

Forest Plan Monitoring Report

**FISCAL YEAR 1996**

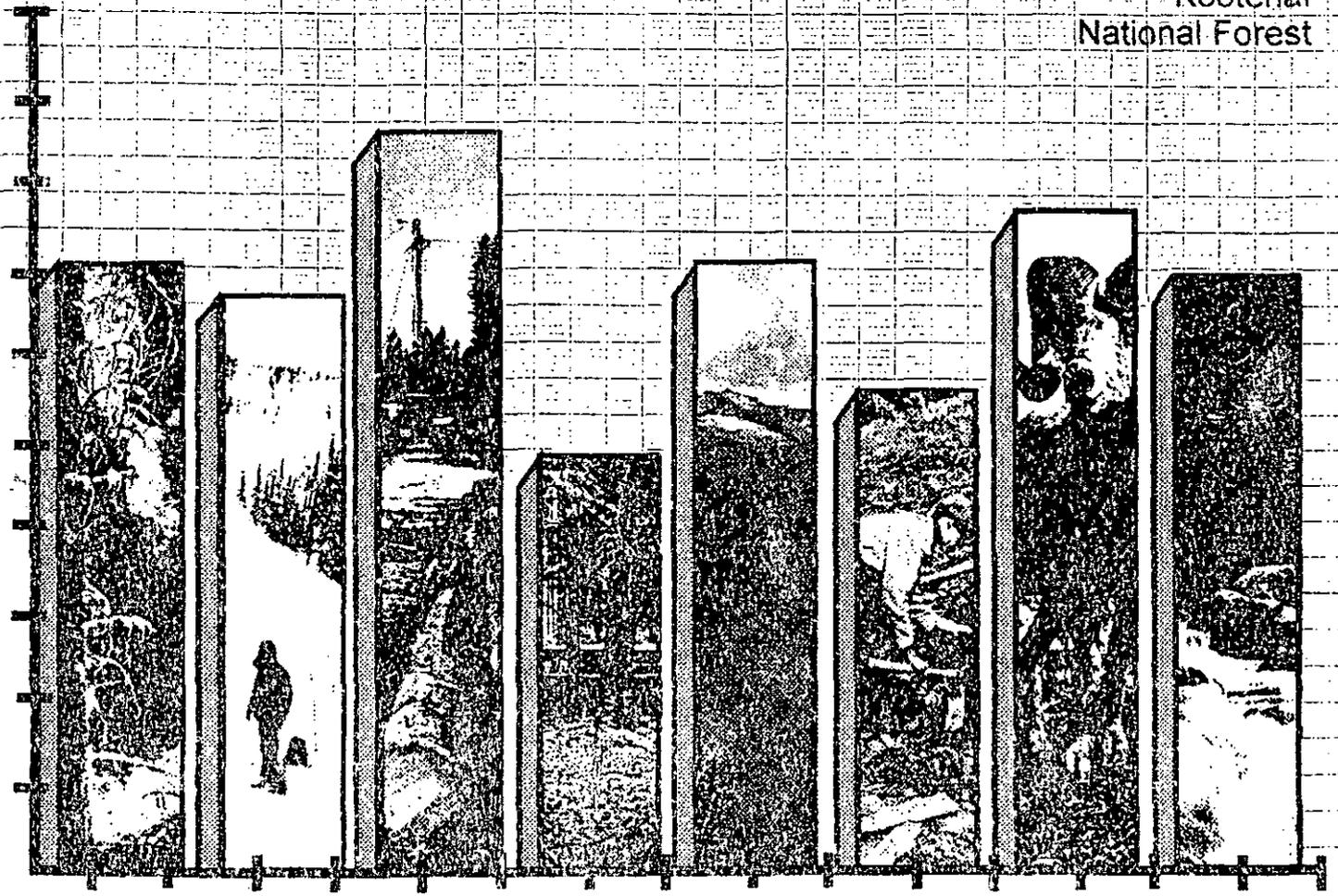
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# Kootenai National Forest Plan

United States  
Department  
of Agriculture



Forest Service  
Kootenai  
National Forest



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for Fiscal Year 1996  
Kootenai National Forest**

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**FOREST PLAN ANNUAL MONITORING REPORT**  
**for Fiscal Year 1996**  
**Kootenai National Forest**

**SUMMARY**

**INTRODUCTION**

We have completed the monitoring of Forest Plan implementation for fiscal year (FY) 1996. This report evaluates all the field data collected by the end of FY 96 (September 30) that pertain to the 25 reported monitoring items. Our monitoring and evaluation process is shown in Chapter IV of the 1987 Kootenai National Forest Land and Resource Management Plan (Forest Plan). This year's report evaluates 25 monitoring items, including 14 annual and five biannual items. In addition, six five-year items are being evaluated this year. These are the five-year items that were found to be inconclusive or off-track in the 1992 Monitoring Report. Because these items are possible candidates for changes during Forest Plan revision, they are being reported this year in order to summarize the applicable information for revision. We will need this information for the development of the "Analysis of the Management Situation" which evaluates existing conditions and monitoring results, and determines the "Need for Change" in the Forest Plan. "Analysis of the Management Situation" and identification of the "Need for Change" are required by the regulations implementing the National Forest Management Act, 36 CFR 219.12, as the preliminary steps of Forest Plan revision. The Forest will be undertaking substantial efforts during 1997 to complete these steps.

The summary explains the Forest Plan itself, the monitoring methods, and summarizes nine years of monitoring practices, standards, and outputs under the Forest Plan.

**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 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 Plan, and Forest Plan amendments) tell us how to put the plan into practice, or give us conditions we must meet while we implement the plan.
- **Land Allocation - Management areas (MAs)**, as described in the Forest Plan Chapter III and displayed on the Forest Plan Map, are those areas of the Forest which are allocated for different types of land management and resource production.

**MONITORING**

As we've found over the last nine years, monitoring occurs in complex and changing environments, and our results will not always be totally predictable, definitive or certain. Monitoring is affected by many things, including natural events that cannot be predicted. The purpose of monitoring is to determine answers to the following questions: Are we doing what the Plan envisioned (implementation monitoring)?

Are we seeing the effects and outputs predicted in the Plan (effectiveness monitoring)? Are the standards working (validation monitoring); do we need to adjust practices to meet the standards? Does the monitoring process need adjusting?

Monitoring data for most items is reported yearly on forms by the Districts or responsible Staff areas at the Supervisor's Office. These forms are reviewed yearly and if updates to the monitoring processes are needed, then changes to the forms are made. You'll notice that some of the action items discuss updating the monitoring forms.

Monitoring and evaluation information will be used more intensively now as we begin Forest Plan revision. Part of the reason we decided to issue a "Notice of Intent" to revise the Forest Plan was because of our findings in the monitoring program. We are off-track in areas regarding the Allowable Sale Quantity (ASQ), and this will be addressed during revision. As noted in this year's report it is timely to further evaluate many other items as we have a greater understanding of the concepts of ecosystem management.

## **CHANGES TO THIS YEAR'S REPORT**

This year you'll notice a couple changes to the report's format. In the past we have ended each evaluation with a section called "Findings". This year those findings have been incorporated into the "Evaluation" section and we've added a section call "Recommended Actions". We added this section to display what, if any, action is recommended to be taken in response to a monitoring item. These actions are also discussed in the summary of each monitoring item. In addition, we changed the order of the report so that all of the water-and fisheries-related monitoring items are found together. This should aid in the understanding of inter-relationships of these items (C-9, C-10, F-1, F-2 and F-3).

## **SUMMARY OF MONITORING RESULTS**

**Roadless Area Overuse (A-2):** A qualitative evaluation was completed for this monitoring item. That evaluation found that most of the Wilderness, Ten Lakes Study Area, proposed wilderness and other roadless areas are not being overused. Some overuse is occurring on approximately 20 acres within the Wilderness and Ten Lakes Study Area. This overuse has primarily been associated with the use of stock during wet periods. With the exception of these 20 acres, this item is on-track with the Forest Plan. We will evaluate what action(s) may be needed to address this issue at the spring Forest recreation workshop. In addition, we will update the monitoring forms so that we can better track the data.

**Off Road Vehicle (ORV) Use Effects (A-5):** A qualitative evaluation was completed for this monitoring item. That evaluation found that we are seeing some minor and isolated effects from ORV use. Mitigation such as kelly humps and log barricades have been effective in reducing this use where it is not appropriate. Because of the minor and isolated nature of ORV use, this item is on-track with the Forest Plan. The monitoring form will also be updated so that we can better track the data.

**Old Growth Dependent Species (C-4):** The pileated woodpecker is the designated old growth habitat management indicator species on the Forest. Personal observations and/or transects may be used as data sources to analyze population viability. Since 1993, the Forest has participated in the Region 1 Landbird Monitoring Program. Observations have been recorded for several thousand points within the Region, including many points on the Kootenai Forest, and the data is statistically valid to provide information on bird species presence, distribution, and habitat associations. The Region 1 Landbird Monitoring Program, the preliminary population transects, and Forest staff observations all point to the same consistent

interpretation that pileated woodpeckers are widespread and are relatively common on the Kootenai National Forest. The information available at this time does not indicate that a downward trend approaching 40 percent of population potential is occurring. We will continue our participation in the Region 1 Landbird Monitoring Program, as well as our forest monitoring efforts.

**Old Growth Habitat (C-5):** The Forest 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. Approximately 1,125,000 acres below 5,500 feet have been evaluated for old growth. A total of 129,104 acres (11.5 percent) are now identified with appropriate management area designations. The level of old growth designated for the areas validated to date is above the 10 percent level required in the Plan; therefore, this item is on-track with the Forest Plan. Good progress is being made in the validation effort and will continue.

**Cavity Habitat (C-6):** The Forest Plan specifies that we will maintain habitat capable of supporting populations of cavity-nesting wildlife at 40 percent or greater of their population potential. The 40 percent population level is considered the minimum level necessary to maintain viable populations. The available monitoring data indicates the Forest is providing sufficient cavity habitat at a drainage or compartment level with the exception of areas where historic conditions such as the widespread turn-of-the-century fires make this impossible. Based on this information, the creation of numerous snags by the 1994 fires, and the existence of ample cavity habitat in the majority of the forest that is outside the suitable timber base, this monitoring item is within acceptable limits of the Forest Plan. We will update the monitoring forms for this item in FY 97. As part of Forest Plan revision, this item will be further evaluated to determine if there should be more localized objectives for cavity habitat.

**Threatened and Endangered Species (C-7):** We're monitoring the quantity and quality of habitat for the recovery of peregrine falcons, gray wolves, bald eagles, grizzly bears and white sturgeon. We're also cooperating with other agencies to obtain population estimates or trends.

- *Peregrine falcon:* Two peregrine falcons were observed on the Cabinet Ranger District in 1996. A bird was seen in the lower Clark Fork valley near Heron and a second sighting occurred along the Bull River. Nesting activity was not confirmed at either location.
- *Gray wolf:* In 1996, reports of wolf sightings continued at slightly increased levels compared to recent years. Sightings were noted in areas on the Fortine Ranger District and portions of Libby and Cabinet Ranger Districts. In addition, sightings increased on the Three Rivers Ranger District in 1996.
- *Bald eagle:* Surveys indicate stable numbers of wintering bald eagles during the reporting period.
- *Grizzly bear:* Grizzly bear habitat effectiveness is above the Plan's standard on a Forestwide average. Two bear management units went below 70 percent habitat effectiveness because of fire salvage projects. These units will meet 70 percent habitat effectiveness once harvest and rehabilitation activities are complete.
- *White sturgeon:* The status of the Kootenai River white sturgeon improved in 1996. A new population estimate (based on better data) from the Idaho Department of Fish and Game indicates there are approximately 1,469 adult sturgeon in the population. This is a 589-fish increase in the estimated size of the population due (in part) to new data from Kootenay Lake in Canada.

All of the threatened and endangered species' habitats being monitored appear to be stable or improving. The information shows that the Kootenai National Forest is progressing toward providing adequate habitat for threatened and endangered species recovery, therefore this item is on-track with the Forest Plan.

**Range Use (D-1):** During the last nine years, grazing use has averaged 90 percent of projected use which is within the range anticipated in the Plan.

**Noxious Weeds (D-2):** Extensive efforts at documenting information regarding noxious weeds occurred in FY 96 with the preparation of the Herbicide Weed Control Environmental Assessment. The information indicates that several noxious weeds have increased more than 10 percent in the numbers of acres affected and some have had a 10 percent or more increase in density of existing infestation. In addition, with the discovery of several new invaders over the last several years, the diversity in noxious weeds has changed. This monitoring item is outside the range prescribed in the Forest Plan.

Prior to 1996 emphasis in weed control focused on the use of biological and cultural controls (cultural control uses plant competition to maintain or enhance desired plants) and the use of herbicides on the north end of the Forest. In 1996, a Noxious Weed Control Provision was added to the timber sale contracts. In 1997, the Herbicide Weed Control EA should be issued, giving the Forest another tool for control. These actions are occurring under the direction of the Forest Plan and should help improve the noxious weed situation on the Forest. In addition, we will update the monitoring forms to collect data on the effectiveness of these new control methods.

**Allowable Sale Quantity (ASQ) (E-1 and Appendix B):** The sell volume chargeable to the ASQ for FY 96 represents approximately 53 percent of the estimated annual ASQ volume. The average annual sell volume chargeable to the ASQ from total suitable lands is at 46 percent of the predicted ASQ and continues to be outside the 95 percent level projected in the Plan. In addition, the Chief issued a decision on a Forest Plan appeal, in November 1995, which directed us to amend or revise the Forest Plan to correct the ASQ calculation and set a program sell level not to exceed 150 MMBF until an amendment or revision of the ASQ is done. The ASQ is a projection based on several assumptions and it is apparent that it will not be attained. Partially based on this item, Forest Plan revision has been initiated. Through revision we will establish the role and scope of timber management and the associated level of ASQ for the revised Forest Plan.

**Acres of Timber Sold for Timber Harvest (E-2):** FY 96 did not follow the general downward trend, but instead showed an increase of acres sold from the previous three years. The nine-year average for Management Area (MA) 15 is just over the Plan's projected level, while four other suitable timber MAs are considerably below in percent accomplished (MAs 12, 14, 16, 17). MA 12 has the largest average acreage deviation (a total of 5,429 acres or 8,800 minus 3,371). It is apparent that the acres sold for harvest will not meet the acreage projected in the Forest Plan. This is a result of many factors which are influencing the Forest's timber sales program. Forest Plan revision will provide the opportunity to assess appropriate levels of harvest volume and acreage.

**Suitable Timber Management Area Changes (E-3):** The degree to which changes have been made to management area designations indicate that validation of Forest Plan data is continuing to occur. The large change in the suitable management area category (-40,413 acres) amounts to approximately three percent of the total suitable timber base. At this time, it is not apparent that this is meaningful in terms of the calculation of ASQ. During Forest Plan revision, ASQ calculations will be made using the validated management areas. This will allow for an assessment of the effect of changed management area designations.

**Timber Harvest Deferrals (E-7):** In FY 96 a total of 3,586 acres were deferred. For FY 88-96, MA 12 had 20,911 acres deferred. This is the largest amount of all the MAs and is beyond the prescribed range of 10,000 acres. The grand total cumulative deferred MA acreage for both categories is now 32,395 acres. This item indicates that many more factors affect harvest than were accounted for during the preparation of the Forest Plan. Since the Forest now has detailed records of such factors, it will be more able to assess those effects during Forest Plan revision. These factors will continue to be monitored.

**Harvest Area Size (E-8 and Appendix C):** The average seedtree harvest exceeded 40 acres in MA's 15 and 16 in 1996. In addition, the average shelterwood harvest exceeded 40 acres in MA 16 in 1996. However, the nine year average harvest area size by regeneration harvest method is still less than 20 acres in MA 11 and less than 40 acres in MAs 12, 14-17.

Appendix C lists the harvest areas resulting in larger than 40 acre openings approved by the Forest Supervisor during FY 1995 and 1996, as well as an estimate of how long it will take for the vegetation to regrow to provide adequate big game hiding cover. These 39 openings were in response to the catastrophic fires of 1994, windstorm or dead lodgepole pine. In most cases, the newly created openings were contiguous with an existing harvest unit. Many of these openings did not provide hiding cover because of the extent of tree mortality. Appropriate documentation and analysis was prepared for the projects approved to exceed 40 acres, therefore this item is consistent with the Forest Plan.

**Clearcut Acres Sold (E-9):** The acres of clearcut harvest sold had been reduced prior to 1996. In FY 96 the amount of clearcutting increased. This is primarily due to emphasis on salvage of timber killed by the 1994 fires and salvage of dead lodgepole pine. In many instances the salvage of fire killed timber or dead lodgepole pine resembled a clearcut. Where there were options, the Forest reduced the amount of clearcutting in the last nine years and met the intent of the Chief's goal for 1997.

**Riparian Areas (C-9):** Three approaches are used to track this item:

- ⇒ **Miles of stream classes and/or stream categories identified and mapped:** Approximately 4,100 lineal miles of riparian habitat have been categorized and mapped since 1988, about half in the past four years.
- ⇒ **Determining whether INFS standards and guidelines were applied during projects:** 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. Based on this amendment, review was initiated to determine if projects followed this direction. Sixty-nine projects were proposed and implemented in compliance with INFS. Ninety percent of these projects used the INFS default criteria for riparian widths and, on 10 percent of the projects, the RHCA width was appropriately modified based on site-specific information.
- ⇒ **Evaluation of the implementation and effectiveness of applicable riparian Best Management Practices (BMPs) that were used during management activities in or near the riparian zone:** In FY 96, 428 practices were evaluated. Acceptable implementations were accomplished an average of 96 percent of the time. Approximately 170 effectiveness evaluations were completed for this same period, of which 98 percent of the BMPs were deemed to be acceptable. For the 2,039 practices evaluated over the seven-year period, acceptable implementations were accomplished an average of 90 percent of the time. Approximately 1,340 effectiveness evaluations were completed for this same period, of which 91 percent of the BMPs were deemed to be acceptable.

We are effectively applying the Riparian Guidelines, INFS direction, and riparian BMPs on projects; therefore, we are on track with the Forest Plan. This is a change from FY 92 because of the increased

effort to map riparian areas, apply INFS guidelines and apply BMPs. Because of the new direction from INFS, no changes to Forest Plan direction are needed at this time.

**Fish Habitat and Populations (C-10):** 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 aggressive water quality protection measures and special streamside management provisions in riparian areas as the means for managing fish habitat. Forest Plan direction for management of fisheries was amended in 1995 with the Inland Native Fish Strategy (INFS). The purpose of INFS is to preserve management options for inland native fish, by reducing the risk of loss of populations and reducing potential negative impacts to aquatic habitat of fishes for an interim period.

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. Monitoring Item F-2 identifies seven representative watersheds where this data should be collected as a measure of Forest-wide management effectiveness. After FY 92 we added channel geometry, particle size distribution and riffle stability index (RSI) as data sources. We determined that data would be collected using these methods on a number of watersheds across the forest including areas that had not been harvested or roaded.

At this point in time we cannot determine whether implementation of Forest Plan prescribed practices has resulted in stream conditions that are outside the variability limits set in the Forest Plan. It is difficult to distinguish between natural variation and management-induced changes in streams. Even with the additional data we have collected since 1992, through new and different means, we are not able to determine whether we are within the variability limits of this monitoring item.

It appears that this monitoring item has several problems. These problems also relate to F-2 Stream Sedimentation.

- ◆ The variability limits are an unrealistic measure of human-caused change because of the natural variations within streams and over time.
- ◆ This monitoring item focuses on larger streams which do not respond immediately to management as do smaller streams where most of our activities occur. It takes more activity and a longer period of management to affect a larger stream than a smaller one.
- ◆ Some of the data sources originally identified for this item have proven unsuccessful. The alternative techniques we have investigated since 1992 (these are reported in F-2) have been more successful, but need more structure for site selection, monitoring intervals, etc.
- ◆ The monitoring program for this item has not been focused as it could be. We have collected a lot of data on smaller streams without a strategic plan on what, where, how and when we will collect the data so it will provide us meaningful results. We have been able to use that data where research has applied a more rigorous sample program.

Because of our findings we are going to establish an interdisciplinary team to evaluate the best course of action. The team shall evaluate whether we need to amend the Forest Plan to establish a new monitoring program for C-10 and F-2, or simply refocus our efforts by formalizing methods, site selection, data management and possibly adding additional monitoring sites where we can evaluate the effect of natural and random causes of change.

**Soil and Water Conservation Practices (F-1):** Approximately 90 separate projects were audited in FY 96 by KNF personnel. In FY 96, implementation evaluations were completed for 4,113 BMPs. Implementation was acceptable 98 percent of the time in FY 96, a marked improvement from 1995. Effectiveness evaluations were completed for 1,749 BMPs in FY 96 and BMPs were acceptable 100 percent of the time.

The FY 96 State BMP Audit done on the Forest evaluated a total of 158 BMPs on four separate projects, the same number of projects and practices as in 1994. Implementation was acceptable or better 92 percent of the time and unacceptable or worse eight percent of the time. When evaluated for effectiveness, BMPs were acceptable or better 92 percent of the time and eight percent were unacceptable or worse.

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

**Sedimentation (F-2):** The Forest Plan identified seven streams that would be monitored for this item. They are: Big, Sunday, Bristow, Red Top, Rock, Granite and Flower Creeks. The data to be collected includes bedload sediment production, suspended sediment concentrations and streamflow. After FY 92 we added channel geometry, particle size distribution and riffle stability index (RSI) as data sources. We determined that data would be collected using these methods on a number of watersheds across the forest including areas that had not been harvested or roaded.

At this point in time we cannot determine whether implementation of Forest Plan prescribed practices has resulted in stream conditions that are outside the variability limits set in the Forest Plan. It is difficult to distinguish between natural variation and management-induced changes in streams. Even with the additional data we have collected since 1992, through new and different means, we are not able to determine whether we are within the variability limits of this monitoring item. The same problems noted for the monitoring program for C-10 are also noted for this item. This item will be reevaluated in conjunction with the reevaluation of C-10.

**Water Yield Increases (F-3):** The forest water yield model is used to analyze the potential effect of disturbance in a watershed as a part of the analysis for timber sales and other activities. If the analysis shows that water yields approach or exceed guidelines, then no projects are proposed or further studies are made which enable our hydrologists to make professional interpretations. Due to past activities (prior to issuance of the Plan), activities on privately owned land, and effects of wildfire, 24 percent of the portion of the Forest analyzed has water yields exceeding the Forest Plan standard. In these areas, projects have not been undertaken or have been modified so that water quality, beneficial uses, and stream channel integrity are maintained.

**Soil Productivity (F-4):** A soils transect survey has been completed on 77 timber harvest units throughout the Forest between 1992 and 1996. These areas include the current logging methods including the types of equipment being used for mechanical falling, yarding, and slash piling. The areas ranged in size from 2 to 117 acres. The 1992 report showed that 52 percent of the 511 acres surveyed to that point were above the Forest Plan variability limits of 15 percent detrimental compaction. Since then, 1,221 acres have been surveyed and only two percent (21 acres) were above the Forest Plan variability limits. This very major change is mainly a result of reduction of acres that are "dozer piled." Other reasons include more winter logging, more broadcast burning, and more use of forwarder logging equipment. Based on the information stated above (the improvement that has occurred since 1992 and that no unit was greater than 15 percent in the last two monitoring seasons), this monitoring item is determined to be

within the recommended range stated in the Forest Plan (no areas should measure more than 15 percent of detrimental disturbance).

**Effects to Local Economy (H-1):** The result of nine years of Forest Plan implementation has been substantial positive economic influence to local counties. Montana, Lincoln and Sanders Counties have received the greatest benefits, but some effects have been present in Boundary County, Idaho, and Flathead County, Montana also. There is a very clear trend established of reduced volume sold from the Forest. Economic impacts of this change have been mitigated by harvesting volume under contract at higher than historical rates. This, along with high national demand for lumber and pulp throughout much of the second five years of Plan implementation, has been helpful in offsetting mill and mine closures which occurred in the early 1990s. In addition, there has been an influx of people to the area who depend on transfer payments rather than a job for their income, and property values and personal income levels have remained stable or increased as a result.

Since the volume under contract has been reduced to the level of about one year's capacity and current sell volumes are lower, the economic situation for local communities is not as resilient as in the first nine years of the Plan. The buffering capacity of the large timber sell and harvest programs of the 1980s and early 1990s is no longer present, so the role of the Forest to mitigate potential negative effects in the local economy (such as closings of privately owned mills and mines) will be more limited. This implies that national and international influences (wood and pulp prices, recessions, and demographic shifts) will have continuing strong and increasing influence on local economies. In addition, it is expected that even small variations in the role of the Forest's economically important programs will have relatively larger effects on local people in comparison to the effects they had in the first 9 years of Plan implementation.

**Emerging Issues (H-2):** This item identifies those issues that appear to be developing since the Plan was initiated, and also monitors the original Forest Plan issues that are still of concern. Emerging issues include: the increased awareness of fuel buildups as it pertains to the wildland/urban interface; interim grizzly bear management requirements; management of ponderosa pine old growth, balancing public access and Forest Plan standards, monitoring needs related to the effects of wildfires, particularly tree mortality, vegetative succession, and fuel accumulations, and access and easements to private land. Forest Plan issues that still exist are: grizzly bear management, timber supply (local economic impact), road management, public access, potential mineral development, visual (scenic) quality, and community stability. During revision of the Forest Plan, all issues which have been reported since 1989 will be assessed for their continuing applicability. If they are still relevant, they will be considered in Forest Plan development.

**Forest Plan Costs (H-3):** Timber sale costs are about three times greater than the Forest Plan projected. This is continuing the upward trend that began in FY 1990. The increase is due to the increasing complexity in timber sale preparation along with the concurrent decrease in the amount of volume being sold. Since unit costs have increased considerably in timber, timber roads, and reforestation, there will be a need to factor in such changes during Forest Plan revision. The Forest's accounting systems are continuing to effectively track these trends. During the revision process, cost efficiency analysis will include these elements and others as appropriate.

**Forest Plan Budget Levels (H-4 and Appendix D):** As in prior years, there is a great deal of variation in the level of funding for various program areas in comparison to the projected amounts. Notable areas where funding has increased beyond expected are fire suppression, fuels management, law enforcement, tree improvement, and salvage sales. Most other program areas are remaining at budget levels below

those projected. However, given major trends now seen since 1988, it is apparent that many programs and costs have changed substantially, and Forest Plan predictions are no longer fully valid. This analysis will be helpful in budget analysis for Forest Plan revision.

**Project Specific Amendments** (Appendix E): Project specific amendments are changes in a standard that only apply to that project. They do not change the standard for the long term. The Forest Plan states, "If it is determined during project design that the best way to meet the goals of the Forest Plan conflicts with a Forest Plan standard, the Forest Supervisor may approve an exception to that standard for the project." Approximately 109 project decisions were issued in FY 1996. Seven project specific amendments were approved in FY 1996 for the following reasons: to allow higher open road densities during activities in MA 12 (big game summer range) and MA 15 (timber); to allow harvest within movement corridors; to allow grazing in MA 24 (low productivity lands); and to allow an exception to partial retention requirements for visuals.

**Programmatic Forest Plan Amendments** (Appendix F): The Forest Plan provides a process for amending the plan. Programmatic amendments are effective until the plan is revised, or changed. One Programmatic Forest Plan Amendment was approved in FY 1996. It changes open road density standards for MA 12 in Barron Creek.

## RECREATION: Roadless Area Overuse; Monitoring Item A-2

ACTION OR EFFECT TO BE MEASURED:	Determine whether roadless areas are being overused, including semi-primitive motorized areas.
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	Deterioration of site conditions sufficient to damage soil and water resources, to permanently affect the site's ability to recover, to become a safety hazard, or to detract from the recreational experience.

**Purpose:** This monitoring item was established to track changes that may be needed in the patterns of use by people and horses in areas designated for roadless recreation. These include designated wilderness, recommended wilderness, a wilderness study area, and designated roadless recreation areas. The Plan requires that this item be reported once every five years. The expected accuracy and reliability of the information is low-to-moderate.

