Forest Plan
Monitoring and Evaluation Report
FISCAL YEAR 2007
April 2008

Kootenai National Forest

United States Department Of Agriculture

Forest Service
Kootenai National Forest

United States Department of Agriculture | **Forest Service** | **Kootenai N.F.** | **1101 U.S. Highway 2 W. Libby, MT 59923**

File Code: 1920

Date: April 28, 2008

Dear Forest Planning Participant:

We have now completed twenty years of implementing the Forest Plan. Over the last twenty years, our Monitoring and Evaluation program has shown that land management occurs in complex and changing situations and our results will not always be totally predictable, definitive, or certain. Many things, including natural events that cannot be predicted, affect management results.

Enclosed is the Kootenai's Forest Plan Monitoring Report for Fiscal Year (FY) 2007. This report includes information pertaining to seventeen monitoring items as well as Forest Plan amendment information. This report also serves as a five year summary and reports and evaluates field data collected up to the end of September 30, 2007. Notification of this report's availability to the public has been made on the Kootenai's Quarterly Schedule of the Proposed Action (SOPA). This report can be found at the following website: http://www.fs.fed.us/r1/kootenai/projects/planning/documents/forest_plan/monitoring/index.shtml.

If you have any questions regarding this Report, please contact Kirsten Kaiser at the Forest Supervisor's Office in Libby at 406-293-6211.

Sincerely,

PAUL BRADFORD
Forest Supervisor
Kootenai National Forest

FY 2007

Forest Plan Monitoring Report

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INTRODUCTION

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

We have now completed twenty years of implementing the Forest Plan. Information from our monitoring reports and other assessments has been useful in preparing for revision of our Forest Plan. The Kootenai and Idaho Panhandle developed an Analysis of the Management Situation (AMS) in March of 2003. This AMS served as our five year monitoring summary and presented valuable monitoring and evaluation information which was used to assist us in identifying changes for Forest Plan revision. This report also serves as a five year summary and reports and evaluates field data collected up to the end of September 30, 2007.

Over the last twenty years our Monitoring and Evaluation program has shown that land management occurs in complex and changing situations and our results will not always be totally predictable, definitive, or certain. Many things, including natural events that cannot be predicted, affect management results.

GLOSSARY OF ACRONYMS

ASH – Available Snag Habitat
ASQ – Allowable Sale Quantity
BH – Breast Height
BMU – Bear Management Unit
BORZ – Bears Outside the Recovery Zone
BY – Bear Year (period from April 1 to November 15, defined by IGBC)
CYE – Cabinet Yaak Ecosystem
DBH – Diameter at Breast-Height
EA – Environmental Assessment
EIS – Environmental Impact Statement
FIA – Forest Inventory and Analysis
FORPLAN – A linear programming system used for developing and analyzing Forest Planning alternatives
FP – Forest Plan
FSM – Forest Service Manual
FY – Fiscal Year
GIS – Geographic Information System
HE – Habitat Effectiveness
IGBC – Interagency Grizzly Bear Committee
IRA- Inventoried Roadless Area
IPM – Integrated Pest Management
KNF – Kootenai National Forest
LAU – Lynx Analysis Units
MA – Management Area
MBEWG – Montana Bald Eagle Management Plan
MDFWP – Montana Department of Fish, Wildlife and Parks
MIS – Management Indicator Species
MMBF – Million Board Feet
NCDE – Northern Continental Divide Ecosystem
NEPA – National Environmental Protection Agency
OMRD – Open Motorized Route Density
ORD – Open Road Density
ORV-Off Road Vehicle
T&E – Threatened and Endangered
TMRD – Total Motorized Route Density
TRD – Total Road Density
USFWS – United Stated Fish and Wildlife Service

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 included designated wilderness, recommended wilderness, a Wilderness Study Area (WSA), and Inventoried Roadless Areas (IRAs). The expected accuracy and reliability of the information is low to moderate.

Background: There were 32 Inventoried Roadless Areas (IRAs) evaluated during the preparation of the Plan. (An IRA, by definition, contains about 5,000 acres or more of Federal land that do not contain any permanent signs of man's developments, such as timber harvest or roads). These 32 IRAs cover almost 400,000 acres. Of this total, about 334,000 acres (84%) were designated to remain roadless and be managed for semi-primitive and primitive recreation while the remaining acres (16%) could be available for possible development. (See Forest Plan Appendix C for detailed information on the IRAs.)

A re-inventory completed in 1999 identified eleven additional inventoried roadless areas, totaling almost 122,000 acres. The re-inventory also added contiguous area to some IRAs, made corrections in boundaries due to development that either occurred or did not occur, corrected acres due to land exchanges, and revealed some mapping errors in the 1980 effort which were corrected. The current 43 IRAs total 639,000 acres.

In January of 2001, the Roadless Area Conservation Rule was published. This Rule prohibits road construction, road re-construction, and timber harvest in IRAs on National Forests. The intent of this Rule is to provide protection of IRAs in their existing natural state. The KNF also adheres to regional guidance that directs the forest to manage IRAs in accordance with Regional Forester direction. This direction requires Regional Forester concurrence for proposed projects in IRAs with potential for ground disturbing activities.

An inventory and evaluation of dispersed camp sites was routinely conducted within the Cabinet Mountains Wilderness (CMW) during the 1980's and 1990's. Due to budget constraints, these were not conducted after 2000. An inventory of most camp sites was completed in 2007 by the Wilderness Institute. Dispersed camp sites and other areas of concentrated use in non-wilderness IRAs usually were not inventoried in detail like the CMW; however, field crews routinely check these sites when working in the area.

Results: In the past five years the roadless area showing the most impacts was the 94,000 acre Cabinet Mountains Wilderness (CMW). Approximately nine acres of camping sites and lake shoreline have been impacted. Most of the impacted camping sites are near popular lakes. Impacts primarily include the loss of vegetation (from all users) and bare soil and tree and root damage (from stock users). A number of impacted sites that were identified over a decade ago and were closed to overnight camping are showing signs of healing. Most campers have moved away from the closed areas and camping impacts are being observed further from the lakes. However, a few campers continue to impact some sites near lakes. Most of the camp sites are stable but rehabilitation is impossible since the sites are continually used. The Wilderness Institute inventoried most of the campsites in the CMW in 2007 which is the most complete inventory in over five years. Corrections to some sites are expected to begin in 2008.

Trails leading to popular designations, primarily lakes, continue to show signs of over use. Primarily this is from heavy foot traffic but also from stock use when trails are wet. Illegal horse use also continues at some lakes. Noxious weeds are becoming more prevalent but infestations are not as heavy as in some other IRAs (see monitoring item D2 for more information). An inventory of noxious weeds was also conducted by the Wilderness Institute for the designated wilderness in 2007. Eradication efforts may begin as early as 2008.

Management within the Wilderness focuses on visitor contacts to avoid additional impacts. Due to budget constraints, wilderness rangers have not been available for the past three years. At least two rangers are expected to be employed in 2008.

Within the 34,000 acre Ten Lakes Wilderness Study Area, effects on resources include trail impacts by hikers and stock. Approximately one acre at Bluebird Lake has been impacted primarily by stock being tied to trees and watering at the lake edge.

Recommended wilderness areas have seen similar impacts along the more popular trails and lakes. Approximately 0.5 acres at Rock Lake and Little Spar Lake show impacts from over use including some stock use. Noxious weeds are beginning to increase in some areas in the Scotchman Peaks IRA.

Snowmobile trespass into motorized restricted IRAs, including the Cabinet Mountains Wilderness, has been documented. Additional signing and law enforcement patrols are expected in 2008.

In the remaining IRAs, impacts have been fairly stable over the past five years with one exception. Upper and Lower Hawkins Lakes in the Northwest Peaks IRA, are showing deteriorating impacts from over use. Most of the impacts are vegetation removal and bare soil from repeated foot traffic and camping with a minor amount from motorized traffic on the trail leading to Upper Hawkins. Although effects may be observed at other sites, no known significant deterioration has resulted in impacts on soil or water nor permanently affected the sites ability to recover or to detract from the recreational experience.

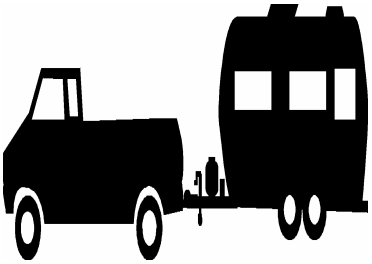
Evaluation: The evaluation for this monitoring item is a qualitative evaluation rather than quantitative evaluation. This qualitative evaluation is based on whether site conditions are of such a nature that they damage soil and water resources, permanently affect the site's ability to recover, become a safety hazard, or detract from the recreational experience. The review indicates that visitor use is currently managed at an acceptable level with some exceptions. Those exceptions are the sites discussed above where heavy impacts have been noted.

Improvements have been identified in many of the IRAs in the past ten years. The documented effects are approximately one-third less than the impacts documented a decade ago. Much of this has occurred in the Cabinets Mountain Wilderness and Ten Lakes Wilderness Study Area. The improvements appear to be the result of closing some unacceptably impacted sites to overnight camping or stock use and education efforts.

Recommended Actions: Actions recommended include continuing with current and new education programs, funding at least two wilderness rangers to provide contacts within the designated wilderness, correct minor impacts before they escalate, and begin corrective action based on the surveys completed by the Wilderness Institute in 2007. Law Enforcement will be requested to monitor illegal trespass with more patrols. The use of permanent hitching rails or high lines will be considered to reduce impacts to trees and restricting the impacts to fewer areas. All of these actions can take place within the current Forest Plan and no changes in the Forest Plan are needed.

RECREATION: Developed Recreation Site Use; Monitoring Item A-4

ACTION OR EFFECT TO BE MEASURED:	Determine the trends in use of Developed Recreation Sites.
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	+/- 20% from predicted RVD use in Developed Sites.



Purpose: This monitoring item was established to determine if developed recreation site capacity was adequate to meet existing and expected future use. If use becomes greater than designed capacity, environmental impacts to soil, water, and vegetation are likely resulting in a loss of quality recreation experience and the possibility of increased vandalism. The Plan requires that this item be reported once every five years. The expected accuracy and reliability of the information is high.

Background: When the Forest Plan was approved in September, 1987, 80 developed recreation sites were identified. These included campgrounds, picnic areas, boat launch sites, day use areas, and cabin rentals. Sites not considered developed were called dispersed sites, although some of these sites had some level of development. Determining how developed sites differed from dispersed sites was often difficult. In 2006 the definition for developed recreation sites changed. All sites are now called recreation sites and separated by the amount of development. Development scale 0 has no facilities but is a site the public routinely uses and is cleaned by recreation crews. Development scale 5 is fully developed, often with flush toilets, showers, hook ups, and hosts and is usually a fee site. There are currently 220 recreation sites identified on the Forest.

The Forest Plan anticipated that use in developed sites would steadily increase by about 9% each decade. By the end of the second decade, use was projected to be around 325,000 Recreation Visitor Days (RVD). A RVD is a recreational activity for 12 hours. A person recreating for 12 hours, two people for 6 hours each, and four people for 3 hours are all 1 RVD. Information is collected by campground hosts, district recreation crews, and compliance officers. At fee sites, fee registration and field forms are used while at non-fee sites, estimates are based on field visits by forest personnel.

For the purpose of monitoring trends in developed recreation use, only the 80 sites identified in 1987 are being reviewed. The total use at all 220 recreation sites is higher than the RVDs being reported under the results section below.

Results: Total use in 2007 at the 80 developed recreation sites is estimated at 325,200 RVDs. This is only slightly higher than the Forest Plan projection of 325,000 RVDs. No estimates were made for the other recreation sites.

Evaluation: The first decade showed a larger increase in developed recreation use with estimated actual use 13% higher than projected use. While use continued to increase in the second decade, it does not appear to be as large as the first decade. Estimated actual use is the same as the Forest Plan projected use at the end of the second decade.

During the 2007 season, several developed recreation sites closed or use was restricted due to access roads being damaged during a severe storm in the fall 2006. Graves Creek Road 114 was washed-out, blocking access to Big and Little Therriault Campgrounds, Horse Camp, and Weasel Cabin. The road leading into Ross Creek Cedars was blocked by a land slide and use was restricted until the road was reopened. High fuel costs are expected to have contributed to recreationists staying closer to home and the reduced number of out-of-state travelers to the forest.

A number of campgrounds are completely full (100% occupancy) on weekends during the summer. A couple of the smaller, popular campgrounds, especially Spar Lake, are full through out the week (identified as being 80% occupied.) Two sites, Dorr Skeels and South Dickey, are day use sites and use often exceeds designed capacity. Across the forest, camping space may be difficult to find during the busiest season of the year; however, there is still sufficient camping capacity to meet the current use and expected use over the next decade.

Recommended Actions: This monitoring item is within the prescribed range stated in the Monitoring Plan. No action is needed at this time. Continuing to monitor this item is important to determine if additional developed recreation sites are needed in the future or if over use is impacting the resources or detracting from the recreational experience.

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 affect 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 concerns 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: Dense vegetation and steep terrain discourages ORV use off constructed roads on much of the forest. Some use does occur in more gentle terrain, along trails that have a wide tread, where vegetation is less dense, and in the Lake Koocanusa draw-down zone. Much of the use outside the draw-down zone is associated with hunting.

The Tri-State Off-Highway Vehicle Record of Decision (ROD) was approved in January 2001. This decision restricted yearlong, all wheeled motorized cross-country travel where it was not already restricted on National Forest System Lands within the State of Montana. The restriction did not apply to Kootenai Forest System Lands within the State of Idaho. Exceptions to the restrictions were allowed for emergency access, such as fire or search and rescue, when specifically authorized under contract, permit, or other document, and for dispersed camping within 300 feet of the road. The 2001 ROD amended the Forest Plan.

Approximately 3600 acres in the Lake Koocanusa draw-down zone was excluded from the ROD. This area was addressed in a separate management plan and decision approved in May 2001. The decision prohibited all motorized vehicles on approximately 300 of the 3600 acres.

Three areas of the Kootenai Forest lie in Idaho: a small area near Buckhorn Mountain (in the Yaak River Drainage), the upper reaches of the West Fork Elk Creek, and a large area in the head waters of Callahan, Keeler, and Star Creeks. The first two area (Buckhorn and West Fork Elk Creek) are in Inventoried Roadless Areas (IRAs) and ORV is virtually impossible due to steep terrain and lack of access. The larger area has a combination of roads, harvested timber stands, and IRAs. A portion of this area is still available for ORV travel.

Douglas Hill and Tobacco River areas are being analyzed for an ORV recreation area. A management plan is being developed that will provide responsible riding routes while monitoring and mitigating impacts as well as providing protection in resource sensitive sites.

Results: Some popular riding areas continue to be used, even though they were closed in the 2001 ROD. Signs designating area restrictions are posted but signs have been vandalized, destroyed, or

stolen. Some physical barriers, such as kelly-humps or log barricades, have been breached or driven around on gentler slopes creating additional routes.

In the designated Cabinet Mountains Wilderness and the 1987 Forest Plan proposed wildness, the primary ORV trespass use is snowmobiles. With the exception of Ten Lakes proposed wilderness, all motorized use is illegal. Impacts are noise during use and the track left until a new snow fall or spring thaw eliminates the evidence. Impacts are short term when compared to summer wheeled use. In the remaining Inventoried Roadless Areas (IRAs), ORV use is primarily snowmobiles with minor amounts of summer wheeled vehicle travel near access roads. Generally, over the snow travel is acceptable, creating evidence of use for short periods of time and is not impactive to natural resources. Wheeled vehicle use is illegal except on approved routes.

About 1500 acres of Lake Koocanusa drawdown zone shows evidence of ORV use. Tracks in the sandy soil are evident in early spring before the reservoir begins to fill. Accept for spring, this area is under water or snow the rest of the year and not available for ORV use. Approximately 50 acres in the Douglas Hill area and 30 acres in Tobacco River area are currently being used by ORV enthusiasts and are being analyzed as an ORV site.

Approximately 35 acres near Eureka are being impacted by ORVs. Most of the use is on more open and less steep land along either side of Lake Koocanusa near the Canadian border, Virginia Hill, Camp 32, and Thirsty Lake. Another 50 acres closer to Libby are also being impacted around Lake Koocanusa, Swede-McMillan, Sheldon Flats, and Bobtail areas. Around Troy and in the Yaak River Drainage, most of the illegal ORV use is violation of road or trail closures although there is minor ORV travel on the gentle ground north of the Kootenai River and at Grouse Lake. In the Clark Fork River drainage, ORV use off designated routes is light and scattered with minimal evidence of impact. Impacts noted on these sites include: damage/loss of vegetation, soil disturbance and rutting, erosion, spread of noxious weeds, and disturbance of wildlife. Social impacts observed include: damage to signs and barriers, creation of new user designed trails, aesthetic issues, noise, potential damage to cultural sites, and conflicts with other recreation users.

Evaluation: This monitoring item calls for a qualitative variability review rather than a quantitative review. This qualitative review is based on whether site conditions are such that soil and water resources are being damaged, a safety hazard develops, and if there are permanent impacts that prevent the site from recovering or impacts develop that detract from the recreational experience. Site review indicates ORV use is minor with a few exceptions where illegal trespass occurs. Within these areas exposed soil, ruts, and areas void of vegetation are evident. Area closures and signing has not provided a significant deterrent to use off designated routes. Outside of these areas, ORV use has not significantly changed in the past ten years. Use has not deteriorated site conditions resulting in known impacts to soil or water resources or detracted from the recreational experience.

Recommended Actions: No changes in the Forest Plan are needed at this time. Signs and physical barriers will continue to be utilized where illegal ORV continues to be a problem and where there is evidence of new use occurring in restricted areas. Information through brochures, maps, and news articles will continue to be utilized to highlight impacts and cost associated with ORV use. Public outreach will be pursued through ORV dealers and clubs on responsible riding techniques.

RECREATION: Roadless Area Changes; Monitoring Item A-6

ACTION OR EFFECT TO BE MEASURED:	Determine the changes in the size and location of the roadless areas, if any.
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	+/- 5% in the acreage on the Forest. +/-5% in the distribution by Ranger District.

Purpose: This monitoring item was established because of two concerns. One concern was that any inventoried roadless area (IRA) that wasn't recommended for wilderness would probably be developed before the Forest Plan was revised (10-15 years) and would not be eligible for reconsideration as wilderness. The other concern was that the roadless areas which were designated for development would not be accessed on schedule because of delays due to appeals, litigation, etc. The Plan requires that this item be reported once every five years. The expected accuracy and reliability of the information is high.

Background: There were 32 Inventoried Roadless Areas (IRAs) evaluated during the preparation of the 1987 Forest Plan. (An IRA, by definition, contains about 5,000 acres or more of Federal land that do not contain any permanent signs of man's developments, such as timber harvest or roads). These 32 IRAs cover almost 400,000 acres. Of this total, about 334,000 acres (84%) were designated to remain roadless and to be managed for semi-primitive and primitive recreation while the remaining acres (16%) could be available for possible development. (See Forest Plan Appendix C for detailed information on the IRAs.)

A re-inventory of IRAs completed in 1999 identified eleven additional IRAs, totaling almost 122,000 acres. The re-inventory also added contiguous area to some IRAs, made corrections in boundaries due to development that either occurred or did not occur, corrected acres due to land exchanges, and revealed some mapping errors in the 1980 effort which were corrected. The current 43 IRAs total 639,000 acres. Please see monitoring item A-2 for information on the 2001 Roadless Rule.

Results: Table A-6-1 displays results of activities within roadless areas in the last twenty years. The activities reported are those that could change the character or the roadless areas to some degree. Between 1988 and 1997, approximately 5,270 acres of inventoried roadless areas had activities associated with timber harvest. No road construction associated with those projects occurred within the roadless areas.

Table A-6-1 Activities within Inventoried Roadless Areas

Fiscal Year	Development by Fiscal Year (acres)*	Cumulative Development (acres)
1988	1,000	1,000
1989	0	1,000
1990	2,730	3,730
1991	1,319	4,049
1992	0	4,049
1993	0	4,049
1994	46	4,095
1995	557	4,652
1996	618	5,270
1997	0	5,270
1998	0	5,270
1999	12	5,282
2000	382	5,664
2001	729	6,393
2002	0	6,393
2003	0	6,393
2004	0	6,393
2005	0	6,393
2006	0	6,393
2007	0	6,393

Between 1997 and 2002, there was approximately 1,123 acres of timber harvest within inventoried roadless areas. No roads within the roadless areas were constructed for these harvests. No changes occurred in the IRAs due to mining activity.

The Roadless Area Conservation Rule of 2001, and all subsequent direction, has placed restrictions on road construction, road re-construction, and timber harvest. Some of these activities may occur provided strict criteria are met. Current authority lies with the Regional Forester or, in certain cases, with the Chief.

Table A-6-2 displays acres of IRAs in the 1987 Forest Plan and the current acres. Figure A-1 is a map comparing the boundaries of Roadless Areas used for Forest Plan Revision and the 1987 Forest Plan Roadless Areas.

Evaluation: The 1987 Forest Plan provided direction for management of the IRAs. Some IRAs were to be managed in a roadless state for semi-primitive and primitive recreation while other IRAs were available for timber harvest including road construction or re-construction. This proved to be very controversial and the amount of timber harvest that was projected in the Forest Plan has not occurred. Evaluation of all IRAs for Forest Plan revision, completed in 2005, revealed considerable controversy is still prevalent. No changes in IRA boundaries have occurred since 2001.

Recommended Actions: The Kootenai will continue to follow current direction for the protection and management of the IRAs. Currently, agency policy is to manage IRAs in their existing condition. Mechanical entry, timber harvest, and road construction or reconstruction is generally restricted but there are some exceptions which require Regional Forester or Chief approval. Routine maintenance of existing improvements and facilities, such as trails, is allowed. Work is often accomplished with small hand-held power equipment such as chain saws and battery powered drills. Motorized vehicles, such as a small track excavator, may be used under certain conditions. No proposed action is recommended.

