Idaho Panhandle National Forests

FOREST PLAN
MONITORING AND EVALUATION REPORTS
2010 and 2011

March 2013

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Idaho Panhandle National Forests

FOREST PLAN

MONITORING AND EVALUATION REPORTS

2010 and 2011

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I. INTRODUCTION

The monitoring and evaluation process compares the end results that have been achieved to the projections made in the Forest Plan. Costs, outputs, and environmental effects, both experienced and projected, are considered. This process comprises a management control system, which provides information to the decision maker and the public on the progress of implementing the Forest Plan. Monitoring is designed to gather data necessary for the evaluation. During evaluation, data provided through the monitoring effort are analyzed, interpreted, and then used to determine if the implementation of the Forest Plan is within the bounds of the plan. Annual reports have been prepared from fiscal year 1988 through fiscal year 2011.

The Forest Plan identifies 21 monitoring and evaluation items. (See Appendix A for requirements.) It requires that 11 items be reported every year, one be reported every 2 years, and 9 others be reported every 5 years. All 21 items were reported in fiscal year 2008; 12 items[1] are reported in this report:

A-1 Outputs of Goods and Services
A-2 Effects on and of National Forest Management
B-6 Actual Sell Area and Volume
D-1 Off-Road Vehicles
E-1 Heritage Resources
F-2 Grizzly Bear Recovery
F-3 Caribou Recovery
G-2 Water Quality
G-4 Fish population trends (bi-annual)
H-1 Threatened, Endangered and Sensitive Plants
I-1 Minerals
K-1 Prescriptions and Effects on Land Productivity

This report also includes information on a number of topics not required by the Forest Plan but important to forest management. For this report, these subjects include ecosystem restoration, old growth and snags.

[1] Interpretation of the information gathered on monitoring item C-1 Visual Quality was not completed at the time this document was published.

II. SUMMARY OF FINDINGS

A few of the key findings are briefly summarized below. More details can be found in the section that discusses the desired monitoring item in the body of the report.

- The forest plan established an average annual allowable sale quantity (ASQ) of 280 million board feet (MMBF) for the first decade after the plan was adopted. This was to occur on an estimated 18,688 acres annually. The plan specified that the ASQ could increase to 350 MMBF in the second decade. The actual amount of timber sold has been much lower than anticipated in the plan. In fiscal years 2010 and 2011, respectively, there was 52.3 and 24.0 MMBF offered, 33.4 and 24.0 MMBF sold; and 20 and 26.3 MMBF harvested. The number of acres sold for harvest in 2010 and 2011, respectively, was 2,446 and 1,048. Payments to counties in fiscal years 2010 and 2011, respectively, totaled $6,987,587.91 and $6,452,760.86.
- Recruitment continues to be quite low for the Selkirk woodland caribou population. The population is currently estimated at 36 animals, with all 36 of these animals residing in British Columbia. For fiscal years 2010 and 2011, eight and nine of the fifteen Grizzly Bear Management Units, respectively, met core and road density standards.
- Forest monitoring of Best Management Practices (BMP) indicates that in most cases they continue to function as expected and are satisfying their intended purpose.
- Opportunities to use funds from a variety of sources to restore ecosystems continue to be sought after. Examples of forest ecosystem restoration work for fiscal years 2010 and 2011, respectively, are listed below. Note: See the Ecosystem Restoration section of this report for more details.
    - Planting approximately 102,190 and 95,020 blister rust resistant white pine seedlings.
    - Planting approximately 1,980 and 4,000 whitebark pine seedlings.
    - Planting approximately 783 and 800 acres of white pine, larch, ponderosa pine and whitebark pine. These are species that are in short supply on the IPNF.
    - Reducing forest density by pre-commercially thinning or releasing 3,812 and 1,446 acres of young trees in 2010 and 2011, most of which released larch, white pine and ponderosa pine. The Timber Stand Improvement and White Pine Pruning accomplishments were substantially increased in 2010 with projects funded by the American Recovery and Reinvestment Act of 2009. Those funds were not available for 2011.
    - Pruning 4,410 and 2,587acres of white pine saplings. This reduces mortality from white pine blister rust.
    - Integrated weed treatments were accomplished on 2,524 and 2,887 acres.
    - There were 852 acres of harvest related fuel reduction and 10,522 acres of natural fuel reduction in 2010. There were 930 and 10,245 acres of harvest related and natural fuels reduction in 2011.
    - Improving 382 and 628 acres of soil and water resources.
    - Decommissioning 26 and 38 miles of road.
- Forest plan standards call for us to maintain 10 percent of our forested acres (231,000 acres) as old growth. For 2010 and 2011, the estimated percentage of old growth on the forested lands of the IPNF, using Forest Inventory and Analysis (FIA) data, is 11.8% (with a 90% confidence interval of 9.6 percent to 14.0 percent).

Table 1 is a quantitative summary of some of the forest's other accomplishments for fiscal years 2010 and 2011.

III. MONITORING ITEMS

This section contains the monitoring and evaluation results for fiscal years 2010 and 2011 for some of the monitoring items discussed.

Forest Plan Monitoring Item A-1: Outputs of Goods and Services

Table 1. Quantitative Estimates of Performance Outputs and Services

Outputs and Services	2010 Quantitative Estimates	2011 Quantitative Estimates
Budget	$44,219,000[1]	26,712,000
Total number of employees	399 (permanent and temporary)	320 (permanent and temporary)
Volume of timber offered	52.3 MMBF	24.0 MMBF
Volume of timber sold	33.4 MMBF	24.0 MMBF
Volume of timber harvested	20 MMBF	26.3 MMBF
Total acres of timber sold	2,446 acres	1,048 acres
Payments to counties[2]	$6,987,587.91	$6,452,760.86
Total reforestation completed[3]	895 acres	1,342 acres
Timber stand improvement completed (pre-commercial thinning and release)	3,812 acres	4,848 acres
Pruning of white pine	4,410 acres	2,587 acres
Soil and water improvement completed	382 acres	628 acres
Roads maintained	1,997 miles	913 miles
Roads constructed	1.2 miles	0 miles
Roads reconstructed	27 miles	2 miles
Roads decommissioned	26 miles	38 miles
Trails constructed/reconstructed	0/83 miles	0/54 miles
Trails maintained to standard	1,367 miles	1,783 miles
Number of wildfires	59 fires	77 fires
Acres burned by wildfire	495 acres	1,283 acres
Harvest related fuel treatment	852 acres	930 acres
Hazardous fuels reduction	10,522 acres	10,245 acres
Wildlife habitat enhanced	10,888 acres	30,038
Noxious weeds treated	2,524 acres	3,600 acres
Abandoned/inactive mines	10 sites addressed	20 sites addressed

[1] This includes $15,270,000 in America Reinvestment and Recovery Act funds (ARRA)

[2] Includes Shoshone, Kootenai, Bonner, Boundary, Benewah, Clearwater, and Latah counties

[3] Includes both planted and natural regeneration that was established in 2010.

Forest Plan Monitoring Item A-2: Effects on and of National Forest Management

The first part of this monitoring item "Effects of Other Government Agencies on the Idaho Panhandle National Forests (IPNF)" has proven to be very difficult to quantitatively measure and for this reason has been reported infrequently. The second part of this item "The Effects of National Forest Management on Adjacent Land and Communities" has been reported most frequently using data on payments to counties. In this report information is presented for two areas: payments to counties and Forest Service employment. Both of these economically impact adjacent communities.

A. Payments to Counties

Background

In the past, the Forest Service paid out 25 percent of its annual revenues collected from timber sales, grazing, recreation, minerals, and land uses to states in which national forest lands were located. The amount a county received depended upon the amount of these activities that occurred in the county and the amount of national forest land within the county.

Under that system the major source of revenue on the Idaho Panhandle National Forests was timber sales. Payments to counties depended on the amount of timber that was harvested during the past year. The following table compares payments to counties with harvested timber volume.

Monitoring Data

Table 2. Payments to Counties with Harvested Timber Volume

Fiscal Year	Payments (MM$)	Volume (MMBF)
1991	5.4	232
1992	7.4	235
1993	6.0	134
1994	6.4	117
1995	5.8	87
1996	6.0	81
1997	3.9	57
1998	4.8	85
1999	3.1	75
2000	4.0	90
2001	8.0	51
2002	8.1	41
2003	8.1	53
2004	8.2	40
2005	8.5	37
2006	8.6	16
2007	8.6	28
2008	8.7	24
2009	7.8	17
2010	6.9	20
2011	6.4	26

Table 3. Distribution of Payments to Counties, Fiscal Year 1991-2000

County	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00
Benewah	65,777	71,747	78,926	60,217	60,294	56,152	45,610	31,051	9,243	17,227
Bonner	830,257	1,229,474	823,120	929,071	966,681	880,735	491,055	761,712	732,841	953,000
Boundary	895,881	1,330,307	885,433	1,003,376	1,060,285	954,333	529,089	823,583	816,527	1,067,089
Clearwater	6,869	7,492	8,242	7,130	6,929	6,452	5,257	3,579	1,065	2,035
Kootenai	645,371	905,926	689,921	826,323	619,058	800,937	492,483	696,058	363,068	393,721
Latah	31,787	34,672	38,141	32,853	31,908	29,716	24,212	16,483	4,906	9,373
Lincoln, MT	41,692	61,909	41,192	46,624	49,267	44,186	24,498	38,160	37,707	49,278
Pend Oreille, WA	223,327	333,409	221,838	251,092	265,328	237,964	131,936	205,511	203,071	265,386
Sanders, MT	11,879	17,640	11,737	13,285	14,038	12,590	6,980	10,873	10,744	14,041
Shoshone	2,783,740	3,423,283	3,180,350	3,213,263	2,758,792	3,011,686	2,148,684	2,171,037	943,124	1,220,016
Total	**5,536,580**	**7,415,859**	**5,978,900**	**6,383,234**	**5,832,580**	**6,034,751**	**3,899,804**	**4,758,048**	**3,122,296**	**3,991,166**

Evaluation: Table 3 depicts how receipts have been distributed to counties for the years 1991 to 2000. There are seven counties in Idaho, two in Montana, and one in Washington that received payments from IPNF activities. The base for the 25 percent payment to states by the IPNF for fiscal year 2000 was collection of $15,248,318.73. Timber volume harvested in FY 2000 was 90 million board feet, which increased from 58 million board feet in fiscal year 1999. Receipts to counties in fiscal year 2000 totaled $3,991,166, an increase of $868,870 from fiscal year 1999.

The receipts to counties from 1991 to 2000 varied from a high of $7.4 million to a low of $3.1 million. The loss in revenue to the counties for roads and school funds was not as proportional as the fall down in timber volumes from a high of 280 million board feet to a low of 57 million board feet because of the increase in the value of the timber during this same period.

Table 4. Distribution of Payments to Five Northern Idaho Counties, Fiscal Year 2001

County	Total Disbursement	% Split Title II/Title III	Title II (Forest Projects)	Title III (County)
Benewah	$115,381.00	50/50	$8,653.55	$8,653.55
Bonner	$1,390,140.00	10/5	$139,013.98	$69,506.98
Boundary	$1,388,722.00	50/50	$104,154.11	$104,154.11
Kootenai	$1,011,683.00	3/12	$30,350.49	$121,401.96
Shoshone	$4,079,756.00	3/12	$122,392.67	$489,570.72
Total	**$7,985,683.00**		**$404,564.80**	**$793,287.32**

Table 4 shows the payments made for fiscal year 2001 to the five Northern Idaho counties in accordance with the Secure Rural Schools and Community Self-Determination Act of 2000 (Public Law 106-393). Under this legislation, payment amounts are determined based upon each county's share of the average of the three highest 25 percent fund payments made to the state during the base period (fiscal years 1986 through 1999). This act also provides that 15 to 20 percent of the total disbursement to each county can be used to finance either Forest Service (Title II) or County (Title III) projects, as determined by each county. Depicted in this table is the total disbursement to each county, as well as the percentages and amounts distributed between Title II and Title III funded projects. Tables 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14 which follow show the same information for fiscal years 2002 through 2011.

Table 5. Distribution of Payments to Five Northern Idaho Counties, Fiscal Year 2002

County	Total Disbursement	% Split Title II/Title III	Title II (Forest Projects)	Title III (County)
Benewah	$116,303.73	7.5/7.5	$8,722.78	$8,722.78
Bonner	$1,401,260.96	10/5	$140,126.08	$70,063.03
Boundary	$1,399,831.45	12.75/2.25	$178,478.51	$31,496.20
Kootenai	$1,026,776,54	15/0	$159,966.47	$0
Shoshone	$4,112,394.21	15/0	$616,859.13	$0
Total	**$8,056,566.89**		**$1,104,152.97**	**$110,282.01**

Table 6. Distribution of Payments to Five Northern Idaho Counties, Fiscal Year 2003

County	Total Disbursement	% Split Title II/Title III	Title II (Forest Projects)	Title III (County)
Benewah	$117,699.00	7.5/7.5	$8,827.45	$8,827.45
Bonner	$1,418,076.00	15/0	$212,711.41	0
Boundary	$1,416,630.00	12.75/2.25	$180,620.25	$31,874.16
Kootenai	$1,032,014.00	15/0	$154,802.07	$0
Shoshone	$4,161,743.00	15/0	$624,261.43	$0
Total	**$8,146,162.00**		**$1,181,222.61**	**$40,701.61**

Table 7. Distribution of Payments to Five Northern Idaho Counties, Fiscal Year 2004

County	Total Disbursement	% Split Title II/Title III	Title II (Forest Projects)	Title III (County)
Benewah	$119,229.00	7.5/7.5	$8,942.21	$8,942.21
Bonner	$1,436,511.00	15/0	$215,476.66	0
Boundary	$1,435,045.00	12.75/2.25	$182,968.31	$32,288.52
Kootenai	$1,045,430.00	15/0	$156,814.50	$0
Shoshone	$4,215,846.00	15/0	$632,376.83	$0
Total	**$8,252,061.00**		**$1,196,578.51**	**$41,230.73**

Table 8. Distribution of Payments to Five Northern Idaho Counties, Fiscal Year 2005

County	Total Disbursement	% Split Title II/Title III	Title II (Forest Projects)	Title III (County)
Benewah	$121,971.76	15/0	$18,295.76	$0
Bonner	$1,357,768.54	15/0	$203,665.28	$0
Boundary	$1,436,432.47	12.75/2.25	$183,145.14	$32,319.73
Kootenai	$1,069,474.95	15/0	$160,421.24	$0
Shoshone	$4,140,330.31	14/1	$579,646.25	$41,403.30
Total	**$8,125,978.03**		**$1,145,173.67**	**$73,723.03**

Table 9. Distribution of Payments to Five Northern Idaho Counties, Fiscal Year 2006

County	Total Disbursement	% Split Title II/Title III	Title II (Forest Projects)	Title III (County)
Benewah	$123,191.48	15/0	$18,478.72	$0
Bonner	$1,371,346.23	15/0	$205,701.94	$0
Boundary	$1,450,796.79	12.75/2.25	$184,976.59	$32,642.93
Kootenai	$1,080,169.70	15/0	$162,025.45	$0
Shoshone	$4,181,733.61	14.25/0.75	$595,897.04	$31,363.00
Total	**$8,207,237.81**		**$1,167,079.74**	**$64,005.93**

Table 10. Distribution of Payments to Five Northern Idaho Counties, Fiscal Year 2007

County	Total Disbursement	% Split Title II/Title III	Title II (Forest Projects)	Title III (County)
Benewah	$122,938.66	15/0	$18,478.72	$0
Bonner	$1,368,531.86	15/0	$198,678.09	$0
Boundary	$1,447,819.37	12.75/2.25	$184,595.97	$32,575.94
Kootenai	$1,077,952.90	0/15	$0	$161,692.93
Shoshone	$4,173,456.56	14.25/0.75	$594,717.56	$31,300.92.00
Total	**$8,190,699.35**		**$996,470.34**	**$225,569.79**

Table 11. Distribution of Payments to Five Northern Idaho Counties, Fiscal Year 2008

County	Total Disbursement	% Split Title II/Title III	Title II (Forest Projects)	Title III (County)
Benewah	$118,313.00	0/15	$0	$17,747
Bonner	$1,262,235.00	15/0	$183,245.00	$0
Boundary	$2,561,640.00	15/0	$384,246.00	$0
Kootenai	$778,346.00	15/0	$116,752.00	$0
Shoshone	$3,830,536.00	12.5/2.5	$478,817.00	$95,764.00
Total	**$8,551,070.00**		**$1,163,060.00**	**$113,511.00**

Table 12. Distribution of Payments to Five Northern Idaho Counties, Fiscal Year 2009

County	Total Disbursement	% Split Title II/Title III	Title II (Forest Projects)	Title III (County)
Benewah	$98,712.00	0/15	$0	$14,806
Bonner	$1,085,274.00	15/0	$162,790.00	$0
Boundary	$2,290,170.00	15/0	$345,525.00	$0
Kootenai	$693,703.00	11.25/3.75	$78,041.00	$383.00
Shoshone	$3,295,634.00	12.5/2.5	$411,954.00	$82,390.00
Total	**$7,463,493.00**		**$998,310.00**	**$97,579.00**

Table 13. Distribution of Payments to Five Northern Idaho Counties, Fiscal Year 2010

County	Total Disbursement	% Split Title II/Title III	Title II (Forest Projects)	Title III (County)
Benewah	$86,776.00	0/0	$0	$0
Bonner	$1,036,254.00	15/0	$155,438.00	$0
Boundary	$1,822,174.00	15/0	$273,326.00	$0
Kootenai	$654,217.00	10.25/5	$67,057.00	$31,075.00
Shoshone	$3,024,868.00	8/7	$241,989.00	$211,740.00
Total	**$6,624,289.00**		**$737,810.00**	**$242,815.00**

Table 14. Distribution of Payments to Five Northern Idaho Counties, Fiscal Year 2011

County	Total Disbursement	% Split Title II/Title III	Title II (Forest Projects)	Title III (County)
Benewah	$80,045.00	0/0	$0	$0
Bonner	$989,627.00	15/0	$148,444.00	$0
Boundary	$1,648,263.00	14/1	$232,405.00	$14,834
Kootenai	$620,704.00	13/2	$80,691.00	$12,414.00
Shoshone	$2,779,215.00	8/7	$222,337.00	$194,544.00
Total	**$6,452,760.00**		**$733,455.00**	**$222,452.00**

B. Forest Service Employment

Background

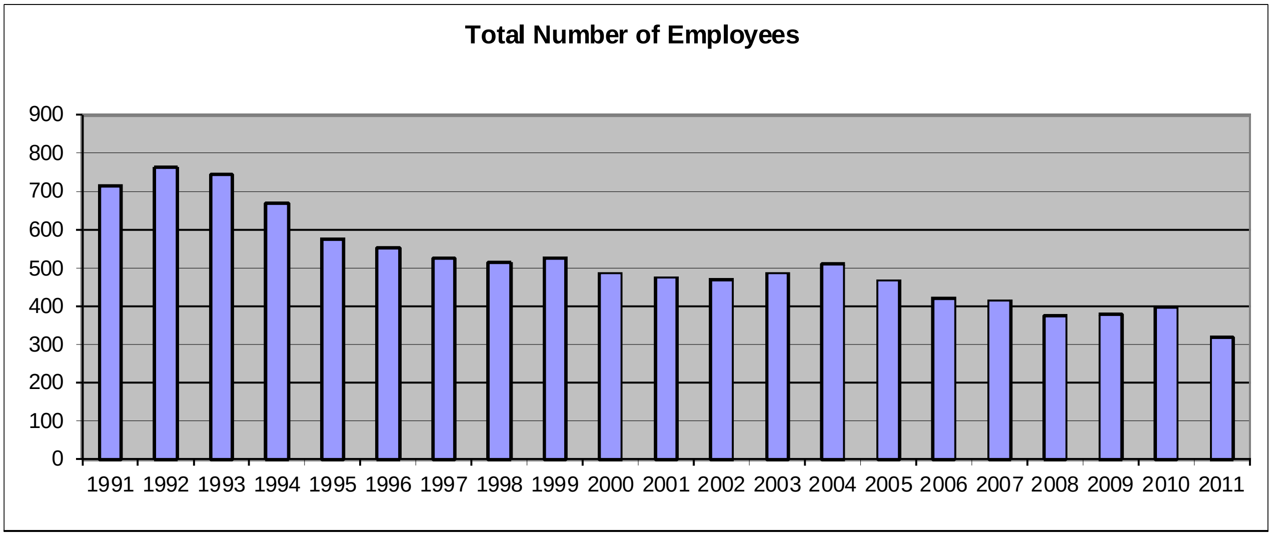
Employees of the Idaho Panhandle National Forests help to stimulate the economy by actively participating in their local economies. As Forest Service employment rates fluctuate each year, the amount of money contributed to the local economy also tends to fluctuate.

Monitoring Data

Table 15. Total Number of Employees

Fiscal Year	Employees
1991	714
1992	762
1993	743
1994	669
1995	575
1996	552
1997	525
1998	514
1999	526
2000	486
2001	475
2002	470
2003	486
2004	510
2005	468
2006	421
2007	415
2008	376
2009	379
2010	399
2011	320

Figure 1. Total Number of Employees



Evaluation: Table 15 and Figure 1 show how the forest workforce has changed from 1991 to 2011. In fiscal year 1992, employment was at a high of 762 permanent and temporary employees and decreased to 320 at the end of fiscal year 2011. This decrease in employment has had a greater effect on the smaller communities such as Bonners Ferry, Wallace and St. Maries than on larger communities such as Coeur d'Alene and Sandpoint where significant population growth has occurred.

Forest Plan Monitoring Item B-6: Actual Sell Area and Volume

The purpose of this item is to monitor the actual amount of timber sold and the amount of acres associated with the volume sold.

Background

The allowable sale quantity (ASQ) is the quantity of timber that may be sold from the area of suitable land covered by the forest plan for a time period specified by the plan. This quantity is usually expressed on an annual basis as the "average annual allowable sale quantity".

The 1987 Idaho Panhandle National Forests' Forest Plan established an average annual allowable sale quantity of 280 million board feet (MMBF) for the first decade the plan was in effect. This was to occur on an estimated 18,688 acres annually. The forest plan stated that, depending on future conditions, the ASQ could increase to 350 million board feet a year for the second decade timber harvest level.

The forest plan identified a threshold of concern for ASQ when accomplishments fall below 75-percent of the desired volume and acres (below 210 MMBF and 14,016 acres).

Monitoring Data

Fiscal Years 2010 and 2011: For these fiscal years the Idaho Panhandle National Forests offered 52.3 and 24.0 million board feet of timber for sale. We sold 33.4 and 24.0 million board feet.

Fiscal Years 1991-2011: The following table depicts timber volumes offered and sold and sale acreages for the past 21 years. Figure 2 graphically presents trends in volumes offered and sold. Figure 3 shows total acres sold.

