Changes by Management Areas (MA) in Suitable Timberland							
Fiscal Year	MA 11	MA 12	MA 14	MA 15	MA 16	MA 17	Total Chg to Suitable MAs
1988	330	0	1,070	(1,760)	(510)	0	(870)
1989	(1,142)	(345)	386	253	(22)	(48)	(918)
1990	(164)	(420)	(130)	(4,273)	916	(661)	(4,732)
1991	78	(442)	(1,050)	(3,188)	(1,414)	(281)	(6,297)
1992	(9,279)	(3,178)	(196)	(1,711)	(1,498)	(323)	(16,185)
1993	(1,329)	1,000	(705)	(7,444)	(2,271)	22	(10,727)
1994	(109)	(402)	106	524	111	(148)	82
1995	(457)	1,441	131	(1,845)	(193)	0	(923)
1996	(1,370)	2,743	(206)	(1,679)	229	440	157
97CLE*	(127)	(2,030)	2,392	(8,680)	(2,689)	(494)	(11,628)
97 other	(2,215)	2,168	(66)	(5,055)	(625)	366	(5,427)
1998	(827)	(1,075)	(1,432)	90	75	(60)	(3,229)
Total Net Chg to MA	(16,611)	(540)	300	(34,768)	(7,891)	(1,187)	(60,697)

Suitable MAs indicate productive forest lands with consideration for other resources determining the difference among them. MA 15 lands are managed primarily for high timber yields. MA 11 and 12 are lands which can provide for timber and big game habitat (11 for winter range and 12 for summer range). MA 14 areas are timberlands which have been identified as essential for recovery of the grizzly bear. MA 16 and 17 indicate areas where protection of the visual resource is important.

* The Checkerboard Land Exchange is shown as a separate breakout in FY 97.

Table E-3-2 Net Acreage Changes by Management Areas (MA) in Unsuitable Timberland							
Fiscal Year	MA 2	MA 10	MA 13	MA 18	MA 19	MA 24	Total Chg to Unsuitable MAs
1988	240	1,670	(500)	190	(280)	480	1,800
1989	842	0	(149)	32	135	100	960
1990	150	1,080	1,877	381	(950)	2,564	5,102
1991	1,009	574	4,135	(140)	(231)	1,724	7,071
1992	196	3,211	7,980	2,656	231	823	15,097
1993	(338)	374	7,931	(595)	(2,115)	2,618	7,875
1994	(173)	(69)	914	(437)	(294)	177	118
1995	181	(643)	1,788	(657)	112	(128)	653
1996	32	(550)	3,290	(1,725)	(630)	(649)	(232)
97CLE*	12,777	(149)	(2,249)	(417)	(464)	(1,581)	7,917
97 other	109	(550)	8,501	(1,625)	(644)	(165)	5,626
1998	37	(170)	2,797	(56)	(108)	(113)	2,387
Total Net Chg to MA	15,062	4,778	36,315	(2,393)	(5,238)	5,850	54,374

Unsuitable MAs are used for areas where timber production is not a primary consideration; for example, MA 2 is Roadless Recreation; MA 10 is big game winter range not suited for timber production; MA 13 is protected old growth habitat; MA 18, 19, and 24 are lands with little timber value or lands difficult to regenerate (rocky areas, steep slopes). Other unsuitable MAs identify Wilderness, Special Interest Areas, Administrative Sites, etc. Included within unsuitable MAs are areas of inventoried old growth not identified as MA 13.

NOTE: The differences displayed in the Fiscal Year totals and the Total MA Changes in the two tables shown above are the result of eight additional MAs which contain some minor changes (usually less than 200 acres each) plus the lands that have been acquired and disposed of in the land exchanges completed during the years since the Forest Plan was approved. In FY 95 and FY 96, there were also changes to all MAs due to the process of converting to GIS.

TIMBER: Timber Harvest Deferrals; Monitoring Item E-7

ACTION OR EFFECT TO BE MEASURED:

Determine the suitable timber acreage deferred from timber sales because of economics, resource conflicts, or other unforeseen reasons.

VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:

More than 10,000 acres cumulative change in any suitable management area (MA).



Purpose: This monitoring item was also established to help ensure that the allowable sale quantity (ASQ) is reasonable. Any significant changes in the acreage available for timber harvest could affect the ASQ because it was determined by estimating the maximum amount of available harvest acreage in the first decade while still meeting all the required Forest Plan standards. The Plan requires that this item be reported annually. The expected accuracy and reliability of the information are both moderate.

Background: To determine the effect of harvest deferrals on the timber sale program, monitoring is done in two different categories. **Category A** deferrals are those that result from our project-specific conclusions about resource or economic conflicts that were not adequately accounted for in the Plan. Examples are road construction that is too expensive or a threatened, endangered, or sensitive species found which was unknown during Forest Planning. **Category B** deferrals are those that result from an externally imposed situation. Examples include appeals and court injunctions or significant timber harvest on adjacent private land which could exceed thresholds and may degrade watersheds if the Kootenai Forest timber is harvested before adequate watershed recovery occurs on the private land. Please note that suitable timber acres rescheduled from one year to a later year within the 15 year period are not considered deferred.

Results: Table E-7-1 displays deferred harvest acres by category for each suitable timber management area on the Forest for FY 88-98. In FY 98, 1,075 acres in Category A were deferred, and 154 were deferred in Category B.

Evaluation: For FY 98, less acres were deferred in **Category A** in comparison to several preceding years. Deferrals took place due to a variety of reasons, including potential impact to watershed, fisheries, and roadless resources, economically unfeasible harvest units, or difficulty in finding an appropriate logging system to fit the situation.

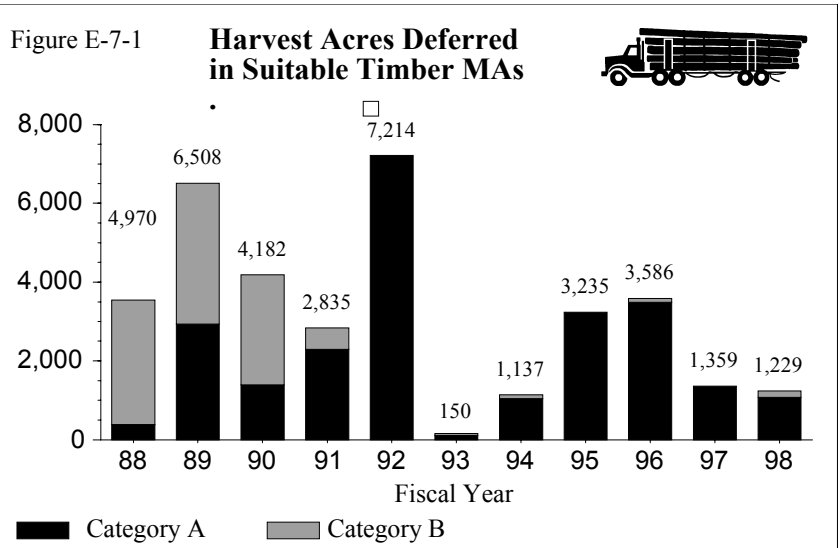


Table E-7-1 shows that for the entire period from FY 88-98, 34,983 acres were deferred for both A and B categories. The largest amount for a single MA is 22,118 acres which were deferred in MA 12. This is the largest amount of all the MAs and is beyond the prescribed evaluation range of 10,000 acres. MA 14 and 15 also had large amounts of harvest deferred, although they did not exceed the 10,000 acre evaluation range.

Recommended Actions: This item indicates that many more factors affect harvest than was accounted for during the preparation of the Forest Plan. Since the Forest now has detailed records of such factors, it will be more able to assess those effects during Plan revision. These factors will continue to be monitored, and brought forward in the revision process.

Table E-7-1 Harvest Acres Deferred in Suitable Timber Management Areas (MAs)							
Category & FY	MA 11	MA 12	MA 14	MA 15	MA 16	MA 17	Total
Category A							
88	15	340	25	0	0	0	380
89	95	2,434	68	196	138	0	2,931
90	89	779	107	120	298	0	1,393
91	204	1,629	360	38	60	0	2,291
92	66	4,886	2,186	76	0	0	7,214
93	0	106	0	0	0	0	106
94	0	77	963	0	0	0	1,040
95	8	1,449	0	936	842	0	3,235
96	0	3,257	234	0	0	0	3,491
97	23	1,163	173	0	0	0	1,359
98	716	44	195	101	19	0	1,075
Subtotal Cat. A	1,216	16,164	4,311	1,467	1,357	0	24,515
Category B							
88	0	2,580	274	314	0	0	3,168
89	198	2,274	301	766	30	8	3,577
90	403	912	62	1,164	168	80	2,789
91	7	60	0	427	50	0	544
92	0	0	0	0	0	0	0

93	0	33	0	0	11	0	44
94	0	0	0	0	0	97	97
95	0	0	0	0	0	0	0
96	0	95	0	0	0	0	95
97	0	0	0	0	0	0	0
98	0	0	0	154	0	0	154
Subtotal Cat. B	608	5,954	637	2,825	259	185	10,468
Totals A and B							
88	287	3,053	408	886	328	8	4,970
89	293	4,708	369	962	168	8	6,508
90	492	1,691	169	1,284	466	80	4,182
91	211	1,689	360	465	110	0	2,835
92	66	4,886	2,186	76	0	0	7,214
93	0	139	0	0	11	0	150
94	0	77	963	0	0	97	1,137
95	8	1,449	0	936	842	0	3,235
96	0	3,352	234	0	0	0	3,586
97	23	1,163	173	0	0	0	1,359
98	716	44	195	255	19	0	1,229
FY 88-97 TOTALS	1,824	22,118	4,948	4,292	1,616	185	34,983

TIMBER: Clear Cut Acres Sold; Monitoring Item E-9

ACTION OR EFFECT TO BE MEASURED:

Acres of clear cut harvest sold.

VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:

Not defined.



Purpose: This monitoring item was established to help ensure that the amount of future clear cut harvesting on the Forest is steadily reduced. The Forest Plan requires that this item be reported annually. The expected accuracy and reliability of the information are both high.

Background: Congress has directed the Forest Service to reduce the amount of clear cut harvesting by 25 percent by 1995. The base line year for this comparison is FY 88. In addition, in a memo dated June 4, 1992, the Chief of the Forest Service expressed his expectation that, when considered throughout the National Forest System, clear cutting would decline by as much as 70 percent from FY 88 to FY 97. The Kootenai is implementing the Chief's guideline policy and using alternative harvest techniques when appropriate.

Results: Table E-9-1 displays the results since FY 88. As can be seen, the acres sold for clearcut harvest steadily declined from FY 90 to FY 98, with the exception of FY 96. In FY 96, the amount of clear cutting increased, primarily due to emphasis on salvaging fire-killed timber created by the 1994 fires and dead lodgepole pine killed by the mountain pine beetle epidemic. In many instances, the salvage of fire-killed timber or dead lodgepole pine resembled a clear cut. After FY 96, the amount of clearcutting declined again, and for FY 98 there has been a 96 percent decrease.

Evaluation: When it was possible to do so, the Forest reduced the amount of clear cutting. As a result, the Chief's goal for reducing clearcutting has been fully met.

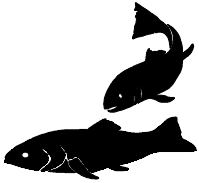
Table E-9-1 Clear Cut Acres Sold by Fiscal Year											
	FY 88	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98
Clear Cut Acres Sold	5,734	5,795	3,068	4,159	3,557	1,469	1,262	483	3,774	902	201
Percent Reduction from 1988	N/A	None	46%	27%	38%	74%	78%	92%	34%	84%	96%

Recommended Actions: Continue monitoring.

RIPARIAN: Riparian Areas; Monitoring Item C-9

ACTION OR EFFECT TO BE MEASURED: Ensure that the intent of riparian management goals are met.

VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION: Failure to meet state and Inland Native Fish Strategy (INFS) standards.



Purpose: This monitoring item was established to help ensure that the intent of riparian management goals is met. With the INFS amendment, the Forest Plan requires that this item be reported annually. The expected accuracy and reliability of the information are both high.