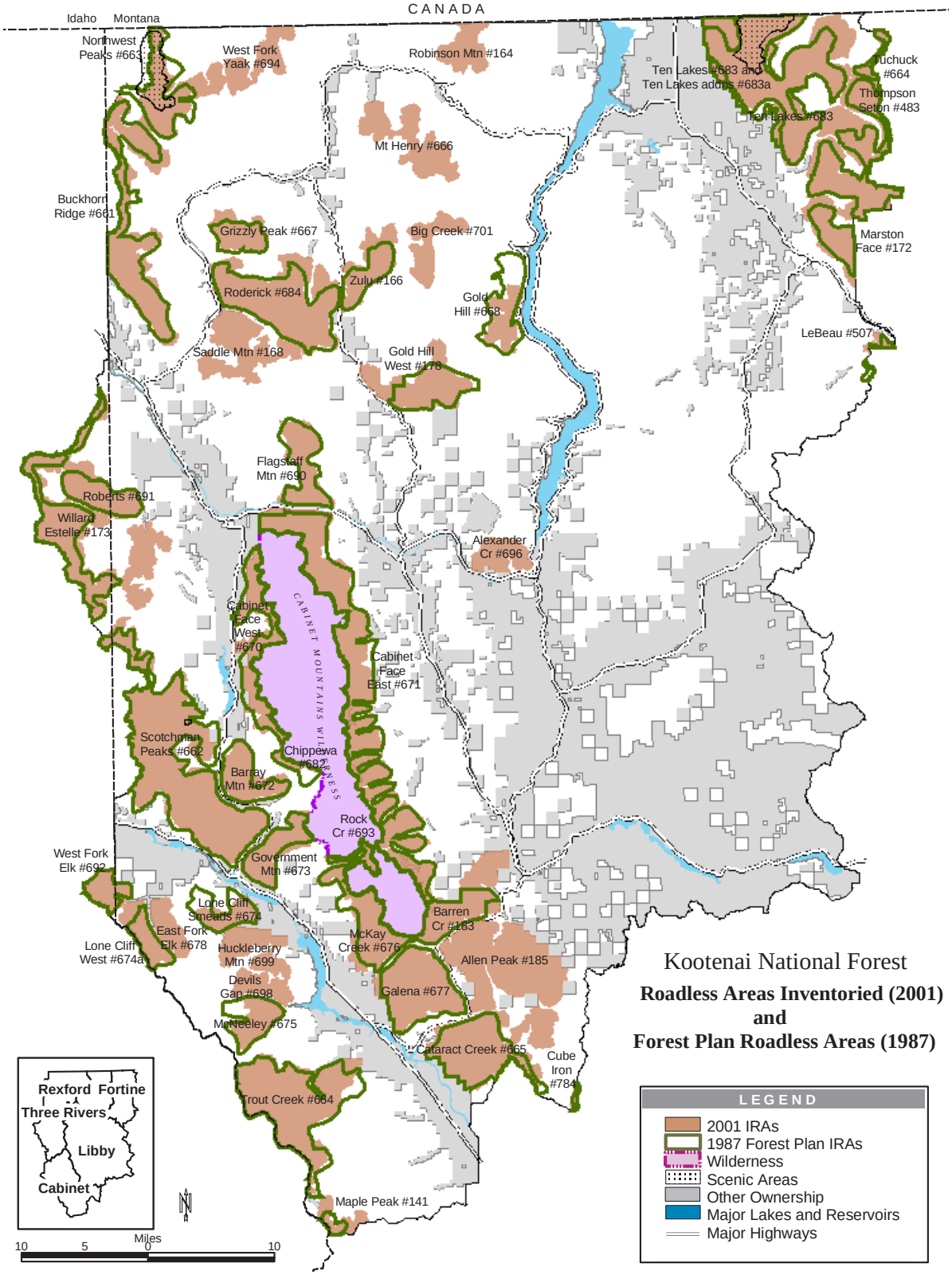
The following table displays acres of Inventoried Roadless Areas (IRAs), currently and from the 1987 Plan. No changes in IRA boundaries have occurred since 2001. In viewing this table, note that the Roadless Area Conservation Draft EIS (May 2000) listed total acres as 628,000 because the acres for Northwest Peaks and Ten Lakes Scenic Areas were left out of the total acres. These acres have been included with their surrounding IRAs in the Kootenai totals. Some areas of proposed wilderness (MA 8) were coded incorrectly in the Roadless EIS in Chippewa and McKay Creek IRAs; these are now coded correctly. Additionally, some small private land inholdings are included in acre totals for IRAs, in addition to the private acres shown.

Table A-6-2 IRA Acres

IRA Name	Current (Acres)	1987 Forest Plan (Acres)
Alexander #696	6,700	0
Allen Peak #185	29,600	0
Barren Cr #183	14,600	0
Berray Mtn #672	9,100	8,300
Big Creek #701	7,500	0
Buckhorn Ridge #661	28,800	22,000
Cabinet Face East #671	51,000	50,400
Cabinet Face West #670	13,700	10,900
Cataract Creek #665	25,400	17,700
Chippewa #682	1,300	2,300
'Cube Iron #784'	600	1,200
'Devils Gap #698'	5,400	0
'East Fork Elk #678'	6,800	5,000
'Flagstaff #690'	11,100	9,500
'Galena #677'	19,300	15,500
'Gold Hill #668'	6,500	10,700
'Gold Hill West # 176'	15,100	10,200
'Government Mtn #673'	10,100	8,600
'Grizzly Peak #667'	7,400	6,000
'Huckleberry Mtn #699'	9,000	0
'LeBeau #507'	1,300	700
'Lone Cliff Smeads #674'	5,100	6,600
'Lone Cliff West #674a'	5,300	0
'Maple Peak #141'	3,600	1,400
'Marston Face #172'	9,100	6,000
'McKay Creek #676'	15,300	13,500
'McNeeley #675'	6,700	7,700
'Mt Henry #666'	13,600	0
'Northwest Peaks #663'	15,300	13,400
'Roberts #691'	10,800	8,000
'Robinson Mtn #164'	7,000	0
'Rock Cr #693'	800	400
'Roderick #684'	29,700	24,800
'Saddle Mtn #168'	14,700	0
'Scotchman Peaks #662'	54,400	51,900
'Ten Lakes #683'	48,500	7,100
'Thompson Seton #483'	29,400	20,100
'Trout Creek #664'	30,900	31,400
'Tuchuck #482'	2,200	2,300
'West Fork Elk #692'	5,200	4,800
'West Fork Yaak #694'	8,200	0
'Willard Estelle #173'	33,000	18,500
'Zulu #166'	10,000	6,400
TOTAL IRA Acres	639,100	403,300

IRA Name	Current (Acres)	1987 Forest Plan (Acres)
SUMMARY		
Total IRAs	639,100	
Cabinet Mountains Wilderness	93,700	
Total Unroaded Category Lands (IRAs plus Wilderness)	732,800	
Other FS Lands not within IRAS	1,517,000	
TOTAL FS Lands	2,249,900	
Private land not in IRAs	763,000	

Figure A-1 Roadless Areas Inventoried for Forest Plan Revision and 1987 Forest Plan Roadless Areas



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

ACTION OR EFFECT TO BE MEASURED:	Changes in elk habitat capability.
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	Any downward trend in elk summer range habitat effectiveness.

Purpose: This monitoring item was established to help ensure that elk summer range habitat capability is improved to provide for an increase in the elk population from 5,000 in 1988 to 8,000 in 2017. The Forest Plan requires that this item be reported once every five years. The expected precision and reliability of the information are moderate.

Background: Potential changes to habitat are analyzed when projects are proposed. This analysis uses the habitat effectiveness determination process outlined in the *Elk Habitat and Timber Management Relations, Central Zone*. The process evaluates such factors as open road density, the amount of hiding cover, and the amount forage. These factors are compared against the existing condition to determine whether the habitat is improving, maintaining, or declining in overall capability. There are about 1,393,000 acres of elk biological summer range on the Forest. Of this, 466,982 acres are allocated primarily for big game summer range (Management Area 12). The other MAs that make up the biological summer range include: 2, 3, 5, 7, 8, 9, 13, 18, 14, 21, and 29. While MAs 15 and 16 can provide summer range habitat, they were not included in the Plan elk output projections due to the anticipated timber harvest levels and resulting habitat values.

Evaluation:

Elk Habitat Capability: Baseline measurements are not available for comparison prior to the Plan. The four, five year periods (1988-1992, 1993-1997, 1998-2002, 2003-2007) of Forest Plan implementation monitoring are summarized in Table C-1-1 (see below) along with the twenty year totals.

During the last five years, the Forest analyzed 141,717 acres of elk summer range. About 46% was improving, with an average improvement of 7% in habitat effectiveness. About 54% were maintained in the existing condition. Less than one percent were in a declining condition.

Over the past twenty years, elk habitat capability has been improving on 35% of the lands analyzed, with an average improvement of 7%. An additional 60% of the lands are maintaining habitat capability, while about 5% show a decline.

Table C-1-1 Elk Habitat Capability Analysis

Time Period	Area Analyzed*	Area Improving	Area Maintained	Area Declining
1988-1992	472,000	282,000	138,000	52,000
1993-1997	1,260,614	320,736	835,961	53,918
1997-2002	1,313,837	435,734	842,843	35,260
2003-2007	141,717	65,146	76,271	300
1988-2007	3,138,168	1,103,616	1,893,075	141,478

* Some duplication of acres analyzed occurred between each 5 year period.

Elk Habitat Effectiveness: Elk habitat effectiveness directly correlates with open road density (ORD). The higher the open road density, the less effective the habitat. Road density data was not available Forest-wide for the primary elk summer range (MA 12) for the time period prior to 1997.

MA 12: The Plan specifies that 0.75 miles per square mile of road would be open to the public on MA 12 lands, which correlates to a 68% habitat effectiveness level. In the last five years there were five Forest Plan amendments that resulted in increases in MA 12 ORDs. Over the past twenty years, there have been 17 such amendments. The amendments affected 31% of the MA 12 lands. The current habitat effectiveness level is 68%, which includes the MA 12 amendments (USDA, Johnson 2006).

Forest-wide: Information for all Forest lands (all MAs) is used to show the probable trend for habitat effectiveness (HE). The trend in HE shows an improving condition (shown in Table C-1-2). This same trend is likely on summer range (MA 12).

Table C-1-2 Forest-wide Elk Habitat Effectiveness Trend

Year	Open Miles	Closed Miles	Total Miles	% Closed	ORD* (mi/sq mi)	Habitat Effectiveness Percent (%)**
1987	4,530	1,670	6,200	27	1.3	56
1988	3,707	3,195	6,972	46	1.1	58
1992	3,364	3,785	7,149	53	1.0	60
1997	3,082	4,275	7,357	57	0.91	62
2002	2,934	4,982	7,954	63	0.86	63
2007	2,905	4,978	7,883	63	0.86	63

* ORD = Open miles/3,373 square miles (Area of KNF capable of providing elk habitat- summer and winter)
** Figure 2 pg. 13 in: USDA FS, MFWP, C S & K Tribes, PC Timber Inc. 1985. *Elk Habitat Timber Management Relations Central Zone Northern Region*. 20 pp.

In 1988, when Forest-wide habitat effectiveness (HE) was 58%, the elk population potential index was 5,000 elk. At the end of the 10 year monitoring period (1997) habitat effectiveness had reached 62%, with a resulting increase (31%) in the elk potential population index (6,555 elk). At the end of the third five year reporting period, habitat effectiveness was up to 63%. At the end of 2007, HE remains at 63%. This maintains the elk potential population index at 6,660 elk. While HE has not increased over the past 5 years, there has been a 71 mile road decrease with road decommissioning. The Plan projected a population potential increase of 3,000 elk over a 30 year time frame. The increases in the elk potential population index are occurring at a faster rate than what was projected in the Forest Plan. One reason is the less than expected road construction on MA 16 and others. These lands have been able to provide higher summer range habitat values than projected in the Plan. See monitoring item C-2 for more information on the elk population.

Literature Cited:

Johnson, Wayne J. 2006. Cumulative effects of past projects on wildlife. Unpublished report. Kootenai National Forest. Libby, Mt. 25pp

WILDLIFE & FISHERIES: Elk Populations; Monitoring Item C-2

ACTION OR EFFECT TO BE MEASURED: Determine changes in elk populations.

VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION: Any downward trend in elk populations.

Purpose: This monitoring item was established to determine if the Forest Plan's projected increase in elk populations occurs. The Plan did not establish a numerical population goal for elk, but rather projected an increasing trend in response to improving habitat conditions. The Plan requires that this item be reported once every five years. The expected precision and reliability of the information are moderate and low, respectively.

Background: Elk population changes are based on hunting and harvest reports (phone surveys), hunter-check station information, aerial surveys, and casual observations. The figures represent the Hunting Districts that are generally encompassed by the Kootenai National Forest (100, 101, 103, 104, and 121). Montana Fish, Wildlife and Parks (MFWP) (Sterling 2007) provided the data used in this monitoring item, and we thank them for their cooperation. Conclusions drawn from the data are the responsibility of the Kootenai National Forest. Elk populations are the product of many factors including habitat conditions, weather severity, and hunting regulations. The elk population trends observed over the last 20 years generally reflects the changes occurring from all these factors.

Evaluation: The aerial survey data on elk numbers show an increase since the last 5 year report (2002). The numbers of elk observed during surveys increased from 1,778 in 2002 to 1,951 in 2007, with incremental increases each of the last 5 years. The average number of calves per 100 cows remained about the same, going from 31 (2002) to 28 (2007). Elk populations increased through 1990 or 1991 and then had a gradual decrease until 1997. The downward trend appears to have reversed from the previous 5 year reporting period (1998-2002).

The hunting season regulations changed between 1996 and 1998 from any bull (cows by permit only) to branch antlered bulls only (cows remain by permit only). The average number of days required to harvest an elk prior to the change was under 120, but since the change it has decreased to an average of 81 days, over the past 5 years. This decrease is likely due in part to the increased elk population which has allowed an increase in the number of cow/calf tags.

The percentage of 6-point or greater bulls in the bull elk harvest has remained steady since the last report (averaged 38% for 1997-2002) at an average of 37% for the last 5 years. This may be due, in part, to increased elk security on the Forest as a result of the road restrictions and decommissioning which has been implemented over the past 20 years.

Elk populations appear to be increasing in the last few years. At this time, no changes in habitat management are warranted.

Recommended Actions: Continue monitoring elk populations to determine future trends. Coordinate with MFWP on changes in hunting regulations which may be needed to produce a desired trend in the elk population and provide for a desired age structure in the bull segment. Integrate the State's Montana Elk Management Plan with the Kootenai's pending Forest Plan Revision.

Literature Cited:

Sterling, Bruce. 2007. *Region One Elk Annual Report July 2004 – June 2007.* MFWP, Kalispell, MT. 35pp.

WILDLIFE & FISHERIES: Other Big Game Habitat; Monitoring Item C-3

ACTION OR EFFECT TO BE MEASURED:	Determine changes in other big game habitat besides elk.
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	Any downward trend in habitat capability.

Purpose: This monitoring item was established to help ensure that habitat for other big game species was maintained or enhanced. The Forest Plan requires that this item be reported once every five years. The expected precision and reliability of the information are moderate and low, respectively.

Background: Habitat capability trends have been monitored for seven big game species, other than elk, on the Kootenai National Forest. These seven species are mule deer, whitetail deer, bighorn sheep, mountain goat, moose, black bear, and mountain lion.

Evaluation:

Overview: In the past 5 years over 48,500 acres of big game habitat have been affected by wildfire and prescribed burning. These factors produced improved forage conditions for the herbivores and contributed to possible population increases, which provide improved prey base numbers for the carnivores. Reductions in open roads have improved security habitat conditions (see items C-1 & C-7).

Mule Deer: Mule deer are widespread across the Forest. There has been no measurable positive or negative trend in habitat capability in the past 5 years; however, the long-term trend (several decades) may be downward. In the past decade, offsetting factors have served to maintain habitat in an essentially static condition. Factors positively affecting mule deer habitat include wildfires and timber harvest on summer range, prescribed burning and forage planting on winter range, and road closures. Negative factors include permanent road construction (which reduces habitat security) and the continuing vegetative succession of grasses, forbs, and shrubs to trees. In the long term, forest succession may be resulting in a downward trend in mule deer habitat by providing more closed canopy forests which are favored by other big game species such as whitetail deer.

Whitetail Deer: This species is the most widespread and abundant big game animal on the Forest. Populations steadily increased to record numbers over the past decade, which is reflective of a positive trend in habitat. Vegetative succession, which has worked against the mule deer, has been a long-term positive factor in whitetail deer habitat. Other positive influences include timber harvest, especially in small units, which increases habitat diversity and edge; and direct habitat improvements such as prescribed burning and slashing in overgrown browse areas. Negative influences include extensive timber harvest in large units on portions of the Forest to reduce fuel loads in the wildland urban interface which provides a significant portion of the winter range. These events reduce cover and habitat diversity favored by whitetail deer.

Bighorn Sheep: Four distinct populations exist on the Forest: the Berray Mountain herd, the Kootenai Falls herd, the Ural Tweed herd, and a herd in the Ten Lakes Scenic Area. These herds occupy the primary bighorn sheep habitats on the Forest. The Ural Tweed population has been

slowly declining over the past 5 years, but the cause is undetermined (personal communication Jerry Brown MFWP 2/13/2008). The other three are stable to slightly increasing (ibid).

The overall habitat trend on the Forest has been increasing during the past 5 year period because of major accomplishments in habitat improvements (primarily prescribed burning) in the Kootenai Falls, Berray Mountain, and Ural Tweed areas, and due to wildfires. Slow decreases in habitat capability have occurred in the Cabinet Wilderness and Ten Lakes areas due to continuing vegetative succession resulting from the absence of fire.

Mountain Goat: This species is limited primarily to rugged topography in the East and West Cabinet Mountain ranges. The habitat trend is static to possibly decreasing in the long term. Any decrease would be due to continuing vegetative succession resulting from a lack of periodic wildfires or prescribed burning at higher elevations. Goat numbers are up over the past ten years (personal communication Jerry Brown 2/13/2008).

Moose: Moose are a pioneer species, thriving where fires or other disturbance events such as timber harvest create early forest successional conditions. Timber harvest during the past several decades, and wildfires during the past 5 years, created large areas of habitat that are beneficial for moose. Although forest succession continues to advance, the overall habitat trend for moose has been positive during the past decade.

Black Bear: Black bear are widespread across the Forest and their overall habitat trend for the past 5 years is positive. Timber harvest, wildfires, and prescribed burning have positively influenced habitat by encouraging the growth of desirable forage plants for bears. The biggest factor in black bear habitat capability over the past decade, however, has been additional road access restrictions and road decommissioning. While these restrictions have generally been applied for other reasons (see C-1 and C-7), they have had the effect of greatly increasing habitat security for black bears. The net effect of all these factors is a positive trend in black bear habitat.

Mountain Lion***:*** The mountain lion is a predator and habitat generalist. Therefore, its existence depends largely on the abundance of prey animals, primarily ungulates such as deer and elk. Since the populations of whitetail deer and elk increased throughout most of the past decade to near-record levels, mountain lions have prospered. The decline of deer and elk populations due to severe weather conditions during winter 1996-97 reduced habitat capability (prey base) for mountain lions, at least temporarily; however prey populations, especially whitetail deer, have shown positive trends since then.

Recommended Actions: For mule deer and mountain goats, continue to explore opportunities for habitat improvement. For the remaining species, no action items are necessary beyond the continued monitoring of habitat.

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

ACTION OR EFFECT TO BE MEASURED:	Population levels of old growth dependent species.
MONITORING OBJECTIVE:	Maintain viable populations of old growth dependent species (≥ 40% of potential).
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	any reduction approaching minimum viable population levels (40% of potential population).

Purpose: This monitoring item was established to help ensure that viable populations of species dependent on old growth habitats were maintained. The expected precision and reliability of the information is moderate and low, respectively. The Forest 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 (MIS) 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 C-5 Old Growth Habitat, and C-6 Cavity Habitat, evaluate the habitat needed to support a viable population of pileated woodpeckers.

The purpose of this monitoring item is to evaluate population levels of old growth dependent species, i.e. 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 trend 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 overall for the Region. Data has 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 for the Kootenai National Forest during 1994-2004 is summarized in Table C-4-1.

Table C-4-1 Pileated Woodpecker Observations on KNF Bird Monitoring Points

Fiscal Year	Number Points Sampled	Number & Mean Observed on Sampled Points	
1994	530	49	9.2
1995	579	32	5.5
1996	545	48	8.8
1998	350	25	7.1
2000	316	39	12.3
2002	318	11	3.5
2004	320	26	8.1

In 1997, a regional decision was made to change the long-term landbird monitoring sampling effort to every other year, with a different sampling approach in intermediate years used to assess various management questions. In 1997, special paired monitoring sites were selected to begin assessing the effects of intermediate timber harvest on pileated woodpeckers (J. Young, unpublished). Twelve treated and 12 control sites, each containing 3 sample points, were selected on the Kootenai. A total of 45 pileated woodpeckers were detected at these sites. Because the study design for this effort called for differences in data collection compared to the data shown for the years 1994-1996, the results are not directly comparable.

The landbird monitoring results for the Northern Region showed pileated woodpeckers present to varying degrees in all vegetation types sampled except agricultural and residential (Hutto 1995). “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 meters).Thus, detecting them in clear cuts and seed-tree cuts should not be taken to mean they can do well with homogeneous stands of those kinds."

Based on the monitoring results it was determined that the rate of detections can vary greatly from year to year, especially for a wide ranging species like the pileated woodpecker that may or may not be anywhere near a given point on a given day. Part of this variation is due to chance and part is

due to observer variability (for example, the single observer on the Kootenai in 2002 detected relatively low numbers for most other species as well). Therefore, it is unlikely that the lower numbers in 2002 represent any sort of real reduction in the population. This is one reason why real trends take many years to confirm.