Table 16. Timber Volumes Offered and Sold (MMBF) and Total Acres Sold

Fiscal Year	*Volume Offered*	*Volume Sold*	*Total Acres Sold*
1991	201.6	163.2	13,989
1992	127.2	108.0	10,508
1993	109.4	124.3	13,939
1994	44.9	16.4	4,283
1995	64.1	37.5	8,437
1996	75.4	42.9	8,631
1997	79.3	108.3	10,914
1998	76.3	90.3	6,974
1999	63.4	30.3	8,751
2000	76.3	78.2	7,332
2001	65.8	40.7	5,626
2002	57.2	55.4	5,383
2003	42.2	22.1	3,282
2004	51.3	59.5	8,085
2005	40.6	23.4	3,081
2006	45.6	26	2,654
2007	63.1	34.4	3,054
2008	55	49.6	5,048
2009	51.5	51.5	3,814
2010	52.3	33.4	2,446
2011	24.0	24.0	1,048

Figure 2. Timber Volume Offered (Series 1) and Sold (Series 2)

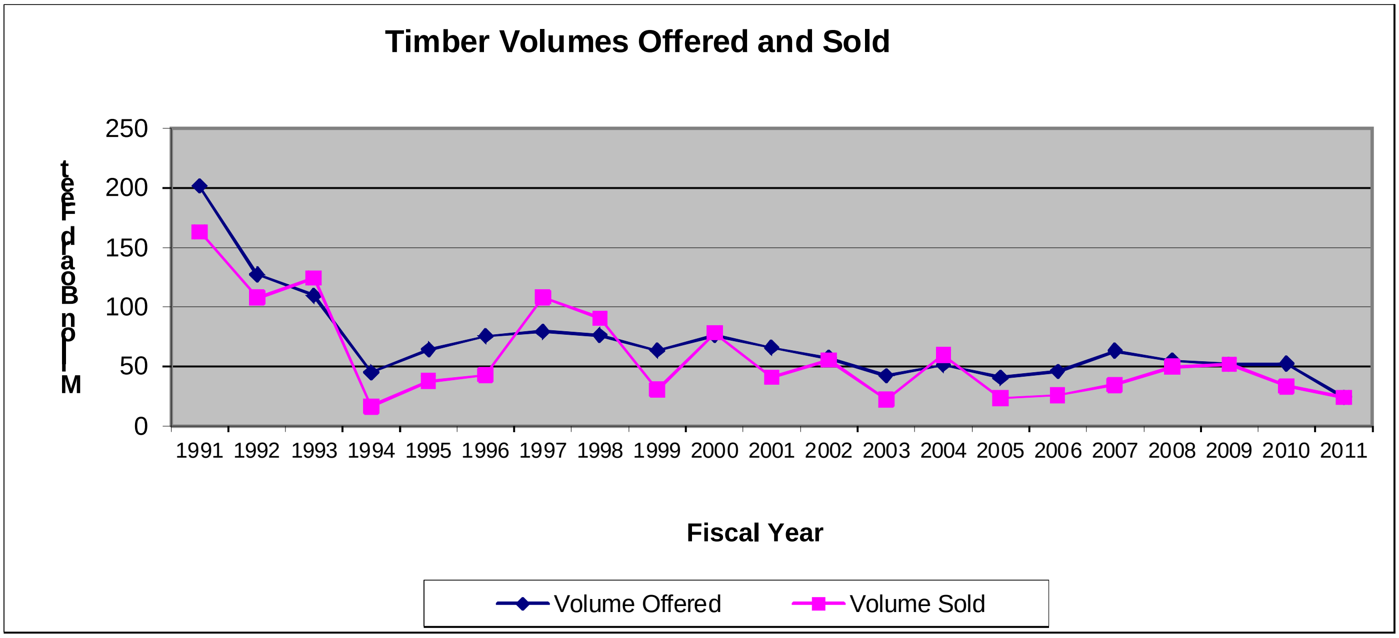
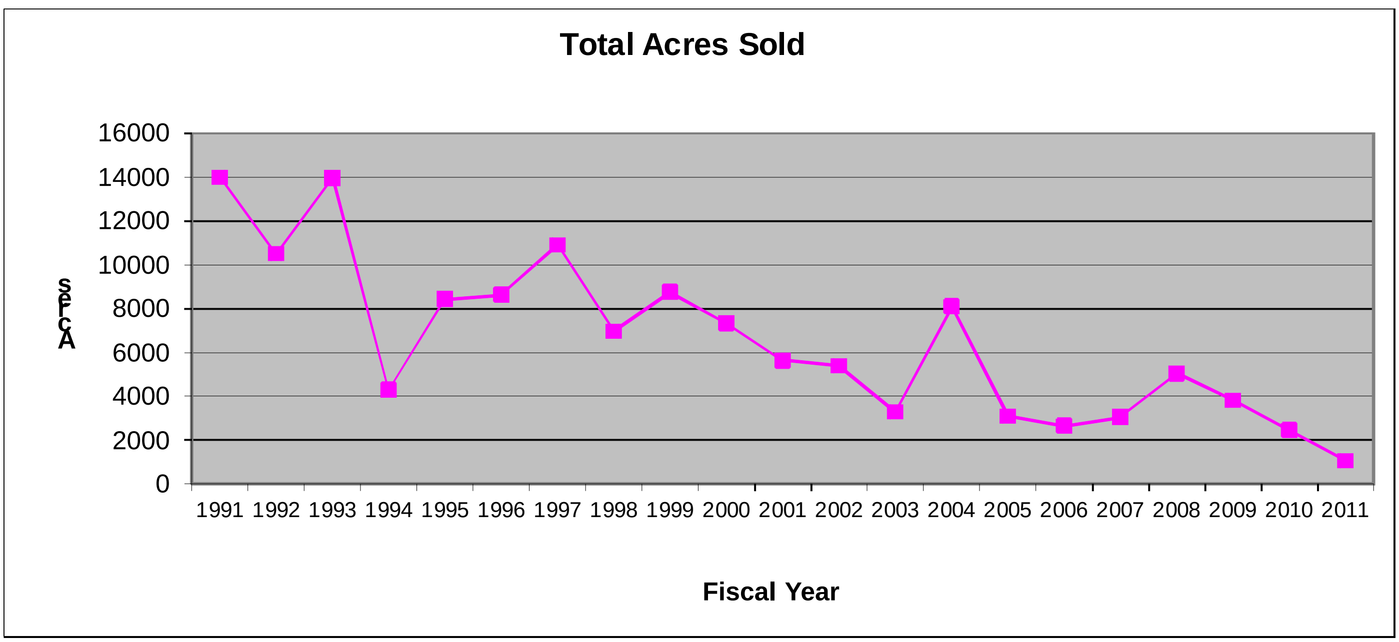


Figure 3. Total Acres Sold



Evaluation

For fiscal year 1988 through 1990 the volume of timber sold and acres sold exceeded the 75-percent threshold identified in the Plan. From fiscal year 1991 through 2011 volume sold and acres sold has fallen below the 75-percent threshold.

There are many reasons why the amount of timber harvested has dropped below the 75-percent threshold. Some of these include: movement away from clearcutting to partial cuts, which means harvesting produces less volume per acre, inventoried roadless areas have not been largely entered, protection of existing and replacement old growth, implementation of INFISH direction, downsizing of the Forest's workforce, budget changes, complexity of NEPA analysis and process, protection of Threatened and Endangered Species habitat, and water quality concerns.

The amount of timber to be harvested on the IPNF is being addressed in forest plan revision.

Forest Plan Monitoring Item D-1: Off-Road Vehicles

Background

The purpose of this monitoring item is to determine the impacts of off-road vehicles on resources or other resource users. It is also to determine if Forest Travel Plan direction is being followed.

Monitoring Data

The principal source of information for this monitoring item is the number of violations documented by Forest Service Law Enforcement Officers that are associated with off-road vehicle use. Listed below is the number of violations issued for fiscal years 1991 to 2011.

Table 17. Total Number of Violations Issued

Fiscal Year	Number of Violations	Fiscal Year	Number of Violations
1991	144	2002	191
1992	167	2003	445
1993	204	2004	411
1994	185	2005	337
1995	88	2006	298
1996	133	2007	224
1997	240	2008	272
1998	246	2009	301
1999	394	2010	241
2000	164	2011	222
2001	285		

Evaluation

The *Number of Violations* noted in the table above is a summary for the fiscal year noted and represent a subset of the total number of violation notices issued for that fiscal year. Beginning in 2008 the number shown is represented by 27 *Offense Codes* as listed in the LEIMARS (Law Enforcement & Investigation Management and Reporting System) database. These 27 codes[2] represent violations associated with off-road vehicle use and other travel management violations that help assess whether Forest Travel Plan direction is being followed.

Some violations by off-road vehicle users occur when no Forest Service personnel are around to witness them. For this reason the number of documented violations is not an accurate measure of the amount of actual violations or resource impacts. However, it can be used as a general indicator of trends in violations and law enforcement activities associated with off-road vehicles.

[2] Codes include: 261.9(a), 261.10(a), 261.12(c), 261.12(d), 261.13, 261.14, 261.15(h), 261.15(i), 261.53(a), 261.53(b), 261.53(c), 261.53(d), 261.53(e), 261.54(a), 261.54(b), 261.54(c), 261.54(d), 261.54(e), 261.54(f), 261.55(a), 261.55(b), 261.55(c), 261.55(d), 261.55(e), 261.56, 261.58(g), 261.58(h)

Forest Plan Monitoring Item E-1: Heritage Resources

The purpose of this monitoring item is to ensure that projects do not cause adverse effects to heritage resources. The threshold of concern is any unmitigated adverse impact. The Idaho Panhandle National Forests (IPNF) monitors land disturbing projects to identify potential impacts to heritage resources. Our 2010 and 2011 monitoring program concluded that forest projects generally caused no adverse effects to heritage resources. However, several projects were incorrectly implemented leading to adverse effects to eligible cultural properties. All effects were disclosed to the proper agencies and action was taken to make sure future projects did not have similar implementation problems.

Vegetative Treatments (Timber Sales and Fuel Reduction Projects)

The Forest reviewed 17 timber sales or fuel reduction projects to completion, while several others were begun for implementation in FY 2011. Thirty-three sites were found within project analysis areas that could be potentially affected by project actions. Four projects were redesigned to avoid affecting heritage sites. No sites are known to have been adversely affected by timber and fuel project implementation.

Lands (Land Conveyance Projects)

Two land conveyance projects were completed in which no National Register eligible sites were affected.

Roads

Six road projects were reviewed, with no affect to any heritage resources. Ten Heritage sites were documented within the projects and none had any adverse effects on eligible sites.

Range

No range projects were reviewed.

Trails

Six trail projects were reviewed in which nine sites could have been affected. No eligible sites were affected by the projects.

Special Use Permits

Twenty-two special use permit projects were reviewed by Forest heritage resource staff. A single site was associated with the permit renewals and it was not affected by the project.

Recreation

Nine recreation projects were reviewed which had the potential to affect eligible heritage resources. Four projects had Heritage sites that were avoided through design considerations.

Minerals

Six mining plans of operation, rock removal permits or mine restoration projects were reviewed. Three projects were redesigned to avoid adverse effects to Heritage sites. The remainder of the projects had no effect to any listed or eligible heritage property.

Facilities

The Forest undertook ten projects in 2010. Six of the projects had historic sites involved. Three sites were completed that had no adverse effect through use of the Secretary of the Interior’s Standards and Guidelines for Historic Preservation. The remainder had no effect to any listed or eligible historic properties.

Wildlife and Fisheries

Four projects were undertaken. One project will adversely affect two eligible properties in which consultation will be undertaken in fiscal year 2011 or 2012 to address the effects. The other projects had no effect to any known cultural resources.

Other Heritage Resource Accomplishments

The Forest recreation and heritage staffs accomplished a significant number of preservation and public outreach projects in 2010. Four Historic Preservation projects were undertaken in 2010, including the Pulaski Trail overlook and adit restoration, Jordan Creek Bridge LIDAR study, Priest Lake Inventory and Mallard Peak Lookout restoration. For public outreach the IPNF co-sponsored three presentations for Idaho Archeology Month. Finally, several news articles were written about Heritage activities including archaeological investigations at the Pulaski Tunnel and Jack Waite Mine. Additional interpretive and research related materials were posted on the IPNF website for public education and enjoyment.

In addition, a sample of heritage sites was monitored under the fiscal year 2010 Idaho Panhandle National Forests Heritage Monitoring Report. As in previous years it was noted that the condition of heritage resources on the IPNF is deteriorating due to weathering, erosion, vandalism, and rarely, project implementation.

Future Trends for Heritage Site and Program Condition

Given the nature of the resources, climate and active management on the Idaho Panhandle it is likely that historic cultural resource sites will continue to degrade over time. For the most part, those resources that could be saved with the time, staff and money available have been highlighted and actively protected, stabilized and restored as evidenced by the tremendous work accomplished on Forest Service administrative sites, cabin and lookout rentals, Cinnabar Creek Domed Oven, Marble Creek historic trails, Hiawatha Trail, Pulaski Trail, Mullen Tree and Road and other historical interpretive sites on the Forest. The remaining mining, logging, trail and homesteading sites are slowly melting into the forest floor and without extremely large commitments of money and effort they will not be saved. The long term outlook for Forest Service budgets and personnel levels is a downward trend, at least with respect to inflation, while project complexity and federal requirements are on an upward trend. While the Forest will continue its commitment to preserve and protect significant sites and work toward preservation of a sample of the remaining sites it is unlikely that the downward trend will be stopped or even slowed with present budgetary and staffing commitments.

Forest Plan Monitoring Item F-2 Grizzly Bear Recovery

The purpose of this item is to monitor the population changes and habitat effectiveness of grizzly bears in the Selkirk and Cabinet-Yaak recovery zones to determine if recovery objectives outlined in the Grizzly Bear Recovery Plan are being met.

Background

The grizzly bear was listed as threatened in 1975. The bear originally occupied a variety of habitats throughout western North America, but today is confined to less than two percent of its original range. Its decline is associated with habitat loss and direct and indirect human-caused mortality. Grizzly bears are considered habitat generalists and opportunistic feeders. They commonly choose low elevation riparian areas and wet meadows during the spring and generally are found at higher elevations the rest of the year.

The Selkirk (SRZ) and Cabinet-Yaak (CYRZ) recovery zones are two of six grizzly bear recovery zones identified in the Grizzly Bear Recovery Plan (USDI Fish and Wildlife Service (1993). Located in northwestern Montana, northern Idaho, northeastern Washington, and British Columbia, the two ecosystems encompass approximately 4,560 square miles of habitat. Portions of the Idaho Panhandle National Forests (IPNF), Kootenai National Forest (KNF), Lolo National Forest (LNF) and Colville National Forest (CNF), and the Kootenay Lakes Forest District (British Columbia) are included in the two recovery areas. State and private lands are also included in both grizzly bear recovery zones.

Population Status

In 1993, the U.S. Fish and Wildlife Service (USFWS) estimated that there were 25 grizzly bears in the SRZ (USDI Fish and Wildlife Service 1993). In 1999, they updated this number to approximately 46 bears in the SRZ (USDI Fish and Wildlife Service 1999). Wakkinen and Kasworm (2004) estimated that the SRZ grizzly bear population has a 67 percent probability that it is increasing. Wakkinen et al. 2009 states that grizzly bears appear to be increasing in the SRZ both in numbers and distribution based on an increase of sightings of bears, and changes in the distribution of credible sightings.

Other estimates for population size in the SRZ includes a 2005 DNA-based hair snare project north of B.C. Highway 3 (Proctor et al. 2007). Thirty-three individual bears were trapped during this effort (Wakkinen et al. 2009), and Proctor et al. (2007) estimated a population of 58 bears for the entire South Selkirk Grizzly Bear Population Unit. A similar DNA-based hair snare effort was implemented for a 466 square mile portion of the ecosystem south of B.C. Highway 3 in 2007 (Wakkinen et al. 2009). Preliminary results indicated that 15 different grizzly bears (nine females, six males) were detected. Three of the 15 bears were detected in an earlier DNA hair sampling effort north of B.C. Highway 3 (Wakkinen 2010). Initial mark-recapture analysis indicated an abundance estimate of 17.9 bears for this 466 square mile portion of the recovery zone (ibid).

The USFWS estimated a population of 15 grizzly bears in the CYRZ in 1993 (USDI Fish and Wildlife Service 1993). More recently, Kasworm et al. (2010) calculated a minimum population estimate of 42 bears for the CYRZ from 2004 to 2009. This included a minimum of 16 individuals in the Cabinet Mountains and 26 individuals the Yaak portion of the recovery zone. Rates of increase for the period from 1983 to 1998 suggested an increasing population (Wakkinen and Kasworm 2004); however, Kasworm et al. (2010) calculated an overall probability of 78 percent that the population was declining from 1983 to 2009. Human-caused mortality has been a significant component in these declines and appears to be largely responsible for the decline in the rate of increase (Kasworm et al. 2010).

As part of an effort to maintain the existing small population of bears in the CYRZ, four sub-adult female grizzly bears were captured in British Columbia and released into the Cabinet Mountains from 1990 to 1994 (USDI Fish and Wildlife Service 1990, Servheen et al. 1987). Three of the four bears remained within the area for at least one year. The success of this initial effort resulted in additional augmentations of seven grizzly bears (six females and one male) from 2005-2010 from the North and South Fork of the Flathead River (U.S.) and the Whitefish Mountain Range (Kasworm et al. 2006, Kasworm et al. 2009, and W. Kasworm pers. comm. 7/21/2010, W. Kasworm pers. comm. 7/27/2010). Two of the female grizzlies returned to their capture area in the Whitefish Mountains in 2010 (W. Kasworm pers. comm. 8/18/2010). The success of the augmentation program is reflected in the increase in the estimated population within the Cabinet-Yaak Recovery Zone since the early 1990s.

Augmentation has not been used in the SRZ to date.

Bear Mortality

Grizzly bear mortalities, both natural and human-caused, are important factors limiting the growth of bear populations in the SRZ and CYRZ (USDI Fish and Wildlife Service 1993). The mortality goal for both SRZ and CYRZ is zero human-caused mortality (ibid). This goal has not been reached as the number of mortalities has been exceeded during many years since research began in the SRZ and CYRZ in the early 1980s.

Two grizzly bear mortalities were documented in Selkirk and Cabinet-Yaak ecosystem in 2010. This included a sub-adult female that was hit and killed in August on B.C. Highway 3 in the SRZ and an adult male that was shot in the CYRZ in October. In 2011, eleven grizzly bear mortalities were noted. This included six[3] in the SRZ and five in the CYRZ (Wakkinen et al. 2011, Kasworm et al. 2011, Kasworm 2012).

Demographic Recovery Plan Criteria

The 1993 Grizzly Bear Recovery Plan identified three demographic criteria to evaluate the status of grizzly bear recovery (USDI Fish and Wildlife Service 1993). This included: 1) the number of unduplicated counts of female grizzly bears with cubs; 2) distribution of females with cubs by bear management unit (BMU); and 3) the number of known human-caused grizzly bear mortalities. The following tables include the 2009-2010 demographic data for the SRZ and CYRZ.

Table 18. Status of the Selkirk Recovery Zone in relation to the demographic recovery targets, 2009 and 2010 (from Wakkinen et al. 2010 and Wakkinen pers. comm. 2012)

Delisting Parameter	Delisting Target	2009 Status	2010 Status
Females w/Cubs (6-year average)	≥6.0	0.3	Not available[2]
Mortality Limit (4% of minimum estimate)	0	1.8	Not available
Female Mortality Limit (30% of total mortality)	0	1.2	Not available
Distribution of Females w/Young	7 of 10 BMUs	0 of 10 BMUs[1]	Not available

[1]There were no observations of family groups in the BMUs in 2009 due in part to the lack of radio-collared grizzly bears in the U.S. portion of the recovery zone. Myrtle, Sullivan-Hughes, Long-Smith, and Kalispell-Granite BMUs were occupied by family groups in 2008.
[2]This information was not available from the Idaho Department of Fish and Game at the time of publication.

[3] All but one of these occurred in the British Columbia portion of the ecosystem.

Table 19. Status of the Cabinet-Yaak Recovery Zone in relation to the demographic recovery targets, 2009 and 2010 (from Kasworm et al. 2010)

Delisting Parameter	Delisting Target	2009 Status	2010 Status
Females w/Cubs (6-year average)	≥6.0	2.0	Not available
Mortality Limit (4% of minimum estimate)	1.6	1.0	Not available
Female Mortality Limit (30% of total mortality)	0.5	0.5	Not available
Distribution of Females w/Young	18 of 22 BMUs	11 of 22 BMUs[1]	Not available

[1]Snowshoe (2), Spar (3), Bull (4), St. Paul (5), Wanless (6), Roderick (11), Keno (13), NW Peak (14), East Fork Yaak (16), Big Creek (17), and Boulder (18) BMUs were occupied by family groups in 2009.
[2]This information was not available from the Idaho Department of Fish and Game at the time of publication.

Habitat Security Management for Grizzly Bears

The Grizzly Bear Recovery Plan (USDI Fish and Wildlife Service 1993) identified adequate effective habitat as the most important element in grizzly bear recovery. Effective habitat is a reflection of an area's ability to support grizzly bears based on the quality of the habitat and the type/amount of human disturbance imposed on it. Security habitat allows for sufficient space for grizzly bears to roam and effectively use available habitats. By definition, security habitat is an area or space outside or beyond the influence of high levels of human activity. Open roads, vegetation and fuel projects, and high-use recreational areas such as trails or campgrounds are examples of activities that reduce the amount of secure habitat that is available to grizzly bears. Traffic on roads disrupts bear behavior and social dynamics, reduces the availability and use of adjacent habitats, creates barriers to movement, and leads to an increased risk of mortality.

Habitat security for grizzly bears is measured annually in fifteen grizzly bear BMUs in the SRZ and CYRZ. The SRZ contains ten BMUs including five on the IPNF, four which are shared with CNF, and one BMU located on the Idaho Department of Lands (IDL). One of these BMUs, LeClerc, (which is primarily on the CNF with a minor portion on the IPNF) is less than 75% Federal ownership. Twenty-two BMUs are contained within the CYRZ, including 15 BMUs on the KNF, one BMU on the LNF, four BMUs on the IPNF, and two BMUs shared between the KNF and IPNF. One of these BMUs (Grouse BMU on IPNF) is less than 75 percent Federal ownership. With the exception of the 28 square mile Lakeshore BMU in the SRZ, each BMU is approximately 100 square miles which represents the average home range of a female grizzly bear with cubs (Christensen and Madel 1982).

Controlling and directing motorized access is one of the most important tools in achieving habitat effectiveness and managing grizzly bear recovery (ibid). By controlling motorized access, certain objectives can be achieved including minimizing human interactions and potential grizzly bear mortality, reducing displacement from important habitats, and minimizing habituation to humans. Habitat effectiveness, Open Motorized Route Density (OMRD), Total Motorized Route Density (TMRD), and core area are four parameters used to quantify habitat security for the grizzly bear. These are explained in more detail below:

<u>Habitat Effectiveness</u>: The IPNF Forest Plan directs that grizzly bear management emphasize maintaining adequate security while providing seasonal habitat components. The Kootenai and IPNF forest plans specify that management for grizzly bear recovery strive for a minimum of 70 % (KNF) or 70 square miles (mi^2) (IPNF[4]) of security habitat or other established thresholds within each grizzly bear

[4] Selkirk RZ: Minimum security habitat standards for the Kalispell-Granite BMU were established at 70% of the BMU (USDA Forest Service 1995) as opposed to 70 mi2, as this was felt to be more appropriate for the size of the BMU (130 mi2) and better met the intent of the cumulative effects process outlined by Christensen and Madel (1982). When the Lakeshore BMU was

management unit (BMU) based on a BMU size of approximately 100 mi^2 (i.e. Christensen and Madel 1982 cumulative effects analysis process). Habitat effectiveness (HE) is calculated by buffering all open roads, timber harvest activities, and high use recreational features by ¼ mile. Habitat outside of the buffer is considered secure.

<u>OMRD, TMRD, and core area</u>: Research completed after the development of the IPNF Forest Plan indicated that open road density and security habitat calculations alone are not a complete measure of the effects of motorized access on grizzly bear habitat use, since grizzly bears tend to avoid closed roads as well as open roads (Mace and Manley 1993, Mace et al. 1996). Results from those studies demonstrated that grizzly bear use of an area declines as total road densities (open and closed roads) exceed 2.0 mi/mi^2 and open road densities exceed 1.0 mi/mi^2 (Mace and Manley 1993). In addition, if roads are located in or next to key habitat components such as riparian areas, snow chutes and shrub fields, important resources within these areas may be unused by bears because of their avoidance behavior, resulting in significant habitat loss. Core area habitats are defined as areas of secure habitat within a BMU that contain no motorized travel routes or high use non-motorized trails during the active bear year and are more than 0.31 miles (500 meters) from a drivable road. These areas are an important component for adult female grizzly bears that have successfully reared and weaned offspring (IGBC 1994, 1998).