**Background:** There is one wilderness, 32 inventoried roadless areas, and one wilderness study area on the Forest. The annual use is about evenly split between the wilderness and the other roadless areas. This even split results in a much higher use per acre within the wilderness because of the difference in total acres (approximately 94,000 in the wilderness and over 400,000 in recommended wilderness, wilderness study, and designated roadless recreation areas). Because of the higher use per acre in the wilderness, the potential for overuse and possible impacts there is also higher.

**Results:** During the past five years, some effects to resources have been observed in the Cabinet Mountains Wilderness and the Ten Lakes Wilderness Study Area. In the 94,000-acre Cabinet Mountain Wilderness, approximately 10 acres of campsites, three acres of lake shore, and three acres of trails have been heavily impacted. Management within the Wilderness focuses on visitor contacts to avoid additional impacts. Most sites are currently at an "acceptable level" of impacts with the goal to preserve near natural conditions. Several sites that are beyond acceptable levels are either closed to public use as they are rehabilitated or restricted to day use only. However, several other sites are very difficult to rehabilitate due to continual use (they are the only sites available for camping). These sites are currently managed in their present condition, which allows other less heavily used sites to be rehabilitated. Additional trail impacts have been noted on trails within areas recommended as Wilderness. These impacts are primarily from using stock during wet periods.

Most of the heavy impact is attributable to too many visitors, increased frequency of visits, use of stock during periods when soils are wet and soft, and stock tied to trees or permitted to graze along lake shores. The horse camp site at Wanless Lake has increased in size during the past five years, and there are some reports of horses being taken farther into the wilderness area than is allowed.

Within the Ten Lakes Wilderness Study Area, effects on resources include rutting of trails by horses and hikers (especially when the trails are wet), impacts on lake shores by campers, and littering. Approximately two acres at Bluebird Lake and two acres at Wolverine Lake are affected.

Use in other roadless areas is low to moderate; therefore, the effects as seen in the Wilderness areas has not been found. No significant site deterioration has resulted in impacts on soil and water nor permanently affected the sites' ability to recover or detract from the recreational experience. Some snowmobile use, which is allowed within the roadless areas, is occurring. One effect that has been noted is people leaving trash behind. The District is working with snowmobile clubs to increase the effort to pick up their litter.

**Evaluation:** Instead of providing quantitative variability thresholds for evaluating this monitoring item, the Forest Plan calls for a qualitative evaluation. This qualitative review is based on whether site conditions are of such a nature that they damage soil and water resources, permanently affect the site's ability to recover, become a safety hazard, or detract from the recreational experience. The review of this item indicates that visitor use is currently managed at an acceptable level, with some exceptions. Except for approximately 20 acres within the Cabinet Mountain Wilderness, adjacent recommended wilderness, and the Ten Lakes Study Area, deterioration of site conditions have not been sufficient to damage soil and water resources, or to detract from the recreational experience. The 20 acres that are affected are primarily impacted by using stock during wet periods.

**Recommended Actions:** Some action may be needed to restrict/control human and horse travel in the Cabinet Mountains Wilderness and Ten Lakes Wilderness Study Area during times when trails are wet and susceptible to impact. This will be discussed at the annual recreation workshop to determine the best course of action. In those areas that snowmobiles have been reported where they are not allowed, some enforcement may be needed. These actions can take place without modifying the Forest Plan, therefore, no changes in Forest Plan direction are needed at this time. The monitoring form for this item will be updated this spring to provide additional consistency in collecting and recording data. An update of monitoring procedures will be given at the annual recreation workshop. Information to consider for the monitoring form includes:

- Using Limits of Acceptable Change principles or Frissell Condition Classes to provide a means for measuring changes.
- Establishing photo points to measure change.
- Using Campsite Inventory Forms (see Cabinet District reports).
- Some determination of overuse: number of complaints from users, number of conflicts among forest recreationists.
- Reduce use to sites using Wilderness Ranger visits, and consider developing other sites away from the lake shores.

In addition, we will work on promoting the use of volunteers/partnerships to repair impacts on campsites and trails.

## RECREATION: ORV Use Effects; Monitoring Item A-5

**ACTION OR EFFECT TO BE MEASURED:**

Determine the environmental effects of Off-Road Vehicle (ORV) use and conflicts with other uses, if any.

**VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:**

Site deterioration to soil and water resources permanently affects a site's ability to recover, results in a safety hazard, or detracts from the recreation experience.

**Purpose:** This monitoring item was established because of a concern over potential increase in ORV use on the Forest. The Plan requires that this item be reported once every five years. The expected accuracy and reliability of the information is low-to-moderate.

**Background:** The combination of dense vegetation and steep terrain in many areas on the Forest discourages the use of ORVs except on the constructed road system. There are reports of some all terrain vehicle (ATV) use off the Forest road system and/or on restricted roads during hunting season. In less densely vegetated and more gentle terrain areas where ORVs can be used, some effects have been reported. One such area is below the full pool of Lake Koochanusa, north of Rexford. ORV activity occurs on this 800-acre "drawdown area" during the early spring months following snow melt when the sandy soil dries out. Use of the area continues until approximately mid-June when the lake begins to refill and access is eliminated. Typically, 10 to 40 ORVs are present during weekends, while two to 10 ORVs are present during weekdays. Other areas receiving use are the low-elevation lakes near Eureka which are used by ORVs when they become dry areas in the summer.

**Results:** During the past five years, approximately 10 acres of disturbance have been reported in the vicinity of Tobacco Plains near the area of full pool on Lake Koochanusa. While the majority of ORV use occurs in the area below full pool, some ORVs travel into an adjacent area managed for non-motorized recreation and wildlife. Use has led to the development of trails. Environmental effects include soil erosion and displacement on steep slopes and brush trampling on the gentler terrain. Wildlife are reportedly disturbed by ORV noise, and there have been reports of complaints from other Forest users regarding the noise and disturbance created by the ORVs. Additionally, there is concern regarding the disturbance of cultural resource sites.

Approximately 15 acres surrounding the low-elevation lakes southeast of Eureka (around Thirsty Lake) are being impacted by ORVs. Gullies are being created on hillsides and heavy rutting is occurring in wet areas. Ditches are developing in meadows near Thirsty, Alkali, and Morgan Lakes and new trails are appearing on hillsides. Increasing amounts of vegetation disturbance have been noted, which is affecting wildlife and sensitive plant habitat, grazing of cattle, and overall aesthetics.

Another 10 acres are being affected on other parts of the Forest. Damage to earthen barriers, disturbance to wildlife and recreationists, vegetation disturbance, and temporary erosion and siltation has been reported. Some rutting of trails has also been observed.

The Forest has responded to the use of ORVs encroaching on the non-motorized area near Lake Kooconusa by placing signs restricting ORVs from the area. Portions of the area have been barricaded with "kelly humps" and log structures have been placed on the trails. Forest Service law enforcement officers have been monitoring the area on heavily used weekends. Additionally, there have been attempts to educate ORV users by contacting local organizations whose members use the drawdown area.

Actions to mitigate trail rutting have included the installation of water bars.

**Evaluation:** Instead of providing quantitative variability thresholds for evaluating this monitoring item, the Forest Plan calls for a qualitative judgement. This qualitative review is based on whether site conditions are of such a nature that they damage soil and water resources, permanently affect the site's ability to recover, become a safety hazard, or detract from the recreational experience. The review of this item indicates the effect of ORV use on the Forest appears to be minor; however, use of the Lake Kooconusa drawdown area, the adjacent non-motorized area and the low-elevation lakes near Eureka appears to be increasing. Continued monitoring will determine whether ORV effects are increasing or decreasing and to the extent measurable. The use of "kelly humps" and log barricades in the non-motorized area adjacent to the Lake Kooconusa drawdown area has been effective. Because the ORV use is limited in nature and mitigation is being effectively applied, this monitoring item is currently being managed at an acceptable level.

**Recommended Actions:** No changes in Forest Plan direction are needed at this time. However, ORV use will be evaluated during Forest Plan revision.

The monitoring form for this item will be updated this spring to provide additional consistency in collecting and recording data. An update of monitoring procedures may be given at the annual recreation workshop. Information to consider for the monitoring form includes:

- Use Limits of Acceptable Change principles or Frissell Condition Classes to provide the means for measuring change.
- Establish photo points to measure change.
- Identify some quantitative measures, such as number of acres.
- Use number of complaints filed with law enforcement officers or District. Could be used to collect reports of damage.
- Establish public outreach and informational program in conjunction with ORV dealers and clubs to highlight impacts and costs associated with ORV use in the forest.

## WILDLIFE & FISHERIES: Old Growth Dependent Species; Monitoring Item C-4

ACTION OR EFFECT TO BE MEASURED:	Population levels of old growth dependent species.
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	Any downward trend approaching 40 percent of population potential.

**Purpose:** This monitoring item was established to help ensure that viable populations of species dependent on old growth habitats were maintained. The expected accuracy and reliability of the information are moderate and low, respectively. The Plan requires that this item be reported every five years.

**Background:** The pileated woodpecker (*Dryocopus pileatus*) is the designated old growth habitat management indicator species on the Forest. Old growth forests and cavity habitat are key components of the species' habitat. The National Forest Management Act states that "Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area...In order to insure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area." 36 CFR 219.19. Monitoring items C5 Old Growth Habitat, and C6 Cavity Habitat evaluate the habitat needed to support a viable population of pileated woodpeckers. Both of these items indicate that we are on-track with providing the necessary habitat.

The purpose of this monitoring item is to evaluate population levels of the pileated woodpecker. There are several different approaches to assessing population viability, ranging from subjective assessments to detailed quantitative models requiring substantial demographic data. The scientific community accepts each of these approaches as valid depending on the circumstances, such as the amount of data available, and the habitat associations, behavior, and demographic characteristics of the individual species being assessed. In March 1997, the Northern Region of the USFS approved a six-step strategy for assessing and managing population viability. This strategy incorporates a review of twelve potential methods or tools for assessing population viability which were identified and described through a contract with a leading academic scientist. The strategy and methods are documented in a Forest Service paper titled *Population Viability Protocol* (Samson et. al. 1997) which establishes future guidance for population viability assessment in the Northern Region.

The Forest Plan monitoring item indicated that personal observations and transects may be used as data sources to analyze population viability. As noted in the FY 92 Monitoring Report, technically reliable and cost efficient techniques for conducting population trends surveys for pileated woodpecker were not established and discussions among wildlife professionals were continuing on the subject. It goes on to state that it had not been determined if the Forest should independently survey for this species, or if efforts on the Kootenai should only contribute toward a much larger combined-forest or Regional survey effort.

Based on discussions with wildlife professionals and the Regional Office, the Kootenai became a participant in the Region 1 Landbird Monitoring Program which started in 1993. In this program, transects consisting of multiple bird monitoring points are set up within a wide range of habitats distributed geographically across the Kootenai National Forest. All migratory and resident bird species detected by specialists trained in bird identification are recorded at each point on each transect. These points are

established as permanent points. The information from these points is transmitted to Dr. Richard Hutto, internationally recognized bird expert, at the University of Montana, where it is tabulated for each participating National Forest and for the Region overall. Data have now been collected for several thousand points within the Region, including on the Kootenai Forest, and the data is statistically valid to provide information on bird species presence, distribution, and habitat associations. Over a period of years, the data will also provide information on bird species population trends.

**Results:** Personal observation by forest biologists indicate that pileated woodpeckers are observed frequently on the Kootenai, and these informal observations provide no indication of any major population change for the species.

Data collected in the R-1 Landbird Monitoring Program is summarized in Table C-4-1. This data has been collected for the last three years. It will take many years of monitoring to determine population trends.

C-4 Pileated Woodpecker Observations on KNF Bird Monitoring Points		
Fiscal Year	Number Points Sampled	Number & Percent Pileateds Observed on Sampled Points
1994	530	49 9.2%
1995	579	32 5.5%
1996	545	48 8.8%

The landbird monitoring results for the Northern Region showed pileated woodpeckers present to varying degrees in all vegetation types sampled except agricultural and residential. This information is presented in the Northern Region Landbird Monitoring Program, second report, prepared by Dr Richard Hutto. Based on these results, Hutto concluded:

"Pileated woodpeckers are widespread throughout the western third of the region. They are relatively common in both uncut and cut mid-elevation conifer forests. Their abundance in harvested forest types is, in part, a consequence of their mobility; they need large trees in relatively uncut stands for nesting purposes, which is reflected in the fact that they occur significantly more often on points with an abundance of snags (6.0 percent) and dead/down (5.1 percent) than on points without those characteristics (2.1 percent and 1.1 percent respectively).

The species appears to do well in a matrix of forest types, but the inclusion of some older forest with large trees is probably necessary. There's generally...an intact forest near where these birds are detected (though not necessarily within 100 m). Thus, detecting them in clearcuts and seed-tree cuts should not be taken to mean they can do well with homogeneous stands of those kinds."

**Evaluation:** Hutto's report, the preliminary population transects, Forest staff observations, and habitat monitoring discussed under Monitoring Items C-5 and C-6 all point to the same consistent interpretation that pileated woodpeckers are widespread and are relatively common on the Kootenai National Forest. The information available at this time does not indicate that a significant downward trend approaching 40 percent of population potential is occurring.

**Recommended Actions:** In review of this monitoring item, no changes are needed in Forest Plan direction. The forest will continue to document personal observations and data collection through the Kootenai's participation in the R-1 Landbird Monitoring Program.

## 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 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 Forest 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 commitment 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 managed 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 and C-5-2.

If no other effective old growth is available then the best available soon-to-be old growth is identified to bring the third order drainage or compartment up to 10 percent. These mature stands are known as old growth replacement stands because they are replacing a current deficiency of high-quality 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 identification (see the Forest Plan Glossary and Appendix 17 of the Forest 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 96. In 1995, 158,736 acres were surveyed, resulting in 19,416 acres (12 percent) of designated old growth. In 1996, 215,483 acres were surveyed, resulting in 24,080 (11 percent) of designated old growth.

Some of these areas include reassessments of previously completed compartments because of changed conditions. These conditions include the fires of 1994 which burned over several compartments,

changing old growth conditions. Because of these reassessments, the information in Table C-5-1 cannot be totalled as this would result in double-accounting of some acres.

C-5-1 Old Growth Habitat and Condition Survey Results by Fiscal Year					
Fiscal Year	Acres Surveyed	Acres Validated as Protected Old Growth Habitat		Acres Old Growth Habitat Judged Fully Effective	
1988-89	94,210	12,730	13.5%	8,450	66%
1990	176,560	18,770	10.6%	17,030	91%
1991	334,300	39,410	11.8%	36,520	93%
1992	212,380	20,930	9.9%	15,500	74%
1993	72,253	10,393	14.0%	8,455	81%
1994	49,381	5,474	11.0%	4,312	79%
1995	158,736	19,416	12.0%	14,340	74%
1996	215,483	24,080	11.0%	17,954	75%

To generate a Forest-wide summary of surveyed areas and designated old growth, results of each fiscal year's surveys have been recorded in a data table of all compartments. Whenever a compartment is reassessed, the new information for that area replaces the old information. The data table tally was used to generate the figures for Table C-5-2, below. The accompanying map (Figure C-5-1) has been shaded to show where old growth evaluation is completed, partially completed, or is still undone.

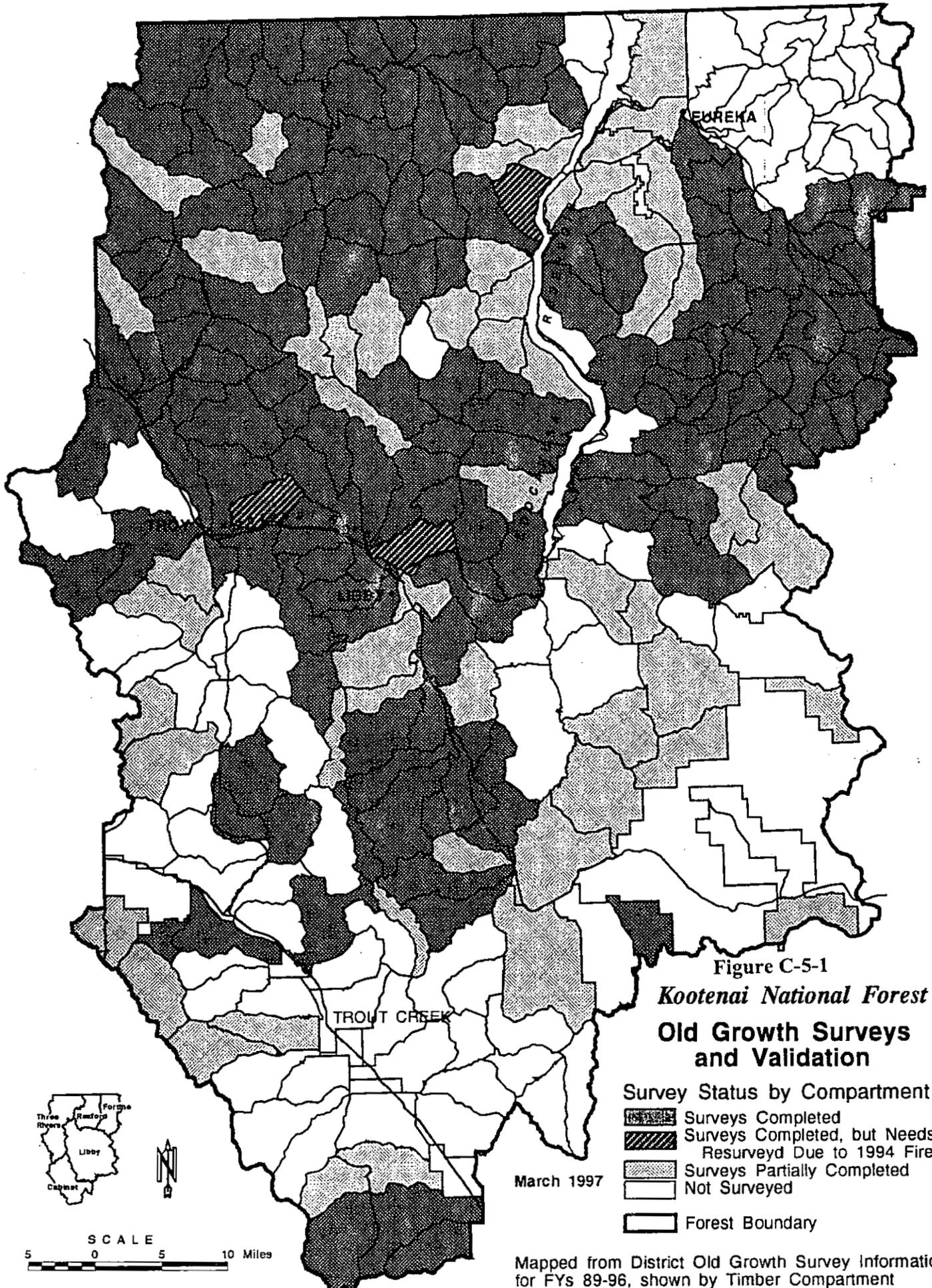
C-5-2 Summary of Total Protected Old Growth for Areas Validated						
Fiscal Year	Acres Below 5500 feet	Acres of Effective Old Growth <sup>1</sup>		Acres of Replacement Old Growth <sup>2</sup>		Total Acres Protected
1988-96	1,124,597	103,389	9.2%	25,715	2.3%	129,104 11.5%

<sup>1</sup> Old growth that contains current old growth attributes  
<sup>2</sup> 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, approximately 1,125,000 acres below 5,500 feet have been evaluated for old growth (there are about 1,865,000 acres below 5,500 feet forest-wide). Of the acres validated, 9.2 percent of the surveyed acres was determined to be effective old growth and 2.3 percent determined to be replacement old growth (mature stands that do not have old growth character now but will in the future), for a total of 129,104 acres (11.5 percent) now identified with appropriate management area designations. The level of old growth designated for the compartments validated to date is above the 10 percent level required in the Plan, therefore this item is on-track with the Forest Plan.

After nine years of old growth validation work, 51 percent (145 compartments out of 283) of the compartments have been completely reviewed and an additional 55 compartments (20 percent) are partially done. Map C-5-1 indicates those compartments completely and partially reviewed. Many of the unsurveyed areas identified on map C-5-1 are in wilderness, proposed wilderness, or areas with very little Forest Service ownership. 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.



## WILDLIFE & FISHERIES: Cavity Habitat; Monitoring Item C-6

ACTION OR EFFECT TO BE MEASURED:	Amount and condition of habitat for cavity-dependent wildlife.
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	Any reduction in habitat capability approaching 40 percent of potential.

**Purpose:** This monitoring item was established to help ensure that adequate amounts of habitat are provided for cavity-nesting species. The expected accuracy and reliability of the information is moderate. The Plan requires that this item be reported once every five years.

**Background:** Appendix 16 of the Forest Plan contains the standards and guidelines for maintaining habitat capable of supporting populations of cavity-nesting wildlife at 40 percent or greater of their population potential. The 40 percent population level is considered the minimum level necessary to maintain viable populations. The management indicator species for cavity nesters is the pileated woodpecker, which is discussed in Monitoring Item C-4. Appendix 16 provides the forest with the option of achieving cavity habitat requirements at either the stand level or the drainage or compartment level. It identifies the minimum density of dead trees (snags) or live cull trees within certain height and diameter criteria needed to meet 40 percent of population potential. Live cull trees are usually broken-topped, or have significant amounts of decayed wood. These dead and dying trees are considered to be the critical habitat indicator for cavity nesters.

**Results:** A total of 130 projects were evaluated for effects on cavity habitat during the reporting period. Pre-treatment habitat capability within harvest units ranged from a low of less than 40 percent of potential to a high of 100 percent of potential habitat. Post-treatment habitat capability ranged from zero percent of potential to 100 percent of potential (habitat potential cannot exceed 100 percent, but some stands contained more than twice the number of snags needed to achieve this level). Monitoring results showed a high level of variation from District to District and project to project, both in analysis method and in success of meeting the Forest Plan standard of maintaining greater than 40 percent habitat potential. Some Districts marked snags for retention at the 100 percent level with the expectation that, through attrition during logging, the 40 percent level would be achieved post-harvest.

New OSHA safety requirements implemented during the reporting period resulted in some changes in approach to providing cavity habitat. For example, live snag-replacement trees were provided instead of snags more often than in the past. More clumping of snags within safe zones was also utilized.

The 1994 wildfires that burned across 53,000 acres of the Kootenai created large numbers of snags. Nearly 47,000 acres of burned area will not be harvested and, thus, all fire-created snags in these areas will be retained. Approximately 6,100 acres have been approved for harvest and many snags were retained in harvest units or in adjacent clumps and stringers.

**Evaluation:** Variation in successfully meeting the 40 percent requirement is likely due to several factors, including:

- different stand vegetation types and pre-treatment availability of snags
- differing emphasis placed on snag retention during project planning and implementation, including post-sale activities
- differences in logging systems and their effects on snag retention
- sensitivity of operators to cavity habitat needs

Monitoring results show a wide variety of techniques are being used by District biologists to evaluate cavity habitat existing condition, anticipated project effects, and post-project condition. These range from subjective assumptions about snag levels in managed versus unmanaged stands, to quantification of snag levels using models of varying complexity, to actually counting snags on the ground. Some Districts are monitoring snags only in harvest units while others are monitoring cavity habitat on a drainage basis. Such a range in methodology leads to complications in compiling and evaluating data in a way that provides meaningful results.

With an increasing emphasis on ecosystem management in recent years, biologists have begun to realize that snags should be managed more holistically at the landscape level. Increasingly in the future, analyses will likely consider snag levels within all vegetation types and successional stages within a larger analysis area such as a watershed. This approach would better facilitate maintenance of viable populations of the full complement of cavity-dependent wildlife which exists in an area.

Monitoring results to date provide evidence that there are mixed results in providing the minimum desired density of snags in harvest units. This is due to several factors including the felling of snags for safety reasons during harvest, lack of available snags to begin with in certain vegetation types, and loss of snags to firewood cutters. In the future, with the new OSHA regulations, the emphasis will be on leaving snags in clumps or stringers that are not harvested and retaining green replacement snags versus existing snags.

Monitoring that has been completed on a compartment or drainage basis indicates that we are meeting the intent of the Forest Plan by providing cavity habitat at a level sufficient to maintain viable populations of dependent wildlife (40 percent or more of population potential). However, in some drainages, due to historic conditions and forest management activities approved prior to the Forest Plan, the availability of cavity habitat is less than desired.

Another consideration is the fact that over 50 percent of the Forest is not within the suitable timber base and will not be logged, plus the fact that much of the suitable timber base has also not yet been logged. This provides assurance that there has not been a Forest-wide reduction in habitat capability approaching 40 percent of potential.

In summary, the available monitoring data indicates the Forest is providing sufficient cavity habitat at a drainage or compartment level. Exceptions are in areas where forest management predating the Forest Plan or historic conditions such as the widespread turn-of-the-century fires make this impossible. Based on this information, the creation of numerous snags by the 1994 fires, and the existence of ample cavity habitat in the majority of the forest that is outside the suitable timber base, this monitoring item is within acceptable limits of the Forest Plan.

**Recommended Actions:**

**Monitoring:** Update the monitoring forms in FY 97 to improve consistency in documenting snag densities at a drainage or compartment level.

**Forest Plan revision :**

- The R-1 protocol for coarse filter analysis will be used in conducting landscape-level vegetation analyses for Forest Plan revision. This will include analysis of standing and down dead woody material and live cull material which provides habitat for cavity-dependent wildlife.
- Use the above analyses and current information from research to develop geographically and ecologically relevant guidance for cavity habitat management for revision of the Forest Plan.
- Develop monitoring methodologies which will be consistently applied across the Forest on a sample basis to provide meaningful, quantified data to determine success in meeting revised Forest Plan guidance.
- Through periodic evaluation and adaptive management, modify cavity habitat guidance and forest management practices as necessary to ensure maintenance of healthy populations of native cavity-dependent wildlife species.

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

**ACTION OR EFFECT TO BE MEASURED:** Provide habitat adequate to ensure Kootenai NF's contribution to recovery of Threatened and Endangered (T&E) Species including: Peregrine Falcon, Gray Wolf, Bald Eagle, Grizzly Bear, 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 Plan requires that this item be reported annually. The expected accuracy and reliability of the information are high and moderate, respectively.

**Results and Evaluation:** By species.

**Peregrine Falcon** -- There are no specific recovery goals for the Forest, but the goal for Montana is 20 nesting pairs (USFWS, 1984). Thirteen pairs are known to have nested in Montana in 1996.

Two peregrine falcons were observed on the Cabinet Ranger District in 1996. A bird was seen in the lower Clark Fork valley near Heron and a second sighting occurred along the Bull River. Nesting activity was not confirmed at either location. Peregrine sightings on the Kootenai may be the result of a hacking (release) program further down the Clark Fork River on the Idaho Panhandle National Forest. Suitable nesting habitat on the Kootenai is localized and not abundant. Due to the steep, cliffy nature of peregrine nesting habitat, activities which could lead to adverse impacts are rare.

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

In 1996, reports of wolf sightings continued at slightly increased levels compared to recent years. Sightings were noted in areas on the Fortine Ranger District and portions of Libby and Cabinet Ranger Districts. In addition, sightings increased on the Three Rivers Ranger District in 1996. Many of these were sightings of individuals from the Murphy Lake and upper Thompson River packs. Sightings on Three Rivers Ranger District could indicate the initiation of a new pack and will require further monitoring. Wolf habitat on the Kootenai did not change measurably in 1996 compared to previous years. Habitat quality continued to be high, with big game prey species at high population levels.