For the reasons stated above, it was recommended that data from a single forest should not be used to calculate trends. Results of the Northern Region Landbird Monitoring Program, which contains much larger sample sizes coordinated throughout the region, were reviewed. At the present time, these sample sizes are not considered large enough to confidently make comparisons between the forest and regional data, especially for less common species like the pileated woodpecker. Because the pileated woodpecker is relatively uncommon and erratic, two other old growth associate species were also reviewed. Although the pileated woodpecker requires a certain amount of old growth in the landscape, it is thought that the winter wren and brown creeper are actually more strongly associated with old growth forest stands. For this reason they are included in this report.

Table C-4-2 displays data for all of USFS Region One, west of the Continental divide for the 138 transects that were run every year. These numbers are better for comparison among years because they summarize the same set of surveys in each year.

Table C-4-2 Pileated Woodpecker Observations on Region One Monitoring Points

Fiscal Year	Number Points Sampled	Number & % Observed on Sampled Points	
1994	1468	*	4.8
1995	1807	149	7.6
1996	1794	110	5.6
1998	1806	110	5.5
2000	1796	149	7.9
2002	1797	106	5.6
2004	1807	138	7.0

Table C-4-3 Winter Wren Observations on Region One Bird Monitoring Points

Fiscal Year	Number Points Sampled	Number & Mean Observed on Sampled Points	
1994	1468	*	13.5
1995	1807	275	12.8
1996	1794	231	11.3
1998	1806	414	19.8
2000	1796	378	17.1
2002	1797	245	12.6
2004	1807	224	11.3

Table C-4-4 Brown Creeper Observations on Region One Bird Monitoring Points

Fiscal Year	Number Points Sampled	Number & Mean Observed on Sampled Points	
1994	1468	*	1.0
1995	1807	31	1.4
1996	1794	67	2.9
1998	1806	144	6.0
2000	1796	183	7.3
2002	1797	133	6.0
2004	1807	132	6.4

* Total not comparable due to different (smaller) sample size (Jock Young personal communication).

The results of the Region One monitoring are similar to those discussed for the Kootenai data. It will take many years to gather enough information to determine any accurate trends. Based on the information gathered to date it is not possible to confidently determine any trends for any of the species identified.

See Monitoring Item C-5 for the most recent forest-wide old growth inventory information. This monitoring item explains how the Forest is achieving Forest Plan direction for old growth (USDA Forest Service 1987, pp II-7, 22, III-54).

Evaluation: Hutto's report, 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 significant downward trend approaching 40% of population potential is occurring. Information for the Region is similar for the pileated woodpecker as well as the two other species which are dependent on old growth for a portion of their lifecycle.

Recommended Actions: it is recommended that the Forest and the Region continue participation in the R-1 Landbird Monitoring Program. It is also recommended that the Forest continue its on-the-ground validation and designation to help meet the needs of species that utilize old growth.

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

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

Purpose: This monitoring item was established to help ensure that an adequate amount of old growth habitat is designated on the Forest. The Forest Plan requires that this item be reported every two years. This item was last published in September of 2007. The expected accuracy and reliability of the information is moderate to high.

Background: The Forest Plan (Volume 1, page II-22) specifies that at any time 10% of the KNF land base below 5,500 feet elevation would be managed as old growth habitat. The old growth would be spread evenly through most major drainages, and would represent the major forest types in each drainage.

Kootenai Supplement (Supplement 85, 1991) to Forest Service Manual 2400 describes the validation process to be conducted on a compartment basis before the Forest conducts management activities that could affect old growth habitat. Validation, as defined in the Manual, is "on-the-ground verification." One of the requirements is that a minimum of 10% of each third order drainage or compartment (or combination of 3rd order drainages or compartments) be designated as old growth habitat. If 10% old growth does not exist within a compartment, designate the best available, soon to be future old growth to bring the total up to 10%, or designate additional old growth from an adjacent area to make up the difference.

Mature stands identified as old growth replacement are stands which will provide for old growth habitat in the future as they age and gain the desired attributes. See the Forest Plan Glossary and Appendix 17 of the Plan for more detail on the description of old growth attributes, including desired distribution patterns.

Inventory and Mapping: The KNF has two separate and independent sources of information for old growth. These are:

1) Forest Inventory and Analysis (FIA) data used to calculate KNF Forest-wide old growth percentages. FIA old growth results for the KNF were available for the first time in 2006.
2) Geographic Information System (GIS) layer of stands designated or undesignated as effective old growth or replacement old growth.

1) <u>Old Growth Estimates from FIA Data</u>

The National Forest Inventory and Analysis (FIA) program provides a congressionally mandated, statistically-based, continuous inventory of the forest resources of the United States. The FIA inventory design is based on the standardized national FIA grid of inventory plots that covers all forested portions of the United States (all ownerships). FIA protocols specify sample plot location

within this systematic grid. Both sample plot location and data collection standards are strictly controlled by FIA protocols. The sample design and data collection methods are scientifically designed, publicly disclosed, and repeatable. Data collection protocols are publicly available on the internet (http://www.fia.fs.fed.us/). There are also stringent quality control standards and procedures, carried out by FIA personnel of the Rocky Mountain Research Station. All of this is designed to assure that there is no bias in sample design, plot location, trees selected for measurement, or the measurements themselves.

The FIA provides a statistically sound representative sample designed to provide unbiased estimates of forest conditions at large and medium scales. This inventory design is appropriate for making estimates of old growth percentages at the scale of a national forest, or large areas of forest land. (More detail on the statistical foundation of using FIA data to assess old growth on national forests is found in: *Application of Forest Inventory and Analysis (FIA) Data to Estimate the Amount of Old Growth Forest and Snag Density in the Northern Region of the National Forest System by Raymond L. Czaplewski, Ph.D.* November 5, 2004 [available from Northern Region, US Forest Service]).

FIA estimates for old growth cannot be used to determine whether or not the Forest is meeting the Forest Plan standard for old growth. The FIA estimate is for all forest lands (not only lands <5500 feet in elevation) and does not include lands managed as replacement old growth. The estimate from FIA is helpful, however, in comparing to the old growth GIS layer used by the Forest for managing old growth.

The FIA data used to estimate old growth on the KNF was collected from 1993 to 1995. To account for disturbance since the inventory, those FIA plots having any disturbance (e.g., wildfire) since the date of inventory and up to the year 2003 were coded as not meeting the old growth definition. This may underestimate the amount of old growth, since not all disturbances would necessarily result in a reduction to old growth. FIA data was originally established to be re-inventoried every 10 years. Starting in 2002, the program has re-measured 10% of plots every year, with 50% of the forest re-measured at this time.

2) Stand-level map of old growth

The KNF continues to use a Geographic Information System (GIS) layer to identify stands that are effective or replacement old growth to meet Forest Plan standards. The stand-level old growth layer provides for distribution of old growth across the Ranger Districts and landscape, and serves as a basis for project planning. The acres associated with the old growth layer indicate whether or not Forest Plan standards are being met.

The Forest has been validating portions of its lands for old growth over the past 20 years (1989-2007), with the exception of the year 2000 (due to extensive wildfire on the Forest). In 2002, in response to litigation, the Forest conducted a forest-wide validation and inventory of old growth, using various survey methods. FIA data for estimating the amount of old growth forest-wide was not available at this time. The mapping of old growth included all of those lands previously validated as old growth, as well as other National Forest lands. This inventory was conducted, in part, to verify that the Forest had an adequate amount of well-distributed old growth habitat to meet the Forest Plan standard (i.e., 10% of the National Forest lands below 5500 feet in elevation), as well as the condition of the old growth (whether it was considered effective or replacement).

Figure C-5-1 displays effective and replacement old growth forest-wide. Figure C-5-2 displays lands designated or undesignated for old growth management forest-wide.

Results: The results from the FIA estimate of old growth are documented in the attached report, "Estimates of Old Growth for the Northern Region and National Forests" by Bush et al, dated May 16, 2007. This report indicates the estimated percent age of old growth (effective) on all forested lands on the Kootenai National Forest is 9.0% with a 90% confidence interval of 7.2% to 10.9%.

Acres from the stand level map are summarized forest-wide in Table C-5-1, displaying the total amount of old growth, whether the old growth is considered to be effective or replacement, and if the old growth has been designated or remains undesignated. There are approximately 1,870,000 acres of National Forest lands below 5500 feet in elevation. As of September, 2007 the stand level inventory indicates a total of 298,699 (16%) of National Forest lands below 5500 feet in elevation are either effective or replacement old growth. Approximately 10.7% (199,865 acres) of those lands were determined to be effective old growth and an additional 5.3% (98,834 acres) identified as replacement old growth.

Comparison: For existing old growth, the two separate tools for inventorying and monitoring old growth show similar results. The FIA data estimates old growth forest wide at 9.0% of the forest with a 90% confidence interval of 7.2% to 10.9%. The acres of effective (existing) old growth in the stand-level GIS layer total to 10.7% of forested lands less than 5500 feet in elevation. Although the FIA data shows less old growth at the mean (9.0%) than the stand level map (10.7%), the stand level map results are within the 90% confidence interval for FIA. As stated earlier, these data sources are measures for different land bases. The FIA percentage is forest-wide, while the stand level data is for lands <5500 feet in elevation. Another reason for the difference may be attributed to the age of the FIA data and the assumption that disturbed plots (e.g., FIA plots with any type of wildfire since inventory) do not meet old growth criteria, resulting in a conservative estimate from FIA.

Evaluation: The monitoring and evaluation of old growth habitat continues to indicate that the Forest is meeting its Forest Plan requirement for managing 10% of the forest as old growth habitat well distributed across KNF lands below 5500 feet elevation.

Recommended Actions: Old growth validation (on-the-ground verification) and designation needs to continue as described in FSM 2400. Priority should be to 1) complete validation as soon as practical for areas that have been partially validated and then on areas not validated and 2) designate existing old growth in areas not validated. Project level analyses will continue to use the stand-level GIS layer in their project level assessments.

Table C-5-1 Stand Level Old Growth Summary

Oldgrowth updated July 2007
10/1/2007

Forestwide Old Growth Below 5500' Elevation

		Designated old growth (designated as an old growth MA)*				Undesignated old growth (not in an old growth MA)*			TOTAL EFFECTIVE old growth (designated and undesignated)*		TOTAL REPLACEMENT old growth (designated & undesignated)*	Grand Total ALL TYPES old growth*		FS Acres DESIGNATED as an old growth Management Area*	
District	FS ACRES (total FS acres under 5500' minus lakes and highways)	designated and effective (plot, walk, vrec)	designated and effective (pi)	designated and replacement	desig unknown (original FP categorized as pi)	undesignated and effective (plot, walk, vrec)	undesignated and effective (pi)	undesignated and replacement	TOTAL acres effective og	Percent of FS Acres in effective og		Acres of all old growth	Percent of FS Acres as all types old growth	Acres designated as old growth MA	Percent of FS Acres as old growth MA
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	
D1	245,629	22,606	338	4,652	275	14,945	796	6,634	38,396	15.63%	11,286	49,682	20.2%	27,871	11.3%
D3	183,772	17,793	2,362	1,252	1,461	17,049	1,764	0	38,194	20.78%	1,252	39,446	21.5%	22,868	12.4%
D4	504,317	37,865	2,372	15,978	1,528	4,328	3,924	3,491	46,887	9.30%	19,469	66,356	13.2%	57,743	11.4%
D5	557,323	45,730	2,507	23,778	355	3,153	2,730	6,236	52,238	9.37%	30,014	82,252	14.8%	72,370	13.0%
D7	378,181	5,072	2,257	16,945	15,939	1,643	10,860	19,868	24,149	6.39%	36,813	60,962	16.1%	40,213	10.6%
Forest Total	1,869,222	129,066	9,836	62,605	19,558	41,118	20,074	36,229	199,865	10.69%	98,834	298,699	16.0%	221,065	11.8%

** All old growth acreages and percents shown in this table include only those stands below 5500' elevation. Not shown are over 19,000 acres of old growth that has been identified above 5500' elevation.*

(1) Total FS Acres minus those acres over 5500' elevation, lakes and highways
(2) Designated Effective Old Growth stands - designated as a Management Area (MA) - inventoried by plot, walk-through or visual recon data
(3) Designated Effective Old Growth stands - designated as an MA - inventoried by photo interpreted data - only 60% of this acreage is calculated as effective old growth (reference FP Appendix 17, pg.17-3)
(4) Designated Replacement Old Growth stands - designated as an MA
(5) Designated unknown: Old Growth designated in the original Forest Plan as an MA, not inventoried yet to determine effectiveness - only 60% of this acreage is calculated as effective old growth (reference FP Appendix 17, pg.17-3)
(6) Undesignated Effective old growth - not in an old growth MA - inventoried by plot, walk-through or visual recon data
(7) Undesignated Effective old growth - not in an old growth MA - inventoried by photo interpreted data - only 60% of this acreage is calculated as effective old growth (reference FP Appendix 17, pg.17-3)
(8) Undesignated Replacement stands
(9) TOTAL acres of effective old growth includes column (2) + column (6) and 60% of column (3), (5) and (7) (these columns reflect stands inventoried by photo interpretation: Reference FP Appendix 17, pg 17-3)
(10) PERCENT of Forest Service acres that are effective old growth = TOTAL old growth (column 9) divided by total FS acres (column 1)
(11) Total Replacement old growth acres = column (4) + column (8)
(12) TOTAL all acres of old growth below 5500' = total effective old growth (column 9) + total replacement old growth (column 11)
(13) Percent of Forest Service acres that are effective or replacement old growth below 5500' = Total all acres old growth (column 12) divided by total FS acres (column 1)
(14) Acres and Percent of FS acres Designated as an old growth Management Area (MA). Includes effective and replacement old growth. Does not include designated old growth over 5500'.

Figure C-5-1 Old Growth by Type

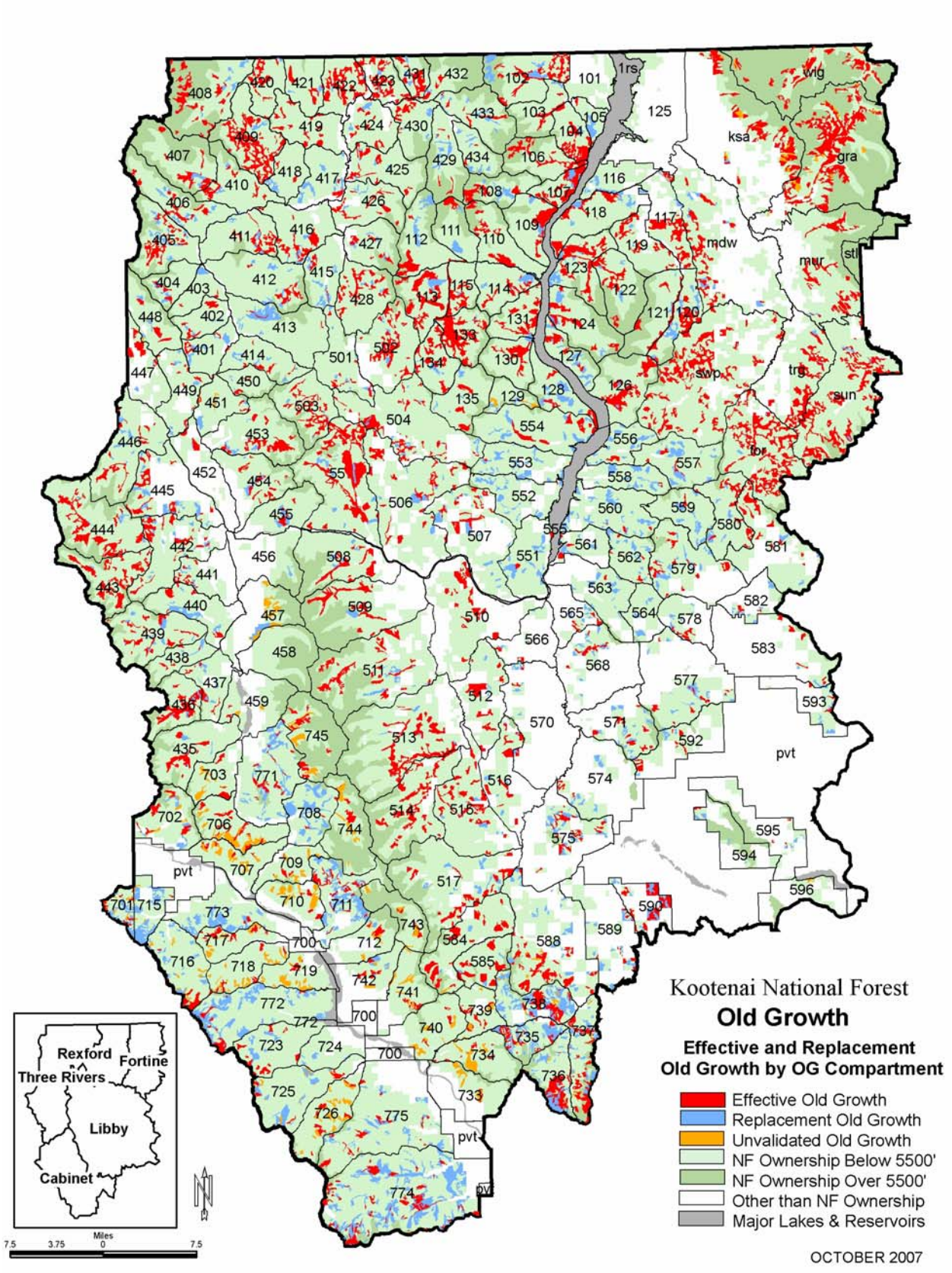
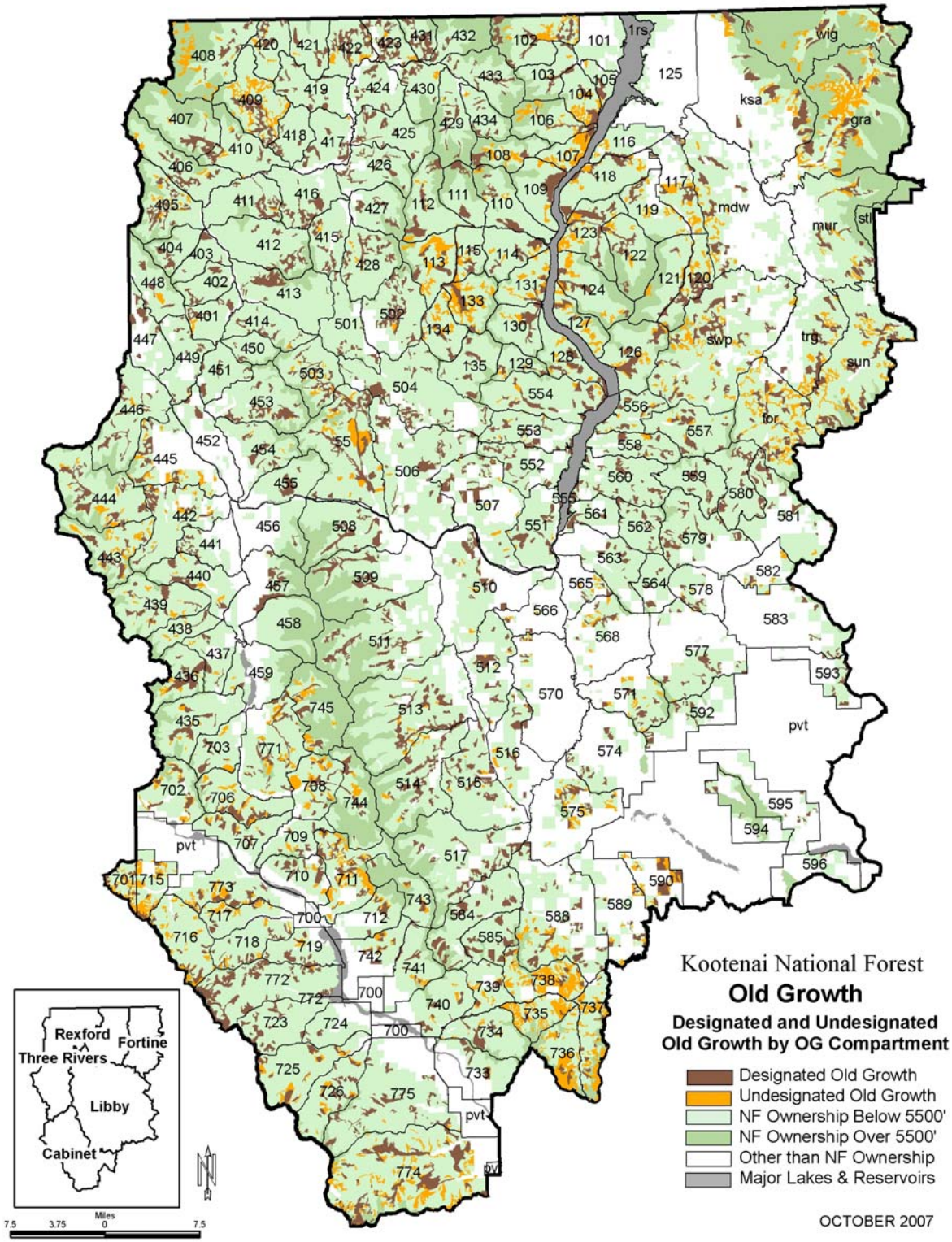


Figure C-5-2 Designated and Undesignated Old Growth



Region One
Vegetation Classification, Mapping, Inventory and Analysis Report

$$\bar{x} = \frac{\sum x}{n}$$

Numbered Report 07-06 v1.2 | **May 16, 2007**

Estimates of Old Growth for the Northern Region and National Forests

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Following is an update in old growth estimates for Region 1 which was reported in *Estimates of Old Growth for the Northern Region and National Forests* (Bush and others, 2006). This update is due to an oversight which was found when assessing old growth in the western Montana zone old growth forest type of alpine larch, whitebark pine, and limber pine. Previously, all plots that met old growth criteria for this forest type were not flagged as old growth. This has been corrected and estimates within this report reflect those changes. Old growth estimates for the Bitterroot, Flathead, Kootenai, and Lolo National Forests as well as total estimates for Region 1 were slightly affected by this change.