Within the SRZ and CYRZ, Wakkinen and Kasworm (1997) found that grizzly bears used the following conditions in regards to roads:

- Open Road Density > 1 mi/square miles (must be 33 percent or less of a BMU),
- Total Road Density > 2 mi/square miles (must be 26 percent or less of a BMU),
- Core Habitat must be at least 55% of the BMU

Per the 2011 Biological Opinion (BO) for the IPNF, habitat effectiveness was dropped as a standard and access standards were set for each BMU (greater than ≥75% federal ownership) with regards to OMRD, TMRD, and Core Area in order to maintain the unit in a condition that promotes viability of the grizzly bear population (USDI Fish and Wildlife Service 2011). In general, the BO adopted the Wakkinen and Kasworm (1997) access parameters (i.e. OMRD≤33%:TRMD≤26%:Core≥55) and spelled out timelines for implementation, administrative use, and reporting requirements. Tables 20 and 21 display OMRD, TMRD, Core Area, and Habitat Effectiveness in each BMU in 2010 and 2011.

Table 20. Cabinet-Yaak and Selkirk Bear Management Unit Summary for the 2010 Bear Year [April 1 through November 15][1]

Bear Management Unit	Open Roads >1 mi/mi^2 (%)	Total Roads >2 mi/mi^2 (%)	Federal Land (%)	Core Area (%)	Habitat Effectiveness[2] (70% or 70 sq. mi)
13 - Keno	33 (33)	25 (26)	99+	59 (59)	72
14 - NW Peak	28 (31)	26 (26)	99+	56 (55)	76
18 - Boulder	33 (33)	35 (29)	92	50 (55)	66
19 – Grouse[3]	61 (59)	59 (55)	54	32 (37)	51
20 - North Lightning	38 (35)	20 (20)	94	61 (61)	71
21 - Scotchman	33 (34)	25 (26)	81	63 (62)	68
Blue Grass	29 (33)	28 (26)	96	50 (55)	72
Long-Smith	21 (25)	14 (15)	92	73 (67)	85
Kalispell-Granite	33 (33)	28 (26)	96	50 (55)	98
Salmo-Priest	31 (33)	24 (26)	99	67 (64)	75

delineated, it was recognized as atypical since it is significantly smaller than most other BMUs (28 square miles) and would not be able to meet the 70 square miles of security standard (USDA Forest Service 1995).

Bear Management Unit	Open Roads >1 mi/mi^2 (%)	Total Roads >2 mi/mi^2 (%)	Federal Land (%)	Core Area (%)	Habitat Effectiveness[2] (70% or 70 sq. mi)
Sullivan-Hughes	23 (24)	19 (19)	99	64 (61)	81
Myrtle	30 (33)	20 (22)	85	60 (56)	74
Ball-Trout	17 (20)	11 (13)	94	72 (69)	77
Lakeshore	83 (82)	54 (56)	86	19 (20)	9
Le Clerc[4]	40	58	64	27	67

[1]Values in parenthesis reflect standards from the 2011 amendment to the IPNF Forest Plan (USDA Forest Service 2011). Habitat Effectiveness was dropped in November of 2011 as a standard that would be tracked annually.
[2]The Kootenai and Lolo NFs report 70%; the IPNF report 70 mi^2, per Forest Plans.
[3]Grouse BMU numbers assume no contribution to core or low road densities from private land.
[4]LeClerc has a no net decrease in core on Federal lands standard only, due to low percentage of Federal land.

Table 21. Cabinet-Yaak and Selkirk Bear Management Unit Summary for the 2011 Bear Year [April 1 through November 15][1]

Bear Management Unit	Open Roads >1 mi/mi^2 (%)	Total Roads >2 mi/mi^2 (%)	Federal Land (%)	Core Area (%)	Habitat Effectiveness[2] (70% or 70 sq. mi)
13 - Keno	33 (33)	25 (26)	99+	59 (59)	72
14 - NW Peak	28 (31)	26 (26)	99+	56 (55)	76
18 - Boulder	34 (33)	35 (29)	92	49 (55)	66
19 – Grouse[3]	60 (59)	59 (55)	54	32 (37)	52
20 - North Lightning	35 (35)	19 (20)	94	64 (61)	74
21 - Scotchman	37 (34)	27 (26)	81	63 (62)	65
Blue Grass	35 (33)	28 (26)	96	50 (55)	72
Long-Smith	21 (25)	14 (15)	92	73 (67)	85
Kalispell-Granite	36 (33)	27 (26)	96	52 (55)	96
Salmo-Priest	30 (33)	24 (26)	99	67 (64)	75
Sullivan-Hughes	25 (24)	19 (19)	99	63 (61)	80
Myrtle	30 (33)	20 (22)	85	60 (56)	74
Ball-Trout	18 (20)	11 (13)	94	72 (69)	77
Lakeshore	81 (82)	50 (56)	86	21 (20)	9
Le Clerc[4]	46	58	64	27	67

[1]Values in parenthesis reflect standards from the 2011 amendment to the IPNF Forest Plan (USDA Forest Service 2011). Habitat Effectiveness was dropped in November of 2011 as a standard that would be tracked annually.
[2]The Kootenai and Lolo NFs report 70%; the IPNF report 70 mi^2, per Forest Plans.
[3]Grouse BMU numbers assume no contribution to core or low road densities from private land.
[4]LeClerc has a no net decrease in core on Federal lands standard only, due to low percentage of Federal land.

Tables 22, 23, 24, and 25 summarize specific actions that resulted in changes to access parameters for each BMU in the CYRZ and SRZ, 2010-2011.

Table 22. Actions taken that resulted in changes from Bear Year 2009 to Bear Year 2010 in the Cabinet-Yaak Recovery Zone

Bear Management Unit	ACTIONS
13 - Keno	Changes in values (OMRD decreased from 34% to 33%; habitat effectiveness increased from 71% to 72%; and Open Road Density decreased from 0.84 to 0.82 mi/mi^2) due to the Buckhorn mine road being gated up to 'The Scout' in 2009.
14 - NW Peaks	No Change
18 - Boulder	OMRD changed slightly, but did not have percentage changes. Continued post-sale piling activities further in on Forest Road 2267 (Kitkatkee Timber Sale).
19 - Grouse	Forest Road 2636 (Van Dyke Road) on the south end (berm 239) appeared to have been accessed via breaching the berm. Approximately 1.3 miles of road had evidence of motorized use that ended at a well-used footpath heading off the main road. Forest Road 2636 became significantly more brushed in beyond the 1.3 mile area and no ATV tracks were noted beyond that point. Forest Road 2636 on the north end (gate #240) seemed to be inaccessible to motorized traffic partly due to the relocation (more defensible) of the gate in October 2009, and partly due to the brushy condition of many segments of the road. An OMRD deduction was taken for the 1.3 mile section. In late September 2010, the berm on the south end of the Forest Road 2636 "loop" was made wider and deeper in an attempt to eliminate motorized access. Gate checks following the berm improvement recorded no evidence of motorized use. The gate on Forest Road 2236 (gate 203) showed evidence of breaching during the 2010 bear year and in late October the gate sustained some damage, presumably from a vehicle pushing on it. It's unclear how often this gate had been breached during 2010 but gate inspections didn't note breaching until late August. Boulder placement and trenching during the 2009 bear year was obviously not entirely successful in preventing the unauthorized motorized use. A 2011 field review is planned to determine if a better solution exists and to determine how much of Forest Road 2236 is being accessed. Approximately 2.8 miles of restricted road was potentially accessed during the 2010 season, therefore, an OMRD deduction was taken again here for the 2010 bear year. Forest Road 280D is gated. However, the private landowners (Peotter) have access to their property via this gate. The Peotter's road use permit was reissued in the fall of 2009 with the requirement for tracking their own access and reporting it to the District's Lands staff. Forest Road 280D was modeled as open. Forest Road 2656C had unauthorized motorized use documented in late July. The lock was missing and the gate was open. The LEO was contacted because a pick-up truck was observed approximately 0.5 miles up the road cutting firewood. Conservatively, approximately 1.2 miles of Forest Road 2656C was modeled as open. Forest Road 2656B had unauthorized motorized use documented in October. The gate slider arm tab was broken off allowing the gate to be opened. Firewood cutting was noted behind this gate. Approximately 1.5 miles of Forest Road 2656B was modeled as open.
20 - North Lightning	Approximately 4.3 miles of Rattle Creek Road (473-FDR) was accessible administratively to motorized vehicles during the active bear year in 2010 for road work associated with the Lightning Creek Restoration Project resulting impacts to core, OMRD, and TMRD. Approximately 1,327 acres of temporary core impacts were associated with the work done on Forest Road 473 during the 2010 bear year. Access to a quarry site on Forest Road 1054/1054A for road work associated with the Lightning Creek Restoration project was completed during the fall of 2009 and the beginning 300 yards was obliterated to prevent motorized access. The 2009 temporary impact to core, OMRD, and TMRD was not reported for the 2010 bear year.

Bear Management Unit	ACTIONS
21 - Scotchman	Forest Road 1184 (E. Fork), Forest Road 1030 (Char Creek), and Forest Road 1030UA were all inaccessible due to a placement of a barrier on Forest Road 1184 just 0.10 mile from the JCT with Forest Road 419. Core, OMRD, and TMRD were all improved for the 2010 bear year; however, these improvements will not be realized during the 2011 bear year due to the decommissioning work planned during the 2011 field season. Approximately 2,068 acres of core habitat was temporarily gained during the 2010 bear year due to the barrier that closed approximately 2.7 miles of open road and approximately 6 miles of gated road.

Table 23. Actions taken that resulted in changes from Bear Year 2009 to Bear Year 2010 in the Selkirk Recovery Zone[1]

Bear Management Unit	ACTIONS
Blue Grass	OMRD increased from 2009 bear year as a result of two unregulated border crossings (Forest Road 2450) being closed by Department of Homeland Security (DHS), necessitating use of an alternate route by Continental Mine owners to their inholding in Blue Joe Creek. Monitoring by IPNF personnel and reported use by the landowners themselves indicate that administrative use limits were exceeded on restricted roads along this alternate route, which includes Forest Roads 1009, 636, 1011 and 2546. All lateral roads along this main route have been gated to control unauthorized access. Since the portion of 2450 north of 2546 along Blue Joe Creek was not yet physically closed by DHS during the summer, it was assumed that use along this road also exceeded use limits (although such use would technically be illegal). Additionally, the IPNF became aware of a DHS radio repeater on the mine property on Continental Mountain, which DHS agents access using OHVs on restricted Forest Road 1388. Remnants of this road continue across the mine property to their main access point on Forest Road 2546. Although much of this route is not currently drivable by passenger vehicle, it could all be conceivably traversed by OHV, and the IPNF has no authority to regulate vehicular use on the mine property itself. Without knowing what level of use is present, the conservative approach is to model this route as "open" for reporting purposes. The portion of Forest Road 1388 on IPNF-administered property is a candidate for use monitoring (using traffic counters) in the future. There were small changes to TMRD and core area, although not enough to change whole (rounded) percentages. TMRD increased slightly due to modeling of the portion of Forest Road 1388 on Continental Mine property as passable by OHV (this may change in the future if it is determined that it is not functioning as such). Core area decreased slightly because of this, but this was offset by a slight increase as a result of the IPNF determination that Trail 308 did not receive enough use during the summer season to be categorized as a "high-use non-motorized trail" by IGBC definition.
Long-Smith	No changes from bear year 2009.
Ball-Trout	No changes from bear year 2009.
Myrtle	OMRD increased because Forest Road 2405 was modeled as open to remove decked logs from the Big Mack timber sale. Forest Road 18-UT has been modeled as restricted in the past (it is gated), but this road accesses the water collection facility for the City of Bonners Ferry (Myrtle Creek is the municipal watershed). Since this road receives regular use by city employees & likely exceeds administrative use levels, it should be modeled as open. Also, the IPNF have recently acquired the property this road physically lies on, so it should be added to the transportation system. No change in core or TMRD percentages.

Bear Management Unit	ACTIONS
Kalispell - Granite	Road 308 along Kalispell Creek was in the process of being decommissioned throughout most of the summer and fall bear season. In association with that work, the following roads had use above administrative allowances: Forest Road 311 was open to the public to allow an alternative access route (main reason for OMRD increase). Forest Road 308 reroute (not numbered yet) was being constructed and therefore added to OMRD/TMRD and locally lost core. Forest Road 657 was opened to allow haul to and from the gravel pit, as well as decommissioning and reconstruction work. Forest Road 1014 was decommissioned (open) (will see core gain here next bear year). Hungry Creek road decommissioning of Forest Road 2119 was completed during the summer and fall season of 2009. TMRD and core area improvements for last season's work were claimed this season. Decommission work was also completed on Forest Road 1351 UG and Forest Road 2120 (Deer Creek) but trips did not exceed administrative use allowances and the work was completed relatively quickly. Work on Forest Road 2120 was confined to the "front end" and consisted of two days' worth of excavator only work. Core area improvements were realized for the majority of the area around the 2009 decommissioning and are claimed in 2010. Stimson Road in T.36N. R.45E. Sec. 7 was actively used during the 2010 season according to Theresa Contreras, Colville NF. Coded this road as "4". It only accounted for a 0.06% increase in OMRD.
Lakeshore	Forest Road 1340 A-F (Fedar Creek) was decommissioned (approximately 3.0 miles) during the fall season during a time when these roads were typically closed. This road is already modeled as open because it is seasonally opened during the summer season. The decommissioning will improve TMRD and core area for reporting in 2011. Forest Road 2249 was decommissioned (approximately 1.95 miles) during the fall bear season. Trips on Forest Road 2249 exceeded administrative use limits so this road was modeled as "open" during the 2010 season. A small section of impassable road was temporarily opened in order to decommission which resulted in a slight TMRD increase, and very short term impact to core (17.4 acres). OMRD increased by 1% due to the opening of this road for decommissioning work. Gate 113, which controls access to Forest Roads 1351/1351UI/1351UX had repairs completed in 2009. In 2010, CDI forms noted some unauthorized motorcycle access around the gate but that use did not appear to be "chronic"; therefore, an OMRD deduction was not taken for that road system in 2010.
Sullivan-Hughes	The IPNF re-classified an existing non-motorized trail from high intensity use to low intensity use, based on data collected in the field. This accounted for the increase in core habitat in the Sullivan-Hughes BMU in 2010.
Salmo-Priest	The IPNF re-classified an existing non-motorized trail from high intensity use to low intensity use, based on data collected in the field. This accounted for the increase in core habitat in the Salmo-Priest BMU in 2010. No other projects were completed that affected road densities, core habitat, or seclusion habitat in this BMU. Numerous activities on the Colville National Forest portion of the BMU.
Le Clerc	Numerous active projects on the Colville National Forest portion of the BMU.

[1]Note: On-going field validation of road status and INFRA road database cleanup may contribute to some change each year. Conditions on the ground do not necessarily change from the previous year.

Table 24. Actions taken that resulted in changes from Bear Year 2010 to Bear Year 2011 in the Cabinet-Yaak Recovery Zone

Bear Management Unit	ACTIONS
13-Keno	Updated based on IPNF roads layers. No on-the-ground changes.
14-NW Peaks	No Change
18-Boulder	*OMRD increase, Core decrease, no change to TMRD* OMRD increased due to road storage activities on FSR 2627 (plus spur), FSR 2112, and FSR 2173/2173A. Also, during the analysis for the Leonia Restoration project a mapping error was discovered that resulted in a 76 acre (0.1 %) core decrease, which effectively lowered the rounded value by one percent to 49 percent (49.4). TMRD and OMRD were unaffected by this error.
19-Grouse	*Core no change, OMRD decrease, TMRD no change* In bear year 2010, an OMRD deduction was taken for a 1.3 mile section of Forest Road 2626. In late September, 2010, the tank trap/berm on the south end of the Forest Road 2636 "loop" was made wider and deeper in an attempt to eliminate motorized access. Gate inspections during the 2011 season concluded this closure to be effective. Horse users have done some brushing on the right which may, in the future, make it easier for ATVs to access the old roadbed behind the improved tank trap. There was no evidence that breaching occurred this season, therefore, no OMRD deduction was taken during the bear year 2011. The gate on Forest Road 2236 (gate 203) showed evidence of breaching again during the 2011 bear year. Plans to place boulders during the 2011 season did not materialize due to contract and budget issues. It's unclear how often this gate had been breached during 2011 but gate inspections noted breaching occurring in June and August. The flat terrain makes this area difficult to provide a long-term effective closure. Approximately 2.8 miles of restricted road (Forest Road 2236 and Forest Road 2236A) was potentially accessed during the 2011 season, therefore, this road was modeled as open for the 2011 bear year. Forest Road 280D is gated however the private landowners (Peotter) have access to their property via this gate. The Peotter's road use permit was reissued in the fall of 2009 with the requirement for tracking their own access and reporting it to the District's Lands staff. The access report has not been received (to date). Forest Road 280D was modeled again as open. Forest Road 2656B had unauthorized motorized use documented in October 2010. The breach was fixed early in the 2011 summer season, however, a new ATV trail coming off the main Forest Road 2656 that goes behind the gate on the right side again made this closure ineffective. Approximately 1.5 miles of Forest Road 2656B was modeled as open again for the 2011 season. Forest Road 2260A gate 28 had a damaged locking tab (cut off) which left it ineffective in preventing access. Not this entire road was drivable, so only the first 1.1 mile was modeled as open for the 2011 season.
20-North Lightning	*Core increase, OMRD decrease, TMRD decrease* Approximately 4.3 miles of Rattle Creek Road (473-FDR) was accessible administratively to motorized vehicles during the active bear year in 2010 for road work associated with the Lightning Creek Restoration. Decommissioning work and placement of a gate at Clatter Creek was completed during the fall of 2010 and therefore core gains (approximately 1,843 acres) were realized for the 2011 bear season.
21-Scotchman	*Core temp loss, OMRD temp increase, TMRD temp increase* Forest Road 1184 (E. Fork), Forest Road 1030 (Char Creek), and Forest Road 1030UA were accessible administratively to motorized vehicles during the active bear year in 2011 for road work associated with the Lightning Creek Restoration. The temporary improvements to Core, OMRD, and TMRD reported for bear year 2010 are expected to become long-term or permanent gains reported for bear year 2012.

Table 25. Actions taken that resulted in changes from Bear Year 2010 to Bear Year 2011 in the Selkirk Recovery Zone

Bear Management Unit	ACTIONS
Blue Grass	*OMRD increase, no change to Core or TMRD* Route used by Continental Mine owners to their inholding in Blue Joe Creek modeled as "open," including Forest Roads 1009, 636, 1011 and 2546. Vehicular use either known (1009) or suspected (2546) to have exceeded administrative use limits. OMRD increase from 2010 bear year as a result of number of trips exceeding use limits on upper segment (behind gate) of Forest Road 636, mainly due to unplanned trips by IDFG personnel for gray wolf research. Also, gated segment of Forest Road 1013 ("Bog Creek Road") shows ATV use (including trees sawed out). Suspect DHS Border Patrol using road at some unknown level for patrol activities. Modeled as "open."
Long-Smith	No changes
Ball-Trout	*OMRD increase, no change to Core or TMRD* OMRD increase resulting from use of gated portion of Forest Road 2411 for salvage of blowdown for Kootenai River restoration project. Although much of the length of restricted portion of 2411 is in Myrtle BMU, the terminus (and salvaged area) is in Ball-Trout BMU.
Myrtle	*No change to Core or TMRD, no percent change in OMRD* Changes from 2010 included returning Forest Road 2405 to "restricted" status (this road was modeled as open in 2010 to remove decked logs from the Big Mack timber sale), and modeling gated portion of Forest Road 2411 as "open" for road decommissioning, and for salvage of down trees to provide materials for Kootenai River restoration project being conducted by Kootenai Tribe of Idaho. Net result was no change in OMRD percentage (30). No change in core or TMRD.

<table>
<tr><th>Bear Management Unit</th><th>ACTIONS</th></tr>
<tr><td>Kalispell - Granite</td><td>Core increase, OMRD increase, TMRD decrease
Decommissioning of Forest Road 308 and Forest Road 308A along Kalispell Creek was completed during 2010 so the improvements associated with that work are reflected in bear year 2011 numbers.

Decommissioning of Forest Road 1351 in Bath Creek was completed during 2010 so the improvements associated with that work are reflected in bear year 2011 numbers.

Forest Road 1014 decommissioning was completed in fiscal year 2010 so the improvements associated with that work are reflected in bear year 2011 numbers.

Forest Road 311 was open to the public again in 2011 to allow an alternative access route during the continued construction of Forest Road 308 reroute and reconstruction of Forest Road 1110.

Forest Road 308 reroute and Forest Road 1110 were open administratively to allow for construction activities in bear year 2011.

Forest Road 657 was opened administratively to allow haul to and from the gravel pit, as well as decommission and recontouring work. Approximately 4.3 miles of decommissioning work was completed on the northern portion of Forest Road 657 this season. Associated improvements to core, OMRD, and TMRD are expected to be realized in bear year 2012. The 0.7 mile section of Forest Road 657 that is south of the rock pit had been decommissioned in 2010 and so is reflected as a code “9” for bear year 2011.

Forest Roads 1376, 1376A, and 1376UB (~2.9 miles) were opened administratively to allow for decommissioning work. Improvements associated with that work should be reflected in bear year 2012 numbers.

Forest Roads 1112, 1112A, 1112B, 1112AUA, and 1112UA (~3.5 miles) were opened administratively to allow for decommissioning work. Improvements associated with that work should be reflected in bear year 2012 numbers.

The following roads were decommissioned during this fall season with the use of explosives: Forest Road 337B, 1323, 1323A, 1362C and 1362D. Due to the short duration of the decommissioning activity and walk-in access only, the gated “2” status of these roads remained unchanged (IGBC 2) for 2011. Improvements associated with this work will be reflected in bear year 2012 numbers.

Stimson Road in T.36N. R.45E. Sec. 7 was again actively used during the 2011 season according to Theresa Contreras, Colville NF. Coded this road as “4”. It only accounted for a 0.06% increase in OMRD.</td></tr>
<tr><td>Lakeshore</td><td>Core increase, OMRD decrease, TMRD decrease
Forest Road 1340 A-F (Fedar Creek) was decommissioned (approximately 3.0 miles) during the Fall of 2010 and so improvements to core (~323 acres), OMRD, and TMRD were realized for the 2011 season.

Forest Road 2249 decommissioning (approximately 1.95 miles) was completed during the fall of 2011 so improvements would be realized in Bear Year 2012. OMRD deduction was taken for 2011.</td></tr>
</table>

Bear Management Unit	ACTIONS
Sullivan-Hughes	IPNF Projects - The IPNF completed **no** activities that affected core habitat, TMRD, or seclusion habitat in this BMU. Administrative Use trips (2) behind Gate 1 and 13 on Forest Road 662 were reported during the spring bear restriction period. This road is analyzed as an open road since the restriction only extends from 3/15 through 6/30. CNF Projects - The CNF completed **no** activities that affected road densities, core habitat, or seclusion habitat in this BMU. Stimson Projects - Stimson owns one section of land in this BMU (T.37N, R.44E, Section 1). Stimson's West Nile Timber Sale was active from October to the beginning of December in the section. As a result of this project, we classed a segment of Forest Road 1935018 as active (open) for the year. US Customs and Border Protection (CBP) - Border Patrol agents repeatedly accessed two restricted roads on the IPNF in 2011. They drove full-sized vehicles on Forest Road 1388 up to the Continental Mine, and Forest Road 1343 in the Hughes Ridge area. From the end of Forest Road 1343 they drove all-terrain vehicles on a non-motorized trail at least up to Cabinet Pass (pers. comm. with L. Bernhardt). We classed the road and trail segments used as active (open) for the year. This activity resulted in a one percent drop in core habitat in the BMU in 2011.
Salmo-Priest	CNF Projects - In late summer of 2011, the CNF backhoe operator removed the gate on Forest Road 3160319 and installed several earthen berms on the road entrance and planted the old road prism. This approximately 1.0 mile long spur road will be classed as impassable/obliterated starting in 2012. The CNF completed no other projects that affected road densities, core habitat, or seclusion habitat in this BMU. IPNF Projects - The IPNF completed no projects that affected road densities, core habitat, or seclusion habitat in this BMU. CBP - When necessary, agents drive behind gates near the US - Canadian Border for law enforcement purposes. CBP vehicle entries on closed roads occur at a low level and they continue to provide us with a yearly log of entries (pers. comm. with S. Clift). CBP vehicles on open roads in this BMU are a now common sight. This increased law enforcement presence could act as a deterrent to illegal entries on closed roads, as well as to poaching.