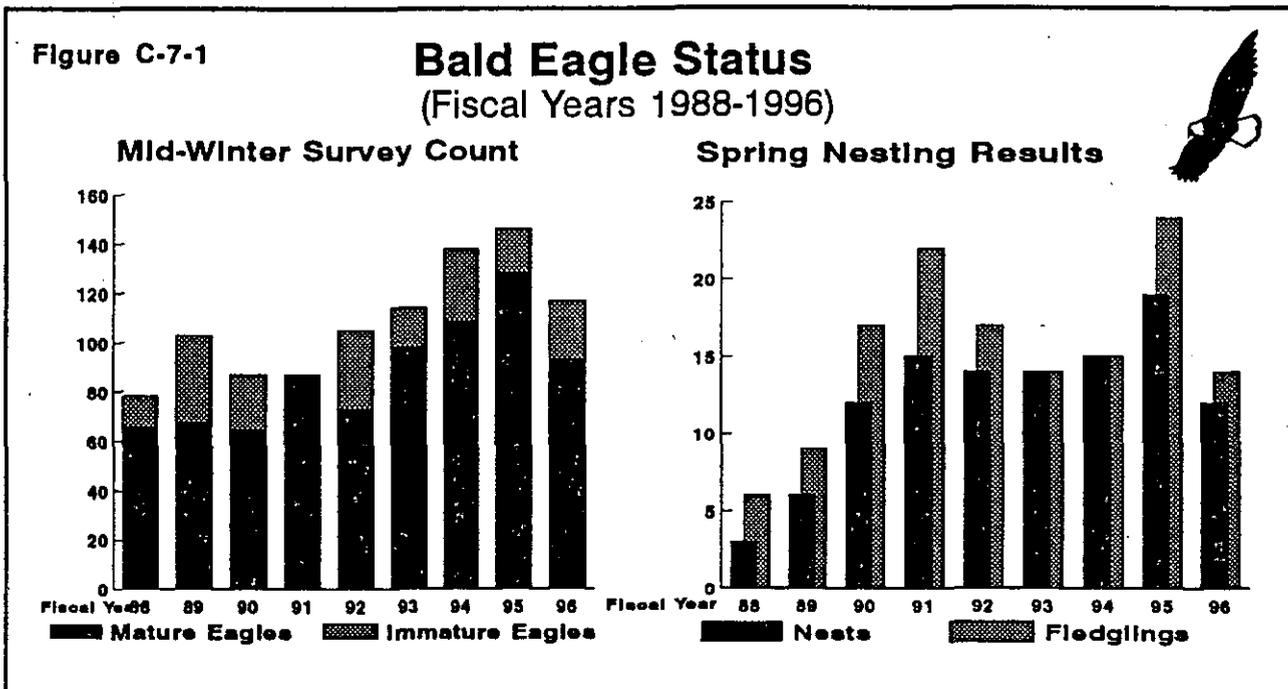
**Bald Eagle** -- The Montana Bald Eagle Management Plan (MBEWG, 1986) and the Pacific States Bald Eagle Recovery Plan (USFWS, 1986) provide guidance for bald eagle recovery. These plans call for the establishment of 52 nesting pairs within Recovery Zone 7, which is the Montana section of the upper

Columbia River Basin. This recovery zone includes all public and private land west of the continental divide in Montana, and the Kootenai Forest area is about 15 percent of the zone.

Table C-7-1 shows the results of mid-winter bald eagle surveys which occur mostly along major water-courses both on the Forest and on adjacent ownerships. The surveys indicate stable numbers of wintering bald eagles during the reporting period. Numbers of active eagle nests and young eagles fledged are also shown in Table C-7-1 and Figure C-7-1. Nesting surveys show an increasing eagle population during the reporting period.

C-7-1 Mid-winter Bald Eagle Survey Count and Spring Nesting Results by Fiscal Year						
Fiscal Year	Mature Eagles	Immature Eagles	Unknown	Total Eagles	Active Nests	Fledglings
1988	66	12	0	78	3	6
1989	68	35	10	113	6	9
1990	65	22	5	92	12	17
1991	87	0	0	99	15	22
1992	73	32	0	105	14	17
1993	98	16	1	115	14	14
1994	108	30	6	144	15	15
1995	128	18	1	147	19	24
1996 <sup>1</sup>	93	24	2	119	12	14
<b>Average</b>	<b>87</b>	<b>21</b>	<b>2</b>	<b>112</b>	<b>12</b>	<b>15</b>

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



**Grizzly Bear** -- The Kootenai National Forest contains portions of two grizzly bear recovery zones: the Cabinet-Yaak Ecosystem (CYE) and the Northern Continental Divide Ecosystem (NCDE). About 72 percent of the CYE is located on the western portion of the Forest and about 4 percent of the NCDE is located in the extreme northeast corner (see Figure C-7-3). Each of these ecosystems are further subdivided into smaller areas for analysis and monitoring, known as bear management units (BMUs).

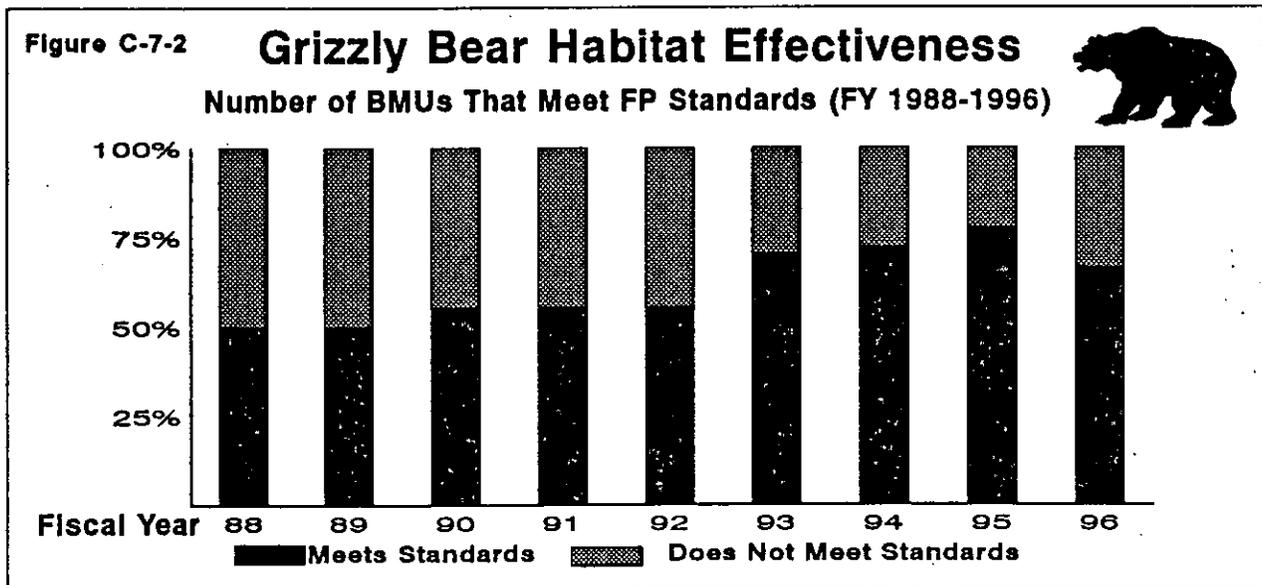
The Forest's primary efforts in grizzly bear recovery are in habitat management, cooperating in grizzly bear studies within the Yaak River area, assisting with bear augmentation tests and monitoring in the Cabinet Mountains, and working with local citizens and interest groups to achieve understanding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

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

Table C-7-2 and Figure C-7-2 show habitat effectiveness values for each of the BMUs evaluated during fiscal years 1988-96. 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 seven BMUs and up in five BMUs in FY 96 compared to FY 95. Two of the declining BMUs were due to more accurate reporting rather than actual changes. Two other BMUs declined due to salvage harvest of timber killed in the 1994 wildfires. These BMUs will show improvement once those activities are completed. The remaining three BMUs declined slightly even though they remained above the 70 percent threshold. The forest-wide average for all BMUs remained constant at 72 percent.

C-7-2 Grizzly Bear Habitat Effectiveness FY 88-96									
Grizzly Bear Management Unit	FY 1988	FY 1989	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996
NC Murphy Lake <sup>1</sup>	78	79	78	78	78	78	78	78	76
#1 Cedar	81	81	81	82	79	79	86	81	81
#2 Snowshoe	82	82	82	81	82	82	84	85	85
#3 Spar	70	71	70	70	79	78	77	77	78
#5 Saint Paul	73	77	79	80	78	81	75	74	73
#7 Silver Butte/Fisher	87	87	87	87	87	82	82	82	82
#8 Vermilion	79	80	80	73	73	71	71	74	77
#9 Callahan	64	55	62	67	70	74	74	76	76
#11 Roderick	60	59	66	68	66	70	70	70	74
#13 Keno	68	68	72	72	69	70	72	73	72
#14 Northwest Peak	61	61	68	68	68	72	74	72	74
#16 East Fork Yaak	47	46	59	61	62	64	64	73	72
#4 Bull	80	78	80	80	80	92	64	63	63
#6 Wanless	74	74	72	74	76	76	71	72	66 <sup>2</sup>
#15 Garver	50	47	62	62	54	65	65	70	68 <sup>3</sup>
#10 Pulpit	43	47	50	56	59	62	62	66	55 <sup>4</sup>
#12 Newton	51	42	43	53	53	49	49	49	62
#17 Big Creek	51	58	58	63	64	68	70	68	68
<b>Forest-wide Average</b>	<b>67</b>	<b>66</b>	<b>69</b>	<b>71</b>	<b>71</b>	<b>73</b>	<b>72</b>	<b>72</b>	<b>72</b>

<sup>1</sup> BMU NC Murphy Lake is in the Northern Continental Divide Ecosystem. Decline is from averaging the Theriault and Krinklehorn subunits. In the past, only the higher subunit was reported. All other BMUs are in the Cabinet Yaak Ecosystem.  
<sup>2</sup> Change is due to additional activities occurring within the BMU. The projects are designed to meet or increase HE in the future.  
<sup>3</sup> Change is due to computerized mapping, which is more accurate than previous efforts.  
<sup>4</sup> Change is due to harvest approved in the Skyline/China Basin Fires Salvage decisions.



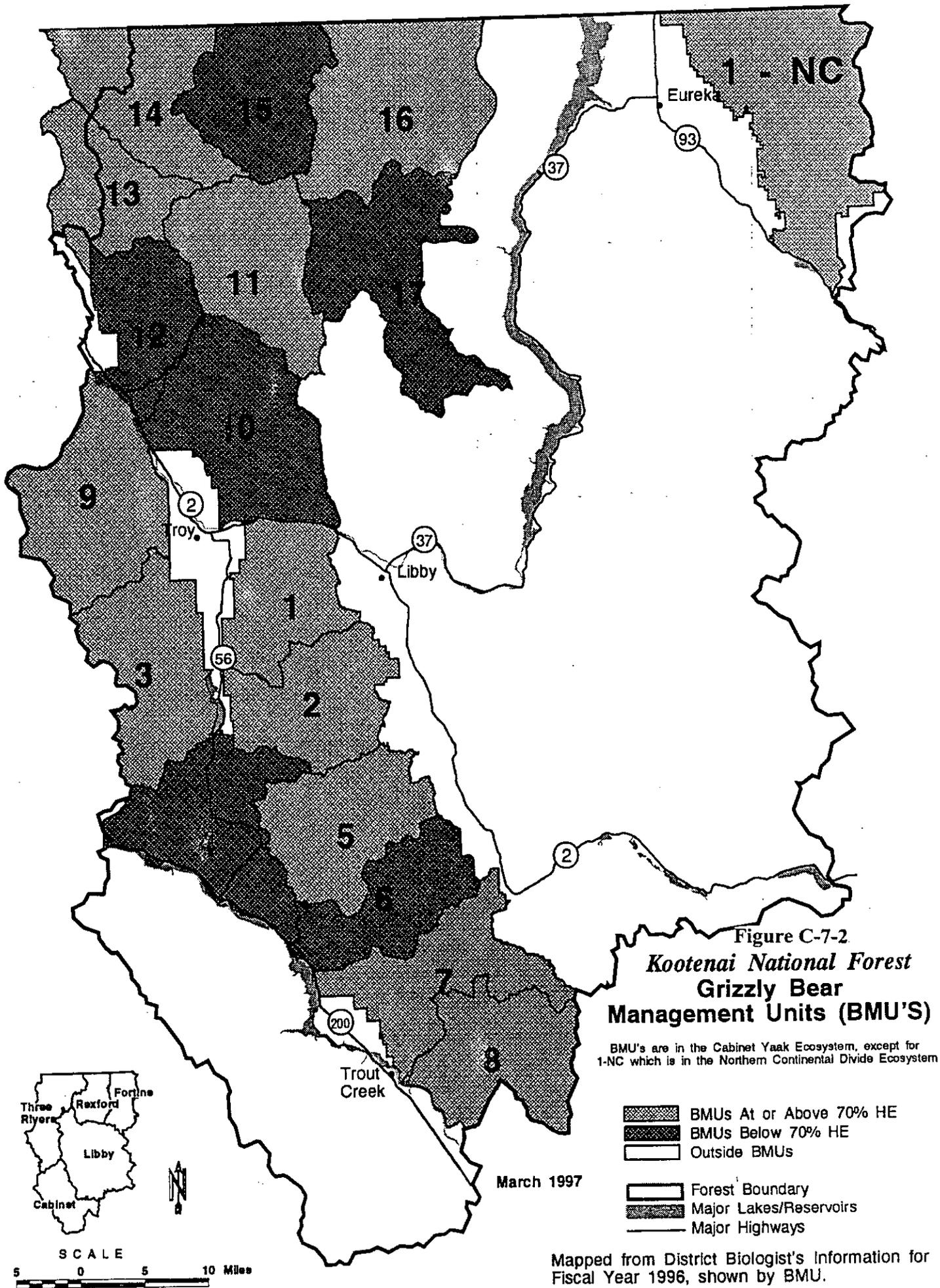


Figure C-7-2  
**Kootenai National Forest  
 Grizzly Bear  
 Management Units (BMU'S)**

BMU's are in the Cabinet Yaak Ecosystem, except for 1-NC which is in the Northern Continental Divide Ecosystem

- BMUs At or Above 70% HE
- BMUs Below 70% HE
- Outside BMUs
- Forest Boundary
- Major Lakes/Reservoirs
- Major Highways

March 1997

Mapped from District Biologist's Information for Fiscal Year 1996, shown by BMU.

In FY 96, there was one confirmed unduplicated sighting of a female grizzly bear with cubs in the CYE. There were no confirmed unduplicated sightings of female grizzlies with young in the Kootenai National Forest portion of the NCDE in 1996. Four of the 17 BMUs on the Kootenai's portion of the CYE were occupied by females with young in FY 96. Since the Kootenai contains only one BMU in the NCDE, distribution of females with young is not reported.

There were no known mortalities in the Kootenai National Forest portion of either the CYE or the NCDE in FY 96. Sightings of females with cubs, distribution of females with young, and human-caused mortalities are summarized for the past nine years in Table C-7-3.

<b>C-7-3 Grizzly Bear Females with Cubs, Distribution of Females with Young, and Human-caused Mortalities</b>					
<b>Fiscal Year</b>	<b>NCDE</b>		<b>CYE</b>		
	<b># Females</b>	<b># Human Caused Mortalities</b>	<b># Females with Cubs</b>	<b># BMUs Occupied by Females with Young</b>	<b># Human Caused Mortalities</b>
1988	0	0	1	1	1
1989	2	0	1	4	1
1990	3	0	1	5	1
1991	3	0	1	2	0
1992	1	1	1	2	0
1993	1	0	2	4	0
1994	0	0	1	3	0
1995	1	1	1	3	0
1996	0	0	1	4	0
<b>Six-year Average</b>	1	0.3	1.2	3	0

Efforts continued in 1996 to implement Interagency Grizzly Bear Committee (IGBC) access management direction. In the NCDE, this involved implementation of the Interim Motorized Access Management Direction developed by the NCDE Motorized Access Management Task Group. In the CYE, the Interim Core Management Strategy developed jointly by the Kootenai National Forest and US Fish and Wildlife Service was used to implement timber salvage harvest resulting from 1994 wildfires. The IGBC manager's subcommittee for the CYE is currently working to develop final access management direction for the ecosystem based on the latest scientific information on the effects of human access on grizzly bears. As alternatives for analyzing access management parameters are still in development by this group, no monitoring results are available to report at this time.

**White Sturgeon** -- The US Fish and Wildlife Service released a Draft Recovery Plan for the Kootenai River white sturgeon in 1996. The short-term goal of the plan is to prevent extinction and to begin restoring natural reproduction in this population. This stock of fish can be considered for downlisting to threatened status after 10 years only if: natural reproduction occurs in three different years prior to 2006; the estimated population is stable or increasing; enough captive-reared juveniles are added to the population for 10 consecutive years that 24 to 120 juveniles survive to maturity; and a long-term

Kootenai River Flow strategy is implemented that insures natural reproduction. Delisting of this population is estimated to take at least 25 years.

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 Fish and Wildlife Service on all proposed or authorized activities. All projects and activities evaluated by the Forest in 1996 were found to have No Effect on the species.

The status of the Kootenai River white sturgeon improved in 1996. A new population estimate (based on better data) from the Idaho Department of Fish and Game indicates there are approximately 1,469 adult sturgeon in the population. This is a 589-fish increase in the estimated size of the population due (in part) to new data from Kootenay Lake in Canada. Also, 342 fertilized sturgeon eggs were recovered during the 1996 spawning season; however, no larvae or juveniles from the 1996 year-class have been found to date.

The wolf, bald eagle, and grizzly bear have had increased sightings during the last nine years of monitoring. All of the threatened and endangered species' habitats being monitored appear to be stable or improving. The information shows that the Kootenai National Forest is progressing toward providing adequate habitat for threatened and endangered species recovery, therefore this monitoring item is on-track with the Forest Plan.

**Recommended Actions:** Based on review of this item, specific changes to Forest Plan direction are not needed at this time. However, using appropriate processes including public involvement, we will implement access management recommendations when they become available from the IGBC CYE manager's subcommittee.

**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 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 Plan requires that this item be reported annually. The expected accuracy and reliability of the information is high.

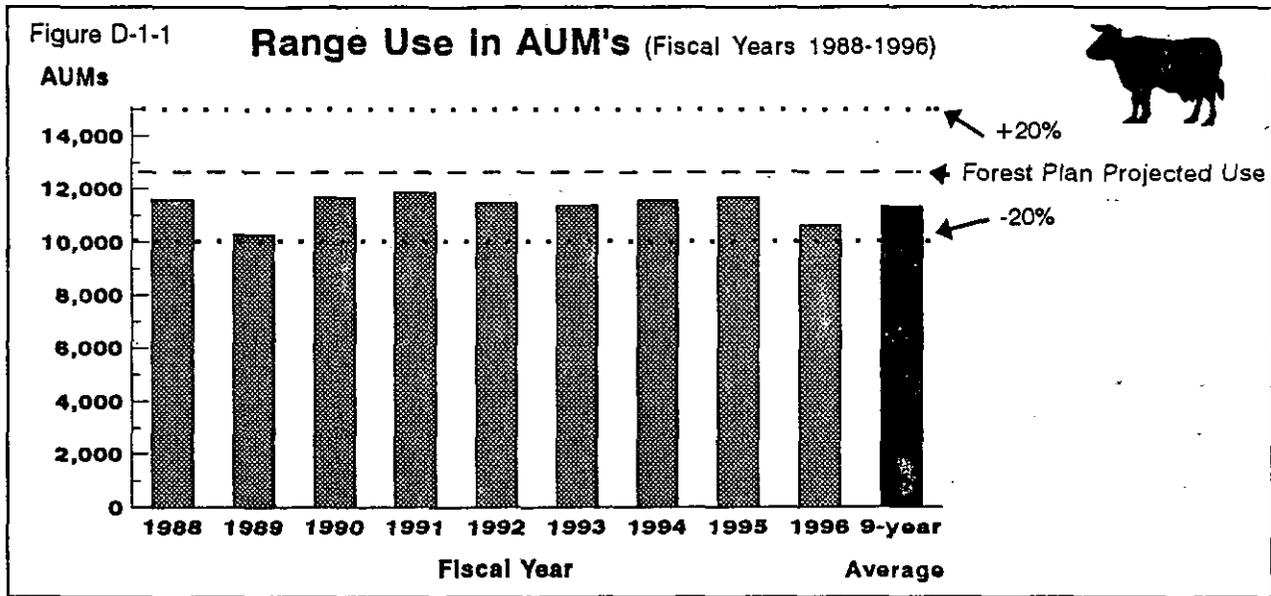
**Background:** Livestock use on the Kootenai was anticipated to be about 12,600 Animal Unit Months (AUMs) per year. At the time the Forest Plan was approved, there were 41 active allotments located mostly in the northeastern portion of the Forest on the Rexford and Fortine Ranger Districts.

Currently, the Forest has 45 grazing allotments, of which 25 are active (four allotments have been split since 1987). Most of these allotments have a 10-year grazing permit with many permits coming up for review. In July 1995, President Clinton signed Public Law 104-19 allowing NEPA analysis to be completed on only 20 percent of the allotments during FY 96 (for the Kootenai this meant nine out of the 45 allotments).

The following allotments had NEPA analyses completed and decisions signed: Swamp Fortine, Trego, Sunday Creek, Lake Creek, Pinkham Creek, Rondo-Mud, Big Beaver, Dead Horse, and Edna Creeks. In accordance with Public Law 104-19, the remaining allotments have been placed on a NEPA schedule for completion over the next 15 years.

**Results:** The FY 96 level of grazing use was 10,638 AUMs or 84 percent of the projected level (see Table D-1-1 and Figure D-1-1). The NEPA analyses completed for the nine allotments showed few, if any, effects resulting from current grazing activities. Some localized effects were noted in riparian areas. As a result, the NEPA decisions for re-issuing term grazing permits included implementation of riparian area protection measures to reduce or eliminate cattle use of these site-specific impacted areas. Some of these protection measures included such things as modified turnout dates, placement of physical barriers, and water developments to attract cattle away from critical riparian areas and wetlands.

<b>D-1-1 Range Use in AUMs (FY 88-98)</b>				
<b>Item</b>	<b>Forest Plan Projected Use</b>	<b>5-Year Average</b>	<b>FY 96</b>	<b>9-Year Average</b>
AUMs	12,600	11,214	10,638	11,348
Percent	100%	89%	84%	90%



**Evaluation:** During the last nine years, grazing use has averaged 90 percent of projected use which is within the range anticipated in the Plan. This lower level results from permittee requests for non-use and from Forest requests to defer grazing to prevent stream bank deterioration and overgrazing.

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

**RANGE: Noxious Weed Infestations; Monitoring Item D-2**

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

**VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:** 10 percent increase in number of acres infested, 10 percent 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 Plan requires that this item be reported annually. The expected accuracy and reliability of the information is moderate to high.

**Background:** 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 powerline rights-of-way and other disturbed areas such as gravel pits. Most of the weeds are brought here attached to machinery, automobiles, railcars, etc. The Kootenai Forest classifies weeds into three categories which roughly follows the system used by Lincoln County. Extensive efforts of documenting information regarding noxious weeds occurred in FY 96 with the preparation of the Herbicide Weed Control Environmental Assessment (EA) released for comments in February 1997. Table D-2-1 shows the types of weeds that occur on the forest.

<b>D-2-1 Noxious Weeds on the Kootenai National Forest</b>				
<b>Category</b>	<b>Status</b>	<b>Threat</b>	<b>Goal</b>	<b>Species Included</b>
Group Ia. Potential Invaders	not known to exist	high probability of causing severe economic or environmental damage	prevention, eradication	common crupina ( <i>Crupina vulgaris</i> ), Dyer's woad ( <i>Isatis tinctoria</i> ), purple loosestrife ( <i>Lythrum salicaria</i> ), yellow starthistle ( <i>Centaurea solstitialis</i> ), eurasian milfoil ( <i>Myriophyllum spicatum</i> ),
Group Ib. New Invaders	small populations at limited sites	high probability of causing severe economic or environmental damage	eradication	rush skeletonweed ( <i>Chondrilla juncea</i> ), musk thistle ( <i>Carduus nutans</i> ), leafy spruce ( <i>Euphorbia esula</i> ), whiteop ( <i>Cardaria draba</i> ), Russian knapweed ( <i>Centaurea repens</i> ), meadow knapweed ( <i>Centaurea pratensis</i> ), tansy ragwort ( <i>Senecio jacobaea</i> )
Group II. Existing Infestations	large, widespread populations	high probability of causing environmental or economic damage	containment within already infested areas, reduction of plant populations	spotted knapweed ( <i>Centaurea maculosa</i> ), diffuse knapweed ( <i>C. diffusa</i> ), Dalmatian toadflax ( <i>Linaria dalmatica</i> ), yellow toadflax ( <i>L. vulgaris</i> ), St. John's-wort ( <i>Hypericum perforatum</i> ), orange hawkweed ( <i>Hieracium aurantiacum</i> ), meadow hawkweed ( <i>H. pratense</i> ), sulfur cinquefoil ( <i>Potentilla recta</i> ), oxeye daisy ( <i>Chrysanthemum leucanthemum</i> ), hound's tongue ( <i>Cynoglossum officinale</i> ), Canada thistle ( <i>Cirsium arvense</i> )

**Results:** Table D-2-2 summarizes the status of information regarding noxious weeds for the Kootenai Forest. The table identifies the species, when it was discovered in America and on the Kootenai, information regarding the distribution on the forest and how the species has increased in numbers and density since initiation of the Forest Plan, and what type of treatments have been used, and their effectiveness. This table does not discuss the status of Group Ia, Potential Invaders, as these species have not been located on the forest at this time. Mechanical weed treatments include hand-pulling, mowing, hoeing or tilling to destroy weeds. Biological control involves release of biocontrol insect species. Chemical treatments involve the application of herbicides.

