

**Forest Plan
Monitoring and Evaluation Report
FISCAL YEAR 2001
September 2002**

**Kootenai
National
Forest**



**United States
Department
Of Agriculture**



**Forest Service
Kootenai National Forest**

**Forest Plan Monitoring
And Evaluation Report
Fiscal Year 2001
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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 FY01. This report evaluates the field data collected by the end of September 30, 2000 that pertain to the 14 monitoring items reported annually and five additional items reported every two years. 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 fourteen 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 that are allocated for different types of land management and resource production.

MONITORING

As we have found over the last fourteen years, land management occurs in complex and changing situations, and our results will not always be totally predictable, definitive, or certain. Many things, including natural events that cannot be predicted, affect management results.

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?

The Districts or responsible Forest Staff areas at the Supervisor's Office report monitoring data for most items annually. Monitoring forms are used to assist in collecting consistent data from the various sources. These work forms are on file in the Planning Section at the Kootenai Supervisors Office.

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 of 1996, was because of our findings in the monitoring program. A new "Notice of Intent" is scheduled to be filed towards the end of the calendar year. Work towards revision is proceeding under the old 1982 regulations while a new set of regulations are being prepared and approved.

SUMMARY OF MONITORING RESULTS

Old Growth Habitat (C-5): Approximately 1,291,900 acres below 5,500 feet have been evaluated for old growth on the Forest since 1988 (there are about 1,865,000 acres of Forest System Lands below 5,500 feet Forest-wide). A total of 145,086 acres (11.2 percent of the acres evaluated) has been designated as old growth. Of the designated acres, 8.9 percent are effective old growth and 2.3 percent are replacement old growth. The fires of 2000 burned in compartments that had previously been validated for old growth, and most of these areas have been re-validated, with some minor differences in total acres of old growth. The level of old growth designated for the compartments validated to date is above the 10 percent level required in the Plan.

After fourteen years of old growth validation work, 154 of the 255 compartments (60 percent) have been completely reviewed and an additional 44 compartments (17 percent) are partially done. Much of the unsurveyed areas are in wilderness, proposed wilderness, or areas with very little National Forest System lands. Accordingly, we are meeting Forest Plan direction for old growth, and validation will continue on the unsurveyed areas.

T & E Species Habitat (C-7):

- **Gray Wolf:** The Kootenai National Forest makes up a small portion of the Northwest Montana Wolf Recovery Area. The recovery goal for this recovery area is 10 wolf packs. In FY01, reports of wolf sightings continued at about the same level as recent years, but sightings were more localized near the areas of known packs. Sightings were reported on all districts except the Cabinet (Trout Creek). The following are the identified wolf packs on the Kootenai: Murphy Lake, Grave Creek, Little Wolf, and Wigwam. The US Fish and Wildlife Service confirmed another pack in 2001, the Fishtrap pack, in the McGinnis Meadows and East Fisher Creek area. The components of wolf habitat on the Kootenai did not change significantly in FY 2001 compared to previous years. Big game populations have rebounded from the severe winter of 1996-97, and they are providing adequate prey resources for continued growth in the wolf population.
- **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. 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. The survey results for FY01 are slightly below the long-term (17 year) average since records have been kept. The USFWS believes the bald eagle has achieved recovery goals and they have proposed removing them from the threatened species list.
- **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. Each of these ecosystems is further subdivided into smaller areas for analysis and monitoring, known as bear management units (BMUs). Grizzly bear habitat effectiveness went down in 3 BMUs and up in 3 BMUs in FY01 compared to FY00. Overall, grizzly bear habitat effectiveness remained about the same as in FY00, and is above the desired level of 70 percent Forest-wide. Seventy-three percent of BMUs meet desired 70 percent habitat effectiveness level.
- **White Sturgeon** The USFWS Recovery Plan for the Kootenai River white sturgeon was signed September 30, 1999. The short-term goals of the Plan are to reestablish natural reproduction and prevent extinction of the species. Long-term goals include providing suitable habitat conditions and restoring a natural age-class structure and an effective population size. Delisting of this population is estimated to take at least 25 years following the approval of the Plan. The 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 USFWS on all proposed or authorized activities. All proposed projects and activities evaluated by the forest in FY01 were found to have No Effect on the species.

- **Bull Trout:** The Kootenai National Forest continues to consult with the USFWS on all ongoing activities under Section 7(a)(1) of the Endangered Species Act. During FY01 the Forest consulted on all proposed activities. The Forest has worked closely with the five other western Montana National Forests, Bureau of Land Management and the USFWS to develop Programmatic Biological Assessments for stream surveys, road maintenance, timber stand improvement, trail maintenance, and recreational site maintenance. There were three new projects evaluated by the Forest that May Affect and are Likely to Adversely Affect bull trout. Consultation for the Whitepine Creek Project, the Spar Timber Sale, and the 2001 Wigwam Watershed Restoration Project were completed in FY01. There were five projects analyzed and determine to May Affect bull trout but not likely to adversely affect them. The remainder of new projects evaluated were determined to have No Effect on the species. The USFWS is continuing its work towards development of a recovery plan with input for the Forest as requested. The Forest continues to work closely with Montana Fish Wildlife and Parks as well as the USFWS to determine distribution and abundance of bull trout within the boundaries of the Kootenai National Forest. No new areas of bull trout habitat were identified in 2001.

Range Use (D-1): Livestock use on the Kootenai was anticipated to be about 12,600 Animal Unit Months (AUMs) per year. The FY01 level of grazing use was 7,017 AUMs or 56 percent of the projected level. Monitoring indicates that riparian protection measures identified in the new grazing permits are being implemented. During the last fourteen years, grazing use has averaged 83 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 over grazing account for use levels being 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 will be reviewed.

Noxious Weed Infestations (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 number of acres affected and some have had a 10 percent or more increase in density of existing infestations 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 these observations, this monitoring item is outside the range prescribed in the Forest Plan. There are several “control” measures being implemented, which should help improve the noxious weed situation on the Forest. It is recommended that no changes be made in the Forest Plan, but that considerable attention be given to the problem during Forest Plan revision.

Allowable Sale Quantity (ASQ) (E-1): 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 6 MMBF per year. Sell volumes have declined from 200 MMBF per year to about 50 MMBF per year between FY88 and FY01. The average annual amount sold has been 102 MMBF from suitable lands, and 1.7 MMBF from unsuitable lands. This actual sell volume is well below the ASQ limit as set in the Plan. Many factors have

influenced the timber sales program. Additional streamside protection measures as required by the Inland Native Fish (INFS) Decision of July, 1995. Also, the USFWS 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.

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 FY01, the acreage sold for regeneration harvest was 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 FY01, 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, ASQ. As stated in the evaluation for that item, wildlife habitat management, watershed concerns, litigation, appeals, deferrals, and changes in management area designation based on field verification have all affected the potential to meet the Plan's projected regeneration harvest.

It is apparent that the acres sold for regeneration harvest will not meet the acreage projected in the Forest Plan. The upcoming revision of the Plan will provide the opportunity to assess appropriate levels of harvest volume and acreage.

Suitable Timber Management Area (MA) 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 current.

Acreage losses occurred in MA 11, 14, and 17, while MA 12, 15 and 16 gained acreage in FY01. Total net loss in the suitable land in FY01 was 18 acres. Most of these MA changes were made in the process of designating MA 13 and other old growth management areas. This monitoring item is outside the prescribed range for MAs 11 and 15 (more than 5,000 acres of cumulative change for any of these suitable MAs).

The degree to which changes have been made to management area designations indicates continuing validation in Forest Plan MAs. The change in the suitable management area category of more than 60,000 acres amounts to approximately 3 percent of the total suitable base. During revision of the Forest Plan, sustainability and ASQ calculations will be made using the validated management areas. An assessment of the effect of changed management area designations will also be done during the revision process.

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 FY01, there were 1,772 acres deferred in Category A and 45 acres deferred in Category B.

Harvest Area Size (E-8 and Appendix B): The average size of units harvested between 1988-2001 is well below the objectives of 20 acres for MA 11 and 40 acres for MA 12. Average size for the other suitable MAs is also below 40 acres.

Appendix B lists the harvest areas resulting in larger than 40 acre openings approved during FY01 as well as an estimate of how long it will take for the vegetation to regrow to meet the management area objectives. There were no openings greater than 40 acres approved by the Forest Supervisor in FY00 and openings in two projects in FY01.

Clear Cut Acres Sold (E-9): The acres sold for clearcut harvest declined from FY90 to FY01, with the exception of FY96. In that FY, 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 FY01 the amount of clearcutting declined again resulting in a 98 percent decrease from the baseline year of 1988. The Forest will continue to monitor this item, but the Chief's goal for reducing clearcutting has been fully met.

Soil and Water Conservation Practices (F-1): FY01 BMP monitoring on the Forest involved BMP monitoring done by Kootenai Forest personnel during their normal work activities. During all of these efforts, BMP's were evaluated at particular sites on various projects across the Forest. Forty-nine projects had implementation monitoring evaluations, and 35 projects had effectiveness evaluations accomplished in FY01 by KNF personnel. Implementation evaluations were completed for 1,104 BMPs and implementation evaluations met the requirement of acceptable over 96 percent of the time. Effectiveness evaluations in FY01 met the requirement of acceptable almost 94 percent of the time.

Riparian Areas (C-9): 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).

- Miles of stream classes and/or stream categories identified and mapped: Almost 6,000 lineal miles of riparian habitat have been categorized and mapped since 1988. Over 3,500 of these miles are perennial streams (Stream Classes 1 and II, 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: In FY01, default RHCA widths and default RMO's were applied on 30.6 miles of stream. A wider than required RHCA was applied on a little over one mile of stream on one project.
- RCHA activity tracking: A little over 80 miles of RHCA had some level of activity in 2001. Most of the work was for road re-construction, improvement of road crossings, road drainage improvement, and trail maintenance and improvement along streams.
- Riparian-related watershed restoration activities: In 2001, riparian-related watershed restoration activities were accomplished on over 105 miles of stream. Over 137 stream crossings were removed or improved, and almost 210 acres of riparian areas had some level of watershed improvements.

- 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 FY01. Forest BMP Audits evaluated 119 specific practices within riparian areas, and acceptable implementation was accomplished 90 percent of the time. Thirty-four effectiveness evaluations were completed for this same period, of which 88 percent of the BMPs were deemed to be effective. For eleven projects, a riparian-area specific BMP evaluation was made by at least one individual. For three additional projects, a riparian-area specific BMP evaluation was made by an Interdisciplinary Team. On all these projects, BMP requirements related to riparian area protection were met.
- For the 2,730 practices evaluated over the twelve-year period (1990-2001), acceptable implementation was accomplished 92 percent of the time. Over 1,847 effectiveness evaluations were completed for this same time period, of which 92 percent were deemed to be effective.

Fisheries Habitat (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 FY92 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 1999 monitoring results reinforce the conclusions that were previously disclosed in the 1996-98 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 and have 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.

Stream Sedimentation (F-2): The 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 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 FY96 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 2001.

Information regarding streambeds, suspended solids and streamflow has 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 is weakened by limitations in the data.

Water Yield Increases (F-3): In FY01, the water yield model was used to estimate the peak flow increase on 436,531 acres of both National Forest and private land. Most of these watersheds have been analyzed in previous years and include many acres of private land. Of the total area analyzed during the fiscal year, 11 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.

Approximately 2,000,000 acres have been analyzed for water yield conditions on the Kootenai since 1988. Of this total, 1,564,706 acres (77 percent) were found to be at or below the guidelines and 477,611 acres (23 percent) were found to be over guidelines according to the most recent analysis in each area, which could be up to thirteen 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, are rescheduled, or are dropped (See Monitoring Items E-1 and E-7). This monitoring item shows that water yield calculations and stream channel analysis are 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 maintenance, road closures and access; declining level of timber harvest; reducing the level of natural fuels on forest service lands; an increasing demand for use of national forest system lands; and rural community development.

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 sales unit costs for FY01 decreased from the average during the preceding years. However, costs are more than three 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. Timber road unit costs were down from the average of the preceding years and are actually lower than the cost predicted in the Forest Plan. The reduction in unit costs is reflective of a reduced amount of road construction and reconstruction. Reforestation unit costs were much higher than the average of preceding years and approximately 72 percent higher than the projected Forest Plan amount. As discussed in preceding monitoring reports, since reforestation is a relatively large component of the timber program, this additional cost is a significant change in the economic efficiency levels of the Forest. Precommercial thinning unit costs continue to stay well below projected costs. 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. During the revision process, cost efficiency analysis will include these elements and others as appropriate.

Forest Plan Budget (H-4): 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 in fire, fuels management, tree improvement, timber salvage sales, and trail and recreation facility construction. Most other program areas remain below projected budget levels. 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 valid. This analysis will be helpful in budget analysis for Forest Plan revision.

Insect and Disease Status (P-1): Commercial thinning (1,310 acres) and precommercial thinning (5,281 acres) treatments have occurred on the Forest over the last two fiscal years. Both treatments include reduction of stocking levels to reduce stress while improving species mixtures that are less susceptible to insect and disease problems. Insect and disease damaged trees are normally reduced during these operations. Mistletoe infected overstory trees on recently regenerated stands have been reduced on 100 acres. Pruning of white pine blister rust infected western white pine occurred on 237 acres. Prescribed burning following harvest and for wildlife

habitat improvement sometimes increases insect activity in residual trees, but at a low level. Due to a recent outbreak of Douglas-fir beetle, it has been observed that Douglas-fir left as seed trees in regeneration harvest units are at higher risk following prescribed burning. Also, Douglas-fir surrounding these areas and in wildfire areas are more susceptible to beetle attack. An insect and disease flight, activity reviews, service visits, stand exams, reforestation exams, permanent plot (growth plots) remeasurements, and benchmark exams indicate stands that have been regeneration harvested and those treated with some form of intermediate treatment are generally healthy, with only minor amounts of insect or disease that can cause significant problems.

Openings over 40 acres (Appendix B): The National Forest Management Act (NFMA) provides direction for development and implementation of land and resource management plans. Secretary of Agriculture regulations of 36 CFR 219 provide guidance for implementing NFMA provisions. Section 219.27 (d)(2)(iii) states that "...the established limit shall not apply to the size of areas harvested as a result of natural catastrophic conditions such as fire, insect and disease attack, or windstorm."

Furthermore, the Northern Regional Guide, 36 CFR 219.8, states, "Where natural catastrophic events such as fire, windstorm, or insect and disease attacks have occurred, 40 acres may be exceeded without 60-day public review and Regional Forester approval, provided that the public is notified in advance and the environmental analysis supports the decision" (Regional Guide, page 2-6). This same direction is repeated in the Regional Supplement to Forest Service Manual 2471.1.

The Forest Plan also provides direction regarding opening sizes: "...maintain a variety of unit sizes of generally 40 acres or less. Where catastrophic conditions such as insects, disease, or fire create a condition whereby larger unit sizes will have no additional effect on wildlife habitat, larger cutting units may be used" (Forest Plan, p II-23). The intent of this statement is to ensure that any activity hastens recovery for wildlife and there are no long-term detrimental effects by exceeding 40 acres.

There were no projects in FY00 with openings over 40 acres, and two projects in FY01.

WILDLIFE & FISHERIES: Old Growth Habitat; Monitoring Item C-5

ACTION OR EFFECT TO BE MEASURED:	Maintain habitat capable of supporting viable populations of old growth-dependent species (10 percent old growth in each drainage).
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	Reduction below 10 percent in a drainage which was previously over minimum or any reduction in a drainage previously under minimum.



Purpose: This monitoring item was established to help ensure that an adequate amount of old growth habitat is designated on the Forest. The Forest Plan requires that this item be reported every two years. The expected accuracy and reliability of the information is moderate to high.

Background: Old growth habitat is recognized as an important and necessary element of diversity that supports a myriad of wildlife species. Maintenance of adequate old growth will assist in ensuring viable populations of native species and in maintaining diversity as required by the National Forest Management Act of 1976 (16 U.S.C. 1600) (FP, Appendix A17-14). To provide habitat for viable populations, the Plan specifies that 10 percent of the Forest land below 5,500 feet elevation would be managed as old growth habitat for dependent wildlife species. This amounts to a minimum of 186,500 acres and ideally would be equally distributed in all drainages on the Forest.

Forest Service Manual 2400, Timber Management, Kootenai Forest Supplement number 85 issued in January, 1991 provides the direction for validation of old growth on the Forest. This supplement clarifies standards for old growth habitat validation on the Forest before any timber sales containing mixed conifer can be sold. One of the requirements established is that old growth habitat be validated and designated at the 10 percent level in each third order drainage or compartment. If 10 percent old growth does not exist within a compartment, then old growth from an adjacent compartment can be used to make up the 10 percent, as long as there is 10 percent old growth when both compartments are combined. This is shown as "Effective Old Growth" in Tables C-5-1, C-5-2.

If no other effective old growth is available then replacement old growth is identified to bring the third order drainage or compartment up to 10 percent. These designated stands are known as old growth replacement stands because they are replacing a current deficiency of old growth habitat and will provide for old growth habitat in the future as they age and gain the desirable attributes. This is shown as "Acres of Replacement Old Growth" in Table C-5-2. Management emphasis is to provide the best possible distribution of old growth habitat wherever possible, and high-quality old growth is to be a priority for protection (see the Forest Plan Glossary and Appendix 17 of the Plan for more detail on the description of old growth attributes, including desired distribution patterns).