Bear Management Unit	ACTIONS
Le Clerc	CNF Projects - In the fall of 2011, Forest Service employees and private contractors completed timber marking, contract inspection, and other work associated with the Hanlon Stewardship Project. As a result of this work, the allowable administrative entries on Forest Road 1935011 and 1935110 were exceeded in the fall bear season. We classed the segments of these two roads used as active (open) in 2011. The CNF put up wood fencing on the entrances of seven, user-created OHV trails at various sites on or near to the Hanlon Cut-off Road (Forest Road 1935115). We installed signs on the trail entrances prohibiting motorized travel and pulled slash and other debris into the trails. In late summer of 2011, the CNF converted a restricted road in the Dry Canyon area to reclaimed/obliterated status. The CNF backhoe operator removed the gate on Forest Road 1933155 and installed several earthen berms on the road entrance. This 0.4 mile spur will be classed as impassable/obliterated starting in 2012. Washington Department of Natural Resources (DNR) Projects - The DNR had an active timber sale in the lower portion of LeClerc Creek (pers. comm. with S. Fisher). Owing to its location between the open, East and West Branch LeClerc Creek Roads (County Roads 3521 and 3503), this project did not affect road densities, core habitat, or seclusion habitat in the BMU. Washington Department of Fish and Wildlife (WDFW) Projects - The CNF issued a restricted road use permit to a state wolf biologist so that he could to trap, radio-collar, and monitor individuals of the Diamond Wolf Pack. This activity occurred on Forest Road 1935011. Stimson Projects - Stimson had several forest management projects active in 2011 that resulted in five separate road segments being classed as active (open) in 2011.

Administrative Use and Monitoring: Per the 1998 IGBC recommendations (Selkirk Cabinet-Yaak Subcommittee of the Interagency Grizzly Bear Committee 1998) and 2001 Biological Opinion (USDI Fish and Wildlife Service 2001), the IPNF has adhered to recommended standards to address the level of motorized use on restricted roads (i.e. behind gates). This parameter is applied on an individual road basis, with those roads that exceed the use limits being treated as "open" for purposes of calculating OMRD. Per the 2001 Biological Opinion, the administrative use standards allow a certain number of vehicles on official Forest Service business to access gates that are closed to the general public. These include private vehicles which have authorization to conduct Forest Service business behind these gates. The maximum number of allowable vehicle trips by bear season for each gate is as follows: 19 trips during spring (April 1 to June 14) + 23 trips during summer (June 15 to September 14) + 15 trips during fall (September 15 to November 15) = 57 total. Administrative use needs change from year to year.

SRZ Administrative Use: During Bear Year 2010 in the SRZ, there were seven instances where administrative use levels exceeded allowable seasonal or total use levels (Table 26). During Bear Year 2011 on the IPNF and Colville National Forest in the SRZ, there were a number of instances where administrative use levels exceeded allowable seasonal use levels (Table 27). Roads that experienced administrative use in excess of the allowable trips—either seasonally or for the entire bear year—were considered "open" when determining the existing condition displayed in Table 27.

Table 26. Seasonal administrative use on the IPNF within the Selkirk Recovery Zone by Bear Management Unit, 2010[1]

Bear Management Unit	Number of Restricted Roads with Administrative Use During Bear Year 2010	Number of Restricted Roads Exceeding Administrative Use Levels in 2010			
		Spring 4/1-6/15 (≥19 round trips)	Summer 6/16-9/15 (≥23 round trips)	Fall 9/16-11/15 (≥15 round trips)	Total Use 4/1-11/15 (≥57 round trips)
Blue Grass	9	0	3	3	3
Long Smith	2	0	0	0	0
Kalispell Granite	8	0	3	2	3
Salmo Priest	1	0	0	0	0
Sullivan Hughes	4	0	0	0	0
Myrtle	3	0	1	0	0
Ball Trout	3	0	0	0	0
Lakeshore	2	0	0	1	1
LeClerc	0	0	0	0	0
Total	**32**	**0**	**7**	**6**	**7**

[1]Additionally administrative use on roads located on the Colville National Forest in the Salmo-Priest, Sullivan-Hughes, and Le Clerc BMUs are reported by the Colville National Forest.

Note: Once roads exceeded allowable round trips, they were considered open for analysis purposes for the remainder of the bear year.

Table 27. Seasonal Administrative Use within the Selkirk Recovery Zone by Bear Management Unit, 2011

Bear Management Unit	Number of Restricted Roads with Administrative Use During Bear Year 2011	Number of Restricted Roads Exceeding Administrative Use Levels in 2011			
		Spring 4/1-6/15 (≥19 round trips)	Summer 6/16-9/15 (≥23 round trips)	Fall 9/16-11/15 (≥15 round trips)	Total Use 4/1-11/15 (≥57 round trips)
Blue Grass	7	0	4	0	4
Long Smith	1	0	1	0	1
Kalispell Granite	8	0	5	5	5
Salmo Priest	8	0	2	2	2
Sullivan Hughes	2	0	1	1	1
Myrtle	2[1]	0	1[1]	0	1[1]
Ball Trout	2[1]	0	1[1]	0	1[1]
LeClerc	25	0	3	6	6
Lakeshore	1	0	1	0	1
Total	**56**	**0**	**19**	**14**	**22**

[1]Includes one share road between Myrtle and Ball-Trout BMUs.

Note: Once roads exceeded allowable round trips, they were considered open for analysis purposes for the remainder of the bear year.

CYRZ Administrative Use: During Bear Year 2010 in the CYRZ, there was one instance where administrative use levels exceeded allowable seasonal or total use levels (Table 28). Roads that experienced administrative use in excess of the allowable trips—either seasonally or for the entire bear year—were considered "open" when determining the existing condition displayed in Table 29. Additional instances of public trespass behind closed gates were documented in several BMUs, but the level of use was not determined.

Table 28. Seasonal administrative use on the IPNF within the Cabinet-Yaak Recovery Zone by BMU, 2010

Bear Management Unit	Number of Restricted Roads With Administrative Use During Bear Year 2010	Number of Restricted Roads Exceeding Seasonal and Total Administrative Use Levels During Bear Year 2010			
		Spring Use Period 4/1-6/15 (≥18 trips)	Summer Use Period 6/16-9/15 (≥23 trips)	Fall Use Period 9/16-11/15 (≥19 trips)	Total Use 4/1-11/15 (≥60 trips)
13-Keno	2	0	0	0	0
14-NW Peaks	2	0	0	0	0
18 - Boulder	8	0	1	1	0
19 - Grouse[1]	4	0	0	0	0
20 - North Lightning	0	0	0	0	0
21 - Scotchman	0	0	0	0	0
Total	**16**	**0**	**1**	**1**	**0**

[1]ATV trespass on all or portions of barriered/gated roads 2656B, 2656C, 2236, and 2636 were estimated to exceed allowable trips.

Note: Once roads exceeded allowable round trips, they were considered open for analysis purposes for the remainder of the bear year.

Table 29. Seasonal administrative use within the Cabinet-Yaak Recovery Zone by Bear Management Unit (BMU), 2011

Bear Management Unit	Number of Restricted Roads With Administrative Use During Bear Year 2011	Number of Restricted Roads Exceeding Seasonal and Total Administrative Use Levels During Bear Year 2011			
		Spring Use Period 4/1-6/15 (≥18 trips)	Summer Use Period 6/16-9/15 (≥23 trips)	Fall Use Period 9/16-11/15 (≥19 trips)	Total Use 4/1-11/15 (≥60 trips)
13-Keno	1	0	0	0	0
14-NW Peaks	4	0	0	0	0
18-Boulder	10	0	3	0	3
19-Grouse	5	0	1	0	1
20-North Lightning	0	0	0	0	0
21-Scotchman	1	0	1	1	1
22-Mt. Headley	7	0	0	1	0
Total	**28**	**0**	**5**	**2**	**5**

<u>Gate and Barrier Monitoring:</u> Per the 2001 Biological Opinion, the IPNF is required to monitor at least 10 percent of restricted roads to provide a reliable count of the combined Forest Service and industry administrative use occurring on these roads. Tables 30 and 31 summarize the annual monitoring completed on existing gates and barriers located within the respectively grizzly bear recovery zones on the Idaho Panhandle National Forests in 2010 and 2011. Beginning in 2012, the forests are required to ensure at least 30 percent of all gates and barriers within the respectively recovery zone are monitored annually (USDI Fish and Wildlife Service 2011).

In 2010, the IPNF monitored 95 and 52 percent of all gates and barriers under IPNF administrative authority in the SRZ and CYRZ, respectively.

Table 30. Summary of restricted and closed route monitoring within the Selkirk and Cabinet-Yaak Recovery Zones located on the IPNF, 2010[1]

Grizzly Bear Recovery Zone	Closure Type	Number of Devices	Number of Closures Monitored once or more during 2010 Active Bear Year	
			1	≥2
Selkirk	Gate	74	7	63
	Barrier	16	2	14
Cabinet-Yaak	Gate	56	5	39
	Barrier	39	0	5

[1]Data is on file at the Bonners Ferry, Sandpoint, and Priest Lake Ranger Stations.

In 2011, the IPNF monitored 64 and 53 percent of all gates and barriers under IPNF administrative authority in the SRZ and CYRZ, respectively.

Table 31. Summary of restricted and closed route monitoring within the Selkirk and Cabinet-Yaak Recovery Zones located on the Idaho Panhandle NF, 2011[1]

Grizzly Bear Recovery Zone	Closure Type	Number of Devices	Number of Closures Monitored once or more during 2010 Active Bear Year	
			1	≥2
Selkirk	Gate	74	13	44
	Barrier	16	0	1
Cabinet-Yaak	Gate	56	9	34
	Barrier	39	6	1

[1]Data is on file at the Bonners Ferry, Sandpoint, and Priest Lake Ranger Stations.

Record of Restricted Road Closure Repairs (Gates and Berms) in 2010 and 2011: Maintenance and repair of the existing closure devices within the recovery zones is an on-going process of site inspection and implementation of repairs and enhancements. Tables 32 and 33 document the repairs and maintenance that occurred within the recovery zones in 2010 and 2011 by BMU. In 2010, $6,900 was spent to implement closure maintenance and repairs with the two recovery zones and in 2011, $7,860 was spent for dedicated gate monitoring and $4,700 was allocated to implement closure maintenance and repairs within the two recovery zones. Most maintenance involved placing concrete posts or boulders or digging trenches adjacent to gates.

Table 32. Summary of restricted and closed route maintenance within the Selkirk and Cabinet-Yaak Recovery Zones located on the IPNF, 2010

Bear Management Unit	2010 Road Closure Repairs (by Gate Number)
Blue Grass	#2, #41, #117, GR18,
Long Smith	-
Kalispell Granite	GR10, #111
Salmo Priest	-
Sullivan Hughes	-
Myrtle	-
Ball Trout	#50
Lakeshore	-
Keno	Buckhorn Gate
Northwest Peaks	-
Boulder	#22
Grouse	Berm on FR2636 (not a gate)
North Lightning	#221
Scotchman	-

Table 33. Summary of restricted and closed route maintenance within the Selkirk and Cabinet-Yaak Recovery Zones located on the Idaho Panhandle NF, 2011

Bear Management Unit	2011 Road Closure Repairs (by Gate Number)
Blue Grass	#38, #100
Long Smith	#81, #281
Kalispell Granite	#111, GR9, 3 additional barriers (rd #308, #1014, & #1015A)
Salmo Priest	-
Sullivan Hughes	#9, #13, #14
Myrtle	-
Ball Trout	-
Lakeshore	-
Keno	-
Northwest Peaks	#57, #117
Boulder	-
Grouse	-
North Lightning	-
Scotchman	-

Population Research Efforts: In 2011, a DNA-based hair snare effort was initiated within the Cabinet-Yaak ecosystem (CYE) to quantify the number of grizzly bears residing in-and-around the recovery zone (Boulanger 2011, Kendal and Allen pers. comm. 2011). Field work to identity rub stations began in the summer of 2011. The IPNF contributed $10,000 to this effort.

In 2011, the IPNF proposed a re-collaring effort for the Selkirk ecosystem (SE) to help quantify population trends and further efforts to develop a good quality seasonal habitat map for the area. It has been almost a decade since grizzly bears were radio-collared in the U.S. portion of the SE. To that end, the Forest allocated $28,000 to purchase remotely down-loadable GPS radio collars, a transceiver, and trap monitors. In addition, they applied for a $25,000 USDI Fish and Wildlife Service grant to assist with costs associated with flying the ecosystem to download location information (via single engine aircraft) and the trapping crew.

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Forest Plan Monitoring Item F-3 Caribou Recovery

The purpose of this item is to monitor the population changes and the effectiveness of their habitat to determine if recovery objectives outlined in the Woodland Caribou Recovery Plan are being met (USDI Fish and Wildlife Service 1994).

Background

The Selkirk population of woodland caribou was listed as endangered by the U.S. Fish and Wildlife Service under an emergency listing process in 1983, with a final rule published in 1984 (USDI Fish and Wildlife Service 1985). At the time of listing, the population consisted of some 25-30 animals with a distribution situated around Stagleap Park in British Columbia and the nearby international border (Scott and Servheen 1985). The recovery area for caribou in the Selkirk Mountains is comprised of approximately 1,471 square miles in southern British Columbia, northeastern Washington and northern Idaho. Fifty-three percent of the recovery area is located in British Columbia, while the remaining 47 percent falls within the U.S. The USFWS published a proposed designation of critical habitat for the Southern Selkirk Mountain caribou population on November 30, 2011 (Federal Register 2011). The final rule is anticipated in November 2012.

The decline in woodland caribou numbers has been generally attributed to habitat loss, habitat fragmentation, and excessive mortality by predators and humans (Mountain Caribou Technical Advisory Committee 2002, USDI Fish and Wildlife Service 1985, 1994, and 2008).

Population Status

An intermediate population target of 100-109 caribou was initially set in the first Recovery Plan for woodland caribou (USDI Fish and Wildlife Service 1985). However, this target was not assumed to be a recovered population, with additional genetics and population modeling work required to reevaluate population viability and a recovered population size (USDI Fish and Wildlife Service 1994). In the short term, the 1994 Plan set a goal of maintaining two herds (in B.C. and Idaho) and the desire to establish a herd in Washington as well (ibid).

As part of the plan for their recovery, caribou were augmented into the ecosystem from populations[5] in British Columbia (USDA Forest Service 1985). In 1987, 1988, and 1990, 60 caribou were augmented into the Idaho portion of the ecosystem. As a result of these efforts the population within the southern Selkirks increased to approximately 55 to 70 animals by 1990. However, the population declined in 1996 in what is believed to be the result of increased rates of predation (Wakkinen and Johnson 2000). A subsequent augmentation effort was conducted in 1996 and 1997 to place 32 caribou into the Washington portion of the ecosystem, followed by a 1998 effort to release 11 additional caribou into the British Columbia portion of the recovery area (Almack 2000, USDI Fish and Wildlife Service 2008). However, similar declines were noted in the Washington portion of the recovery area (Almack 2000). Idaho Fish and Game documented only 1-3 caribou in the vicinity of Snowy top and Little Snowy Top[6] during the last five years of late winter census efforts. The Selkirk caribou population is currently estimated at 36 animals, with all 36 of these animals residing in British Columbia (Degroot et al. 2011).

Neither the interim population target of 100-109 animals nor the creation and maintenance of herds in Idaho and Washington have been achieved at this time. Currently, the existing distribution of caribou appears to be nearly identical to the mid-1980s when only a handful of caribou were using the Little Snowy Top-Shedroof divide area with any consistency. While the goal of establishing new herd groups

[5] Augmented caribou included both mountain and northern ecotypes based on the availability of animals from several source populations in British Columbia.
[6] Shedroof Divide situated on both the IPNF and CNF.

and increasing the local population within the United States has not been successful the program has been important in maintaining a core population of caribou within the overall recovery area (USGAO 1999) (USDI Fish and Wildlife Service 2008).

Forest Plan Direction

Appendix N of the Idaho Panhandle National Forests Forest Plan listed specific habitat management guidelines for caribou. The Forest Plan defined target conditions for each of five seasonal caribou habitats. Achieving target conditions is a long-term process, resulting from natural succession or manipulation of vegetation. The Forest Service continues to implement recommendations of the caribou steering committee and recovery teams, support Idaho Department of Fish and Game and Washington Department of Fish and Wildlife in winter caribou censuses and monitoring radio-collared caribou, and support research on predation and other factors that are preventing the recovery of this species.

A stand-based habitat suitability index (HSI) and habitat capability index (HCI) was developed as part of the 1987 IPNF Forest Plan (USDA Forest Service 1986). Subsequent updates and evaluation of the Idaho/Washington portion of the recovery area have been used for land management decisions from 1994 to 2007 (Allen and Deiter 1993, and Allen 1998). A landscape level habitat priority model was recently developed to facilitate a unified broad-scale assessment of caribou habitat throughout the recovery zone (Kinley and Apps 2007).

The 2001 Amended Biological Opinion for the Continued Implementation of the Idaho Panhandle National Forests Land and Resource Management Plan[7] (USDI Fish and Wildlife Service 2001), emphasized that increasing recreation pressure (during both winter and summer seasons) was decreasing habitat effectiveness for caribou. This included potential increases in caribou harassment, displacement, and possible injury in late winter habitats by snowmobile recreational activity (ibid).

The IPNF responded by developing a "Situation Summary and Management Strategy for Mountain Caribou and Winter Recreation" (USDA Forest Service 2004). This document provided a strategy to 1) educate the public on the existing closure areas and the effects of winter recreation on caribou; 2) emphasize law enforcement of existing snowmobile closure areas; and 3) monitor the effectiveness of closure areas and define existing snowmobile use (ibid). Subsequent implementation by the IPNF included enhanced information and education efforts and aerial monitoring of recreation versus caribou use. However, litigation in 2005 resulted in a 2007 injunction to preclude snowmobile use within much of the caribou recovery zone until the IPNF completed a Winter Travel Plan. Since 2007, the IPNF has conducted aerial and ground patrols in order to enforce this closure. Additional inventory and monitoring efforts have been conducted by IDFG and the Selkirk Conservation Alliance (SCA), respectively.

2010 Information and Education and Ground Monitoring

Five hundred closure maps were distributed to local gas stations, snowmobile dealers, and local resorts located in-and-around the closure area during the month of January. These maps were also posted at applicable trailheads and available at Forest Service district offices.

A total of nine on-the-ground compliance patrols were conducted during the months of January, February and March of 2010. Patrols consisted of visits to numerous locations including Smith Creek, Roman Nose, Continental Mine, Abandon Creek, Hughes Ridge, and the 302 trailhead and associated trails. Ground patrols did not find evidence of closure violations during seven of these patrols. Violations were noted in the Continental Mine area, along the 1382 road, and at Hughes Ridge. At least one of these was attributed to law enforcement patrols by the U. S. Border Patrol.

[7] The 2001 Biological Opinion for the continued implementation of the 1987 Forest Plan was necessary in order to comply with the revised regulations governing section 7 procedures of the Endangered Species Act. The 2001 BO administratively amended the original 3/24/1986 biological opinion to include an analysis of incidental take and an incidental take statement pursuant to CFR Part 402.14(i) (USDI Fish and Wildlife Service 2001).

2011 Information and Education and Ground Monitoring

Two news releases concerning the closure were sent out in December of 2010. A total of 1,000 closure maps were distributed to local gas stations, snowmobile dealers, and local resorts in the North Zone during December and January of 2011. These maps were also posted at applicable trailheads and available at Forest Service district offices.

The Forest Service conducted a total of twenty-five on-the-ground compliance patrols during the months of January through April of 2011. Patrols consisted of visits to numerous locations including Smith Creek, Roman Nose, Continental Mine, Abandon Creek, Hughes Ridge, Myrtle Creek, Snow Creek, Pack River, the 302 trailhead and associated trails. At least 180 snowmobilers were contacted during these patrols.

2010-2011 Winter Aerial Monitoring

Fixed-wing aerial monitoring of the snowmobile closure is used to determine where violations are most likely to occur, and helps focus subsequent on-the-ground compliance patrols and signage to reduce or eliminate further incursions into the closure. The number of winter patrols are limited by suitable flying conditions which are largely influenced by the weather (i.e. amount/type of precipitation, wind, and visibility). While snowmobilers are occasional observed during these flights, this type of monitoring effort typically results in an assessment of snowmobile activity after it has occurred in a given area. Therefore, it cannot typically be used to determine the intensity (i.e. how many riders) and duration of the snowmobiling activity. The technique is also limited by the observer's ability to see tracks from the air which is influenced by existing snow conditions, surface winds, aspect, elevation, amount of vegetation, and time of day (i.e. amount and direction of sunlight and associated shadows). Likewise, a lack of recent snowfall can make it difficult for the observer to discern old tracks from more recent snowmobile activity which increases the potential for "double" counting tracks in a given area. Finally, it can be difficult to discern where the closure boundary is from the air with a high degree of precision. This may result in some observed tracks being counted as "violations" when the rider may have been just outside the closure boundary. Subsequent ground patrols are helpful in discerning whether a violation occurred or not.

A total of nine flights were made in 2010 to document snowmobile use in-and-around the snowmobile closure area. Of the nine flights made in 2010, violations of the caribou closure on NFS lands (> 100 meters inside boundary) were noted in five general areas. Specific locations include the Pack River, Continental Mountain, West Fork Cabin, Cow Creek, Hughes Ridge, Grass Creek, and an unnamed lake located northwest of Little Snowy Top Mountain. In several instances it appeared that the snowmobiles were entering the closure area from access points on the Idaho Department of Lands. In the case of the unnamed lake, the snowmobilers were accessing the area from British Columbia. Most violations were concentrated in-or-around the court-ordered movement corridor located in the 1967 Trapper Creek Burn, and more than 6 miles from recent caribou use near Little Snow Top Mountain.

Of the four flights[8] made in 2011, violations of the caribou closure (> 100 meters inside boundary) were noted in the Blue Joe Creek, Continental Mountain, Hughes Ridge, and within the Trapper Creek Burn movement corridor. All of these violations were located approximately 6 miles or more from recent caribou[9] use near Little Snow Top Mountain.

Winter Census: As part of the Recovery Plan, a census technique for woodland caribou was developed and initiated in 1991 by the Idaho Department of Fish and Game (IDFG) to provide a minimum population and recruitment estimates (Wakkinen et al. 1996, USDI Fish and Wildlife Service 1994 and 2008). The technique quantifies the factors affecting visibility and provides statistically valid population estimates. The census is conducted in the winter (February through April) when caribou are at higher

[8] Incomplete report from SCA for 4/26/2011 flight.
[9] Woodland caribou were not observed in the U.S. or near Little Snowy Top in 2011.

elevations and in open-canopy forests. It involves a two-phase aerial survey using a “pre-survey” fixed-wing aircraft flight and a subsequent helicopter survey flight to note distribution, total numbers, and recruitment (via classification of adults versus calves) (Wakkinen et al. 1996). This technique is similar to what has been developed and implemented by others to accurately census big game populations (Resource Inventory Committee 2002). When coupled with the fixed-winged monitoring of the closure area that has been occurring since 2007[10], the population census effort provides the most accurate picture of woodland caribou numbers and distribution during the late winter season.

Minimum population estimates of 43 caribou were documented from the winter census in 2010, with only two of these animals found in the U.S. (Wakkinen et al. 2010). A total of 36 caribou were observed during the 2011 census but none of these animals were located in the U.S. (Degroot et al. 2011). Woodland caribou have not been observed south of the Little Snowy Top area during the combined winter census or snowmobile closure monitoring efforts since March of 2007 (Wakkinen 2003, 2004, 2005[11]; Wakkinen et al. 2006). At that time, a lone caribou was observed in the upper portion of the Ball Creek drainage (Wakkinen et al. 2007). Table 34 displays trends in the population since the inventory began in 1991.