Background: Riparian zone management is one of the most important practices to maintain water quality and a large number of riparian-dependent resources. Riparian management involves implementing actions that maintain or improve riparian conditions, and identification and mapping so resource managers know the area of concern and application. Thus, one of the Plan objectives is to site-specifically identify and map all riparian areas before any projects such as timber sales are authorized (Forest Plan, page II-11).

Since the Plan was approved, Forest guidelines have been completed for the identification, mapping, and management standards necessary to protect riparian areas. Forest Plan Appendix 26, Riparian Area Guidelines, was issued in 1991 and was further updated in 1994 with the passage of the Montana Streamside Management Zone (SMZ) Law (HB731). These Guidelines stratify the Forest into four different stream classes. These stream classes are:

- Class I: large perennial streams
- Class II: smaller perennial streams
- Class III: intermittent streams
- Class IV: dry draws, swales

Classes I, II, and III require specific resource considerations before any activities can proceed. Some restrictions also apply to Class IV streams, wetlands, ponds, and bogs. Implementation of the Soil and Water Conservation Practices Handbook after 1988 and statewide implementation of voluntary Forestry Best Management Practices in 1989 have also aided the improvement of riparian conditions. ¹

In 1995, the Decision Notice for the Inland Native Fish Strategy (INFS) EA amended the Forest Plan by providing an interim strategy to protect native fisheries until a decision is issued for the Upper Columbia River Basin Environmental Impact Statement. The need to modify the existing Plan was determined, in part, from the monitoring of 28 National Forests, which indicated that many watersheds were below Forest Plan standards or exceeded thresholds of concern. INFS modified Forest Plan direction by adding additional requirements to manage fish habitat and channel conditions as well as the standard riparian vegetation zone.

¹Please refer to Monitoring Item F-1, Soil and Water Conservation Practices, for a fuller explanation of how Best Management Practices are monitored.

INFS identified riparian management objectives (RMOs) and riparian habitat conservation areas (RHCAs) for streams depending on the size of stream and whether it contained a fishery. INFS only modified those portions of the Kootenai Forest Plan that were less restrictive than INFS.

INFS identified four stream categories, based on length of flow-period and fishery presence or absence:

- Category 1: perennial fish-bearing streams
- Category 2: perennial flowing, non-fish-bearing streams
- Category 3: ponds, lakes, reservoirs, and wetlands
- Category 4: seasonally flowing or intermittent streams

The transition from the original Forest Plan direction to INFS implementation has been a gradual increase in the restrictions placed on riparian zone activities. For instance, the 1991 Riparian Area Guidelines established, by stream class, minimum width of SMZs, number of trees that had to be left after harvest, which classes had restrictions on both-side harvest, maximum unit length, and amount of total harvest per decade per mile of channel length. The 1994 update of the Riparian Area Guidelines incorporated the Montana State SMZ Law, widening the minimum-width of the SMZ, mandating that leave-trees be calculated by percent rather than number of trees, and requiring protection of all classes of channels.

With the implementation of INFS in 1995, overall riparian area activities allowed became more restricted. For instance, the width of riparian zones (RHCAs) increased. Additional standards and guidelines are applied, including requirements for extensive analysis before harvesting in some classes of watersheds. As a result, actions to date have dramatically reduced the levels of activities within riparian zones.

INFS also requires monitoring of the interim direction. The primary focus of this monitoring is to verify that the standards and guidelines were applied during project implementation. Monitoring to assess whether the standards are effective to attain Riparian Goals and Management Objectives is a lower priority given the short time frames for the interim direction. Complex ecological processes and long time frames are inherent in the Riparian Management Objectives, and it is unrealistic to expect that the monitoring would generate conclusive results within 18 months of issuance of the INFS decision (INFS Decision Notice, Appendix A-15).

Results: With the modification of the Forest Plan by INFS, five approaches are used to track this item:

- 1) Riparian Mapping;
- 2) RHCA/RMO modification documentation;
- 3) RHCA activity tracking;
- 4) Watershed and stream restoration activities;
- 5) Riparian area BMP results.

1) Riparian Mapping: Miles of stream classes and/or stream categories identified and mapped. Table C-9-1 displays the miles of riparian habitat that have been classified and mapped since 1988. Almost 4,800 lineal miles of riparian habitat have been categorized and mapped since 1988. Over 2,700 of these miles are perennial streams (Stream Classes 1 and 2, INFS Categories 1 and 2). The rest are intermittent and ephemeral streams (Stream Classes III, INFS Category 4).

Table C-9-1 Miles of Stream Classes Identified and Mapped			
Fiscal Year	Stream Class I & 2, INFS Category 1 & 2; (perennial streams)	Stream Class III, INFS Category 4, (intermittent and ephemeral streams)	Total Miles
1988-89	136	79	215
1990	409	246	655
1991	392	244	636
1992	363	299	662
1993	205	204	409
1994	157	87	244
1995	235	307	542
1996	451	281	732
1997	201	102	303
1998	207	171	378
Totals	2,756	2,020	4,776

2) RHCA/RMO modification documentation, to determine whether INFS standards and guidelines were applied during projects: Twenty-three projects were evaluated in FY 98 to determine how INFS-RHCA and RMO were applied. All 23 projects meet or exceed the default RHCA width. The default INFS RHCA width was applied on approximately 325 miles of stream

Note: The Forest has begun a project that will develop Kootenai-specific RMOs (see Recommended Actions section).

3) RHCA activity tracking: In 1998, a little over 77 miles of RHCA had some level of activity. Most of the work was for road re-construction, improvement of road crossings and road drainage improvement.

4) Watershed and stream restoration activities: In 1998, watershed restoration activities were accomplished on over 60 miles of stream. Thirty-eight stream crossings were removed, and a total of 175 other small sites had improvements such as ditch relief culverts, stream channel veins (near bridges), or large woody debris (LWD) addition to reaches where woody debris is lacking. Since 1990, watershed restoration on the Forest has totaled over 6,500 acres.

5) Riparian area BMP results: This includes evaluation of implementation and effectiveness of applicable riparian BMPs that were used during management activities in or near the riparian zone (Table C-9-2). Table C-9-2 displays the results of the riparian-area BMP evaluation process from years 1990 through 1998. In even numbered years, results include information from State Audits. In odd numbered years, results are only from the on-forest BMP tracking program. The determination of proper BMP application is referred to as implementation monitoring. The determination of whether the BMP worked or not is effectiveness monitoring.

In FY 98, forty-three practices were evaluated within riparian areas. Acceptable implementation was accomplished 100 percent of the time. Approximately 117 effectiveness evaluations were completed for this same period, of which 99 percent of the BMPs were deemed to be effective. For the 2,336 practices evaluated over the eight-year period, acceptable implementation was accomplished 91 percent of the time. Approximately 1,684 effectiveness evaluations were completed for this same period, of which 93 percent were deemed to be effective. The abnormal year was 1995 when only 83 percent of the implementation evaluations and 82 percent of the effectiveness evaluations were scored as acceptable. There were special circumstances that account for this unusual result, as discussed below.

Table C-9-2 Riparian Area BMP Implementation and Effectiveness					
Fiscal Year	Data Source	Implementation Evaluations	Percent Acceptable or Better	Effectiveness Evaluations	Percent Acceptable or Better
1990	Forest & State (EQC) MBMP Audits	201	89%	82	87%
1991	Forest-wide BMP Audits	145	95%	145	95%
1992	Forest & State (EQC) MBMP Audits	241	88%	241	96%
1993	Forest-wide BMP Audits	226	96%	120	92%
1994	Forest & State (EQC) MBMP Audits	295	91%	117	99%
1995	Forest-wide BMP Audits	503	83%	467	82%
1996	Forest & State (EQC) MBMP Audits	428	96%	169	98%
1997	Forest-wide BMP Audits	254	97%	226	95%
1998	Forest & State (EQC) MBMP Audits	43	91%	117	99%
Totals		2,336	93%	1,684	93%

Sampling of Projects: In addition to the above items, in FY 98 we completed two specific reviews to look at post-project riparian conditions. On October 15, 1998, an IDT reviewed the North Fork Fire Salvage Sale SMZ on the Rexford District. This team, which included both District and Supervisors' Office personnel, reviewed the adequacy of the delineated RHCAs and the condition of the INFS Resource Management Objectives (RMOs). This review covered a variety of stream and channel sizes. The group found that the delineated RHCAs were acceptable in all cases and that salvage activities had not impeded recovery of the RMOs to pre-fire conditions.

A second review took place on the Fortine District on October 28th. In this review, the joint-office IDT reviewed ground conditions following harvest and slash treatment in a unit in the Sunday Creek watershed. Again, the group determined that the protection afforded the small intermittent tributary on the boundary of the unit had been well protected from both harvest and the slash burning.

Evaluation: Riparian zones are being identified and mapped as part of Forest Plan implementation. Appendix 26, Riparian Guidelines, and INFS direction is being followed. After increased emphasis over the last five years, riparian areas discovered during layout and sale administration are being identified and protected. Review of this portion of the monitoring item indicates we are successfully applying riparian considerations to projects.

Review of BMP documentation shows that several projects approved and implemented prior to the update of the Riparian Guidelines in 1994 were not modified to be in compliance with the SMZ law. This accounted for the lower BMP ratings for 1995. However, these projects followed Regional direction which stated that we would not modify existing contracts, but would work to meet riparian requirements by negotiating with purchasers. If the purchaser would not agree to the modifications, then the changes were not made (Regional Forester's letter of May 28, 1992). Review of sales that are being implemented under current direction, such as the fire salvage sales on the Rexford, Three Rivers, and Libby Districts, indicates that riparian guidelines and INFS are being applied and the appropriate BMPs implemented.

With respect to INFS, all indications are that we are meeting the intent and requirements. We are screening projects for possible problems; implementing the criteria except where we have better information and have modified the interim defaults; and are monitoring to measure success in meeting the Riparian Management Objectives.

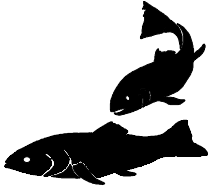
Conclusion: We are effectively applying the Riparian Area Guidelines, INFS direction, and riparian BMPs on projects; therefore, we are on-track with the Forest Plan. Because of the new direction from INFS, no change to Plan direction is needed at this time.

Recommended Actions:

- Continue emphasis on BMP implementation and evaluate effectiveness.
- Continue to monitor a sample of projects where RHCA's have been site-specifically modified or harvest allowed within the RHCA to see how the activities were implemented and what, if any, long-term effect these activities had on the riparian condition.
- Continue to monitor a sample of projects to evaluate whether the riparian guidelines/INFS are meeting their objectives or whether there is a need to change direction.
- Assemble existing data, and begin to collect additional data, to develop more appropriate RMOs for this Forest.

WILDLIFE & FISHERIES: Fisheries Habitat; Monitoring Item C-10

ACTION OR EFFECT TO BE MEASURED:	Determine changes in fish habitat and populations
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	+/- 10% change in redds +/- 2 degrees change in stream temperature +/- 10% change in sediment +/- 10% change in embeddedness +/- 20% change in debris accumulations



Purpose: This monitoring item was established to help ensure that changes in fish habitat and populations do not exceed certain levels. The Forest Plan requires that this item be reported every two years. The Plan expected accuracy and reliability of the information is moderate to high.

Background: Fish habitat and population concerns overlap with the Kootenai's responsibility for protecting downstream beneficial uses as required by State of Montana and Federal laws and regulations. The Forest Plan committed to water quality protection measures and special streamside management provisions in riparian areas as the means for protecting fish habitat (see Forest Plan - Chapter II, and Appendices 25 and 26). The Plan also scheduled fish habitat improvement projects as mitigation for negative cumulative effects on the fisheries resource as a result of Plan implementation and management activities that pre-dated the Plan.

The Plan indicated that stream surveys, streambed coring, water temperature, woody debris counts, redd counts, and/or embeddedness sampling could be used as data sources to assess the effects of implementation on fish and habitat. Monitoring Item F-2 identifies seven representative watersheds where this data should be collected as a measure of Forest-wide management effectiveness. However, because most of the implementation activities have occurred outside of the seven representative watersheds, the Forest has dedicated more time to site-specific project monitoring for timber sales than to monitoring of the seven representative watersheds.