Results: Table C-5-1 displays the result of the old growth validation surveys for each fiscal year from FY 88 through FY01. In 2000 no old growth validation was done. In 2001, 41,872 acres were surveyed and old growth was designated for 4,576 acres (10.9 percent) in those areas. Some of these areas include reassessments of previously completed compartments because of changed

conditions and so the information in Table C-5-1 cannot be totaled as this would result in double-accounting of some acres.

Table C-5-1 **Old-Growth Habitat and Condition Survey Results**

FY	Acres Surveyed	Designated Old Growth Habitat			Portion of Designated Old Growth that is Fully Effective Old Growth Habitat	
		Acres	Percent	Acres	Percent	
89	94,210	12,730	13.5%	8,450	66%	
90	176,560	18,770	10.6%	17,030	91%	
91	334,300	39,410	11.8%	36,520	93%	
92	212,380	20,930	9.9%	15,500	74%	
93	72,253	10,393	14.4%	8,455	81%	
94	49,381	5,474	11.1%	4,312	79%	
95	158,736	19,416	12.2%	14,340	74%	
96	215,483	24,080	11.2%	17,954	75%	
97	158,495	16,948	10.7%	15,650	92%	
98	372,454	42,304	11.2%	33,626	79%	
99	269,920	28,587	10.6%	19,894	70%	
00	0	0	0	0	0	
01	41,872	4,576	10.9%	3,986	87%	

Whenever an area is resurveyed, the information for the new survey is used in place of previous survey information. The table below reflects the current Forest-wide summary of surveyed areas and designated old growth. The accompanying map has been shaded to show where old growth evaluation is completed, partially completed, or is still undone.

Table C-5-2 **Summary of Total Designated Old Growth for Areas Validated**

Fiscal Years	Acres Below 5500 Feet	Effective Old Growth		Replacement Old Growth*		Total Designated Old Growth	
		Acres	Percent	Acres	Percent	Acres	Percent
1988-01	1,291,922	115,725	8.9%	29,361	2.3%	145,086	11.2%

* Soon-to-be old growth that is designated when no other old growth is available to meet the 10% requirement

Evaluation: As noted in table C-5-2, 1,291,922 acres below 5,500 feet have been evaluated for old growth on the Forest since 1988 (there are about 1,865,000 acres below 5,500 feet Forest-wide). A total of 145,086 acres (11.2 percent of the acres evaluated) has been designated as old growth. Of the designated acres, 8.9 percent are effective old growth and 2.3 percent are replacement old growth. The fires of summer 2000 burned in compartments that had previously been validated for old growth, and most of these areas have been re-validated, with some minor adjustments in total acres of old growth. The level of old growth designated for the compartments validated to date is above the 10 percent level required in the Plan.

The map shows how many areas across the Forest have been validated for old growth. After twelve years of old growth validation work, 154 of the 255 compartments (60 percent) have been completely reviewed and an additional 47 compartments (18 percent) are partially done. Map C-5-1 indicates those compartments completely and partially reviewed and also shows that much of

the unsurveyed areas are in wilderness, proposed wilderness, or areas with very little Forest Service ownership. Within the 47 compartments not completely validated for old growth, those shown as “Partially Done” on the following map, there is a total of 35,760 acres of management areas designating old growth. Old growth MA’s account for 11% of the approximately 329,000 acres of “Partially Done” compartments. Within the 45 compartments not yet validated (the white areas on the map), there are another 27,980 acres of old growth management areas, which is 10% of approximately 271,000 acres.

Accordingly we are confident that the Forest is meeting old growth direction.

Recommended Actions: Based on review of this monitoring item, no changes are needed in the Forest Plan at this time. Good progress is being made in the validation effort and will continue.

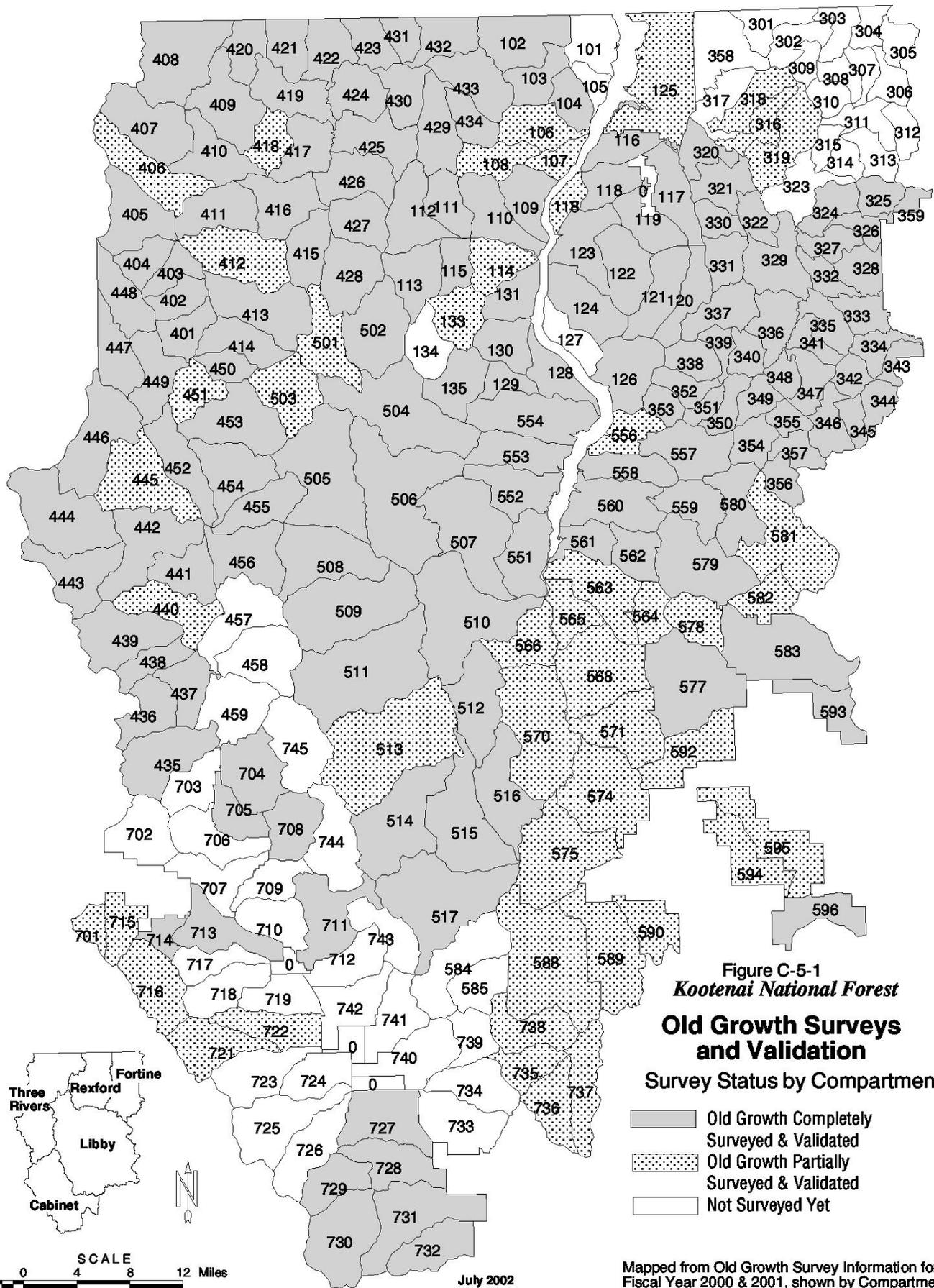


Figure C-5-1
Kootenai National Forest

**Old Growth Surveys
and Validation**

Survey Status by Compartment

- Old Growth Completely Surveyed & Validated
- Old Growth Partially Surveyed & Validated
- Not Surveyed Yet

Mapped from Old Growth Survey Information for Fiscal Year 2000 & 2001, shown by Compartment.

July 2002

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: Gray Wolf, Bald Eagle, Grizzly Bear, Bull Trout and White Sturgeon.

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.



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:

Gray Wolf: The Wolf Recovery Plan (USFWS, 1987) provides guidance for the recovery of the gray wolf. The Kootenai National Forest is part of the Northwest Montana Wolf Recovery Area. The recovery goal for this recovery area is 10 wolf packs.

In 2001, reports of wolf sightings continued at about the same level as recent years, but sightings were more localized near the areas of known packs. Sightings were reported on all districts except the Cabinet (Trout Creek).

A female wolf and 4 pups from the Boulder pack were removed and released on the Kootenai Forest in Parsnip Creek. The animals had radio collars and tracking showed movement to Canada and finally a move to the west side of the Flathead Reservation.

The following are the identified wolf packs on the Kootenai: Murphy Lake, Grave Creek, Little Wolf, Fishtrap, and Wigwam. The U.S. Fish and Wildlife Service confirmed the Fishtrap pack in 2001. Wolves from each of the known packs spend a portion of their time on the Forest and the remainder on other National Forests, State, or private lands. The Wigwam pack spends a majority of its time in Canada, and USFWS does not count it toward the 10-pack recovery goal for northwest Montana.

The following is a brief summary of each of the known wolf packs during 2001:

Murphy Lake pack – There were two radio-collared animals in this pack. Aerial locations revealed that the pack did not den in 2001, and consequently they did not have pups. There were no mortalities or depredations reported this year. The pack consists of three adults. They continue to use habitat southwest of Highway 93.

Grave Creek pack – The Fish and Wildlife Service captured and radio-collared two wolves (1 yearling and re-collaring the alpha female). Members of the pack killed an adult cow in June, which was the reason for the trapping and collaring effort. Defenders of Wildlife compensated the rancher for the loss. No further actions were taken. There were no wolf mortalities in the pack this year. Following denning, the Fish and Wildlife Service confirmed 6 animals (4 adults and 2 pups) in the pack. The pack spends most of its time east of Highway 93, with occasional excursions to the Flathead Forest. A radio-collared female dispersed and is now a member of the Kootenai pack in Canada, that has been known to use the west side of Lake Koocanusa south to the bridge.

Wigwam pack – There are no radio-collared wolves remaining in this pack. There was a credible sighting of two wolves near the Therriault Lakes, but the Grave Creek pack also uses this area making it difficult to attribute the sighting to a specific pack. The pack spends a majority of its time in Canada, and USFWS does not count it towards the 10-pack recovery goal for northwestern Montana.

Little Wolf pack – This pack has apparently been reduced to only two animals. The Fish and Wildlife Service attempted to trap and radio-collar the animals in 2001, but had no success. They continue to use the Pleasant Valley area.

Fishtrap Pack – The Fish and Wildlife Service confirmed this pack in 2001. It is estimated to have 7 individuals (4 adults and 3 pups). The pack occupies an area in the southeast corner (McGinnis Meadows and East Fisher Creek) of the Libby District, but also uses the Fishtrap and main Thompson River drainages on the Plains/Thompson Falls District of the Lolo National Forest. There was one reported mortality of a collared wolf. The USFWS is investigating the death.

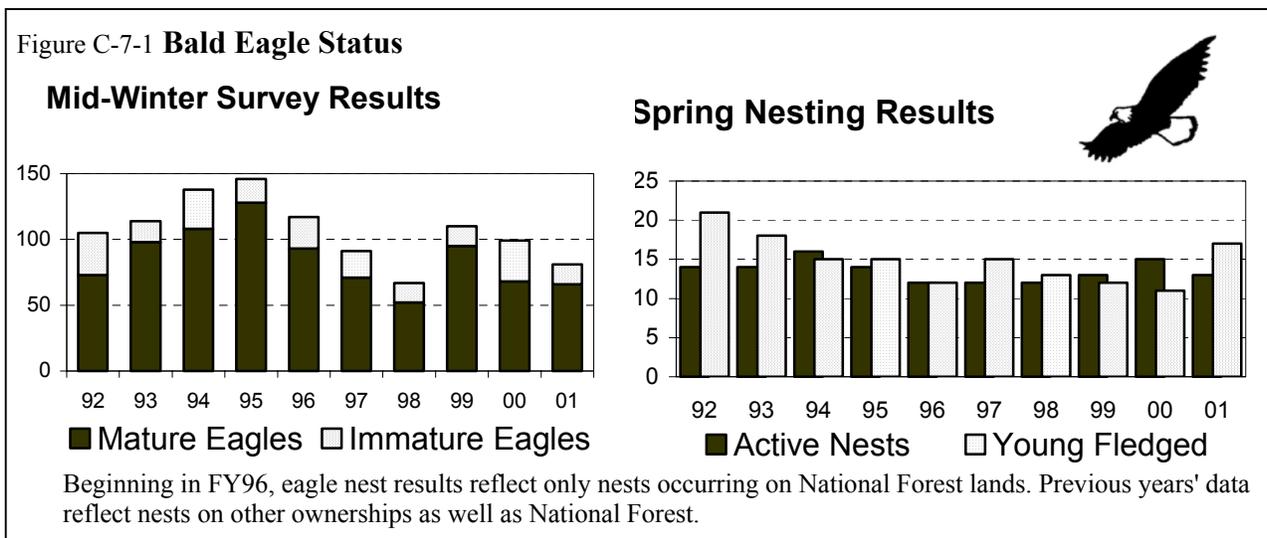
The components of wolf habitat on the Kootenai did not change significantly in 2001 compared to previous years. Big game populations have rebounded from the severe winter of 1996-97, and they are providing adequate prey resources for continued growth in the wolf population.

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, 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. The Kootenai National 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.

Figure C-7-1 shows the results of mid-winter bald eagle population 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 2001 are slightly below the long-term (17 year) average since records have been kept. A total of 66 mature and 15 immature bald eagles were observed.

Numbers of active eagle nests and young eagles fledged are also shown in Figure C-7-1. Nesting surveys show the 2001 nesting eagle population continuing at similar levels as the past few years. Seventeen young were fledged from 13 active nests. USFWS believes the bald eagle has achieved recovery goals and they've proposed removing them from the threatened species list.





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 is 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 in the Yaak River and Cabinet Mountains areas, 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: 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. The Forest monitors habitat effectiveness in each BMU as an indicator of habitat trend.

Habitat Effectiveness: Figure C-7-2, Table C-7-1 and Figure C-7-3 show habitat effectiveness values for each of the BMUs evaluated during fiscal years 1988-01. 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 3 BMUs and up in 3 BMUs in FY01 compared to FY00. Activities on private lands can affect habitat effectiveness within BMUs, and the Forest Service has no authority over these activities or their effects on grizzly bear habitat effectiveness. Fourteen of the 18 BMUs were at or above the desired 70 percent level (the same as in FY00), and the Forest-wide average for all BMUs remained 73 percent, slightly above the average for the past 10 years.

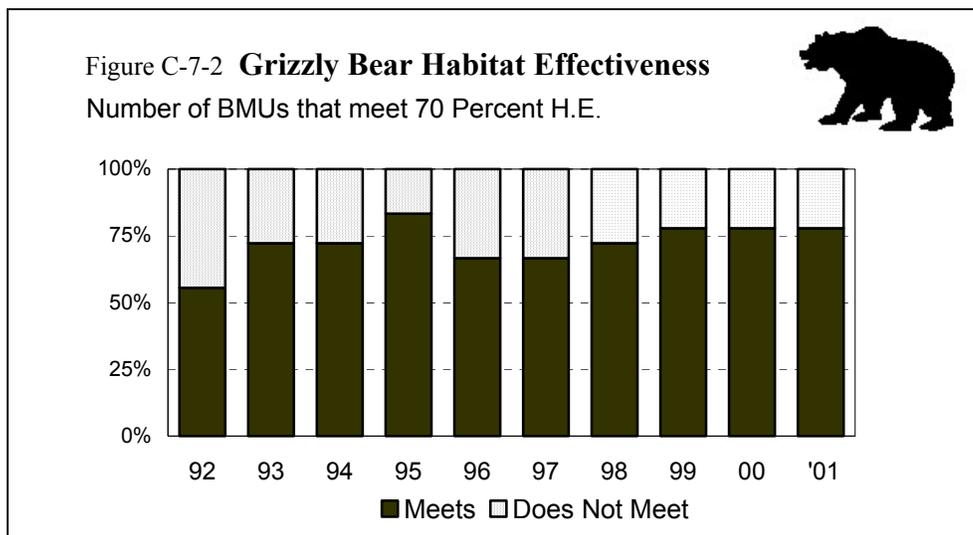
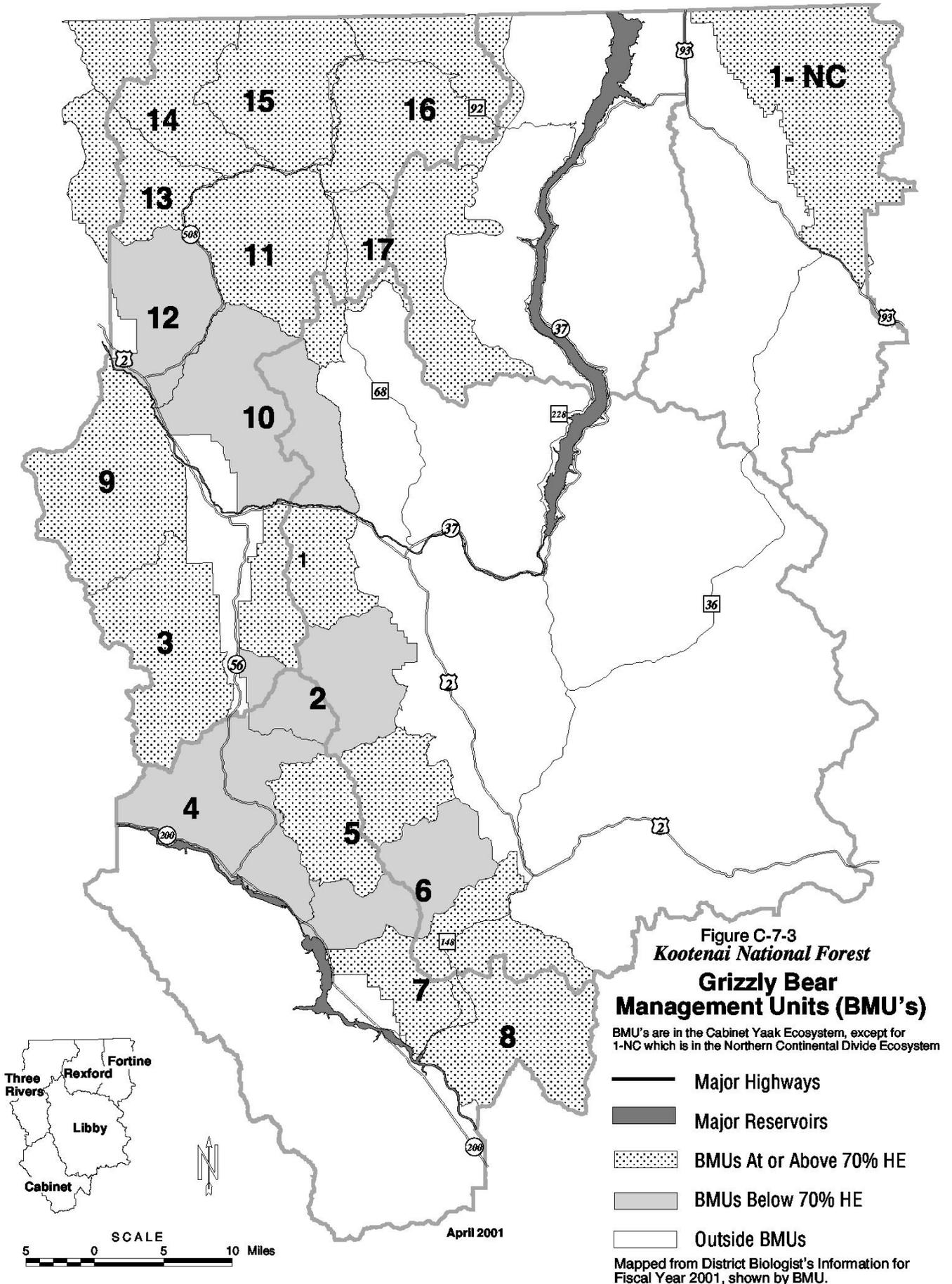