[10] The USDA Forest Service has been conducting aerial monitoring of the closure area since 2007, and the Selkirk Conservation Alliance has been conducting aerial monitoring since 2008. In addition to documenting violations of the current snowmobile closure, observers also note the location and numbers of caribou or caribou tracks in the recovery area. This information is shared with IDF&G biologists to assist with census efforts (Project File Data).

[11] “Due to poor snow conditions the 2005 survey must be considered a minimum count and not a population estimate or census” (Wakkinen 2005).

Table 34. Trends in the southern Selkirk Mountain woodland caribou population size including resident and translocated caribou, 1991-2012 (Degroot et al. 2011, Wakkinen 2003 and 2008, Wakkinen et al. 2010)

Year	Winter Census Population Size		
	United States	British Columbia	Total
1991	26	21	47
1992	24	23	47
1993	23	28	51
1994	13	32	45
1995	13	39	52
1996	12	27	39
1997[a]	9	30	39
1998[b]	31	14	45
1999[c]	6	42	48
2000	3	31	34
2001	Poor snowpack—no census conducted		
2002	2	32	34
2003	1	40	41[d]
2004	3	30	33
2005	2	33	35[e]
2006	1	33	34[e]
2007	2	42	44
2008	3	43	46
2009	3	43	46
2010	2	41	43
2011	0	36	36

[a]Includes 19 animals released in 1996
[b]Includes 13 animals released in 1997
[c]Includes 11 animals released in 1998
[d]Not reliable
[e]Minimum count

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Forest Plan Monitoring Item G-2: Water Quality

Monitoring item G-2 describes the monitoring results designed to check and evaluate the effectiveness of forest management activities on watersheds, water resources, and their beneficial uses within the forest. Practices include Best Management Practices (BMP) monitoring, which cover implementation and effectiveness monitoring of activities that took place in 2010 or summarized based on previous years monitoring.

Water Quality and Water Resource Monitoring is intended to demonstrate that actions and practices are *implemented as designed* (implementation monitoring), are *functioning as effectively as intended* in controlling non-point sources of pollution (effectiveness monitoring), and are *achieving the objectives* of protecting water quality and beneficial uses as assumed (validation monitoring). The primary purpose of BMP monitoring is to demonstrate that BMPs and the forest's *Soil and Water Conservation Practices* are functioning as effectively as intended. If they do not adequately demonstrate effectiveness, then the practices may be re-evaluated and redesigned as necessary. Implementation and effectiveness monitoring on the Forest during 2010, demonstrated that present and past projects were usually successful in meeting their intended objectives (see also section K-1 for BMP monitoring results related to soil resources).

Summary of Turbidity Sampling of Short Creek during the Implementation of the Shortcake Habitat Improvement Project

Turbidity sampling was conducted as part of the Shortcake habitat improvement project located on the lower 1-mile stretch of Short Creek, a tributary to upper Tepee Creek. Results showed that turbidity was elevated during periods of in-channel work. However, turbidity levels were not excessive, and were not chronic, suggesting that impacts to fish and aquatic species were temporary and did not appear to displace fish from Short Creek (Table 35). Observations of fish abundance following the project showed that fish were well distributed throughout the project area. Actual data is available from District files.

Sampling Site A was located immediately downstream of the turbidity control structure. The turbidity control structure was located immediately downstream of station 0+00. The turbidity control structure was not moved during the implementation phase of the project. As work progressed upstream and the distance from the turbidity structure increased, turbidity readings decreased. Sampling Site B was located approximately 300 meters downstream of the turbidity control structure at the Junction of Forest Road 812 and Short Creek. Sampling Site C was located approximately 65 meters downstream of the confluence of Tepee Creek and Short Creek. Readings were taken in Tepee Creek at Site C.

Table 35. NTUs Measured for Short Creek

	Site A (n=41)	Site B (n=6)	Site C (n=6)
Average	18	8	4
Max	87	23	12
Min	1	1	1

Review of selected 2010 Suction Dredge NOIs in Beaver and Eagle Creek watersheds

In October 2010, the several Forest minerals administrators, and hydrologists and fisheries biologists reviewed a series of suction dredging operations on several tributaries of Beaver and Eagle Creeks. These areas typically receive the highest suction dredge mining use across the Forest. The group noted several areas where suction dredge operators were conducting activities outside the IDWR permit stipulations for suction dredging resulting in significant disturbance to streambed and channel morphology in small streams. Recommendations for improvement included increased administration by both the Forest Service and Idaho Dept. of Water Resources; hose size restrictions in smaller streams, improvements in reclamation at the end of the season, and increased education. It was suggested that three of the operations be put under Plans of Operation should operators want to continue to suction dredge at the same level of disturbance. None of the suction dredge operations were in designated critical habitat for Columbia River bull trout.

Best Management Practices Review for Pre-haul Road Maintenance and Road Reconstruction Activities, Blue Alder Stewardship Project

In September 2010, the Central Zone road manager and hydrologist reviewed several roads in the Blue Alder Stewardship Project during pre-haul and road reconstruction activities. Results indicated that implementation of BMPs were successful in minimizing sediment delivery off site and to streams located in Blue Creek. Some additional improvements were also recommended by the hydrologist such as designating a location for excess fill slope material and some additional erosion control measures. Additional project monitoring is ongoing as part of the project.

Best Management Practices Implementation and Turbidity assessment, Forest Service Road 590 and Deception Creek Crossing

During January 2010 the stream crossing at Forest Service Road 590 and Deception Creek partially washed out, prohibiting log hauling activities on the Hoodoo Ames Timber Sale. Due to lack of funds, it was decided to re-use the existing culvert by excavating the fill and re-setting back into the stream. Prior to reconstruction activities, Deception Creek was de-watered and routed through a series of off-channel settling ponds to minimize sediment delivery to the stream. Unfortunately, the existing culvert fell apart during removal. A new culvert could not be purchased and placed by the end of the season and the road was closed indefinitely.

The crossing was then prepared for spring runoff by widening the stream channel to accommodate large flows and covering the fill on either side of the channel with geo-textile fabric to prevent surface erosion. Rip-rap was placed at the toes of the fills to prevent scour and secure the geo-textile fabric. Straw and grass seed were spread on the flat areas and the road approaches to further minimize surface erosion. Follow up reviews in 2011 showed no soil movement or surface erosion at the site. Baseline turbidity readings were recorded near 0.5 NTUs. Turbidity readings remained low for most of the stream channel work except during the brief de-watering phases where readings were estimated at 40 to 50 NTUs.

North Fork Coeur d’Alene River TMDL Assessment

The Idaho Department of Environmental Quality (IDEQ) Coeur d’Alene Regional Office and the U.S. Forest Service Idaho Panhandle National Forests (USFS-IPNF) Coeur d’Alene River Ranger District are working on a cooperative project in the North Fork Coeur d’Alene River Subbasin of north Idaho. The *North Fork Coeur d’Alene River Subbasin Sediment TMDL Implementation Effectiveness Review* is a multi-phase project to evaluate water quality impairments related to excess sediment in streams. In 2002, a sediment TMDL was developed for sediment-impaired streams in this subbasin. Since that time, watershed restoration, road decommissioning and maintenance upgrades, and instream habitat work has improved water quality conditions. The primary focus of this project is to evaluate whether this work has attained the goals set by the TMDL and whether these streams now fully support cold water aquatic life.

A large portion of the project involves paired monitoring of eight selected streams and protocols from IDEQ and USFS were utilized in 2009 for field validation of modeling results. One crew used the IDEQ Beneficial Use Reconnaissance Program (BURP) protocols for rapid assessment of wadeable streams, and collected fisheries, macro-invertebrate and habitat data that can be easily incorporated into the IDEQ water body assessment framework for determining beneficial use support and water quality compliance. Another crew visited the same sites as part of the USFS PACFISH/INFISH Biological Opinion (PIBO) Effectiveness Monitoring Program. Results are currently being analyzed. Preliminary results from the BURP program index scores indicate water quality goals for sediment have likely been met and that these streams have likely attained their sediment load reductions called for in the TMDL and now fully support cold water aquatic life. These results will be compared to PIBO data, other field data and modeling results for the final assessment product.

Additionally, we will use this project as a pilot comparison of the BURP and PIBO protocols for water body assessment purposes. We are evaluating whether data generated through the PIBO program can be used to generate BURP-compatible index scores. PIBO index scores will be compared with BURP index scores and the Idaho water body assessment framework to determine whether and how PIBO data can be utilized in determining beneficial use support. We are also analyzing data collected under the two protocols to compare the compatibility and variability of results. Outcomes will include increased monitoring data available for water body assessments, increased data coordination between USFS and DEQ, and improved understanding between agencies of PIBO and BURP data and how these data may be used. This should increase the quality and efficiency of monitoring and water body assessments. A final report of this project was anticipated by the end of calendar year 2011, but due to procedural limitations, the final report is expected to be delivered in calendar year 2012.

WATSED Validation Monitoring (FINAL)

Predicted sediment and runoff for all of the baseline and control sub-watersheds (Table 36) were derived from the methods documented in the R1/R4 Sediment Guide (USDA Forest Service 1981) and the WATBAL Technical User Guide (Patten 1989). The model calibrated for the Idaho Panhandle National Forests, known as WATSED, is a tool that organizes typical watershed response relationships resulting from land management activities. Use of the model is designed to provide information to the resource specialist, who, along with knowledge of the model and its limitations, other data and analyses, experience, and professional judgment, integrates all available information to draw conclusions about the probable effects of land management activities on sediment and water yield for the comparison of different alternatives during project planning efforts.

Table 36. Baseline and control subwatersheds for validation of WATSED predictions

Station	Sediment T/yr (Observed)	Sediment T/yr (Expected)	Peak Flow Q (Observed)	Peak Flow Q (Expected)	Peak Flow time > 75% (Observed)	Peak Flow time > 75% (Expected)
Long Canyon	346	563	287	248	33	34
Halsey	57	202	31	25	38	34
Big Elk	227	1,387	116	77	40	40
Bird	2,976	484	128	92	42	44
Skookum	243	281	121	70	40	39
Cat Spur	176	305	39	39	34	40

This report provides a summary of the results from all past monitoring reports. Baseline stations are long-term sites that were established to provide information on the natural processes, functions, and variability of steams and watershed systems over time. Some baseline site also are a control to compare to other watersheds with similar climatic, physical, and hydrologic character, to help determine what may have occurred naturally versus through management activities (Appendix JJ, IPNF Forest Plan, Amendment No. 1).

As described in previous monitoring reports, the model typically overestimates sediment production, underestimates water yield, and is inconclusive as to peak flow exceedence, as depicted in the following figures.

Figure 4. WATSED Modeling – Expected vs. Observed Sediment

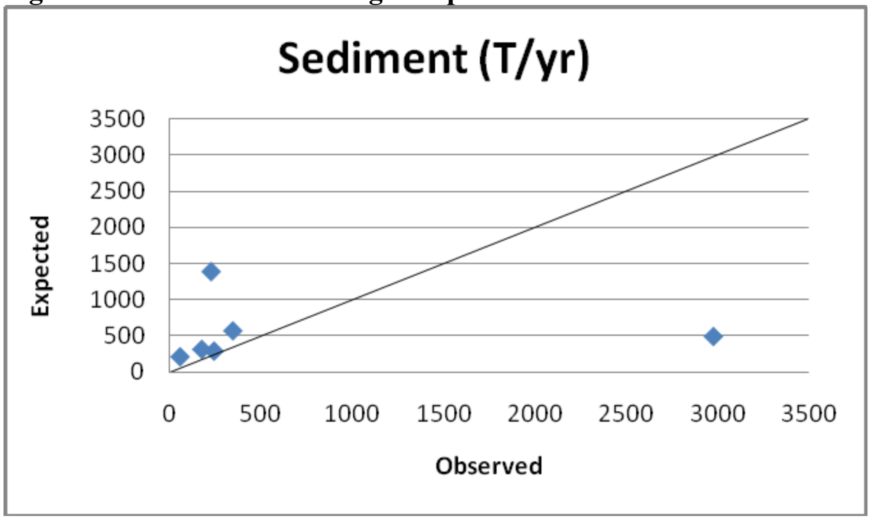


Figure 5. WATSED Modeling – Expected vs. Observed Peak Flow

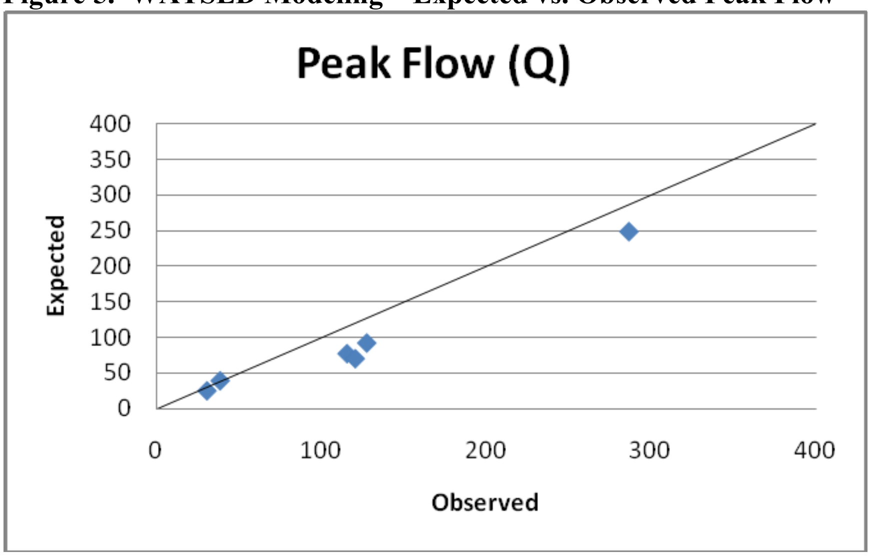
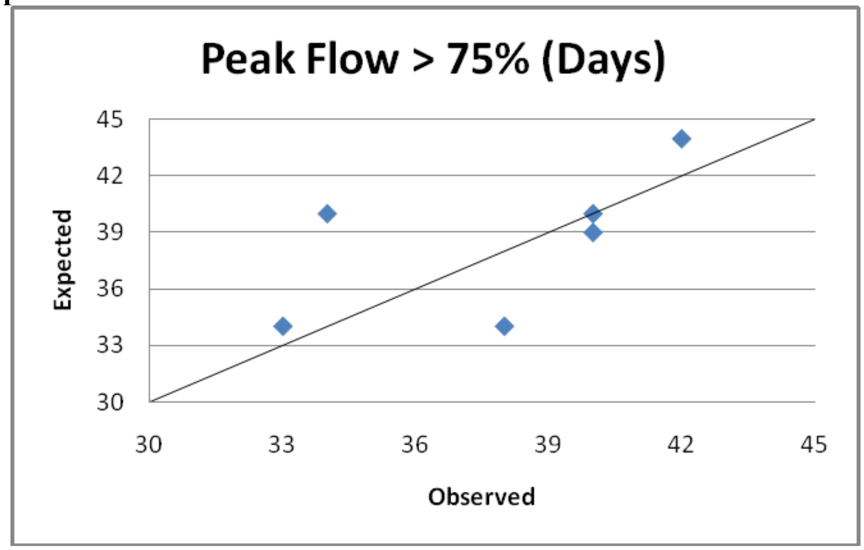


Figure 6. WATSED Modeling – Expected vs. Observed Peak Flow Time > 75 percent



WATSED estimates the most probable mean annual sediment loads, expected sediment load modifications over time, and water yield. WATSED is not intended to determine event-based processes or specific in-channel responses. It does, however, incorporate the results of those processes in the calibration of its driving coefficients. Furthermore, WATSED does not evaluate increases in sediment and peak flows specifically resulting from "rain-on-snow" events or other stochastic events, nor does it attempt to estimate in-channel and stream-bank erosion. WATSED includes assumptions and cannot determine the exact response of a given sub-watershed.

Forest Plan Monitoring Item G-4: Fish Population Trends

In conjunction with Idaho Department of Fish and Game (IDFG), annual surveys of a subset of streams on the Idaho Panhandle National Forests (IPNF) are conducted. The primary focus of these surveys has been westslope cutthroat trout (*Oncorhynchus clarki lewisi*) and bull trout (*Salvelinus confluentus*). Some of these surveys are only conducted once, while others have been surveyed multiple years in the same location (index streams). Surveys for bull trout have been focused in the Priest, Pend Oreille, and St. Joe basins. Extensive surveys for cutthroat trout have been conducted in the Coeur d'Alene basin. Population trends of these two species are analyzed to determine the current status of the species', within the context of current land management across the entire IPNF landscape. Other surveys and inventories have been conducted independently by the Forest Service, but results are communicated to IDFG.

Bull Trout Redd Counts

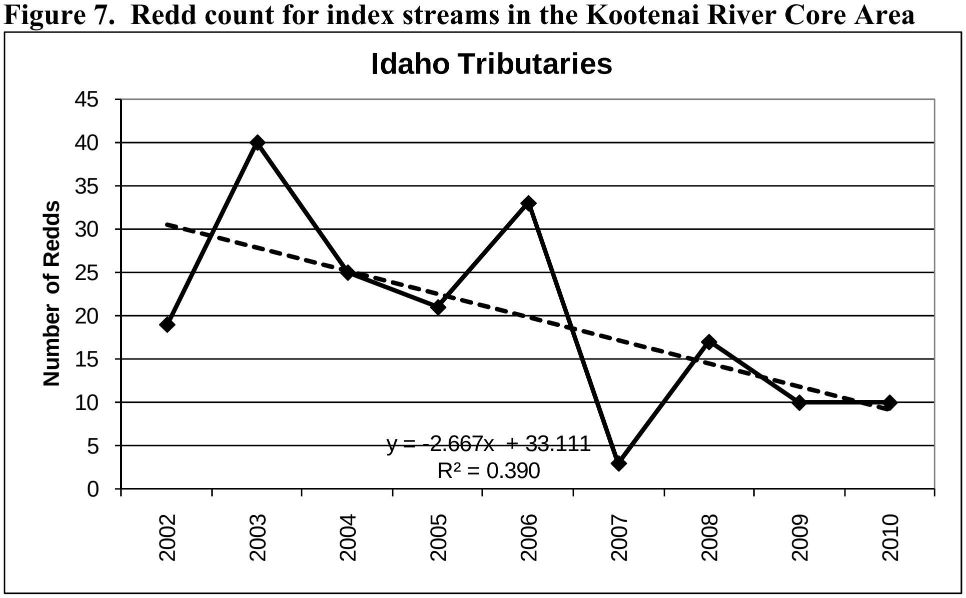
Bull trout were listed on June 10, 1998 as Threatened under the Endangered Species Act. Populations are tracked annually by IDFG, by monitoring the amount of reproduction potential, where redd counts are used as a surrogate to estimate population trends. Based on current information, bull trout appear to be stable or increasing across most of the Idaho Panhandle National Forests.

Bull trout redds were counted in 2011 as an index of the abundance of bull trout in each major drainage in northern Idaho. In six index streams in the Pend Oreille drainage, 474 redds were counted. This was an increase from last year, but slightly below average. In the Upper Priest Lake drainage, 13 redds were counted in seven index streams, which was a decline from the last two years but better than during the period from 2005 to 2008. In the Kootenai drainage, 82 redds were counted, which was the lowest total count since 1994. In the St. Joe drainage, 43 redds were counted in three index sections, which was the lowest count since 2001. In the Little North Fork Clearwater River, 26 redds were found in five index streams, which was the lowest count since 2002. These surveys indicated particularly low populations of bull trout in the Upper Priest and St. Joe drainages. All data referenced were adapted from the Maiolie et al (2011a).

Kootenai River

Populations in the Idaho portion of the Kootenai River Core Area are predicted to be in a declining trend (Figure 7).

Figure 7. Redd count for index streams in the Kootenai River Core Area



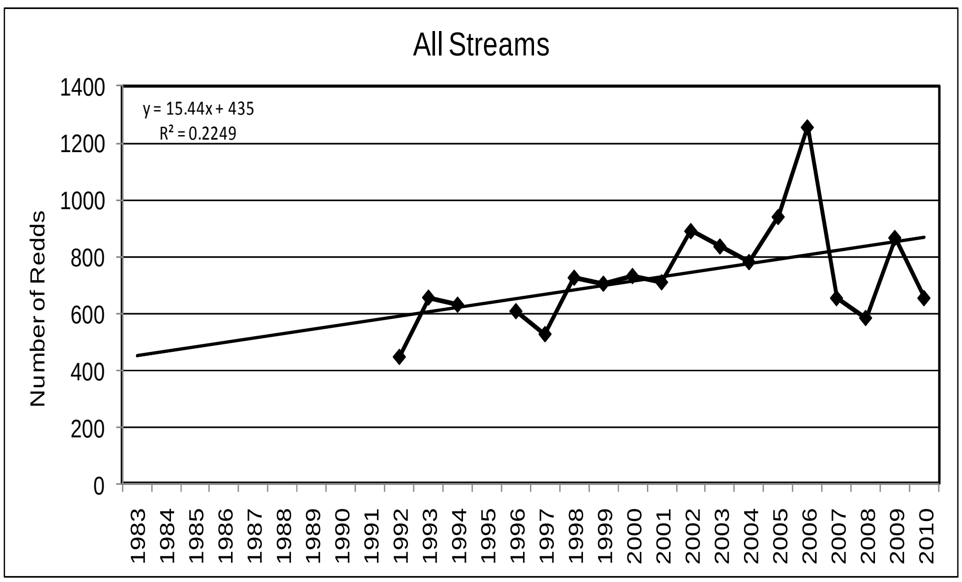
In the Idaho portion of the Kootenai River Core Area, North and South Callahan Creeks and to a lesser extent Boulder creek are the only streams identified as important bull trout spawning tributaries. Counts in 2010 in the Kootenai River Core Area were low compared to when surveys were initiated in 2002. In terms of the entire Kootenai River Core Area, the majority of the bull trout population is located in Montana tributaries. Similar to 2009, 90 percent of the total redds were counted in Montana in 2010.

Previous radio tracking data indicates that bull trout spawning downstream of Kootenai Falls, in North and South Callahan Creeks and O'Brien Creek, are mostly adfluvial fish coming from Kootenay Lake in British Columbia. Bull trout spawning upstream of Kootenai Falls, in Montana, appear to have a fluvial life cycle where they overwinter in Kootenai River and spawn in tributaries such as Quartz Creek, Bear Creek, Pipe Creek and West Fisher River. This suggests we may not see the same trends in bull trout abundance between these two populations. In addition, Canada allows harvest of bull trout in Kootenay Lake, which may also influence trends in the lower Kootenai River tributaries. No data is available for most of the sub-watersheds on the IPNF although some redd surveys have occurred in Lower Boulder, where one redd was counted in 2005 and spawning activity has not been observed since.

Lake Pend Oreille/Lower Clark Fork

Populations in the Lake Pend Oreille/Lower Clark Fork Core Area are predicted to stable or increasing (Figures 8).