<b>D-2-2 Status of Noxious Weed Monitoring</b>			
<b>Species</b>	<b>New Species, when Discovered</b>	<b>Local Distribution. Increase in numbers and density</b>	<b>Type of Treatments and Effectiveness</b>
<b>Group Ib, New invaders/ small populations at limited sites.</b>			
Rush skeletonweed ( <i>Chondrilla juncea</i> L.)	1938, WA. 1991, KNF. One site in 1991, 64 sites in 1996. Moving fast in MT.	The number of sites has increased from one site on the forest in 1991 to 39 sites in 1996 in Lincoln County, and 9 sites in Sanders County	Mechanical-ineffective; Biological-effective in warmer climates; Chemical-very effective
Musk thistle ( <i>Carduus nutans</i> L.)	1853, PA. Plants cover many acres in only one or two seasons. 1988, KNF.	The number of sites has increased from one site in 1988 to seven sites in 1996. 100 acres currently on KNF.	Mechanical-somewhat effective; Biological-somewhat effective; Chemical-effective
Leafy spurge ( <i>Euphorbia esula</i> L.)	1827, US. Spreading rapidly. On KNF, from two acres to five acres in five years. 1991, Rexford RD.	Two acres were known to be infested in 1991. Five acres are known in 1996 on the Rexford RD.	Mechanical-ineffective; Biological-somewhat effective; Chemical-marginally effective
Whitetop or hoary cress ( <i>Cardaria draba</i> [L.] Desv.)	1862, NY. 1916, Gallatin County, MT.	Scattered plants, Rexford RD. No new sites in 1996	Mechanical-ineffective; Biological-none yet; Chemical-effective
Russian knapweed ( <i>Centaurea repens</i> L.)	1898, US. 1934, Fergus County, MT.	Not known to occur on the KNF. Noted by Lincoln County	Mechanical-ineffective; Biological-limited success in Canada; Chemical-effective
Diffuse knapweed ( <i>Centaurea diffusa</i> Lam.)	1951, Mineral Co, MT. 1996, KNF. In 25 years, spread from 9 to 28 counties in Pacific NW.	One site on Libby RD. Located in isolated patches, but appears to be increasing	Mechanical-ineffective; Biological-many available; Chemical-effective
Meadow knapweed ( <i>Centaurea pratensis</i> Thuill.)	1880, Quebec for honey production. 1911, OR. 1995, KNF.	Five acres, Troy RD. Located in isolated patches, but is increasing	Mechanical-ineffective; Biological-limited effectiveness; Chemical-effective
Tansy ragwort ( <i>Senecio jacobaea</i> L.)	1922, OR. 1996, KNF.	Unknown size patch on Fisher River RD. Located in isolated patches. Contained so far	Mechanical-unknown; Biological-somewhat effective; Chemical-effective
<b>Group II, Existing infestation/ large widespread populations</b>			
Spotted knapweed ( <i>Centaurea maculosa</i> L.)	1920, Gallatin County. 1982, every County in MT.	Possibly every road on KNF. More scattered in off-road dry sites with open canopy, trailheads, harvest units, most disturbed sites. Is highly scattered, over entire forest	Mechanical-ineffective; Biological-many available, may decrease plant density and seed production; Chemical-effective
Poison hemlock ( <i>Coinium maculatum</i> L.)	Early 1800's, US.	Not confirmed to date on the KNF.	N/A

D-2-2 Status of Noxious Weed Monitoring, continued			
Species	New Species, when Discovered	Local Distribution. Increase in numbers and density	Type of Treatments and Effectiveness
Dalmatian toadflax ( <i>Linaria dalmatica</i> [L.] Mill.)	Mid-1800's, North America. Discovered on KNF 1982	Small isolated sites across the KNF, mainly on roads. Appears to be increasing in small patches around the forest	Mechanical-ineffective; Biological-mixed results; Chemical-effective
Yellow toadflax ( <i>Linaria vulgaris</i> Mill.)	Mid-1800's, North America.	Fairly common in isolated patches along roads throughout the KNF.	Mechanical-ineffective; Biological-mixed results; Chemical-ineffective
St. John's-wort ( <i>Hypericum perforatum</i> L.)	1850, OR. 1900, CA. 1880, MT.	Small, scattered, isolated patches on roadsides and near roads in open forest.	Mechanical-ineffective; Biological-mixed results; Chemical-Effective
Orange hawkweed ( <i>Hieracium aurantiacum</i> L.)	1875, VT. 1945, WA. 1952, KNF.	Common along roadsides, skid trails, harvest units, and powerline ROWs. Spreading rapidly	Mechanical-ineffective; Biological-unknown; Chemical-Effective
Meadow hawkweed ( <i>Hieracium pratense</i> Tausch.)	1879, NY. 1969, WA. 1958, KNF.	Isolated plants along roads. Appears to be increasing rapidly	Mechanical-ineffective; Biological-unknown; Chemical-Effective
Sulfur cinquefoil ( <i>Potentilla recta</i> L.)	1900, Ontario. 1950, NE US. 1947, Ravalli Co, MT. 1949, Lincoln Co, MT. Rate of spread similar to spotted knap-weed.	50,000 acres in MT. Spotty populations within forest environment and along abandoned or existing roads in KNF.	Mechanical-ineffective; Biological-unknown; Chemical-Effective
Oxeye daisy ( <i>Chrysanthemum leucanthemum</i> L.)	Not known at this time.	Extensive in powerline ROWs, fields, wastelands, roadsides. Scattered in openings.	Mechanical-ineffective; Biological-unknown; Chemical-effective
Canada thistle ( <i>Cirsium arvense</i> [L.] Scop.)	Early 1700's, US.	Scattered to extensive populations in cutting units, along skid trails, landings, and wastelands.	Mechanical-ineffective; Biological-unknown; Chemical-effective
Hound's tongue ( <i>Cynoglossum officinale</i> L.)	Not known at this time.	Scattered to heavy populations along roads, open forest, recreational areas, and trails.	Mechanical-ineffective; Biological-unknown; Chemical-effective
Blueweed ( <i>Echium vulgare</i> )	Found in MT 1968, found on the Kootenai 1995	Scattered populations. Appears to be spreading	Mechanical-ineffective; Biological-not available; Chemical-somewhat effective

**Evaluation:** As noted in Table D-2-2, musk thistle, leafy spurge, tansy ragwort, blueweed, rush skeletonweed and several other new species of noxious weeds have appeared on the KNF in the past decade. These weeds exist in small populations at limited sites. The Forest Service and local counties are especially concerned about rush skeletonweed (*Chondrilla juncea*), which was first found in Montana in 1991. It is now known to occur at roughly 80 sites in Lincoln and Sanders Counties and at one site in Flathead County. Two-thirds of these sites are on the KNF. The weed appears to be spreading rapidly; 27 new sites were found between August and October, 1996. Rush skeletonweed has proven extremely damaging to croplands and extremely difficult to control in many western states; it currently infests an estimated 6,000,000 acres outside of Montana.

The KNF lists rush skeletonweed and other recent arrivals as New Invaders, or Priority 1b weeds. The KNF's goal is to eradicate these weeds before they become established on the forest. Eradicating new invaders while populations are small minimizes the risk of their infesting the Tobacco, Clark Fork, and Flathead Valleys and future costs of control and management. Biological agents do not effectively

**Results:** Table D-2-2 summarizes the status of information regarding noxious weeds for the Kootenai Forest. The table identifies the species, when it was discovered in America and on the Kootenai, information regarding the distribution on the forest and how the species has increased in numbers and density since initiation of the Forest Plan, and what type of treatments have been used, and their effectiveness. This table does not discuss the status of Group Ia, Potential Invaders, as these species have not been located on the forest at this time. Mechanical weed treatments include hand-pulling, mowing, hoeing or tilling to destroy weeds. Biological control involves release of biocontrol insect species. Chemical treatments involve the application of herbicides.

<b>D-2-2 Status of Noxious Weed Monitoring</b>			
<b>Species</b>	<b>New Species, when Discovered</b>	<b>Local Distribution. Increase in numbers and density</b>	<b>Type of Treatments and Effectiveness</b>
<b>Group Ib, New invaders/ small populations at limited sites.</b>			
Rush skeletonweed ( <i>Chondrilla juncea</i> L.)	1938, WA. 1991, KNF. One site in 1991, 64 sites in 1996. Moving fast in MT.	The number of sites has increased from one site on the forest in 1991 to 39 sites in 1996 in Lincoln County, and 9 sites in Sanders County	Mechanical-ineffective; Biological-effective in warmer climates; Chemical-very effective
Musk thistle ( <i>Carduus nutans</i> L.)	1853, PA. Plants cover many acres in only one or two seasons. 1988, KNF.	The number of sites has increased from one site in 1988 to seven sites in 1996. 100 acres currently on KNF.	Mechanical-somewhat effective; Biological-somewhat effective; Chemical-effective
Leaty spurge ( <i>Euphorbia esula</i> L.)	1827, US. Spreading rapidly. On KNF, from two acres to five acres in five years. 1991, Rexford RD.	Two acres were known to be infested in 1991. Five acres are known in 1996 on the Rexford RD.	Mechanical-ineffective; Biological-somewhat effective; Chemical-marginally effective
Whitetop or hoary cress ( <i>Cardaria draba</i> [L.] Desv.)	1862, NY. 1916, Gallatin County, MT.	Scattered plants, Rexford RD. No new sites in 1996	Mechanical-ineffective; Biological-none yet; Chemical-effective
Russian knapweed ( <i>Centaurea repens</i> L.)	1898, US. 1934, Fergus County, MT.	Not known to occur on the KNF. Noted by Lincoln County	Mechanical-ineffective; Biological-limited success in Canada; Chemical-effective
Diffuse knapweed ( <i>Centaurea diffusa</i> Lam.)	1951, Mineral Co, MT. 1996, KNF. In 25 years, spread from 9 to 28 counties in Pacific NW.	One site on Libby RD. Located in isolated patches, but appears to be increasing	Mechanical-ineffective; Biological-many available; Chemical-effective
Meadow knapweed ( <i>Centaurea pratensis</i> Thuill.)	1880, Quebec for honey production. 1911, OR. 1995, KNF.	Five acres, Troy RD. Located in isolated patches, but is increasing	Mechanical-ineffective; Biological-limited effectiveness; Chemical-effective
Tansy ragwort ( <i>Senecio jacobaea</i> L.)	1922, OR. 1996, KNF.	Unknown size patch on Fisher River RD. Located in isolated patches. Contained so far	Mechanical-unknown; Biological-somewhat effective; Chemical-effective
<b>Group II, Existing infestation/ large widespread populations</b>			
Spotted knapweed ( <i>Centaurea maculosa</i> L.)	1920, Gallatin County. 1982, every County in MT.	Possibly every road on KNF. More scattered in off-road dry sites with open canopy, trailheads, harvest units, most disturbed sites. Is highly scattered, over entire forest	Mechanical-ineffective; Biological-many available, may decrease plant density and seed production; Chemical-effective
Poison hemlock ( <i>Coinium maculatum</i> L.)	Early 1800's, US.	Not confirmed to date on the KNF.	N/A

D-2-2 Status of Noxious Weed Monitoring, continued			
Species	New Species, when Discovered	Local Distribution. Increase in numbers and density	Type of Treatments and Effectiveness
Dalmatian toadflax ( <i>Linaria dalmatica</i> [L.] Mill.)	Mid-1800's, North America. Discovered on KNF 1982	Small isolated sites across the KNF, mainly on roads. Appears to be increasing in small patches around the forest	Mechanical-ineffective; Biological-mixed results; Chemical-effective
Yellow toadflax ( <i>Linaria vulgaris</i> Mill.)	Mid-1800's, North America.	Fairly common in isolated patches along roads throughout the KNF.	Mechanical-ineffective; Biological-mixed results; Chemical-ineffective
St. John's-wort ( <i>Hypericum perforatum</i> L.)	1850, OR. 1900, CA. 1880, MT.	Small, scattered, isolated patches on roadsides and near roads in open forest.	Mechanical-ineffective; Biological-mixed results; Chemical-Effective
Orange hawkweed ( <i>Hieracium aurantiacum</i> L.)	1875, VT. 1945, WA. 1952, KNF.	Common along roadsides, skid trails, harvest units, and powerline ROWs. Spreading rapidly	Mechanical-ineffective; Biological-unknown; Chemical-Effective
Meadow hawkweed ( <i>Hieracium pratense</i> Tausch.)	1879, NY. 1969, WA. 1958, KNF.	Isolated plants along roads. Appears to be increasing rapidly	Mechanical-ineffective; Biological-unknown; Chemical-Effective
Sulfur cinquefoil ( <i>Potentilla recta</i> L.)	1900, Ontario. 1950, NE US. 1947, Ravalli Co, MT. 1949, Lincoln Co, MT. Rate of spread similar to spotted knap-weed.	50,000 acres in MT. Spotty populations within forest environment and along abandoned or existing roads in KNF.	Mechanical-ineffective; Biological-unknown; Chemical-Effective
Oxeye daisy ( <i>Chrysanthemum leucanthemum</i> L.)	Not known at this time.	Extensive in powerline ROWs, fields, wastelands, roadsides. Scattered in openings.	Mechanical-ineffective; Biological-unknown; Chemical-effective
Canada thistle ( <i>Cirsium arvense</i> [L.] Scop.)	Early 1700's, US.	Scattered to extensive populations in cutting units, along skid trails, landings, and wastelands.	Mechanical-ineffective; Biological-unknown; Chemical-effective
Hound's tongue ( <i>Cynoglossum officinale</i> L.)	Not known at this time.	Scattered to heavy populations along roads, open forest, recreational areas, and trails.	Mechanical-ineffective; Biological-unknown; Chemical-effective
Blueweed ( <i>Echium vulgare</i> )	Found in MT 1968, found on the Kootenai 1995	Scattered populations. Appears to be spreading	Mechanical-ineffective; Biological-not available; Chemical-somewhat effective

**Evaluation:** As noted in Table D-2-2, musk thistle, leafy spurge, tansy ragwort, blueweed, rush skeletonweed and several other new species of noxious weeds have appeared on the KNF in the past decade. These weeds exist in small populations at limited sites. The Forest Service and local counties are especially concerned about rush skeletonweed (*Chondrilla juncea*), which was first found in Montana in 1991. It is now known to occur at roughly 80 sites in Lincoln and Sanders Counties and at one site in Flathead County. Two-thirds of these sites are on the KNF. The weed appears to be spreading rapidly; 27 new sites were found between August and October, 1996. Rush skeletonweed has proven extremely damaging to croplands and extremely difficult to control in many western states; it currently infests an estimated 6,000,000 acres outside of Montana.

The KNF lists rush skeletonweed and other recent arrivals as New Invaders, or Priority Ib weeds. The KNF's goal is to eradicate these weeds before they become established on the forest. Eradicating new invaders while populations are small minimizes the risk of their infesting the Tobacco, Clark Fork, and Flathead Valleys and future costs of control and management. Biological agents do not effectively

control these infestations because populations are 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.

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

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 has been the primary method of weed control across much of the forest. Since 1987, the KNF, in cooperation with the Western Agricultural Research Center (WARC), has made over 30 releases of biocontrol agents. Most of these releases have been targeted at control of spotted and diffuse knapweed, though several biocontrol agents for St. John's-wort and toadflax have also been released.

The effect of these releases has been minimal. Biocontrol has not measurably reduced populations of knapweed, St. John's-wort, or toadflax on the KNF, probably because populations of biocontrol agents are still very small relative to the size of the weed infestations. There is observational evidence that seedhead flies have slowed the rate of knapweed spread and, with continued releases and reproduction, these and other biocontrol insects may over time begin to reduce existing weed populations. However, it is unlikely that biocontrol agents will cause any widespread reduction of knapweed over the next 10 years, during which time 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. Biocontrols may also be preyed upon by other insects, and animals. Some biocontrols may be limited by climatic and environmental conditions (rainfall, cold, shade etc.). Biocontrols usually do not eradicate the host weed and are often required in very large numbers to considerably effect the host. Thus biocontrols are best used on existing, wide-spread weed infestations and not on new invader species for which the goal is eradication. (Herbicide Weed Control EA, 1997).

The KNF's mechanical and cultural control efforts have not proven effective at containing or reducing widespread noxious weed infestations. Some forms of mechanical and cultural control, such as tilling and mulching, have not been tried because they are not practical on the steep, forested hillsides which comprise much of the forest. Roadside mowing has not prevented knapweed from flowering and going to seed.

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

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

All 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 "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.

The KNF has used herbicides to control noxious weeds with some success. The 1986 Noxious Weed Treatment Program Final Environmental Impact Statement allows the use of herbicides on the Rexford and Fortine Ranger Districts. Spraying of roadsides, administrative sites and gravel pits on these districts in recent years has visibly reduced weed populations in many areas and prevented weeds from spreading to uninfested areas. Except for emergency spraying at the Troy and Libby Airports after the 1994 fires, the KNF has not used herbicides elsewhere on the forest. Lincoln, Sanders, and Flathead Counties have sprayed roadsides which cross NFS lands where the county has clear right-of-way. The forest has completed an Herbicide Weed Control Environmental Assessment (EA), which is out for comment at this time. The purpose of this EA is to provide an additional tool for eradicating new invaders and limiting the spread of existing noxious weeds.

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

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

**Recommended Actions:** To gain a better understanding of the effectiveness of control efforts, District weed coordinators will develop a process for establishing monitoring plots for new invaders and existing infestations. This process should be developed and implemented during FY 97. The process should be designed to evaluate whether populations are increasing in density or size when herbicides are applied. In addition, we will continue to work with the WARC to evaluate the effectiveness of biological controls and releasing biocontrol agents as they become available.

We will continue our efforts to train field crews in identification of noxious weed species and continue our efforts to identify and control new invaders.

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

<b>ACTION OR EFFECT TO BE MEASURED:</b>	Determine if the sell volume meets the projections of the Forest Plan, including other permissible sale volumes.
<b>VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:</b>	+/- 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 Plan is not exceeded and, if not attained, why. The Plan requires that this item be reported annually. The expected accuracy and reliability of the information is high.

**Background:** The ASQ is a projected maximum or ceiling and not a target to be reached at the expense of all 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 is 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 2,330 MMBF for the decade which is an average of 233 MMBF per year.

**Results:** The sell volume chargeable to the ASQ for FY 96 represents approximately 53 percent of the estimated annual ASQ volume (see Table E-1-1 and Figure E-1-1). The general reasons for this lower-than-average sell are as stated in the FY 92 monitoring report (effects from wildlife snag management, wildlife hiding cover and travel corridor needs, old growth needs, grizzly bear needs, and increased harvest rate on private lands). Other factors that affected the sell program in FY 96 include additional time needed to examine the environmental effects of our proposed actions, the Inland Native Fish (INFISH) Decision which included new requirements for streamside management, the US Fish and Wildlife Service amended biological opinion issued July, 1995, changing priorities, and project deferrals (see E-7).

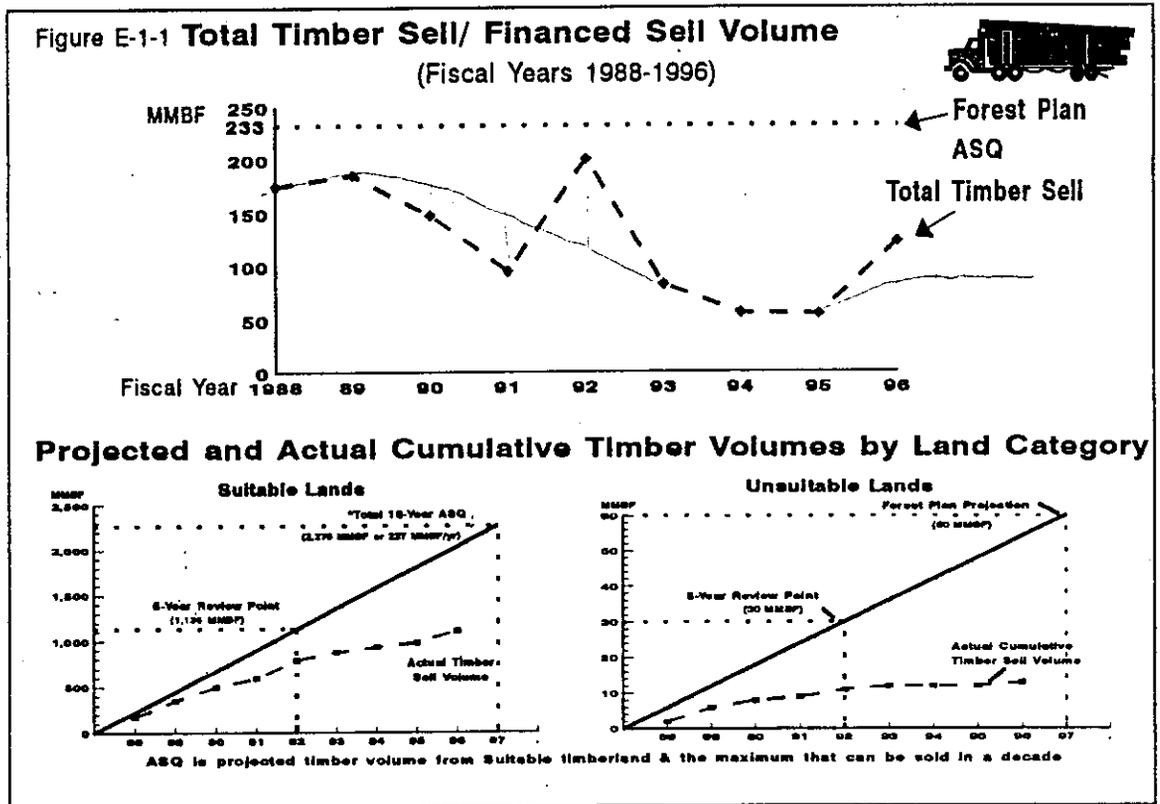
**Total Suitable Lands:** Total actual timber volume that is chargeable to the ASQ sold for the last nine years is 1,108 MMBF. This is 935 MMBF (or 46 percent) less than the projected nine-year ASQ volume (see Table E-1-1 and Figure E-1-1).

**Evaluation:** Table E-1-1 indicates that the average annual sell volume chargeable to the ASQ from total suitable lands is at 46 percent of the predicted ASQ and continues to be outside the 95 percent level prescribed in the Plan. As referred to in "Results" above, the FY 92 monitoring report summarized a variety of factors that have affected the timber sell program. Because of these factors, the forest sell level has been steadily decreasing. Public controversy, scrutiny, scheduling requirements necessary to meet mitigation measures, and consultation requirements have increased. New information is being incorporated into decisions. This includes information regarding INFISH and the US Fish and Wildlife Service amended biological opinion, sensitive species needs, and other requirements.

This monitoring item continues to be off-track with the Forest Plan projection. In addition, the Chief issued a decision on a Forest Plan appeal in November, 1995, which directed us to amend or revise the Forest Plan to correct the ASQ calculation (inaccurate due to a technical error) and set a program sell level not to exceed 150 MMBF until an amendment or revision of the ASQ is done.

E-1-1 Timber Sell Volumes (MMBF) by Category by Fiscal Year						
	Annual Forest Plan Projection ASQ	FY 1996	Total 9-Year Actual Sell 1988-96	9-Year Sell Average FY 1988-96	9-Year Forest Plan Projected ASQ	Difference from Forest Plan 9-Yr ASQ Projection
Suitable Lands	227	122.9	1108.3	123.1	2043	-935 -46%
Unsuitable Lands	6	0.6	13.4	1.5	54	-41 -76%
<b>Total Timber Sell Program</b>	<b>233</b>	<b>123.5</b>	<b>1121.7</b>	<b>124.6</b>	<b>2097</b>	<b>-976 -46%</b>

**Recommended Actions:** The ASQ is a projection based on several assumptions and it is apparent that it will not be attained. Partially based on this item, Forest Plan revision has been initiated. Through revision we will establish the role and scope of timber management and the associated level of ASQ for the revised Forest Plan.



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

ACTION OR EFFECT TO BE MEASURED:	Determine if the regeneration harvest acres meet Forest Plan projections by management area.
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	+/- 10 percent by management area.

**Purpose:** This monitoring item was established to help ensure that harvest acreages sold and allowable sale quantity (ASQ) volumes sold are closely correlated. The Plan requires that this monitoring item be reported annually. The expected accuracy and reliability of the information is high.

**Background:** The acres to be harvested to meet the ASQ 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 large 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 Forest Plan.)

The Forest Plan projects 15,740 acres of annual regeneration harvests to achieve the ASQ. Regeneration harvests include clear cut, seed tree, and shelterwood cutting methods.

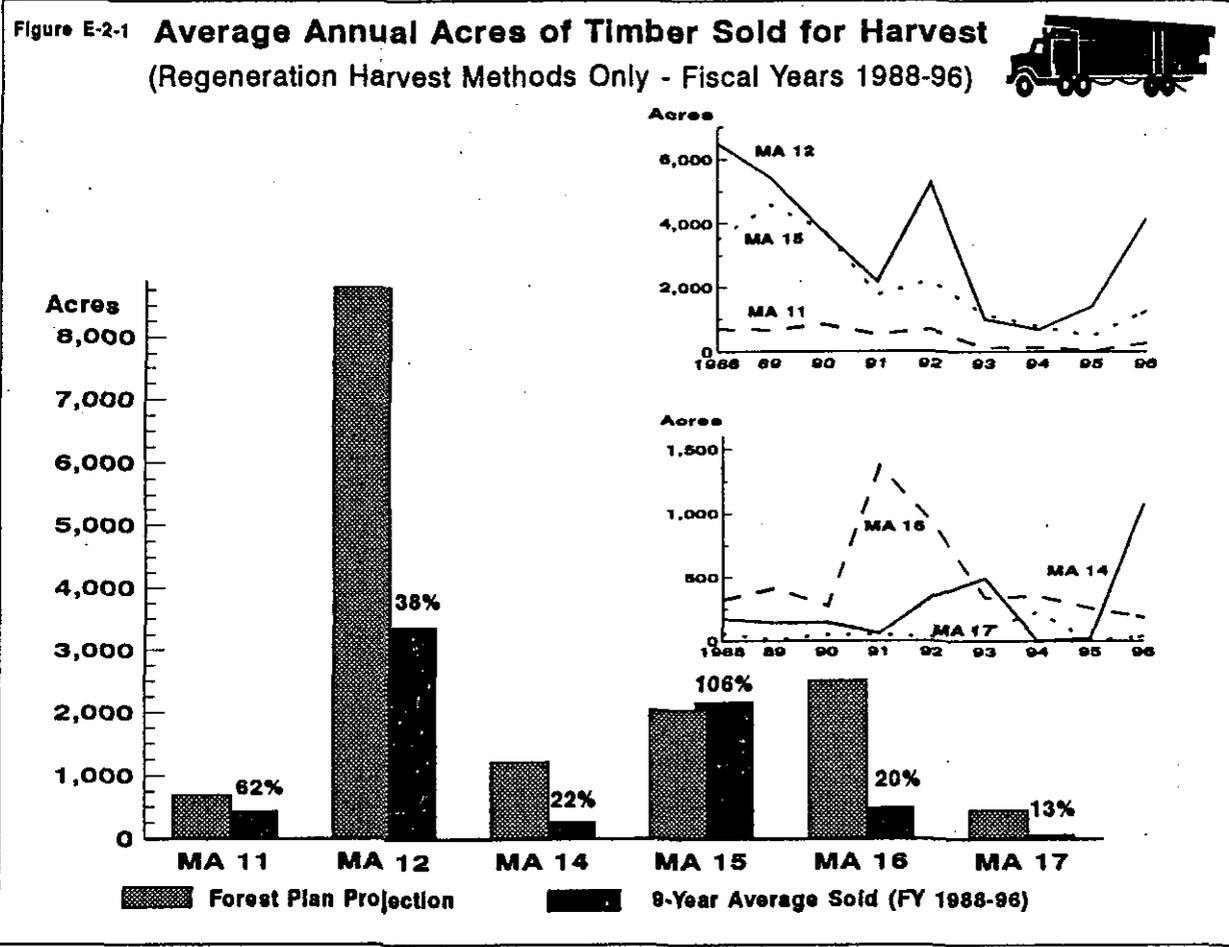
**Results:** Table E-2-1 and Figure E-2-1 show the acres sold for regeneration harvest by MA by fiscal year plus the nine-year average and compares that average to the Forest Plan projection. FY 96 did not follow the general downward trend, but instead showed an increase from the previous three years. The nine-year average for MA 15 is just over the Plan's projected level, while four other suitable timber MAs are considerably below in percent accomplished (MAs 12, 14, 16, 17). MA 12 has the largest average acreage deviation (a total of 5,429 acres or 8,800 minus 3,371).

These six MAs are used to indicate productive forest lands. MA 15 lands are managed primarily for high timber yields, MA 11 and 12 are managed for timber and for 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 special management of the visual resource is important.

**Evaluation:** This monitoring item is similar to the findings found in E-1, Allowable Sale Quantity. As stated in that item, wildlife needs, watershed concerns, extensive legal requirements, and litigation and appeals have all affected the ability of meeting the Plan's projected regeneration harvest. This monitoring item is out of the specified range for regeneration harvest (+/-10 percent).

E-2-1 Acres of Timber Sold for Harvest by Fiscal Year (FY)*												
MA	Forest Plan Projected Acres	FY 1988	FY 1989	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	Average Sold per Year	% of Forest Plan Projection
11	690	696	665	831	521	681	105	118	17	244	431	62%
12	8,800	6,518	5,431	3,729	2,182	5,265	1,003	685	1,398	4130	3,371	38%
14	1,220	170	139	142	56	353	491	0	22	1080	273	22%
15	2,050	3,513	4,574	3,790	1,752	2,217	1,146	770	487	1251	2,167	106%
16	2,520	325	416	277	1,371	935	340	356	258	187	496	20%
17	460	55	10	47	47	31	88	228	0	36	60	13%
<b>Total</b>	<b>15,740</b>	<b>11,277</b>	<b>11,235</b>	<b>8,816</b>	<b>5,929</b>	<b>9,482</b>	<b>3,173</b>	<b>2,157</b>	<b>2,182</b>	<b>6928</b>	<b>6,798</b>	<b>43%</b>

\* Regeneration Harvest Methods Only



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

**TIMBER: Suitable Timber Management Area 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 major changes have on the ASQ. The Plan requires that this item be reported annually. The expected accuracy and reliability of the information is 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.

**Results:** Table E-3-1 displays the net MA acreage changes in suitable timberland for the last nine years (FY 88-96) and the net change in suitable timberland. The largest change in FY 96 was a net loss of 1,370 acres in MA 11 and a gain of 2,743 acres in MA 12. Total net gain in the suitable timberland in FY 96 was 157 acres.