Introduction

This document summarizes analysis conducted using Forest Inventory and Analysis (FIA) data to estimate the percentage of old growth on forested lands in the Northern Region and on National Forests in the Northern Region.

Overview of FIA

The national Forest Inventory and Analysis (FIA) program provides a congressionally mandated, statistically-based, continuous inventory of the forest resources of the United States. Since 1930, the FIA program has been administered through the Research and Development branch of the Forest Service, which makes it administratively independent from the National Forest System. The Interior West Forest Inventory and Analysis work unit, headquartered at the USFS Rocky Mountain Research Station in Ogden, Utah oversees the FIA inventory in Region 1. More information on IW-FIA is available on the internet at: http://www.fs.fed.us/rm/ogden/sitemap/index.shtml.

FIA inventory design is based on a national hexagon of inventory plots. Data is collected on all forested portions of the plots, throughout the United States, regardless of ownership. FIA protocols specify sample plot location within this hexagonal grid. Data collection standards are strictly controlled by FIA protocols. The sample design and data collection methods are scientifically designed, publicly disclosed, and

repeatable. Data collection protocols are publicly available on the internet (http://www.fia.fs.fed.us/). There are also stringent quality control standards and procedures, carried out by FIA personnel of the Rocky Mountain Research Station. All of this is designed to assure that data is collected consistently throughout the United States, and that stated accuracy standards are met by the field crews.

FIA Sampling

To estimate the percentage of old growth for large areas, such as the Northern Region, individual National Forests, or even large landscape areas, it is infeasible to maintain an inventory for every acre of the millions of acres of forestland. FIA provides a statistically-sound representative sample designed to provide unbiased estimates of forest conditions at broad- and mid-levels. The FIA sampling frame uniformly covers all forested lands, regardless of management emphasis. Therefore, wilderness areas, roadless areas, and actively managed lands all have the same probability of being sampled.

Table 1: Date of Inventory by National Forest

National Forest	Date of FIA Periodic Inventory
Eastern Montana	
Beaverhead-Deerlodge	1996-1997
Custer	1997
Helena	1996-1998
Gallatin	1997-1998
Lewis & Clark	1996-1997
Western Montana	
Bitterroot	1994-1995
Flathead	1993-1994
Kootenai	1993-1997
Lolo	1995-1996
Northern Idaho	
Idaho Panhandle	2000-2003
Clearwater	1998-2002
Nez Perce	2000-2002

Using FIA data to assess the percentage of old growth allows the Region to base its monitoring on an unbiased, statistically sound, independently designed and implemented representative sample of forest lands. This inventory is reasonably current because FIA plots in Region 1 were installed during 1993 to 2004 (see Table 1 for specific inventory year by National Forest). All forested[1] plots that are located on the National Forest lands are used to derive these estimates. Those FIA plots in which wildfire or harvest have occurred since the dates of inventory until November, 2003 were assumed to not meet the old-growth criteria. This results in conservative estimates as not all wildfire and harvest activities remove all old growth on the landscape. To remain current, FIA has started to re-measure 10% of its plots every year. As these re-measured plots accumulate, we will periodically update our FIA old-growth analysis and report.

All plots installed in Montana from 1993 until 1996, utilized a sample location (field plot) composed of five to seven variable-radius plots with trees 5 inches and larger, in diameter at breast-height (DBH) tallied with a basal area factor of 40. The number of plots installed depended upon the year of inventory; early inventories had a seven-plot cluster, whereas those inventories collected 1995-1996 had five plots.

[1] "..land at least 10% stocked, or currently nonstocked but formerly having such stocking, with timber and/or woodland trees, and where human activity on the site does not preclude natural succession of the forest (i.e., the site will be naturally or artificially regenerated)." *Interior West Forest Land Resource Inventory Field Procedures, 1995-1996*

After 1996, FIA adopted a national plot layout consisting of a cluster of four plots. Trees 5-inches DBH and larger were measured on a 1/24th-acre plot. In 2002, Region 1 worked with IW-FIA to modify the national layout by adding a ¼-acre macro-plot. These protocols were integrated into the IW field procedures and data collection software, and loaded into IW-FIA's database. These protocols dictate that trees 5.0 – 20.9 inches DBH were measured on the 1/24th- acre plot and trees 21.0 inches DBH and larger were measured on the ¼-acre plot. Data collected in 2002 was completed by IW-FIA crews while crews were collecting data. All plots that did not have the ¼-acre plot installed in 2002 had the ¼-acre plot augmented to the standard FIA plot layout in 2003 and 2004. These data were measured by contract crews, overseen by Region 1, using IW protocols and software. For a detailed description of field procedures see http://fsweb.ogden.rmrs.fs.fed.us/data_collection/data_collection.html

FIA field procedures dictate that age for trees 3.0" DBH and larger is measured by counting annual growth rings at breast height, and recorded as "breast-height age". Breast-height (BH) is defined as 4.5' tall. It follows that BH age is the number of years the tree has survived since it reached 4.5 feet tall, which is less than its total age. In temperate regions similar to the Northern Region, coniferous trees always take several years to reach breast height, and these years need to be added to "breast-height age" to get the total age of the tree. The minimum age criteria for old growth used in *Green and others (1992, errata corrected 02/05)* is total age rather than breast-height age. The data used for estimating old growth should be consistent with *Green and others* definitions. Therefore, a conservative estimate of the number of years a currently large tree took to reach BH is added to the BH age (ring count) to account for the difference between the old-growth definition of tree age and FIA field measurement protocols. See Estimates *of Years to Breast Height for Large Conifer Tree Species in the Northern Region* (Berglund, Bush, and Zack, in preparation).

Analysis Techniques

The R1-FIA Summary Database was used to conduct this analysis. As its name suggests, this database is comprised of several tables of summarized attributes derived from FIA field-collected data. This database has the functionality to compute the mean, standard error, and confidence intervals for percentage old growth.

Because FIA data comes from a statistical sample rather than a 100% census, attributes calculated from this data are estimates and the accuracy of these estimates can be computed and reported as confidence intervals. To calculate the confidence intervals a technique called "bootstrapping" is used. Bootstrapping is a statistical method that is independent of the distribution of the underlying data. For more information on bootstrapping, see Leach (2002) *A Case Study in the Evaluation of Confidence Interval Algorithms* and Leach (2005) Bootstrap *Calculation of Confidence Intervals for the Estimates of Means by Stratum.*

The Northern Region uses a 90%-confidence interval for describing the reliability of these estimates. The 90% level was chosen to provide a fairly precise level for a biological attribute that can be very variable. It can be thought that if a different set of randomized sample points were collected 100 different times, the estimates of the percent old growth would be within the 90%-confidence interval 90% of the time. This also indicates that if every tree on every acre were measured, there is a 90% probability that the true proportion of old growth for the population would be within this confidence interval. Or that 9 out of 10 times, the true population mean is within the confidence interval derived from the sample.
For further information on the R1 FIA Summary Database see *Overview of R1 FIA Summary Database*, Bush and others (2006).

Northern Region Old Growth Criteria

Numerous definitions for old-growth forests all tend to focus on "criteria relating to the age, size, and successional stage of overstory trees . . .", (Foster and others 1996). These attributes identified by Foster and others are consistent with the four important attributes in the Northern Region old growth criteria documented in Green and others, i.e., minimum age, diameter, and trees per acre (TPA) over minimum

age and diameter thresholds, and minimum basal area, an indicator of stand density. Moreover, Foster and others (1996), in agreement Spies and Franklin (1996), suggest an old-growth ecosystem is distinguished by old trees, but is not necessarily in the late-successional condition nor free of evidence of human activities.

The Northern Region's definition of old growth, as documented in Green and others, is used to determine if an FIA plot meets old growth minimum criteria. These minimum thresholds are documented in tables 1-3 of the Green document and are the key attributes in identifying old growth. A variety of "associated characteristics" have been identified that can be useful in determining the quality of Old Growth communities for some specific purposes when developing a project-level management approach however, these are not required characteristics as per the Green and others document and therefore are not used for the broad-level analysis.

FIA plot-level data and analysis methods used here are similar to the plot-level data and analysis methods used by Green and others (2005) when determining the old growth criteria. Neither dataset nor analysis method specifies a minimum acre requirements for the size of an old growth polygon.

For further detail on the statistical foundation of using FIA data to assess old growth on national forests see: *Application of Forest Inventory and Analysis (FIA) Data to Estimate the Amount of Old Growth Forest and Snag Density in the Northern Region of the National Forest System (*Czaplewski, 2004).

Percent Old Growth in the Northern Region and on Individual National Forests

Table 2 provides a summarization of the estimates of percent old growth on forest-lands for the Northern Region and individual National Forests as per the Region 1 Green and others definition of old growth. Forests have varying old growth requirements in their current Forest Plans which are not reflected in this table. See the Forest Plans and/or Monitoring Reports for more information on old growth standards and guidelines for each Forest.

Table 2: Northern Region and individual National Forest estimates of percent old growth, standard error, and 90%-confidence intervals

Unit	% Old Growth Estimate	90%-Confidence Interval - Lower Bound	90%-Confidence Interval - Upper Bound	Total Num PSUs	Num Forested PSUs
Northern Region	13.7%	12.9%	14.4%	3883	3423
Beaverhead-Deerlodge	22.9%	20.5%	25.4%	547	442
Bitterroot	12.8%	10.1%	15.6%	252	226
Idaho Panhandle	11.8%	9.6%	14.0%	413	397
Clearwater	9.4%	7.3%	11.8%	305	300
Custer	10.1%	6.4%	14.1%	195	105
Flathead	11.0%	9.0%	13.1%	382	338
Gallatin	25.5%	21.7%	29.3%	285	223
Helena	10.9%	7.8%	14.1%	149	138
Kootenai	9.0%	7.2%	10.9%	370	352
Lewis & Clark	13.3%	10.6%	16.2%	299	267
Lolo	9.6%	7.7%	11.5%	347	327
Nez Perce	14.4%	11.8%	17.2%	339	308

Distribution of Old Growth within Individual National Forests

Using FIA data, the same methodology can also be used to estimate the percent old growth on medium to large geographic areas, landscapes, or watersheds within individual National Forests. Estimates of old growth across these areas provide a means for examining the distribution of old growth within a National Forest. Reports for individual National Forests provide this watershed or landscape-level information. In order to obtain reliable estimates of old growth with meaningful confidence limits, the landscape area must be large enough to encompass a reasonable number of FIA plots. Because of the resolution of the FIA data, it should not be used for estimates within a project-area as there are seldom enough plots to derive estimates of old growth with any sort of reliability.

Relationship to Forest Maps of Allocated Old Growth Stands, and Project-level Mapping

Broad-level estimates of old growth are intended to be used in conjunction with project-level estimates and associated maps and maps of stands allocated to old growth management by a National Forests. These broad-level estimates are intended to allow land managers to assess forest-plan compliance and to set the context for the maps of stands allocated to old growth management and their project-level estimates which are useful tools for project design and implementation.

Furthermore, FIA data provides mid- and broad-level estimates. The resolution of the grid is too course to derive reliable estimates within project areas. At the project-level, it is recommended that Forests conduct stand-based mapping, inventory, and analysis to meet their information and analysis within the project area.

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

ACTION OR EFFECT TO BE MEASURED:	Cavity habitat condition and amount.
MONITORING OBJECTIVE:	Maintain habitat capable of supporting viable populations of cavity nesters (> 40% of potential).
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	Any reduction in habitat capability approaching 40 % 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 Forest Plan requires that this item be reported once every five years.

Background: Appendix 16 of the Plan contains the standards and guidelines for maintaining habitat capable of supporting populations of cavity-nesting wildlife. The primary goal is to maintain viable populations of cavity dependent wildlife species throughout the Forest. To achieve this goal, at least 40% (1 snag per acre) of the potential capacity will be maintained throughout commercial forest lands and at least 60% (1.5 snags per acre) of the potential will be maintained in riparian areas. The 40% 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 various levels of population potential (40% to 100%). 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: The results used for this monitoring item are derived from two sources; 1) District analysis conducted during the NEPA process (generally on a timber compartment or watershed), and 2) on-the-ground monitoring of individual harvest units. Available Snag Habitat (ASH) or habitat capability is determined on a compartment or watershed basis. Analyses include an estimate of snags in treated and untreated acres of National Forest lands, based on information from the timber stand database and snag monitoring records. Factors included in the calculations are: acres of harvest (regeneration and/or intermediate), acres of non-harvest, acres of natural openings, and miles of road. Estimates are made about the number of snags available in each of these areas. Because of firewood cutting, no snags are assumed to occur within a specified distance from a road, generally 200 feet. Past regenerated stands and natural openings were also considered to have very minimal amounts of snags (<10% ASH). Uncut and partially cut stands were estimated to have a 40-100% ASH. On-the-ground monitoring is usually conducted post harvest where actual snag numbers are counted. During the reporting period (2003-2007) on-the-ground monitoring was conducted on 161 individual harvest units (Table C-6-1) and analysis was conducted on 33 compartments (Table C-6-2).

Individual Harvest Unit Results: Pre-treatment habitat capability within harvest units was generally considered to be 100% of potential habitat (it requires 2.25 snags per acre to achieve the 100% level). Post-treatment habitat capability ranged from zero percent of potential to 100% of potential. Only existing snags were included in the calculations for habitat capability. Overall, adequate snag numbers were

retained in over 72% of the harvest units monitored in order to meet or exceed the 40% level. Monitoring of harvest units also includes counting the number of green tree replacements. These replacement trees are often girdled or inoculated to initiate decay processes that will create snags. Results of these treatments are variable but generally take many years to achieve a desired result. When considering availability of replacement trees, 148 units (92%) met Forest Plan snag standards.

Table C-6-1 Individual Units Monitored 1988-2007

Year	Units Monitored	Units Meeting FP Standards	Units Not Meeting FP Standards
1988-1992	303	177 (58.4%)	126 (41.6%)
1993-1997	624	390 (62.5%)	234 (37.5%)
1988-2002	1386	781 (56.3%)	605 (43.7%)
2003-2007	161	117 (72.6%)	44 (27.3%)

Compartment Level Results: Evaluation of cavity habitat trend was completed on 33 compartments (see Table C-6-2) during the reporting period (2003-2007). All of the compartments retained adequate snag numbers to meet or exceed Forest Plan goals for the 40% level. The 33 compartments analyzed cover a total of 233,366 acres. Of these acres, 5,483 (2%) maintained existing snag levels and 227,883 (98%) showed a decline in snag levels but still remained at or above the 40% capability level.

Table C-6-2 Compartments Analyzed 1988-2007

Year	Compartments Monitored	Compartments Meeting FP Standards	Compartments Not Meeting FP Standards
1988-1992	74	68 (91.9%)	6 (8.1%)
1993-1997	66	64 (97.0%)	2 (3.0%)
1988-2002	202	192 (95.0%)	10 (5.0%)
2003-2007	33	33 (100%)	0 (0%)

Forest-wide Results: On some harvest units an inadequate amount of snags are left after logging operations are complete. These inadequacies result from being knocked down during logging operations and planting site preparation, removal for safety purposes, natural wind throw, and being burned during slash burning operations. Snags along roadways are also deficient in some areas because of firewood cutting by the public. Overall, considering both harvested and unharvested acreages, the 40% cavity habitat potential is being met in most drainages because of the amount of unharvested timber still remaining.

Evaluation: Variation in successfully meeting the 40% 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 to date provide evidence that there are mixed results in providing the minimum desired density of snags in harvest units (Table C-6-1). 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. Improvement in retaining snags is occurring. With the new OSHA

regulations, the emphasis is on leaving snags in clumps or stringers that are not harvested and retaining green replacement trees versus existing snags.

Monitoring that has been completed on a compartment or drainage basis indicates that we are meeting the intent of the Plan by providing cavity habitat at a level sufficient to maintain viable populations of dependent wildlife (40% or more of population potential). However, in some drainages the availability of cavity habitat is less than desired (Table C-6-2).

Another consideration is the fact that over 50% 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% of potential.

In summary, the available monitoring data indicates the Forest is providing sufficient cavity habitat at a drainage or compartment level. Based on this information, the creation of numerous snags by wildfires, 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 Plan.

Recommended Actions: New scientific information concerning snags (Bull et. al. 1997 and Harris unpub.) has become available and may apply to snag management on the Kootenai. The Plan snag standards and guidelines are primarily based on Thomas (1979). Bull documents that the assumptions used by Thomas may be in error and that additional snag habitat, more snags and replacement trees, may be needed to provide adequate habitat for cavity nesters. A review of the snag requirements should be completed during Forest Plan revision. This is on-going at this time.

Forest Plan Revision :

- The R-1 protocol for coarse filter analysis should 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 (including down woody material) for revision of the 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: Threatened & Endangered Species Habitat; Item C-7

ACTION OR EFFECT TO BE MEASURED:	Provide habitat adequate to ensure KNF contribution to the recovery of Threatened and Endangered (T&E) Species including: Lynx, Gray Wolf, Bald Eagle, Grizzly Bear, Bull Trout and White Sturgeon.
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	Any downward population trend. Any forest-wide decrease in habitat quantity or quality. Failure to meet recovery plan goals for the KNF.

Purpose: This monitoring item was established to help ensure that the KNF contributes to the recovery of listed threatened and endangered species. The Forest Plan requires that this item be reported annually. This item was last published in September of 2006. The expected precision and reliability of the information is high and moderate, respectively.

Evaluation:

Gray Wolf –

The Wolf Recovery Plan (USFWS, 1987) provides guidance for the recovery of the gray wolf. The KNF is part of the Northwest Montana Wolf Recovery Area. The recovery goal for this area is ten wolf packs, which has been met for four consecutive years (USFWS, 2007). Wolves from each of the known packs spend at least a portion of their time on the Forest and the remainder on other National Forests, State, or private lands.

Following is a summary of the known wolf packs during 2007 (Sime et. al. 2008).

Candy Mountain Pack – This pack was first discovered in 2003. The pack's territory is in the Yaak River drainage. The pack produced at least 2 pups in 2007. It started the year with 11 individuals but ended with only four being documented. This pack has no radio collared animals.

Fishtrap Pack – First found in 2000, the pack has 3 radio collared animals out of the pack of seven wolves. This pack produced three pups in 2007. The pack occupies an area in the southeast corner (McGinnis Meadows and East Fisher Creek) of the Libby Ranger District but also uses the Fishtrap and main Thompson River drainages on the Plains/Thompson Falls District of the Lolo National Forest. This pack is considered a breeding pair.

Kootenai South Pack – Considered a separate pack since 2005, these wolves occupy a territory mainly south of the U.S./Canada border and west of Koocanusa Reservoir. The pack was not collared at the end 2007 due to a legal harvest in Canada. There are four wolves in the pack, including 2 pups of the year and it is considered a breeding pair.

Ksanka Pack – This pack was first identified in 2006 with the discovery of a dispersing wolf from the Kintla pack in the North Fork Flathead River drainage. These wolves occupy an area east and southeast of Eureka, Montana. One wolf has a radio collar. The den site was found in September 2007 and 2 pups along with 4 adults were confirmed.

Lost Soul Pack – Discovered through a dispersing wolf from the Kootenai South Pack in 2006, this pack now has no radio collared animals. The number of wolves in the pack is not known for 2007. It occupies an area between Koocanusa Reservoir and Libby.

Lydia Pack – The Lydia pack was discovered in 2006. There were eight wolves, including 5 pups in the pack in 2007. The pack is now collared. They occupy an area in and around the Pinkham Creek drainage, near Eureka, Montana. Four confirmed or probable wolf kills of cattle occurred in 2007. Two different den sites were located and documented.

Meadow Peak Pack – This packs territory is north of Thomson Chain of Lakes, where they have been since 2006. One wolf carries a radio collar for the three member pack. The pack is not considered a breeding pair.

Murphy Lake Pack – These wolves were first found in 1991. This pack's territory is between Eureka and Whitefish. The number of wolves was unknown in 2006. The pack was counted as a breeding pair this past year as they produced two pups, doubling the pack size to four. The pack remains without a collared animal.

Pulpit Mountain Pack – Another pack found in 2006, it was not a breeding pair in 2007. A total of three wolves run in the pack. The pack remains uncollared, but its territory is estimated to be in the O'Brien and China Creek drainages.

Wolf Prairie Pack – First documented in 2004, this is a pack of three wolves without a breeding pair. The pack's territory is on the eastern edge of the KNF, northwest of Pleasant Valley. One wolf carries a radio collar. There was one attack on livestock, but no animals were killed in 2007.

Calder Mountain – found in 2005, this border pack, which counts toward the Idaho population estimate, occupies an area west of Troy, Montana. These wolves are thought to spend most of their time in Idaho. There were four pack members in 2007, but it is not considered a breeding pair for the year. The pack is not collared.

Kootenai North – the number of wolves in this pack in 2007 is unknown. They spend most of their time in Canada west of Koocanusa Reservoir and do not count toward the Montana population estimate. It was located twice in the U.S. in 2007.

Habitat and Population Trend: Wolf numbers using the Kootenai continue to increase, reflecting continuing suitable habitat conditions. Wolf habitat conditions did not change significantly in 2007 compared to previous years. Big game populations are providing adequate prey resources for continued wolf population growth.

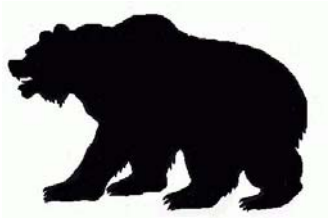
Bald Eagle – the bald eagle was removed from the list of threatened and endangered species list in August 2007. The Montana Bald Eagle Management Plan (MBEWG, 1994) provides guidance for bald eagle management. This plan assures compliance with the Bald and Golden Eagle Protection Act. Ten new nest sites were found over the past five years (2003-2007). At the end of 2007 there were 19 pair territories on National Forest lands. There were also 25 pair territories on private, state or other federal lands within the KNF area. Fourteen pair territories were active on KNF lands in 2007, with four inactive and the status of one was unknown.