Figure 8. Redd counts for index streams in the Lake Pend Oreille/Lower Clark Fork Core Area



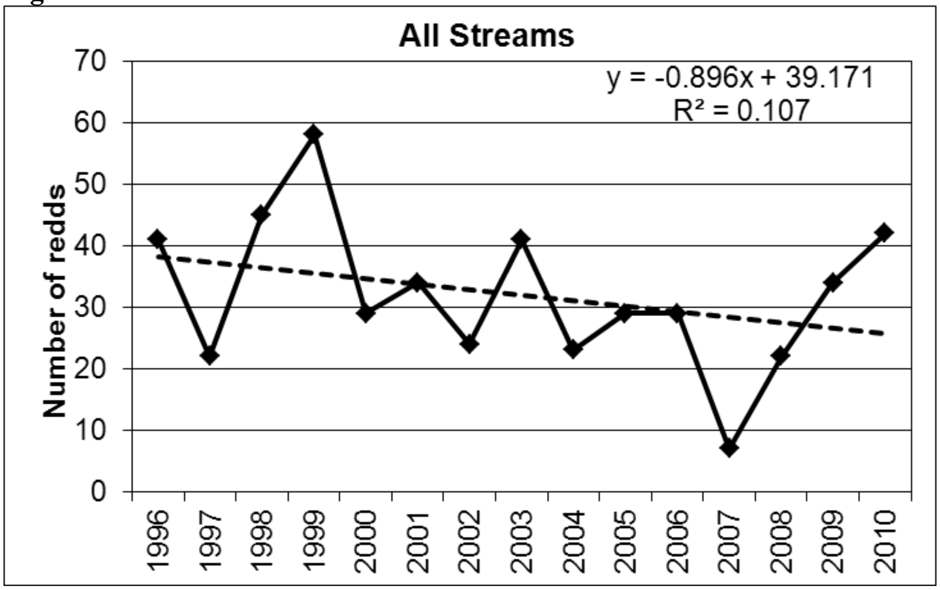
Despite an overall improving trend in bull trout redds, many tributaries have demonstrated reductions from 2009 observations. Reductions were most dramatically noted in tributaries to the north shore of Lake Pend Oreille and the lower Clark Fork River, including the Pack River, Grouse Creek, and Lightning Creek. No explanatory relationship has been defined for the causal mechanism of these variations, however, these drainages have historically have experienced high channel instability. Reduced counts may correspond to high flows that occurred in the fall of 2006, which resulted in channel alterations.

Bull trout redd surveys in 2010 were also likely impacted by in-stream conditions at several locations, that may have also affected observations in these locations. Disturbed substrates resulting from abundant early spawning kokanee in eastside tributaries to Lake Pend Oreille, including North Gold, Gold, and Granite creeks, as well as Sullivan Springs, limited identification of redds, where bull trout and kokanee spawning activity overlapped.

Priest Lakes

Populations in the Priest Lakes Core Area are predicted to be decreasing (Figure 9).

Figure 9. Redd counts for index streams in the Priest Lakes Core Area



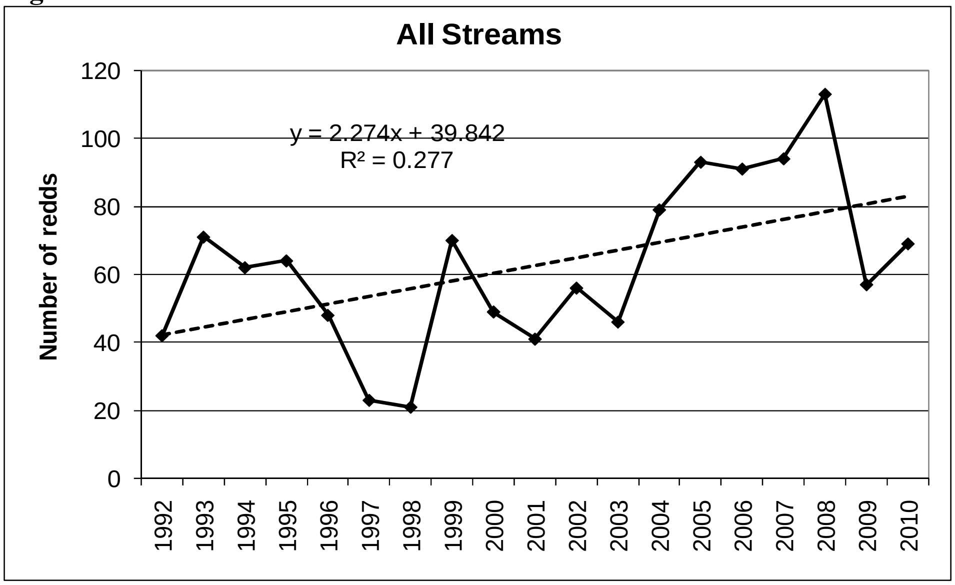
It is well documented that the bull trout population in the Priest Lake Core Area are in decline and at risk of collapse, although redd counts in 2010 were the highest they have been since counts in 2003 and above the average counts since recording surveys began in 1983. Few of the tributaries of Priest Lake have been surveyed for redds since 1986 when the population collapse was documented. Relatively few bull trout spawn in tributaries of Priest Lake and probably contribute only a few adult fish to the entire core area.

The primary cause for the decline in the bull trout population in the basin is likely the expanding population of lake trout, which continually poses an overwhelming threat to the adfluvial bull trout population. An on-going effort to remove lake trout from Upper Priest Lake has been underway for several years, with the intention of reducing bull trout predation. Although the effectiveness of this removal is uncertain at this time, the hope is that this will translate to increasing numbers of spawning adult bull trout. In addition to predation by lake trout of sub-adults entering the lake, juvenile bull trout also face predation and competition by non-native brook trout in rearing tributaries to the Priest Lakes.

Coeur d'Alene Lake

Populations in the Coeur d'Alene Lake Core Area are predicted to be increasing (Figure 10).

Figure 10. Redd counts for index streams in the Coeur d'Alene Lake Core Area

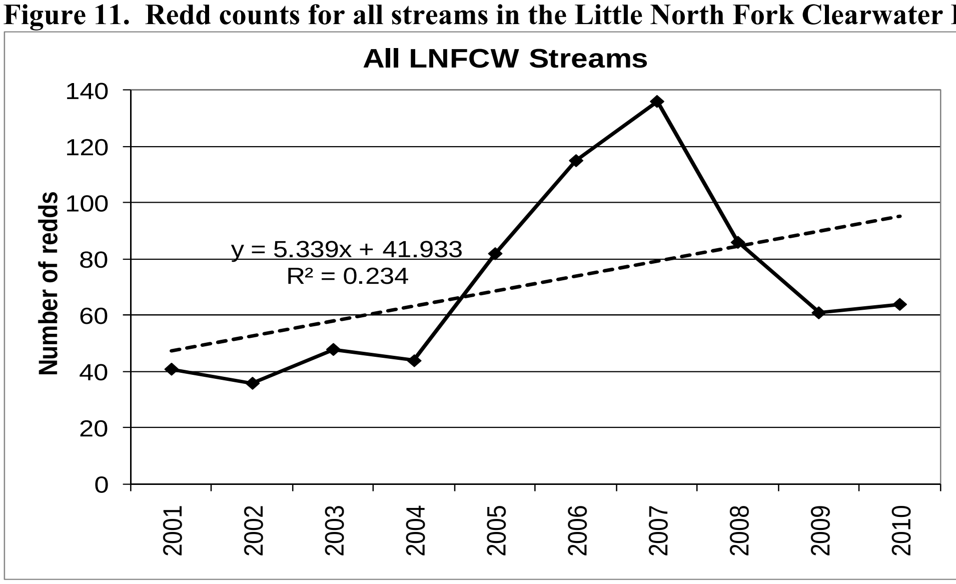


Multiple streams were sampled in the St. Joe in 2010, and typical to St. Joe surveys, only a few streams (Medicine Creek, Heller Creek and the upper St. Joe River) are responsible for producing the majority of bull trout in the entire core area (78 percent of redds were counted in these streams during 2010). In most years, a significant number of redds are counted in Wisdom Creek, however, only a single redd was counted in 2010. The reduction in numbers may be due to potential migration barriers such as beaver dams in the mainstem of the St. Joe River. The current population size, estimated at 221 fish in the core area, is considerably lower than the recovery population size of 1,100. Spawning and rearing activity has not been observed in the Coeur d'Alene River drainage.

North Fork Clearwater River

Populations in the North Fork Clearwater Core Area are predicted to be increasing (Figure 11).

Figure 11. Redd counts for all streams in the Little North Fork Clearwater River Core Area



The Idaho Department of Fish and Game has estimated there were 757 adult bull trout in 2010. The 145 redds counted in 2010 was slightly lower than the 151 counted in 2008 and noticeably lower than the 221 redds counted in 2007. This reduction in redds counted was primarily in the Little North Fork of the Clearwater River. Even given these observations, redd counts in the Little North Fork Clearwater River are assumed to be on an overall increasing trend. A number of streams in the core area are not counted on an annual basis due to their remoteness, and as a results, the spawning escapement in this core area is likely higher than the redd counts indicate. Additionally, in several tributaries of the North Fork of the Clearwater, only short stream segments are surveyed which possibly limits observations. Despite these limitations, bull trout redd counts have remained steady for the past five years.

Cutthroat Trout Surveys

The Idaho Department of Fish and Game estimated fish densities at established transects in three river systems as part of a long term data set to evaluate a variety of fishery management and habitat improvement efforts. We snorkeled 28 transects in Coeur d'Alene River, 15 in the St. Maries River, and 12 in the Priest River. Total densities of age-1 and older westslope cutthroat trout (*Oncorhynchus clarki lewisi*) were 1.93 fish/100 m^2 in the Coeur d'Alene River drainage, 0.02 fish/100 m^2 in Priest River, and 0.10 fish/100 m^2 in the St. Maries River. Densities of cutthroat trout ≥ 300 mm in length were 0.29 fish/100 m^2 in the Coeur d'Alene River, 0.001 fish/100 m^2 in the Priest River, and 0.03 fish/100 m^2 in the St. Maries River. Cutthroat trout in the North Fork Coeur d'Alene River were at record high densities and appeared to be responding to restrictive regulations and habitat improvements. Densities of larger cutthroat trout have increased by 574 percent from the densities seen during the period from 1991 to 2002. In addition we sampled five sites in the Priest River by electrofishing. Species composition showed low cutthroat abundance and an increasing population of smallmouth bass (*Micropterus dolomieu*). All data referenced were adapted from the Maiolie et al (2011b).

Hybridization in the North Fork of the Coeur d'Alene River

The Idaho Department of Fish and Game examined a sample of 170 trout collected throughout the North Fork Coeur d'Alene River that were analyzed at seven diagnostic nuclear DNA markers. Of these specimens, 79 percent were pure cutthroat trout, 11 percent were pure rainbow trout and 9 percent were cutthroat x rainbow hybrids. Of the hybrid trout, 15 out of 16 were greater than F1 hybrids. This data should serve as a baseline to determine future changes in hybrid composition. Prior to genetic analysis, biologists or officers classified each trout as a cutthroat, rainbow, or hybrid trout based on phenotypic traits. All fish classified as rainbow trout were genetically rainbow trout or hybrids, with zero percent pure cutthroat trout. Fish classified as cutthroat trout were genetically cutthroat trout 96 percent of the time, hybrids 4 percent of the time, and rainbow trout zero percent of the time. Trout that were genetically hybrids were misidentified 100 percent of the time, being called cutthroat trout 38 percent of the time, and misidentified as rainbow trout 62 percent of the time. These data illustrate the difficulty of phenotypically identifying hybrid trout in the North Fork Coeur d'Alene River.

Electrofishing Surveys

Electrofishing surveys that are related to project implementation, under the guidance of Forest Plan direction, resulted in observations of both native and non-native species, although population densities and trends are unknown at this point.

Table 37. Meadow Creek (Bonners Ferry) – Presence/Absence survey

Species	Total Catch	Catch/Unit Effort	Population Estimate	Abundance (Fish/mi)
Brook Trout	68	na	na	na
unknown	3	na	na	na

Table 38. Murray Creek (Priest Lake) – Presence/Absence survey

Species	Total Catch	Catch/Unit Effort	Population Estimate	Abundance (Fish/mi)
Westslope Cutthroat Trout	40	na	na	na

Table 39. North Fork Grouse Creek (Sandpoint) – Presence/Absence survey

Species	Total Catch	Catch/Unit Effort	Population Estimate	Abundance (Fish/mi)
Rainbow Trout	17	na	na	na
Brook Trout	19	na	na	na
Sculpin	10	na	na	na
Dace	3	na	na	na

Table 40. Quartz Creek (Sandpoint) – Presence/Absence survey

Species	Total Catch	Catch/Unit Effort	Population Estimate	Abundance (Fish/mi)
Westslope Cutthroat Trout	38	na	na	na
Brook Trout	2	na	na	na
unknown	15	na	na	na

Table 41. Twenty Mile Creek (Bonners Ferry) – Presence/Absence survey

Species	Total Catch	Catch/Unit Effort	Population Estimate	Abundance (Fish/mi)
Rainbow Trout	43	na	na	na

Table 42. Catspur Creek (St. Maries) – Presence/Absence survey

Species	Total Catch	Catch/Unit Effort	Population Estimate	Abundance (Fish/mi)
Westslope Cutthroat Trout	23	na	na	na
Sculpin	30	na	na	na

Table 43. Tributary to Catspur Creek (St. Maries) – Presence/Absence survey

Species	Total Catch	Catch/Unit Effort	Population Estimate	Abundance (Fish/mi)
Westslope Cutthroat Trout	6	na	na	na

Table 44. Log Creek (St. Maries) – Presence/Absence survey

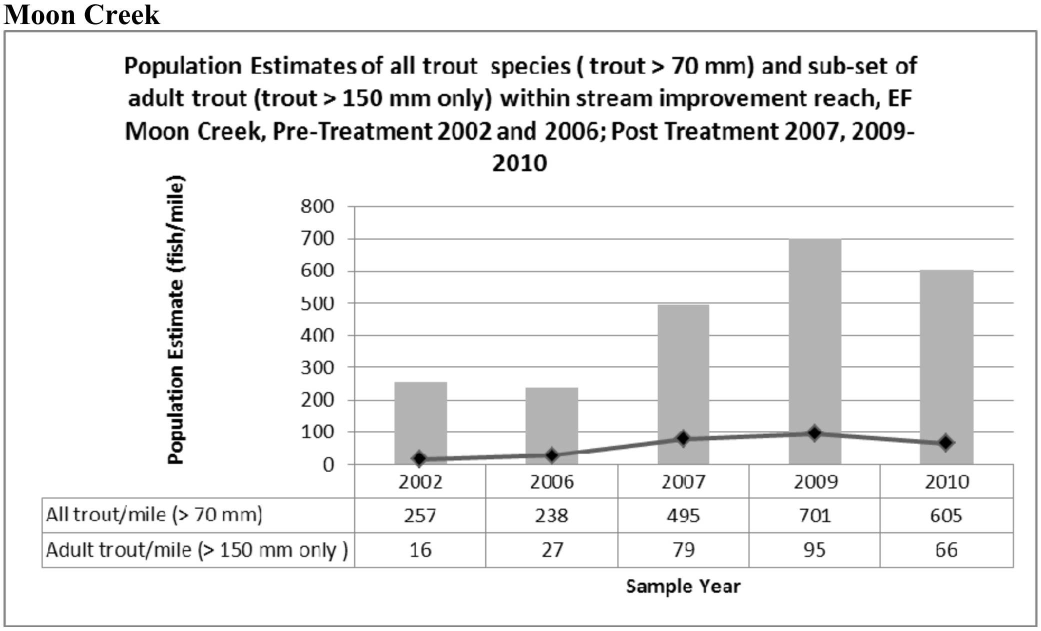
Species	Total Catch	Catch/Unit Effort	Population Estimate	Abundance (Fish/mi)
Westslope Cutthroat Trout	20	na	na	na

Silver Crescent Mine Reclamation

Channel restoration is often an afterthought in the context of large mine reclamation projects since emphasis is largely focused on removal and/or stabilization of contaminated material. While removal of historic contamination sources often show immediate water quality benefits, channel morphology improvements may occur over decades, resulting in slow progression of stream channel improvement and development of suitable aquatic habitat. Well-designed channel restoration can accelerate this process and provide suitable habitat for aquatic organisms over a shorter timeframe. In 2007 the Idaho Panhandle National Forests identified post CERCLA stream restoration needs in East Fork Moon Creek to accelerate stream recovery to meet water quality criteria, improve habitat, reduce sedimentation, and meet other forest plan management objectives. Pre- and post-restoration monitoring efforts suggest that the stream channel improvements following reclamation work met all of the set objectives. Total fish abundance increased 242 percent three years after the stream restoration work. Substantial improvements were observed in fish habitat conditions, stream channel function, fish biodiversity, aquatic insect biodiversity, and plant biodiversity. Furthermore, these improvements were noted in the first three years following completion of the stream restoration work (Figure 12). In summary, our monitoring efforts suggest that post reclamation stream restoration work such as the East Fork Moon Creek is an important component in mine reclamation projects and should be considered in future mine reclamation plans in the Coeur d'Alene River basin.

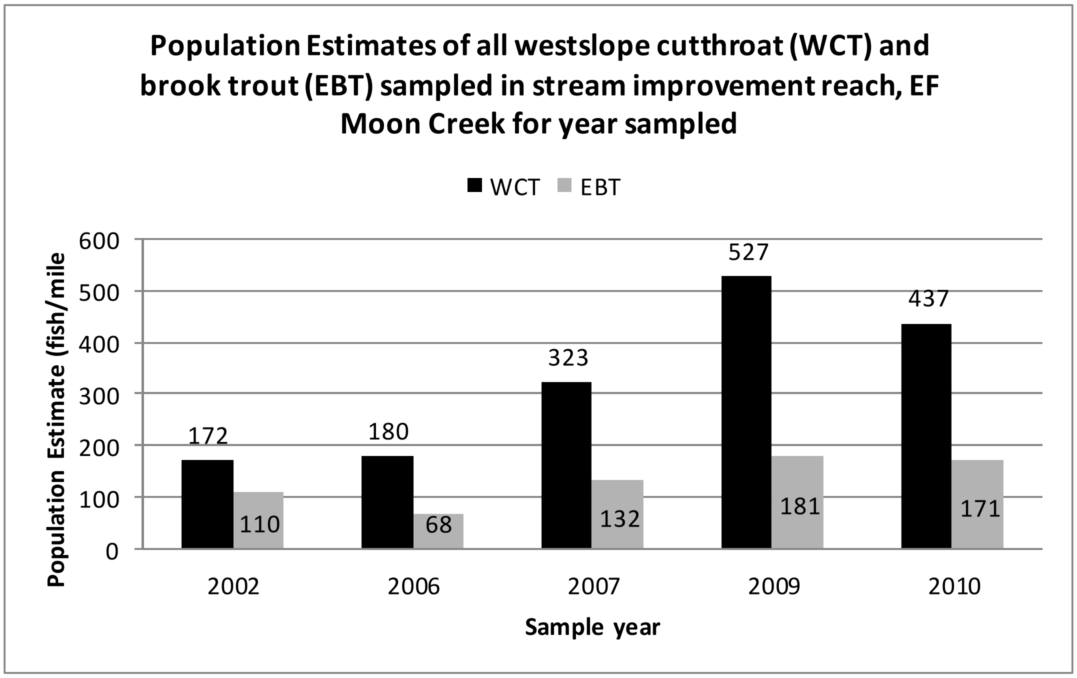
During pre- and post-restoration assessment monitoring of trout response to stream restoration efforts, dramatic increases in both total and adult trout abundance were observed (Figure 13). Two-pass depletion efforts were conducted at three sites within the one-mile stream restoration reach. Fish abundance increased nearly three-fold immediately following stream restoration efforts, and appears to have remained relatively consistent through 2010. Species composition following stream restoration seems to indicate that the number of westslope cutthroat trout have increased following treatment (Figure 13). However, we cannot conclusively connect increases to habitat or water quality improvements since brook trout were removed following capture. Westslope cutthroat trout were clearly most abundant in the upstream sample site, suggesting that the presence of brook trout may still be negatively effecting westslope cutthroat distribution in East Fork Moon Creek. Overall, the CERCLA reclamation and stream restoration efforts in East Fork Moon Creek have been a success, with positive salmonid responses to water quality and habitat improvement.

Figure 12. Population estimates of trout species within stream improvement reach, East Fork Moon Creek



	2002	2006	2007	2009	2010
All trout/mile (> 70 mm)	257	238	495	701	605
Adult trout/mile (> 150 mm only)	16	27	79	95	66

Figure 13. Population estimates of westslope cutthroat trout and brook trout, East Fork Moon Creek



The following photos are of East Fork of Moon Creek at the cross section #10 monitoring site showing the progression of channel improvement from restoration efforts, including: May 2006 former channel; October 2007 - post construction; July 2008 - post planting; and July 2009 - stream improvement structures and developed bank vegetation.

Fig. 14. May 2006

Fig. 15. Oct 2007

Fig. 16. July 2008

Fig. 17. July 2009

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Forest Plan Monitoring Item H-1: Threatened, Endangered and Sensitive Plants

Forest Plan direction for sensitive and rare species, including plants, is to manage habitat to maintain population viability, to prevent the need for federal listing, and to determine the status and distribution of Threatened, Endangered, Sensitive (TES) and other rare plants.

Background

Threatened Species: Prior to 1998, only one threatened plant was listed for the Idaho Panhandle National Forests, *Howellia aquatilis* (Water Howellia). This species was historically (1892) known to occur within the Pend Oreille sub basin, near Spirit Lake, Idaho, on private land. Surveys conducted by Idaho Conservation Data Center (ICDC) botanists in 1988 failed to relocate this population. Existing populations are known for adjacent areas in eastern Washington, western Montana, and south in the headwaters of the Palouse River in north-central Idaho. Surveys of suitable habitat (vernal pools) across northern Idaho by USFS and ICDC botanists in subsequent years have failed to find additional populations. It is believed to be locally extinct. Surveys of suitable habitat on federal lands will continue following requirements found in the Endangered Species Act of 1974 and Forest Service policy. According to USFWS, water howellia is suspected to occur on the IPNF in Kootenai, Shoshone and Benewah Counties (USDI 2010).

In early 1998, the U.S. Fish and Wildlife Service (USFWS) listed the orchid, *Spiranthes diluvialis* (Ute ladies'-tresses), as threatened. Based on populations that occur in inter-montane valleys of Montana, the shores of an alkaline lake in Washington, and populations in southern Idaho, Utah, Nevada, Wyoming, and Colorado, northern Idaho was thought by USFWS to have some potential habitat. Surveys of habitat (deciduous cottonwood and open meadow riparian areas) by USFS and ICDC botanists have yet to document populations or any highly suitable habitat in northern Idaho. In reports released in 1999 and 2001 on predicting the distribution of potential habitat, the Idaho Conservation Data Center disclosed that very few of the plant associations known to host Ute ladies'-tresses occur in northern Idaho. The likelihood of Ute's ladies-tresses actually occurring in northern Idaho is remote. In 2004 USFWS, which has the responsibility for this species, removed *S. diluvialis* from the list of threatened species suspected to occur on the IPNF.

In November of 2001, the USFWS listed the plant *Silene spaldingii* (Spalding's catchfly) as threatened. This long-lived perennial forb species is known from 52 sites in west-central Idaho, northwestern Montana, adjacent British Columbia, northeastern Oregon, and eastern Washington. In eastern Washington, this species is known from remnant patches of native bluebunch wheatgrass and fescue grasslands. This habitat is limited on National Forest lands to some low elevation areas in close proximity to the Palouse prairie and breakland areas along the major river corridors.

In the spring of 2000, IPNF botanists developed a process to predict potential habitat (e.g. grasslands) utilizing the SILC (Satellite Imagery Land-cover Classification) data. Broad-scale and project level field surveys were conducted from 2000 to 2003 to validate predicted habitat and search for populations. Potential habitat identified in proposed project areas is surveyed prior to implementation. No populations of Spalding's catchfly have been found to date on the IPNF. According to USFWS, this species is suspected to occur on the IPNF in Kootenai, Shoshone and Benewah Counties.

Sensitive Species and Forest Species of Concern: In October of 2004, the Region 1 sensitive species list was updated, following the Region 1 Species-at-Risk Protocol. The new list contains 59 species designated as sensitive by the USFS. The Species-at-Risk Protocol allows forests to also develop a Forest Species of Concern (FSOC) List to address other rare species for which there may be local concern. While no biological evaluations are prepared for Forest species of concern as for sensitive plants, viability concerns are addressed in environmental documents. The IPNF currently addresses 44 Forest species of concern.

Candidate Plant Species: Candidate species are those species for which the United States Fish and Wildlife Service believes sufficient information is available on biological vulnerability and threats to support proposals to list them as Endangered or Threatened. Slender moonwort (*Botrychium lineare*) was listed by the USFWS as a candidate species for the IPNF until it was removed from the candidate list on December 6, 2007 (USDI 2007). This species was found to be more abundant and widespread than previously recognized is lacking sufficient information to justify continued candidate status.