Forest Plan direction for protection of fisheries was amended in 1995 with the Inland Native Fish Strategy (INFS). INFS amended the Plan by providing additional riparian management objectives, standards and guidelines, and monitoring requirements. The revised monitoring requirement from INFS directs that we evaluate whether implementation of standards is moving towards attainment of riparian goals and objectives - however, we should not expect conclusive monitoring results in the near-term because streams respond to new riparian management practices slowly.

In 1992 we determined that this monitoring item would not allow a meaningful evaluation of the effect to fisheries habitat from Forest Plan implementation actions such as timber harvest and road construction. In 1993 we began investigating alternative ways to monitor fish and fish habitat.

Results: Data from stream surveys, streambed coring, water temperature, woody debris counts, redd counts, and/or embeddedness sampling have been collected across the Forest. This data has been collected in one or more of the seven representative watersheds and many more watersheds not

specifically identified in the Plan. The FY 98 monitoring results are consistent with the summary conclusions stated in the FY 96 and 97 Monitoring Reports.

Redd Counts - *This task requires a field survey of streams during and immediately after fish have spawned to estimate the amount of fish reproduction that has occurred. The intent is to test whether Forest management direction and implementation activities are having adverse or beneficial effects on fish abundance.*

Data on redd counts have been collected in three of the seven representative watersheds. Also, in cooperation with Montana Department of Fish, Wildlife and Parks, one representative watershed and 14 other streams were checked for fall spawning redds. The results of this monitoring suggest that bull trout population numbers have increased in the last few years. The number of spawning adults continues to fluctuate, with an apparent increasing trend. This may actually reflect an increased effort to locate bull trout redds. Bull trout spawning data from Canada, however, strongly suggest that the Upper Kootenai stock of bull trout is the largest in Montana with upwards of 1,000 adults spawning each year. The majority of these fish winter in Lake Koocanusa and spawn in Canada.

The fall redd count data for all watersheds indicate year to year variability in fish spawning that exceeds the limits set in the Forest Plan. This variability appears to be largely the result of inconsistent monitoring methods. The number of streams monitored for redds and the length of each stream monitored has changed each year as we seek to identify the preferred spawning areas. As we reported in 1997, it appears that the relationship between fish spawning and present forest management is obscure, and the use of redd count data is impractical as a measure of protection effectiveness. Redd counts will be used as a data source for tracking the trend in bull trout numbers, but not as a measure which would initiate further action.

Stream Temperatures - *This task involves the deployment of a recording device that can measure water temperatures on a continuous basis. The intent is to test whether Forest management and implementation activities (mainly riparian activities) are having adverse or beneficial effects on water quality.*

Stream temperature data has been collected on all seven representative watersheds. The monitoring data shows a strong relationship between stream temperature and the concurrent air temperature and rainfall (or snowfall) for the watershed. This variability in stream temperatures is unrelated to Forest management. However, data from several monitoring sites suggest that the effects of historic riparian logging practices that pre-date the Forest Plan (primarily two-sided riparian area harvest) may affect stream temperatures. The INFS amendment and the Riparian Area guidelines identified stream side management zones or riparian habitat conservation areas which require a certain amount of trees to remain adjacent to the stream. This has minimized the effect that timber harvest has on stream temperatures.

Previous monitoring identified a need for temperature data from reference streams to better portray "natural conditions" as well as increase the power of the existing data. In FY 99 the Forest will place a minimum of ten temperature monitors within selected reference watersheds. Additionally

the Forest will be identifying what temperature monitoring data has been collected on Forest by other agencies.

Sediment Cores - *This task has required the annual removal of a fraction of the streambed to identify changes in fine sediment conditions - that is, monitoring of sediments smaller than 1/4 inch in size by taking streambed cores. This task, together with the embeddedness task (below) and Monitoring Items F-2 and F-3, look at the effects of forest management on water and fish habitat quality. The intent is to test whether Forest management direction and implementation activities (mainly road and harvest activities) are having adverse or beneficial effects on streambed quality.*

Sediment core data has been collected on four of the seven representative watersheds, plus many additional watersheds. Some of this monitoring is a result of a cooperative effort to evaluate proposed hardrock mines and the status of bull trout on the Forest. The monitoring data shows a strong relationship between stream bed sediment and the annual total water yield and highflow conditions for the watershed. Monitoring at several sites suggests that there has been a 5 to 10 percent increase in fine sediment compared to undisturbed reference sites as a result of cumulative forest management. However, these findings do not answer whether present Forest Plan standards are adequate to prevent the observed change in stream bed sediments. This streambed data has been useful for documenting baseline watershed conditions for bull trout as part of the ongoing Section 7 consultation.

Embeddedness - *This task involves monitoring of the streambed surface to look for an increase or decrease in the amount of fine sediment accumulating on streambed surfaces. The results from this task, together with the streambed coring and Monitoring Items F-2 and F-3, are evaluated as a group to look for consistent trends. The intent is to test whether Forest management direction and implementation activities (mainly road and harvest activities) are having adverse or beneficial effects on streambed quality.*

Embeddedness data has been collected on four of the seven representative watersheds, plus some streams inventoried in FY 98. This data was also used for documenting baseline conditions during Section 7 consultation on bull trout. The embeddedness monitoring data for all watersheds indicates year to year variability that is greater than the limits set in the Forest Plan. The monitoring data suggests a relationship between stream surface sediment, and the annual total water yield and highflow conditions for the watershed. This complicating factor in the embeddedness data does not answer whether present Forest standards are adequate or not to prevent an increase in streambed surface sediments.

Woody Debris - *This task involves monitoring of stream segments to look for an increase or decrease in the type or amount of logs lying in or above the stream. Woody debris (logs) plays a critical role in maintaining stream habitat quality and maintenance of stable stream channels. The intent is to test whether Forest management direction and implementation activities (mainly riparian and upland harvest activities) are having adverse or beneficial effects on the instream wood accumulations.*

Woody debris data has been collected on four of the seven representative watersheds, with several hundred additional sites elsewhere. The woody debris monitoring data for all watersheds indicate little year to year variability in those instances where a consistent survey method was used. The FY 98 and previous year's data indicate a substantial reduction in instream woody debris in most managed streams by comparison to reference streams. However, most of these monitoring results cannot distinguish between historic impacts and the effect of present management direction. Other circumstantial information suggests that in nearly all instances where woody debris is absent (or nearly so), deliberate stream cleaning completed before the Forest Plan was written is the likely cause. The INFS amendment and the Riparian Area Guidelines provide direction on providing future woody debris recruitment to streams. The Forest will be compiling the large woody debris data that has been collected during past years' surveys for inclusion in a Forest aquatic data base. The Forest will also be collecting large woody debris data from reference streams to better define the "natural" frequency for woody debris.

Other Applicable Information: Stream survey data and monitoring over the last ten years hints that the recent INFS amendment to the Forest Plan riparian management objectives (RMOs) may not fit our local site conditions. The INFS RMOs provide objectives for different habitat features. They are numerically specific over a very large area. Our data from watersheds that have not been significantly affected by land management suggests that: local instream woody debris should be higher than INFS requirements; local abundance of stream pools should be higher than INFS requirements; and, local pool dimensions (widths and depths) should be somewhat higher than INFS requirements. We say "should be" for a reason - our sampling is not extensive enough to objectively modify the INFS RMOs for the local area at this time; however, the additional temperature and woody debris data to be collected in FY 99 will help determine how well those two RMOs fit the Kootenai's "natural condition."

The Interior Redband trout research project initiated in 1997 is cooperation with the University of Idaho, Bonneville Power Administration and Montana Department of Fish, Wildlife and Parks has been completed. The 1998 results, and the Master's Thesis from the project are presently in progress.

The Rexford Ranger District recently completed a watershed condition analysis based on data collected from 1996-98. The summary identified the potential value of cross sectional analysis to identify changes in stream channel condition. The document also proposed several potential changes for RMOs that would better represent the "natural condition" on that portion of the Forest.

The Libby Ranger District is in the process of monitoring the effects of the Quartz Creek Watershed Restoration. To date more than 68 percent of the road system in West Fork Quartz Creek has been made hydrologically neutral through various levels of restoration. A focus of the FY 98 monitoring was to determine Total Suspended Solids and turbidity associated with culvert removals on live streams. The results showed that through dewatering much of the effect can be reduced but not eliminated. Monitoring also identified a short lived total suspended solids peak, less than 24 hours, associated with removal. The extent of effects was determined to be limited to the vicinity of the project with very little downstream transport. Limited downstream effects were believed to be associated with low flow conditions. Low flows permit more rapid settling of fines. The monitoring also identified a variation in effects associated with the individual operators doing the culvert removals.

Evaluation: At this point in time we cannot determine whether implementation of existing Forest Plan prescribed practices results in stream conditions that are outside the variability limits set in the Plan. As noted in the above discussion, it is difficult to distinguish among a variety of possible causes for change in streams. Our ability to detect changes in streams and habitat and identify the cause using the C-10 monitoring data is low, and the risk of a faulty conclusion continues to be high. Also, many of the monitoring variables are much more variable than assumed, and thus the accuracy and reliability of C-10 data may be moderate at best. The present Forest Plan monitoring effort and sample design can reliably identify only a 50 percent or greater impact from all causes of change. Thus, the data is not sufficient to reliably detect a change as small as the present variability limits for monitoring element C-10. In effect, some C-10 monitoring items appear to be outside the acceptable limits of change more often than not, but the cause could be natural, human-caused, a combination of the two, or could be a result of sample error. As noted above, some monitoring procedures are not reliable indicators, and others have been significantly affected by the INFS amendment to the Forest Plan. The 1998 monitoring results reinforce the conclusions that were previously disclosed in the 1996 and 97 reports, and indicate the need to change the monitoring requirements.

Recommended Actions:

Monitoring: As indicated in the FY 96 Monitoring Report, a Forest interdisciplinary team was convened in 1997. This group of water, fish and watershed experts recommended a complete update of the Forest Plan C-10 monitoring requirements because of the substantive changes in management direction (INFS) and the 10 year monitoring evaluation. The team is still in the process of developing a new monitoring program for fish and fish habitat. We are exploring options for monitoring bull trout and water quality limited segments. In addition, we have been developing aquatic data bases which are providing a better insight on what type of data is useful and where it can be most effectively applied. Once we have evaluated what additional items we may need to monitor, what questions we are really trying to answer, and how we can best collect the data to answer those questions, then we will develop a proposal to amend the Forest Plan.

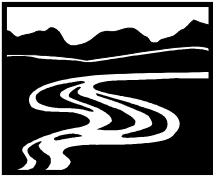
Forest Plan Implementation: We have modified the C-9 monitoring requirement to better track implementation of Best Management Practices and INFS standards and guides as recommended by the C-10 interdisciplinary team. We have also issued a Kootenai National Forest policy statement on how to site-specifically designate INFS riparian buffer strips to ensure Forest-wide consistency in this critical habitat protection strategy. We have also completed a Best Management Practices training program for all field personnel to improve our performance in watershed and habitat protection.

Habitat restoration efforts continue to focus on mitigation of sediment and woody debris impacts. These efforts are focusing on known sediment sources and areas lacking woody debris. We will continue restoration efforts where project analyses indicate a need.

SOIL & WATER: Soil and Water Conservation Practices; Monitoring Item F-1

ACTION OR EFFECT TO BE MEASURED: Determine if regional and project soil and water protection practices protect soil and water resources and water quality.

VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION: Failure to meet State Standards and Protect Beneficial Uses.



Purpose: This monitoring item was established to try to ensure that State water quality standards are met. The Plan requires that this item be reported annually. The expected accuracy and reliability of the information are both high.