Bald eagle habitat is generally within one mile of major lakes and rivers. Habitat quality and quantity on the Kootenai is stable, and may be increasing in the long term as potential nest trees mature.

Mid-winter bald eagle population surveys: Sightings occur mostly along major watercourses both on the Forest and on adjacent ownerships. Results are highly variable from year to year due to varying weather conditions. The survey results for 2007 show a total of 67 wintering bald eagles. This is below the 20 year (1988-2007) average of 97 wintering eagles.

Nesting surveys show the 2007 nesting eagle population slightly up on National Forest lands, with 13 young fledged from 14 active nests. The overall reproduction of 36 (including private land sites) was slightly above the average year (24.5 fledged is the 20 year average).

The USFWS removed the bald eagle from the threatened species list on August 8, 2007. This is the last time bald eagle monitoring will be reported as part of the Kootenai Forest Plan Monitoring Report item C-7. It will continue to be reported under item C-8.



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

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

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

Unduplicated Sightings of Females with Cubs: In 2007, there were four credible sighting of unduplicated female grizzly bears with cubs of the year in the Kootenai portion of the CYE, and two in the KNF portion of the NCDE. The Kootenai portion of the NCDE was above the six year average for number of females sighted with cubs, as was the CYE.

Distribution of Females with Young: Eight of the seventeen BMUs on the Kootenai portion of the CYE were occupied by females with young in 2007. The total number of different BMUs occupied over the entire recovery zone during the past six years was 14, compared to the Recovery Plan goal of eighteen (personal communication: Wayne Kasworm, February 2008). The one BMU in the Kootenai's portion of the NCDE was occupied by four females with young during the year. These numbers are above the six year average for the NCDE and above average for the CYE.

Mortality: There was one human caused grizzly mortality reported in 2007 for the CYE and one in the Kootenai portion of the NCDE.

Sightings of females with cubs of the year, distribution of females with young and human-caused female moralities are summarized for the past six years in Table C-7-1. These levels do not yet meet recovery goals for the CYE.

Access Management: With the District court decision (12/13/2006) to set aside the Forest Plan Access amendment, habitat criteria for linear open road density and percent habitat effectiveness once again are reported. The linear open road density criterion is $\leq$ 0.75 miles per square mile for each BMU. Fifteen of the 17 BMUs on the KNF meet this criterion. The habitat effectiveness criterion is $\geq$ 70%. Thirteen of the 17 BMUs on the KNF meet this criterion.

Applying best science (Wakkinen and Kasworm 1997) has established additional access management consideration in assessing grizzly bear habitat in the CYE. Identified monitoring parameters include Open Motorized Route Density (OMRD), Total Motorized Route Density (TMRD) and core.

Tables C-7-2 A, B, and C display Core, OMRD, and TMRD values by BMU for bear years (BY) 2000 through 2007. Changes in core, OMRD and TMRD in FY 07 are the result of management activities, activities on private land, and field verified corrections in road status from bear year 2006.

Table C-7-1 Grizzly Bear Females with Cubs, Distribution of Females with Young, and Human-Caused Mortalities

Bear Year (BY)	NCDE (KNF Portion)			CYE (KNF portions only)		
	# Females with Cubs of the year	#BMUs Occupied by Females with Young	# Human Caused Mortalities	# Females with Cubs of the year	# BMUs Occupied by Females with Young	# Human Caused female Mortalities
2002	2	1	0	4	7	4
2003	0	0	1	2	7	0
2004	4	1	1	1	5	0
2005	2	1	0	1	3	2
2006	0	1	1	1	3	0
2007	2	1	1	4	8	1
Six-year Average	1.7	1.0	0.7	2.2	5.5 *	1.2

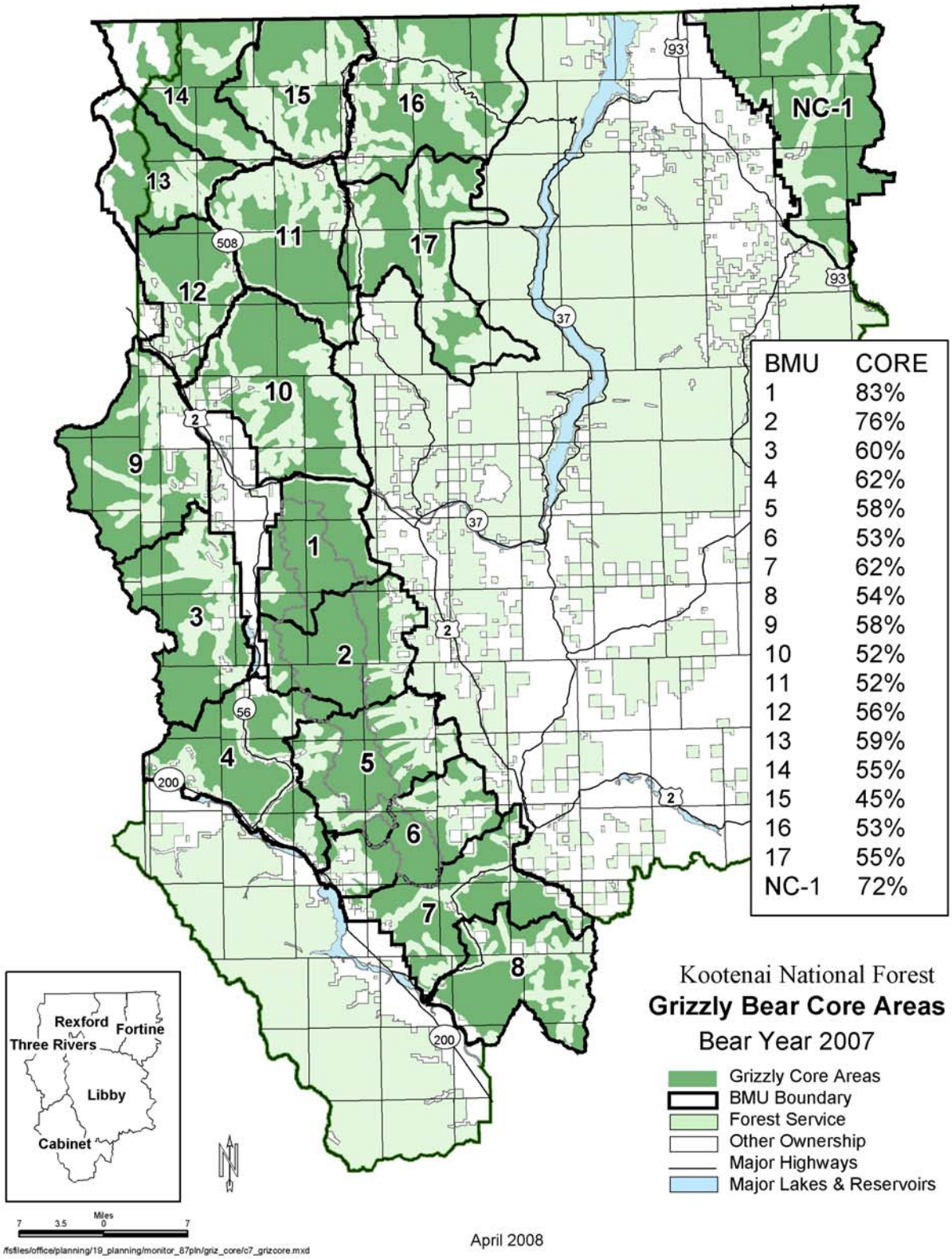
*Note: 14 different BMUs were known to be used by females with young over the past 6 years

Table C-7-2A Bear Year (BY) (4/1 thru 11/15)% Core for the CYE by BMU

BMU	BY 00 %	BY 01 %	BY 02 %	BY 03 %	BY 04 %	BY 05 %	BY 06 %	BY 07 %
1 Cedar	83	83	83	83	84	85	85	83
2 Snowshoe	78	77	77	78	78	77	76	76
3 Spar	58	61	62	62	63	63	62	60
4 Bull	63	63	62	62	63	63	63	62
5 Saint Paul	62	62	63	60	60	59	60	58
6 Wanless	53	55	55	54	56	54	54	53
7 Silver Butte/Fisher	66	66	66	66	66	67	67	62
8 Vermilion	57	56	56	56	56	56	56	54
9 Callahan	56	57	57	59	60	59	58	58
10 Pulpit	48	49	49	52	52	51	51	52
11 Roderick	55	54	54	53	53	53	52	52
12 Newton	56	57	57	56	56	56	56	56
13 Keno	59	62	62	61	61	61	59	59
14 NW Peak	56	56	56	57	57	56	55	55
15 Garver	48	47	50	50	48 *	46	45	46
16 E Fk Yaak	45	45	45	49	55	54	53	53
17 Big Creek	49	50	50	50	50	49	54	55
Average (not weighted)	58	59	59	59	60	59	59	58

Highlighted value does not meet the $\geq$ average 55% level identified by research (Wakkinen & Kasworm 1997).
* In BMU 15,% core change is the result of an error correction in BY03. Correction was made after on-the-ground validation of road status.

Figure C7-1 Grizzly Bear Core Areas



Bear Year (BY)% Core for the NCDE by BMU

BMU	BY 00 %	BY 01 %	BY 02 %	BY 03 %	BY 04 %	BY 05 %	BY 06 %	BY 07 %
Murphy Lake NC-1	70	70	72	72	72	72	72	72

Table C-7-2B Bear Year (BY) OMRD Conditions (% BMU > 1 mi/mi^2) for the CYE by BMU

BMU	BY 00 %	BY 01 %	BY 02 %	BY 03 %	BY 04 %	BY 05 %	BY 06 %	BY 07 %
1 Cedar	12	12	12	12	13	14	12	12
2 Snowshoe	17	17	17	17	17	19	20	19
3 Spar	24	26	27	24	25	26	27	27
4 Bull	36	36	36	36	37	37	36	37
5 Saint Paul	27	27	26	27	26	27	27	28
6 Wanless	34	34	33	37	33	35	35	32
7 Silver Butte/Fisher	23	23	23	23	23	24	23	25
8 Vermilion	32	32	32	32	32	32	32	33
9 Callahan	32	32	32	26	26	28	28	27
10 Pulpit	45	41	41	41	41	42	41	44
11 Roderick	29	29	31	30	29	28	28	28
12 Newton	45	43	43	41	41	42	42	42
13 Keno	34	33	28	33	33	34	34	34
14 NW Peak	28	35	28	27	28	28	28	28
15 Garver	31	31	31	31	29	33	30	30
16 E Fk Yaak	31	28	29	28	31	28	28	29
17 Big Creek	32	32	31	31	31	29	31	30
Average	28	30	31	31	31	30	30	30

Highlighted value does not meet the $\leq$ average 33% level identified by research (Wakkinen & Kasworm 1997).

Bear Year (BY) OMRD Conditions (% BMU > 1 mi/mi^2) for the NCDE by BMU

BMU	BY 00 %	BY 01 %	BY 02 %	BY 03 %	BY 04 %	BY 05 %	BY 06 %	BY 07 %
Murphy Lake NC-1	20	20	19	19	20	20	20	20

Table C-7-2C Bear Year (BY) TMRD Conditions (% BMU > 2 mi/mi^2) for the CYE by BMU

BMU	BY 00 %	BY 01 %	BY 02 %	BY 03 %	BY 04 %	BY 05 %	BY 06 %	BY 07 %
1 Cedar	11	11	10	11	10	8	8	9
2 Snowshoe	14	14	14	14	14	14	15	16
3 Spar	30	27	26	26	24	24	24	27
4 Bull	26	26	26	26	26	26	26	26
5 Saint Paul	21	21	21	21	21	24	23	23
6 Wanless	33	32	32	32	31	31	33	33
7 Silver Butte/Fisher	20	20	20	20	21	20	21	23
8 Vermilion	21	23	23	23	23	23	23	24
9 Callahan	28	27	27	26	26	26	26	26
10 Pulpit	34	32	32	30	31	29	28	28
11 Roderick	27	28	28	28	29	29	28	29
12 Newton	31	29	30	31	31	31	30	31
13 Keno	24	24	24	24	23	24	25	25
14 NW Peak	26	26	26	25	26	26	26	26
15 Garver	32	32	30	29	29	34	33	32
16 E Fk Yaak	38	38	38	30	25	26	26	27
17 Big Creek	27	26	26	25	25	25	20	18
Average	26	26	24	25	24	25	23	25

Highlighted value does not meet the $\leq$ average 26% level identified by research (Wakkinen & Kasworm 1997).

Bear Year (BY) TMRD Conditions (% BMU > 2 mi/mi^2) for the NCDE by BMU

BMU	BY 00 %	BY 01 %	BY 02 %	BY 03 %	BY 04 %	BY 05 %	BY 06 %	BY 07 %
Murphy Lake NC-1	12	12	6	6	6	6	6	6

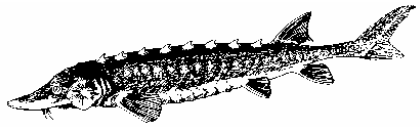
Bears Outside the Recovery Zone (BORZ): In addition to the monitoring items inside the recovery zone, criteria for areas outside the recovery zones that are occupied by grizzly bear are also monitored to assure compliance with ESA. The criteria for bears outside the recovery zone (BORZ) polygons are: no increases in linear open road density above baseline conditions and no permanent increases in linear total road densities above baseline conditions. Table C-7-3 shows the baseline conditions established as of 2003 and corrected in 2005 and reports this year's status.

Table C-7-3 Linear Open and Total Road Densities (miles/mile^2) by BORZ Polygon

BORZ Polygon	Baseline Linear Open Road Density (ORD)	FY 04	FY 05	FY 07	Baseline Linear Total Road Density (TRD)	FY 04	FY 05	FY 07
Clark Fork	0.9	0.9	0.9	0.9	2.6	2.6	2.6	2.6
Troy	1.2	1.1	1.1	1.1	2.6	2.5	2.5	2.5
Cabinet Face	2.2	2.2	2.2	2.2	3.9	3.9	3.9	3.9
West Kootenai	1.3	1.3	1.3	1.3	3.0	3.0	3.0	3.0
Tobacco	2.0	1.8	2.0	2.0	3.0	3.3	3.0	3.0
Libby	1.9	1.9	1.9	1.9	3.4	3.4	3.4	3.4
Fisher	1.0	1.0	1.0	1.0	2.7	2.7	2.7	2.7

Summary: Sightings of female grizzly bears with cubs of the year in FY 07 were up from FY 06, and the six year average has increased. Females with young occupied more BMUs than in the previous year, and the number was above average for the CYE. There was one human caused female grizzly mortality in 2007. Overall, open and total route densities declined slightly during the year. The amount of total core area in grizzly habitat remained approximately the same as last year. The grizzly bear population trend in the CYE has about a 94% probability that it is declining (Kasworm et. al. 2007).

Lynx – The Canada lynx was listed as threatened in March, 2000. The KNF currently manages for lynx habitat using the Northern Region Lynx Management Direction (McAllister et. al. 2007). The Forest delineated 47 Lynx Analysis Units (LAUs) which approximate a lynx home range size. At the end of 2007 all LAUs met the Northern Region Lynx Management Direction for habitat standards (including but not limited to: $\leq$ 30% unsuitable condition and $\leq$ 15% changed to unsuitable condition in last 10 years). Fifteen of the 47 LAUs were known to be occupied by lynx in 2007.



White Sturgeon -- The US Fish and Wildlife Service (FWS) Recovery Plan for the Kootenai River white sturgeon was signed on September 30, 1999. The short-term goals of the Plan are to re-establish natural reproduction and prevent extinction of the species. Long-term goals include providing suitable habitat conditions and restoring a natural age-class structure and an effective population size. This stock of fish will be considered for down listing to threatened status after 10 years only if natural reproduction occurs in three different years; the estimated population is stable or increasing; enough captive-reared juveniles are added to the population for 10 consecutive years that 24 to 120 juveniles survive to maturity; and a long-term Kootenai River flow strategy is implemented that ensures natural reproduction. Delisting of this population is estimated to take at least 25 years following the approval of the Recovery Plan.

Recovery of white sturgeon is managed by Idaho Fish and Game, Kootenai Tribe of Idaho, and Montana Department of Fish, Wildlife and Parks. The Recovery Plan for the white sturgeon outlines a comprehensive set of actions needed to begin the recovery process. The Plan does not identify actions or objectives that directly affect management of the Kootenai National Forest. However, under the Endangered Species Act (Section 7(a)(1)), the Forest is obligated to use its authorities to aid in the

recovery process and to consult with the USFWS on all proposed or authorized activities. All proposed projects and activities evaluated by the Forest in FY 07 were found to have No Effect on the species.
In 2006, the USFWS issued a biological opinion regarding the Army Corps of Engineers' and the Bonneville Power Administration's proposed operation of Libby Dam and its effect on the Kootenai River white sturgeon and its critical habitat (USFWS 2006). Although the proposed action includes provisions for augmenting flows, creating appropriate water depths, and for increasing the amount of rocky substrate within a portion of sturgeon breeding habitat, these actions are experimental, the schedule for their implementation is not well defined, and their effects on the sturgeon are uncertain. The final opinion includes findings that the proposed action will jeopardize the continued existence of the Kootenai River white sturgeon and adversely modify its critical habitat.

Ongoing population research on the white sturgeon has indicated that from nine to 20 spawning events occur annually in the Kootenai River and many viable embryos are produced (Paragamian and Wakkinen 2002). Most of the post-Libby Dam spawning events have been documented in areas where substrate conditions appear to be unsuitable for egg incubation and larval rearing (Paragamian et al. 2001). No larvae and very few wild juveniles have been collected despite years of intensive sampling (Rust and Wakkinen 2005). Releases of hatchery reared juveniles (as young as nine months of age at release) consistently exhibit successful growth, and second year survival rates exceed 90% (Ireland et al. 2002). Between 1992 and 2004, the Kootenai River sturgeon population has been augmented with nearly 47,000 juveniles (age 1 and 2) from the Kootenai Tribe of Idaho Conservation Aquaculture Facility and the Kootenai Sturgeon Hatchery. The most recent population estimate in 2006, from the Idaho Department of Fish and Game indicates there are approximately 450 adult sturgeons in the population (Paragamian et al. 2005).

Bull trout -- The Kootenai National Forest continues to consult with the USFWS on all proposed activities under Section 7(a)(2) of the Endangered Species Act. The Forest also works closely with the five other western Montana National Forests, Bureau of Land Management and the USFWS to implement Programmatic Biological Assessments and maintain consistency for consultation standards.

For 07 there were three placer mining projects proposed on Libby Creek that were submitted to the USFWS for formal consultation. The determination of the biological assessments in all cases was: May Affect, Likely to Adversely Affect bull trout. This work included instream suction dredging in known bull trout rearing habitat. Additionally, Mineral Management Corporation's, Montanore Project to develop the Libby Creek adit was also submitted to the USFWS for formal consultation as it was determined that implementation of the grizzly mitigation package would have adverse impacts on bull trout and bull trout critical habitat.

The Forest continues to work closely with Montana Department of Fish Wildlife and Parks, Idaho Department of Fish and Game, Avista, and the USFWS to determine distribution and abundance of bull trout within the boundaries of the Kootenai National Forest. This includes yearly surveys to identify the number of redds and spawning adults in several streams across the Forest. Table C-7-4 below shows the number of bull trout redds surveyed in 2007. Redd numbers in Keeler Creek, Grave Creek, O'Brien Creek and the US portion of the Wigwam River were up, the remainder of the streams showed a general decrease in redd numbers. Pipe Creek had no redds.

Table C-7-4. 2007 Redd Survey Data.

Stream	Number of Bull Trout Redds
Upper Wigwam	33
Keeler Creek	84
Pipe Creek	0
O'Brien Creek	77
Grave Creek	208
Quartz Creek	50
Bear Creek	9
West Fisher River	18
North Callahan Creek	3
South Callahan Creek	0
Vermilion River	24
Marten Creek	1
Bull River	NA
South Fork Bull River	3
East Fork Bull River	9
Swamp Creek	7
Rock Creek	4

Recommended Actions: Based upon the best available information, populations of all threatened or endangered terrestrial species, except grizzly bear, on the Kootenai are stable or increasing. The bald eagle was removed from the threatened and endangered list in August 2007. All of the threatened and endangered species' habitats being monitored appear to be maintaining or improving. Information shows that the Kootenai National Forest is progressing toward providing adequate habitat for threatened and endangered species recovery. Based on review of this item, specific changes to Forest Plan direction are not needed at this time. It is recommended that the Forest continue to implement recovery actions and actively seek to improve habitat conditions for listed species populations. It is further recommended that the Forest increase information and education efforts related to grizzly bears, especially food attractants. It is also recommended that the Forest increase cooperative efforts with county officials to place bear resistant dumpsters to reduce grizzly bear mortality risks due to food attractants.

Lastly, it is recommended that the Forest continue to implement recovery actions under Section 10(a)(1)(A) and actively seek to improve connectivity of bull trout populations.

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WILDLIFE & FISHERIES: Indicator Species; Monitoring Item C-8

ACTION OR EFFECT TO BE MEASURED:	Determine habitat and population trends for viable populations of indicator species.
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	Any reduction approaching minimum habitat needed for viable population levels (40% of potential population).

Purpose: This monitoring item was established to help ensure that habitat was provided for the identified indicator species on the Forest. The Forest Plan requires that this item be reported once every five years. The expected accuracy and reliability of the information is moderate.

Background: The list of indicator species on the Kootenai Forest can be found in Volume 2, Appendix 12 of the Plan. The species include grizzly bear**,** gray wolf, bald eagle, peregrine falcon, elk, whitetail deer, mountain goat, and pileated woodpecker.