Table C-7-1 **Grizzly Bear Habitat Effectiveness by Fiscal Year**

Grizzly Bear Management Unit (BMU)	R.D	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01
#NC1 Murphy Lake	3	78%	78%	78%	78%	78%	76%	76%	76%	76%	76%	77%
#1 Cedar	(4) 5	82%	79%	79%	86%	81%	81%	86%	85%	88%	89%	88%
#2 Snowshoe	4 (5) 7	81%	82%	82%	84%	85%	85%	85%	83%	85%	69%	83%
#3 Spar	4	70%	79%	78%	77%	77%	78%	76%	78%	78%	76%	70%
#4 Bull	7	80%	80%	92%	64%	63%	63%	62%	62%	62%	65%	65%
#5 Saint Paul	(5) 7	80%	78%	81%	75%	74%	73%	74%	75%	74%	75%	75%
#6 Wanless	(5) 7	74%	76%	76%	71%	72%	66%	66%	68%	67%	69%	69%
#7 Silver B/Fisher	(5) 7	87%	87%	82%	82%	82%	82%	81%	81%	79%	80%	80%
#8 Vermilion	7	73%	73%	71%	71%	74%	77%	77%	77%	73%	77%	77%
#9 Callahan	4	67%	70%	74%	74%	76%	76%	76%	73%	71%	72%	72%
#10 Pulpit	(4) 5	62%	54%	65%	65%	70%	68%	57%	57%	61%	65%	65%
#11 Roderick	(4) 5	68%	66%	70%	70%	70%	74%	74%	70%	73%	73%	71%
#12 Newton	4	53%	53%	49%	49%	49%	62%	57%	44%	62%	60%	60%
#13 Keno	4	72%	69%	70%	72%	73%	72%	72%	72%	71%	72%	72%
#14 Northwest Pk	4	68%	68%	72%	74%	72%	74%	74%	74%	71%	75%	75%
#15 Garver	4	62%	54%	65%	65%	70%	68%	63%	66%	70%	70%	70%
#16 E Fork Yaak	1 (4)	61%	62%	64%	64%	73%	72%	70%	70%	74%	70%	72%
#17 Big Creek	(1)4 5	63%	64%	68%	70%	68%	68%	68%	71%	71%	73%	73%
Forestwide Average		71%	71%	73%	72%	72%	73%	72%	71%	73%	73%	73%

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.
 () in the Ranger District (R.D.) column indicates the lead District for information reporting.



Unduplicated Sightings of Females with Cubs: In FY01, there was one confirmed unduplicated sightings of female grizzly bears with cubs in the Kootenai portion of the CYE (Kasworm 2002). She was seen in BMU 11 with 2 cubs but later lost them both. These cub mortalities were assumed to be from natural causes. There were two confirmed unduplicated sightings of female grizzlies with cubs in the Kootenai portion of the NCDE in FY01. The NCDE was above the 6 year average for number of females sighted with cubs, while the CYE was below the average.

Distribution of Females with Young: Three of the 17 BMUs on the Kootenai portion of the CYE were occupied by females with young in FY01. The total number of different BMUs occupied over the entire recovery zone during the past 6 years was 13, compared to the Recovery Plan goal of 18 (Kasworm 2002). The one BMU in the Kootenai's portion of the NCDE was also occupied by a female with young during the year. These numbers are slightly below the 6 year average for the CYE and slightly above the average for the NCDE.

Mortality: A single mortality was reported in the CYE in FY01. It was a yearling female killed in a mistaken identity case (Kasworm 2002). Considering the past year mortality and new cubs information, it is likely that the grizzly bear population trend in the CYE may be slightly declining. However, the confidence interval for this estimate makes it impossible to statistically conclude that the population is decreasing. There were two reported grizzly bear mortalities in the Kootenai portion of the NCDE in FY01. Both were human caused, with one classified as self-defense and the other classified as a mistaken identity.

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-7-2.

Table C-7-2 **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
1996	0	1	0	1	4	0
1997	2	1	*1	3	7	1
1998	2	1	0	0	4	0
1999	0	0	0	0	1	2
2000	2	1	0	2	3	1
2001	2	1	2	1	3	1
Six-year Average	1.3	0.8	0.5	1.2	3.7(13)	0.8

*Outside Recovery Zone

** (13) is the total number of different BMUs occupied over the past 6 years. The recovery Plan goal is 18.

Access Management: The Interagency Grizzly Bear Committee manager's subcommittees for the CYE and NCDE are currently working to refine access management guidance for the ecosystems based on the latest scientific information on the effects of human access on local grizzly bear populations. Interim options for analyzing access management parameters were tentatively agreed upon by these groups in

December 1998. The monitoring parameters agreed upon included: core area, open motorized route density (OMRD), and total motorized route density (TMRD). As a result of a lawsuit in the CYE, implementation of the CYE Subcommittee's interim direction has been deferred. The current strategy for the CYE is to apply the USFWS's mandatory requirements in the revised Forest Plan Biological Opinion (USFWS 1995) of no net loss in core area and no net increase in OMRD or TMRD in any BMU. A Forest Plan amendment has been initiated as part of the lawsuit settlement to establish further access management direction in the CYE. The final EIS was release in March 2002. The Record of Decision (ROD) is expected by the end of 2002.

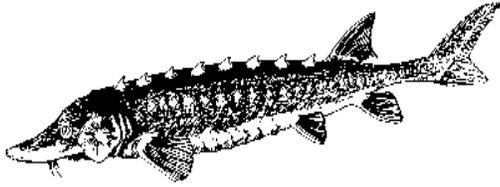
Table C-7-3 below displays OMRD, TMRD and Core by BMU in comparison to previous years for which these parameters have been measured. The data for FY01 shows changes in core, OMRD and TMRD, which are the result of activities on private land and field verified corrections in road status from FY00.

Table C-7-3 **Baseline conditions of Interim Access Management monitoring items (CYE BMUs)**

BMU	FY98 Core %	FY99 Core %	FY00 Core %	FY01 Core %	FY98 % BMU OMRD >1mi/ sqmi	FY99 % BMU OMRD >1mi/ sq.mi.	FY00 % BMU OMRD >1mi/ sq.mi.	FY01 % BMU OMRD >1mi/ sq.mi.	FY98 % BMU TMRD >2mi/ sq.mi.	FY99 % BMU TMRD >2mi/ sq.mi.	FY00 % BMU TMRD >2mi/ sq.mi.	FY01 % BMU TMRD >2mi/ sq.mi.
1 Cedar	69	84	83	83	23	13	12	12	16	9	11	11
2 Snowshoe	-	77	78	77	-	18	17	17	-	15	14	14
3 Spar	-	57	58	61	-	23	24	26	-	31	30	27
4 Bull	62	61	63	63	39	39	36	36	28	27	26	26
5 Saint Paul	60	61	62	65	29	28	27	27	23	21	21	21
6 Wanless	51	51	53	55	37	32	34	34	35	34	33	32
7 Silver Butte/Fisher	65	66	66	66	27	23	23	23	22	19	20	20
8 Vermilion	54	57	57	56	32	11	32	32	23	21	21	23
9 Callahan	-	53	56	57	-	36	32	32	-	31	28	27
10 Pulpit	42	45	48	49	50	50	45	41	41	37	34	32
11 Roderick	52	52	55	54	32	33	29	29	31	31	27	28
12 Newton	-	56	56	57	-	43	45	43	-	28	31	29
13 Keno	58	56	59	62	34	37	34	33	23	26	24	24
14 NW Peak	58	60	56	56	31	32	28	35	24	22	26	26
15 Garver	35	46	48	47	32	30	31	31	45	34	32	32
16 E Fk Yaak	38	40	45	45	38	36	31	28	45	42	38	38
17 Big Creek	32	42	49	50	43	37	32	32	44	33	27	26
Average	52	57	58	59	34	29	28	30	31	27	26	26

Summary: Overall, grizzly bear habitat effectiveness remained about the same as in FY00, and is above the desired level of 70 percent Forest-wide. Seventy-eight percent of BMUs meet the desired 70 percent habitat effectiveness level.

Sightings of female grizzly bears with cubs were the same as FY00, as was the six year average. Females with young occupied the same numbers of BMUs as in the previous year. There was one human caused mortality of a sub-adult female bear. Two cub mortalities, from natural causes, occurred in the Canadian portion of the CYE during the year. Overall, open and total road densities declined slightly during the year. The amount of core area in grizzly habitat slightly increased during the year. The grizzly bear population trend in the CYE is being prepared by the USFWS and should be available by the end of 2002.



White Sturgeon -- The USFWS Recovery Plan for the Kootenai River white sturgeon was signed 30 September, 1999. The short-term goals of the Plan are to reestablish natural reproduction and prevent extinction of the species. Long term goals include providing suitable habitat conditions and restoring a natural age-class structure and an effective population size. This stock of fish will be considered for downlisting to threatened status after 10 years only if natural reproduction occurs in three different years; 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 following the approval of the Plan.

The 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 USFWS on all proposed or authorized activities. All proposed projects and activities evaluated by the Forest in FY01 were found to have No Effect on the species.

In December 2000, the U.S. Fish and Wildlife Service issued a biological opinion stating that Libby Dam is the primary factor affecting the Kootenai River white sturgeon. The Fish & Wildlife Service also designated 11.2 miles of river below Bonners Ferry, ID as critical habitat.

The most recent population estimate from the Idaho Department of Fish and Game indicates there are approximately 1,469 adult sturgeon in the population.

Bull trout -- The Kootenai National Forest continues to consult with the USFWS on activities under Section 7(a)(1) of the Endangered Species Act. During FY01 the Forest consulted on all proposed activities. The Forest continues to work closely with the five other western Montana National Forests, Bureau of Land Management and the USFWS to implement Programmatic Biological Assessments for stream surveys, road maintenance, timber stand improvement, trail maintenance, and recreational site maintenance.

There were three new projects evaluated by the Forest that May Affect and are Likely to Adversely Affect bull trout. Consultation for the Whitepine Creek Project, the Spar Timber Sale, and the 2001 Wigwam Watershed Restoration Project were completed in FY01. There were five projects analyzed and determine to May Affect bull trout but not likely to adversely affect them. The remainder of new projects evaluated were determined to have No Effect on the species. The USFWS continues to develop a recovery plan. The Forest continues to work closely with Montana Fish Wildlife and Parks and the USFWS to determine distribution and abundance of bull trout within the boundaries of the Kootenai National Forest. No new areas of bull trout habitat were identified in 2001.

Recommended Actions: Based upon the best available information, populations of all threatened or endangered species on the Kootenai are stable or increasing. The peregrine falcon has recovered and has been removed from the endangered species list. The bald eagle is likewise proposed for removal from the list. 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 has been successful spawning in 1997 as well as establishing a higher estimate of individuals in the population. Furthermore, a recovery plan is now in place with specific goals and recovery actions. Bull trout redd count numbers were commensurate with previous years except in Pipe, Bear, and Keeler Creeks. Redd count numbers provided by Montana Fish Wildlife and Parks show there was an increase of more than 60% in both Quartz (154) and Grave (158) Creeks redd numbers.

Literature Cited:

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USFWS. 1993. Grizzly bear recovery plan. U.S. Fish and Wildlife Service, Missoula, MT. 181 pp.

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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 AUMs per year. At the time the Plan was approved, there were 41 (total of 45) active allotments located mostly in the northeastern portion of the Forest on the Rexford and Fortine Ranger Districts. Currently, the Forest has 44 grazing allotments, of which 23 are active. The allotments have a ten-year permit period. All of the active allotments, but two, have had NEPA analysis completed and Management Plans written and updated since 1996. The two remaining allotments are in the beginning stages of NEPA analysis. The Swamp Creek allotment no longer exists because it was part of a land exchange.

Results: In FY01 there were 7,017 AUM units of grazing on the Kootenai (see Table D-1-1). This is 56 percent of the projected level of available use. 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	FY01 Use	14-year Average
AUMs	12,600	7,017	10,441
Percent	100	56	83

Evaluation: During the last 14 years, grazing use has averaged 83 percent of projected use, which is within the range anticipated in the Plan. Annual use is lower than projected in the Forest Plan due to permittee requests for non-use and Forest requests to defer grazing to prevent overgrazing in riparian areas and to prevent stream bank deterioration. Also, all allotments are transitory range. As tree cover becomes greater less sunlight is available for grass growth, which means less forage available. A significant lack of moisture the last several years has also had a negative impact on biomass production, resulting in less forage availability. Much of the grazing in many of the allotments occurs on the roadside vegetation. Problems in a transitory-range area include cattle congregating in openings and in riparian areas, which in effect become “sacrifice” areas. These openings and riparian areas can eventually “convert” to Kentucky bluegrass sites, which continually attract animals. It is very difficult to move and/or to keep animals spread over the entire allotment resulting in some areas receiving more concentrated use. The trend in AUMs has been downward since 1995. There are several reasons for this trend, including market conditions, increased emphasis in riparian area protection, societal changes, a reduction in the

number of full-time ranchers, and less transitory range. Partial or total non-use was taken on nine allotments. Six temporary permits were issued.

Recommended Action: In review of this monitoring item, many of the allotments that were active at the initiation of the Forest Plan are no longer active (reasons stated above). It is recommended that during Forest Plan Revision these inactive allotments be terminated. These allotments are: Edna Creek, Mud Griffith Creeks, Upper Grave Creek, Seventeen Mile, South Fork, Upper Ford, Yaak River, Bobtail, Elliot Cowell, Five Mile, Granite-Cherry, Jumbo-Bayhorse, Libby Creek, McMillan, Quartz, Prospect, Schrieber, Sheldon Mountain, Surprise, Swede Mountain, West Fisher, Marten Creek, and Tuscor Creek. For the active allotments no change is needed. Numbers will remain lower than Projected Forest Plan Use, again for the reasons stated above. Range Use will be looked at in Forest Plan Revision.

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 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. Weed infestations have been established along many roadsides, railroad and power line rights-of-way and other disturbed areas such as gravel pits. Spotted knapweed and others have started to migrate away from the road right-of-way onto undisturbed hillsides, especially within the drier vegetation types. Weeds are also becoming established in harvest units where the seeds have been brought by machinery. Most of the weeds are/were brought here attached to machinery, automobiles, railcars, etc. The Kootenai Forest classifies weeds into five categories, which include all the species listed by the State of Montana and Lincoln and Sanders Counties. Table D-2-1 shows the types of weeds, and the category they are in, that occur on the Forest. The Forest has prepared an Herbicide Weed Control Environmental Assessment (EA) (1997). Nomenclature for vascular plants follows Hitchcock and Cronquist (1973) and for bioagents follows Rees et al. (1996).