**Evaluation:** The largest changes in FY 96 were the result of validating big game summer range (MA 12) and winter range (MA 11) and validating old growth habitat (MA 13). The cumulative acreage changes for the last nine years are displayed in Table E-3-2. Most of the acreage gained in these unsuitable management areas, which offset the suitable timber acreage losses, were in MA 13 (old growth). The pattern of change has been fairly consistent in both magnitude and direction. This monitoring item is outside the prescribed range for MAs 11 and 15 (more than 5,000 acres of change). The remaining suitable timber MAs are within evaluation limits (MAs 12, 14, 16, 17).

<b>E-3-1 Net Acreage Changes by Management Areas (MA) in Suitable Timberland</b>							
<b>FY</b>	<b>MA 11</b>	<b>MA 12</b>	<b>MA 14</b>	<b>MA 15</b>	<b>MA 16</b>	<b>MA 17</b>	<b>Total Chg to Suitable MAs</b>
1988	330	0	1070	-1760	-510	0	-870
1989	-1142	-345	386	253	-22	-48	-918
1990	-164	-420	-130	-4273	916	-661	-4732
1991	78	-442	-1050	-3188	-1414	-281	-6297
1992	-9279	-3178	-196	-1711	-1498	-323	-16185
1993	-1329	1000	-705	-7444	-2271	22	-10727
1994	-109	-402	106	524	111	-148	82
1995	-457	1441	131	-1845	-193	0	-923
1996	-1370	2743	-206	-1679	229	440	157
<b>Total Net Chg to MA</b>	<b>-13442</b>	<b>397</b>	<b>-594</b>	<b>-21123</b>	<b>-4652</b>	<b>-999</b>	<b>-40413</b>

\* 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.

<b>E-3-2 Net Acreage Changes by Management Areas (MA) in Unsuitable Timberland</b>							
<b>FY</b>	<b>MA 2</b>	<b>MA 10</b>	<b>MA 13</b>	<b>MA 18</b>	<b>MA 19</b>	<b>MA 24</b>	<b>Total Chg to Unsuit MAs</b>
1988	240	1670	-500	190	-280	480	1800
1989	842	0	-149	32	135	100	960
1990	150	1080	1877	381	-950	2564	5102
1991	1009	574	4135	-140	-231	1724	7071
1992	196	3211	7980	2656	231	823	15097
1993	-338	374	7931	-595	-2115	2618	7875
1994	-173	-69	914	-437	-294	177	118
1995	181	-643	1788	-657	112	-128	653
1996	32	-550	3290	-1725	-630	-649	-232
<b>Total Net Chg to MA</b>	<b>2139</b>	<b>5647</b>	<b>27266</b>	<b>-295</b>	<b>-4022</b>	<b>7709</b>	<b>38444</b>

\* Unsuitable MAs are used for areas where timber production is not a primary consideration; for example, MA 2 is used for Roadless Recreation; MA 10 for big game winter range not suited for timber production; MA 13 indicates designated old growth habitat; MA 18, 19, and 24 are used for lands with little timber value or lands difficult to regenerate (rocky areas, steep slopes). Other unsuitable MAs identify Wilderness, Special Interest Areas, Administrative Sites, etc. Included within unsuitable MAs are areas of inventoried old growth not identified as MA 13. NOTE: The differences displayed in the Fiscal Year totals and the Total MA Changes in the two tables shown above are the result of eight additional MAs which contain some minor changes (usually less than 200 acres each) plus the lands that have been acquired and disposed of in the land exchanges completed during the years since the Forest Plan was approved. In FY 95 and FY 96, there were also changes to all MAs due to the process of converting to GIS.

**Note on methodology:** The maps of management areas used during Forest Plan preparation were drafted by hand on topographic quad sheets. Acreage of each management area was determined by mechanical planimeter techniques. Since that time, much more accurate techniques to measure acreage have become available using a special computer database known as a Geographic Information System (GIS). During FY 95, the Forest completed digitizing the then-current management area boundaries and validated them against the official hard copy maps and records of management areas. Some of the changes in MAs in FY 95 and FY 96 are due to this conversion process from a less accurate to a more accurate method. The actual acres and percent by MA of Forest land from the original method in FY 87 and from the GIS maps in FY 96 is compared below. This shows the largest differences in MA 13 and MA 15, which is consistent with Table E-3-1 (MA changes by fiscal year).

<b>E-3-3 Comparison of MA Acres 1987 and 1996</b>				
<b>Suitable MA</b>	<b>1987 Maps</b>	<b>% of Forest</b>	<b>1996 GIS</b>	<b>% of Forest</b>
11	225,710	10.1%	221,317	9.8%
12	469,520	20.9%	471,089	20.9%
14	187,390	8.4%	182,984	8.1%
15	281,610	12.5%	260,814	11.6%
16	80,960	3.6%	76,772	3.4%
17	23,230	1.0%	23,676	1.1%
<b>Unsuitable MA</b>	<b>1987 Maps</b>	<b>% of Forest</b>	<b>1996 GIS</b>	<b>% of Forest</b>
2	288,060	12.8%	289,751	12.9%
10	113,670	5.1%	120,647	5.4%
13	110,970	4.9%	137,944	6.1%
18	45,390	2.0%	46,083	2.0%
19	71,270	3.2%	70,310	3.1%
24	23,430	1.0%	31,245	1.4%

The total amount of changes made in all the MAs during the last nine years is approximately 83,000 acres. This includes map drafting errors found (incorrect MA numbers assigned or lines missing, etc.), errors identified on the ground (non-productive land identified as productive on the Forest Plan map, etc.), and land exchanges completed (which require additions or subtractions of MA acreages). This also includes the acre differences attributable to conversion to GIS. As a result of nine years of cumulative change in suitable timber land, MA 11 and MA 15 continue to be beyond the -5,000 acres total change level shown in the Plan.

**Recommended Actions:** The degree to which changes have been made to management area designations indicate that validation of Forest Plan data is continuing to occur. The large change in the suitable management area category (-40,413 acres) amounts to approximately three percent of the total suitable timber base. At this time, it is not apparent that this is significant in terms of the calculation of ASQ. During revision of the Forest Plan, ASQ calculations will be made using the validated management areas. This will allow for an assessment of the effect of changed management area designations.

## TIMBER: 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 major 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 is 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 Forest Plan. Examples are road construction that is too expensive or a threatened, endangered, or sensitive species found which was unknown during Forest Planning. **Category B** deferrals are those that result from an externally imposed situation. Examples include appeals and court injunctions or significant timber harvest on adjacent private land which could cause cumulative watershed damage 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 Forest Plan period are not considered deferred.

**Results:** Table E-7-1 and Figure E-7-1 and 2 display deferred harvest acres by category for each suitable timber management area on the Forest for FY 88-96. Several harvest deferrals occurred in Category A and one in Category B in FY 96. In Category A, 3,586 acres were deferred and in Category B, 95 were deferred.

**Evaluation:** For FY 96, more acres were deferred in **Category A** in comparison to several preceding years. Some timber sales were deferred because of effects from the wildfires including needs to provide adequate grizzly bear habitat and watershed recovery. Some areas were deferred because the timber was not economical to harvest due either to the size of timber or because use of a helicopter was uneconomical. A few acres were deferred to protect sensitive plants.

In **Category B**, 95 acres were deferred during FY 96. This was based on direction from the Secretary of Agriculture to not harvest within roadless areas under PL 104-19 (Recision Law).

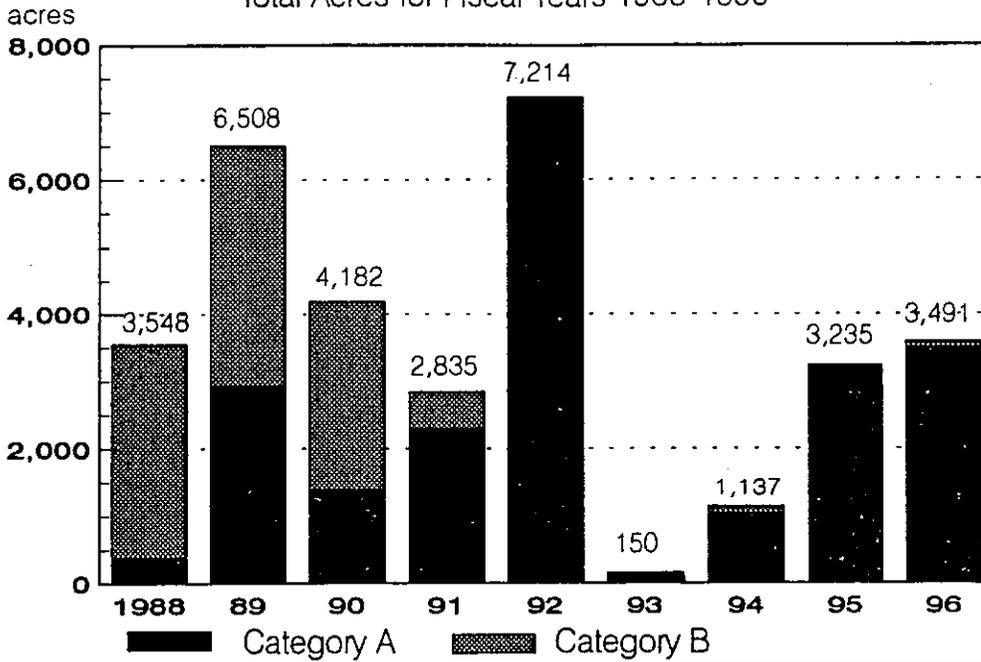
**Summary:** For FY 88-96, MA 12 had 20,911 acres deferred. This is the largest amount of all the MAs and is beyond the prescribed range of 10,000 acres. The grand total cumulative deferred MA acreage for both categories is now 32,395 acres.

**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 Forest Plan revision. These factors will continue to be monitored.

<b>E-7-1 Harvest Acres Deferred in Suitable Timber Management Areas (MA's)</b>							
<b>Category and Fiscal Year</b>	<b>MA 11</b>	<b>MA 12</b>	<b>MA 14</b>	<b>MA 15</b>	<b>MA 16</b>	<b>MA 17</b>	<b>Total</b>
<b>Category A</b>							
1988	15	340	25	0	0	0	380
1989	95	2,434	68	196	138	0	2,931
1990	89	779	107	120	298	0	1,393
1991	204	1,629	360	38	60	0	2,291
1992	66	4,886	2,186	76	0	0	7,214
1993	0	106	0	0	0	0	106
1994	0	77	963	0	0	0	1,040
1995	8	1,449	0	936	842	0	3,235
1996	0	3,257	234	0	0	0	3,491
<b>Subtotal Cat. A</b>	<b>477</b>	<b>14,957</b>	<b>3,943</b>	<b>1,366</b>	<b>1,338</b>	<b>0</b>	<b>22,081</b>
<b>Category B</b>							
1988	0	2,580	274	314	0	0	3,168
1989	198	2,274	301	766	30	8	3,577
1990	403	912	62	1,164	168	80	2,789
1991	7	60	0	427	50	0	544
1992	0	0	0	0	0	0	0
1993	0	33	0	0	11	0	44
1994	0	0	0	0	0	97	97
1995	0	0	0	0	0	0	0
1996	0	95	0	0	0	0	95
<b>Subtotal Cat. B</b>	<b>608</b>	<b>5,954</b>	<b>637</b>	<b>2,671</b>	<b>259</b>	<b>185</b>	<b>10,314</b>
<b>Totals A and B</b>							
1988	15	2,920	299	314	0	0	3,548
1989	293	4,708	369	962	168	8	6,508
1990	492	1,691	169	1,284	466	80	4,182
1991	211	1,689	360	465	110	0	2,835
1992	66	4,886	2,186	76	0	0	7,214
1993	0	139	0	0	11	0	150
1994	0	77	963	0	0	97	1,137
1995	8	1,449	0	936	842	0	3,235
1996	0	3,352	234	0	0	0	3,586
<b>FY 88-96</b>	<b>1,085</b>	<b>20,911</b>	<b>4,580</b>	<b>4,037</b>	<b>1,597</b>	<b>185</b>	<b>32,395</b>

**Figure E-7-1 Harvest Acres Deferred in Suitable Timber MA's**

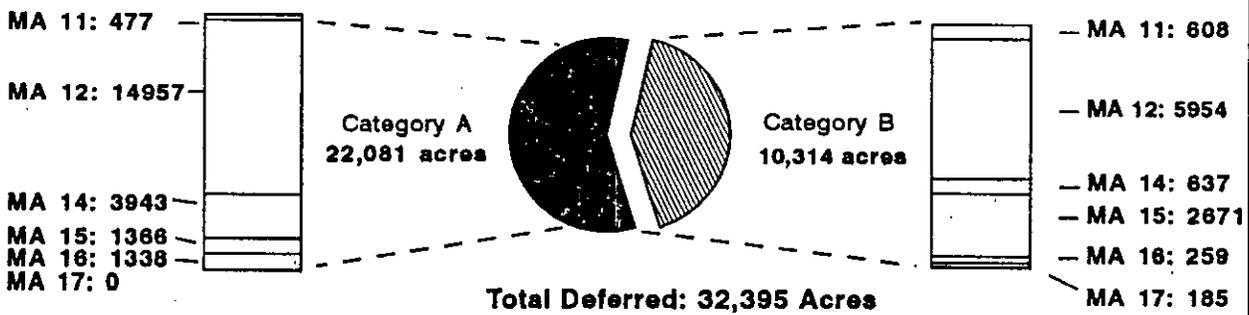
Total Acres for Fiscal Years 1988-1996



**Figure E-7-2**

**Harvest Acres Deferred in Suitable Timber MAs**

Total Acres for Fiscal Years 1988-1996



**Category A:** Harvest deferred due to project-specific conclusions regarding resource conflicts not adequately accounted for in Forest Plan.

**Category B:** Harvest deferred due to externally-imposed situations, such as court injunctions or timber harvest on adjacent private land.

## 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 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 Forest 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 clear cutting, seed tree, and shelterwood cutting. 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 specified to not exceed 20 acres to provide for moose and white-tailed deer. In MA 12, the regeneration harvest area size is specified to not exceed 40 acres to provide 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 analyses 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 catastrophic events such as fire, windstorms, insect attacks, 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 nine years, from 1988-96, including a nine-year average. The harvest methods displayed are clear cutting, seed tree cutting, shelterwood cutting, and all other harvest methods. *Clear cutting* generally leaves a few scattered live and dead trees per acre for cavity-nester use; *seed tree* harvest leaves about four to eight trees per acre for natural seeding; *shelterwood* cutting leaves about nine to 15 trees per acre for natural seeding and environmental protection such as shading. The other harvest methods include overstory removal, salvage, sanitation, thinning, preparatory cuts, and other intermediate silvicultural treatments that do not considerably 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 C lists the harvest areas resulting in larger than 40 acre openings approved during FY 95 and 96 as well as an estimate of how long it will take for the vegetation to regrow to provide adequate big game hiding cover. There were 39 resultant openings greater than 40 acres approved by the Forest Supervisor. All were in response to the catastrophic results of the 1994 fires, windstorm, or dead lodgepole

pine. In most cases, the newly created openings were contiguous with an existing harvest unit. Many of these openings did not provide hiding cover because of the extent of mortality.

**Evaluation:** Figure E-8-1 shows that the average seed tree harvest exceeded 40 acres in MAs 15 and 16 in 1996. In addition, the average shelterwood harvest exceeded 40 acres in MA 16 in 1996. However, the nine-year average harvest area size by regeneration harvest method is still less than 20 acres in MA 11 and less than 40 acres in MAs 12 and 14-17.

**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 so with the appropriate documentation and analysis and, therefore, are consistent with the Forest Plan. Continue to monitor this item.

**E-8-1 Average Harvest Area Size in Acres by Harvest Method and Management Area (MA)**

Harvest Method and Fiscal Year	MA 11	MA 12	MA 14	MA 15	MA 16	MA 17
<b>Clear Cutting</b>						
1988	17	33	7	20	4	2
1989	20	31	22	30	32	0
1990	15	15	0	27	14	4
1991	8	21	20	19	72	8
1992	10	19	30	30	42	0
1993	19	18	18	9	22	21
1994	6	19	4	1	21	1
1995	6	22	10	8	23	0
1996	21	15	32	17	0	18
<b>9-Year Average</b>	14	21	16	18	26	6
<b>Seed Tree Cutting</b>						
1988	15	39	12	37	15	13
1989	8	30	16	30	34	0
1990	33	20	24	35	16	20
1991	23	22	17	32	20	18
1992	14	18	32	31	1	0
1993	4	10	3	22	0	23
1994	8	26	4	22	19	1
1995	6	18	12	26	13	0
1996	0	32	15	74	70	0
<b>9-Year Average</b>	12	24	15	34	21	8
<b>Shelterwood</b>						
1988	32	10	12	27	0	0
1989	15	15	14	25	8	0
1990	15	27	0	17	20	0
1991	13	25	10	28	29	0
1992	24	31	25	0	14	15
1993	3	1	31	1	26	0
1994	8	15	0	35	1	0
1995	7	20	0	0	28	0
1996	12	15	0	0	48	28
<b>9-Year Average</b>	14	18	10	15	19	5
<b>All Other Methods</b>						
1988	32	32	58	31	18	28
1989	31	98	54	40	113	28
1990	29	22	35	27	26	8
1991	43	36	45	40	38	58
1992	28	48	20	38	35	45
1993	20	30	23	22	23	35
1994	43	22	19	20	9	9
1995	26	34	17	22	21	3
1996	26	24	36	31	0	0
<b>9-Year Average</b>	31	38	34	30	31	24

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

**ACTION OR EFFECT TO BE MEASURED:** Acres of clear cut harvest sold.

**VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:** Not defined.

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

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

**Results:** Table E-9-1 displays the results since FY 88. As can be seen, the acres of clear cut harvest sold had been reduced prior to 1996. In FY 96, the amount of clear cutting increased. This is primarily due to emphasis on salvaging fire-killed timber created by the 1994 fires and salvage of dead lodgepole pine. In many instances, the salvage of fire-killed timber or dead lodgepole pine resembled a clear cut.

**Evaluation:** Where there were options, the Forest reduced the amount of clear cutting in the last nine years and met the intent of the Chief's goal for 1997.

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

**Recommended Actions:** Continue monitoring.

## RIPARIAN: Riparian Areas; Monitoring Item C-9

ACTION OR EFFECT TO BE MEASURED:	Ensure that the intent of riparian management goals are met.
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	Failure to meet state and Inland Native Fish Strategy (INFS) standards.*

**Purpose:** This monitoring item was established to help ensure that vegetation management protects the soil and water resources. The Plan requires that this item be reported once every five years. The FY 92 The expected accuracy and reliability of the information is 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 Forest 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 Forest Plan was approved, supplemental Forest guidelines have been completed for the identification, mapping, and management standards necessary to protect riparian areas. Forest Plan Appendix 6, 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. \*\*

In 1995, the Decision Notice for the Inland Native Fish Strategy (INFS) EA amended the Forest Plan by providing an interim strategy to protect native fisheries until a decision is issued for the Upper Columbia River Basin Environmental Impact Statement. The need to modify the existing Plan was determined, in part, from the monitoring of 28 national forests, which indicated that many watersheds were below Forest Plan standards or exceeded thresholds of concern. INFS modified Forest Plan direction by adding

\* Forest Plan originally stated that we would use C-10, F-1, and F-2 variability limits for this item. In 1995 however, the Forest Plan was amended to the focus of riparian management toward meeting the new INFS standards. Furthermore, since the focus of this item has been on riparian BMPs, that portion of F-1 is included in this item. Because C-10, F-1, and F-2 are thoroughly analyzed separately, this item now focuses on the implementation of the standards.

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

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 (RHCAAs) 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, which are:

- 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 Revision of the Riparian Area Guidelines incorporated the Montana State SMZ Law, widening the minimum-width of the SMZ, mandating that leave-trees be calculated by percent rather than number of trees, and requiring protection of all classes of channels.

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

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

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

**Miles of stream classes and/or stream categories identified and mapped (Table C-9-1).** Table C-9-1 displays the miles of riparian habitat that have been classified and mapped since 1988. Approximately 4,100 lineal miles of riparian habitat have been categorized and mapped since 1988, about half in the past four years. Over 2,300 miles are perennial streams (Stream Classes 1 and 2, INFS Categories 1 and 2). The rest are intermittent and ephemeral streams (Stream Classes III, INFS Category 4).

<b>C-9-1 Miles of Stream Classes Identified and Mapped</b>			
<b>Fiscal Year</b>	<b>Stream Class I &amp; 2, INFS Category 1 &amp; 2; (perennial streams)</b>	<b>Stream Class III, INFS Category 4, (intermittent and ephemeral streams)</b>	<b>Total Miles</b>
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
<b>Totals</b>	<b>2,348</b>	<b>1,747</b>	<b>4,095</b>

**Determining whether INFS standards and guidelines were applied during projects.** In 1995/96, 12 ongoing projects were modified to better comply with INFS. These projects represented a moderate to high (and unacceptable) risk to near-term conservation of bull trout. These projects were one timber sale, two road projects, eight minerals activities, and one special use permit. In addition, 69 projects were proposed and implemented in compliance with INFS. Ninety percent of these projects used the INFS default criteria for riparian widths and, on 10 percent of the projects, the RHCA width was modified based on site-specific information. No projects modified INFS riparian management objectives; seven projects conducted a watershed analysis prior to finalizing the project; and five projects required INFS-related monitoring.

**Evaluation of the 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 1996. In even numbered years, results include information from State Audits. In odd numbered years, results are only from the on-forest BMP tracking program. The determination of proper BMP application is referred to as implementation monitoring. The determination of whether the BMP worked or not is effectiveness monitoring.

In FY 96, 428 practices were evaluated. Acceptable implementations were accomplished an average of 96 percent of the time. Approximately 170 effectiveness evaluations were completed for this same period, of which 98 percent of the BMPs were deemed to be acceptable. For the 2,039 practices evaluated over the seven-year period, acceptable implementations were accomplished an average of 90 percent of the time. Approximately 1,340 effectiveness evaluations were completed for this same period, of which 91 percent of these BMPs were deemed to be acceptable. The abnormal year was 1995 when only 83 percent of the implementation evaluations and 82 percent of the effectiveness evaluations were scored as acceptable. There were special circumstances that account for this unusual result, as discussed on the following page.

<b>C-9-2 Riparian Area BMP Implementation and Effectiveness</b>					
<b>Fiscal Year</b>	<b>Data Source</b>	<b>Implementation Evaluations</b>	<b>Percent Acceptable or Better</b>	<b>Effectiveness Evaluations</b>	<b>Percent Acceptable or Better</b>
1990	Forest & Sate (EQC) MBMP Audits	201	89%	82	87%
1991	Forest-wide BMP Audits	145	95%	145	95%
1992	Forest & Sate (EQC) MBMP Audits	241	88%	241	96%
1993	Forest-wide BMP Audits	226	96%	120	92%
1994	Forest & Sate (EQC) MBMP Audits	295	91%	117	99%
1995	Forest-wide BMP Audits	503	83%	467	82%
1996	Forest & Sate (EQC) MBMP Audits	428	96%	169	98%
<b>Totals</b>		<b>2039</b>	<b>90%</b>	<b>1341</b>	<b>91%</b>

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

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

With respect to INFS, all indications are that we are meeting the intent and requirements. We are screening projects for possible problems; implementing the criteria except where we have better information and do not need their interim defaults; and are monitoring to measure success in meeting the Riparian Management Objectives.

Also, the Forest has been very active in watershed restoration since 1990. We have accomplished restoration on over 6,200 acres between 1990 and 1995, many of which were identified riparian problem areas. In FY 96, we restored 89 acres of degraded riparian habitat using a combination of KV and regular funding.

During the last four years, we have actively pursued collecting additional research on topics related to maintaining riparian habitat. We have just concluded a contract with Colorado State University for a study that included an evaluation of channel-measurement and description parameters. Working with the Intermountain Forest and Range Experiment Station, we funded an additional study that examined the channel dynamics of the smaller order channels that are often overlooked in design and layout of timber sales. This data clearly indicated the value of channel buffering and the value of large woody debris in maintaining viable channel and riparian conditions. This information has not indicated a need to change the Forest Plan, but has reinforced the importance of riparian buffers. We have also collected information in undisturbed watersheds to help us identify "reference" aquatic conditions, or the range of variability we would expect in stream systems that had not had any active forest management. This information will be very useful in Forest Plan revision as we evaluate the effects of various management scenarios, separating the impacts due to natural processes.

**Conclusion:** We are effectively applying the Riparian Guidelines, INFS direction, and riparian BMPs on projects; therefore, we are on track with the Forest Plan. This is a change from FY 92 because of the increased effort to map riparian areas, apply INFS guidelines and apply BMPs. Because of the new direction from INFS, no change to Forest Plan direction is needed at this time.

**Recommended Actions:** Emphasis on BMP implementation and implementation of INFS will continue.

Beginning this fiscal year, we will:

- 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.
- monitor a sample of projects to evaluate whether the riparian guidelines/INFS are meeting their objectives or whether there is a need to change direction.
- continue emphasis on BMP and INFS implementation.
- begin reporting the miles of riparian zone in which there are treatments or timber harvest.

In conjunction with Forest Plan pre-revision, we will develop a consistent methodology for evaluating riparian conditions, such as evaluating proper functioning conditions. This will enable us to better track whether we are maintaining or improving conditions over time.

## 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 percent change in redds +/- 2 degrees change in stream temperature +/- 10 percent change in sediment +/- 10 percent change in embeddedness +/- 20 percent 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 Plan requires that this item be reported every two years. The Forest 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 aggressive water quality protection measures and special streamside management provisions in riparian areas as the means for managing 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 management activities that predated the Plan.

Forest Plan direction for management of fisheries was amended in 1995 with the Inland Native Fish Strategy (INFS). The purpose of INFS is to preserve management options for inland native fish, by reducing the risk of loss of populations and reduce potential negative impacts to aquatic habitat of fishes for an interim period. INFS amended the Forest Plan by providing additional riparian management objectives, standards and guidelines, and monitoring requirements. INFS standards and guidelines are based on the best scientific information available at the time. The amendment will apply until a decision is reached on the Interior Columbia Basin Ecosystem Management Project. 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 the processes that drive stream conditions operate over long time frames.

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. Monitoring Item F-2 identifies seven representative watersheds where this data should be collected as a measure of Forest-wide management effectiveness. It was assumed that if the condition of these seven streams did not deteriorate during prescribed Forest Plan management, then conditions were acceptable. 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. This site specific monitoring was used to determine existing conditions prior to actions, as well as monitoring the effects after projects were initiated. Substantial time has also been dedicated to evaluating the status of sensitive fish populations, all of which were designated sensitive subsequent to the Forest Plan.

In 1992 we determined that this monitoring item and monitoring item F-2 as designed would not allow a meaningful evaluation of the effects of Forest Plan management such as timber harvest and road construction on the fishery habitat. 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. These data sources were channel geometry, particle size distribution and riffle stability index (RSI). 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. The monitoring results for these items are reported in F-2.

**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 Forest 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.

**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 on three of the seven representative watersheds. Also, in cooperation with Montana Fish, Wildlife and Parks, one representative watershed and 14 other streams are annually checked for fall spawning redds. These 15 fall spawning index streams have had redd counts for 1 to 5 years, and in several instances up to twelve years. Another 12 watersheds have been monitored in the fall for one year, and then abandoned because they do not contain fall-spawning fish of interest. One representative watershed, plus five other streams, have had spring redd counts for 1 to 6 years; however, spring spawning counts have generally been unreliable or inaccurate because of high streamflows that obliterate the redds. As a result, the spring redd-count effort has largely been abandoned in favor of the fall redd-count.

The fall redd count data for all watersheds indicates year to year variability in fish spawning that exceeds the limits set in the Forest Plan. A 25 percent drop in the fall redd-count, followed by a 50 percent increase the next year, has been a common outcome of this data. This variability appears to be largely the result of inconsistent monitoring methods and a small sample size. The number of streams monitored for redds and the length of each stream monitored has changed each year as we seek to identify the preferred spawning areas. Several sites where redd-counts exceed the variability limit are undeveloped watersheds or have had no active management activities during the life of the spawning fish. Thus, it appears that the relationship between fish spawning and present forest management is obscure, and the use of redd count data may be impractical as a measure of effectiveness.