Results and Evaluation (by species):

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% of the CYE is located on the western portion of the Forest and about 4% of the NCDE is located in the extreme northeast corner. Grizzly bear habitat effectiveness improved over the last 20 years and is above the desired level of 70% Forest-wide, although some BMUs remain below this level. Sightings of female grizzly bears have increased, as well as their distribution. There were 6 mortalities in the last six years in the Kootenai portion of the CYE and an additional 8 in the British Columbia, Canada portion. One died in the KNF portion of the NCDE. Based on this analysis (see C-7) grizzly bear habitat is improving. The CYE population has a 94% probability that it is declining (Kasworm et. al 2007), while the NCDE population appears to be increasing. More complete information about the monitoring for grizzly bear habitat and population can be found in Monitoring Item C-7.

Gray Wolf: The Wolf Recovery Plan (USFWS, 1987) provides guidance for the recovery of the gray wolf. There is one recovery area within and adjacent to the Kootenai Forest (the Northwest Montana Recovery Area). The recovery goal for this area is 10 wolf packs.

Over the past 20 years, reports of wolf sightings have varied with an increase over the past 5 years. Sightings were noted in areas on all Ranger Districts. Many of these were sightings of individuals from known packs (see Item C-7). In addition, new pack activity was confirmed on the Forest (see Item C-7). Most of the components of wolf habitat on the Kootenai did not change significantly in 2007 compared to previous years. However, big game populations, which are the primary prey for wolves, have recovered from declines caused by the severe winter of 1996-97 (see monitoring items C-2, and C-7). At this time, wolf populations are increasing and adequate habitat is provided for their primary prey base.

Bald Eagle: The bald eagle was removed from the list of threatened and endangered species in August 2007. The Montana Bald Eagle Management Plan (MBEWG, 1994) now provides guidance for bald eagle management. This plan establishes guidance to assure compliance with the Bald and Golden Eagle Protection Act.

Bald eagle habitat is generally within one mile of major lakes and rivers. Habitat quality and quantity on the Kootenai is stable, and may be increasing in the long term as potential nest trees mature. Monitoring Item C-7 shows the results of mid-winter bald eagle surveys which occur mostly along major watercourses both on the Forest and on adjacent ownerships. Although the results vary somewhat from year to year due to varying weather conditions, the surveys indicate stable numbers of wintering bald eagles during the reporting period. Nesting surveys show an increasing nesting eagle population.

Peregrine Falcon: One or two peregrine falcons per year are observed on average on the Kootenai National Forest. Nesting activity was confirmed during this last 5 year monitoring period. Two nest sites were confirmed and a third suspected. 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. Peregrine falcons appear to be maintaining their rare presence on the Kootenai.

Elk: The aerial survey data on elk numbers show an increase since the last 5 year report (2002). The numbers of elk observed during surveys increased from 1778 in 2002 to 1951 in 2007, with incremental increases each of the last 5 years. The number of calves per 100 cows remained about the same, going from 31 (2002) to 28 (2007). Elk populations increased through 1990 or 1991 and then had a gradual decrease until 1997. The downward trend appears to have changed over the previous 5 year reporting period (1998-2002). More information is found in Monitoring Item C-2. Elk habitat has been improving over the past 5 years (see Item C-1 for details).

Whitetail Deer: This species is the most widespread and abundant big game animal on the Forest. The whitetail deer numbers show a significant recovery from the effects of the severe winter conditions of 1996-1997. Montana Fish, Wildlife and Parks officials have restored the week long either sex whitetail season in all hunting districts that cover the Kootenai National Forest. Habitat conditions for whitetail deer show improvement in some areas (i.e. better security due to access management changes – see Item C-1) and slight declines in others (i.e. reductions of cover on winter range due to management activities designed to reduce fuels in the urban interface and activities on private land such as subdivision).

An “up-and-down” pattern in whitetail populations is typical of how the species responds to weather conditions in northern heavy-snow regions, and does not appear to be directly related to management actions of the Forest Plan standards for winter range. The standards emphasize small opening sizes and retention of cover, and would tend to buffer winter population fluctuations to some degree.

Mountain Goat: This species is limited primarily to rugged topography in the East and West Cabinet Mountain ranges. The habitat trend is static to possibly decreasing in the long term. Any decrease is due to continuing vegetative succession resulting from a lack of periodic wildfires or prescribed burning at higher elevations. Because primary mountain goat habitat is located at high elevations and the Forest Plan has allocated these lands to non-commodity uses, management activities (other than fire suppression) are not a major concern. Goat numbers are up over the past ten years (personal communication: Jerry Brown 2/13/2008).

Pileated Woodpecker: 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. Additional information is being collected through the R-1 Landbird Monitoring Program and through sampling special paired monitoring sites to begin assessing the effects of intermediate timber harvest on pileated woodpeckers. The landbird monitoring results for the Northern Region, 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. In addition, monitoring items C-5 Old Growth Habitat, and C-6 Cavity Habitat indicate that we are on-track with providing the necessary habitat for this species. See Monitoring Item C-4 (old growth species) for more information.

Recommended Actions: The results for these indicator species generally show stable or increased sightings during the last 20 years of monitoring. Elk and whitetail deer show an increase since the last reporting period. Additional monitoring is needed to determine if this trend continues. All of the species' habitats appear to be maintaining or improving. The information shows that the Kootenai National Forest is maintaining or progressing toward providing adequate habitat for these indicator species.

Based on review of this item, specific changes to Forest Plan direction are not needed at this time. However, the Forest is in the process of revising the Forest Plan. Revision efforts will review the species used as management indicators.

RANGE: Noxious Weed Infestations; Monitoring Item D-2

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

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

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

Background: The Forest Plan states that noxious weed infestations will be monitored for increases in total acreage, increases in weed density and the introduction of new weed species on the Forest. In some areas, weed infestations have been established along many roadsides, railroad and power line rights-of-way and other disturbed areas such as gravel pits. Spotted knapweed, tansy ragwort, rush skeleton weed, and other weed species have migrated away from the road right-of-way onto undisturbed hillsides, especially within the drier vegetation types. Orange hawkweed has increased a presence on moist habitat types under full canopies and is converging on the edges of the Cabinet Mountain Wilderness. Weeds are also becoming established in harvest units where the seeds have been brought by machinery and other vectors such as wildlife, cattle, railcars, and/or wind. The Forest completed a Final Environmental Impact Statement (FEIS) in 2007 with a subsequent Record of Decision signed in April of 2007. The primary purpose of this decision is to reduce the impacts of noxious weeds and restore native plant communities.

Table D-2-1 shows the types of weeds that occur on the Forest and their respective category.

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

Category	Status	Threat	Goal	***Species Included***	
Category 1. *Established infestations*	Large and widespread populations	High probability of causing severe economic and environmental damage	Contain inside infested areas and reduce plant populations	common burdock	*Arctium minus*
				absinth wormwood	*Artemisia absinthium*
				cheatgrass	*Bromus tectorum*
				diffuse knapweed	*Centaurea diffusa*
				spotted knapweed	*Centaurea maculosa*
				oxeye daisy	*Chrysanthemum leucanthemum*
				Canada thistle	*Cirsium arvense*
				field bindweed	*Convolvulus arvensis*
				common hound's-tongue	*Cynoglossum officinale*
				orange hawkweed	*Hieracium aurantiacum*
				meadow hawlweed complex	*Hieracium piloselloides*
				common St. John's-wort	*Hypericum perforatum*
				yellow hawkweed	*Hieracium pratense*
				sulfur cinquefoil	*Potentilla rectum*

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

Category	Status	Threat	Goal	***Species Included***	
				common tansy	*Tanacetum vulgare*
				mullein	*Verbascum spp.*
				Germander speedwell	*Veronica chamaedrys*
				common speedwell	*Veronica officianlis*
Category 2. *New Invaders*	Small and medium populations at limited sites	High probability of causing severe economic and environmental damage	Eradicate small infestations and reduce larger infestations	bugloss	*Anchusa officinalis*
				white bryony	*Bryonia alba*
				whitetop (hoarycress)	*Cardaria draba*
				musk thistle	*Carduus nutans*
				meadow knapweed	*Centaurea pratensis*
				Russian knapweed	*Centaurea repens*
				dwarf snapdragon	*Chaenorrhinum minus*
				rush skeletonweed	*Chondrilla juncea*
				chicory	*Cichorium intybus*
				poison-hemlock	*Conium maculatum*
				Scot's broom	*Cytisus scoparius*
				blueweed	*Echium vulgare*
				Russian olive	*Elaeagnus augustifolia*
				leafy spurge	*Euphorbia esula*
				spotted cat's-ear	*Hypochaeris radicata*
				kochia	*Kochia scoparia*
				Dalmatian toadflax	*Linaria Dalmatica*
				yellow toadflax	*Linaria vulgaris*
				scentless chamomile	*Matricaria maritima agrestis*
				Scotch thistle	*Onopordum acanthium*
				Japanese knotweed	*Polygonum cuspidatum*
				tall buttercup	*Ranunculus acris*
				tansy ragwort	*Senecio jacobaea*
Category 3. *Potential invaders*	Not known to occur	high probability of causing severe economic or environmental damage	Prevent and eradicate promptly, if found	plumeless thistle	*Carduus acanthoides*
				yellow starthistle	*Centaurea solstitialis*
				common crupina	*Crupina vulgaris*
				Dyer's woad	*Isatis tinctoria*
				purple loosestrife	*Lythrum salicaria*
				Eurasian watermilfoil	*Myriophyllum spicatum*
				tamarisk	*Tamarix* spp.

Nomenclature for vascular plants follows Hitchcock and Cronquist (1973) and for bio-agents follows Rees et al. (1996).

Evaluation: All weed species listed in Table D-2-1 are of concern on the Kootenai National Forest (KNF). This list includes the State of Montana and Lincoln County lists as well as other weed species that the Forest considers important. The State of Montana and Lincoln County are very concerned about new invaders, especially three relatively new weed invaders--tansy ragwort, rush skeleton weed, and orange hawkweed. There is a strong desire to keep these species from moving east of the Continental Divide into the large farming areas of central and eastern Montana. The State has provided added monies for surveys and spraying to contain the expansion of these species and to eradicate them. Even though strong

emphasis is placed on these species, concern remains for all the other weed species listed. Control is not confined to the three species above. Treatments for all weed species is an Integrated Pest Management approach that includes one, or a combination, of the following: biological--release of bio-agents; mechanical--hand pulling, hoeing, clipping of seed heads, etc.; chemical--application of herbicides; and cultural--establishment of desirable plants as competition.

The 2007 Weeds FEIS and Record of Decision places the emphasis on an integrated aerial and ground weed control operation. Existing weed infestations have expanded greatly in numbers, aerial extent, and diversity over the past 25 years. The most common weed on the KNF is spotted knapweed. In 1995, county weed specialists estimated that knapweed infested over 240,000 acres in Lincoln County and 175,000 acres in Sanders County (Hirsch and Leitch 1996). The current estimate is over 300,000 acres in Lincoln County (2007 Weeds FEIS). Two-thirds of the total infestations are in forestlands and rangelands, with the remaining third in road or railway corridors.

Many of our weeds are located along roads, utility corridors, railroad corridors and other disturbed areas such as campgrounds, burned areas and electronic sites. Weeds have migrated from corridors into undisturbed areas including winter game ranges and trails into the Cabinet Mountain Wilderness area. Weed risk on the Kootenai, as documented in the 2007 Weeds FEIS, estimates that with current levels of disturbance, 63% of the Forest (1,400,800 acres) are at high risk, with 27% (603,800 acres) at moderate risk.

Orange and meadow hawkweeds, oxeye daisy, and common St. John's-wort have made significant increases in the last ten years in areas across the Forest. Orange hawkweed continues to spread within some habitat types and under moist, shaded canopies. Orange hawkweed and oxeye daisy are the main weed threats to the Cabinet Wilderness, brought in along trails. The toadflaxes, absinth wormwood, and common hound's-tongue are also increasing in different parts of the Forest. Blue weed has been observed in recent harvest units in the Clark Fork Valley area.

Inventory: Six hundred ninety-six weed surveys were completed in 2007. Table D-2-2 summarizes the percent of a weed species found within each surveyed area. The surveys note each noxious weed species seen in the survey (from the KNF list of weed species) as well as the predominant infestation size and cover class, or density, of each species. Weeds listed on table D-2-1 are those currently being tracked by the KNF. Surveys were of a general type that took note of weed species on roads traveled, trails, and into the general forest environment.

Table D-2-2 displays the information from the surveys discussed in the preceding paragraph. Infestation sizes were noted and characterized as one of the following:<.1 acre, .1 to 1 acre, 1 to 5 acres, and > 5 acres. Cover classes (plant densities) were characterized as trace (<1%), low (1 to 5%), medium (6 to 25%), or high (>25%).

Table D-2-2

Species (*Six Letter Code*)	% of Surveys with this Species	Predominant Infestation Size	Predominant Cover Class
I Established Infestations			
Common burdock (*Arcmin*)	*		
Absinth wormwood (*Artabs*)	2	.1 to 1-5 acre	medium
Diffuse knapweed (*Cendif*)	3	<.1	trace
Cheatgrass *(Brotec)*	*		
Diffuse knapweed *(Cendiff)*	*		
Spotted knapweed (*Cenmac*)	444	<.1 to 1-5 acre	low to high
Oxeye daisy (*Chrleu*)	291	.1-1 acre	med
Canada thistle (*Cirarv*)	135	<.1 ac	trace to low
Field bindweed *(Conarv)*	*		
Common hound's-tongue *(Cynoff)*	11	.1-1 acre	low to med
Orange hawkweed (*Hieaur*)	217	.1-1 to 5 acre	low to med
Meadow hawlweed complex (Hiepil)	1	<.1- 1 acre	trace
Common St. John's-wort (Hypper)	187	<.1-1 acre	low to med
Yellow hawkweed (Hiepra)	*		
Sulfur cinquefoil (Potrec)	56	<.1 ac	trace to low
Common tansy (Tanvul)	96	<.1-1 acre	trace to med
Mullein (Verbas)	*		
Germander speedwell (Vercha)	*		
Common speedwell (Veroff)	0		
2 New Invaders			
Bugloss (*Ancoff*)	*		
White bryony *(Bryalb)*	*		
Whitetop (*Cardra*)	*		
Musk thistle (*Carnut*)	1	<.1	trace
Meadow knapweed (*Cenpra*)	1	<.1- 1 acre	trace
Russian knapweed (*Cenrep*)	*		
Dwarf snapdragon (*Chamin*)	*		
Rush skeletonweed (*Chojun*)	36	<.1	trace
Chicory (*Cicint*)	8	<.1 ac	trace
Poison-hemlock (*Conmac*)	*		
Scot's broom (*Cytsco*)	*		
Blueweed (Viper's bugloss) (*Echvul*)	14	<.1	
Russian olive *(Elaang)*	*		
Leafy spurge (*Eupesu*)	3	<.1	trace
Spotted cat's-ear (*Hyprad*)	0		
Kochia (Kochia)	*		
Dalmatian toadflax (Lindal)	45	.1-1 acre	low
Yellow toadflax (Linvul)	2	<.1 acre	low to high
Scentless chamomile (Matagr)	*		
Scotch thistle (Onoaca)	0	.	.
Japanese knotweed (Polcus)	*		
Tall buttercup (Ranacr)	*		
Tansy ragwort (Senjac)	54	<.1 acre	trace to low
3 Potential Invaders			
Plumeless thistle (*Caraca*)	*		

Species (*Six Letter Code*)	% of Surveys with this Species	Predominant Infestation Size	Predominant Cover Class
Yellow starthistle (*Censol*)	*		
Common crupina (*Cruvul*)	*		
Dyers woad (*Isatin*)	*		
Purple loosestrife (*Lytsal*)	*		
Eurasian milfoil (*Myrspi*)	*		
Tamarisk (*Tamarix spp.*)	*		

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

Change over time can be measured by observing changes in percent of surveys with each species present, and by observing changes in the most common size and density of those populations. The monitoring report for FY 2003-2004 (published in 2005) , Table D-2-2 showed that spotted knapweed, common St. John's-wort, meadow hawkweed, Canada thistle, orange hawkweed, common hound's-tongue, and oxeye daisy were the most common weed species present on the KNF, all having been recorded on over 30% of the surveys conducted. Canada thistle, spotted knapweed, and bull thistle were the most prevalent. The report continued with: "Many weed species are just becoming established, such as rush skeleton weed, blue weed, chicory, kochia, Dalmatian and yellow toadflaxes, common and germander speedwells, scentless chamomile, and tall buttercup. Common St. John's-wort, orange hawkweed, rush skeleton weed, common tansy, and oxeye daisy…" This year's monitoring report indicates that species common two years ago have dramatically increased in presence and cover. Spotted knapweed, oxeye daisy, orange hawkweed, meadow hawkweed, St. John's-wort, sulfur cinquefoil, and common tansy have increased 3 to 5 times over the amount found indicated in the 2003-2004 report. Predominant infestation size and cover class has for most of these species has also increased overall.

Table D-2-3 describes the average infestation size and density for each of the weed categories (established infestations, new invaders, and potential invaders) and then gives the overall average for all weeds tracked by the Forest. For this monitoring period, the overall infestation size has shifted and larger populations have been identified; the overall density class has also increased. Category 1 (established infestations) are the most abundant and cover the largest land area. Weeds are most numerous in the .1 to 1 acre size category and also most numerous in the medium density class.

The results in Table D-2-3 were calculated by dividing the total number of recorded weed infestations in each category (size class and density class) by the total number of recorded weed infestations in each category. This gives a percentage of the total weeds in each category found in each size and density class. This same process was used to calculate the overall average, adding up weed infestations in all categories by their infestation sizes and densities, and dividing by the total weed infestations recorded.

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

	Infestation Size				Infestation Density			
Weed Category	Number/% <.1 acre	Number/ %.1-1 ac	Number/% 1-5 acres	Number/ % >5 acres	Number/ % Trace	Number/ % Low	Number/ % Medium	Number/ % High
Category 1 (Established Infestations)	175/68%	472/90%	358/98%	81/96%	127/71%	265/77%	559/97%	113/97%
Category 2 (New Invaders)	83/32%	52/10%	6/2%	3/47%	51/29%	77/33%	15/3%	3/3%
Category 3 (Potential Invaders)	0	0	0	0	0	0	0	0
Overall Average	258/37%	524/75%	364/52%	84/12%	178/26%	342/49%	574/83%	116/17%

Implementation:
The KNF's present weed management program is an Integrated Pest Management (IPM) approach that combines prevention, education, and biological, mechanical, cultural, and chemical control of weeds. Biological control (bio-control) has been a method of weed control across much of the Forest since 1987. Twenty-one bio-agents as well as two fungi have been released in the KNF (Lincoln County area). Since 1987 the KNF, in cooperation with the Western Agricultural Research Center (WARC) and other agencies and entities, has made approximately 250 releases (Table D-2-4) of bio-control agents and fungi. Each release contains 50 to 200 insects. Weed species currently under biological control include spotted knapweed, Dalmation and yellow toadflax, St. John's-wort, musk thistle, Canada thistle, leafy spurge, and tansy ragwort. Biological control for the hawkweeds are currently under development and may be available within the next 10 years. Due to the length of time required to locate a plant's natural enemy and the required quarantined period, noxious weeds normally gain a very competitive edge over the bio-agents (biological control agents).

Knapweed root weevils, moths, gall flies, and other agents were released over 300 acres in 2005, 500 acres in 2006, and 1500 acres in 2007. Seed flies and cinnabar moths for tansy ragwort control covered 50,000 acres in 2005; 100,000 in 2006; and 300,000 acres in 2007. Dalmatian toadflax moths and weevils were released over 100 acres in 2007. Bio-agents will attack various plant parts, such as roots, seeds, flowers, and buds.

Bio-controls have advantages and disadvantages. If bio-controls 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 bio-control populations to become large enough to impact the host weed. Other insects and animals may also prey upon Bio-controls. Some bio-controls may be limited by climatic and environmental conditions (rainfall, cold, shade etc.). Bio-controls usually do not eradicate the host weed completely and are often required in very large numbers to significantly affect the host. Thus, bio-controls are best used on existing, widespread weed infestations and not on new invader species for which the goal is eradication (2007 Weeds EIS).

The following table indicates the number of bio-agents released and the year of release.

Table D-2-4 Number of bio-agents released per year

Year	1987	1988	1989	1990	1991	1992	1993	1994	1995
No.	2	6	4	4	10	10	12	14	28

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004
No.	58	40	11	38	2	6	4	3	6
Year	2005*	2006*	2007*						
No.	100,600	900	22,200						

*2005, 2006, 2007 source of information - Larry Benson, Lincoln County Coordinator, Eureka, Montana (2008).

Effectiveness:
In many cases the effect of the releases has been minimal thus far, although the bio-agent populations have been building and the increase in weeds has slowed in some areas. Bio-control has not measurably reduced populations of knapweed, common St. John's-wort, Canada thistle, or toadflax on the KNF, probably because populations of the bio-control agents are still very small relative to the size of the weed infestations. There is observational evidence that bio-control agents have slowed the rate of knapweed, Dalmation and yellow toadflax, and tansy ragwort spread and, with continued releases and reproduction, these and other bio-control insects may, over time, begin to reduce existing weed populations. (2007 Weeds EIS).

Various spot checks have shown that larvae of the released bio-agents can readily be found. The Northern Region office of Cooperative Forestry and Forest Health Protection (CFFHP) Department continues to monitor the survival of released bio-agents (*Agapeta zoegana* and *Cyphocleonus achates)*. Of the over 25-bioagent release sites checked, all had larvae and/or adults of the bio-agents present. A determination was made that at least ten of the sites have populations sufficient to use as insectaries (a population large enough to collect insects for transfer to other sites). A local insectary is beneficial as these insects have adapted the best to conditions of the local area.

Biological control agents have not proven to effectively control new infestations because populations are generally small and scattered or because effective bio-control agents have not been found (2007 Weeds EIS). 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.