Table D-2-1 Noxious Weeds on the Kootenai National Forest

Category	Status	Threat	Goal	Species Included
Group Ia. <i>Potential Invaders</i>	not known to exist	high probability of causing severe economic or environmental damage	prevention, eradication	plumeless thistle (<i>Carduus acanthoides</i>), 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>), tamarisk (<i>Tamarix</i> spp.)
Group Ib. <i>New Invaders</i>	small populations at limited sites	high probability of causing severe economic or environmental damage	eradication	bugloss (<i>Anchusa officinalis</i>), whitetop (<i>Cardaria draba</i>), musk thistle (<i>Carduus nutans</i>), diffuse knapweed (<i>Centaurea diffusa</i>), Russian knapweed (<i>Centaurea repens</i>), dwarf snapdragon (<i>Chaenorrhium minus</i>), rush skeletonweed (<i>Chondrilla juncea</i>), Scotch thistle (<i>Onopordum acanthium</i>), Japanese knotweed (<i>Polygonum cuspidatum</i>), tall buttercup (<i>Ranunculus acris</i>)

Group Ic. <i>New Invaders</i>	medium populations at limited sites	high probability of causing severe economic or environmental damage	containment within main body of infestation, eradication of populations	blueweed (<i>Echium vulgare</i>), leafy spurge (<i>Euphorbia esula</i>), Dalmatian toadflax (<i>Linaria dalmatica</i>), yellow toadflax (<i>Linaria vulgaris</i>), tansy ragwort (<i>Senecio jacobaea</i>)
Group II. <i>Existing Populations</i>	large, widespread populations	high probability of causing environmental or economic damage	prioritize areas to be treated, reduction of plant populations, reduce rate of spread	common burdock (<i>Arctium minus</i>), absinth wormwood (<i>Artemisia absinthium</i>), spotted knapweed (<i>Centaurea maculosa</i>), oxeye daisy (<i>Chrysanthemum leucanthemum</i>), Canada thistle (<i>Cirsium arvense</i>), field bindweed (<i>Convolvulus arvensis</i>), common hound's tongue (<i>Cynoglossum officinale</i>), orange hawkweed (<i>Hieracium aurantiacum</i>), meadow hawkweed (<i>Hieracium pratense</i>), common St. John's-wort (<i>Hypericum perforatum</i>), sulfur cinquefoil (<i>Potentilla recta</i>), common tansy (<i>Tanacetum vulgare</i>)
Group III. <i>Species of Undetermined Status</i>	variable, some new, some well established	undetermined – potential for environmental and economic damage	monitor known populations for trends	meadow knapweed (<i>Centaurea pratensis</i>), chicory (<i>Chicorium pratensis</i>), poison-hemlock (<i>Conium maculatum</i>), Scot's broom (<i>Cytisus scoparius</i>), spotted cat's-ear (<i>Hypochaeris radicata</i>), kochia (<i>Kochia scoparia</i>), scentless chamomile (<i>Matricaria maritime var. agrestis</i>), germander speedwell (<i>Veronica chamaedrys</i>), common speedwell (<i>Veronica officinalis</i>)

Evaluation: 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 has deemed 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 central and eastern Montana. The State has provided added monies for surveys and spraying to contain the expansion of these species and to eradicate them. Even though strong emphasis is placed on these two species, concern remains for all the weed species listed. Also, control is not confined to these two species. Treatments for the weed species is an Integrated Pest Management approach that includes one, or a combination, of the following: **biological**--release of bioagents; **mechanical**--hand pulling, hoeing, clipping of seed heads, etc.; **chemical**--application of herbicides; and **cultural**--establishment of desirable plants as competition.

Existing weed infestations have expanded greatly over the past 15 years. The most common weed on the KNF is spotted knapweed. In 1995, county weed specialists estimated that knapweed infested over 250,000 acres across the forest (Hirsch and Leitch 1996). Two-thirds of

the total infestations are in forestlands, rangelands, and/or wildlands; the remaining third are in road or railway corridors. The most widespread infestations are in the Clark Fork, Fisher River, and Kootenai River valleys. The spread of weeds has become very noticeable on winter game ranges, especially to the east of Libby. As an example, the “horse range” behind (north of) Canoe Gulch Ranger Station is estimated to have lost 70-80 percent of its effectiveness as winter range. Most of the encroachment has been by spotted knapweed. Spotted knapweed is less widespread in the Tobacco Valley area because of earlier weed control programs that included the use of herbicides (1986 Noxious Weed Treatment Program Final Environmental Impact Statement allows the use of herbicides on the Rexford and Fortine Ranger Districts). KNF specialists estimate that approximately 250,000 acres are at moderate or high risk of infestation by spotted knapweed, tansy ragwort, leafy spurge, blueweed, and goatweed; one million acres are at high risk of infestation by orange and meadow hawkweeds; and 500,000 acres are at moderate or high risk of infestation by tansy ragwort. These acres were compiled by applying a modification of the process described by Mantas and Jones (2001).

Orange and meadow hawkweeds, oxeye daisy, and common St. John’s wort have made significant increases in the last ten years around the Forest. The toadflaxes, absinth wormwood, and common hound’s-tongue are increasing in different parts of the Forest. Blue weed has been observed in many recent harvest units in the Clark Fork Valley area.

Inventory

Four hundred ninety-two weed surveys were completed last summer (FY 01). Table D-2-2 summarizes the percent of a weed species found within each survey. The surveys note each noxious weed species seen in the survey (from the Kootenai National Forest list of weed species) as well as the predominant infestation size and cover class, or density, of each species. Weeds listed on table D-2-1 are those currently being tracked by the Kootenai National Forest. Three types of surveys were conducted last summer. One was a road survey specifically looking for rush skeletonweed. It also noted the presence or absence of other weed species. The second survey type was an area survey confined to the upper Little Wolf Creek drainage specifically to locate tansy ragwort plants. The third type was a general survey noting weed species on roads traveled. The majority of the surveys occurred on the northeast portion of the Forest. People involved with fighting fire on other parts of the Forest prevented a more even distribution of survey location

Table D-2-2

Species (<i>Six Letter Code</i>)	% of Surveys with this Species	Predominant Infestation Size	Predominant Cover Class
<i>Ia Potential Invaders</i>			
Plumeless thistle (<i>Caraca</i>)			
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>)			
Tamarisk (<i>Tamarix spp.</i>)			
<i>Ib New Invaders (small populations)</i>			
Bugloss (<i>Ancoff</i>)	*		
Whitetop (<i>Cardra</i>)	*		
Musk thistle (<i>Carnut</i>)	*		
Diffuse knapweed (<i>Cendif</i>)	<1	.1-1 acre	trace
Russian knapweed (<i>Cenrep</i>)	<1	<.1	medium
Dwarf snapdragon (<i>Chamin</i>)	*		
Rush skeletonweed (<i>Chojun</i>)	6	<.1	trace
Scotch thistle (<i>Onoaca</i>)	*		
Japanese knotweed (<i>Polcus</i>)	*		
Tall buttercup (<i>Ranacr</i>)	*		
<i>Ic New Invaders (medium populations)</i>			
Blue weed (Viper's bugloss) (<i>Echvul</i>)	*		
Leafy spurge (<i>Eupesu</i>)	*		
Dalmatian toadflax (<i>Lindal</i>)	1	<.1 acre	low
Yellow toadflax (<i>Linvul</i>)	<1	<.1 acre	low
Tansy ragwort (<i>Senjac</i>)	10	***	***
<i>II Existing Infestations</i>			
Common burdock (<i>Arcmin</i>)	*		
Absinth wormwood (<i>Artabs</i>)	15	<.1	trace
Spotted knapweed (<i>Cenmac</i>)	28	****	****
Oxeye daisy (<i>Chrlou</i>)	28	***	***
Canada thistle (<i>Cirarv</i>)	23	****	***
Field bindweed (<i>Conarv</i>)	*		
Common hound's-tongue (<i>Cynoff</i>)	11	**	**
Orange hawkweed (<i>Hieaur</i>)	27	***	****
Meadow hawkweed (<i>Hiepra</i>)	22	***	***
Common St. John's-wort (<i>Hypper</i>)	10	***	***
Sulfur cinquefoil (<i>Potrec</i>)	2	<.1 acre	trace to low
Common tansy (<i>Tanvul</i>)	<1	<.1 acre	trace to low
<i>III. Species of Undetermined Status</i>			
Meadow knapweed (<i>Cenpra</i>)	*		
Chicory (<i>Cicint</i>)	*		
Poison-hemlock (<i>Conmac</i>)	*		

Scot's broom (<i>Cytsco</i>)	*		
Spotted cat's-ear (<i>Hyprad</i>)	*		
Kochia (<i>Kocsco</i>)	*		
Scentless chamomile (<i>Matmar</i>)	*		
Germander speedwell (<i>Vercha</i>)	*		
Common speedwell (<i>Veroff</i>)	*		

- * = Species known to occur on the KNF, Lincoln County, and/or Sanders County but not noted on any surveys.
- ** = Indicates that the lower two categories of size and cover class are well represented.
- *** = Indicates that the lower three categories of size and cover class are well represented.
- **** = Indicates that all infestation size and cover class categories are well represented.

Table **D-2-2** information was tabulated from the three types of surveys. These surveys also indicated the typical size of infestation and the average cover class or density of 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 trace (<1%), low (1 to 5%), medium (6 to 25%), or high (>25%). The total number of noxious weed species noted in the road surveys is 16. There are an additional 26 species on the Forest weed list. Eleven new sites of rush skeletonweed were located. Over 600 miles of road were inventoried.

Approximately 4500 acres were surveyed and mapped for tansy ragwort. Both the size and density were noted and provided the basis for the spraying of tansy. The tansy ragwort population was originally noted only in the upper Little Wolf area on the KNF and the upper Good Creek area of the Flathead National Forest. It was hoped that it could be contained to these areas. It is now being found up to 20 air miles away. Several new sites were found again last season.

Change over time can be measured by observing changes in % 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, common St. John's-wort, meadow hawkweed, Canada thistle, orange hawkweed, absinth wormwood, common hound's-tongue, and oxeye daisy are the most common weed species present on the KNF, all having been recorded on over 30% of the surveys conducted. Canada thistle, spotted knapweed, and bull thistle are the most prevalent. Many weed species are just becoming established, such as rush skeletonweed, blue weed, chicory, kochia, Dalmatian and yellow toadflaxes, common and germander speedwells, scentless chamomile, and tall buttercup. Common St. John's-wort, orange hawkweed, rush skeletonweed, common tansy, and oxeye daisy all appear to be more common on the west side of the Forest, whereas, absinth wormwood, meadow hawkweed, hound's-tongue, musk thistle, and tansy ragwort are more common on the east side. Musk thistle, whitetop, Japanese knotweed, diffuse and meadow and Russian knapweed, Scotch thistle, kochia, leafy spurge, poison-hemlock, and Scot's broom have been found on the Forest, but were not recorded in this year's surveys.

Table D-2-3 Percentage of Weed Populations in Each Infestation Size and Density by Weed Category

Weed Category	Infestation Size				Infestation Density			
	Number / % <.1 acre	Number / % .1-1 acre	Number / % 1-5 acres	Number / % >5 acres	Number / % Trace	Number / % Low	Number / % Medium	Number / % High
Potential Invaders	0	0	0	0	0	0	0	0
New Invaders	85/77	20/18	6/5	0	78/71	26/24	7/5	0
Existing Infestations	853/58	406/27	166/11	52/4	610/42	475/32	312/21	80/5
Undetermined Status	0	0	0	0	0	0	0	0
Overall Average	59	27	11	3	43	32	20	5

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 (86%) are found in populations of less than .1 acre and .1-1 acre in size. Population densities for trace (42%), low (32%), and medium (21%) are all similar. 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.

CONTROLS

Biological 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 a 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

knapweed, though several biocontrol agents for common St. John's-wort, tansy ragwort, leafy spurge, Canada thistle, and Dalmatian toadflax have also been released. The releases have been made in approximately 75 different locations. Some releases have been made in the same sites to help build the populations faster in these areas.

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. Even though the bioagents are expanding they are not having a significant impact on populations densities or population spread.

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, Canada thistle, or toadflax on the KNF, probably because populations of the 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 10 years, during which time spotted knapweed, St. John's-wort, toadflax, and other existing infestations will continue spreading (Herbicide Weed Control EA 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. Other insects and animals may also prey upon Biocontrols. Some biocontrols may be limited by climatic and environmental conditions (rainfall, cold, shade etc.). Biocontrols usually do not eradicate the host weed completely and are often required in very large numbers to significantly affect the host. Thus, biocontrols are best used on existing, widespread weed infestations and not on new invader species for which the goal is eradication (Herbicide Weed Control EA 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 (Herbicide Weed Control EA 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: Various spot checks have shown that larvae of the released bioagents can readily be found. Last summer the Northern Region office of Cooperative Forestry and Forest Health Protection (CFFHP) department monitored the survival of *Agapeta zoegana* and *Cyphocleonus achates* releases. Of the 15-bioagent release sites checked all had larvae and/or adults of the bioagents present. A determination was made that at least four of the sites have populations sufficient to use as insectaries (a population large enough to collect insects for transfer to other sites). A local insectary is the best since these insects have adapted the best to conditions of the local area.

Herbicide Application

Implementation: In 2001 a total of 4200 acres were treated with herbicides to control rush skeletonweed, spotted knapweed, Canada thistle, Dalmatian and yellow toadflax, leafy spurge, absinth wormwood, and tansy ragwort specifically. These applications also reduced populations of diffuse knapweed, sulfur cinquefoil, oxeye daisy, St. John's wort, orange hawkweed, and meadow hawkweed. In the last 10 years more than 10,000 acres have been sprayed for spotted knapweed, leafy spurge, Dalmatian and yellow toadflax, rush skeletonweed, tansy ragwort, orange hawkweed, meadow hawkweed, oxeye daisy, absinth wormwood, Canada thistle, sulfur cinquefoil, common tansy, Russian knapweed, and diffuse knapweed.

Subsequent to a review and documentation of new information the KNF has added four new chemicals that will allow more options in the treatment of weed populations on the Forest. The chemicals are Metsulfuron (trade name-Escort), Imazapic (trade name-Plateau), Sulfometuron (trade name-Oust), and Triclopyr (trade name-Garlon 3A).

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 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 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 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 spraying starting in 1993, the KNF has only been spraying on a larger scale since 1997. Lincoln, Sanders, and Flathead Counties have sprayed roadsides, which cross NFS lands where the county has clear rights-of-way since the early 1990's. The KNF completed an Herbicide Weed Control Environmental Assessment (EA 1997). The purpose of this EA was to provide an additional tool for eradicating new invaders and limiting the spread of existing noxious weeds.

Mechanical and Cultural

Implementation: Seed heads of tansy ragwort were clipped along several hundred yards of roadway. Areas of Dalmatian toadflax were hand pulled. These plants and plant parts were then burned.

Effectiveness: 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. Roadside clipping of tansy ragwort seed heads was used this year in conjunction with spraying.

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 (Herbicide Weed Control EA 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.

NEW INVADERS

All weeds are a focus for The Kootenai National Forest, State of Montana, and Lincoln County. But new invaders are of special interest since they are generally confined to one area or part of the state. Tansy ragwort and rush skeletonweed are two such species. The Montana Department of Agriculture is working strenuously to keep these two species west of the Continental Divide. Rush skeletonweed has been a priority since its discovery in Lincoln and Sanders Counties in the early nineties. There has been an eradication program in existence for Lincoln and Sanders Counties and the Kootenai National Forest since. The populations are located along roads and are flagged. The plants are removed and/or sprayed. Every site that has been known to have rush skeletonweed is visited several times each year. The known populations are decreasing.

Tansy ragwort exploded after the Little Wolf Fire in 1994. Since the fire covered many ownerships and tansy is located on these same ownerships, a cooperative program between the State of Montana Lands Division, Plum Creek Timber Company, Bonneville Power Administration, Lincoln County, Flathead County, Kootenai National Forest, Flathead National Forest, US Fish and Wildlife Service, Montana Department of Agriculture, and private land owners has been working to contain tansy in the Little Wolf vicinity. Through an Integrated Pest Management program of biological, mechanical, cultural, and chemical factors these entities are working hard to contain tansy. Other than some new isolated sites located approximately 20 air miles to the northeast the tansy has remained in the Little Wolf/Island Lake area. The main strategy has been to eliminate new populations located away from the main population and

contain the main population. This means that spraying has been used for the outlying populations and bioagents releases for the main population. This strategy of bioagent releases in the center of the infestation, spraying of the perimeter populations and clipping adjacent to water bodies has been very successful in containing tansy ragwort.

Conclusion: Monitoring indicates that several noxious weeds (see Table D-2-2) have increased more than 10% in the numbers of acres affected and some have had a 10% or more increase in density of existing infestation, since the Forest Plan (1987) was first 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, this 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) on the southern part of the Forest and the use of herbicides and biological and cultural controls 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 the ability to use a more integrated approach to controlling weeds. These actions are occurring under the direction of the Forest Plan and should help improve the noxious weed situation on the Forest. It is recommended that no changes are needed in the Forest Plan at this time.

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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.

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 FY92 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.

Results: Table E-1-1 shows that sell volumes have declined from approximately 200 MMBF per year to approximately 50 MMBF per year from FY 88 to FY01. For the past 14 years, the average yearly amount sold has been 102 MMBF from suitable lands, and 1.7 MMBF from unsuitable lands. In total, this amounts to 103.7 MMBF average per year. This actual sell volume is well below the ASQ limit as set in the Plan.

Evaluation: After 14 years of implementation, the trend of decreasing sell volume is continuing. In the FY92 and FY97 Monitoring Reports, the Forest reported in detail on a number of factors that 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 FY92 Monitoring Report). During the second five years of implementation, sell volume averaged about 81 MMBF/year.