The only known location in Idaho is an historical occurrence documented in 1925 from Upper Priest River on Idaho Panhandle National Forests lands. This occurrence was searched for in 2002, but was not relocated. This species remains on the Regional Forester's sensitive plant list and is addressed in biological evaluations. Project clearance surveys and proactive plant surveys since 2002 have failed to locate new occurrences of slender moonwort.

Monitoring Data

Surveys: During project planning, qualified botanists assess habitats for their suitability to support sensitive and rare plants. Habitat found to be suitable within project areas, and which would be affected by project-related activities, is surveyed to determine the presence of rare plant species. Protection measures are implemented to maintain population and species viability following the National Forest Management Act and Forest Service policy.

For 2010 and 2011, Forest botany personnel performed on-the-ground botanical surveys on 16,359 and 3,993 acres, respectively, of suitable rare plant habitat in support of various projects including vegetation management, minerals, fuels reduction, watershed restoration, fisheries, recreation, grazing, and special uses. The following table displays survey acres by zone.

Table 45. IPNF Rare Plant Botanical Survey Acres in 2010/2011 by Zone

IPNF Zone	Acres Surveyed
North Zone	10,996 / 1,093
Central Zone	2,863 / 2,300
South Zone	2,500 / 600
IPNF Total Acres Surveyed	16,359 / 3,993

Survey trends: The number of acres surveyed for rare plants is a measure of the Forest Plan commitment to determine the status and distribution of rare plants within the Idaho Panhandle National Forests. Qualified botanists and other personnel with training in botany and rare plant identification conduct botanical surveys.

Prior to 1988, the Forest Service did not conduct surveys, and rare plant observations reported to the ICDC were incidental. From 1988 until 1993 the exact number of acres surveyed was not well documented, but is estimated to be about 5,000 acres. Good records of the number of acres surveyed by botany personnel have been kept since 1994. From 1994 through 2010, botanical surveys were done on 160,121acres of federal lands on the IPNF with the express purpose of documenting and protecting rare plant populations from management activities, and mitigating potential adverse effects. The acreage represents approximately 23 percent of the estimated 705,000 acres of suitable rare plant habitat on the IPNF have been surveyed to date.

Observations: Another measure of the status and distribution of rare plants is the number of occurrences documented for the five northern counties of Idaho. Information was compiled from the Idaho Conservation Data Center (ICDC 2010), which is the repository of all information relating to rare species in the State. The information below includes some sightings on non-federal lands. However, the vast majority of observations come from lands under federal management. Sightings on adjacent private lands are important in understanding the distribution of occurrences in the ecosystem as a whole. However, there are no laws governing rare plants on non-federal lands in the State of Idaho; subsequently, few surveys have occurred on non-federal lands, and observations have generally been incidental discoveries. Between 1892 and 1987 there were 119 rare plant observations documented in the five northern counties, on federal and non-federal lands. Since 1988, botanists and other personnel from the USFS, the Bureau of Land Management, and the Idaho Conservation Data Center have documented over 950 occurrences of 85 plant species, mostly on federal lands.

There were several notable discoveries of rare plants on the Forest in 2010and 2011 by IPNF personnel. The discoveries included 12 different sensitive plant species and six other rare plant species (Forest Species of Concern, or "FSOC"), and one discovery new to Idaho that is currently unranked. The total new rare plant occurrences in 2010 and 2011 are displayed in the following table.

Table 46. New IPNF Rare Plant Element Occurrences by Zone for 2010 and 2011*

Species	Common name	Status	Number of Occurrences by Zone		
			NZ	CZ	SZ
Blechnum spicant	Deerfern	Sensitive	6		1
Botrychium spp.	Moonwort species	Sensitive	2		
Botrychium hesperium	Northern moonwort	Sensitive-WA	1		
Botrychium lanceolatum	Triangle moonwort	Sensitive	9	1	
Botrychium minganense	Mingan moonwort	Sensitive	6	2	
Botrychium pedunculosum	Stalked moonwort	Sensitive	3	1	
Botrychium pinnatum	Northwestern moonwort	Sensitive	5	2	
Buxbaumia piperi	Green bug-on-a-stick moss	FSOC		2	
Carex buxbaumii	Buxbaum's sedge	Sensitive	1		
Carex magellanica ssp. irrigua	Boreal bog sedge	Sensitive	1		
Cephalanthera austineae	Phantom orchid	FSOC		4	1
Cypripedium fasciculatum	Clustered lady's-slipper	Sensitive		2	3
Diphasiastrum sitchense	Sitka clubmoss	FSOC	1		
Dodecatheon dentatum	White Shootingstar	FSOC			1
Drosera intermedia	Spoonleaf sundew	Sensitive			1
Githopsis specularioides	Common bluecup	Un-ranked new occurrence in Idaho	1		
Ivesia tweedy	Tweedy's Ivesia	FSOC			2
Lycopodium dendroideum	Ground pine	Sensitive	1		
Lycopodium (Diphasiastrum) sitchense	Sitka clubmoss	FSOC	2		
Orobanche pinorum	Pine broomrape	FSOC	5	7	
Petasites sagittatus	Arrowleaf coltsfoot	FSOC	1		
Pilophorus acicularis	Devil's matchstick lichen	FSOC			1
Rhizomnium nudum	Naked Mnium moss	Sensitive			2

Species	Common name	Status	Number of Occurrences by Zone		
			NZ	CZ	SZ
Sanicula marilandica	Maryland sanicle	Sensitive-WA	1		
Waldsteinia idahoensis	Idaho barren strawberry	Sensitive		3	
Zone Element Occurrence Totals			46	24	12
IPNF Total New Element Occurrences 2010 and 2011					**82**

*Includes occurrences on IPNF lands only.

Monitoring Projects

Formal Population Monitoring: ICDC and USFS botanists have installed a number of formal, permanent monitoring plots over the last fifteen or more years, and baseline information has been collected. However, only a few of the formal monitoring plots have actually had multiple-year, repeated measures to evaluate population trends.

On the North Zone in 2010 monitoring plots for several sensitive species in Grass Creek and Cow Creek on the Bonners Ferry Ranger District were sampled (in early summer and again in autumn).

Also on the North Zone in 2010 Deerfern (*Blechnum spicant*) plots on the Priest Lake District were monitored in a long-term study that was initiated in 1991.

In 2010, monitoring for Clustered Lady's-slipper (*Cypripedium fasciculatum*) was done in Chloride Gulch on the Sandpoint Ranger District.

Transects for Clustered Lady's-slipper (*Cypripedium fasciculatum*) were also monitored in Eagle Creek on the St. Joe portion of the IPNF.

Howell's gumweed (*Grindelia howellii*) plots established on the St. Joe Ranger District in 1995 near Lindstrom Peak were monitored in 2010.

Distillery Bay Deerfern (Blechnum spicant) Monitoring

In late fall 2010; botanists conducted formal monitoring of a population of deerfern on the Priest Lake Ranger District. In 1991 seven permanent plots had been established and had been sampled in 1994, 1997, 2001, and 2006. These plots encompass a single, large population of deerfern along streams in the Distillery Bay area. Two separate regeneration harvests of the surrounding late successional forests were accomplished in the late 1980s, before this species was added to the Region 1 sensitive species list. Plots to monitor the population's response to the timber harvest activities were established the year after the last timber activity in the area was completed.

One plot in an undisturbed portion of old growth western hemlock forest (plot 2) serves as a control plot. Three plots are located at the edge of a harvest unit (plots 1, 3 and 7), so those plots experienced a change in light regime (i.e. increased insolation) but little ground disturbance. Three plots are within timber harvest units (plots 4, 5 and 6), so the plants in these plots experienced both increased insolation and ground disturbance. While plot 4 receives some shade from residual western hemlock, plots 5 and 6 are in full sun.

Monitoring results: Monitoring results from 1991-2010 are shown in the following table. The control plot (plot 2) increased only slightly overall, by two individuals, from 1991 through 2010. All plots within the previous timber harvest units (plots 4, 5, and 6) and most of the plots on the edge of previous timber harvest units (plots 3 and 7) exhibited an overall increase in numbers of individuals since 1991; only plot 1, located on the edge of the timber harvest declined in population size.

The monitoring of this deerfern population was initially designed as a ten-year project. However, it has been determined that long-term monitoring of the populations may provide valuable information on the response of this species to the recovery of the disturbed areas. The next scheduled sampling of the plots is in 2015 or 2016.

Table 47. *Blechnum spicant* monitoring plots, 1991-2010

Plot	Year	Juvenile	Juvenile flowering	Vegetative adults	Flowering adults	Flowering plus	Total	Yr to Yr Change
1 - E	**1991**	17	0	101	0	0	118	n/a
	1994	44	0	120	11	0	175	+57
	1997	93	0	165	3	0	261	+86
	2001	57	1	67	0	0	125	-136
	2006	34	0	76	12	2	124	-1
	2010	13	0	74	13	0	91	-33
Total	**Change**	**-4**	**0**	**-27**	**+13**	**0**	**-27**	
2 - U	**1991**	5	0	15	2	1	23	n/a
	1994	4	0	14	4	0	22	-1
	1997	4	0	23	0	0	27	+5
	2001	1	0	20	0	0	21	-6
	2006	0	0	22	2	1	25	+4
	2010	0	0	17	7	1	25	0
Total	**Change**	**-5**	**0**	**+2**	**+5**	**0**	**+2**	
3 - E	**1991**	6	0	43	20	0	69	n/a
	1994	8	6	22	24	0	60	-9
	1997	28	7	66	1	0	102	+42
	2001	15	6	55	6	0	82	-20
	2006	4	1	37	12	4	58	-24
	2010	0	0	65	16	0	81	+23
Total	**Change**	**-6**	**0**	**+22**	**-4**	**0**	**+12**	
4 - D	**1991**	2	0	11	11	11	35	n/a
	1994	12	0	13	16	1	42	+7
	1997	9	0	46	1	0	56	+14
	2001	8	1	31	14	0	54	-2
	2006	1	0	41	3	2	47	-7
	2010	1	0	52	4	0	57	+10
Total	**Change**	**-1**	**+0**	**+42**	**-7**	**-11**	**+22**	
5 - D	**1991**	0	0	3	1	2	6	n/a
	1994	15	0	0	1	3	19	+13
	1997	5	0	6	5	2	18	-1
	2001	0	0	2	1	3	6	-12
	2006	0	0	13	3	0	16	+10
	2010	0	0	12	2	0	14	-2
Total	**Change**	**0**	**0**	**+9**	**+1**	**-2**	**+8**	
6 - D	**1991**	10	8	2	13	25	58	n/a
	1994	13	1	36	24	4	78	+20
	1997	64	2	49	12	3	130	+52
	2001	43	12	20	17	0	92	-38
	2006	40	9	40	17	0	106	+6

Plot	Year	Juvenile	Juvenile flowering	Vegetative adults	Flowering adults	Flowering plus	Total	Yr to Yr Change
	2010	13	1	56	10	0	80	-26
Total	**Change**	**+3**	**-7**	**+54**	**-3**	**-25**	**+22**	
7 - E	**1991**	6	0	2	7	37	52	n/a
	1994	20	0	31	14	8	73	+21
	1997	37	0	53	15	3	108	+35
	2001	25	0	48	34	2	112	+4
	2006	8	0	37	18	5	68	-44
	2010	0	0	42	27	5	74	+6
Total	**Change**	**-6**	**0**	**+40**	**+20**	**-32**	**+22**	
U = Undisturbed plot; E = Edge plot; D = Disturbed plot								
Year to year change is measured from the preceding sample. Total change between first sample and last is shown in bold type.								

Grass Creek and Cow Creek Monitoring

Monitoring plots within Grass Creek and Cow Creek were initiated in 2004 to determine effects of grazing within cattle allotments on fen habitats that support rare plant species. Three plots were established within Cow Creek, three plots within Grass Creek, and one control plot was established nearby in Smith Creek Research Natural Area (RNA.)

The plots consist of permanent photo points and site monitoring that indicates overall site quality, rare plant population vigor, and any damage to the habitat. The plots are visited each year, both before grazing begins in the allotments and also as the grazing season ends in October.

In 2004, monitoring revealed extensive cattle use of one plot, as well as the surrounding fen habitat. As a result, beginning in 2005, and every year since, a season-long exclusion fence has been erected around the rare plant population before the grazing season begins.

2010 Pre-Grazing Results: Plots in Cow Creek contained populations of the sensitive species *Trientalis arctica*, *Carex magellanica* ssp. *irrigua*, *Carex leptalea*, and *Trichophorum alpinum*.

All three plots in Grass Creek contained populations of the sensitive species *Trientalis arctica* and *Carex leptalea*, and *Carex magellanica* ssp. *irrigua*. One plot in Grass Creek also encompassed a population of *Trichophorum alpinum*. The plot in Grass Creek which had been damaged by cattle in 2004, and is now protected annually by exclosure fencing, appears to have completely recovered.

The control plot in Smith Creek RNA also contained populations of *Carex magellanica* ssp. *irrigua*.

Due to late season snows, in combination with cool spring conditions and late spring snowpack melting, all six monitoring plots and one control plot were exhibiting delayed emergence. Only a low percentage of plants had begun flowering; most were still in vegetative stages. Most of the plots and associated fens were still partially flooded with snow-melt.

2010 Post-Grazing Results: Fall monitoring revealed light to moderate cattle use within plots 1 and 2 in Cow Creek and all plots within Grass Creek. Even plot 1 in Grass Creek, which is exclusion fenced during the grazing allotment season, showed visible evidence of late-season cattle use. Apparently, after the fencing was removed there were still some straggling cows in the allotment. However, botanists did not observe any cattle use within the area of the control plot in the Smith Creek RNA.

Figure 18. Pre-grazing Monitoring Cow Creek- Plot 2, June 24, 2010. Note standing water within plot

2011 Pre-Grazing Results: Plots in Cow Creek contained populations of the sensitive species *Trientalis arctica*, *Carex magellanica ssp. irrigua*, *Carex leptalea*, and *Trichophorum alpinum*.

All three plots in Grass Creek contained populations of the sensitive species *Trientalis arctica* and *Carex leptalea*, and *Carex magellanica ssp. irrigua*. One plot in Grass Creek also encompassed a population of *Trichophorum alpinum*. The plot in Grass Creek which had been damaged by cattle in 2004, and is now protected annually by exclosure fencing, appears to have completely recovered.

The control plot in Smith Creek RNA also contained populations of *Carex magellanica ssp. irrigua*.

Similar to 2010, a combination of cool spring conditions and late spring snowpack melting resulted in all six monitoring plots and one control plot exhibiting delayed emergence. Only a low percentage of plants had begun flowering by late June and early July; most were still in vegetative stages. Most of the plots and associated fens were still partially flooded with snow-melt.

2011 Post-Grazing Results: Fall monitoring revealed light to moderate cattle use within plots 2 and 3 in Cow Creek and plots 2 and 3 within Grass Creek. Some trampling was evident in those four plots mentioned; however, no signs of cattle use in the control plot were evident.

Figure 19. Pre-grazing Monitoring Cow Creek- Plot 2, June 29, 2011. Note standing water within plot

<u>Clustered Lady's Slipper (*Cypripedium fasciculatum*) Monitoring at Chloride Gulch</u>

Cypripedium fasciculatum is a USFWS Service Species of Concern and a Forest Service Region 1 sensitive species. The Idaho Department of Fish and Game Conservation Data Center lists the species as having a rank of G4S3S2. A Global rank of G4 indicates the species is not rare and is apparently secure on a range-wide basis, but with cause for long-term concern (usually more than 100 occurrences range-wide). An S rank of S3 indicates the species is rare or uncommon in Idaho but not imperiled (typically 21 to 100 occurrences statewide). A State Priority listing of S2 indicates the species is likely to be classified as Priority 1 (endangered of becoming extirpated from Idaho within the foreseeable future), if factors contributing to population decline or habitat degradation or loss continue (ICDC 2008).

In 2003, a large population of *Cypripedium fasciculatum* was discovered on National Forest System (NFS) lands in the Chloride Gulch drainage on the Sandpoint Ranger District. This large population, or metapopulation, of over 700 individuals, is scattered in several subpopulations within and adjacent to a proposed timber harvest and fuel reduction project area. Although the proposed timber harvest and fuel reduction treatments which prompted this botanical find have been delayed, the District desired to initiate monitoring, both to obtain baseline data and also following any treatment to determine the species' response to overstory canopy removal (timber harvest) and prescribed burning activities (either spring or fall).

In June 2010 and June 2011, in cooperation with volunteers from the Kinnikinnick Native Plant Society, the North Zone Botanist and field botanist completed “Year Three” and “Year Four” (respectively) of this long-term monitoring project. Ten subpopulations will be monitored annually, for five consecutive years. Later monitoring will occur at two to three-year intervals until project treatment activities occur, after which monitoring will occur annually for ten years. Three of the ten subpopulations will eventually become control plots, in which no treatment activities will occur.

Within each plot, all *C. fasciculatum* stems in each size class (< 40mm and > 40mm) were counted; the total number of flowering and fruiting stems in each plot was also recorded. Because it is possible for clusters of aerial stems to emerge from the same rhizome (Seevers and Lang 1998), aerial stems rather than genets (genetically distinct individuals) were counted. Provision was made for any undeveloped buds and capsules present; flower number would be estimated by counting floral bracts.

Cypripedium fasciculatum makes a bract that subtends each individual flower (Thorpe et al. 2007). Occasionally, a bract is made for a bud that does not fully mature, and these were called undeveloped buds in this study (Thorpe et al. 2007). Most of these undeveloped buds are so small that they either do not have a bract or the bract itself is so tiny that it would not be confused with a functional flower bract (Thorpe et al. 2007). Most undeveloped buds are small, translucent, whitish nubs at the center of the leaf axil (Thorpe et al. 2007). Sometimes they are larger and identifiable as flower buds, but one can usually tell by their lack of color, small size, and stage of development relative to other flowers in the population that they will not develop into mature flowers (Thorpe et al. 2007). Undeveloped buds can occur with or without functional flowers (Thorpe et al. 2007).

Litter depth and browsing were also noted. Litter depth was determined by inserting a ruler into the soil until the ruler reached firm resistance indicating the presence of mineral soil. The depth of insertion was recorded in millimeters. At most plots, five measurements of litter depth were made in random locations, and the average litter depth was recorded for each plot. The number of browsed plants was tallied for each plot.

All associated trees, shrubs, forbs, grasses, or other plants identified within each plot were documented. Finally, overstory tree and mid-story shrub canopy cover were recorded by ocular estimation.

The following table summarizes the data obtained from 2008 through 2011. A complete and detailed monitoring report for each year is available upon request.

Table 48. 2008-2011 Monitoring Results from Chloride Gulch, Clustered Lady's Slipper population

YEAR	TOTAL NO. STEMS	VEG <40 MM	VEG > 40MM	FLR > 40MM	FRUIT > 40MM	TOTAL FLRS	TOTAL FRUITS	AVG FLRS/ FLRING STEM	AVG FRUITS/ FRUITING STEM	BROWSED	AVG LITTER DEPTH (MM)	AVG OVERSTORY TREE CANOPY COVER (PERCENT)	AVG SHRUB CANOPY COVER (PERCENT)
2008	636	103 (16.19%)	276 (43.4%)	241 (37.9%)	16 (2.52%)	372	20	1.54	1.25	55 (8.65%)	32.11	35.00	69.5
2009	718	98 (13.65	301 (41.9)	238 (33.1)	81 (11.28%)	435	115	1.58	1.38	15 (2.09%)	26.82	28.5	79.5
2010	733	125 (17.1%)	277 (37.8%)	218 (29.7%)	113 (15.4%)	360	201	1.73	1.65	82 (11.2%)	30.23	39.25	71.5
2011	778	204 (26.2%)	146 (18.8%)	211 (27.1%)	207 (26.6%)	494	416	2.14	2.07	64 (8.2%)	22.5	42.5	67

Monitoring at Lindstrom Peak: *Grindelia howellii*

Monitoring plots south of Lindstrom peak were initiated in 1995 to determine effects of recreation and noxious weed encroachment on habitats that support rare plant species. Three plots were established.

The plots consist of permanent site monitoring transects that indicates overall site quality, rare plant population vigor, and any damage to the habitat. The plots are visited yearly during flowering.

Table 49. Howell's Gumweed (*Grindelia howellii*) Monitoring Results, 1995-2011

Plot/ Year	Germ/Juvenile	NFADS	FADS	Ave Flowers	Total Plants
1/ 1995	221	48	4	9.33	273
2000	2	32	21	6.7	55
2005	15	5	11	10.30	31
2008	0	0	1	3	1
2009	0	0	3	3	3
2010	0	29	18	-	47
2011	215	8	18	-	241
2/ 1995	739	257	74	8.05	1070
2000	71	81	4	3.75	156
2005	116	7	13	6.30	136
2008	27	6	8	4	41
2009	-	-	-	-	40
2010	117	10	100	-	227
2011	278	25	9	-	312
3/ 1995	-	-	-	-	-
2000	39	158	22	7.64	523
2005	Plot stakes missing	No data collected	-	-	-
2008			-	-	-
2009	-	-	-	-	-
2010	Plot re-found	No plants	On	Transect	-
2011	1	-	-	-	1

*(Germ = germinant; NFAD = non-flowering adult; FADS = Flowering adult. Average flowers is average flowers per flowering plant, - denotes missing data)

2010 Results: No use by humans was observed within plot one. Plot two had a few ATV tracks but much less than compared to 2009. No noxious weeds are present in plot one; however knapweed was pulled from less than 20 feet away. Plot two has St. Johnswort throughout the plot and surrounding area.

Noxious weeds and recreational use in this area are on ongoing issues. Additional data from prior to 2005 is available. Plot 3 shows a constant decline from 1995, however no ATV tracks were observed in the plot and while noxious weeds are present in the plot their density is low compared to plot 2. Both plot 1and 2 show a cyclical trend with initial declines and in 2010 a dramatic increase in plants. Additional data is needed to see if this upward trend will continue.

2011 Results: There was no use by humans observed within plot one. Plot two had a few ATV tracks but not as heavily used as in 2009 and about the same use as observed in 2010. There were no noxious weeds in plot one; however knapweed was pulled from less than 20 feet away. Plot two has St. Johnswort throughout the plot and surrounding area. Knapweed is found down slope.

Eagle Creek (unit 50): *Cypripedium fasciculatum* monitoring

Monitoring plots consist of two liner plots that parallel the old trail. The trail was previously re-routed and no current use was apparent. Large logs blocking the route to the CYFA site are still in place. Individual CYFA were noted along existing trail also. The population appears to be maintaining its health and vigor; however, 2010 did show a number of fruits aborted. This was not noted in 2009. In 2010, plot two showed a 47% increase in total plants from 2009, but a decrease of 0.5% in 2011, while plot one had an increase of two plants in 2010 and a 35% decrease in total plants in 2011.

Figure 20. Cypripedium fasciculatum

Table 50. *Cypripedium fasciculatum* monitoring - Plot 1

Year	Vegetative	Fruiting	# of Fruits	Total Plants
2009	29	41	49	70
2010	38	64 (includes aborted)	25	72
2011	27	61	0*	53

* No fruits set due to timing of monitoring

Table 51. *Cypripedium fasciculatum* monitoring - Plot 2

Year	Vegetative	Fruiting	# of Fruits	Total Plants
2009	21	30	34	51
2010	39	56 (includes aborted)	106	95
2011	51	105	0*	90

* No fruits set due to timing of monitoring

Elk Prairie

This area of up-land grass inclusion has a history of grazing by stock from a nearby outfitter. In 2008 St. Joe District personnel visited the area and overuse was evident. The site was re-visited in the summer of 2009 and 2010. Recover is still occurring. In 2010 the numbers of individual grass clumps (FIED, AGSP, POSE, and others) had increased and a greater number of forbs both in number and variety as compared to 2008 and 2009 were observed. However, re-vegetation is still in progress and it is recommended that there be no-grazing in 2011.

Illegal ATV use was also found in 2009. A second trail was created by single-track motorized users on the steep areas near the top of the prairie to the tree line paralleling the original trail. If these additional trails continue to be made Elk Prairie will soon be lined with trails. No additional damage was observed in 2010.