Herbicide Application

Implementation:
In 2006/2007 approximately 4715 acres were treated with herbicides to specifically control invasive species, the majority being composed of: rush skeleton weed, spotted knapweed, Canada thistle, Dalmatian and yellow toadflax, leafy spurge, absinth wormwood, and tansy ragwort. These applications also reduced populations of diffuse knapweed, sulfur cinquefoil, oxeye daisy, common St. John's wort, orange hawkweed, and meadow hawkweed. In the last 10 years more than 30,000 acres have been sprayed for spotted knapweed, leafy spurge, Dalmatian and yellow toadflax, rush skeleton weed, tansy ragwort, orange hawkweed, meadow hawkweed, oxeye daisy, absinth wormwood, Canada thistle, sulfur cinquefoil, common tansy, Russian knapweed, and diffuse knapweed.

Effectiveness:

Monitoring of the rush skeleton weed populations by Lincoln County has shown that Tordon 22K is effective against this species. Follow-up spraying of individual plants that were not sprayed because they were missed earlier, or germinated later in the year has been found to be a key element in the control of this species.

The KNF has used herbicides to control noxious weeds with success. Spraying of roadsides, administrative sites, and gravel pits has visibly reduced weed populations in many areas and prevented weeds from spreading to un-infested areas. The Kootenai spends approximately $200,000 per year for the weed control program with an annual accomplishment of 600 to 900 acres of forest land treated with herbicides and other integrated methods. Since the last monitoring report, over 2,500 miles of roads, have been treated annually.

Mechanical and Cultural Implementation:
Seed heads of tansy ragwort are clipped along roadways and recreation areas. Seed heads of rush skeleton weed are clipped and then the remainder of the plant is sprayed. Areas of Dalmatian toadflax are hand pulled. In 2004, 2005, and 2006, orange hawkweed plants were pulled within the Hoskins Lake Research Natural Area, specifically adjacent to the lake and the hiking path. All these plants and plant parts are burned. Weeds were pulled by hand during the field seasons of 2006 and 2007 throughout the Cabinet Wilderness trail system.

Effectiveness:
The KNF's mechanical and cultural control efforts have not effectively contained or reduced widespread noxious weed infestations. In most cases, 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 and 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 has been proven to be ineffective on weeds with deep taproots and weeds which reproduce through runners or shoots, such as rush skeleton weed 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 (2007 Weeds EIS).

Most soil-disturbing activities on the KNF require reseeding of exposed soil. Though reseeding is done principally to prevent erosion, it does inhibit invasion of disturbed sites by noxious weeds. The KNF requires seed to be certified "noxious weed free." In addition, the KNF has established a native seed bank to assist in restoring disturbed sites. Reseeding and re-vegetation has prevented weeds from spreading onto many disturbed sites. However, these practices have not effectively prevented existing infestations from spreading and 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 is expected to continue to help prevent the establishment of new weeds to disturbed sites.

NEW INVADERS

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

Tansy ragwort exploded after the Little Wolf Fire in 1994. A cooperative program between the State of Montana Lands Division, Plum Creek Timber Company, Bonneville Power Administration, Lincoln County, Flathead County, KNF, Flathead National Forest, U.S. Fish and Wildlife Service, Montana Department of Agriculture, and private land owners has been in effect since 1996 to contain tansy in the Little Wolf/Upper Good vicinity. Through an IPM program of biological, mechanical, cultural, and chemical factors these entities are working hard to contain tansy. Other than some new isolated sites, located approximately 20 air miles to the northeast, tansy has remained in the Little Wolf/Island Lake area on the KNF and the Upper Good area on the FNF. The main strategy has been to eliminate new populations located away from the main population and contain the main population. Spraying has been used for the outlying populations and bio-agent releases for the main population. This strategy of bio-agent release in the center of the infestation, spraying of the perimeter populations and clipping adjacent to water bodies has been very successful in containing tansy ragwort.

Conclusion:

Table D-2-4 Percentage Comparison of Weed Infestation Size and Density for 2003/2004 and Present

	Infestation Size				Infestation Density			
Weed Category	**Number /% <.1 acre**	**Number /%.1-1 ac**	**Number /% 1-5 acres**	**Number /% >5 acres**	**Number /% Trace**	**Number /% Low**	**Number /% Medium**	**Number/% High**
Overall Average 2003-2004	40/67%	32/22%	20/9%	8/3%	34/56%	25/23%	22/15%	19/7%
Overall Average Current	258/37%	524/75%	364/52%	84/12%	178/26%	342/49%	574/83%	116/17%

Monitoring indicates that noxious weed species (see Table D-2-4) have increased in overall numbers and area infested. Based on this, this monitoring item is outside the range prescribed in the Forest Plan. The Forest continues to implement strategies to reduce the spread of noxious weeds and in many areas weed populations have been visibly reduced and weeds have been prevented from spreading to un-infested areas.

Recommended Actions: There is the potential to treat more acres more efficiently and effectively than before, with more versatility in methods and techniques of weed control. The recommended action is to implement the Forest's 2007 Weeds Decision and continue to monitor, in conjunction with implementation of the Forest's Environmental Management System.

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

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

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

Background: The ASQ is a projected maximum or ceiling. The Forest's projected total maximum timber sell volume for the decade from suitable management areas is 2,270 million board feet (MMBF), which is an average of 227 MMBF per year (see Forest Plan, Appendix 11). In addition, 60 MMBF was estimated to be sold from unsuitable management areas, averaging six MMBF per year. These two components of suitable and unsuitable sell volumes comprised the total potential timber sale program of 2.3 billion board feet for the decade, or an average of 233 MMBF per year.

In November 1995, the Chief of the Forest Service issued a decision on a Forest Plan appeal related to a technical error in the calculation of the Forest's ASQ. The issue centered on how timber age classes were cataloged in the inventory information used to calculate ASQ. A description of the problem is in the FY 92 Monitoring Report. The decision required that the Forest is not to exceed a sell volume of 150 MMBF per year until the Plan is either amended or revised.

Results: Table E-1-1 shows that sell volumes have declined from approximately 200 MMBF per year in FY 88 to approximately 65 MMBF per year in FY 05 and 34 MMBF in FY 07. For the past 20 years, the average yearly amount sold has been 86.6 MMBF per year. This actual sell volume is below the ASQ limit as set in the Plan.

Evaluation: After 20 years of implementation, the trend of decreasing sell volume is continuing. In the FY 92 and FY 97 Monitoring Reports, the Forest reported in detail on a number of factors that caused this decrease. Most of these factors are still influencing the sell volume. The first five years of implementation, sell volume was relatively high, averaging 161 MMBF/year (see the FY 92 Monitoring Report). During the second five years of implementation, sell volume averaged about 81 MMBF/year. The average for 1998-2002, the third five-year period, was 60.9 MMBF/year. The last five years has an average of 43.4 MMBF/year.

Many factors have influenced the timber sales program. The United States Fish and Wildlife Service (USFWS) amended the biological opinions for grizzly bear recovery in July 1995 and changed how recovery processes would take place on the Forest. The Inland Native Fish (INFS) Decision of July 1995 resulted in additional streamside protection measures. In general, it has become more difficult to plan and execute sales due to public controversy (appeal and litigation); protection of threatened and endangered species habitat, inability to enter inventoried roadless area, water quality concerns, and reduction in Forest budgets.

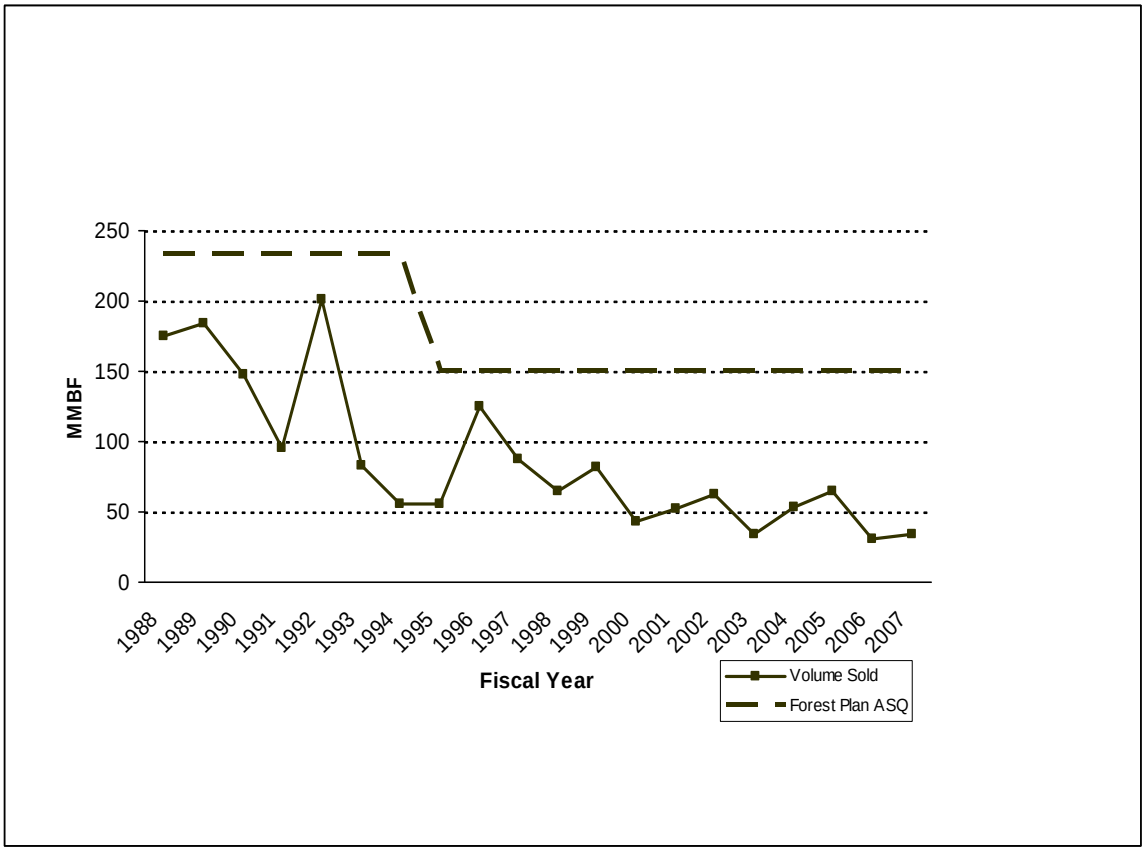
The evaluation limit for this monitoring item is plus or minus 5% for suitable volumes and plus or minus 10% for unsuitable volumes. These limits have been exceeded, and this indicates that evaluation of these

factors, which started in the FY 92 Monitoring Report, will need to continue during the revision of the Forest Plan.

Table E-1-1 Timber Sell Volume (MMBF) by Fiscal Year

Forest Plan Annual ASQ Projection, Adjusted ASQ	Average Sell Volume FY 88-92	Average Sell Volume FY 93- 97	Average Sell Volume FY 98- 02	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Average Sell Volume FY 02 - 07	Average Sell Volume FY 1988 - 2007
233 from 1988 – 1994 150 from 1995	161	81.4	60.9	34.0	53.4	65.2	30.6	33.7	43.4	86.6

Figure E-1-1 Timber Sell Volume Compared to ASQ



Recommended Actions: The Forest has not exceeded the ASQ in 20 years of implementation. However, large changes in the actual program levels versus the projections of the Forest Plan indicate that revision of the Plan will need to address the sustainability of the timber sale program.

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% 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 this item to be reported every five years. The expected accuracy and reliability of this 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 displacement, compaction, and puddling from the wheels of vehicles, the hooves of cattle, the weight of a dragged log, the equipment dragging the log, etc. These factors result in the reduction of pore space, which reduces the ability of water to move into and through the soil. The soil is especially vulnerable during wet weather and wet soil conditions. Pore space reduction means more overland flow which can result in surface erosion and/or mass soil movement. The soil 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 all the above conditions incur adverse affects on their hydrologic function and/or sustain actual losses in soil productivity.

Region 1 has a policy that allows up to 15% detrimental disturbance (FSH 2509.18, 5/1/94; updated 1999 FSM 2500 – Watershed and Air Management, R-1 Supplement No. 2500-99-1, Chap 2550 – Soil Management). The Kootenai Forest uses the 15% detrimental disturbance as a measure to track the impact on site productivity. If 15% of an area is significantly disturbed, then we can conclude that it has probably incurred a decrease in long-term site productivity.

Field monitoring prior to 2007 was done within activity areas (i.e. timber harvest units) using line transect and walk-through methods (patterned after Howes et al. 1983). The *line transect* was performed perpendicular to the direction of the ground-disturbing activity and involved from one to five transects within each activity area. Each step along the transect represented a monitoring point. Both quantitative and qualitative descriptions were provided. The *walk-through* method involved walking through the unit and providing a qualitative description of the soil impacts. Each transect represented the various activities that occurred within that portion of the activity area. The monitoring was representative of the variety of timber harvesting techniques that occurred on the Kootenai NF. The activities represented included: skyline/cable logging, forwarder logging, tractor logging (rubber tired skidders and tracked vehicles) and horse logging. Both summer and winter operational periods were included in the ground-based activities. Fuel reduction/site preparation activities have occurred in some of the surveyed units.

In 2007, under Regional Forester direction, the Kootenai along with other forests in Region 1 began using the *draft Northern Region Soil Disturbance Monitoring Protocol* (2007). This methodology is similar to what has been used on the Kootenai for the last 19 years; however, the two data sets are not statistically comparable, so for the purposes of this Report, the respective results for the two methodologies are reported separately. The new methodology requires determining soil disturbance at one of four levels along a random transect. The transect is monumented for future use and a minimum of 30 points is

collected equidistant (halfway) across the activity area along the transect. The intent is that this methodology would be repeatable and the data statistically defensible.

Results: Table F-4-4 & F-4-5 summarize the amount and type of harvest monitoring completed. Surveys have been completed on 462 (231 transects and 231 walk-throughs) timber harvest units scattered across the Forest between 1988 and 2006. These areas represent the current logging methods, including the types of equipment being used for mechanical falling, skidding, yarding, and slash piling. The areas ranged in size from two to 226 acres. Surveys have been completed by two methods: transect and walk-through.

The 1992 report showed that 49% of the 501 transected-acres surveyed to that point were above the Forest Plan variability limits of 15% detrimental disturbance. From 1993-2002, 11,945 acres have been surveyed and less than 1/10% (29 acres) was above the Forest Plan limits. Similarly, in the last five year reporting period (2003-2007) there were four units that exceeded 15% detrimental disturbance. Table F-4-3b shows the acres which have exceeded the 15% detrimental disturbance criteria. For the last five year period, there were 140 acres out of a total 3,300 acres surveyed or 4% of the activity areas monitored. Table F-4-1 displays the types of timber sales monitored from 1988-2007. Table F-4-2 displays the number of units by harvest types monitored from 1988-2007. Areas where cable logging methods were used show little or no detrimental disturbance. The use of forwarders and winter logging, also, result in very low to low detrimental disturbance. Areas where tractors were used resulted in a higher level of detrimental disturbance, however, were still within the desired levels. In general, the amount of heavily disturbed area increased directly with the number of machinery operations, the amount of area impacted, and/or the amount of moisture in the soil.

Table F-4-1 Types of Timber Sales Monitored

Sale Types	**88**	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**00**	**01**	**02**
Regular	2	2	1	3	10	9	3	7	8	5	12	4	3	3	20
Pest Control	2	3	1	2	4	3	0	0	8	7	7	14	2	1	2
Fire Salvage	0	5	10	9	0	4	0	0	4	11	3	0	0	0	1
Sale Types	**03**	**04**	**05**	**06**	**07**										
Regular	5	5	6	10	11										
Pest Control	1	0	0	0	1										
Fire Salvage	9	0	0	1	4										

Table F-4-2 Number of Units by Harvest Type

Sale Types	**88**	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**00**	**01**	**02**
Regular	5	6	1	7	17	19	6	15	13	9	20	7	4	7	47
Pest Control	5	5	1	2	9	5	0	0	15	14	14	25	2	2	2
Fire	0	9	19	16	0	10	0	0	11	21	4	0	0	0	1

Sale Types	**88**	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**00**	**01**	**02**
Salvage															
Sale Types	**03**	**04**	**05**	**06**	**07**										
Regular	10	11	19	25	20										
Pest Control	2	0	0	0	2										
Fire Salvage	18	0	0	1	8										

Evaluation:

1988-1992 Results: A total of 102 units (20 transects and 82 walk-throughs) were monitored during this time period. Only walk-through monitoring occurred during the first four years of this five year period. The 1992 Monitoring Report indicated that 49% of the line-transected surveyed acres, to that point, were beyond the Forest Plan variability limits. Twenty units on 10 sales were monitored. Eight units comprised of 245 acres contained more than 15% detrimental compaction. They ranged from 19 to 27%. The influence of past activities was observed in one of the units -unit one of the Good Creek P.C. Sale had 10% detrimental impact from the current activities. However, as a result of activity in the early sixties, another nine percent occurred at that time. The combination of the two activity periods, where trails were built both horizontally and vertically, resulted in 19% detrimental impact.

Some of the reasons for the activity areas beyond the Forest Plan variability limit of 15% detrimental disturbance were: the inclusion of small areas of steep terrain within areas of more gentle terrain which resulted in improper equipment being used on steep topography, some operations where dozer piling was required in the contract., and level of experience of the sale administrator(s) and/or logging operator(s).

1993-1997 Results: One hundred thirty-eight units within 69 sales were monitored during this five year period. Sixty-six units were line transects and 72 were walk-throughs. Of the 66 units, only 21 acres (one percent of measured acres) (one and one half units) were beyond the Forest Plan variability limits. The 66 units contained a total of 2022 acres. This reduction in acreage over the 15% level is mainly a result of far fewer acres that were "dozer piled." Other reasons include more winter logging, more broadcast burning, and more use of forwarder logging equipment. During this same period, walk-throughs were conducted on 72 units containing a total of 2,656 acres. The line transects represent approximately seven percent of the total harvested acres, while the walk-throughs represent about nine percent. The total of 2,499 acres surveyed from 1992-1997 represent about seven percent of the annual harvest acres. It is expected that the areas measured were representative of the entire Forest therefore, about 11% of logging and site preparation activities may have been beyond the variability limit of the Forest Plan. This number, however, is very misleading since only one percent of the harvest activities during the 1993-1997 periods were detrimentally impactive.

1998-2002 Results: One hundred thirty-six units within 72 sales were monitored during this five year period. Of the 74 line-transected units (2,417 acres) none were determined to be beyond the 15% detrimental disturbance level. During this same period, walk-throughs were conducted on 62 units containing a total of 2,314 acres. The walk-throughs and line transects represent approximately 11% of the harvested acres. Results displayed that in the year 2002, there was an increase in the “6-10” and “11-15” categories (Tables F-4-3a and F-4-3b). Part of the explanation was the number of units (11) that contained past activities.

2003-2006 Results: One hundred eleven units within 58 sales were monitored during this five year period. Of the 81 line-transected units (1,931 acres), two were determined to be beyond the 15% detrimental disturbance level. The two units that exceeded the 15% criteria were measured in 2005 and 2006. The total affected area was 9 acres out of 52 total acres for the two units. As noted in the year 2002, there continued to be an increase in the "6-10" and "11-15" categories which is attributable to units that contained past activities (Tables F-4-3a and F-4-3b).

2007 Results: This data was collected using a different methodology than the previous 19 years and although similar is not comparable. For 2007, 30 units from 16 sales were monitored for soil disturbance. Two of the 30 units exceeded the 15% detrimental disturbance criteria. The total area for the units was 21 acres, of which roughly seven acres had detrimental disturbance. Both units were required winter logging. The impacts were caused by logging activities that occurred when the ground was not frozen (Tables F-4-5).

Table F-4-3a Units by Soil Disturbance Category (Line Transect)

Disturbance Categories in Percent (%)	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02
< 6	0	0	0	0	0	5	3	8	12	17	17	10	0	1	6
6-10	0	0	0	0	6	4	0	1	6	5	9	4	0	2	14
11-15	0	0	0	0	6	5	.5	0	0	0	0	3	0	0	8
15 +	0	0	0	0	8	1	.5	0	0	0	0	0	0	0	0
Totals	0	0	0	0	20	15	4	9	18	22	26	17	0	3	28
	03	**04**	**05**	**06**	**07**										
< 6	8	4	12	11	17										
6-10	7	5	4	9	6										
11-15	0	2	2	5	5										
15 +	0	0	1	1	2										
Totals	15	11	19	26	30										

Table F-4-3b Acres by Detrimental Soil Disturbance Category (Line Transect)

Disturbance Categories in Percent (%)	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02
< 6	0	0	0	0	0	170	32	160	377	637	558	170	0	38	80
6-10	0	0	0	0	134	68	0	29	230	129	259	147	0	246	688
11-15	0	0	0	0	122	131	14	0	0	0	0	58	0	0	173
15 +	0	0	0	0	245	8	13	0	0	0	0	0	0	0	0
Totals	0	0	0	0	501	377	59	189	607	766	817	375	0	284	941
	03	**04**	**05**	**06**	**07**										
< 6	362	40	297	315	1108										
6-10	285	65	43	312	145										
11-15	23	9	21	102	33										
15 +	0	0	24	28	88										
Totals	670	114	385	757	1374										

Recommendations:
Performance for this monitoring is consistent with Forest Plan direction. Of the 141 units sampled in the last five year period, only four were determined to exceed 15% detrimental disturbance. In all cases, the reason for this exceedance was associated with required winter logging, occurring when conditions were not as prescribed. This level of impact can be avoided through diligent sale administration and increased operator awareness. This monitoring item is determined to be within the recommended range stated in the Forest Plan with four exceptions.

Ideally, the soil quality standards that would be used for measuring soil damage would be soil structure and soil productivity. Because these soil qualities are difficult to measure, other soil qualities are substituted. These surrogates are soil compaction, rutting, soil displacement, surface erosion, severely-burned soil, and soil mass movement.