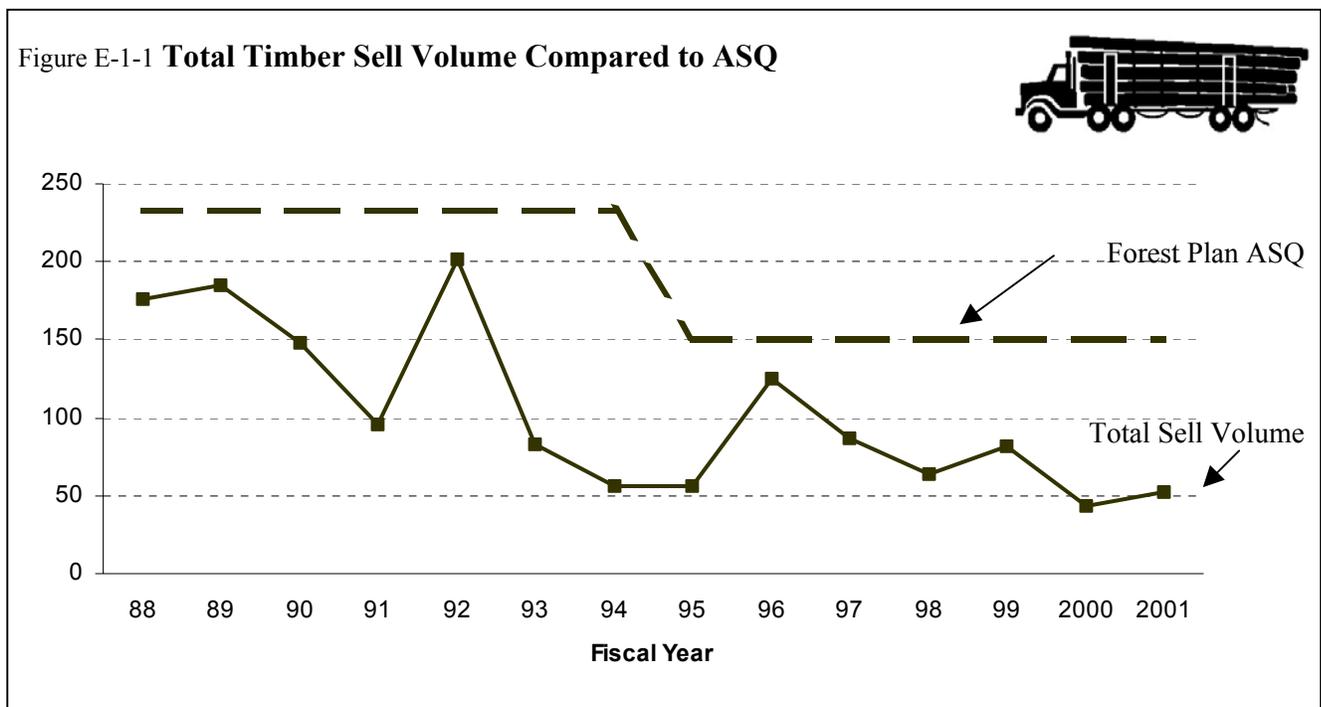
Many factors have influenced the timber sales program. The USFWS amended the biological opinions for grizzly bear recovery in July 1995 and changed how recovery processes would take place on the Forest. The Inland Native Fish (INFS) Decision of July 1995 resulted in additional

streamside protection measures. 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 FY92 Monitoring Report, will need to continue during the revision of the Forest Plan.

Table E-1-1 **Timber Sell Volumes (MMBF) by Category by Fiscal Year**

	Forest Plan Annual ASQ Projection	Average Sell Volume FY 88-92	Average Sell Volume FY93-97	FY 1998	FY 1999	FY 2000	FY 2001
Suitable Lands	227	159	81	61.6	79.8	41.1	49.3
Unsuitable Lands	6	2	0.4	2.8	1.9	2.0	2.9
Total Timber Sell Program	233	161	81.4	64.4	81.7	43.1	52.2



Recommended Actions: The Forest has not exceeded the ASQ in 14 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

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 fourteen years of implementation and for FY01. During FY01, the general downward trend that 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 FY01, but was either salvage, selection, or intermediate harvest that did not result in a regenerated stand.

For the first fourteen 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.

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. One additional factor in the decline in acres sold for harvest through regeneration methods is the

strong trend away from regeneration harvest to more intermediate cuts, salvage and individual tree harvest methods.

Table E-2-1 Acres of Timber Sold for Harvest by Fiscal Year (Regeneration Harvest Methods Only)

MA	Forest Plan Projection	FY 00 Acres Sold	FY 00 % of Projected	FY 01 Acres Sold	FY 01 % of Projected	14-Yr Average (1988 - 2001)	Average % of Projected (1988 - 2001)
11	690	31	4%	326	47%	336	49%
12	8,800	137	2%	259	3%	2,420	27%
14	1,220	0	0%	0	0%	180	15%
15	2,050	731	36%	458	22%	1,745	85%
16	2,520	0	0%	19	1%	349	14%
17	460	0	0%	0	0%	43	9%
Total	15,740	899	6%	1,062	7%	5,074	32%

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.

Recommended Actions: It is apparent that the acres sold for regeneration harvest will not meet the acreage projected in the Forest Plan. The 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 FY95-96 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 fourteen years (FY 88-01) and the net change in all suitable timberland. Acreage losses occurred in MA 11, 14 and 17; while MA 12, 15 and 16 gained acreage in FY01. Total net loss in the suitable timberland in FY01 was 18 acres. Table E-3-2 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)
1999	316	1,434	(648)	(1,281)	(1,801)	(1,168)	(3,148)
2000	754	(894)	(434)	404	(307)	(425)	(902)
2001	-283	93	-49	148	144	-71	-18
Total Net Chg to MA	-15824	93	-831	-35497	-9855	-2851	-64765

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 FY97.

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)
97 CLE*	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
1999	(131)	366	3587	(145)	(343)	(331)	3,003
2000	28	307	1,282	347	10	(49)	1,925
2001	6	-49	-420	-34	26	-7	-478
Total Net chg to MA	14,965	5,402	40,764	-2,225	-5,545	5,463	58,824

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 designated 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 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 FY95 and FY96, 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 that 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.

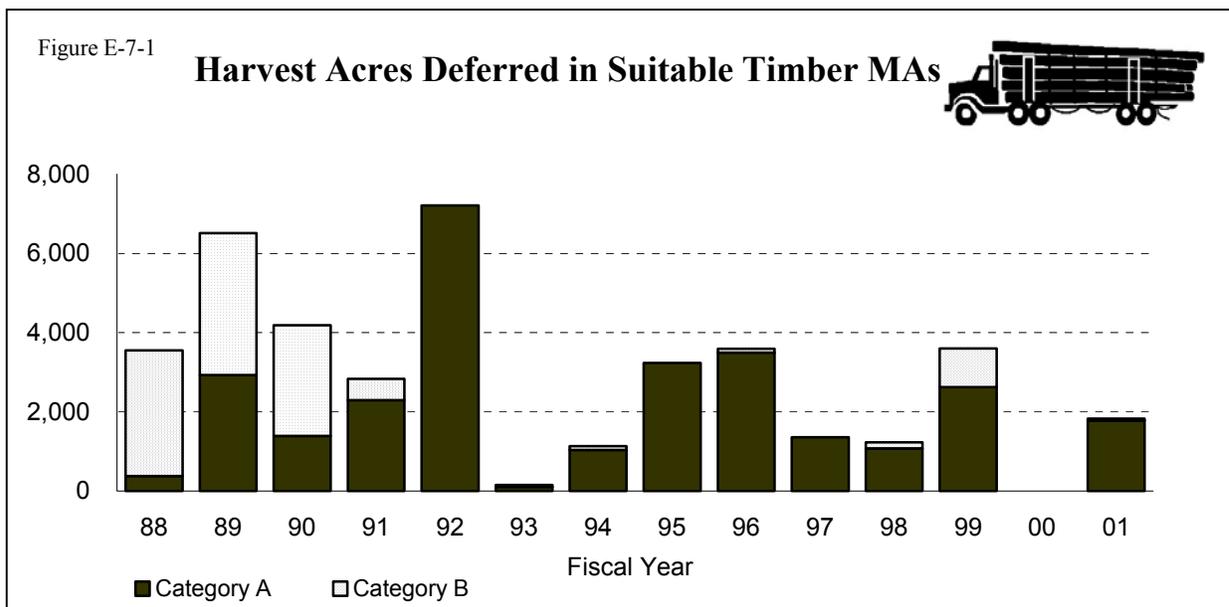


Table E-7-1 **Deferred Harvest Acres by suitable Management Area (MA)**

Category	Fiscal Year	MA 11	MA 12	MA 14	MA 15	MA 16	MA 17	Total
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
	99	1,738	241	281	158	75	129	2,622
	00	0	0	0	0	0	0	0
01	1,554	82	45	63	11	27	1,772	
Subtotal Cat. A		4,508	16,487	4,637	1,688	1,443	156	28,919
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
	99	0	419	0	0	500	54	973
	00	0	0	0	0	0	0	0
01	0	0	0	0	0	45	45	
Subtotal Cat. B		608	6,373	637	2,825	759	284	11,441
A & B	88	15	2,920	299	314	0	0	3,548
	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
	99	1,738	660	281	158	575	183	3,595
	00	0	0	0	0	0	0	0
01	1,554	82	45	63	11	67	1,817	
FY 88-01 TOTALS		5,116	22,860	5,274	4,513	2,202	440	40,360

Results: Table E-7-1 displays deferred harvest acres by category for each suitable timber management area on the Forest for FY 88-01.

Evaluation: In FY01 1,772 acres were deferred in Category A and 45 acres deferred in Category B.

Table E-7-1 shows that for the entire period from FY 88-01, 40,360 acres were deferred for both Categories A and B. The largest amount for a single MA is 22,860 acres that 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 11, 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.

TIMBER: Harvest Area Size; Monitoring Item E-8

ACTION OR EFFECT TO BE MEASURED:

Cutting unit size by forest type, management area, and District.

VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:

Variation in trends of other resources beyond the natural variation that can be determined.



Purpose: This monitoring item was established to help ensure that the maximum regeneration harvest sizes permitted in the Forest Plan are not exceeded without appropriate documentation. The Plan requires this item be reported every two years. The expected accuracy and reliability of the information is high.

Background: The Plan provides standards and guidelines for timber harvest area sizes for individual MAs. These harvest area limitations are primarily for regeneration harvest methods, which are clearcuts, seedtree and shelterwoods. The purpose is to provide a balance for all the major resources emphasized in each of the specific MAs. In MA 11, for example, regeneration harvest area size is recommended to not exceed 20 acres to provide habitat for moose and white-tailed deer. In MA 12, the regeneration harvest area size is recommended to not exceed 40 acres to provide habitat for elk. In other MAs, no specific guides are given, but regeneration harvest area sizes need to be consistent with other management objectives for the MA.

Exceptions to these guides can be considered during an environmental analysis in which location-specific land attributes and issues are considered and the harvest area size and resultant openings are planned to best meet the management objectives of the area. The Regional Forester needs to approve any non-catastrophic harvest area request to exceed 40 acres. The Forest Supervisor can approve an opening greater than 40 acres when a catastrophic event such as wildfire, windstorm, insect, or disease damages a forest stand. Monitoring of these approved exceptions for timber harvest areas and resultant openings is done to track the amount of variation from the MA guidelines.

Results: Table E-8-1 displays the Forest-wide average harvest area size in acres for each MA by harvest method. The period shown is the last fourteen years, from 1988-01. The harvest methods displayed are clear cutting, seed tree cutting, shelterwood cutting, and all other harvest methods. *Clearcutting* generally leaves a few scattered live and dead trees per acre for cavity-nester use; *seedtree* harvest leaves about four to eight trees per acre for natural seeding; *shelterwood* harvest leaves about 9-15 trees per acre for natural seeding and environmental protection such as shading. The other harvest methods include overstory removal, individual tree and group selection, salvage, sanitation, thinning, preparatory cuts, and other intermediate silvicultural treatments that do not significantly open the forest canopy. Because of their more limited impact compared to the regeneration harvest methods, these other harvest methods do not have any acreage restrictions for harvest area size.

Appendix B lists the harvest areas resulting in larger than 40 acre openings approved during FY01 as well as an estimate of how long it will take for the vegetation to regrow to meet the management area objectives. There were no openings greater than 40 acres approved by the Forest Supervisor in FY00, and openings in two projects in FY01.

Evaluation: Figure E-8-1 shows that the average harvest area size for FY 88 to FY01. The average sizes are well below the objectives of 20 acres for MA 11 and 40 acres for MA 12. Average size for the other suitable MAs are also generally below 40 acres. As discussed in the FY96 Monitoring Report, there were occasional instances of a single year's average value extending beyond 40 acres. These instances occurred when there were relatively few harvest units in a given year, and the units had been approved as described above.

Recommended Actions: Based on review of the monitoring information, no changes are needed to the Forest Plan. Projects approved to exceed 40 acres were done with the appropriate documentation and analysis and, therefore, are consistent with the Plan. Continue to monitor this item.

Table E-8-1 **Average Harvest Area Size in Acres by Harvest Method and MA**

Fiscal Year	MA 11	MA 12	MA 14	MA 15	MA 16	MA 17
Clearcutting						
88	17	33	7	20	4	2
89	20	31	22	30	32	0
90	15	15	0	27	14	4
91	8	21	20	19	72	8
92	10	19	30	30	42	0
93	19	18	18	9	22	21
94	6	19	4	1	21	1
95	6	22	10	8	23	0
96	21	15	32	17	0	18
97	11	23	0	14	7	21
98	0	19	0	77	0	0
99	0	24	3	36	0	0
00	12	12	0	17	0	0
01	18	11	0	39	0	0
14-yr average	12	20	10	25	17	5
Seed Tree						
88	15	39	12	37	15	13
89	8	30	16	30	34	0
90	33	20	24	35	16	20
91	23	22	17	32	20	18
92	14	18	32	31	1	0
93	4	10	3	22	0	23
94	8	26	4	22	19	1
95	6	18	12	26	13	0
96	0	32	15	74	70	0
97	0	27	0	33	18	11
98	0	41	0	182	0	0
99	20	32	0	37	29	0
00	0	56	0	57	0	0
01	13	17	0	27	19	0
14-yr average	10	28	10	46	18	6

Table E-8-1 (con't) **Ave. Harvest Area Size in Acres by Harvest Method and Management Area**

Fiscal Year	MA 11	MA 12	MA 14	MA 15	MA 16	MA 17
Shelterwood						
88	32	10	12	27	0	0
89	15	15	14	25	8	0
90	15	27	0	17	20	0
91	13	25	10	28	29	0
92	24	31	25	0	14	15
93	3	1	31	1	26	0
94	8	15	0	35	1	0
95	7	20	0	0	28	0
96	12	15	0	0	48	28
97	0	7	0	7	0	0
98	52	48	0	8	0	0
99	272	27	0	30	0	0
00	21	0	0	66	0	0
01	21	14	0	100	0	0
14-yr average	35	18	7	25	12	3
All Other Methods						
88	32	32	58	31	18	28
89	31	98	54	40	113	28
90	29	22	35	27	26	8
91	43	36	45	40	38	58
92	28	48	20	38	35	45
93	20	30	23	22	23	35
94	43	22	19	20	9	9
95	26	34	17	22	21	3
96	26	24	36	31	0	0
97	15	17	18	20	23	11
98	41	18	0	25	34	0
99	32	91	0	65	10	15
00	33	21	1	21	0	0
01	23	19	36	30	21	0
14-yr average	30	37	26	31	27	17

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 forest wide to meet State water quality standards, and to meet our MOU obligation with the Department of Environmental Quality that makes the FS the management agency for water quality protection on National Forest System lands. The BMPs are various practices that 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. Other BMPs seek to protect and conserve the soil resource. 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 called effectiveness monitoring.

Projects that are evaluated for BMP implementation and effectiveness include timber harvest, road construction and reconstruction projects, road maintenance, range allotment management, mine site rehabilitation, special-use permit administration, and other activities that expose or disturb soil, creating ground conditions that could lead to water quality impacts; or that adversely affect the soil resource

RESULTS:

FY 2001 BMP monitoring on the Forest involved BMP monitoring done by Kootenai National Forest personnel during their normal work activities. During all of these efforts, BMP's 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.

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

Results of BMP Monitoring Done by Kootenai Forest Personnel, including District and Zone Review Teams: 49 projects had implementation monitoring evaluations, and 35 projects had effectiveness evaluations accomplished in FY 2001 by KNF personnel. Implementation evaluations were completed for 1104 BMPs and implementation evaluations met the requirement of acceptable almost 96 percent of the time. Effectiveness evaluations in FY 2001 met the requirement of acceptable over 94 percent of the time (see Table F-1-2).

	Implementation (%)											
	90	91	92	93	94	95	96	97	98	99	00	01
Acceptable or Better	96	96	93	98	99	92	98	98	97	98+	98+	95.7
Unacceptable	4	3	6	2	1	8	2	1.9	2.8	1.6	1.2	3.4
Very Unacceptable	0.4	1	0	0.2	0.02	0	0.02	0.1	0	*0	0**	0.8
Grossly Unacceptable	0	0	0	0	0	0	0	0	0	0	0	0
	Effectiveness (%)											
	90	91	92	93	94	95	96	97	98	99	00	01
Acceptable or Better	91	88	86	96	99	92	100	99	96.3	94.8	95+	91.4
Unacceptable	8	12	13	3	1	8	0	1.2	3.4	4.5	1.9	5.7
Very Unacceptable	1	0	2	1	0	0	0	.14	0.2	.07	2.4	3.0
Grossly Unacceptable	0	0	0	0	0	0	0	0	0	0	0	0

*- 1 out of 1897 practices

** 2 out of 1,040 practices evaluated

COMMENTS:

Only 4 of the 1104 practices evaluated for implementation and effectiveness showed up as problems (cited more than 3 times, total, for implementation and effectiveness):

SWCP 14.13- Special Erosion Prevention Measures On Areas Disturbed by Harvest Activities;

SWCP 15.02- Location and Design of Roads and Trails

SWCP 15.12- Control of Road Activities in Riparian Areas; and

SWCP 15.18- Disposal of Road-side Debris.