Background: The Forest has been monitoring the Soil and Water Conservation Best Management Practices (BMPs) since 1988. These BMPs are required forestwide to meet State water quality standards, and to meet our MOU obligation with the Water Quality Bureau that makes the FS the management agency for water quality protection on National Forest System lands. The BMPs are various practices which are designed to eliminate or reduce non-point sources of pollution such as sediment, which is the primary source of non-point pollution on the Forest. BMP monitoring consists of two parts: 1) determine whether the practice (BMP) was applied on-the-ground as called for; and 2) if applied correctly, did it eliminate or minimize the effect that required the BMP. The determination of proper BMP application is referred to as implementation monitoring. The determination of whether the BMP worked or not is effectiveness monitoring.

In 1998, the Forest implemented a new BMP program that should produce better protection of soil and water resources. All four of the elements of this monitoring report are included in the new Program. One of the new elements under this new program is Supervisors Office-level BMP Reviews. Results from these reviews that were performed on two districts are included below.

Projects that are evaluated for BMP implementation and effectiveness include timber sale road construction, timber harvest, mine site rehabilitation, and other activities that expose or disturb soil, or create ground conditions that could lead to water quality impacts.

An element continued under the new program is the spot review of selected activities. Spot monitoring of selected activities is conducted to determine BMP effectiveness as well as determining compliance with our requirement to protect beneficial uses of water, including fisheries and aquatic habitat.

RESULTS:

FY 98 BMP monitoring on the Forest involved three different efforts: 1) BMP monitoring done by Kootenai Forest personnel during their normal work activities; 2) Supervisors Office-level BMP Reviews on two Districts; and 3) BMP monitoring coordinated by the Forestry Division, Department of Natural Resources and Conservation (DNRC), as part of a larger Statewide Forestry BMP Audit. During all of these efforts, BMPs were evaluated at particular sites on various projects across the Forest. The implementation and effectiveness monitoring evaluations were both rated as shown in Table F-1-1.

Table F-1-1 BMP Evaluation Rating Scale and Summary		
Rating	Implementation	Effectiveness
Acceptable or Better	Operation Meets Requirements	Adequate or Improved Protection of Soil and Water Resources
Unacceptable	Minor Departure from Intent	Minor and Temporary Impact
Very Unacceptable	Major Departure from Intent	Major and Temporary, or Minor and Prolonged Impact
Grossly Unacceptable	Gross Neglect or No Application At All	Major and Prolonged Impact

1) Results of BMP Monitoring Done by Kootenai Forest Personnel: About 69 separate projects were audited in FY 98 by KNF personnel. FY 98 implementation evaluations were completed for 180 BMPs and implementation evaluations met the requirement of acceptable 97 percent of the time. Effectiveness evaluations in FY 98 met the requirement of acceptable just over 96 percent of the time (see Table F-1-2).

Table F-1-2 BMP Monitoring Results by Kootenai Forest Personnel																				
	Implementation (%)										Effectiveness (%)									
	90	91	92	93	94	95	96	97	98	99	90	91	92	93	94	95	96	97	98	99
Acceptable or Better	96	96	93	98	99	92	98	98	97	91	88	86	96	99	92	100	99	96.3		
Unacceptable	4	3	6	2	1	8	2	1.9	2.8	8	12	13	3	1	8	0	1.2	3.4		
Very Unacceptable	0.4	1	0	0.2	0.02	0	0.02	0.1	0	1	0	2	1	0	0	0	.14	0.2		
Grossly Unacceptable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		

2) Results of Supervisors Office-level BMP Reviews: These reviews were conducted on the Rexford District on October 1, 1998; and the Cabinet District on October 7th. These reviews are required under the Revised BMP Program.

Objectives of the Reviews: The objectives of the Supervisors Office Staff-Level BMP Reviews were as follows:

- Involve Supervisors Office personnel in the KNF BMP Process, to make sure the BMP "feedback loop" is completed from the bottom to the top, from the District seasonal to the Forest Supervisor;
- Involve outside entities such as the Montana DEQ and State Forestry BMP Audit Team personnel to build credibility and to give them the opportunity to pass on concerns and advice;
- Provide feedback to a District and/or Zone on their BMP work for a particular project;
- If problems and areas of concern are found, discuss solutions with all of the applicable resources.

Rexford Review: Over 90 percent (32/35) of the practices evaluated within the unit and on the roads received a score of acceptable or better. Road surface drainage was the general problem with the other three practices. Based on response to the Riparian Area Questions, we determined that there were no

problems with either the KNF Riparian Area Guidelines, or the Inland Native Fish Strategy (INFS) requirements. Reviewers particularly liked the armored drain dips on Road 7236; the cut-slope armor at a potential problem crossing site; and the obliterated temporary timber harvest roads. Both review teams awarded scores of "5", meaning the activity exceeded the requirements of the BMP, for these drain dips. The armor at one of the problem crossing sites was built out of large rock and was designed to keep the crossing inlet open and free from cut slope slumping. Cut slope slumping has been a problem on this road before so the group felt the score of "5" for this installation was well deserved. The group was particularly impressed with the quality of the road decommissioning they saw on the review.

While not specifically addressed in the Review, the group observed the Devils Elbow problem site. At this location, a large active slump has run out onto the road twice in the last few years. Both Engineering and Watershed Improvement dollars have been used to try to stabilize the site and additional work was on-going.

Key Findings From the Rexford District Review:

- The two highest priority problems identified were rutting of the road surface and road surface drainage ditches. Engineered rolling drain dips that also drained the ditches were identified as the solution here. If a sufficient number were installed, and particularly near the stream crossing sites, the Team believed it would eliminate all of the problems found in the Review. The ditches would have reduced flow, they would divert sediment-laden water away from the crossing sites, and they would control excess prism flow that was causing the rutting.
- Roxann Lincoln of the DEQ reiterated the groups' praise of the rock-lined dips, and added positive feedback on the grassed channels. She also said that she empathized with our dilemma over funding of our road-related problems. She particularly liked our planned emphasis on funding to correct the road surface drainage problems.
- Over the past year this Zone and District have done a great deal of work to correct the types of problems found during this Review. They have used the "10 percent" funds, CNES, and even NFSI funds at times to correct such problems.
- The District and Zone were going to immediately address the problem areas from this Review with a combination of funding sources.

Cabinet District Review:

This Review focused on a unit and the roads associated with the Cedar Gulch Salvage Sale. The contract for the sale was signed in May, 1996; harvest was done in the winter of 1998, and the slash will be treated in spring of 1999. There was no road construction on this sale, but both existing and reconstructed roads that were used in the sale were reviewed. The Sale Administer asked for review and comment on two specific sites/practices: disposition of the straw bales on the reconstructed road, and the acceptability of the reconstruction and decommissioning activities on FR 2277A.

Similar to the Rexford District Review, over 90 percent (32 of 35) of the practices evaluated within the unit and on the roads received a score of acceptable or better and three practices were deemed a problem. There was no SMZ unit to be evaluated on this sale. Problem practices centered on sizing and armoring of stream crossing structures during reconstruction and on some road maintenance issues. The reviewers determined that the number and quality of the drain dips installed during reconstruction of FR2285 were more than necessary, awarding scores of "5". They also determined that there was a

commendable level of road decommissioning, on an old temporary road used for hauling, and on a temporary road found within the unit.

There was a lot of discussion about each of the practices that the Team had been asked to specifically comment on. At the temporary road 2277A crossing site on Big Cedar Gulch, the Sale Administrator had not installed a crossing structure but instead had gone with temporary filling during the dry period when it was to be used. The fill was removed during the winter and would be removed at the conclusion of the hauling period. At this site, there was not much evidence of major channelized flow and the Team decided that the practice used was acceptable. Also on this temporary road location, the Sale Administrator had not required the purchaser to do the full contract-required clearing width. Because the road was to be restored after use, he believed, and the Team agreed, that the width was not required to log and haul, and would be much easier to obliterate if the size was smaller.

A second practice we were asked to comment on concerned the disposition of the straw bales and stored sediment from the reconstruction period. After a lot of discussion, the Team consensus was that the bales should be left in place to naturally decay, but that seed should be placed on the sediment to trap what we could. It was felt that the stream could handle a "bleeding in" of this small amount of sediment, from the decay of the straw and from what might escape from the filtering of the streamside vegetation below.

The first problem found during the Review was centered around the Orr Creek Crossing, which was reviewed in the reconstruction planning process but was not modified, other than having the inlet cleaned. After a lot of discussion, the group agreed the crossing pipe was undersized. The Team agreed that the pipe should have been armored at the inlet end, based on what **appeared** to be fill-scour. (Note: A short time before this Review, the fire crew used this site to fill an engine to burn a unit. They cut brush from around the site, including from around the inlet, making it difficult to clearly identify an inlet scour problem.) They also used hand tools to drain a large road puddle that was over the pipe directly into the creek.

Another problem at this crossing was the fact that the road "dipped into the crossing", meaning it wanted to drain any road prism flow into the culvert outlet/stream. The Sale Administrator explained what he planned to do at the site which met the approval of the Team: Construct an additional drain-dip up-road from the crossing; Create a berm to carry whatever flow that still makes it to the crossing on across and open a hole that allows it to drain away from direct entry to the stream.

Other problems found during the review included two culverts that had plugged outlet ends. The Team did agree that these culverts were basically in dry draws, and that any flow would probably have cleaned out the outlet plugging, but road maintenance should have kept them open in case of a major storm.

Key Findings From the Cabinet District Review:

- The most important conclusion or finding from this Review involved the Orr Creek crossing. The road was significantly improved during the reconstruction but the pipe was not replaced with a larger one nor was the fill armored. The pipe was examined, and the inlet cleaned as a result, but it was not recognized at that time that the crossing was probably not meeting the 100-year flood passage requirement for INFS Priority Watersheds. In the future, this should be addressed by comparing channel dimensions with crossing structure dimensions during the reconstruction review and doing

whatever is necessary to see that the crossing can pass the 100-year flood without causing sedimentation. Increasing the pipe size is one solution but armoring the site may also work at times. Conditions within the pipe (rust-line height, etc.) should also be reviewed at the same time and used in the decision. A key ingredient in the decision will be to have all of the key folks involved, both Engineering and Watershed/Fisheries;

- We need some awareness sessions for employees who aren't normally required to implement BMPs. For instance, had the fire crew been thinking BMPs and water quality, hopefully they would have drained the big puddle away from the stream, not into it;
- The contract requirement for clearing width was more than necessary on the temporary road to be decommissioned, and the Sale Administrator made the correct decision in requiring a much smaller width. This is a good example of how the new KNF BMP Process is designed to work: a knowledgeable person on the ground modifies an earlier decision which results in a better product or result, all while still meeting the **objective** of the practice;
- The Sale Administrator and Engineering Rep corrected most of the identified problems and had the repairs made within a few days. The undersized culvert will have to wait till we have additional funding available.

3) Results of BMP Monitoring Done by the State BMP Audit Team: In FY 98, only one Kootenai National Forest timber sale was monitored as part of the statewide Montana Forestry Best Management Practices Implementation Monitoring Program. This audit was conducted under the supervision of the DNRC by an interdisciplinary team comprised of a fisheries biologist, a forester, a hydrologist, a representative of a conservation group, a logging/road engineer, a soil scientist, and, for the first time, a representative for small loggers in Montana.

The FY 98 State BMP Audit done on the Forest evaluated a total of 47 BMPs, a dramatic reduction from the 158 practices evaluated on four separate projects in 1996. Implementation evaluations met the requirements of acceptable or better 89 percent of the time while 10 percent were rated unacceptable or worse. Effectiveness evaluations met the requirements of acceptable or better 91 percent of the time and 8 percent were unacceptable or worse (see Table F-1-3). These two ratings are similar to, but slightly lower than, the Statewide average of 94 percent acceptable or better for implementation and 96 percent acceptable or better for effectiveness.

TableF-1-3 BMP Monitoring Results by State BMP Audit Team										
Rating	Implementation (%)					Effectiveness (%)				
	FY 90	FY 92	FY 94	FY 96	FY 98	FY 90	FY 92	FY 94	FY 96	FY 98
Acceptable or Better	84	83	84	92	89	91	86	84	92	91
Unacceptable	13	10	8	6	6	8	7	7	4	4
Very Unacceptable	3	6	8	2	4	1	6	7	4	4
Grossly Unacceptable	0	1	1	0	0	0	2	2	0	0

The State BMP Audit Report process also separately evaluates the sensitive or "high-risk" BMPs and how they compare to the statewide average. The "high-risk" BMPs are those that are considered to be the most important in protecting watersheds and water quality.