Several alternatives to redd counts have been evaluated in the monitoring program. Fish population estimates have been conducted at a number of sites using several different methods. More than 20 sites have had from one to five years of sampling for stream insects. In general, these alternative methods have shown no clear advantages over redd counts except they look at something other than the fish that spawn in the fall. These alternative methods, like redd counts, found high variability in data unrelated to management and generally higher costs for no clear gain in information value.

Based on the above results, monitoring of fish reproduction does not appear to be meaningful as a way to gauge the effectiveness of Forest Plan management. The annual amount of spawning fish is a response to many factors, both natural, human-influenced and unrelated to land management, and thus would never be directly and solely a response to forest management actions. Based on this analysis we will not continue using redd counts as a data source or 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. These streams have been continuously monitored for 1 to 5 years, or as a minimum, over the spring-summer-fall season each year. Another 23 watersheds have been monitored for one year, or for one summer period.

The stream temperature monitoring data for all watersheds indicates year to year variability that exceeds the limits set in the Forest Plan. Temperature swings of 35 degrees are common in all streams over the course of the year. Daily variations in temperature in any one stream typically approach 10 degrees during the height of summer. Even from year to year, the same stream will have a 2 or more degree difference in temperature without any changes in forest management.

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 appears to be unrelated to Forest management. For example one monitoring site where between-year temperature changes exceed 2 degrees is an undeveloped watershed. Monitoring at several other sites indicates there can be a 1 to 5 degree change in stream temperatures - both averages and extremes - due to riparian timber harvest. However, these findings are for a short period (1 year) and have not been replicated in enough locations to be deemed reliable. The results so far are not powerful enough to draw definitive conclusions. The use of stream temperatures as a data source should continue, but the focus of the monitoring should shift to account for the INFS standard that specifies the use of riparian buffer strips.

**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. These representative watersheds have been monitored for 1 to 11 years. Another 31 sites have been monitored for one to six years. 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. Streambed coring is difficult to do reliably, is expensive, and realistic only when roads are very close to the sample site. The selection process for where to take core samples has changed over the years.

The sediment monitoring data for all watersheds indicates year to year variability (change) that is less than the limits set in the Forest Plan. The monitoring data shows a strong relationship between stream bed sediment and the annual total water yield and high flow conditions for the watershed. With a few exceptions, all of the streambed samples contained less than 30 percent fine sediment. Fine sediment levels above 35 percent are considered threatening to coldwater fish production. Several sites had fine sediment levels above 40 percent due to nearby mass erosion sediment sources or because it was a site that naturally accumulates and holds fine sediment. In other instances sediment levels above 40 percent could be due to harvest and roads.

Monitoring at several sites indicates 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 are for a short period (1 year) and have not been replicated in enough locations to be deemed reliable. They also do not answer whether present Forest Plan standards are adequate to prevent the observed change in stream bed sediments.

Monitoring of streambed sediments appears to be warranted in situations where habitat quality for a species of concern is an issue. As a general monitoring tool and as a means for evaluating present Forest Plan direction, this method is unsuitable due to exceptional costs, infeasibility in most stream locations, the obscure relationship between streambed sediments and present-day management, the fact that sampled areas are generally not the first area to respond to a change in sediment conditions, and the fact that sampling actually cleans the streambed in some situations. The results to date are not powerful enough to draw definitive conclusions.

Our primary management focus will continue to be on monitoring sediment prevention measures (see Monitoring Item F-1) as we refine and evaluate other sediment data sources such as this one. This approach is consistent with interagency agreements regarding water quality and beneficial uses under the Clean Water Act. Based on this analysis, we will not continue using sediment cores as a data source for this monitoring item.

**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. These representative watersheds have been monitored for 1 to 5 years. Another 38 sites have been monitored for one to two years. Four different monitoring techniques have been utilized in this task. Two methods (Lolo Hoop and Embeddedness) were found to be flawed and were abandoned during the first five years of monitoring. We continue to use the Lolo Grid and Pebble Count methods. Thus, the reliability of the data is low, particularly when it requires comparisons between monitoring methods.

The embeddedness monitoring data for all watersheds indicates year-to-year variability that is greater than the limits set in the Forest Plan. Surface fine sediments can vary more than 10 percent between streams, and a between-year increase of 20 percent at one site followed by a 15 percent

decrease the next year is not unusual. The monitoring data suggests a relationship between stream surface sediment, and the annual total water yield and high flow conditions for the watershed.

Monitoring at several sites indicates there has been a 5 to 10 percent increase in surface fine sediment compared to unimpacted reference sites as a result of cumulative forest management. However, these findings are for channels that are not comparable and have not been replicated in enough locations to be deemed reliable. They also do not answer whether present Forest standards are adequate to prevent the observed change in streambed surface sediments. The results to date are not powerful enough to draw definitive conclusions. The use of embeddedness monitoring as a data source should continue.

**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. These representative watersheds have been monitored for 1 year. Another 204 sites have been monitored for at least one year with 10 sites having 2 to 4 years of data. To date this task has used at least five different measurement methods. Thus, the reliability of the data is low, particularly when it requires comparisons between monitoring methods.

The woody debris monitoring data for all watersheds indicates little year to year variability in those instances where a consistent method was used. Comparisons between sites where one area has not been affected by management activities and sites where streams have been affected by management indicate there has been at least a 50 percent decrease in woody debris and in many cases nearly a 100 percent reduction due to active watershed management. A watershed research effort on the Forest further supported these findings. However, most of these monitoring results cannot distinguish between historic impacts and the effect of present management direction. Other circumstantial information suggests that in nearly all instances where woody debris is absent (or nearly so) was the cause of stream cleaning completed before the Forest Plan was written. The results to date are not suitable for drawing firm conclusions about the effect of present management direction.

The use of woody debris monitoring as a data source should continue. Because of the recent INFS amendment to the Forest Plan, the focus of this monitoring item should shift to evaluate the effect of uncut stream buffers and not just the effects of riparian clearcuts.

**Other Applicable Information:** Since 1992 the Forest has worked with Colorado State University to complete "Validation of Water Yield Thresholds on the Kootenai National Forest". The objectives of this effort were three-fold: (1) evaluate the causative factors relating timber harvest and related activities to increases in (the size of) peak flows; (2) develop criteria for determining the amount, degree, and type of impact attributable to peak flow increases; and (3) better characterize the peak flow increase thresholds to be used as planning tools for future timber harvest activities on the Kootenai National Forest. The final report for this effort was approved in March 1997. Information from this report will be useful for refining the C-10 monitoring program.

**Evaluation:** At this point in time we cannot determine whether implementation of Forest Plan prescribed practices has resulted in stream conditions that are outside the variability limits set in the Forest Plan. As noted in the above discussion, it is difficult to distinguish between natural variation and management-induced changes in streams. If the monitoring data cannot distinguish between these possible causes of a change, then the risk increases that we will either change management direction when it is not warranted, or fail to change management direction when it is warranted, due to a faulty evaluation of the monitoring data.

Even with the additional data we have collected since 1992, through new and different means, we are not able to determine whether we are within the variability limits of this monitoring item. Part of the problem stems from the variability limits themselves. The present monitoring effort and sample design 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 10 to 20 percent resulting from present-day management direction. In some cases it cannot even identify a trend in conditions because of high year-to-year variability. In effect, some monitoring items appear to be outside the acceptable limits of change more often than not, in part because we do not have enough reference data to distinguish natural change from human-caused. Thus, the discriminatory power of our present monitoring effort is low and the risk of a faulty conclusion is high.

In addition management direction changed in 1995 per the decision of 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. These findings are consistent with findings in the report "Validation of Water Yield Thresholds on the Kootenai National Forest" recently completed by Colorado State University.

It appears that this monitoring item has several problems. These problems also relate to F-2 Stream Sedimentation.

- ◆ The variability limits are an unrealistic measure of human-caused change because of the natural variations within streams and over time.
- ◆ This monitoring item focuses on larger streams which do not respond immediately to management as do smaller streams where most of our activities occur. It takes more activity and a longer period of management to affect a larger stream than a smaller one.
- ◆ Some of the data sources originally identified for this item have proven unsuccessful. The alternative techniques we have investigated since 1992 (these are reported in F-2) have been more successful, but need more structure for site selection, monitoring intervals, etc.
- ◆ The monitoring program for this item has not been focused as it could be. We have collected a lot of data on smaller streams without a strategic plan on what, where, how and when we will collect the data so it will provide us meaningful results. A more rigorous sample program would be helpful here.

**Recommended Actions:**

**Monitoring:** Based on the above discussion it is apparent that we need to reevaluate this monitoring item and that of F-2 Stream Sedimentation. Therefore, we shall establish an interdisciplinary team to evaluate the best course of action. The team shall evaluate whether we need to amend the Forest Plan to establish a new monitoring program for C-10 and F-2, or simply refocus our efforts by formalizing methods, site selection, data management and possibly adding additional monitoring sites where we can evaluate the effect of natural and random causes of change. The team shall provide a

recommendation to the Forest Supervisor on the appropriate course of action by October 1997. The team shall also look at what other, if any, types of data should be collected to evaluate the effects of management based on the INFS amendment.

***Forest Plan Implementation:*** We will continue to implement INFS until the Forest Plan is amended by ICBEMP. We will continue emphasis on BMP implementation to maintain a strong emphasis on our sediment prevention measures. In addition we will focus habitat restoration on mitigation of sediment and woody debris impacts.

***Forest Plan revision:*** Unless the interdisciplinary team recommends, and the Forest Supervisor approves, a Forest Plan Amendment as discussed above, the Forest Plan revision should include a change in the C-10 monitoring requirement. This change should include a rigorous sample design, identification of standard sampling methods, a detailed strategy for data stratification, data sharing with adjacent National Forests, a shared database for all monitoring results, a change in the temperature standard to conform to water quality regulations, explicit data evaluation methods that will be used to support a finding of unacceptable change, and several types of monitoring (implementation effects, trends, restoration effects, and reference conditions).

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

ACTION OR EFFECT TO BE MEASURED:	Determine if Regional and project soil and water practices meet State Water Standards.
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	Failure to meet State Standards and Protect Beneficial Uses

**Purpose:** This monitoring item was established to help ensure that the State water quality standards are met. The Plan requires that this item be reported annually. The expected accuracy and reliability of the information is 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. The BMPs are various practices which are designed to eliminate or reduce non-point sources of pollution such as sediment, which is the primary source of non-point pollution on the Forest. BMP monitoring consists of three parts: (1) determine whether the practice (BMP) was applied on-the-ground as called for; (2) if applied correctly, did it eliminate or minimize the effect that required the BMP; and (3) spot monitor selected activities to determine effectiveness of BMPs. The determination of proper BMP application is referred to as implementation monitoring. The determination of whether the BMP worked or not is effectiveness monitoring.

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

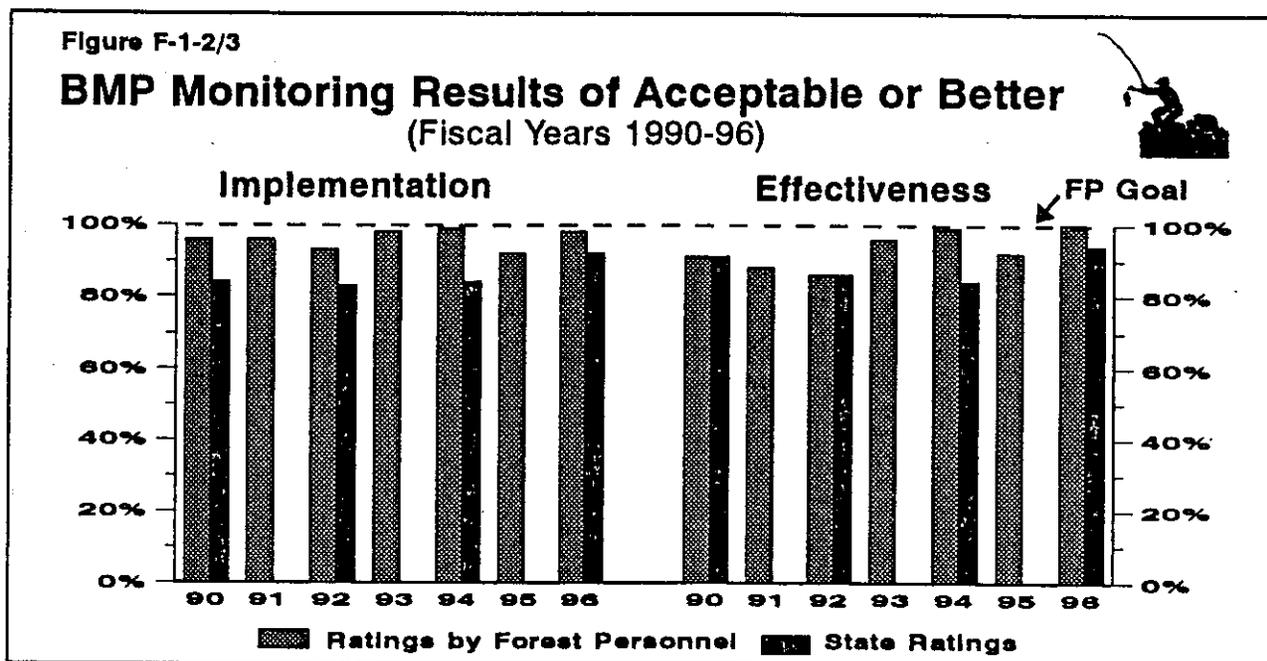
Spot monitoring of selected activities is also being conducted to determine BMP effectiveness as well as determine compliance with our requirement to protect beneficial uses of water, including fisheries and aquatic habitat.

FY 96 BMP monitoring on the Forest involved two different efforts: BMP monitoring done by Kootenai Forest personnel during their normal work activities and BMP monitoring coordinated by the Forestry Division, Department of Natural Resources and Conservation (DNRC), as part of a larger Statewide Forestry BMP Audit. During both efforts, BMPs were evaluated at particular sites on various projects across the Forest. The implementation and effectiveness monitoring evaluations were both rated as shown in Table F-1-1.

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

**Results of BMP Monitoring Done by Kootenai Forest Personnel:** About 90 separate projects were audited in FY 96 by KNF personnel. In FY 96, implementation evaluations were completed for 4,113 BMPs. Implementation was acceptable 98 percent of the time in FY 96, considerably up from 1995. Effectiveness evaluations were completed for 1,749 BMPs in FY 96 and met the requirement of acceptable 100 percent of the time (see Table F-1-2 and Fig. F-1-2/3).

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



**Results of BMP Monitoring Done by the State BMP Audit Team:** In FY 96, four Kootenai Forest timber sales were monitored as part of the statewide Montana Forestry Best Management Practices Implementation Monitoring Program. These audits were conducted under the supervision of the DNRC by an interdisciplinary team comprised of a fisheries biologist, a forester, a hydrologist, a representative of a conservation group, a logging/road engineer, and a soil scientist.

The FY 96 State BMP Audit done on the Forest evaluated a total of 158 BMPs on four separate projects, the same number of projects and practices as in 1994. Implementation was acceptable or better 92 percent of the time and eight percent were unacceptable or worse. When evaluated for effectiveness, BMPs were acceptable or better 92 percent of the time and eight percent were unacceptable or worse (see Table F-1-3 and Figure F-1-2/3). These two ratings were almost identical to the statewide average of 92 percent acceptable or better for implementation and 94 percent acceptable or better for effectiveness.

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

The State BMP Audit Team also evaluated the sensitive or "high-risk" BMPs and how they compared to the statewide average. The "high-risk" BMPs are those that are considered to be the most important in maintaining watersheds and water quality.

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

- I.C.1 Provide adequate road surface drainage for all roads.
- I.C.6 Route road drainage through adequate filtration zones before entering stream.
- I.D.2 Stabilize erodible soils (e.g., seeding, benching, mulching).
- I.E.2 Maintain erosion control features (dips, ditches, functional culverts).
- II.A.5 Design and locate skid trails to avoid concentrating run-off.
- II.C.2a Adequate drainage for temporary roads, skid trails, fire lines.
- II.D.9 Limit water quality impacts of prescribed fire.
- III.C.3 Prevent erosion of culvert and bridge fills (e.g., armor inlet and outlet).

In this sensitive-BMP category, implementation results for the four KNF-audited sales were 74 percent acceptable compared to the statewide average of 81 percent. Effectiveness results were 71 percent acceptable compared to 86 percent for the statewide average.

**Evaluation of BMP Monitoring by Kootenai Forest Personnel:** The results of the FY 96 BMP monitoring indicate improvement in the BMP program relative to 1995 (see Table F-1-2). No BMPs were rated as "grossly unacceptable" in FY 96 and only one was "very unacceptable." The scores of 98 percent for acceptable implementation and 100 percent for acceptable effectiveness point to the overall success of the Forest BMP Program.

Only four practices were identified as problems and given less than acceptable scores: Practice 14.11, Log Landing Erosion Control; Practice 14.14, Revegetation of Disturbed Areas; Practice 14.16, Meadow Protection During Timber Harvest; and Practice 14.17, Streamcourse Protection. The 1996 BMP monitoring results contrast sharply with 1995 -- BMPs that were problems in 1995 were resolved, but new problem areas surfaced in 1996.

**Evaluation of the Statewide BMP Audit Team Results:** The FY 96 BMP Audit results for the Kootenai Forest audited sales are the same as the statewide results for the implementation and effectiveness categories and both are very respectable, overall. One reason for this is that KNF sales being audited in past years were harvested before BMPs were being applied as part of the project. Audited Forest Service sales, in general, had been older than sales being evaluated for other ownerships because of the time lag built into our legal process of project development.

When comparing this Forest to the statewide average for the "high risk" BMPs in FY 96, the ratings for both the implementation and effectiveness categories were lower than the statewide average. This continues the trend toward lower Forest ratings for the "high risk" BMPs. One reason for this is that the Forest has not been as aggressive as necessary in bringing existing roads up to current BMP standards when we use them for new projects. The Forest is building new roads to meet new BMP specifications, but, in many instances, we are not applying the specifications to bring the old roads into compliance when used for a new project. However, with respect to streamside management zone (SMZ) protection (one of the high-risk BMPs), the Forest has improved as we have incorporated these requirements into our contracts (see C-9 for more information).

**Spot Monitoring of Selected Activities:** Spot monitoring of BMP effectiveness by Forest personnel was done on a project basis on several sites in 1996. These site-specific monitoring projects evaluated BMPs with respect to sediment and turbidity, usually through comparisons of data collected above and below the project. Projects that were monitored included culvert removal on Arbo Creek and the West Fork of Quartz Creek, roadside timber salvage on Cripple Horse Creek, fire effects and other cumulative impacts on eight streams on the Rexford Ranger District, and channel reconstruction of Lower Quartz Creek. In some cases, this monitoring showed a need for additional BMPs for future projects. In most cases, results showed we were successful in preventing sediment from leaving a site or from entering a water body. The Arbo Creek Project demonstrated a need for additional BMPs in our restoration contracts and closer oversight of the work.

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

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

- 1) Continue monitoring, emphasizing implementation, evaluation, tracking, and the feedback loop. Give special emphasis to the "high risk" BMPs.
- 2) Have another All-Forest field training session in the spring to cover all aspects of BMPs. Revise standardized forms to facilitate tracking and training.
- 3) Work with Forest Management Team to develop program of District and Zone IDT Effectiveness BMP Monitoring to increase our performance and help complete the feedback loop.

## SOIL AND WATER: Stream Sedimentation; Monitoring Item F-2

**ACTION OR EFFECT TO BE MEASURED:** Determine sediment impacts on water quality.

**VARIABILITY WHICH WOULD INITIATE** 20 percent increase in bedload or suspended sediments.

**FURTHER EVALUATION:**

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

**Background:** The Forest Plan identified seven streams that would be monitored for this item. They are: Big, Sunday, Bristow, Red Top, Rock, Granite and Flower Creeks. The data to be collected includes bedload sediment production, 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 identify the level of sediment transport for the seven Forest Plan Monitoring streams, and to look for evidence of a change 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. For instance, the State of Montana has a turbidity standard for no more than a 5 turbidity units (NTU) increase above natural. The standard is met, by State regulation, whenever Best Management Practices (BMPs) are implemented.

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. These data sources were channel geometry, particle size distribution and Riffle Stability Index (RSI). 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.

**Results:** Information regarding bedload, suspended solids and streamflow have been collected in one or more of the seven representative watersheds. This same data has also been collected in many more watersheds not specifically identified in the Forest 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.*

Bedload samples have been taken for one to several years in two of the seven representative watersheds. The difficulty in collecting this data is that the investigator must sample the stream during the few minutes to several hours out of the whole year when bedload is actually moving. Our experience to date is that this short-lived event frequently occurs when most Forest roads are impassable due to snow, or that the stream velocity or amount of bedload movement is so great that the investigator cannot hold the sample device in the stream long enough to collect data. The bedload sediment data are too sparse to warrant a conclusion about natural processes or management-induced effects.

Monitoring of bedload does not appear to be a feasible tool to gauge the effectiveness of Forest Plan management techniques. The task has proven to be nearly impossible as a general measure except in rare instances. It is doubtful whether we can ever reliably collect this data at one or more sites on an annual basis, therefore we will no longer use bedload movement as a data source.

In lieu of bedload monitoring, several alternative monitoring methods are under investigation. We have established stream channel cross-sections at several hundred sites, with the goal of remeasuring the channel each year to check for a net change in the channel shape. To date more than 40 of these sites have 2 years of data available. We are also evaluating the use of scour chains - a device that is buried in the streambed and then monitored each year to check for the depth of streambed scour or fill.

**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.*

As a result of the findings in the 1992 Forest Plan Monitoring Report, and national publications evaluating monitoring protocols, channel cross-section measurements were added as an alternative data source. The shape and area of the channel cross-section can change in response to a variety of management activities. Management can alter the size or frequency of peak flows and the sediment load, and these are likely to affect the shape and area of the channel cross-section.

Since 1989, we have collected cross-section data on over 50 streams, a few of which were reference streams (those with no past activity). Analysis of the results has been difficult because of the lack of a computer model that can evaluate between-year changes. Even if such a model were available, we do not have enough reference site data to determine natural variability. The data available is not sufficient and our abilities to analyze the data is limited; therefore we are unable to draw a conclusion about the effectiveness of management direction. This data will still be collected as we develop a computer model to evaluate stream changes.

**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 over 35 streams on the forest. While the technique appears to hold promise for evaluating larger streams, we have had a great deal of difficulty using it on the smaller streams that comprise the bulk of our monitoring efforts. After consulting with the IPNF after recent flooding, we did not use the technique in 1996 because of the difficulty in separating natural from human-caused changes. Again, because of the lack of adequate reference data, we cannot make as much use of the data as we would like. We will continue to use this data source for the appropriate type of streams and focus our efforts on collecting reference data.

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

We have collected particle size distribution data on 40 streams since 1992. However, these results have not been replicated at enough sites or for a long enough time period to reach reliable conclusions. In addition, we need 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. These representative watersheds have been monitored for 1 to 2 years, with 4-year records at several sites. Another 60 sites in other watersheds have been monitored for approximately one year. Thus, 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 indicate year-to-year variability that is greater than the limits set in the Forest Plan. Suspended sediments can vary more than 20 percent between streams. For instance, a between-year increase of 50 percent at one site followed by a 25 percent decrease the next year is not unusual. The monitoring data suggest a strong relationship between suspended sediment, and the annual total water yield and highflow conditions for the watershed. Monitoring at a couple of sites indicates the State water quality standard for NTUs is technically exceeded as a result of present forest management even when BMPs are applied. In these cases we reported the incidents to the Department of Water Quality Bureau to determine the best course of action to mitigate the sites and determine what went wrong so it doesn't happen again. This is part of the BMP feedback loop.

This same data confirm that these elevated levels of high-flow suspended sediment only persist for a few years, but do not return to pre-disturbance conditions and likely represent a longterm chronic problem. However, these results have not been replicated at enough sites or for a long enough time period to reach reliable conclusions. The results to date are not powerful enough to draw definitive conclusions. Monitoring of suspended sediments appears to be warranted given the results to date, therefore we will continue to use this item as a data source.

**Other Applicable Information:** Since 1992 the Forest has worked with Colorado State University to complete a study to validate water yield thresholds on the Forest. The objectives of this effort were threefold: (1) evaluate the causative factors relating timber harvest and related activities to increases in (the size of) peak flows; (2) develop criteria for determining the amount, degree, and type of impact attributable to peak flow increases; and (3) better characterize the peak flow increase thresholds to be used as planning tools for future timber harvest activities on the Forest. The final report for this effort was approved in March 1997. Information from this report will be useful for refining the F-2 monitoring program.

**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. If the monitoring data cannot distinguish between the possible causes of a change, then the risk increases that we will either change management direction when it is not warranted, or fail to change management direction when it is warranted, due to a faulty evaluation of the monitoring data.

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 is not sufficient to reliably identify an impact of 20 percent due to present management direction at all sites. Thus, the discriminatory power of our present monitoring effort is low and the risk of a faulty conclusion is moderate to high.

In addition 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. These findings are consistent with findings in the study on Forest watersheds recently completed by Colorado State University.

It appears that this monitoring item has several problems. These problems also relate to C-10 Fisheries Habitat.

- ◆ The variability limit is an unrealistic measure of human-caused change because of the natural variations within streams and over time.
- ◆ This monitoring item focuses on larger streams which do not respond immediately to management as do smaller streams where most of our activities occur. It takes more activity and a longer period of management to affect a larger stream than a smaller one.
- ◆ Some of the data sources originally identified for this item have proven unsuccessful. The alternative techniques we have investigated since in 1992 have been more successful, but need more structure for site selection, monitoring intervals, and computer support.
- ◆ The monitoring program for this item has not been focused. We have collected a lot of data on smaller streams without a strategic plan on what, where, how and when we will collect the data so it

will provide us meaningful results. We have been able to use that data where research has applied a more rigorous sample program.

**Recommended Actions:**

**Monitoring:** Based on the above discussion it is apparent that we need to reevaluate this monitoring item and that of C-10 Fisheries Habitat. Therefore, we shall establish an interdisciplinary team to evaluate the best course of action. The team shall evaluate whether we need to amend the Forest Plan to establish a new monitoring program for C-10 and F-2, or simply refocus our efforts by formalizing control methods, site selection, data management, computer support and possibly adding additional monitoring sites where we can evaluate the effect of natural and random causes of change (reference streams). The team shall provide a recommendation to the Forest Supervisor on the appropriate course of action by October 1997. The team shall also look at what other, if any, types of data should be collected to evaluate the effects of management based on the INFS amendment.

In their evaluation, the team shall review the most recent literature on stream monitoring programs, other research that has been conducted on the forest and recommendations presented in that research, as well as evaluate the data we currently have to see where we can make it more useful.

**Forest Plan Implementation:** We will continue to implement INFS until the Forest Plan is amended by the EMP. We will continue emphasis on BMP implementation to maintain a strong emphasis on our sediment prevention measures.

**Forest Plan revision:** Unless the interdisciplinary team recommends, and the Forest Supervisor approves a Forest Plan Amendment as discussed above, the Forest should consider revising F-2 during Forest Plan revision. Furthermore, we should validate the R1-WATSED watershed effects model that is intended to avoid, rather than mitigate, the effects of Forest management on streams and water quality. Recommendations from the report "Validation of Water Yield Thresholds on the Kootenai National Forest" recently completed by Colorado State University may be used to help refocus our monitoring efforts for this item.

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

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

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

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

FP 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.