SWCP 14.13- This practice was cited four times (twice each for implementation and effectiveness) out of a total of 19 implementations. It was usually cited because erosion was occurring on disturbed ground, or seeding was needed to prevent noxious weed invasion.

SWCP 15.02- This practice was cited six times for implementation and seven times for effectiveness, out of 42 implementation evaluations, by far the most problematic-practice in 2001. The biggest problem here was the disposition of ditch flow, keeping relief culvert and roadside ditch flows from entering streams and channels. This is a continuing problem on the Forest, a remnant of past construction methods.

SWCP 15.12- This practice was cited four times (twice each for implementation and effectiveness) out of a total of 8 implementations. Keeping road-related activities and materials out of the riparian zone, particularly during road maintenance, was the problem.

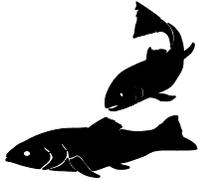
SWCP 15.18- This practice was cited four times (twice each for implementation and effectiveness) out of a total of only 3evaluated- implementations. It was cited because road maintenance material was placed into the SMZ on more than one occasion,

Emphasis and Action Items for 2002: 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 Forest BMP Process and Program. This process emphasizes monitoring, implementation, evaluation, documentation, tracking, and completion of the feedback loop to improve resource protection. Utilize the findings from reports such as this to identify problems and solutions.
- Continue to hold All-Forest field training sessions to cover all aspects of BMPs.
- Conduct Supervisors Office-level BMP reviews on at least three Ranger Districts, to try to “catch up” on last summers’ schedule.
- Send a copy of this write-up to all Districts and Zones to identify the problems areas, the emphasis areas for FY2002.

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

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

modified Forest Plan direction by adding additional requirements to manage fish habitat and channel conditions as well as the standard riparian vegetation zone.

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. It also mandated percent rather than number of leave-trees, and required 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 (called Riparian Habitat conservation Areas [RHCAs] in INFS) increased. Additional standards and guidelines are applied, including requirements for extensive analysis before harvesting in some classes of watersheds. As a result, there was a dramatic reduction in riparian zone activities.

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 is also to assess whether the standards are effective to attain Riparian Goals and Management Objectives (RMOs).

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. Over 6,000 lineal miles of riparian habitat have been categorized and mapped since 1988. Almost 3,500 of these miles are on 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 1 & 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
1999	559	497	1056
2000	110	46	156
2001	57	45	102
Totals	3,482	2,608	6,090

2) RHCA/RMO modification documentation: This is tracked to determine whether INFS standards and guidelines were applied during projects. In particular, this item identifies where default RMOs and RHCA widths may have been modified based on site-specific analysis. In FY 2001, default RHCA widths and default RMOs were applied to 30.6 miles of stream. A wider than required RHCA was applied on a little over one mile of a stream on one project.

3) RHCA activity tracking: In FY2001, a little over 80 acres miles of RHCA had some level of activity. Most of the work was for road re-construction, improvement of road crossings, road drainage improvement, and trail maintenance and improvement along streams.

4) Watershed and stream restoration activities: In 2001, riparian-related watershed restoration activities were accomplished on over 105 miles of stream. Over 137 stream crossings were removed or improved, and almost 210 acres of riparian areas had some level of watershed improvements.

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 2001. 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 FY2001, Forest BMP Audits by at least one individual evaluated 119 specific practices within riparian areas. Acceptable implementation was accomplished 90 percent of the time. Thirty-four effectiveness evaluations were completed for this same period, of which 88 percent of the BMPs were deemed to be effective. For three additional projects, a riparian-area specific BMP evaluation was made by an IDT. On all three of these projects, BMP requirements related to riparian area protection were met.

For the 2730 practices evaluated over the 12-year period, acceptable implementation was accomplished 92 percent of the time. Over 1847 effectiveness evaluations were completed for this same period, of which 92 percent were deemed to be effective.

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%
1999	Forest-wide BMP Audits	74	100%	15	87%
2000	Forest & State (EQC) MBMP Audits	201	97%	114	98%
2001	Forest-wide BMP Audits	119	90%	34	88%
Totals		2730	92%	1847	92%

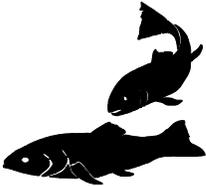
Conclusion: Riparian zones are being identified and mapped as part of Forest Plan implementation. Forest Plan Appendix 26, Riparian Area Guidelines, and INFS direction are being followed. After increased emphasis over the last several years, riparian areas discovered during layout and sale administration are being identified and protected. Review of this portion of the monitoring item indicates we are successfully applying riparian considerations to projects. 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 Area 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 localized-RMOs for this Forest. This will be done as part of the on-going Forest Plan Revision Process.

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 FY2000-01 monitoring results are consistent with the summary conclusions stated in the FY1998-99 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 six other streams were checked for fall spawning redds. Numbers of redds for 2000 and 2001 are shown in the following table. The number of spawning adults continues to fluctuate. Bull trout spawning data from Canada continues to suggest that the Upper Kootenai stock of bull trout is functioning appropriately. The majority of these fish winter in Lake Kooconusa and spawn in Canada.

Table . Bull trout redd survey summary for all index tributaries in the Kootenai River Basin.

Stream	Year Surveyed	No. of Redds	Miles Surveyed
Grave Creek ^a	2000	97	9
	2001	158	9
Quartz Creek ^b	2000	91	8.5
	2001	154	8.5
O'Brien Creek	2000	34	4.3
	2001	47	4.3
Pipe Creek	2000	30	8.0
	2001	6	8.0
Bear	2000	23	4.25
	2001	7	4.25
Keeler ^c	2000	90	8.9
	2001	18	8.9
Wigwam (B.C and U.S.)	2000	1204	22
	2001	NA	

a. Includes Blue Sky and Clarence Creeks

b. Includes West Fork Quartz Creek

c. Includes South and North Forks of Keeler Creek

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 is tied to several factors. The decrease in redd numbers for Pipe, Bear and Keeler Creeks may be the result of poor spawning success between 1994-96 or most likely the result of low flows last September and October. Access into preferred spawning sites on these streams is heavily dependent on flow at the time of migration.

On a more positive note, Grave and Quartz Creek redd numbers were up by more than 60% each. The increase in Grave Creek is likely due to the improved access created by the modified Glen

Lake Irrigation District (GLID) point of diversion (POD). Screening installed at the POD was proven effective at reducing the number of fish entrained into the GLID irrigation system.

The large increase in redds for Quartz Creek may be attributable to the watershed restoration work that has been completed there. More than 60 miles of road has been made hydrologically neutral in the drainage and fine sediment monitoring has indicated a decrease in fines. The increased redd numbers for 2001 are encouraging as they occur at a time when increased numbers of bull trout would be expected to be found as a result of the watershed restoration.

The value of the redd counts as a monitoring tool is improving as run timing and preferred spawning areas have been identified for streams tributary to the Kootenai River. Work is currently being done on tributaries to the Clark Fork River to establish migration timings and preferred spawning sites. The bulk of that work is being completed by MFWP and the USFWS. The relationship between fish spawning and present forest management is obscure. 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.

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 streambed 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 streambed sediments.

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 FY99. 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 high flow 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 FY01 and previous year's data indicate a substantial reduction in instream woody debris in most managed streams by comparison to reference streams. Large woody debris frequency is seldom found to be below INFS standards.

Unfortunately 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 for 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 aquatics database. The Forest continues to collect 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 twelve 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 managed and unmanaged watersheds alike 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 stream habitat data collected through FY01 continues to improve our knowledge of the existing habitat and what its potential is.

The Interior Redband trout research project initiated in 1997 in cooperation with the University of Idaho, Bonneville Power Administration and Montana Department of Fish, Wildlife and Parks has been completed and the Master's Thesis from that project is available from the University of Idaho. As a result of that project, there is currently a group looking at restoration and enhancement opportunities specifically targeting redbands. The Forest will actively participate in that effort.

The Libby Ranger District continues to monitor the effects of the Quartz Creek Watershed Restoration. Whether directly correlated or not, there does appear to be a substantial increase in the number of bull trout being produced by Quartz Creek.

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 when originally selected, 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 2001 monitoring results further reinforce previous conclusions that indicate the need to change the monitoring requirements.

The National Fish Ecology Unit began an INFS effectiveness monitoring program in FY00. Sites on the Kootenai were sampled in FY01 but the results are not yet available. Random sites will be sampled on the Forest every year with 'reference' sites sampled every five years.

Recommended Actions:

Monitoring: This area of the Forest Plan has been identified as one to be addressed in Revision. Given the multiple layers of mandated monitoring and National efforts plus the upcoming implementation of the National Resource Information System (NRIS) the Forest needs to adapt

its Monitoring Plan. The Forest is currently populating a fish habitat database that will facilitate moving all new and existing data into NRIS when it is made available within the Region.

Forest Plan Implementation: 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. The Forest is committed to restoration efforts where project analyses indicate a need.

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 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 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 FY96 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 2001.

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.

Collection of bedload sediment samples has been discontinued as outlined in the FY96 Monitoring Report. Alternative monitoring methods are now used as outlined previously. That 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 60 streams, a few of which are reference streams (those with no past activity). In 2001 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, limits the utility of this data to validate the effectiveness of management direction. Natural variability between years further confounds data interpretation.

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 2001 we again restricted the use of this technique to larger streams.

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 100 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 2001, 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.

Figure 1 displays the relationship between management activities, percent fines and fish numbers in Bobtail Creek. Instream fines have shown little change from 1994 to date even with more than a quadrupling of equivalent Clearcut acres (ECA) and a tripling of road miles within the watershed. Fish numbers have however decreased but it does not appear that decrease is associated with forest management activities.

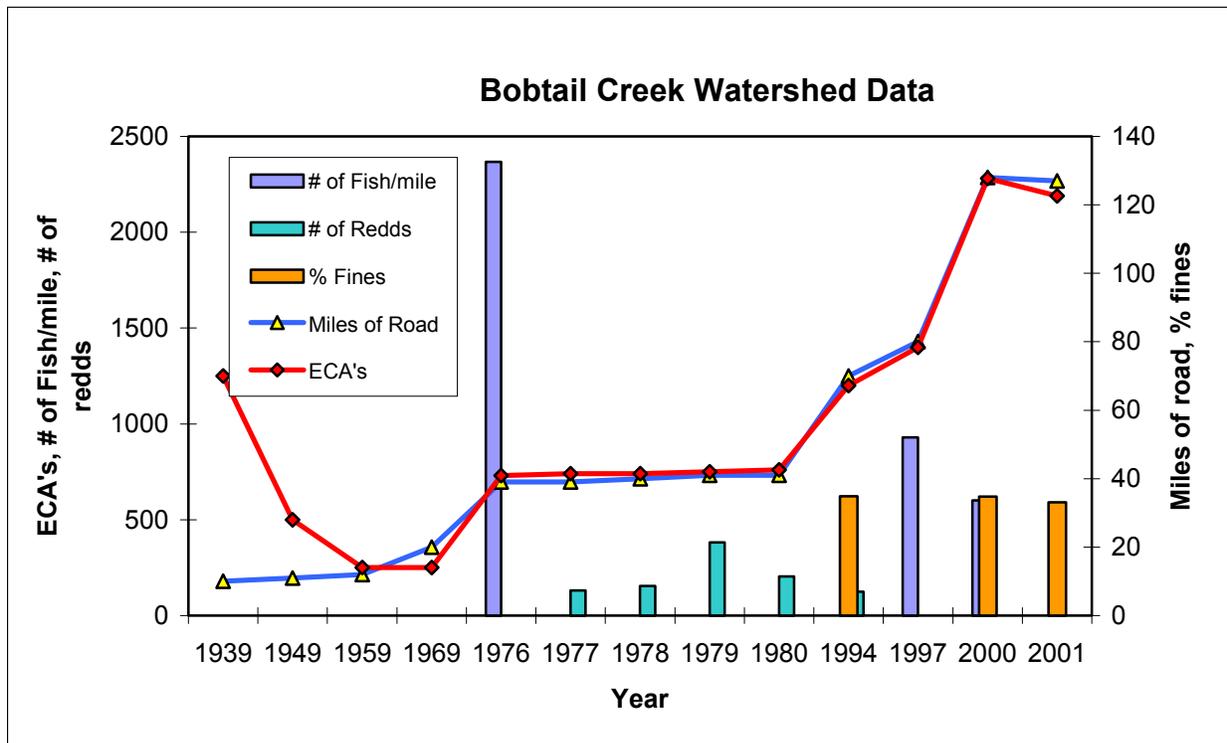


Figure 1

Data displayed in Figure 2 also indicates current Forest Plan direction through INFISH has had a positive effect on instream conditions. Aquatic macroinvertebrates are extremely sensitive to water quality and instream fines. Sediment core and aquatic insect data collected at three sites on Pipe Creek show conditions remain stable with continued management on both Private and

public lands. It can be concluded that current direction under INFISH is adequate to maintain water quality and aquatic habitat conditions.

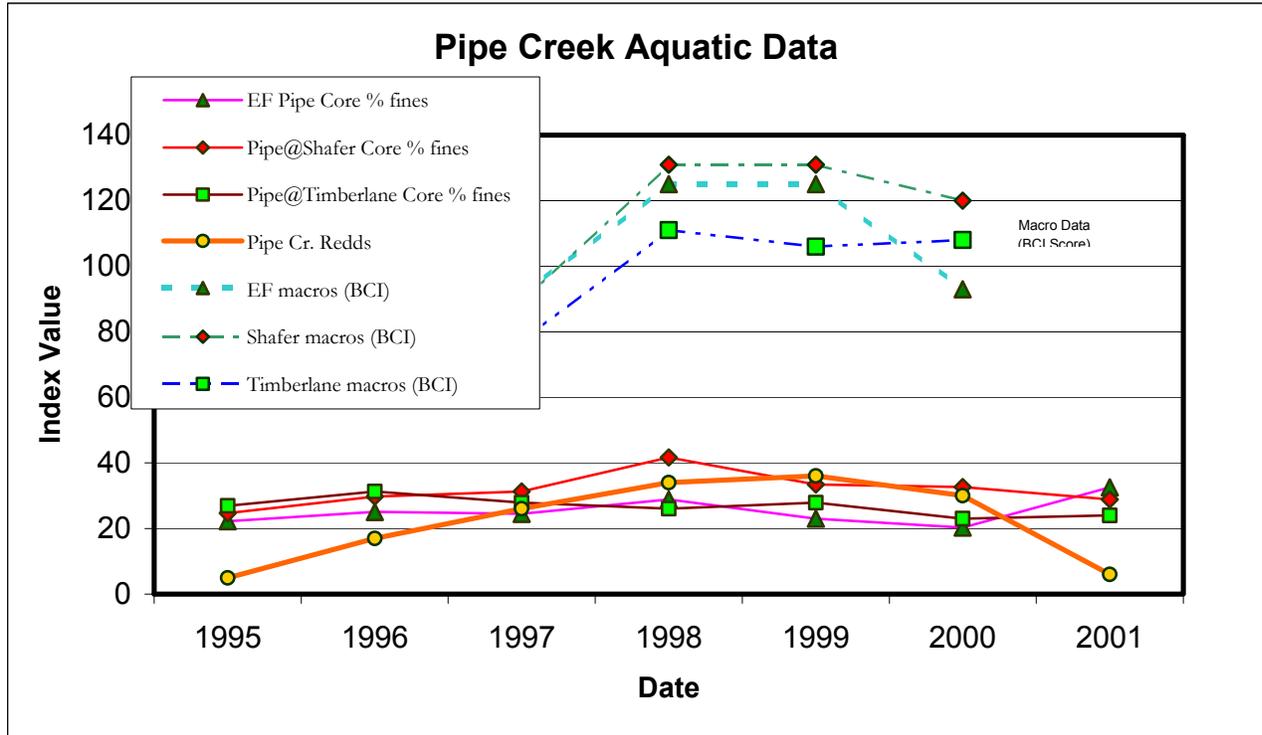


Figure 2

Figure 3 shows the relationship between fines and bull trout redds in Quartz Creek. Quartz Creek is an INFISH Priority watershed. Management levels in Quartz Creek have been reduced since 1994 and more than 60 miles of road have been decommissioned within the watershed. In light of this, it is notable that there is no apparent trend in percent fines. There was however a large increase in bull trout redds between 2000 and 2001. Given the variability in the data it is impossible to link the increased number of bull trout with reduced road miles and active forest management.