Table F-4-4 Kootenai NF Soil Monitoring Summary

Year	Total No. of Sales	Total No. of Units	Total Acres	No. of Tran-sected Sales	No. of Tran-sected Units	No. of Transects	No. of Moni-toring Points	No. of Walk-thru Sales	No of Walk-thru Units
1988	4	10	316	0	0	0	0	4	10
1989	10	20	533	0	0	0	0	10	20
1990	12	21	718	0	0	0	0	12	21
1991	14	25	833	0	0	0	0	14	25
1992	14	26	637	10	20	68	6800	4	6
1993	16	34	935	6	14	31	7407	10	20
1994	3	6	115	2	4	8	1963	1	2
1995	7	15	343	4	9	18	4394	3	6
1996	20	39	1609	9	17	40	14004	11	22
1997	23	44	1676	13	22	47	15819	10	22
1998	22	38	1574	14	26	62	20520	8	12
1999	18	32	657	11	17	33	6918	7	15
2000	5	6	337	0	0	0	0	5	6
2001	4	9	520	1	3	12	4706	3	6
2002	23	51	1643	13	28	77	21037	10	23
2003	15	30	675	6	15	42	22183	9	15
2004	5	6	114	5	11	11	362	0	0
2005	11	19	385	11	19	19	372	0	0
2006	11	26	757	11	26	26	608	0	0
Totals	**237**	**457**	**14,377**	**116**	**231**	**494**	**126,721**	**121**	**231**

Table F-4-5 - Kootenai NF Soil Monitoring Summary using DRAFT R1 Monitoring Protocol.

Year	Total No. of Sales	Total No. of Units	Total Acres	No. of Tran-sected Sales	No. of Tran-sected Units		No. of Moni-toring Points	No. of Walk-through Sales	No. of Walk-through Units
2007*	16	30	1,374	16	30		1,306	0	0
Totals	**16**	**30**	**1,374**	**16**	**30**		**1,306**	**0**	**0**

*Region 1 adopted a new soil monitoring protocol (*draft Northern Region Soil Disturbance Monitoring Protocol*, 2007).

FACILITIES: Road Access Management; Monitoring Item L-1

ACTION OR EFFECT TO BE MEASURED:	The miles of road closed.
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	+/- 20% of the proportion of open to closed roads, as described in the Forest Plan, by the end of the first decade

Purpose: To see if the road closure objectives of the Forest Plan are being achieved. The Plan requires that this item be reported every five years. The expected accuracy and reliability of the information is high.

Background: Just prior to the time the Plan was approved in September, 1987, about 27% of the National Forest System roads had either yearlong or seasonal prohibitions in effect (Forest Plan FEIS, page IV-51). The Plan projected that in order to provide the issue resolution desired, about 57% of the roads would eventually need some form of prohibition. This would be about double the miles of road with prohibitions at the time the Plan was approved. The assumption was that the number of new roads needed to harvest timber would increase significantly, and that they would all have prohibitions in effect when the timber sales were completed -- the net result being an increase in the number of miles of road with prohibitions but the number of miles of roads without prohibitions would remain the same. The need for additional prohibitions was to protect dispersed recreation values, provide for wildlife security in big game winter and summer range, reduce road maintenance costs, and provide for grizzly bear recovery. Because of the significant increase in the amount of miles of road under prohibitions needed (from 27% to 57%), it was assumed that it would take about 10 years to accomplish. This is about an 11% increase each year to reach the planned level.

Evaluation: By FY 97, the objective of having prohibitions on approximately 57% of the Forest's roads (Forest Plan p. II-10) was achieved. By 2002, the percentage of existing roads with either yearlong or seasonal prohibitions reached 63%. In 2004, the percentage stabilized at 63% and continues to be stable through 2006. Table L-1-1 shows the progression. The roads with prohibitions are both yearlong and seasonal prohibitions. The percentage of roads with prohibitions is 6% greater than estimated, and the total amount roads without prohibitions are 1,590 miles less than was estimated in the 1987 Forest Plan. This is partly a result of the fact that new road construction was less than anticipated due to reductions in the timber sale program. Prohibitions have been placed on roads that previously had no prohibitions (which were not anticipated to have prohibitions in the Forest Plan) and on newly constructed roads. The reasons for these unanticipated prohibitions include additional wildlife habitat security measures, to decrease potential sedimentation, and to improve hydrological conditions. Table L-1-1 shows the total miles of road increasing by 494 miles between 1997 and 2002 (a 7% increase). Only 13.8 miles are from actual new road construction. The balance is a result of a more thorough accounting of previously uninventoried roads.

The trend over the last five years is that the number of roads where motor vehicle use is prohibited, either yearlong or seasonally, has started to level off. This is an indication that the Forest is approaching the necessary level of access management to achieve wildlife and watershed objectives.

Recommended Actions: Continue to monitor the mileage of roads with prohibitions and the reasons for the prohibitions.

Table L-1-1 Forest Roads Access Restrictions

FY	Total Miles of Road	Total Miles of Road with Prohibitions*	% of Total Roads with Prohibitions	Total Miles of Road without Prohibitions	Difference in Miles of Road without Prohibitions from FY 87
87	6,200	1,669	27%	4,530	0
92	7,149	3,784	53%	3,365	(1,165)
97	7,460	4,275	57%	3,185	(1,345)
02	7,954	4,982	63%	2,934	(1,596)
04	7,916	4,971	63%	2,945	(1,585)
06	7,908	4,968	63%	2,940	(1,590)
07**	7,888	4,983	63%	2,905	(1,645)

* National Forest System roads only, where motor vehicle use is prohibited either yearlong or seasonally.

** Data Source: Infra / II_MVUM_ROAD_ALLOW as of 12/05/2007

FACILITIES: Road Density; Monitoring Item L-2

ACTION OR EFFECT TO BE MEASURED:	Determine if the road densities predicted in the Plan are still valid.
VARIABILITY WHICH WOULD INITIATE FURTHER EVALUATION:	Any increase in road density over that predicted in the Forest Plan.

Purpose: This monitoring item was established because there was a strong public concern that the amounts of existing and planned roads were too numerous and that the cost to other resources (soil, water, wildlife, roadless recreation and economics) was too high. The Forest Plan requires that this item be reported every five years. The expected accuracy and reliability of the information is high.

Background: The monitoring item was designed to test the assumption of road density used in the FORPLAN computer model. This model calculated the total road mileage needed to access all suitable timberland. The maximum road densities projected in FORPLAN ranged from 4.4 to 5.8 miles per square mile, depending on the steepness of the terrain and the logging system used. These road densities were calculated from previous experience on the Forest during the 1970s. Also, a Forest goal was established to minimize the number of roads needed to manage the Forest (see Forest Plan, page II-1). As a result, it was anticipated that actual road densities would be less than or equal to the projected maximum.

Results: During the first 5 years of Forest Plan monitoring, the only way to measure road density was based on measurements made by Ranger Districts during project planning. This method is inherently incomplete, since only a small part of the Forest is sampled. In the FY 92 Monitoring Report, the road density for suitable lands was estimated to be 3.2 miles of road per square mile. During the next 10 years of Plan monitoring, the roads and management area information for the Forest's geographic information system (GIS) was completed, and it became possible to obtain an actual measurement of road density rather than a sample. In FY 97, the calculation for road density on suitable timberlands was 3.53 miles per square mile. As of FY 2002, this calculation showed that the road density for suitable lands is 3.34 miles per square mile. As of FY 2004, this calculation showed that the road density for suitable lands is 3.44 miles per square mile. This increase in density is the result of the decrease in the total number of acres of suitable timberlands (approx. 8,000 fewer acres) and the increase in total number of miles of roads (approximately154 miles) due to a more complete inventory of existing roads. As of FY 07, this calculation showed that the road density for suitable lands (lands suitable for timber production) is 3.49 miles per square mile. This increase in density is the result of the decrease in the total number of acres of suitable timberlands (approx. 3,800 fewer acres) due to management area allocation changes and the increase in total number of miles of roads (approximately 74 miles) due to a more complete accounting of existing roads.

Evaluation: The actual road density on suitable timberlands has been measured to be 3.49 miles per square mile, which is significantly less than the road density that is necessary to fully access all the suitable timberlands on the Forest as projected by FORPLAN. Given the decreased harvest levels of the Forest's current program in comparison to its program of 20 years ago, it is unlikely that there will be any significant increase in road density in the near term.

Recommended Actions: The Forest Plan goal is to construct the minimum number of roads to permit efficient removal of timber and mineral resources. This is continuing to occur; therefore no action is needed at this time.

The following table displays a list of approved project-specific Forest Plan amendments on the Kootenai National Forest.

Project Specific Amendments						
FY Year	**District**	**Date Signed**	**Decision Name**	**Standard Amended**	**Description**	**Years in effect**
1992	Rexford	05/07/92	Flat Creek	MA 15, TS #5	Placement of units adjacent to existing uncertified units	10 years
	Three Rivers	06/09/92	Arbo Creek	Exceed water yield, MA 12 ORD, MA 12 cover/forage ratios, allow timber salvage in MA 2	Water yield created by existing situation	ORD increase for this life of the sales; MA 2 salvage for the life of the sale, cover forage ratios for 10-15 years
	Three Rivers	06/09/92	4th of July	Exceed water yield, MA 12 ORD, MA 12 cover/forage ratios, allow timber salvage in MA 2	Water yield created by existing situation	ORD increase for this life of the sales; MA 2 salvage for the life of the sale, cover forage ratios for 10-15 years
1993	Rexford	7/23/93	Compartment 10	MA 12, FS#3	Exceed ORD until 1994	2 years
	Rexford	04/25/93	Dodge Creek Heli	MA 12, FS #3	Exceed ORD until 1994	2 years
	Rexford	10/20/92	Compartment 26	MA 12 WS#7 & TS #2	Not meeting hiding cover requirements due to harvest of dead LPP,	10-15 years
	Murphy Lake	07/12/93	Meadow View	MA 12, FS #3	ORD of 1.0 during sale; .75 after	2 years
	Libby	12/14/93	Purcell	MA 12 FS #3; MA 14 FS#4 in comp 504; MA 15/16/17/18, WS #2 in comp 503	ORD increase during project activities.	2 years
	Libby	06/14/93	Thomas/Gulch Rainy Blue	MA 12, FS #3	ORD of 3.3 (max) during Dec-Aug; .6 after	2 years
	Canoe Gulch	07/02/93	Weigel Creek	MA 12, FS #3	ORD of 1.9; .6 after	2 years
1994	Libby	04/29/94	Tepee Salvage	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
	Cabinet	10/19/93	Gray Woodchuck	MA 12, FS #3	ORD 1.85 during sale; .75 after	3 years

Project Specific Amendments						
FY Year	**District**	**Date Signed**	**Decision Name**	**Standard Amended**	**Description**	**Years in effect**
1995	Rexford	07/27/95	Webb	MA 12, FS #3	ORD 1.12 during sale; .44 after	2 years
	Rexford	01/05/95	Compartment 4	MA 12 TS #2 & WS #7	Harvest w/in movement corridors	10-15-years
	Rexford	01/05/95	Compartment 2	MA 12, FS #3	ORD 1.3 during sale; .75 after	2 years
	Libby	04/26/95	Dry Fork Salvage	MA 12, FS #3	ORD 2.1during sale; .75 after	1 year
	Libby	05/11/95	Road 4904K; Mushroom harvest	MA 12, FS #3	ORD1.5 during picking	1 year
	Libby	06/01/95	Canyon Salvage	MA 15, WS #2	ORD 3.8during sale; 3.0 after	1 year
	Libby	06/27/95	Cripple Horse Salvage	MA 12, FS #3	ORD 2.1during sale; .7 after	1 year
	Libby	06/27/95	Brush Creek Salvage	MA 12, FS #3	ORD 1.4 during sale; .75 after	1 year
	Libby	08/18/95	Peace Alexander Salvage	MA 12, FS #3	ORD up to 2.5 during sale; .75 after	1 year
1996	Rexford	10/95	North Fork Salvage	MA 12 TS #7; MA 14 TS #5b	Harvest w/in movement corridors	10-15 years
	Rexford	04/26/96	Pinkham Allotments	MA 24, Range #1	Allow grazing in MA 24	10 years
	Murphy Lake	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	09/24/96	Huckleberry Salvage	MA 12 TS #2 & WS #7 MA 12, FS #3	Harvest w/in movement corridors Existing ORD .65, during sale 1.03, after sale .65	10-15 2 years

Project Specific Amendments						
FY Year	**District**	**Date Signed**	**Decision Name**	**Standard Amended**	**Description**	**Years in effect**
1997	Libby	10/21/96	Worland Salvage	MA 12 TS #2 & WS #7 MA 12, FS #3	Harvest w/in movement corridors Existing ORD 2.6, during sale 2.05, after sale .66	10-15 years 2 years
	Libby	10/23/96	Bristow Salvage	MA 12 TS #2 & WS #7 MA 12, FS #3	Harvest w/in movement corridors Existing ORD 1.27, during sale 1.27, after sale 0.74	10-15 years 2 years
	Libby	11/26/96	Weigel Salvage	MA 12 TS #2 & WS #7	Harvest w/in movement corridors	10-15 years
	Rexford	11/18/96	Burro Face Salvage	MA 12 TS #2 & WS #7 MA 12, FS #3	Harvest w/in movement corridors Existing ORD 1.01, during sale 1.49, after sale 0.75	10-15 years 3 years
	Rexford	06/06/97	McSutton Salvage	MA 12 TS #2 & WS #7 MA 15 TS #5 MA 12, FS #3	Harvest w/in movement corridors Harvest adjacent to units not recovered Existing ORD .81 , during sale 1.53 , after sale 0.75	10-15 years 2-4 years 3 years
	Libby Libby	06/19/97 06/19/97	Cripple Horse Timber Sale Cripple Horse Timber Sale	MA 12 TS #2 & WS #7 MA 12, FS #3	Harvest within movement corridors Comp 609 Existing ORD 1.4 , during sale 2.2 , after sale 1.4 (this is allowed for under amendment #8) Comp 610 existing ORD .9, during sale 2.2, after sale 0.0	10-15 years 2 years

Project Specific Amendments						
FY Year	**District**	**Date Signed**	**Decision Name**	**Standard Amended**	**Description**	**Years in effect**
1998	Libby	1/23/98	Alexander Salvage Timber Sale	MA 12 FS #3	Comp 601, overlaps with amendments for Peace Alexander, Will allow ORD to go to 2.0, after sale .63	2 years
	Libby	03/9/98	Sheep Range Timber Sale	MA 10 WS #3	Suspend snag requirements	2-3 years
	Three Rivers	06/16/98	Wood Rat Timber Sale	MA 10 WS #3	Suspend snag requirements	2-3 years
	Libby	6/9/98	Grubb Salvage Timber Sale	MA 12 FS#3	Comp 643, existing ORD 0.0, during project 1.53, after 0.0	1-2 years
	Libby	6/9/98	Grubb Salvage Timber Sale	MA 12 TS #2	Removal of hiding cover	10-15 years
	Cabinet	6/26/98	Beaver Creek Ecosystem Mgmt Project	MA 13 TS #3	Allow harvest in old growth	3-5 years
	Cabinet	6/26/98	Beaver Creek Ecosystem Mgmt Project	MA 10 WS #3	Suspend snag requirements	3-5 years
	Libby	06/17/98	North Fork Jackson Salvage Timber Sale	MA 12 TS #2 & WS #7	Harvest w/in movement corridors	10-15 years
	Libby	06/17/98	North Fork Jackson Salvage Timber Sale	MA 12, FS #3	Comp 602 Existing ORD .75 , during sale 1.5 , after sale .75	1 years

Project Specific Amendments						
FY Year	**District**	**Date Signed**	**Decision Name**	**Standard Amended**	**Description**	**Years in effect**
1999	Rexford	1/23/98	Parsnip Lodgepole Pine Salvage Timber Sale	MA 16 TS #4	Suspend requirement that existing cutting units will not be enlarged until they are certified as regenerated and recovered.	10-15 years
	Three Rivers	03/15/99	Pine Timber Sale	MA 10 WS #3	Suspend snag requirements	2-3 years
	Libby	3/11/99	Deer Marl Salvage Timber Sale	MA 12 TS #2	Removal of hiding cover	10-15 years
	Rexford	6/16/99	Pinkham Timber Sales	MA 12 TS #2 & WS #7	Harvest within movement corridors adjacent to unrecovered openings	10-15 years
	Rexford	6/16/99	Pinkham Timber Sales	MA 12 FS#3	Comp. 18 and 21 Existing ORD is 1.51 and will increase to 1.81 during activity.	3-5 years
	Three Rivers	6/18/99	Clay Beaver Timber Sale	MA 12 TS #2 & WS #7	Harvest within movement corridors adjacent to unrecovered openings	10-15 years
	Libby	6/23/99	Dry Pocks Timber Sale	MA 12 FS#3	Comp 579, existing ORD 0.0, during project 1.0, after 0.0.	3 years
2000	Libby	6/8/00	Syrup Salvage	MA 12, TS#2	Removal of hiding cover	10 years
	Libby	6/16/00	Syrup Salvage	MA 12, FS#3	Comp 578, existing ORD .34, During 2.1, after .34	3 years
	Libby	6/22/00	McSwede Timber Sale	MA 16 MA 11	Short term reduction in VQO Short term reduction in VQO	20 to 25 years 20 to 25 years
2001	Libby	10/00	Alexander Timber Sale	MA 12, FS #3	Comp 551, existing ORD .33, During 2.0, after .33	3 years
	Libby	10/00	Alexander Timber Sale	MA 10, WS #3	Suspend snag requirements	3-5 years
	Three Rivers	4/10/01	Spar and Lake Forest Health Project	MA 10, WS#3	Suspend snag requirements	3-5 years
	Three Rivers	5/1/01	Troy Beetle	MA 10, WS#3	Suspend snag requirements	2-3 years

Project Specific Amendments						
FY Year	**District**	**Date Signed**	**Decision Name**	**Standard Amended**	**Description**	**Years in effect**
2002	Rexford	10/5/01	Pink Stone Fire Recovery	MA12, FS #3	ORD to increase to 2.70 during activities	2-5 years
	Rexford	10/5/01	Pink Stone Fire Recovery	MA12 TS #2, Wildlife Standard #7	Harvest within movement corridors adjacent to unrecovered openings	10-15 years
	Rexford	12/14/01	Gold/Boulder/Sullivan	MA 13 Timber Standards #2 & #3	Timber salvage in MA 13	2 years
	Rexford	12/14/01	Gold/Boulder/Sullivan	MA12 TS #2, Wildlife Standard #7	Harvest within movement corridors adjacent to unrecovered openings.	10-15 years
	Rexford	12/14/01	Gold/Boulder/Sullivan	MA 12, Facilities Standard #3	ORD Increase to 1.52 during activities.	5-7 years
	Cabinet	6/17/02	White Pine	MA 13, Timber Standard #3	Timber Harvest in MA 13	2-3 years
	Cabinet	6/17/02	White Pine	MA 12, Facilities Standard #3	Temporary increase in ORD from 0.71 to 2.23	5 years
	Cabinet	6/14/02	White Pine	MA 10, Wildlife Standard #3	Suspend Snag Requirements	2-3 years
2003	Rexford	10/11/02	Young J	MA 12, Facilities Standard #3	ORD Increase to 1.19 during activities.	2 years
2004	Libby	6/2/04	Pipestone	MA 12, Facilities Standard #3	ORD increases in 3 compartments during activities. Post-project ORDs at or below existing levels for 5 compartments.	3-5 years
	Libby	6/2/04	Pipestone	MA 17, Recreation Standard #4	Harvest will not meet partial retention VQO.	20 years
	Libby	6/16/04	South McSwede	MA 12, Facilities Standard #3	Comp 539 existing and during project ORD of 3.88, post-project ORD of 2.44. Comp 540 existing and during project ORD of 1.20, post-project ORD of 1.20.	3-5 years
	Libby	6/16/04	Bristow	MA 12, Facilities Standard #3	For sub planning unit, ORD increase from existing level of 1.0	3-5 years

Project Specific Amendments						
FY Year	**District**	**Date Signed**	**Decision Name**	**Standard Amended**	**Description**	**Years in effect**
					to 1.5 during activity period. Post-project ORD of 0.78	
	Rexford	7/28/04	Lower Big Creek	MA 12, Timber Standard #2 MA 12, Wildlife & Fish Std. #7	Harvest within movement corridors adjacent to unrecoverd openings	15 years
	Cabinet	9/1/04	Dead Beaver	MA 10, Wildlife & Fish Std. #3	Suspend Snag Requirements	1 year
2005	Rexford	5/14/05	McSutten	MA 12, Facilities Standard #3	ORD increase to 1.00 during activities.	10 years
	Rexford	5/14/05	McSutten	MA 12, Timber Standard #2 MA 12, Wildlife & Fish Std. #7	Harvest within movement corridors adjacent to unrecoverd openings	10-15 years
	Three Rivers	6/14/05	Northeast Yaak	MA 13, Timber Standard #3	Timber Harvest in MA 13	3-5 years
	Libby	6/15/05	Riverview (Alder, Cow)	MA 12, Facilities Standard #3	ORD of 1.30 during activities, post project ORD of 0.96 compared to existing ORD of 2.00.	5 years
	Libby	6/15/05	Cow Creek	MA 10, Wildlife & Fish Std. #3	Suspend snag requirements	5 years
2006	Libby	4/18/06	Smoked Fish	MA 10, Wildlife & Fish Std. #3	Suspend snag requirements	5 years
2007	Cabinet	6/8/2007	West Elk Interface Protection	MA 10, Wildlife & Fish Std. #3 MA 10, Timber Standard #3	Suspend snag requirements. Harvest for fuel reduction objectives. (360 acres)	3-4 years
	Libby	7/26/2007	Kootenai River North	MA 10, Wildlife & Fish Std, #3	Suspend snag requirements	5 years