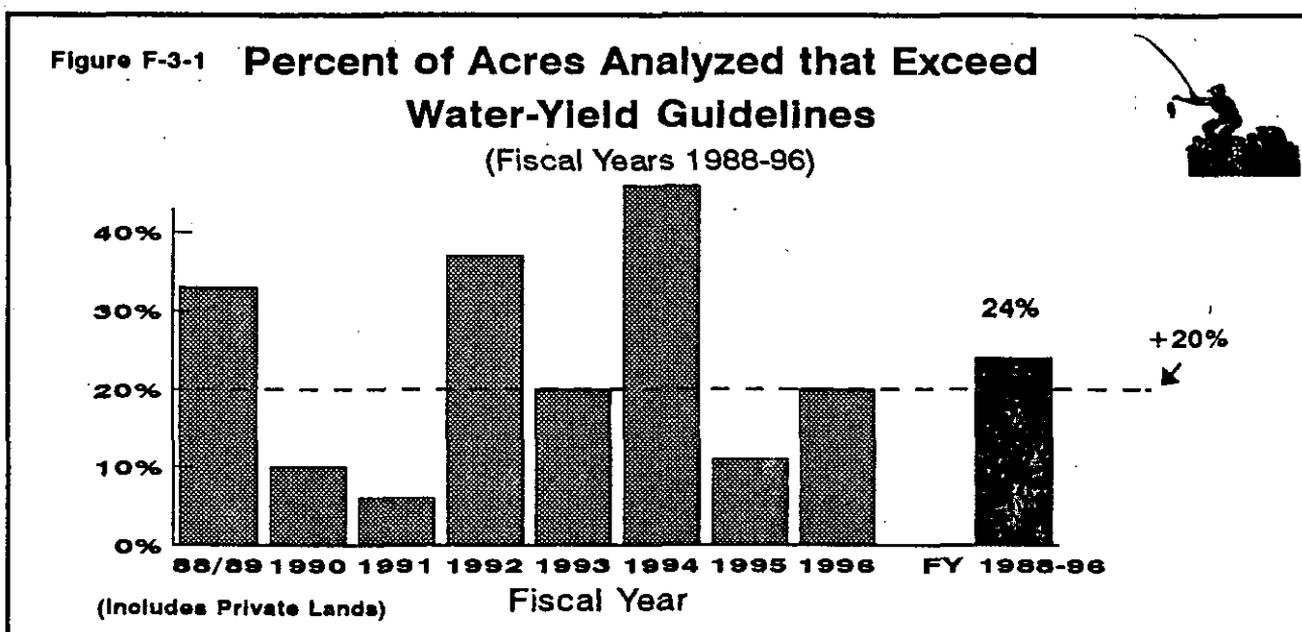
This monitoring item evaluates whether model-projected existing peak flows exceed a value determined from analysis of the existing stream condition. Channel damages have not necessarily occurred for the reported instances of exceeding of hydrologic guidelines.

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

Table F-3-2 and the Water Yield Analysis Map (Figure F-3-2) present an estimation of the forest-wide condition based on a master list of watersheds updated when areas are reevaluated.

Table F-3-1 and Figure F-3-1 show the results for each fiscal year. In FY 96, the water yield model was used to estimate the peak flow increase on 223,545 acres of both National Forest and private land. Of the total area analyzed during this fiscal year, 20 percent of the acres exceeded the 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.

<b>F-3-1 Watersheds Analyzed for all Ranger Districts by Fiscal Year</b> (Includes Private Lands)			
<b>Fiscal Year</b>	<b>Total Acres of Watersheds Analyzed</b>	<b>Acres of Watersheds Exceeding WY Guidelines</b>	<b>Percent of Analyzed Acres Exceeding WY Guidelines</b>
1988-89	944,170	314,404	33%
1990	141,054	14,564	10%
1991	226,836	13,020	6%
1992	163,297	59,661	37%
1993	83,479	16,654	20%
1994	130,890	59,597	46%
1995	277,229	29,682	11%
1996	223,545	45,758	20%



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

The second method used to analyze the peak flow data records the analysis results for each watershed, updated whenever a watershed is reanalyzed. 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) has been 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 eight years ago and conditions may have changed.

As shown in Table approximately 1,940,500 acres have been analyzed for water yield conditions on the Kootenai since 1988. Of this total, 1,482,700 acres (76 percent) were found to be at or below the guidelines and 457,800 acres (24 percent) were found to be over in the year the analysis was done.

<b>F-3-2 Summary of Watershed Analysis Results</b> (Includes Private Land)			
<b>Fiscal Years</b>	<b>Acres of Watersheds Analyzed</b>	<b>Acres (and %) of Watersheds That Meet WY Guidelines</b>	<b>Acres (and %) of Watersheds Exceeding WY Guidelines</b>
FY 88- FY 96	1,940,516	1,482,693 (76%)	457,823 (24%)

**Evaluation:** Table F-3-1 shows 11 percent of the analyzed watershed acreage for FY 95 and 20 percent of the analyzed watershed acreage for FY 96 exceed the peak flow water yield guidelines. As in prior years, the reasons for these current conditions are usually related to harvesting of timber in years prior to the implementation of the Forest Plan and relatively slow recovery of vegetation in certain watersheds. In addition, natural events such as wildfire have caused high mortality of trees in certain areas, resulting in conditions which cause increased runoff and peak flow increases. When such conditions are encountered in the project planning process, projects are designed so that peak flows still meet the Forest Plan guidelines to protect water quality and beneficial uses.

Table F-3-2 indicates that, for the period from FY 88 to FY 96, about 24 percent of the watershed acreage, including private land, is exceeding water yield guidelines. Map F-3-1 shows the watersheds where peak flow analysis has been done in one or more Fiscal Years since 1988 and also shows the results of the most current analysis. This monitoring item continues to be off-track with the Forest Plan. It is important to note, however, that when projects are proposed in watersheds that are over the standard, they are designed to improve the long-term watershed condition, rescheduled, or dropped. This element of monitoring is showing that water yield calculations and stream channel analysis is an important part of the analysis needed before projects can be implemented by Ranger Districts.

**Recommended Actions:** No changes to the Forest Plan are needed at this time. However, the above evaluation shows a continuing need to evaluate hydrologic conditions. As part of Forest Plan revision, the following will be implemented:

- 1) Develop an enhanced watershed analysis process which better integrates stream channel condition information with the calculated data on potential peak flow increases. This will include updating methodologies and providing a consistent approach for all Ranger Districts to use.
- 2) Integrate the peak flow analysis process (called WATSED) into the Forest's new Geographic Information System (GIS). This will increase efficiency and provide easier access to data.
- 3) Design a database system which will allow more efficient tracking of the watershed conditions. This data base would contain information on the current and historic condition of watersheds. This will aid in understanding recovery periods and the role of natural events in creating changes in watershed conditions.

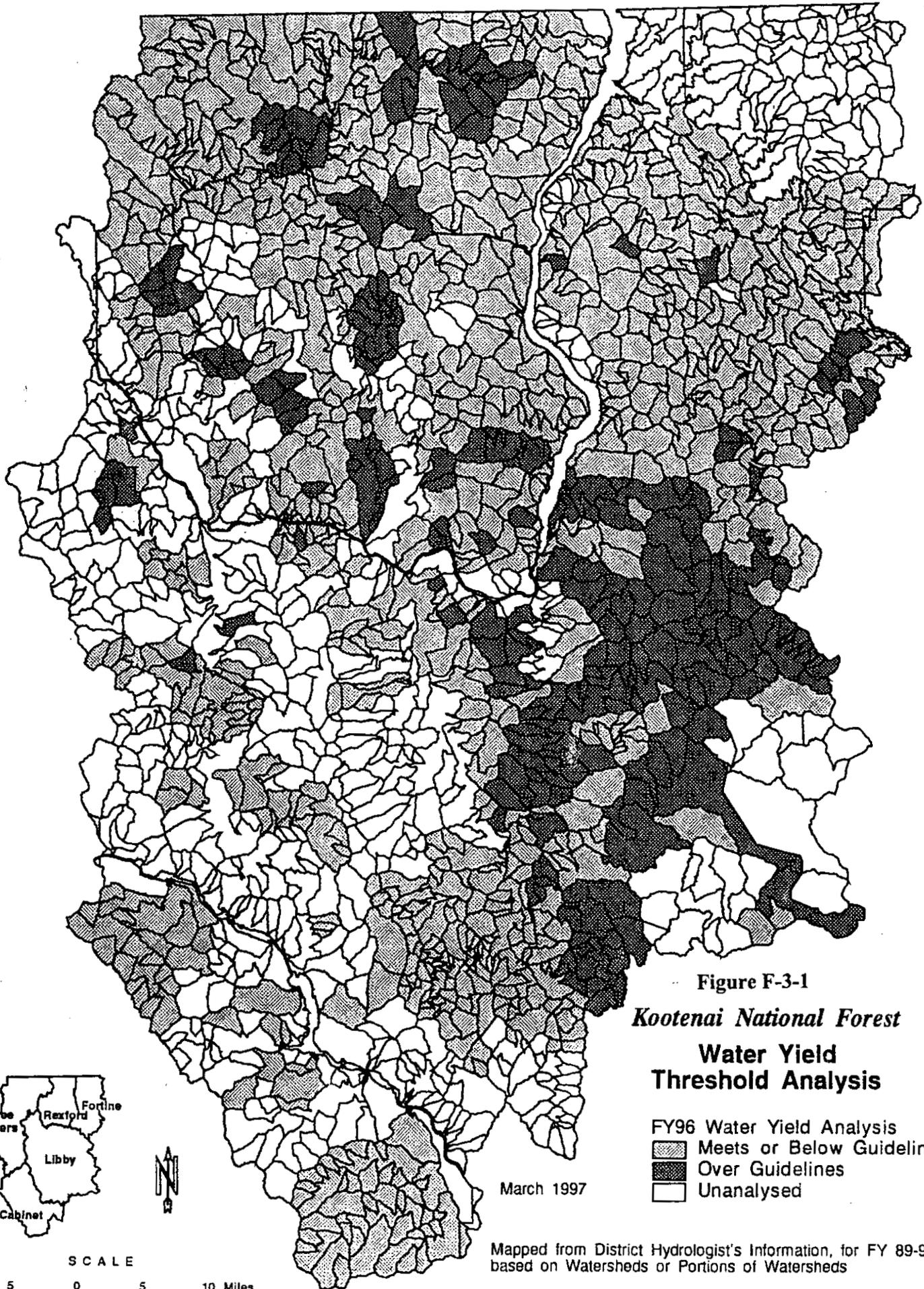


Figure F-3-1  
**Kootenai National Forest**  
**Water Yield**  
**Threshold Analysis**

FY96 Water Yield Analysis  
 [Diagonal lines] Meets or Below Guidelines  
 [Solid black] Over Guidelines  
 [White] Unanalysed

March 1997

Mapped from District Hydrologist's Information, for FY 89-96,  
 based on Watersheds or Portions of Watersheds



## SOIL AND WATER: Soil Productivity; Monitoring Item F-4

**ACTION OR EFFECT TO BE MEASURED:** Determine the changes in site quality due to surface displacement and soil compaction.

**VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:** A 15 percent decrease in site productivity.

**Purpose:** This monitoring item was established to help ensure that the basic soil resource is not compromised in the production of other resources such as timber harvesting, grazing, etc. The Plan requires that this item be reported every five years. The expected accuracy and reliability of the information is moderate.

**Background:** Soil resource management has the goal of maintaining or improving long-term soil productivity and soil hydrologic function. Soils can be physically damaged by the displacement, compaction, puddling, and infiltration reduction due to the use of heavy equipment, especially during wet weather and wet soil conditions. They can also be physically and chemically damaged by heat during any intense burning, such as from wildfires, broadcast burning during site preparation, or by the burning of mechanically-bunched slash piles. Soils that are damaged from the above conditions incur adverse affects on their hydrologic function or sustain actual losses in soil productivity.

Ideally, the soil quality standards that would be used for measuring soil damage would be soil structure and fertility. Because these soil qualities are difficult to measure, other soil qualities are substituted. These substitutes are soil displacement and the associated soil compaction.

Region 1 has a policy that allows up to 15 percent detrimental disturbance (FSH 2509.18, 5/1/94). The Kootenai Forest uses the 15 percent detrimental disturbance as a measure to track the impact on site productivity. If 15 percent of an area is significantly disturbed, then we can say that it has probably incurred a decrease in long-term site productivity.

Field monitoring is done within activity areas using the line transect method. The line transect is perpendicular to the direction of the ground-disturbing activity. Usually, three transects (an upper, middle, and lower) are done within each activity area. Each transect represents the activity that occurred within that portion of the activity area. All of the monitoring completed so far is representative of timber harvesting operations. The activities represented are cable logging, forwarder logging, tractor logging (both summer and winter operations), and tractor piling.

**Results:** The survey has been completed on 77 timber harvest units scattered across the forest between 1992 and 1996. These areas represent the current types of logging methods including the types of equipment being used for mechanical falling, yarding, and slash piling. The areas ranged in size from two to 117 acres. The 1992 report showed that 52 percent of the 511 acres surveyed to that point were above the Forest Plan variability limits of 15 percent detrimental compaction. Since then, 1,221 acres have been surveyed and only two percent (21 acres) were above the Forest Plan variability limits.

Table F-4-1 displays the results of the surveys completed from 1992-1996. Areas where cable logging methods were used showed little or no detrimental disturbance. The use of forwarders and winter logging, also, usually resulted in very low to low detrimental disturbance. Areas where tractors were used resulted in a higher level of detrimental disturbance. In general, the amount of heavily disturbed area increased directly with the number of machinery operations.

**Evaluation:** The 1,732 acres surveyed represents about seven percent of the annual harvest acres. If the areas measured are representative of the entire Forest, about 16 percent of logging and site preparation activities may be beyond the variability limit of the Forest Plan. Some of the reasons for the areas beyond the Forest Plan variability limit of 15 percent detrimental disturbance are: the application of an approved silvicultural prescription, the inclusion of small areas of steep terrain within areas of more gentle terrain, inadequate designation of the proper logging equipment, and level of experience of the sale administrators or logging operators.

The 1992 Monitoring Report indicated that 52 percent of the surveyed acres, to that point, were beyond the Forest Plan variability limits. Of the 49 units surveyed since 1992, only two (two percent of measured acres) were beyond the Forest Plan variability limits. This very major change is mainly a result of reduction of acres that are "dozer piled". Other reasons include more winter logging, more broadcast burning, and more use of forwarder logging equipment.

Based on the information stated above (the improvement that has occurred since 1992 and that no unit was greater than 15 percent in the last two monitoring seasons), this monitoring item is determined to be within the recommended range stated in the Forest Plan (no areas should measure more than 15 percent of detrimental disturbance).

**Recommended Actions:** Continue monitoring.

<b>F-4-1 Summary of Surveys of Disturbed Soils</b>				
<b>Timber Sale Name</b>	<b>Harvest Unit Number</b>	<b>Acres</b>	<b>% of Area Detrimentially Disturbed*</b>	<b># of Monitoring Points</b>
<b>At or Below 15%:</b>				
<b>1992</b>				
Beaver Peak	9	18	12%	294
Blue Rice	21	28	7%	243
Dry Gulch Dixie	14	7	15%	150
Dry Gulch Dixie	14	2	3%	125
Good Creek	1	28	10%	369
Good Creek	16(1)	18	12%	113
Good Creek	16(2)	-	7%	106
Good Creek	16(3)	-	10%	203
Good Creek	16(4)	-	6%	180
Good Creek	24	17	15%	360
Homesteader	4	15	8%	326
Homesteader	27	15	13%	229
Homesteader	27A	-	2%	59
Homesteader	30	6	7%	162
South Pinto	2(1)	60	7%	119

<b>F-4-1 Summary of Surveys of Disturbed Soils (continued)</b>				
<b>Timber Sale Name</b>	<b>Harvest Unit Number</b>	<b>Acres</b>	<b>% of Area Detrimentially Disturbed*</b>	<b># of Monitoring Points</b>
South Pinto	2(3)	-	7%	115
South Pinto	2(2)	-	7%	740
South Pinto	2(4)	-	15%	99
Upper Basin	9A	5	6%	113
<b>1993</b>				
Zeller Creek	11	21	1%	580
Zeller Creek	12	28	9%	993
Arbo Fire Salvage	1	43	15%	783
Arbo Fire Salvage	2	21	8%	619
Arbo Fire Salvage	4	31	12%	511
Ten Left Salvage	10	86	0%	250
Fourth-Cyclone Salvage	9 & 9A	46	14%	237
Butler Dedit	2	24	0%	518
Butler Dedit	4A	7	8%	333
Butler Dedit	6	12	8%	342
Butler Dedit	8	11	13%	252
Smoke Creek PC	8	23	5%	921
Smoke Creek PC	9	16	1%	852
<b>1994</b>				
Calx Mtn (Trans. 1)	8	14	12%	415
Calx Mtn (Trans. 2)	8	13	10%	239
Prospect/Parmenter	21	22	4%	795
Prospect/Parmenter	22	4	3%	80
Prospect/Parmenter	23	6	0%	255
<b>1995</b>				
Swede McMillan	29	15	<1%	673
Swede McMillan	31A	17	4%	249
Swede McMillan	34	20	4%	470
Swede McMillan	46	5	3%	722
West Pipe	17B	8	3%	295
West Pipe	23	43	3%	235
Prospect/Parmenter	20	13	2%	530
Barnum	2	39	0%	410
Barnum	4	29	7%	810
<b>1996</b>				
Thompson View	1	13	4%	637
Thompson View	4 & 7	38	5%	777
Thompson View	5	28	5%	937
Thompson View	6	22	6%	863
South Parsnip	10	117	10%	1675
Ural Creek	5	46	4%	1323
Inch Mountain	1	38	1%	791
Inch Mountain	11	39	1%	875
French Mudpickens	8	39	1%	1160
Upper Face	8	32	6%	704
Upper Face RTS	10	20	9%	334
Upper Face Dozer	10	34	7%	571
Fowler Fire Salvage	42	6	4%	575
Stevens Blacktail	4	13	5%	850

<b>F-4-1 Summary of Surveys of Disturbed Soils (continued)</b>				
<b>Timber Sale Name</b>	<b>Harvest Unit Number</b>	<b>Acres</b>	<b>% of Area Detrimentally Disturbed*</b>	<b># of Monitoring Points</b>
Stevens Blacktail	16(A)	20	2%	794
Stevens Blacktail	16(B)	14	9%	443
Stevens Blacktail	17	17	9%	280
Beetle Bug	1	75	1%	514
<b>Total Acres At or Below 15%</b>		<b>66 units</b>	<b>1447</b>	
<b>Above 15%:</b>				
<b>1992</b>				
Blue Rice	17	29	27%	243
Blue Mountain	2	77	20%	448
Dogwood Windy	28	27	22%	314
Dry Gulch Dixie	16	16	20%	419
East Raritan	1	35	25%	387
Good Creek	1A	28	19%	369
Good Creek	14	26	20%	364
Homesteader	29	7	25%	119
Upper Basin	9	19	21%	292
<b>1993</b>				
Butler Didit	5	8	17%	116
<b>1994</b>				
Calx Mtn (Trans. 3)	8	13	23%	189
<b>Total Acres Above 15%</b>		<b>11</b>	<b>285</b>	

**HUMAN & COMMUNITY DEVELOPMENT: Changes in Local Economy; Monitoring Item H-1**

<b>ACTION OR EFFECT TO BE MEASURED:</b>	Determine the changes in the local economy as a result of Forest Plan implementation.
<b>VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:</b>	Further action will depend on the significance of Forest activities and will most likely be reflected after 10-15 years.

**Purpose:** This monitoring item provides for the collection and display of information regarding the effect of Plan decisions on local economies. The Plan requires that this item be reported once every five years, and this was done in the February, 1993 report. In an effort to prepare for the revision of the Forest Plan, this item is being reported after an additional 4 years, or 1 year early. The expected accuracy and reliability of the information is low to moderate.

**Background:** The Kootenai National Forest has substantial economic impact on 3 counties in Montana (Lincoln, Sanders, and Flathead), and on Boundary County in Idaho. Most effects are felt in Lincoln and Sanders Counties. Historically, natural resources have been the foundation of these economies, contributing through the forest products industry, mining, agriculture, tourism, and recreation such as fishing and big-game hunting. Studies conducted during the preparation of the Plan showed that the forest products industry is the largest contributor, creating directly and indirectly about 70% of the two Counties' employment. Inputs to this economic sector are from both private and federal lands, and is variable from year to year depending on timber harvesting plans. In 1988, for instance, the Kootenai Forest accounted for about two-thirds of the timber harvest activity in Lincoln County. Since forest products make up such a large portion of the Counties' economic base, the trend of the local economy fundamentally mirrors the trend which is seen in the forest products industry.

Any variation experienced in the local economies from year to year results from a variety of sources. These include national economic effects, actions of private timber and mining companies, and the flow of goods and services from the Kootenai Forest. Because of these variables, only averages of economic values through longer periods of time provide a true insight into the nature of changes in local economies. At this point, we can summarize 9 years of data and reliably show trends which have been established. For our report next year, at the 10-year point, we will make updates for the effect of events in the 10th year, which should not change the evaluation significantly.

**Results:** *First 5 years, 1988 to 1992.* Evaluation of the economic effects of the Kootenai National Forest program for the first five years of Plan implementation showed a decrease in the Forest's economic impact in comparison to that initially expected when the Plan was implemented (see the Forest's 1992 Monitoring Report for details). Harvest volumes and the resulting jobs and community income was high in the first part of the period, but by 1991, the economic effect had dropped to a low coinciding with the national recession. In 1992, a recovery was initiated as the Nation emerged from the recession. Harvest

volumes from the Kootenai dropped from 248 MMBF in 1987 and 1988 to 174 in 1992. In comparison to expectations, harvest volume was down by 25% by 1992. Percentage decreases in jobs and community income was not as large, because the harvest shifted toward smaller trees, which require more employees to harvest and process, according to analysis by the University of Montana's Bureau of Business and Economic Research (BBER). Another characteristic of timber harvest during these first five years was that the amount of volume under contract declined by over 50%. This occurred as a result of harvest volumes remaining at an average of 207 MMBF/year while sell volumes averaged 160 MMBF/year (see Table H-1-1). As a result, a major buffering capacity to help match demand with supply had been downgraded. Volume under contract at the end of FY 1992 was 256 MMBF.

*Next 4 years, 1993 to 1996.* The recovery which appeared to be underway in 1992 continued, as the National economy regained its strength. As a result, the level of jobs and income slightly exceeded the levels noted in the late 1980s. From the recovery peak in 1993 to the present time, however, jobs and income have steadily declined by nearly 20%. The amount of timber harvested from the Kootenai National Forest from 1993 to 1996 has decreased by 35%. In addition, considerable economic effects occurred in Lincoln County as the ASARCO mine in Troy closed, the Noranda Montanore adit closed, and the Champion Mill in Libby was sold and large portions of its operation dismantled. These events resulted in large layoffs. Residual effects of these closings have been spread out over a several year period and some effects are only now becoming apparent. The expected effects of the closings were also partially offset as the level of transfer payments have increased at a steeper rate. These payments consist of retirement, social security, medical insurance, unemployment insurance, income maintenance, and veterans payments. In many cases, people who relocated from the area as layoffs occurred were replaced by retirees and others who migrated in from other states.

For Fiscal Years 1993 to 1996, harvest volume from Kootenai National Forest lands averaged 109 MMBF/yr. At the end of that period, there was 151 MMBF under contract but not yet harvested. During this same time period, the amount of wood processed in Lincoln County is estimated by BBER to be down about 6%, indicating that products from privately-owned lands were not sufficient to maintain historical outputs as harvest levels from National Forest sources decreased.

High national demand for lumber products along with increasingly constrained supplies led to a strong increase in price for timber during the last four years of plan implementation. This trend actually had been weakly established in 1990, but then more dramatically advanced in 1993, and peaked in 1995. This price rise stimulated more profitability from timber harvest on both public and private lands, and helped greatly to minimize potential impacts which were occurring as a result of mill and mine closings. Revenues from timber harvests on National Forest lands which are paid to the State for use in county roads and schools averaged \$25.87 per MBF in the first 5 years of the Plan, and have averaged \$59.61 per MBF in the next 4 years. These higher payments result in less current and future direct tax burden on County residents, thereby improving net personal income levels.

*National demand for timber declined in 1996, as evidenced by dropping prices for dimensional material and pulp.* In addition, on the Kootenai, harvest shifted strongly toward salvage of wildfire killed timber, which has lower recovery rates and less mill value. This trend is likely to continue into 1997 and possibly 1998. It is anticipated that the payments to the State will not achieve the peak levels seen in 1995 during the next few years as this kind of timber remains a large component of the total harvest.

H-1-1 Changes in the Local Economy by Fiscal Year (FY)					
Economic Parameters	5-Year Average FY88-FY92	FY 1993	FY 1994	FY 1995	FY 1996
Number of Jobs <sup>1</sup>	N/A	5200	4150	3250	4190
Community Income <sup>2</sup> (millions of dollars)	N/A	157	137	95	123
Timber Harvested (mmbf) <sup>3</sup>	207	155	111	70	100
Timber Volume Sold (mmbf) <sup>4</sup>	160	85	59	58	125

109  
82

<sup>1</sup>. In the timber industry, including Kootenai Forest employment.

<sup>2</sup>. Generated from the number of jobs in the timber industry and Kootenai employment, the 25% return receipts payments, and Kootenai Forest capital investments.

<sup>3</sup>. From the Kootenai Forest only.

<sup>4</sup>. The information used in this Table is taken from the 1996 TSPIRS Report and restated to use more accurate data available from recent studies by the Bureau of Business and Economic Research. The difference from other harvest volumes in this report are due to reporting procedures.

**Evaluation:** The result of 9 years of Forest Plan implementation has been substantial positive economic influence to local counties. In Montana, Lincoln and Sanders counties have been the most important benefactors, but some effects have been present in Boundary County, Idaho, and Flathead County, Montana also. As discussed under item E-1 of this report, there is a very clear trend established of reduced volume sold from the Forest. Economic impacts of this change have been mitigated by harvesting volume under contract at higher than historical rates. This, along with high national demand for lumber and pulp throughout much of the second 5 years of Plan implementation, has been helpful in offsetting mill and mine closures which occurred in the early 1990s. In addition, there has been an influx of people to the area who depend on transfer payments rather than a job for their income, and property values and personal income levels have remained stable or increased as a result.

Since the volume under contract has been reduced to the level of about one year's capacity and current sell volumes are lower, the economic situation for local communities is not as resilient as in the first 9 years of the Plan. The buffering capacity of the large timber sell and harvest programs of the 1980s and early 1990s is no longer present, so the role of the Forest to mitigate potential negative effects in the local economy (such as closings of privately owned mills and mines) will be more limited. This implies that national and international influences (wood and pulp prices, recessions, and demographic shifts) will have continuing strong and increasing influence on local economies. In addition, it is expected that even small variations in the role of the Forest's economically important programs will have relatively larger effects on local people in comparison to the effects they had in the first 9 years of Plan implementation.

**Recommended Actions:** Continue monitoring and further evaluate during Forest Plan revision

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

ACTION OR EFFECT TO BE MEASURED: Emerging issues

VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION: Issues surfaced that were not included in or analyzed for effect by the 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 is moderate.

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

### Emerging or Potential Forest Issues Not Specifically Evaluated in the Forest Plan:

**Wildland/Urban Interface** - Due to the fires in 1994, there is an increased awareness and concern regarding the wildland/urban interface and fuel buildups as it pertains to risk to human life and property.

**Amended Forest Plan Biological Opinion:** The USFWS amended biological opinion of July 1995 states that until new Forest-wide access management direction is issued, projects should not increase the density of open roads above the current Forest Plan standard, should not increase the density of open motorized trails, should not increase the net total motorized access route density, and should not decrease the existing amount of core area in a Bear Management Unit. Departures can be made in consultation with the USFWS and will emphasize ways to increase security for bears with a long-term goal of achieving the Access Committee's recommendations. Meeting this direction may limit the level of management that could have been realized under past direction.

**Ponderosa Pine Old Growth Management:** This issue was brought forward from the FY 95 Monitoring Report. Ponderosa pine stands historically evolved with disturbances such as low-intensity ground fires. Without such disturbances, the potential for attaining an old growth state is reduced due to increased understory vegetation which could carry a high-intensity fire. Due to long history of fire suppression, a need may exist to remove (through timber harvest) some of the understory vegetation prior to burning. The Forest Plan allows for prescribed burning within MA 13 old growth stands, but does not allow for removal of timber without an amendment to the plan.