Figures 4-6 are hydrographs showing the relationship between sediment movement and the peak flows for Bobtail, Pipe and Quartz Creeks. Most sediment movement occurs during a very short period of time as would be expected

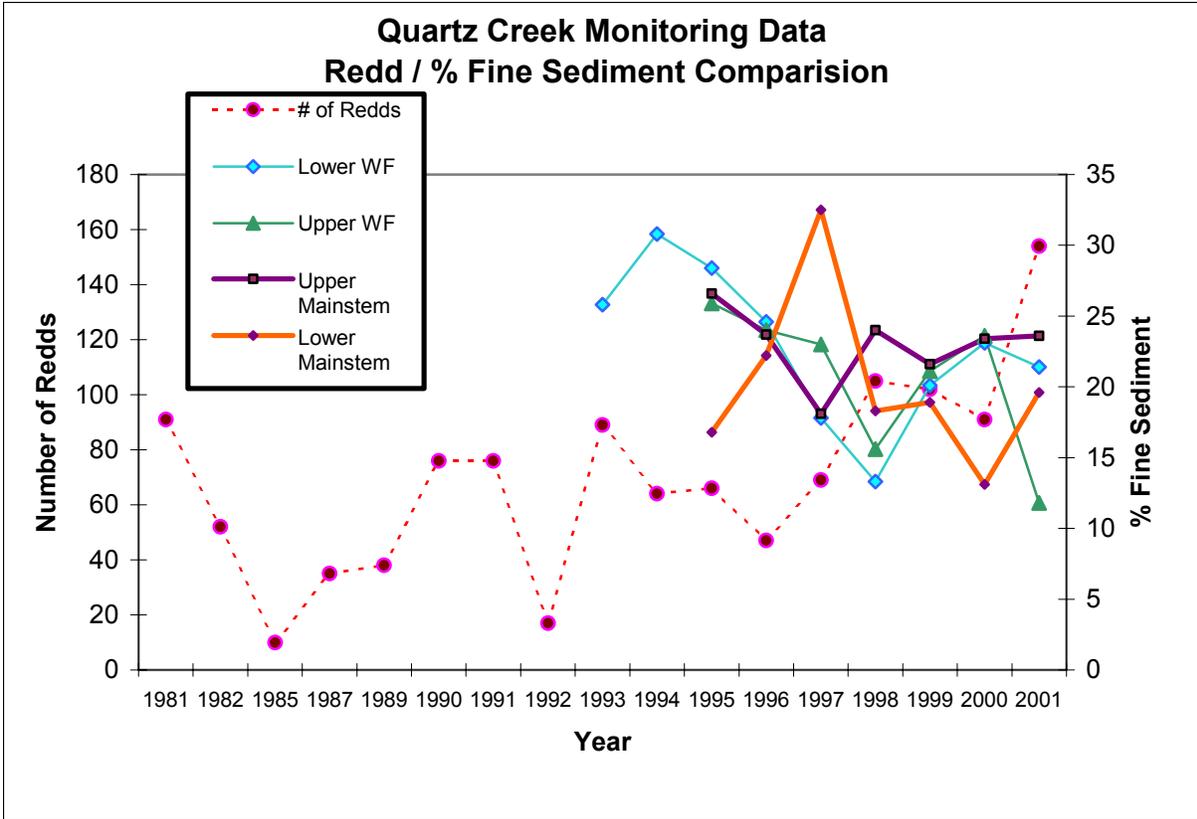


Figure 3

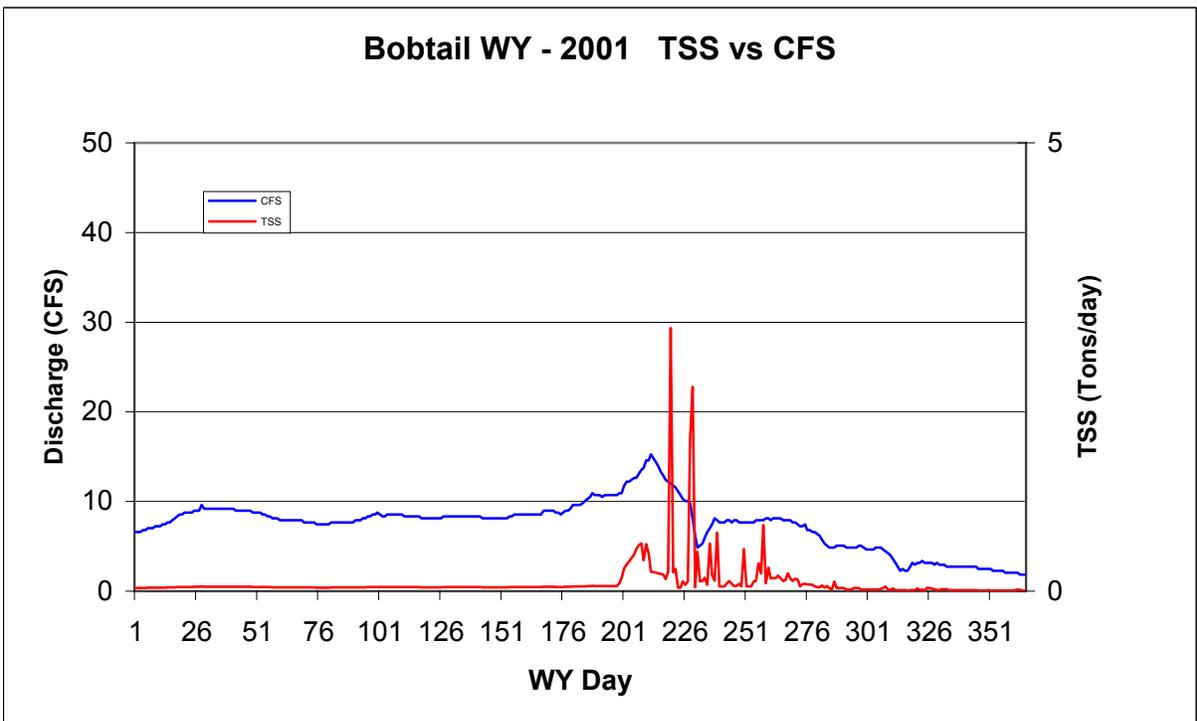


Figure 4

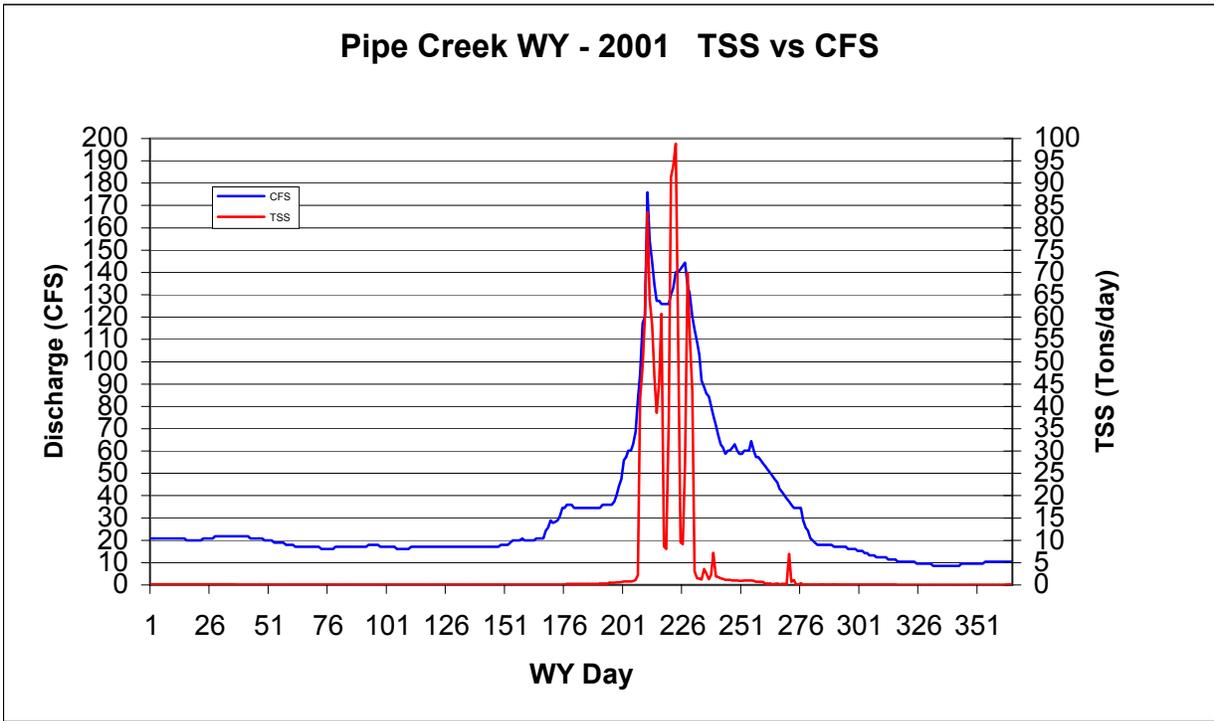


Figure 5

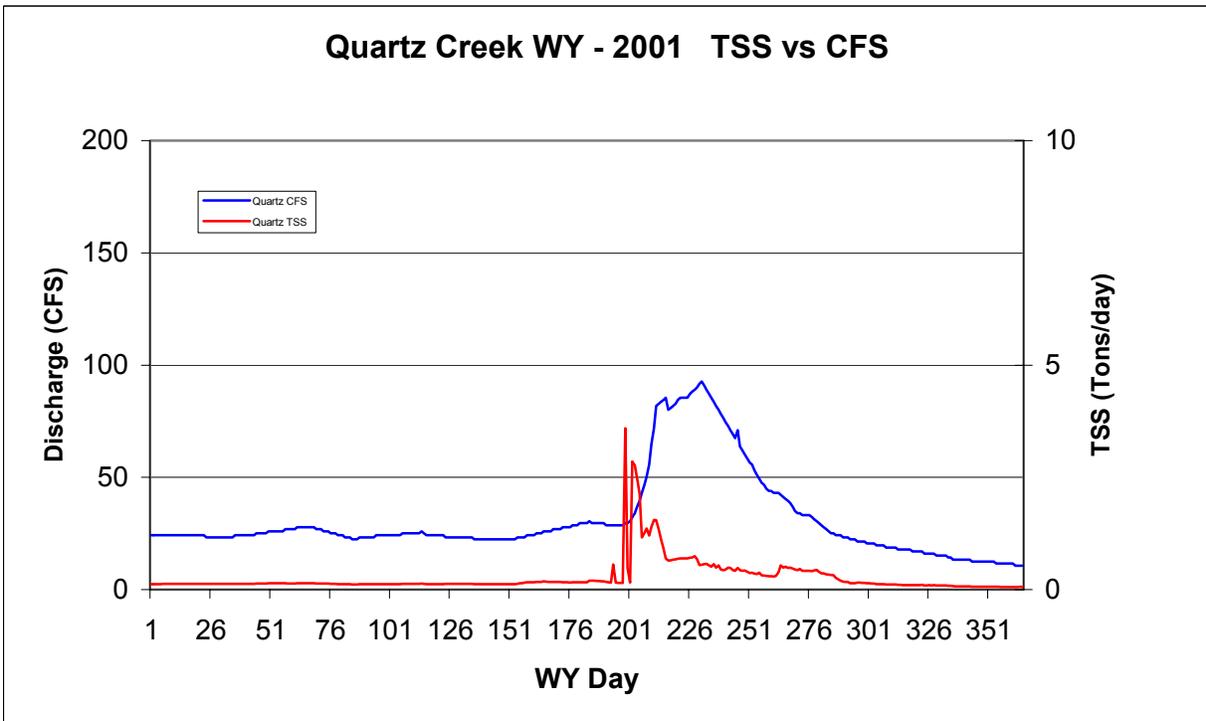


Figure 6

Other Applicable Information:

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. As a caution, 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. It does appear that the guidance provided by INFISH is adequate to maintain aquatic habitat conditions.

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.

These two recommendations will be considered as Forest Plan monitoring has been identified as a subject to address in Forest Plan Revision. Monitoring items and methodology will be carefully considered in building the new Forest Plan.

Forest Plan Implementation: The Forest will continue to implement INFS with an emphasis on BMP application to maintain our efforts of sediment prevention. In addition, we continue habitat restoration efforts that are focused on stabilizing known sediment sources.

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

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



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.

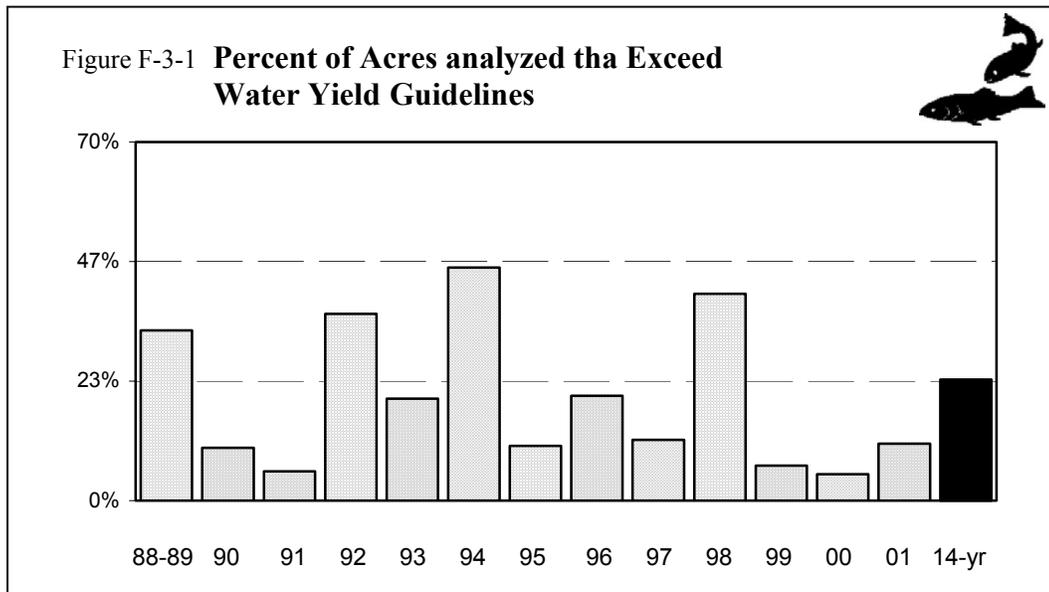
Results: The Forest has employed two methods to examine this data. Table F-3-1 tracks the watersheds that are evaluated as a part of project planning. Since these analyses are not randomly distributed around the Forest, results tend to be skewed in some years depending on which watersheds are being analyzed 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 FY01, the water yield model was used to estimate the peak flow increase on 436,531 acres of both National Forest and private land. Most of these watersheds had been analyzed in previous years. Of the total area analyzed during this fiscal year, 11 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 of 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%
99	172,538	11,777	7%
00	135,835	7,013	5%
01	436,531	48,570	11%



Some of the totals in Table F-3-1 include reassessments of previously completed watersheds because of changed conditions. For instance, many acres were reanalyzed following the fires last summer. 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 totaled 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 thirteen years ago and conditions may have changed.

As shown in Table F-3-2, over 2,042,317 acres have been analyzed for water yield conditions on the Kootenai since 1988. Of this total, 1,564,706 acres (77 percent) were found to be at or below the guidelines and 477,611 acres (23 percent) were found to be over guidelines according to the most recent analysis in each area, which could be up to twelve years ago.

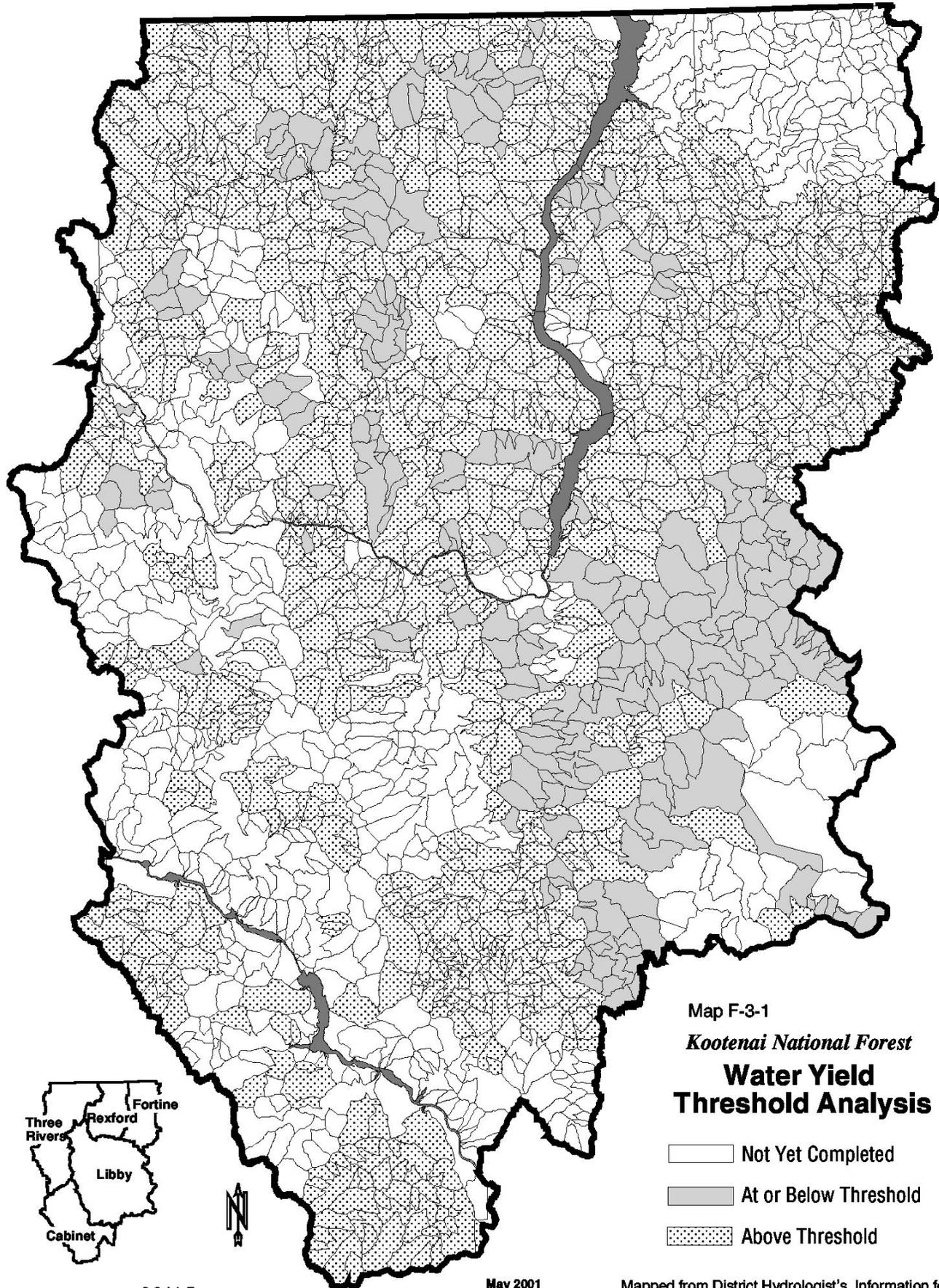
Table F-3-2 **Summary of Watershed Analysis Results** (includes private land)

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 01	2,042,317	1,564,706 77%	477,611 23%

Evaluation: Table F-3-1 shows 11 percent of the analyzed watershed acreage for FY01 exceed the peak flow water yield guidelines. The large fires from the summer of 2000 affected many areas across the forest, resulting in conditions that cause increased runoff and peak flow increases. And, as in prior years, the reasons for these current conditions are also 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. 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.