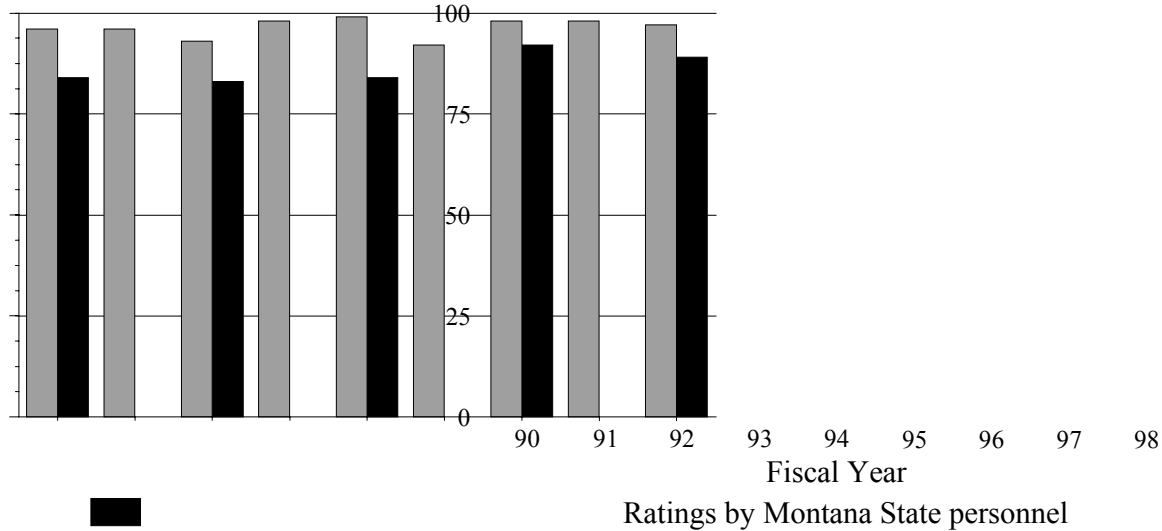
Eight "high-risk" BMPs were determined to be the most important for protecting Montana watersheds:

- III.C.1 Provide adequate road surface drainage for all roads.
- III.C.6 Route road drainage through adequate filtration zones before entering stream.
- III.D.2 Stabilize erodible soils (i.e., seeding, benching, mulching).
- III.E.2 Maintain erosion control features (dips, ditches, functional culverts).
- IV.A.5 Design and locate skid trails to avoid concentrating runoff.
- IV.B.5 Adequate drainage for temporary roads, skid trails, fire lines.
- IV.C.8 Limit water quality impacts of prescribed fire.
- V.C.4 Prevent erosion of culvert and bridge fills (i.e., armor inlet and outlet).

In this sensitive-BMP category, implementation results for the KNF-audited sale were 57 percent acceptable compared to the Statewide average of 84 percent. Effectiveness results were also 57 percent acceptable compared to the Statewide average of 89 percent. These results are skewed by the fact that only one site was reviewed, but also indicate that this one sale had problems.

Figure F-1-2

BMP Implementation Results of Acceptable or Better



Evaluation of BMP Monitoring by Kootenai Forest Personnel: The results of the FY 98 BMP monitoring are comparable to 1997, although slightly lower (see Table F-1-2). Implementation was down less (1 percent) while effectiveness was down 2.7 percent. No BMPs were rated as "grossly unacceptable" in FY 98, and only two were rated as "very unacceptable", both for effectiveness. The scores of 97 percent for acceptable implementation, and 96 percent for acceptable effectiveness, point to the overall success of the Forest BMP Program.

Only four practices appeared to be a problem in FY 98: Practice 14.3, Use of Sale Area Maps to Designate Soil and Water Protection; Practice 14.7, Tractor Loggable Ground; Practice 14.15, Erosion Control on Skid Trails; and Practice 15.2, Location and Design of Roads and Trails. None of these had been identified as being problems in the past. They will be emphasized in the training planned for summer 1999.

Evaluation of the Statewide BMP Audit Team Results: The FY 98 BMP Audit results for the Kootenai Forest audited sale were 89 percent implementation and 91 percent effectiveness, 5 percent below the Statewide averages of 94 percent implementation and 96 percent effectiveness. When comparing this Forest to the Statewide average for the "high risk" BMPs in FY 98, the ratings for both the implementation and effectiveness categories were dramatically lower than the Statewide average. Road surface drainage and the maintenance of erosion control features both turned up as problems. These results continue the trend towards lower Forest ratings for the "high risk" BMPs found over the past 4 to 6 years. One reason for this is that the Forest has not been as aggressive as necessary in bringing existing roads up to current BMP standards when they are used for new projects. All the new roads being built by the Forest meet new BMP specifications, but in many instances we are not applying the specifications to bring the old roads into compliance when used for a new project.

However, with respect to streamside management zone (SMZ) protection (one of the high-risk BMPs), the Forest has improved as we have incorporated these requirements into our contracts (see C-9 for more information).

Conclusion: In review of this item, we are generally meeting State standards and protecting beneficial uses. Additional emphasis is needed on "high risk BMPs", particularly bringing existing roads up to BMP standards. With the continuing emphasis on BMPs, and further implementation of the new Process, this item is on track with the Forest Plan.

Action Items Required: No changes to the Forest Plan are needed at this time. The following actions will occur to improve our implementation and monitoring efforts.

- Continue implementation of the new Forest BMP Process and Program. This process emphasizes monitoring, implementation, evaluation, documentation, tracking, and completion of the feedback loop to improve resource protection. Give special emphasis to the "high risk" BMPs.
- Repeat last years' All-Forest field training session in the spring to cover all aspects of BMPs.
- Implement direction in the Regional Foresters' memo of March 11, 1999. In this memo, he emphasized correcting road drainage problems, both surface and cross drainage and provided a prioritization scheme for tackling existing problems: 1) correct the defects that are delivering sediment to the waters; 2) correct those that are at risk of delivery; and 3) correct the defects which affect the servability of the road.

SOIL & WATER: Stream Sedimentation; Monitoring Item F-2

ACTION OR EFFECT TO BE MEASURED:	Determine sediment impacts on water quality.
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	20% increase in bedload or suspended sediments.



Purpose: This monitoring item was established to help ensure that the State water quality standards are met and fish habitat is protected. The Forest Plan requires that this item be reported annually. The Plan expected accuracy and reliability of the information is moderate.

Background: The Plan identified seven stream that would be monitored for this item. They are: Big, Sunday, Bristow, Red Top, Rock, Granite and Flower Creeks. The data to be collected includes bedload and suspended sediment concentrations and streamflow. Nearly all of the Forest's monitoring effort for this item has been dedicated to suspended sediment monitoring for timber harvest and road construction activities. This data is to be used to look for evidence of a change in streambed and water quality conditions, and thus probable effects on beneficial uses, related to present management direction. In addition, a parallel goal has been to gather enough data so that the Forest's sediment predictive tool (R1-WATSED) can be validated and refined for general use before activities are implemented.

The data from this monitoring requirement must be evaluated in the context of results from Monitoring Items C-9, C-10, F-1 and F-3. As with these other monitoring items, the goal of this item is to confirm whether beneficial uses are being protected and water quality laws are being met.

In 1992 we determined that this monitoring item and monitoring item C-10 as designed would not allow a meaningful evaluation of sedimentation from Forest Plan management such as timber harvest and road construction. Based on this we determined that we would accept the intent of this monitoring item but add some additional data sources to help understand the effects of our management. The FY 96 Monitoring Report included a nine-year evaluation of the monitoring results for this element. The 1996 nine-year evaluation concluded that a need for change in C-10/F-2 monitoring was apparent, and that a team should be assembled to identify the best course of action. This report, incorporates by reference, the nine-year evaluation of F-2 and updates that evaluation with any new information from 1997.

Results: Information regarding streambeds, suspended solids and streamflow have been collected in several of the seven representative watersheds. This same data has also been collected in many more watersheds not specifically identified in the Plan. The monitoring results suggest the need for change in some areas, but the certainty of these findings are weakened by limitations in the data.

Bedload - *This task requires the placement of a collection device in a stream at the time that streamflows are at the highest point of the year. The intent is to test whether Forest management direction and implementation activities are having adverse or beneficial effects on watershed sediment production or channel stability.*

As outlined in the FY 96 Monitoring Report, we have discontinued the collection of bedload sediment samples. In lieu of bedload monitoring, several alternative monitoring methods are now in use as outlined below. The data indicates sediment relations in streams are strongly linked to the annual snowpack and resulting runoff conditions.

Channel Cross Sections - *This task requires detailed measurements of a stream from bank to bank, and then repeating this procedure each year to check for changes in channel shape. The intent is to test whether forest management direction and implementation activities are having adverse or beneficial effects on water yield and sediment production and thus the condition of the stream channel.*

Since 1989, we have collected cross-section data on more than 50 streams, a few of which are reference streams (those with no past activity). In 1998 this monitoring data was collected, but the lack of a computer model to evaluate annual changes in channel shape, and a shortage of reference data, strongly inhibits our ability to draw a conclusion about the effectiveness of management direction.

Riffle Stability Index - *This task requires detailed examination of the roles in stream channels to determine whether conditions are stable or not. The intent is to test whether cumulative management activities are having adverse or beneficial effects on stream channels, watershed conditions and fish habitat via changes in streambed sediments.*

Beginning in 1989, we have applied this procedure on numerous streams on the Forest. In 1998 we again restricted the use of this technique to larger streams where the technique holds promise. The 1998 data indicates the high runoff year had a noticeable effect on streambeds, but the shortage of reference data inhibits interpretation and evaluation of this data.

Particle-size Distribution - *This task requires a detailed description of the rocks in a stream channel. The intent is to test whether forest management direction and implementation are having adverse or beneficial effects on average channel conditions and movement of sediment.*

We have collected particle size distribution data on hundreds of streams since 1992, including more than 90 reference streams. However, these results have not been repeated at specific sites for a long enough time period to identify trends and reach reliable conclusions. In addition, we need more trend data from reference streams so that we can determine the streams' natural variability. The results to date are not powerful enough to draw definitive conclusions. Monitoring of particle-size distribution appears to be warranted given the results to date, therefore we will continue to use this item as a data source.

Suspended Sediments - *This task involves monitoring of the fine sediment particles in flowing water to look for an increase or decrease in the suspended sediment load. The results from this task, together with Monitoring Items C-10 and F-3, are evaluated as a group to look for consistent trends. The intent is to test whether Forest management direction and implementation activities (mainly road and harvest activities) are having adverse or beneficial effects on water quality.*

Suspended sediment data collection has been implemented on all seven representative watersheds. The reliability of the data is limited primarily because of the lack of multiple-year samples and high variability in the data. The suspended sediment monitoring data for all watersheds, and that from 1998, indicates year to year variability that is greater than the limits set in the Forest Plan. The monitoring data suggests a strong relationship between suspended sediment, and the annual total water yield and high-flow conditions for the watershed. This same data confirms that these elevated levels of high-flow suspended sediment only persist for a few years after a human disturbance, but do not return to pre-disturbance conditions and likely represent a long-term chronic problem. However, these results have not been replicated at enough sites or for a long enough time period to reach reliable summary conclusions. The results to date are not powerful enough to draw definitive conclusions on the present Forest management direction.

Other Applicable Information: The Rexford Ranger District completed a watershed condition analysis in 1998. This analysis also identified the strong relationship between water year and sediment yield. This relationship confounds our ability to identify sediment production resulting from management practices. The Analysis also confirmed the value of cross sectional analysis for detecting changes in channel conditions.