**Balancing Road Closures to Meet Forest Plan Standards While Providing Access to the National Forests for the Public:** Recent planning efforts indicate that the Forest Plan open road density standard of .75 miles per square mile in MA 12 cannot be achieved in some areas without closing all the roads including main collector roads and loop roads which have been traditionally used for decades. Projects which cannot meet the standard are either being winter logged, deferred, or a Forest Plan amendment (either programmatic or project specific) is being proposed. Response to road closures has included an increasing number of signs and gates being vandalized or removed.

**Wildfire and Subsequent Effects:** The Forest has experienced major fire events in the last few decades (1979, 1984, 1988, 1991, and 1994) and has been faced with a number of project-level proposals for rehabilitation and salvage that require an assessment of burn intensity and tree mortality levels. In response to these needs, the silviculturists have written guidelines that apply the findings of area fire research and professional experience to site specific conditions. This effort has been without the benefit of local long term study of post-fire conditions.

Following an extensive fire event in 1994, the Forest Management Team approved a long term monitoring project. This project is intended to establish baseline information regarding fire caused tree mortality, vegetative succession and fuels accumulation. Specific objectives include a refinement in the predictive guidelines used for estimating tree mortality in fire-affected areas, and to determine trends in succession of vegetation. Thirty-eight plots are established to date. Monitoring will continue on a one, two, three, five and ten year schedule.

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

**Continuing Forest Issues that May Still Affect the Forest Plan:** The Forest Plan initially identified and addressed 13 public issues. As stated in the FY 92 monitoring report of these original 13 issues, the following are continuing to be controversial: 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:** During revision of the Forest Plan, all issues which have been reported since 1989 will be assessed for their continuing applicability. If they are still relevant, they will be considered in Forest Plan development.

## 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 plan continue to be valid.

**VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:** A deviation of more than 10% from the cost data used to calculate present net value in the Plan.

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

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

Cost analysis was undertaken for timber sale preparation and administration (site preparation, reforestation, precommercial thinning) and roads constructed primarily for timber harvest. The baseline unit cost figures (those used to calculate Present Net Value in the Plan) were extracted from the planning record, and inflated to FY 96 dollars in order to provide comparability. The fiscal year unit cost values were obtained from Forest accounting reports and the Forest management attainment reports, and inflated to FY 1996 dollars. Timber sale preparation costs include all planning, sale preparation, and sale administration expenditures for the fiscal year. Timber output is based on the amount sold in the fiscal year. Timber road costs are based on purchaser credit established and associated engineering support costs. Reforestation costs include all reforestation-related costs including co-operative work required by timber sale contractors. All acres with reforestation work are represented in the output level. Table H-3-1 shows the baseline, the first 5 years, and FYs 1993-1996 unit cost data for these items.

### Results and Evaluation:

**Timber Sales unit costs** for FYs 1993-1996 are displayed in Table H-3-1 and show an increase over the level projected in the Forest Plan. This is continuing the upward trend that began in FY 90. Currently, costs are about 3 times greater than projected, which is well outside the +/-10% range prescribed in the Plan. This increase is due to the increasing complexity in timber sale preparation along with a concurrent decrease in the amount of timber volume being sold. For more detail on these aspects, please refer to Monitoring Items E-1 through E-3 and E-7.

**Timber Roads unit costs** were close to the level projected in the Forest Plan for the first five years of the Plan, but increased in FY 93 through FY 95 (see Table H-3-1), largely as a result of decreased

volume sold, lowering cost efficiency. In FY 96, increased timber volume sold in comparison to prior years resulted in costs dropping below the predicted levels in the Forest Plan. Much of the increase in timber sold was a result of salvage of timber killed in 1994 wildfires. Harvest was focused on areas in which minimal road construction was required. It is anticipated that road unit costs will increase as the harvest of fire killed timber decreased.

**Reforestation unit costs** were also higher than projected in the Forest Plan for FY 96 (see Table H-3-1). This continues the slight upward trend that began in FY 90. Due to changes in accounting procedures, there is some inaccuracy in these cost figures; however, it appears that reforestation costs are 30-50% higher than predicted. Since reforestation is a relatively large component of the timber program, this additional cost is a potentially major change in the economic efficiency levels of the Forest.

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

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

H-3-1 Forest Plan Unit Costs by Fiscal Year								
Cost Item	Units	Unit Costs Projected in Plan	Weighted Average FY88-94	FY 93	FY 94	FY 95	FY 96	Weighted Average FY 93-96
Timber Sales	\$/MBF	28	41	110	126	139	62	100
Timber Roads	\$/MBF	31	51	53	55	58	24	43
Reforestation	\$/acre	347	366	389	411	510	540	448
Precommercial Thinning	\$/acre	310	220	217	227	287	213	237

\*All unit costs in this table have been updated to FY 96 dollars to account for inflation and to provide comparability

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

**ACTION OR EFFECT TO BE MEASURED:** Assess Forest budget levels and their effects on Forest Plan implementation

**VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION** 10% deviation by funding item from the predicted levels in the Plan.

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

**Background:** The budget process is directly related to the Forest 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 Forest Plan predictions are no longer fully valid. The analysis presented below will be helpful in budget analysis for Forest Plan revision.

**Results:** Table H-4-1 (next page) shows the percentage difference between the planned budget and actual expenditures for the first five years of the Plan, and FY's 1993-96. Major increases have occurred in fire, fuels, law enforcement, timber salvage sales, trail construction and tree improvement. For more detailed information on the specific dollar amounts for each budget item by fiscal year, see Appendix D at the end of this report.

**Evaluation:** In order to evaluate this information with its wide variations, the major Forest programs were grouped for easier comparison. For each major Forest program (such as timber, wildlife, recreation, etc.), all applicable budget items were grouped and added together. Data for all fiscal years were averaged to smooth out year-to-year variations. Output levels for each major resource area were obtained from Appendix A (at the end of this report) and are based on the Forest's Management Attainment Report for FY's 1988-96. For each major program area, all applicable outputs were added together. To some extent, some misrepresentation was introduced by this addition (for instance, developed recreation and dispersed recreation) but overall results do show the major trends. Table H-4-2, on a following page, shows the results of this analysis. Following that table, there is a brief listing of each program area, the outputs contributing to it, and an evaluation of the trend.

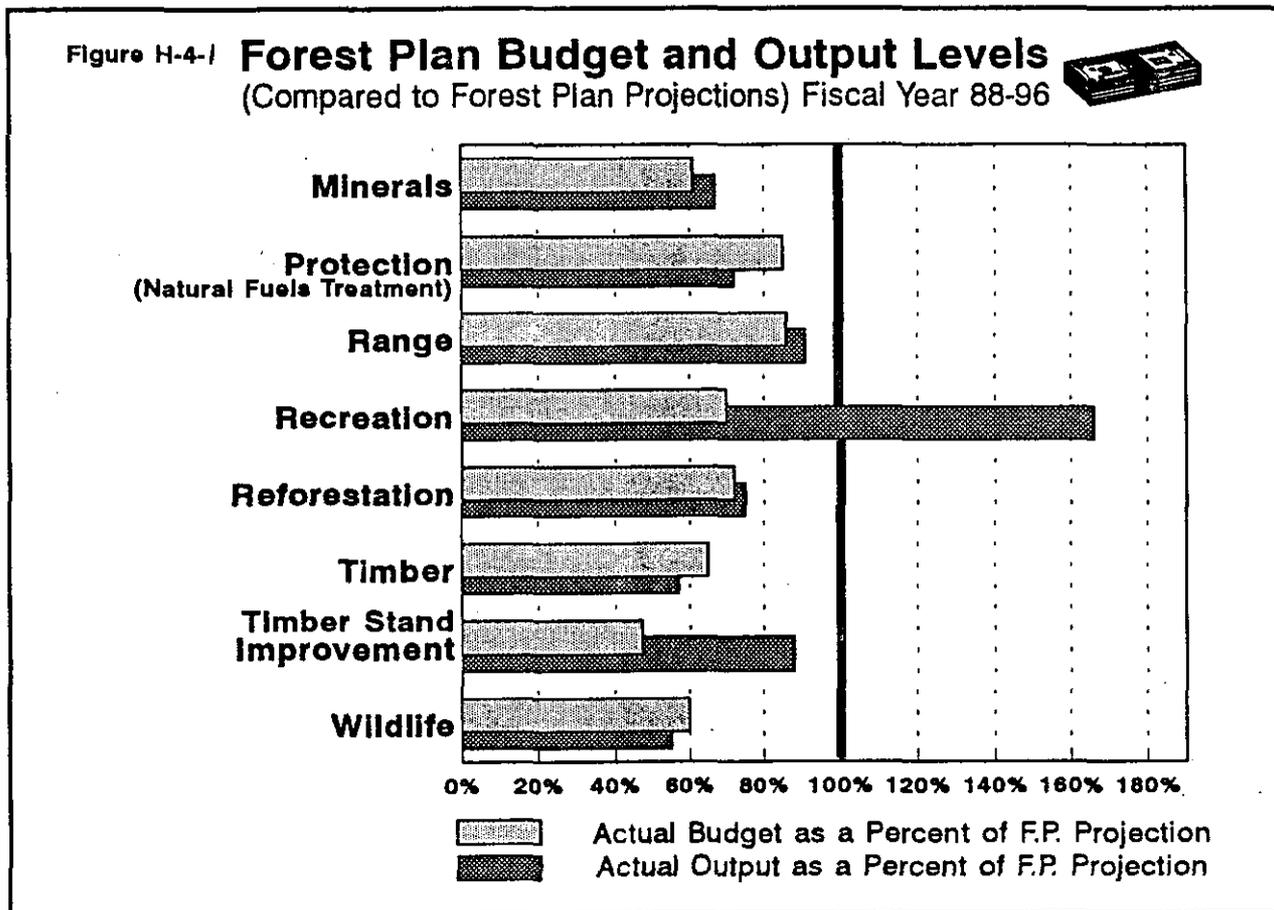
H-4-1 Comparison of Actual Budgets Used to Implement the Forest Plan (%)						
Funding Item	Budget Activity	Avg. Percent for FY 88-92	Actual Budget as a Percent of Planned Budget			
		FY 88-92	FY 1993	FY 1994	FY 1995	FY 1996
0	General Administration (approp)	75	65	60	41	36
01	Fire	76	85	1252	835	270
02	Fuels	39	113	113	197	134
03-05	Timber	69	50	50	38	41
06-07	Range	111	84	54	117	153
08	Minerals	57	54	53	77	75
09	Recreation	68	68	73	69	66
10	Wildlife and Fish	58	60	59	49	39
11	Soil, Air, Water	77	91	83	89	68
12	Facility Maintenance	82	107	93	113	79
13-15	Lands/ Land Management	59	94	75	92	86
42-43	Lands-Status/ Acquisition	114	51	51	40	23
16	Landline Location	77	91	89	40	32
17	Road Maintenance	77	52	59	63	58
18	Trail Maintenance	78	87	75	69	66
19	Co-op Law Enforcement	25	120	89	92	44
20	Reforestation (appropriated)	69	51	55	63	55
21	ISI (appropriated)	60	62	55	88	56
23	Tree Improvement	106	304	217	280	273
26-28	KV (Trust Fund)	132	153	124	117	99
29	CFWS - Other (Trust Fund)	109	107	95	86	147
30	Timber Salvage Sales (Permanent Fund)	375	1125	828	1327	1393
31	Brush Disposal (Perm Fund)	102	86	58	51	83
32	Range Improvement	68	40	39	77	64
33	Recreation Construction	79	48	132	49	26
34	Facility Construction: FA&O	4	4	8	109	0
35	Engineering Const. Support	59	49	35	36	35
36	Const. Capital Invest Roads	16	18	2	14	15
37	Trail Const/ Reconstruction	87	191	217	251	159
24, 38	Timber Road Const.: PC/Elect. <sup>1</sup>	52	53	33	22	24
	<b>Totals</b>	72	79	98	90	69

<sup>1</sup>PC = Purchaser Credit established

For more detail, please refer to Appendix D, at the end of this report, for the specific dollar amount for each budget item by Fiscal Year.

H-4-2 Forest Plan Budget & Output Levels for Fiscal Years 1988-96*		
Activity or Output	Actual Budget as a Percent of Forest Plan	Actual Output as a Percent of Forest Plan Projection
Minerals	61%	67%
Protection, Natural Fuels Treatment	85%	72%
Range	86%	91%
Recreation	70%	166%
Reforestation	72%	75%
Timber	65%	57%
Timber Stand Improvement	47%	88%
Wildlife	60%	55%

\* Factors contributing to the outputs are shown in the text.



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

**Protection (natural fuels treatment, in acres):** Continuing the trend which began in FYs 1992 and 1993, the acres of natural fuels treatments went up substantially over prior years (see Table H-4-1). As a result, the level of accomplishment is continuing very high, at 138% of the planned amount.

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

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

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

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

**Timber Stand Improvement (Acres precommercially thinned):** Actual costs for precommercial thinning for the first nine years of the Plan have been less than those anticipated. Acreage thinned has not fully reached planned levels due to budget limits, but may approach planned amounts in future years as more stands grow into overstocked conditions or more stands become accessible.

**Wildlife and Fish (Total acres of wildlife, fish, and T & E habitat improvement):** Budgets in this area average at around 60 percent of planned amounts considered over the last nine years. Accomplishment also remains lower than expected at about 55%. Table H-4-1 shows a decline in these budgets beginning in FY 95 and a further decline in FY 96. This trend away from the levels of funding prior to FY 95 may signal a change in the ability of the Forest to undertake habitat improvement work.

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

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

<b>ACTION OR EFFECT TO BE MEASURED:</b>	Determine the level of insect and disease organisms following management activities to insure the health of residual and surrounding stands.
<b>VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:</b>	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 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 few years. A drought in 1994 has caused mortality in some seed/sap plantations. Wildfires (over 50,000 acres) that burned in August of 1994 destroyed some plantations (2,500 acres) killing most of the trees and weakening trees in other plantations.

**Results:** The drought and fires of 1994 have not significantly increased insect and disease levels. Reforestation efforts in 1996 have led to 9,000 acres regenerated with primarily mid and intolerant conifer species. Plantations destroyed in 1994 have been replanted. Stocking control (precommercial thinning) was completed on 3,878 acres in FY 96. The forest has aggressively been salvaging fire-killed timber with the final sales being sold in December, 1996. These efforts tie to the strategies outlined in the Forest Assessment of 1994 fires and appear successful.

**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 considerable problems.

The forest surveyed 22,000 acres for dwarf mistletoe infection in FY 96. We found few infections in the seed/sap size class. Mature trees (western larch, lodgepole pine, and Douglas fir) near many of the plantations are infected and thus pose a threat by spreading this disease. Plans to treat 1,355 acres of mistletoe-infected overstory trees have been proposed for FY 97.

Western gall rust, which many pathologists claim has only minor effect on forest production (mbf/ac), is continuing to infect lodgepole pine. We have requested that the region prepare an evaluation ("white paper") on this disease and recommend possible management strategies. Root rot continues to infect tolerant species primarily in the western districts. The vast majority of stocking in these plantations is composed of intolerant species not highly susceptible to root rot.

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 tested to reduce infection levels. During FY 96, approximately 120 acres on the Three Rivers Ranger District had treatment for blister rust infection. Pruning took place following a precommercial thinning entry.

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

**APPENDIX A: Planned Outputs or Activities and Accomplishments**

APPENDIX A: Planned Outputs or Activities and Accomplishments					
Target Item	Output or Activity	Unit of Measure	Planned	Actual Accomplishments	
			Planned Amount per Year	FY 96	Percent of Planned Units
<b>Recreation</b>	Developed Use	M RVD	297	329	111%
	Dispersed Use:				
	Wilderness	M RVD	18	28	156%
	Non-wilderness	M RVD	559	1284	233%
<b>Wildlife and Fish</b>	Wildlife Habitat Improvement	Acres	5600	538	10%
	T & E Habitat Improvement	Acres	150	0	-
	Fish Habitat Improvement	Acres	120	80	67%
<b>Range</b>	Permitted Grazing Use	M AUM	12.6	10.6	84%
<b>Soil</b>	Soil Inventory	M Acres	15.7	-	-
<b>Lands</b>	Land Exchange	Acres	1700	0	-
<b>Minerals</b>	Minerals Management	Cases	300	120	40%
<b>Protection</b>	Fuels Treatment, Natural	Acres	800	1722	215%
<b>Timber</b>	Total Volume Offered <sup>1</sup>	MMBF	233	122	52%
	Reforestation (appropriated)	M Acres	3	2.9	97%
	Reforestation (KV)	M Acres	7.1	4.9	69%
	Reforestation (Other - Co-op)	M Acres	4 <sup>2</sup>	0	-
	Total Reforestation	M Acres	14.1	8	55%
	Timber Stand Improv (appropriated)	M Acres	4 <sup>3</sup>	3	75%
	Timber Stand Improv (KV)	M Acres	1	1	100%
	Total Timber Stand Improv	M Acres	5	4	80%
	Stand Examination	M Acres	139	107	77%
	Fuel Treatment (BD/KV)	M Acres	11.7	3.5	30%
<b>Facilities</b>	Total Road Construction <sup>4</sup>	Miles	237	30	13%
	Trail Construct/Reconstruct	Miles	7.5	12	160%

<sup>1</sup> Timber offered but not necessarily sold as of Oct 31 of the Fiscal Year. Planned amounts include 25 MMBF/year of non-interchangeable volume (primarily dead lodgepole) plus 202 MMBF of live green timber for an ASQ of 227 MMBF/year. In addition to the ASQ, six MMBF/year of unregulated volume is expected to be offered.

<sup>2</sup> Acres of site preparation for natural regeneration as part of the timber sale contract (purchaser's requirement) and other contributed funds.

<sup>3</sup> Includes precommercial thinning and release.

<sup>4</sup> Includes arterial, collector, and local roads.

## APPENDIX B-1

<b>Timber Sell Volume: Monitoring Item E-1</b>
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The following Table shows actual accomplishments compared to Forest Plan projections:

### SUITABLE LANDS

Unit of Measure -->	Forest Plan <sup>1</sup> MMBF	FY88 MMBF	FY89 MMBF	FY90 MMBF	FY91 MMBF	FY92 MMBF	FY93 MMBF	FY94 MMBF	FY95 MMBF	FY96 MMBF	Total FY 88-96 MMBF	Average Per Year MMBF	9-Year Vol. Diff. MMBF	Actual VS Plan PERCENT
<b>ASQ:</b>														
Regulated	202	152.4	152.8	115.4	74.5	150.4	58.0	35.3	34.1	61.9	834.8	92.8	-983.2	45.9%
Non-interchangeable														
Dead LPP	20	19.2	25.9	26.4	14.7	26.2	11.4	6.7	3.3	4.3	138.1	15.3	-41.9	76.7%
Other Dead	5	1.7	2.3	4.5	4.6	22.0	12.2	13.7	17.7	56.6	135.3	15.0	90.3	300.7%
Total Non-interchangeable	25	20.9	28.2	30.9	19.3	48.2	23.6	20.4	21.0	61.0	273.4	30.4	48.4	121.5%
<b>Total ASQ</b>	<b>227</b>	<b>173.3</b>	<b>181.0</b>	<b>146.3</b>	<b>93.8</b>	<b>198.6</b>	<b>81.6</b>	<b>55.7</b>	<b>55.1</b>	<b>122.9</b>	<b>1,108.3</b>	<b>123.1</b>	<b>-934.7</b>	<b>54.2%</b>
<b>Non-chargeable<sup>2</sup></b>														
Roundwood	0	0.9	0.7	0.8	2.3	0.3	0.5	0.9	0.4	0.4	7.2	0.8	N/A	N/A
Fuelwood	0	2.4	3.2	2.1	2.4	2.1	2.3	2.6	3.0	2.7	22.8	2.5	N/A	N/A
Total Non-chargeable	0	3.3	3.9	2.9	4.7	2.4	2.8	3.5	3.4	3.2	30.0	3.3	N/A	N/A

### UNSUITABLE LANDS

All Unregulated	6	2.4	3.4	2.2	1.4	2.4	0.5	0.2	0.3	0.6	13.4	1.5	-40.6	24.8%
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<sup>1</sup> Average Annual Outputs.

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

**NOTES:**

a. Totals may not be exact because of rounding.

b. Volume added to timber sales due to skid trail development, log landing clearing, temporary road construction, etc. has been included in the Total ASQ quantity. For FY88-94, this additional volume was included in the Timber Cut and Sold Report, the primary source document for Appendix B-1. For FY95-96, additional volume of 0.6 and 1.4 million board feet respectively was not included in the Timber Cut and Sold Report, but was reported as added volume in the Timber Sale Accounting System.

## APPENDIX C: 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 Kootenai Forest Plan also provides direction regarding opening sizes and states, "...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, page II-23). The intent of this statement is to ensure that any activity hastens recovery for wildlife and that there are no long-term detrimental effects through exceeding 40 acres. The following projects were approved by the Forest Supervisor to exceed opening sizes and, therefore, are consistent with Forest Plan direction.

Appendix C: Openings Greater than 40 Acres					
Fiscal Year	Project Name	Total Acres of Openings	MA	Years to Recovery	Comments
1995	Webb Fire Salvage	54	11, 12, 16	10-15	Harvest of 3 fire killed units when combined are > 40 acres
		699	11, 12, 16	10-15	Harvest of 8 fire killed units (288 acres) adjacent to 411 acres of existing fire created opening
		849	11, 12, 16	10-15	Harvest of 2 fire killed units (184 acres) adjacent to 655 acres of existing fire created opening
	Twin Meadows Fire Salvage	200	12, 14	15-20	Harvest of 3 fire killed units (140 acres adjacent to 2 existing units (60 Acres)
	Canyon Area Salvage	41	15	5-10	Harvest of 2 units of dead LPP (50-90% dead) when combined are > than 40 acres
		69	15	5-10	Harvest of 3 units of dead LPP (50-90% dead) when combined are > than 40 acres
	Cripple Horse Salvage	69	12, 15	5-20	Harvest of 39 ac unit of fire killed timber adjacent to existing 30 ac unit
		98	15	5	Harvest of 51 ac unit of fire killed timber adjacent to existing 30 ac unit
	Brush Creek Salvage	130	12	5-15	Harvest of 40 acres of dead LPP adjacent to existing 90 ac opening

## APPENDIX D: Projected and Actual Budgets Used to Implement Forest Plan

(In thousands of dollars)

Item	Budget Activity	Planned Amount base year FY 78	FY 88-94 % of Planned	FY 95 Planned Amount	FY 95 Actual Amount	FY 95 % of Actual Amount
00	General Administration	1465	63%	3228	1233	41%
01	Fire	530	675%	1168	9754	835%
02	Fuels	59	131%	130	256	197%
03-05	Timber	2648	50%	5835	2240	38%
06-07	Range	59	97%	130	152	117%
08	Minerals	287	53%	632	487	77%
09	Recreation	561	70%	1236	856	69%
10	Wildlife and Fish	648	60%	1420	703	49%
11	Soil, Air, Water	269	87%	593	531	89%
12	Facility Maintenance	145	100%	319	360	113%
13-15	Lands/Land Management	156	84%	344	315	92%
42-43	Lands-Status/Acquisition	96	38%	212	85	40%
16	Land Line Location	285	90%	628	253	40%
17	Road Maintenance	764	55%	1684	1055	63%
18	Trail Maintenance	115	81%	253	175	69%
19	Co-op Law Enforcement	12	104%	26	24	92%
20	Reforestation (appropriated)	871	53%	1919	1205	63%
21	TSI (appropriated)	562	58%	1238	1090	88%
23	Tree Improvement	20	260%	44	123	280%
26-28	KV (Trust Fund)	1427	138%	3144	3678	117%
29	CFWS - Other (Trust Fund)	348	101%	767	659	86%
30	Timber Salv Sales Perm Fund	275	974%	606	8039	1327%
31	Brush Disposal (Perm Fund)	694	72%	1530	776	51%
32	Range Improvement	6	39%	13	10	77%
33	Recreation Construction	99	91%	218	107	49%
34	Facility Construction: FA&O	111	6%	245	268	109%
35	Engineering Const Support	2360	42%	5200	1879	36%
36	Const Capital Invest Roads	1801	10%	3968	569	14%
37	Trail Const/Reconstruction	32	204%	71	178	251%
24, 38	Timber Road Const: PC/Elect	2399	43%	5286	1143	22%
<b>Totals</b>		<b>\$19,104</b>	<b>89%</b>	<b>\$42,096</b>	<b>\$38,303</b>	<b>90%</b>

Planned Dollars are the costs originally calculated for the budget activity, base year 1978  
 FY 1988-92 percent is brought forward from the 1993-1995 Monitoring Report  
 FY 1996 Planned Dollars are FY 78 times 2.26689 to account for inflation

## APPENDIX E: Project-specific Amendments

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

The Kootenai Forest Supervisor determined that the following projects are designed to meet the goals of the Forest Plan and, therefore, approved these project-specific amendments.

<b>Appendix E: Project-specific Amendments, FY 96</b>					
<b>District</b>	<b>Date Approved</b>	<b>Decision Name</b>	<b>MA Standard</b>	<b>Description</b>	<b>Years in Effect</b>
Rexford	10/95	North Fork Salvage	MA 12 TS #7; MA 14 WS #5b	Harvest within movement corridors	10-15 years
Rexford	04/26/96	Pinkham Allotments	MA 24, Range #1	Allow grazing in MA 24	10 years
Fortine	02/06/96	South End Allotments	MA 24, Range #1	Allow grazing in MA 24	10 years
Three Rivers	10/06/95	South Fork Salvage	MA 14, Rec #1	Not meet Partial Retention	15 years
Three Rivers Libby	04/23/96	Skyline Ridge China Basin	ORD in BMU 10	ORD of 1.02 in BMU 10; ORD of 1.71 in BAA 4-10-1	3-4 years
Libby	01/10/96	Little Wolf	MA 12, FS #3	ORD max 2.3 in Comp 33; 1.5 in Comp 43; ORD after sale .7 in Comp 33, 0 in Comp 43	2 years
Rexford	9/24/96	Huckleberry Salvage	MA 12 TS #7; MA 14 WS #5b  MA 12, FS #3	Harvest within movement corridors  Existing ORD .65, during sale 1.03, after sale .65	10-15  2 years

MA 12 - Big Game Summer Range Timber  
MA 15 - Timber Production

## APPENDIX F: Programmatic Amendments, FY 96

The Forest Plan provides a process for amending the plan. Amendments are effective until Forest Plan revision or until they are changed. The following amendment was approved in FY 96.

- No 11**    **7/26/96**    Forest Plan, page III-51, in Management Area (MA) 12 is modified for the "Facilities" section, standard #3, to allow an open-road density of 1.6 miles per square mile during non-activity periods and 2.0 miles per square mile during activity periods in compartment 603, Barron Creek drainage, on the Libby Ranger District. Approximately 977 acres of MA 12 are affected. An activity period is in effect when management activities require open-road access (roads open to the public).

## SOURCES OF INFORMATION

For information about the Forest Plan and this monitoring report,  
contact the following offices:

Kootenai National Forest  
**Supervisors Office**  
506 US Hwy 2 West  
Libby, MT 59923  
406-293-6211

Kootenai National Forest  
**Rexford Ranger District**  
1299 Hwy 93 N  
Eureka, MT 59917  
406-296-2536

Kootenai National Forest  
**Fortine Ranger District**  
PO Box 116  
Fortine, MT 59918  
406-822-4451

Kootenai National Forest  
**Three Rivers Ranger District**  
1437 North Highway 2  
Troy, MT 59935  
406-295-4693

Kootenai National Forest  
**Libby Ranger District**  
1263 Highway 37  
Libby, MT 49923  
4060293-8861

Kootenai National Forest  
**Cabinet Ranger District**  
2693 Highway 200  
Trout Creek, MT 59874  
406-827-3533

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