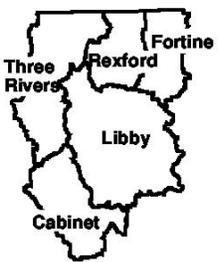
Table F-3-2 indicates that, for the period from FY 88 to FY01, about 23 percent of the watershed acreage, including private land, is exceeding water yield guidelines. Figure F-3-2 is a map showing the watersheds where peak flow analysis has been done in one or more Fiscal Years since 1988 and also shows 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.



Map F-3-1
Kootenai National Forest
**Water Yield
 Threshold Analysis**

- Not Yet Completed
- At or Below Threshold
- Above Threshold



8 SCALE 8 16 Miles

May 2001

Mapped from District Hydrologist's Information for Fiscal Year 1999, shown by watershed.

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

ACTION OR EFFECT TO BE MEASURED:	Emerging issues.
VARIABILITY WHICH WOULD INITIATE for FURTHER EVALUATION:	Issues surfaced that were not included in or analyzed 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 Maintenance: The inability to maintain existing roads to an acceptable standard continues to be a major concern both internally and with the public. There is a conflicting need to improve watershed conditions with the need to maintain public access.

Road Closures: Road closures in general have become part of the public's concern over federal vs local control.

Access: Public comments include concerns about access to the forest for a variety of reasons, including snowmobile or OHV use in Designated and Recommended Wilderness areas. There is a conflicting need to provide back-country winter access with the need to maintain habitat security for lynx and other species. The Forest Plan allows snowmobiling in the Ten Lakes WSA, however, opponents interpret it as authorization at the level of use at the time the Plan was approved. Use in the Ten Lakes WSA has increased significantly since 1987 including non-typical use by llama and mountain bikers. There is also a conflicting need to provide access to private lands (ANILCA) with a need to maintain habitat security, especially for grizzly bear.

Wildlife Issues: Linking wildlife habitat across national forest lands is becoming an issue that will need to be addressed in Forest Planning. In addition, management for grizzly bears outside of identified Recovery Areas is becoming an increasing concern.

Community Protection: The National Fire Plan is providing increased emphasis for reducing hazardous fuels around communities. The Kootenai continues to plan and implement projects that meet objective of the Fire Plan.

Land Uses: There is an increasing demand for use of National Forest System lands. This is putting stress on conflicting resource values and the ability of the Agency to address them in a timely manner.

Community Relations: There is public perception that the Forest Service is not fulfilling its responsibility as a partner in rural community development. This issue is also related to the decline in timber harvest and road closures. The regional/national initiatives related to roadless areas, planning regulations and transportation management are a source of local frustration. Local people feel left out of the process. The Forest is struggling with how to balance the expectations of the public with regard to sustainable forest uses while keeping pace with the laws, regulations, and policies that guide National Forest management.

CONTINUING FOREST ISSUES THAT MAY STILL AFFECT THE FOREST PLAN:

The Forest Plan initially identified and addressed 13 public issues. As stated in the FY92 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. Collaboration with the public will be an important aspect of the new revision process.

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 that 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 that 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 2001 dollars in order to provide for comparison. The fiscal year unit cost values were obtained from Forest accounting reports and Forest management attainment reports. 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. Road costs are based on purchaser credit established and associated engineering support costs.

In FY99, changes were made to the Forest Service accounting system and it is no longer possible to separate timber road costs from all other road costs. For this report, total road construction and reconstruction support costs were used, resulting in an over-estimate of unit 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 88-01, and FY 2001 unit cost data for these items.

Results and Evaluation:

Timber Sales unit costs for FY 2001 decreased from the average in the preceding years. However, costs are more than three 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 planning, 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.

Timber Roads unit costs were \$26 per MBF in FY 2001, which is a decrease from the average of the preceding years. The FY 2001 cost is actually lower than the cost predicted in the Forest Plan. The reduction in unit costs is reflective of a reduced amount of road construction and reconstruction. Monitoring has shown that this value varies from year to year as a result of changing harvest and road construction emphasis.

Reforestation unit costs were much higher than preceding years, and approximately 72 percent higher than the projected Forest Plan amount. As discussed in preceding monitoring reports, since reforestation is a relatively large component of the timber program, this additional cost is a significant change in the economic efficiency levels of the Forest.

Precommercial thinning unit costs continues to stay well below projected costs, helping the Forest to minimize overall costs. 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 timber sale and reforestation unit costs are significantly higher than projected levels in timber sales and reforestation, there will be a need to factor in such changes during Forest Plan revision. Changes to the accounting system have made unit costs for timber roads more difficult to track in the future. 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 88-01	FY 2001
Timber Sales	\$/MBF	33	105	111
Timber Roads	\$/MBF	33	42	26
Reforestation	\$/acre	381	477	656
Precommercial Thinning	\$/acre	341	248	201

* All unit costs in this table have been updated to 2001 dollars to account for inflation and provide for comparison.

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 shows the percentage difference between the planned and actual budgets for FY2001. Major increases have occurred in fire, fuels, timber salvage sales, tree improvement, and trail and recreation facility construction.

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-4-1 were grouped and added together. 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 FY2001. 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. Budget and output data were averaged over the last 14 years to smooth out year-to-year variations. 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 is not a controllable item, because the Forest is required to respond to cases as they arise.

Protection (natural fuels treatment, in acres): Continuing the trend which began in FYs 92 and 93, the acres of natural fuels treatments increased substantially over prior years (see Appendix A). As a result, the level of accomplishment is continuing high, at 302 percent of the planned amount.

Table H-4-1 **FY2001 Budget as a Percent of Forest Plan Projected Amount**

Item	Budget Activity	Planned Amount Base Year 1978	Planned Amount Base Year 2001	FY 2001 Actual Amount	FY 2001 Actual % of 2001 Planned Base
00	General Administration	1,465	3,362	0*	0%
01	Fire	530	1,216	3,579	294%
02	Fuels	59	135	784	579%
03-05	Timber	2,648	6,077	2,364	39%
06-07	Range	59	135	81	60%
08	Minerals	287	659	436	66%
09	Recreation	561	1,287	805	63%
10	Wildlife and Fish	648	1,487	645	43%
11	Soil, Air, Water	269	617	681	110%
12	Facility Maintenance	145	333	440	132%
13-15	Lands/ Land Management	156	358	390	109%
42-43	Lands-Status/ Acquisition	96	220	362	164%
16	Landline Location	285	654	143	22%
17	Road Maintenance	764	1,753	2,281	130%
18	Trail Maintenance	115	264	327	124%
19	Co-op Law Enforcement	12	28	34	123%
20	Reforestation (appropriated)	871	1,999	487	24%
21	TSI (appropriated)	562	1,290	552	43%
23	Tree Improvement	20	46	111	242%
26-28	KV (Trust Fund)	1,427	3,275	1,841	56%
29	CFWS - Other (Trust Fund)	348	799	713	89%
30	Timber Salv Sales Perm Fund	275	631	3,453	547%
31	Brush Disposal (Perm Fund)	694	1,593	730	46%
32	Range Improvement	6	14	4	29%
33	Recreation Construction	99	227	211	93%
34	Facility Construction: FA&O	111	255	116	46%
35	Engineering Const. Support	2,360	5,416	44	1%
36	Const. Capital Invest Roads	1,801	4,133	805	19%
37	Trail Const/ Reconstruction	32	73	163	222%
24/ 38	Timber Road Const.: PC/Elect.	2,399	5,505	253	10%

* As part of a national change in budget accounting, the General Administration fund was done away with in FY01. Costs for this item were spread to the remaining budget line items.

Table H-4-2 **Forest Plan Budget & Output (Averages for FY88 – FY01)**

Activity or Output	Actual Budget as a Percent of Forest Plan	Actual Output as a Percent of Forest Plan
Minerals	96	62
Protection, Natural Fuels Treatment	198	302
Range	113	83
Recreation	71	154
Reforestation	91	70
Timber	50	46
Timber Stand Improvement	71	82
Wildlife	49	49

Range (permitted grazing use): The range budget has averaged 13% above Forest Plan projections while production amounts are below those shown in the Plan. 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 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 budgets have been close to those projected in the Plan while outputs are at a reduced level. See Monitoring Item H-3 for a discussion of reforestation unit costs.

Timber (Total volume sold, MMBF): Both timber budgets and outputs are less than planned. See Monitoring Item H-3 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 49 percent of planned amounts. Accomplishment also remains lower than expected at about 49 percent. These budgets show a decline beginning in FY 93 and continuing through FY 01. Much of this decrease in the wildlife budget was due to a change in

the accounting system. This change in the accounting system and the subsequent reduction in fish and wildlife funds reduces the ability of the Forest to undertake habitat improvement work.

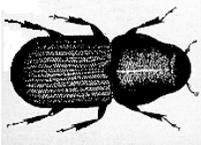
Conclusion: Based on the information stated above, this monitoring item is outside the range prescribed in the Plan.

Recommended Actions: Develop a new forest plan budget and associated outputs as part of the forest plan revision.

PROTECTION: Insect and Disease Status; Monitoring Item P-1

ACTION OR EFFECT TO BE MEASURED: Determine the level of insect and disease organisms following management activities to insure the health of residual and surrounding stands.

VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION: Insect and disease levels increase beyond normal levels.



Purpose: This monitoring item was established to ensure that insect and disease levels are not made worse by Forest management activities, particularly timber management. The Forest Plan requires that this item be reported every two years. The expected accuracy and reliability of the information is moderate.

Background: Insects and disease (I&D) levels in stands meeting the above criteria have remained at endemic (low) levels for the last two years. Management activities are normally designed using integrated pest management strategies to ensure insect and disease levels remain low from management activities. This includes treatments to physically reduce insect and disease damaged trees and subsequent fuel abatement to do the same.

Results: Densely growing trees, regardless of size, can come under stress, often predisposing them to insect and/or disease attack. Commercial (1310 acres) and precommercial thinning (5281 acres) treatments have occurred on the Forest over the last two fiscal years. Both treatments include reduction of stocking levels to reduce stress while improving species mixtures that are less susceptible to insect and disease problems. Insect and disease damaged trees are normally reduced during these operations. Mistletoe infected overstory trees on recently regenerated stands have been reduced on 100 acres. Pruning of white pine blister rust infected western white pine occurred on 237 acres. Prescribed burning following harvest and for wildlife habitat improvement sometimes increases insect activity in residual trees, but at a low level. Due to a recent outbreak of Douglas-fir beetle, it has been observed that Douglas-fir left as seed trees in regeneration harvest units are at higher risk following prescribed burning. Also, Douglas-fir surrounding these areas and in wildfire areas are more susceptible to beetle attack.

Evaluation: An insect and disease flight, activity reviews, service visits, stand exams, reforestation exams, permanent plot (growth plots) remeasurements, and benchmark exams indicate stands that have been regeneration harvested and those treated with some form of intermediate treatment are generally healthy, with only minor amounts of insect or disease that can cause significant problems.

The Forest has surveyed 3355 acres in 2000 and 2001 for Douglas-fir beetle. Followup treatments included pheromone trapping and application of anti-aggregant pheromone on 1813 acres.

Western gall rust continues to infect many lodgepole pine stands recently precommercial thinned. We have requested that the region prepare an evaluation ("white paper") on this disease and recommend possible management strategies. Root disease continues to infect regenerated

species with low resistance, primarily in the western districts. The vast majority of stocking in these plantations is composed of intolerant species not highly susceptible to root disease.

White pine blister rust continues to infect natural white pine at a high rate. We rarely feature natural white pine as a crop tree, so this condition does not pose a threat to the forest timber resource productivity. However, in stands where natural white pine is intended to remain a part of the stand composition and infection levels are moderate, branch pruning is being employed to reduce infection levels.

Recommended Actions: Based on the information stated above, insect and disease levels are at low levels in managed stands. Continue monitoring using the above surveys.

Appendix A: Planned Output or Activities and Accomplishments

Actual Accomplishments						
Target Item	Output or Activity	Unit of Measure	Planned Units	FY 2001	FY88-01 Average	FY88-01 Ave. % of Planned Units
Recreation	Developed Use	M RVD	297.0	278.6	275.2	93%
	Dispersed Use: Wilderness	M RVD	18.0	25.9	23.5	131%
	Non-Wilderness	M RVD	559.0	567.1	1,043.5	187%
Wildlife and Fish	Wildlife Habitat Improvement	Acres	5,600.0	1,344.0	2,593.4	46%
	T & E Habitat Improvement	Acres	150.0	614.0	176.9	118%
	Fish Habitat Improvement	Acres	120.0	69.0	113.8	95%
Range	Authorized Grazing Use ²	M AUM	12.6	7.0	10.4	83%
Soil	Soil Inventory	M Acres	15.7	0.0	4.3	27%
Lands	Land Exchange	Acres	1,700.0	231.0	1,884.8	111%
Minerals	Minerals Management	Cases	300.0	144.0	185.1	62%
Protection	Fuels Treatment, Natural	Acres	800.0	2,885.0	2,414.3	302%
Timber	Total Volume Offered	MMBF	233.0	74.0	107.2	46%
	Reforestation (appropriated)	M Acres	3.0	0.6	2.8	92%
	Reforestation (KV)	M Acres	7.1	1.6	5.6	80%
	Reforestation (Other, Co-op)	M Acres	4.0	0.5	1.5	37%
	Total Reforestation	M Acres	14.1	2.7	9.9	70%
	Timber Stand Improv (appropriated)	M Acres	4.0	2.8	3.3	82%
	Timber Stand Improv (KV)	M Acres	1.0	0.2	0.8	82%
	Total Timber Stand Improv	M Acres	5.0	3.0	4.1	82%
	Stand Examination	M Acres	139.0	21.8	119.8	86%
	Fuel Treatment (BD/ KV)	M Acres	11.7	5.2	7.7	66%
Facilities	Total Road Construction	Miles	237.0	1.5	40.7	17%
	Trail Construct/ Reconstruct	Miles	7.5	10.7	10.9	146%

² Authorized grazing use is the amount of grazing that is billed for a season. Permitted use is the amount on the grazing permit and may be higher than the authorized amount, due to fluctuations in herd size, change in weather, etc.

APPENDIX B: Openings Greater than 40 Acres

The National Forest Management Act (NFMA) provides direction for development and implementation of land and resource management plans. Secretary of Agriculture regulations of 36 CFR 219 provide guidance for implementing NFMA provisions. Section 219.27 (d)(2)(iii) states that "...the established limit shall not apply to the size of areas harvested as a result of natural catastrophic conditions such as fire, insect and disease attack, or windstorm."

Furthermore, the Northern Regional Guide, 36 CFR 219.8, states, "Where natural catastrophic events such as fire, windstorm, or insect and disease attacks have occurred, 40 acres may be exceeded without 60-day public review and Regional Forester approval, provided that the public is notified in advance and the environmental analysis supports the decision" (Regional Guide, page 2-6). This same direction is repeated in the Regional Supplement to Forest Service Manual 2471.1.

The Forest Plan also provides direction regarding opening sizes: "...maintain a variety of unit sizes of generally 40 acres or less. Where catastrophic conditions such as insects, disease, or fire create a condition whereby larger unit sizes will have no additional effect on wildlife habitat, larger cutting units may be used" (Forest Plan, p II-23). The intent of this statement is to ensure that any activity hastens recovery for wildlife and there are no long-term detrimental effects by exceeding 40 acres.

The following projects were approved by the Forest Supervisor to exceed opening sizes and, therefore, are consistent with Forest Plan direction.

Fiscal Year	Project Name	Total Acres of Openings	MA	Years to Recovery	Comments
2001	Syrup	82	12	3-17	Harvest to meet desired landscape composition, structure and function in two units.
2001	Pink Stone	2,355	12 15	12-15	Salvage of fire killed trees in 35 units to meet fuels management objectives and help restoration in the Pinkham Creek drainage following the fires of 2000.

APPENDIX C: List of Preparers

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