Evaluation: The primary intent behind F-2 monitoring is to evaluate whether present management direction is sufficient to maintain water quality. For this monitoring to achieve its purpose, we must be able to distinguish between natural variation and management-induced changes. Our ability to detect changes in streams and habitat and identify the cause using the F-2 monitoring data is largely undefined and the risk of a faulty conclusion is high. Also, some of the monitoring variables are much more variable than assumed, and thus the accuracy and reliability of F-2 data may be moderate at best. The present monitoring effort and sample design generally would only reliably identify a 50 percent or greater impact from all causes of change. The available monitoring data are not sufficient to reliably identify an impact of 20 percent due to present management direction at all monitoring sites. Thus, the discriminatory power of our present monitoring effort is low and the risk of a faulty conclusion is moderate to high.

Forest management direction changed in 1995 per the decision of the Inland Native Fish Strategy (INFS). As stated in the INFS monitoring requirements it will take several years of monitoring to determine whether this new management direction is sufficient to maintain aquatic beneficial uses, or whether additional objectives and protection measures are needed. These findings are consistent with findings in the study of Forest watersheds recently completed by Colorado State University.

Recommended Actions:

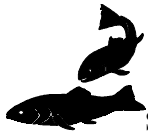
Monitoring: As noted in C-10, an interdisciplinary team was formed in 1997 to recommend a course of action to change the C-10 and F-2 monitoring program. The monitoring requirements from F-2 were recommended for revision in the following manner:

- 1) Incorporate sediment monitoring in a new C-11 monitoring element, and refocus the intent as validation monitoring;
- 2) Modify the monitoring evaluation requirements to emphasize trend monitoring as opposed to the present percent-change-from-1987 approach.

Forest Plan Implementation: We will continue to implement INFS. We will continue emphasis on BMP implementation to maintain a strong emphasis on our sediment prevention measures. In addition, we will continue habitat restoration efforts which are focused on restoration of known sediment sources.

SOIL & WATER: Water Yield Increases; Monitoring Item F-3

ACTION OR EFFECT TO BE MEASURED:	Determine the cumulative level of water yield increases and the effects on stream channels.
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	20 percent of watersheds exceed hydrologic guidelines.



Purpose: This monitoring item was established to track our progress in protecting water-dependent resources from effects of management-influenced high stream flows. The Forest Plan requires that this item be reported annually. The expected accuracy and reliability of the information are moderate to high.

Background: Water yield increases can adversely affect stream channels and fisheries habitat. The Plan states that projects involving significant vegetation removal will accomplish a cumulative watershed effects analysis to ensure that water yield and sediment levels do not increase beyond acceptable limits (Forest Plan, II-24). The Plan also references the dependence of timber harvest on the rate of hydrologic recovery (Forest Plan, II-4, 7).

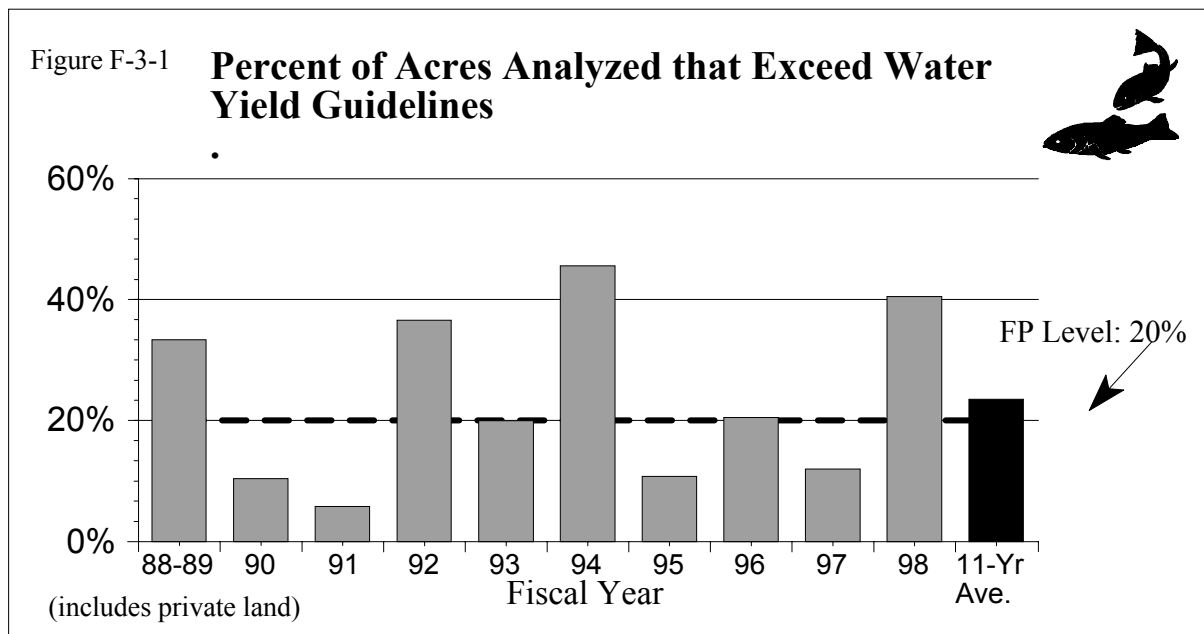
Forest Plan Appendix 18 (Kootenai Forest Water Yield Model Instructions and support guidance memos) was provided to guide the process of accomplishing the cumulative effects analysis. This analysis procedure estimates the peak flow increase over natural conditions for a watershed or sub-watershed based on existing and proposed activities on both the public and private lands.

Results: The Forest has employed two methods to examine this data. Table F-3-1 tracks the watersheds which are evaluated as a part of project planning. Since these analyses are not randomly distributed around the Forest, results tend to be skewed in some years depending on which watersheds are being analyzed or re-analyzed.

Table F-3-2 and the Water Yield Analysis Map present an estimation of the Forest-wide condition based on a computer file of watersheds that is updated each year to indicate the results of the most current water yield analysis.

Table F-3-1 shows the results for each fiscal year. In FY 98, the water yield model was used to estimate the peak flow increase on 539,652 acres of both National Forest and private land. The major portion of these watersheds had been analyzed in previous years and include many acres of private land. Of the total area analyzed during this fiscal year, 40 percent of the acres exceed Forest water yield guidelines. Channel damage has not necessarily occurred in watersheds shown to be exceeding water yield guidelines, since this monitoring item is based on computer modeling and not field observations and measurements.

Table F-3-1 Watersheds Analyzed for all Ranger Districts by Fiscal Year			
Fiscal Year	Total Acres , Watersheds Analyzed	Acres of Watersheds Exceeding WY Guidelines	Percent of Analyzed Acres Exceeding WY Guidelines
88-89	944,170	314,404	33%
90	141,054	14,564	10%
91	226,836	13,020	6%
92	163,297	59,661	37%
93	83,479	16,654	20%
94	130,890	59,597	46%
95	277,229	29,682	11%
96	223,545	45,758	20%
97	141,171	16,827	12%
98	539,652	218,197	40%



Some of the totals in Table F-3-1 include reassessments of previously completed watersheds because of changed conditions. For instance, FY 94 includes a large number of acres that were reanalyzed following fires. Many of those acres had been analyzed earlier as part of normal operations. It is also important to note that, in areas analyzed in earlier years, hydrologic recovery has been occurring and watershed restoration projects have been implemented. Due to these changed conditions, some of these areas may not exceed water yield guidelines today. Because of the reassessments done in later years, the information in Table F-3-1 cannot be totalled since some acres would be double-counted.

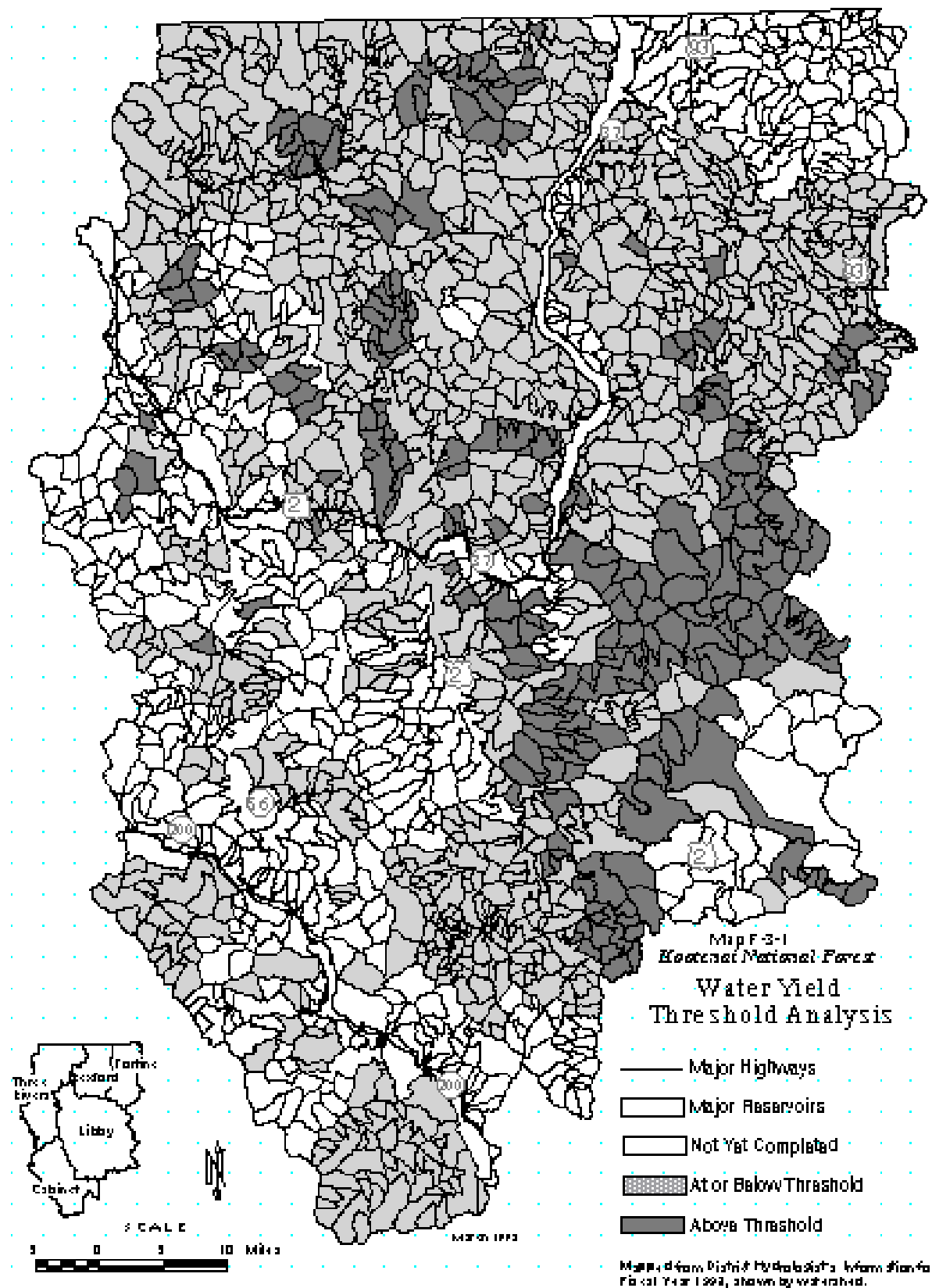
The second method used summarizes the most recent analysis results for each watershed. This enables us to show a total for the Forest. This data is summarized to generate the figures for Table F-3-2. The map on the following page (Figure F-3-1) is shaded to show where watersheds have been analyzed and most recent analysis shows they meet or exceed Water Yield Guidelines. As noted above, some of these areas were last analyzed up to ten years ago and conditions may have changed.

As shown in Table F-3-2 approximately 1,979,800 acres have been analyzed for water yield conditions on the Kootenai since 1988. Of this total, 1,505,500 acres (76 percent) were found to be at or below the guidelines and 474,301 acres (24 percent) were found to be over guidelines according to the most recent analysis in each area, which could be up to ten years ago.

Table F-3-2 Summary of Watershed Analysis Results (includes private land)			
Fiscal Years	Acres of Watersheds Analyzed	Acres (and percent) of Watersheds That Meet WY Guidelines	Acres (and percent) of Watersheds Exceeding WY Guidelines
FY 88- FY 98	1,979,800	1,505,500 76%	478,000 24%

Evaluation: Table F-3-1 shows 40 percent of the analyzed watershed acreage for FY 98 exceed the peak flow water yield guidelines. As in prior years, the reasons for these current conditions are usually related to harvesting of timber in years prior to the implementation of the Plan, timber harvest on private lands, and relatively slow recovery of vegetation in certain watersheds. In addition, natural events such as wildfire have caused high mortality of trees in certain areas, resulting in conditions which cause increased runoff and peak flow increases. When such conditions are encountered in the project planning process, projects are designed so that peak flows still meet the Forest Plan guidelines to protect water quality and beneficial uses.

Table F-3-2 indicates that, for the period from FY 88 to FY 98, about 24 percent of the watershed acreage, including private land, is exceeding water yield guidelines. Map F-3-1 shows the watersheds where peak flow analysis has been done in one or more Fiscal Years since 1988 and also shows the results of the most current analysis. This monitoring item continues to be off-track with the Forest Plan. It is important to note, however, that when projects are proposed in watersheds that are over the standard, they are designed to improve the long-term watershed condition, rescheduled, or dropped (See Monitoring Items E-1 and E-7). This monitoring item shows that water yield calculations and stream channel analysis is an important part of the analysis needed before projects can be implemented.



HUMAN & COMMUNITY DEVELOPMENT: Emerging Issues; Monitoring Item H-2

ACTION OR EFFECT TO BE MEASURED:

Emerging issues.

VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:

Issues surfaced that were not included in or analyzed for effect by the Forest Plan.



Purpose: This monitoring item was established to track the amount of resource management conflict that is occurring, especially those conflicts which were not foreseen during the preparation of the Forest Plan. The Plan requires that this item be reported annually. The expected accuracy and reliability of the information are both moderate.

Background: New emerging issues could affect the Forest's ability to implement the Plan as intended, so they are identified as part of monitoring.

EMERGING OR POTENTIAL FOREST ISSUES NOT SPECIFICALLY EVALUATED IN THE FOREST PLAN:

Roads and Associated Access Issues:

Road Obliteration: The Forest Plan was amended by the Inland Native Fish Strategy which provided guidance on the need for road obliteration. The public is now having a difficult time understanding why we spend so much money on roads and then partially or fully obliterate them. The interdisciplinary process used to decide which roads to rehabilitate and to what extent is unknown or poorly known to the public.

Balancing Road Closures to Meet Forest Plan Standards While Providing Access to National Forests: It is becoming more difficult to meet Forest Plan standards for open road density and still provide access to the main collector roads. In some areas we are close to the maximum number of road closures that the public will tolerate. This is evident by the increasing number of signs and gates being vandalized.

Access and Easements to Private Landowners: Inhabited private land has increased in the last few years and, with it, the expectation that access across Forest Service land and maintenance of this access will be given, which is not always the case.

Noxious weeds: The discovery and spread of new species of noxious weeds in addition to those already well established has been difficult to keep ahead of.

Timber Being Offered: There are concerns about the low quality of wood being harvested due to the "thin from below" type harvest commonly being used now. This is related to the economics of harvest and to the reduced harvest level as reported in FY 97. Thinning from below has been criticized as not economically feasible, especially when combined in any manner with a proposal involving helicopter. In addition, the local community is greatly concerned about the reduced timber harvest levels that have resulted from a variety of reasons.

Harvest in Riparian Habitat Conservation Areas (RHCAs): INFH allows activities to occur in RHCAs or RHCAs to be modified, if a certain level of analysis has been completed and riparian management objectives are met. However, establishment of default-width RHCAs with no harvest allowed are becoming routine. It takes a great deal of documentation to modify RHCAs and/or allow harvest within RHCAs.

Opening Sizes and Disturbance Patterns: The Forest Plan anticipated opening sizes to generally not exceed 40 acres. This limitation on opening size cannot be met when designing activities to mimic natural disturbance patterns. Harvesting in big game travel habitat adjacent to existing openings continues to be an issue in most timber sale proposals in MA 12. As with opening size, this limitation hampers efforts to design activities to mimic natural disturbance patterns

Down sizing of budgets and workforce: Down sizing changes our ability to provide the kinds of service the public expects from a government agency. Fewer employees and fewer dollars equate to less time to accomplish the job. Services such as campground maintenance, environmental education, coordination with community groups (such as; Rod & Gun, Chamber of Commerce), as well as resource related projects (ie, resource monitoring) may not meet with public expectations in the future.

Firewood Not as Readily Available: Firewood along open roads is perceived as being cut out and the number of restricted roads makes for low firewood availability.

Prescribed Burning: The Forest has recognized a need to do more prescribed burning to improve habitat condition. Some people consider it a mistake to kill trees during prescribed burning and a waste of resource if those trees are not salvaged. In addition, while many people understand the benefits of reducing fire hazard in the urban interface, there is still a tolerance limit for smoke in the communities. It will be difficult to achieve higher levels of fire hazard reduction given the tolerance limit. Some people perceive the risk of prescribed burns getting out of control as being much higher than our experience has shown it to be. These concerns make acceptance difficult for the prescribed burning needed to reduce fire hazards and accomplish ecosystem management goals.

Use of Fire and Timber Harvest in Old Growth: Currently the Forest Plan allows burning in designated old growth but timber harvesting is not allowed. Several fire cycles have been missed in some stands and some cutting and removal of fuels is necessary before fire can be reintroduced. Otherwise, the fires will be too intense.

CONTINUING FOREST ISSUES THAT MAY STILL AFFECT THE FOREST PLAN:

The Forest Plan initially identified and addressed 13 public issues. As stated in the FY 92 Monitoring Report of these original 13 issues, the following are still current issues: grizzly bear management, timber supply (local economic impact), road management and public access, potential mineral development, visual (scenic) quality, and community stability (in the broader sense of using the natural resources of National Forest lands to provide jobs related to recreation, tourism, and forest products other than timber).

Recommended Actions: These emerging issues and those identified in previous reports will be reviewed during Forest Plan revision to determine if and how they should be resolved.

HUMAN & COMMUNITY DEVELOPMENT: Forest Plan Costs; Monitoring Item H-3

ACTION OR EFFECT TO BE MEASURED:

Determine if the costs of producing outputs that were used in the Forest Plan continue to be valid.

VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:

A deviation of more than 10 percent from the cost data used to calculate present net value in the Forest Plan.



Purpose: This monitoring item was established to track the cost of major items contributing to the present net value of the Forest Plan. The Plan requires that this item be reported annually. The expected accuracy and reliability of the information are moderate to high.

Background: During the development of the Plan, cost data were broken down into fixed, other, and variable costs. Fixed costs consisted of 45 categories of costs and these items were the same for all alternatives considered. Other costs include 16 categories of cost items which were lumped but varied by alternative. Variable costs consisted of certain recreation costs, wildlife habitat improvement costs, range management and improvement costs, and all timber-related costs. These breakdowns were consistent with analytical techniques used for the Plan, but do not compare directly with accounting classifications (different breakdowns) now in use. As a result, only some of the variable costs can be readily used to determine changes in unit costs. However, the ones used are the variable cost items which influenced land allocation and activity scheduling in the Plan and indicate trends in unit cost change for monitoring purposes.

Cost analysis was undertaken for timber sale preparation and administration (site preparation, reforestation, precommercial thinning) and roads constructed primarily for timber harvest. The base line unit cost figures (those used to calculate Present Net Value in the Plan) were extracted from the planning record and inflated to FY 98 dollars in order to provide comparability. The fiscal year unit cost values were obtained from Forest accounting reports and Forest management attainment reports and inflated to FY 98 dollars. Timber sale preparation costs include all planning, sale preparation, and sale administration expenditures for the fiscal year. Timber output is based on the amount sold in the fiscal year. Timber road costs are based on purchaser credit established and associated engineering support costs. Reforestation costs include all reforestation-related costs including cooperative work required by timber sale contractors. All acres with reforestation work are represented in the output level. Table H-3-1 shows the base line, the average inflation-adjusted costs for FY 93-97, and FY 98 unit cost data for these items.

Results and Evaluation:

Timber Sales unit costs for FY 98 increased from the average in the preceding five years, and is also much greater than the amount projected by the Plan. This higher value for FY 98 costs is similar to the costs noted in FY 94 and 95 (see the FY 97 monitoring report). Costs are about four times greater than projected, which is well outside the +/- 10 percent range prescribed in the Plan. This increase is due to the increasing complexity in timber sale preparation, along with a concurrent decrease in the amount of

timber volume being sold. For more detail on these aspects, please refer to Monitoring Items E-1 through E-3 and E-7.

Timber Roads unit costs were \$35 per MBF in FY 98, which is a slight decline from the average of the preceeding 5 years. The FY 98 cost is about \$3 higher than the cost predicted in the Forest Plan. Monitoring has shown that this value varies from year to year as a result of changing harvest emphasis, so it is expected that this cost will continue to hover around the long term averages.

Reforestation unit costs were slightly lower than the last five years, but about 24 percent higher than the projected Forest Plan amount. As discussed in preceeding monitoring reports, since reforestation is a relatively large component of the timber program, this additional cost is a potentially significant change in the economic efficiency levels of the Forest.

Precommercial thinning unit costs continue to stay below projected costs, helping the Forest to minimize overall costs (see Table H-3-1). However, in terms of the total PNV of the Plan, precommercial thinning accounts for only 0.2 percent of the total contribution to PNV costs, so the overall economic efficiency is only slightly affected.

Recommended Actions: Since unit costs have increased significantly in timber, timber roads, and reforestation, there will be a need to factor in such changes during Forest Plan revision. The Forest's accounting systems are continuing to effectively track these trends. During the revision process, cost efficiency analysis will include these elements and others as appropriate.

Table H-3-1 Forest Plan Unit Costs by Fiscal Year*				
Cost Item	Units	Unit Costs Projected in Plan	Weighted Average FY 93-98	FY 98
Timber Sales	\$/MBF	30	98	133
Timber Roads	\$/MBF	32	46	35
Reforestation	\$/acre	355	463	439
Precommercial Thinning	\$/acre	315	249	210

* All unit costs in this table have been updated to FY 98 dollars to account for inflation and to provide comparability

HUMAN & COMMUNITY DEVELOPMENT: Forest Plan Budget: Monitoring Item H-4

ACTION OR EFFECT TO BE MEASURED:	Assess Forest budget levels and their effects on Forest Plan implementation
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION	10 percent deviation by funding item from the predicted levels in the Forest Plan.



Purpose: This monitoring item was established to track the budget levels received from Congress. The Forest Plan requires that this item be reported annually. The expected accuracy and reliability of the information are both high.

Background: The budget process is directly related to the Plan, but also influenced by other factors. Program targets vary from year to year to meet certain needs and such changes are reflected in the budget figures. As a result, budget levels for any single year should be interpreted with care. However, given major trends now seen since 1988, it is apparent that many programs and costs have changed substantially, and Plan predictions are no longer fully valid. The analysis presented below will be helpful in budget analysis for Forest Plan revision.

Results: Table H-4-1 (next page) shows the percentage difference between the planned and actual budgets for FY 98. Major increases have occurred in fire, fuels, range, law enforcement, timber salvage sales, KV Trust Funds, trail construction and tree improvement. For more detailed information on the specific dollar amounts for each budget item by fiscal year, see Appendix B at the end of this report.

Evaluation: In order to evaluate this information with its wide variations, the major Forest programs were grouped for easier comparison. For each major Forest program (such as timber, wildlife, recreation) all applicable budget items shown in Table H-4-2 were grouped and added together. Data for all fiscal years were averaged to smooth out year-to-year variations. Output levels for each major resource area were obtained from Appendix A (at the end of this report) and are based on the Forest's Management Attainment Report for FY 98. For each major program area, all applicable outputs were added together. To some extent, some misrepresentation was introduced by this addition (for instance, developed recreation and dispersed recreation) but overall results do show the major trends. Table H-4-2, on a following page, shows the results of this analysis. Below is a brief listing of each program area, the outputs contributing to it, and an evaluation of the trend.

Minerals (number of cases handled): The number of minerals cases arising is not a controllable item, because the Forest is required to respond to cases as they arise. Although a considerable number of cases have been completed, many of them have been less complicated than the expected long-term average.

Protection (natural fuels treatment, in acres): Continuing the trend which began in FYs 92 and 93, the acres of natural fuels treatments went up substantially over prior years (see Appendix A). As a result, the level of accomplishment is continuing very high, at 638 percent of the planned amount.

Range (permitted grazing use, in acres): Both range budgets and production amounts are below that shown in the Plan, but relatively less so for production. See Item D-1 for more information.

Recreation (Total of developed and dispersed use, in recreation visitor days): Compared to the Plan, recreation budgets are lower and outputs are higher. Continuing difficulty in obtaining full funding on a national basis affects this program area. Outputs, however, are steadily increasing as more people opt to volunteer, and challenge grants help reduce this gap between planned and realized funding. Recreation experience quality could diminish if the current cooperation diminishes and the budget gap continues. The low reliability and accuracy of the dispersed recreation use data (using traffic counts to calculate driving for pleasure and viewing values, for example) may also be a contributing factor to the large overrun of outputs.

Reforestation (Acres reforested naturally and artificially, by Forest and cooperators): Reforestation budget and achievement levels are close to those projected in the Plan.

Timber (Total volume sold, MMBF): Both timber budgets and outputs are less than planned. See Monitoring Item H-2 for a discussion of timber unit costs and Monitoring Item E-1 for timber sell volume information.

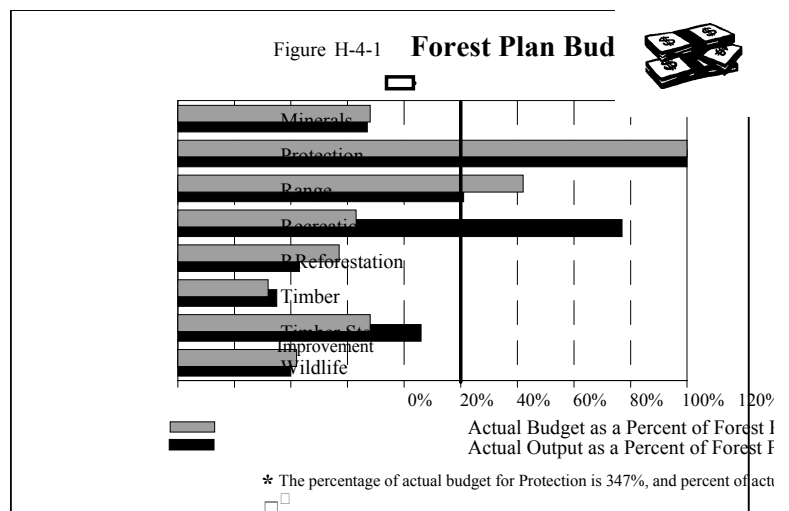
Timber Stand Improvement (Acres precommercially thinned): Actual costs for precommercial thinning have been less than those anticipated. Acreage thinned has not fully reached expected levels due to budget limits.

Wildlife and Fish (Total acres of wildlife, fish, and T & E habitat improvement): Budgets in this area average around 42 percent of planned amounts in FY 98. Accomplishment also remains lower than expected at about 40 percent. As discussed in the FY 97 Monitoring Report, these budgets show a decline beginning in FY 93 and continuing through FY 98. This trend away from the levels of funding prior to FY 93 signals a change in the ability of the Forest to undertake habitat improvement work.

Conclusion: Based on the information stated above, this monitoring item is outside the range prescribed in the Plan.

Recommended Actions: Continue monitoring.

Activity or Output	Actual Budget as a % of Forest Plan	Actual Output as a % of Forest Plan
Minerals	68	67
Protection, Natural Fuels Treatment	347	638
Range	122	101
Recreation	63	157
Reforestation	57	43
Timber	32	35
Timber Stand Improvement	68	86
Wildlife		



Wildlife	42	40
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* Factors contributing to the outputs are shown in the text.

Table H-4-2 Actual Budgets as a Percent of Forest Plan Projected Amounts

Item	Budget Activity	Planned Amount base year FY 78	FY 1998 Planned Amount	FY 1998 Actual Amount	FY 1998 % of Actual Amount
00	General Administration	1,465	3,347	1,261	38%
01	Fire	530	1,211	1,924	159%
02	Fuels	59	135	226	168%
03-05	Timber	2,648	6,050	2,593	43%
06-07	Range	59	135	231	171%
08	Minerals	287	656	469	72%
09	Recreation	561	1,282	887	69%
10	Wildlife and Fish	648	1,481	472	32%
11	Soil, Air, Water	269	615	393	64%
12	Facility Maintenance	145	331	300	91%
13-15	Lands/ Land Management	156	356	367	103%
42-43	Lands-Status/ Acquisition	96	219	37	17%
16	Landline Location	285	651	213	33%
17	Road Maintenance	764	1,746	1,111	64%
18	Trail Maintenance	115	263	185	70%
19	Co-op Law Enforcement	12	27	69	252%
20	Reforestation (appropriated)	871	1,990	914	46%
21	TSI (appropriated)	562	1,284	380	30%
23	Tree Improvement	20	46	100	219%
26-28	KV (Trust Fund)	1,427	3,260	3,405	104%
29	CFWS - Other (Trust Fund)	348	795	971	122%
30	Timber Salv Sales Perm Fund	275	628	8,162	1299%
31	Brush Disposal (Perm Fund)	694	1,586	779	49%
32	Range Improvement	6	14	5	36%
33	Recreation Construction	99	226	128	57%
34	Facility Construction: FA&O	111	254	1	0%
35	Engineering Const. Support	2,360	5,392	1,596	30%
36	Const. Capital Invest Roads	1,801	4,115	418	10%
37	Trail Const/ Reconstruction	32	73	111	152%
24, 38	Timber Road Const.: PC/Elect.	2,399	5,481	1,296	24%

FY 1998 Planned Dollars are FY 78 times 2.2848 to account for inflation.

APPENDIX A: Planned Output or Activities and Accomplishments

Target Item	Output or Activity	Unit of Measure	Actual Accomplishments				
			Planned Units	10-Year Ave. % of Planned Units	FY 1998	FY 98 % of Planned Units	
Recreation	Developed Use	M RVD	311	87%	347	112%	
	Dispersed Use: Wilderness Non-Wilderness	M RVD	25.1	141%	20	80%	
		M RVD	912.4	201%	1006	110%	
Wildlife and Fish	Wildlife Habitat Improvement	Acres	3,699.80	49%	2100	57%	
	T & E Habitat Improvement	Acres	141.2	81%	200	142%	
	Fish Habitat Improvement	Acres	142	119%	20	14%	
Range	Permitted Grazing Use	M AUM	11.84	89%	12	101%	
Soil	Soil Inventory	M Acres	8.95	38%	0	0%	
Lands	Land Exchange	Acres	3,174	137%	160	5%	
Minerals	Minerals Management	Cases	222.8	64%	201	90%	
Protection	Fuels Treatment, Natural	Acres	1,285.60	158%	5101	397%	
Timber	Total Volume Offered 1 Reforestation (appropriated)	MMBF	159.21	53%	81.6	51%	
		M	3.2	108%	2.3	72%	
	Reforestation (KV)	Acres					
		M	6.84	97%	3.6	53%	
	Reforestation (Other - Co-op)	Acres					
		M	2.6	50%	0.2	8%	
	Total Reforestation	Acres					
		M	12.64	86%	6.1	48%	
	Timber Stand Improv (appropriated)	Acres					
		M	3.76	85%	3.3	88%	
	Timber Stand Improv (KV)	Acres					
		M	1.04	94%	1	96%	
	Total Timber Stand Improv	Acres					
M		4.8	87%	4.3	90%		
Stand Examination	Acres						
	M	135.2	111%	52	38%		
Fuel Treatment (BD/ KV)	Acres						
	M	8.84	76%	5.4	61%		
Facilities	Total Road Construction 2 Trail Construct/ Reconstruct	Miles	134.54	23%	16	12%	
		Miles	22.86	299%	10	44%	

APPENDIX B: Timber Sell Volume: Monitoring Item E-1

The following Table shows actual accomplishments compared to Forest Plan projections. All values are shown in million board feet (MMBF). Please see Monitoring Item E-1 for details. For individual years' data, see the FY 97 Forest Plan Monitoring Report.

	SUITABLE LANDS			
	Forest Plan ASQ	Total Amount FY 88-98	Average Per Year	Amount FY 1998
ASQ:				
Regulated	202	906.5	82	30.6
Non-Interchangeable				
Dead LPP	20	195.8	17.8	23.2
Other Dead	5	154.6	14.1	7.7
Total Non-Interchangeable	25	350.4	31.9	31.0
Total Chargeable Volume	227	1,256.9	114.0	61.6
	UNSUITABLE LANDS			
Non-Chargeable ²				
Roundwood	0	8.1	0.7	0.6
Fuelwood	0	27.2	2.5	2.0
Total Non-Chargeable	0	35.3	3.2	2.6
Unregulated	6	16.4	1.5	2.8
Financed Sell Volume	233	1601	119.0	67.0

² Woody material that is sold, but not accounted for in Appendix 11 of the Forest Plan. Roundwood is small material not meeting Region 1 forest planning sawlog specifications and usually removed as post, pole, or rail products.

NOTE: Totals may not be exact because of rounding.

APPENDIX C: Project-specific Amendments

The Forest Plan identified overarching standards for all Forest lands. One of these standards (Forest Plan, page II-20) states, "If it is determined during project design that the best way to meet the goals of the Plan conflicts with a Forest Plan standard, the Forest Supervisor may approve an exception to that standard for the project." Project-specific amendments change the standard only for the period covered by that project.

District	Date Signed	Decision Name	Standard Amended	Description	Years in effect
Libby	1/23/98	Alexander Salvage Timber Sale	MA 12 FS #3	Comp 601, overlaps with amendments for Peace Alexander, Will allow ORD to go to 2.0, after sale .63	2 years
Libby	3/9/98	Sheep Range Timber Sale	MA 10 WS #3	Suspend snag requirements	suspended
Three Rivers	6/16/98	Wood Rat Timber Sale	MA 10 WS #3	Suspend snag requirements	suspended
Libby	6/9/98	Grubb Salvage Timber Sale	MA 12 FS#3	Comp 643, existing ORD 0, during project 1.53, after 0	1-2 years
Libby	6/9/98	Grubb Salvage Timber Sale	MA 12TS #2	Removal of hiding cover	10-15 years
Cabinet	6/26/98	Beaver Creek Ecosystem Mgmt Project	MA 12 TS #3	Allow harvest in old growth	suspended
Cabinet	6/26/98	Beaver Creek Ecosystem Mgmt Project	MA 10 WS #3	Suspend snag requirements	suspended
Libby	6/17/98	North Fork Jackson Salvage Timber Sale	MA 12 TS #2 & WS #7 MA 12, FS #3	Harvest w/in movement corridors Comp 602 Existing ORD .75 , during sale 1.5 , after sale .75	10-15 years 1 years

MA 10 - Big Game Winter Range
MA 12 - Big Game Summer Range Timber

APPENDIX D: Programmatic Amendments

The Forest Plan provides a process for amending the Plan. Amendments are effective until Forest Plan revision or until they are changed. The following amendments approved in FY 98

- | | | |
|--------|----------|---|
| No. 10 | 11/15/97 | Modify Forest Plan, Management Area 24, Range Standard #1 to state that domestic livestock grazing is permitted. |
| No. 13 | 6/25/98 | The Forest Plan, page III-51, in Management Area (MA) 12 is modified for the "Facilities" section, standard #3, to change the open-road density standard to 1.1 miles per square mile during non-harvest periods, and 1.5 miles per square mile during activity periods, in the Beaver Creek Drainage (Compartments 30, 31 and 32), Cabinet Ranger District. Approximately 20,810 acres are affected. |

APPENDIX E: Bibliography

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