Sandhouse Special Interest Area

This site has a large population of *Botrychium* species, *Rhizomnium nudum*, and *Cephalanthera austineae* was observed in the 1990s. In 2008 and 2009 the SIA was visited and *Cephalanthera austineae* (phantom orchid) was not observed. This species does not germinate every year. The botany staff has been trying to relocate this observance. The SIA was in good shape with no trailing from nearby ATV camp site.

Theriault Lake Research Natural Area (RNA)

Botanical staff surveyed the RNA and attempted to relocate an observance of *Carex californica*.. They were unable to relocate the *C. californica*. Additional land may be added the RNA in order to protect a large stand of Aspen. Some ATV use was observed on the eastern edge of the RNA. A second observance of *Carex californica* about 5 miles from the Theriault Lake site was found to be in excellent shape and had two new sub-populations.

Emerald Creek

This large site has 32 clumps of deerfern (*Blechnum spicant*). Monitoring started in 1998. The site was found as part of a timber sale. The stand in which these plants grow was dropped from the sale. In 1998 there were 30 clumps. The most recent monitoring was done in 2009. At that time there were 198 individual plants in 30 clumps. In 2011 284 individual plants where found with 28% of those being immature plants. Approximately 5% of the plants showed signs of predation. There was a lot of elk prints and dropping. On the lower portion of the site closest to the meadow there was very lite grazing by cattle on the meadow grasses. Predation is most likely from elk. The population is growing and is maintaining its viability.

Informal Monitoring

Sites of *Dodecatheon dentatum* and *Cypripedium fasciculatum* in the Malin and Fishhook Creek areas were revisited.

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Forest Plan Monitoring Item I-1: Minerals

The purpose of this monitoring item is to determine if the operation of mining activities meet forest plan standards.

Background

The most current mining activity on the IPNF consists of placer mining for gold in alluvial bottoms (placer mining) on the central part of the forest. There is a small amount of exploration for vein deposits of metals (hard rock mining). There is a facilitated garnet digging site on the southern part of the forest with some saleable activity for commercial garnet production.

Exploration or mining activity that is likely to result in a significant amount of land disturbance requires a reclamation bond to insure that funds are available to reclaim the site. If the amount of resource damage would be negligible no bond is required. When the term "processing" is used it means that the plan submitted by the miner has been processed by the Forest Service and a decision has been made on whether they can proceed with the exploration or mining activity.

Monitoring Data

For 2010 and 2011 there were 18 and 15 open "active" mining plans on the forest. All were inspected regularly for compliance when active. Any noncompliance was corrected with a notice of noncompliance and documented appropriately. As for inactive mine sites addressed – this includes clean-ups (CERCLA) and safety mitigation (Bat gates, plugs, etc) – 10 sites were addressed in 2010 and 20 sites were addressed in 2011.

A. *Non-Bonded Non-Energy Operations Processed*: The number of operations processed that did not require a reclamation bond. Accomplishment is reported when an operation plan is processed to a decision.

> Total Non-Bonded Non-Energy Operations Processed – 6,664 (2010) and 5,628 (2011) (6,546 and 5,530 of these were garnet collecting permits on the St. Joe Ranger District in 2010 and 2011, respectively)

B. *Bonded Non-Energy Operations Processed*: The number of operations processed for which reclamation bonds were required. Accomplishment is reported when an operating plan is processed to a decision.

> Total Bonded Non-Energy Operations Processed – 3 (2010) and 0 (2011)

C. *Total Bonded Non-Energy Operations*: The total number of new and existing bonded operations on which surface disturbance has occurred.

> Total Number of Bonded Non-Energy Operations – 18 (2010) and 15 (2011)

D. *Bonded Non-Energy Operations Administered to Standard*: The number of bonded operations administered to a level that ensures compliance with operating plans.

> Total Operations Administered to Standard – 18 (2010) and 15 (2011)

Evaluation: All bonded non-energy operations are being administered to standard.

Forest Plan Monitoring Item K-1: Prescriptions and Effects on Land Productivity

Our Forest Soil Resource objective is to maintain and restore long-term productivity, to support healthy vegetative communities and protect watersheds. Key elements of maintaining long-term soil productivity include retaining surface organic layers, surface volcanic ash, and the bulk density of the surface volcanic ash within natural ranges of variability.

The major detrimental impacts to long-term soil productivity are:

- Compaction
- Removal of topsoil (displacement)
- Units with insufficient organic matter and coarse woody-debris left on-site
- Areas that have been severely burned

Definitions of what is considered detrimental impacts:

Detrimental Compaction: *More than 15% increase in bulk density over natural for volcanic ash surface soils. The compacted soil displays a massive or platy structure.*

Detrimental Displacement: *Removal of the forest floor and one inch or more of the surface mineral soil over a 25 ft^2 or more area.*

Severely Burned: *The soil surface is in a condition where most woody debris and the entire forest floor are consumed down to the mineral soil. The soil surface may have turned red due to extreme heat. Also, fine roots and organic matter are consumed or charred in the upper inch of mineral soil.*

Coarse woody-debris recommendations are as follows:

- Douglas-fir sites need 7 to 13 tons per acre
- Grand fir sites need 7 to 14 tons per acre
- Western hemlock/western red-cedar sites need 17 to 33 tons per acre
- Subalpine fir sites need 10 to 19 tons per acre

Optimum levels of fine organic matter are 21 to 30 percent in Douglas fir and grand fir habitat types. In subalpine fir, moist western hemlock and western red-cedar habitat types, strong levels of fine organic matter exist at 30 percent or greater (Graham et al., 1994).

This year's monitoring focused on the following:

1. Monitoring of pre-harvest soil conditions on three timber sales.
2. Monitoring of post-harvest soil conditions on 6 timber sales.
3. Monitoring of Priest Lake grazing allotments.
4. Review of prescribed burns.
5. Review of Lookout ski area.

A. Monitoring of Pre-harvest Soil Conditions on three Timber Sales

Seventeen units in 3 proposed timber sales were evaluated to determine existing pre-harvest conditions and additional mitigation recommendations necessary to ensure that Forest Plan and Regional Soil Quality Standards are met (Table 52). Results showed that 82% of the units had low to moderate existing impacts while legacy management activities impacts for the remainder were higher. None of the units exceeded existing conditions greater than 15%.

Table 52. Ranges of impacts evaluating existing conditions on three timber sales on the IPNF (*does not include first entry units)

	Existing Condition - Range of Disturbance			
Proposed Timber Sale	**0% to 5%**	**% to 10%**	**% to 15%**	**>15%**
Priest Lake Experimental Station (NZ)		5	3	
Fern Hardy (CZ)	6			
Lower Priest (NZ)	3			
Total (17 Units)*	**9**	**5**	**3**	**0**

Continued monitoring of existing conditions over the years has shown that disturbances from harvest activities diminish as most of the units treated in the past generally show lesser amounts of disturbance as time passes.

Monitored levels of organic matter were variable in all units and generally ranged from low to optimal with some higher values present in moist site habitats. Coarse woody debris was generally satisfactory for the majority of the proposed timber sale units for existing conditions while some were below (≤5 tons/acre) for a sale on the Central Zone and associated with dry aspects and shallow soils. These evaluations allowed for recommendations to leave additional coarse woody debris after the harvest.

Assessment of proposed units also showed that existing available information from the past harvest database does not always reflect actual conditions on the ground, which is remedied by on-the-ground visits to confirm existing conditions of past management activities.

B. Monitoring of Post-harvest Soil Conditions

Twenty-two units in six timber sales were monitored for post-harvest levels of management impacts. The majority of ground-based logged units were in the range of 11 to 15 percent of detrimental soil impacts for logging which is around the expected (~13%) disturbance associated with such equipment, therefore meeting Forest Plan and Regional Standards. Retention of coarse woody debris was satisfactory in all units.

Table 53. Background and monitoring results of post-harvest detrimental soil impacts on four timber sales

Timber Sale	Unit	Equipment	Fuels	Detrimental Soil Impacts%	CWD tons/acre
Conventional Caribou (CZ)	17A	Sky	GP	12	11
Conventional Caribou (CZ)	17B	FB/P/S	GP	21	34
Wrenco Loop (NZ)	8	FB/P/S	UB (not done)	11	27
Wrenco Loop (NZ)	9**	FB/P/S	GP	13	40
High Bridge Outlet (NZ)	7A	FB/P/F/winter	GP	15	31
High Bridge Outlet (NZ)	7B	FB/P/F/winter	GP	19	34
High Bridge Outlet (NZ)	7C	FB/P/F/winter	GP	13	44
High Bridge Outlet (NZ)	7 total	FB/P/F/winter	GP	16	35
High Bridge Outlet (NZ)	12	FB/P/F/winter	UB	15	11
High Bridge Outlet (NZ)	13	FB/P/F/winter	UB	15	13
High Bridge Outlet (NZ)	14	FB/P/F/winter	UB	14	7
High Bridge Outlet (NZ)	18	FB/P/F/winter	GP	14	15
High Bridge Outlet (NZ)	23 w/o 33, 35	FB/P/F/winter	GP	15	10
High Bridge Outlet (NZ)	33	FB/P/F/winter	GP	16	16
High Bridge Outlet (NZ)	35	FB/P/F/winter	GP	13	10
High Bridge Outlet (NZ)	23 total	FB/P/F/winter	GP	15	11
High Bridge Outlet (NZ)	26	P/F/winter	GP	13	27
Brushy Mission (NZ)	6	FB/P/S/winter	GP, part UB	10 (5% from UB)	12
Brushy Mission (NZ)	7	FB/P/S/winter	GP	6	5
Brushy Mission (NZ)	10	FB/P/S/winter	GP	8	15
Rock n' Roll (SZ)	1	HF/EX/S	none	10	18
Rock n' Roll (SZ)	2A	HF/S	none	13	30
Quarling Eagles (SZ)	6A	FB/S	incomplete	11	30
Quarling Eagles (SZ)	2G2	FB/S	UB	9	30

FB = Feller-Buncher
F = Forwarder
P = Processor
CWD = Coarse Woody Debris

UB = Underburn
HF = Hand felled
S = Skidder
EX = Excaliner

*The accomplished year displays when latest entry was made, either for harvest or fuel treatment – the latter usually occurs the following year after harvest.
**Unit was re-evaluated after some of the skid trails were decompacted in 2009.

Evaluation of the data for the HBO sale showed elevated values for several of the units. One immense complication was due to the re-numbering and combining of several activity areas so that the timber sale map did not easily match with the original NEPA units. For example, Unit 7 was divided into three separate units (A, B, and C), and Unit 23 contained two additional units (33 and 35) within its original boundary. Table 2 displays individual monitoring results for each unit as well as a combined score.

Unit 7 was visited after it was monitored and additional work was identified by the team. This also includes the decompaction of a main trail that was deemed unnecessary, which should lower disturbance values and promote soil recovery and hydrologic function. Mitigation is expected to take place in 2011 and would be monitored upon completion.

Monitoring of the Conventional Caribou sale resulted in unfavorable results for both commercially thinned units. Although Unit 17A is meeting R1 soil quality standards (SQS), the unit was skylined and should have been impacted at much lower levels. The majority of disturbance can be traced back to the grapple piling that occurred in an unorganized matter based on the amount and pattern of tracks.

Unit 17B has been visited many times in the past to observe the recovery trend of the unit. The first visit revealed churned up soils and deep ruts in the north-facing moist part of the unit and it was unrecognizable if impacts originated from harvest or grapple piling but likely both. Fortunately, the ash cap is quite deep so that very little to none of the coarser sub-soils were mixed in and logging equipment moved during dry conditions so that impacts are primarily from deep rutting rather than compaction.

The drier west-facing slopes of the unit are shallow, rocky, and revealed some compaction in trails that appeared more organized and spaced. Vegetation is returning rather quickly although the unit should be monitored for weeds, especially since it is surrounded by logged industrial timber land. Although impacts are exceeding, it does not seem advantageous to re-work the primarily rutted and churned surface soils because compaction is not the main disturbance, erosion is not an issue, and the site is re-vegetating.

Great results were achieved on the Brushy Mission sale were three winter-logged units resulted in disturbance at or less than 10%. It was difficult to even make out many of the skid trails in the units. Coarse woody debris, however, is on the lower end, especially for Unit 7, and overall, the units could benefit from leaving more of the smaller woody material which, in some cases was utilized for biomass.

C. Monitoring of Priest Lake Grazing Allotments

Three allotments were monitored in the spring and fall of 2010 to observe trends in vegetation patterns based on long-and short term objectives. Long-term goals include sustained land productivity and minimized risk of degradation while short-term objectives focus on maintaining adequate soils cover to decrease erosion potential, promote water infiltration, and limit invasive species.

1. Methodology

Since vegetation is one of the basic and most easily observable indicators to monitor rangeland, permanent line point intercept plots were established in some of the most heavily used portions of the Four Corners, Lamb Creek, and Moores Creek allotments. Each allotment contains two monitoring sites that were visited in the early summer before the grazing season started followed by post-grazing monitoring in the fall.

The line-point intercept method is a rapid assessment that quantifies soil cover, including vegetation, litter, rocks, weeds, and bare ground. These measurements can be related to soil and site stability, hydrologic function, and biotic integrity as well as the ability of the site to resist and recover from degradation. Methods followed guidelines in Herrick et al. Vol. I and II (2009) and were modified to fit allotment conditions in northern Idaho.

Each plot consisted of a central point (recorded with GPS and marked by wooden stake or rebar) from which five random 100 ft. transects radiated in a star-like pattern every 72 degrees. Photos were taken towards the transect line at both ends and sketches were made as transects were established in the early summer. Photo points are retaken during every monitoring session and should provide for an additional tool that reflects trends over the long-term. They have also proven invaluable for re-aligning of transects during different seasons.

Percent foliar cover counted the total number of plant intercepts in the “top layer”. Basal cover counted the total numbers of plant basal intercepts at the soil surface. Bare ground was recorded along the line but only counted as truly bare when there were no foliar <u>and</u> basal intercepts present. Within foliar and basal counts, weeds (primarily knapweed, daisy, and tansy) were identified and recorded accordingly.

2. Observations & Results

The following is a compilation of observations and results comparing seasonal trends between pre- and post-grazing monitoring. Additional field reports and the raw data compilations for each plot are available for the 2010 summer and fall monitoring season and contain more detailed data and photos.

2.1. Four Corners Allotment

Lower Meadow (N 48° 18.097 W 116° 58.980)

Grazed for many decades, the Four Corners allotment lies within a TMDL drainage and generally contains about 70 cows. One set of transects were taken near a meander on a lower terrace complex that has previously been used by cattle as well as campers. Soils on the terrace are silty sand and switch to sand close to the edge of one of the terraces. Near the edge of the stream, soils are silty loams with a minor clay component. No ash layer was observed at this location due to the close proximity and depositional influence of the stream as this site can get flooded in some years.

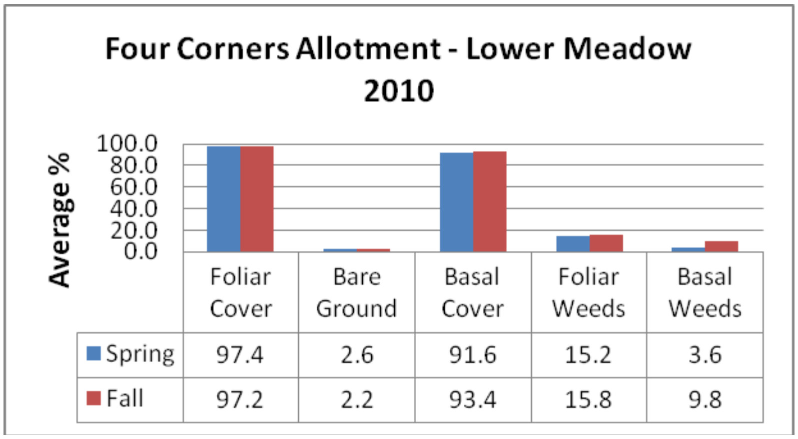


Figure 21. Monitoring results for the Four Corners Allotment – Lower Meadow site

The overall vegetative cover was satisfactory early summer and fall with little bare ground present, primarily from gopher piles. While still ungrazed in the spring, the wet season promoted good growth and the Lower Meadow site contained grasses and forbs that were up to 10 inches tall but weeds, primarily knapweed, were already of concern.

In the fall, weed presence doubled and the highest terrace was infested with knapweed. The tansies and daisies that were observed in the spring were still in the mix but now just barely visible and mixed in with the grass that varied from ~1 to 8 inches. Several patches were dense with clover and mixed with dandelions. Calling some of the plants a forb or a weed was often difficult due to their small emergence.

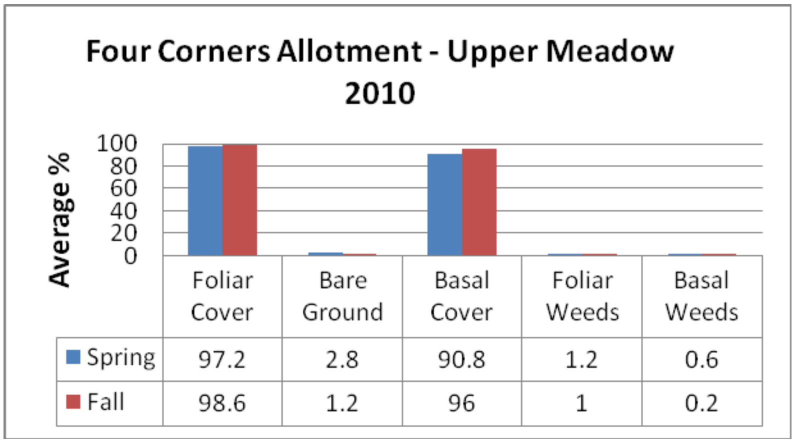
An interesting pattern is visible with lots of weeds on three of the northernmost transects while the two transects to the south barely had any. It appears that just a slight elevation change of a foot to a higher and drier terrace may have some influence. The most impacted weedy area is also on a portion of the terrace complex that has likely received the most use by cattle and recreation due to an old road that used to provide access to this popular spot.

Needless to say, this site has been utilized for many decades and is very resilient. Thus far there is still a grassy component underneath mingling with the knapweed and tansy. A shift to more predominant weeds over time could reduce the root mass that is holding the otherwise sandy and silty soils on the lowest terrace together, which could be very important during flood years.

Upper Meadow (N 48° 18.039 W 116° 59.138)

Additional transects were taken in the Upper Meadow on a much higher terrace. The area is also a popular recreation spot for camping and OHV use and some rehab was done years ago by ripping and decommissioning the access route to the lower terrace on which the other plot is situated.

This mesic site primarily contains grasses, few forbs, and is surrounded by encroaching conifer stands. Several roads are present and impacts from cattle and people are difficult to separate so that the long-term results represent cumulative disturbance trends from the general use of the area.



	Foliar Cover	Bare Ground	Basal Cover	Foliar Weeds	Basal Weeds
Spring	97.2	2.8	90.8	1.2	0.6
Fall	98.6	1.2	96	1	0.2

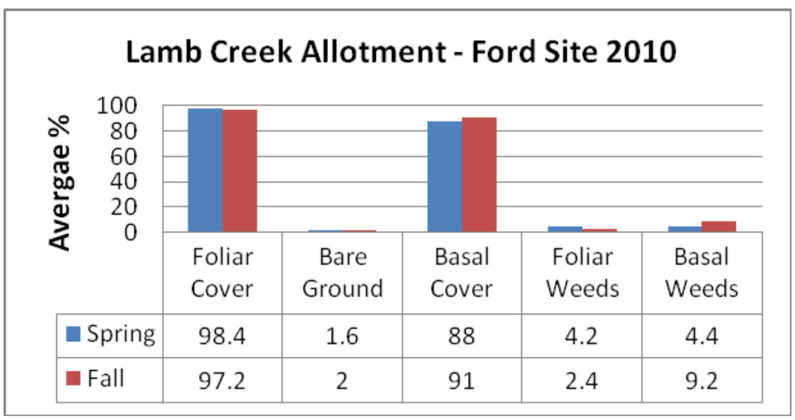
Figure 22. Monitoring results for the Four Corners Allotment – Upper Meadow site

In the spring, the Upper Meadow site's stubble height was on average about 3+ inches and contained a solid cover of grasses with little weeds and forbs and an increased layer of litter in the form of dried out basal leaves of the grasses. In the fall, little to no apparent changes from the spring was found despite its heavy use. Though the stubble height was reduced to 1 to 3 inches, the meadow was densely covered in grass with occasional patches containing larger grass blades. Weeds were negligible.

2.2. Lamb Creek Allotment

Ford Site (N 48° 31.867 W 116° 58.607)

The Ford Site is located in an open meadow adjacent to the stream through which a ford along the otherwise alder-flanked banks provides one of the few stream crossings. Soils are granular brown silt loams speckled with mica that contain occasional clay and sand lenses. Plenty of roots are present along with some compaction but the site is otherwise productive.



	Foliar Cover	Bare Ground	Basal Cover	Foliar Weeds	Basal Weeds
Spring	98.4	1.6	88	4.2	4.4
Fall	97.2	2	91	2.4	9.2

Figure 23. Monitoring results for the Lamb Creek Allotment – Ford site

In the spring, grasses on the meadow averaged 1 to 1.5 feet in height and little bare ground was observed besides some gopher disturbance and some grassy tracks from ATV use. Weeds were present but were not fully developed; therefore the count was likely lower than recorded.

In contrast, stubble height in the fall was reduced to 1 to 3 inches of uniformly grazed pasture. Weeds, such as daisies and tansies, were emerging with small leaves under short grasses and some areas where heavily covered with moss. Foliar weed counts were greater in the early summer but basal weeds doubled in the fall compared to June.

Forage Site (N 48° 31.867 W 116° 58.607)

The center of the transect cluster is an old metal cage of a forage plot in the middle of the meadow marked with a stake at the westernmost side. Soils are brown to dark brown silty clay loams that are gravel free and show plenty of root growth throughout. Most of the meadow was covered with grasses, forbs, and weeds in the spring and contained increased counts of thistles as well as small tansies and daisies that likely made up more of the count than recorded.

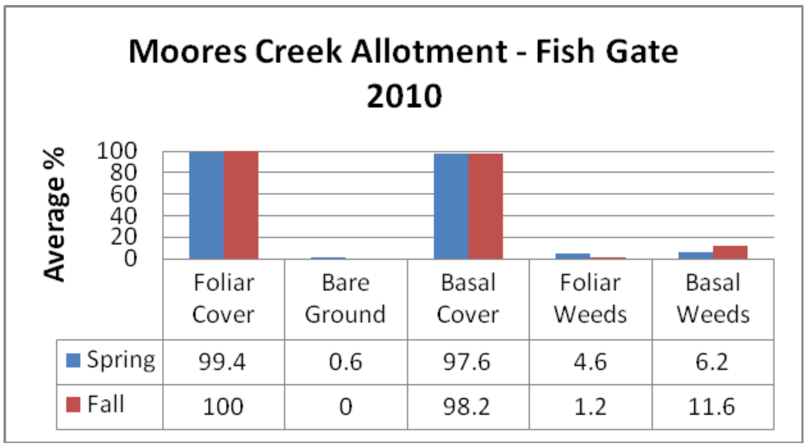
The vegetation in the meadow portion measured on average 9 to 12 inches with taller grasses in between. Several sedge patches were also present that dried out in the fall. This site appears to be less used by recreation than the Ford site and the creek is not accessible and fenced off along the riparian area.

In the fall, this site showed signs of heavy grazing and stubble height was as uniformly low as the Ford site. Grass lengths ranged between 1 to 5 inches and increased stubble height in places may be correlated to gopher activity, which is plentiful in the pasture.

The meadow also shows a distinct vegetation change that delineates a wetland component due to tall canary grass and standing puddles of water on its northern transect in the spring – this area was grazed down in the fall. Two main trails extend east to west through the pasture and show heavy use. Weeds, just like at the Ford site, were small but consistently present under the grass.

2.3. Moores Creek Allotment

Fish Gate (N 48° 20.625 W 116° 58.783)

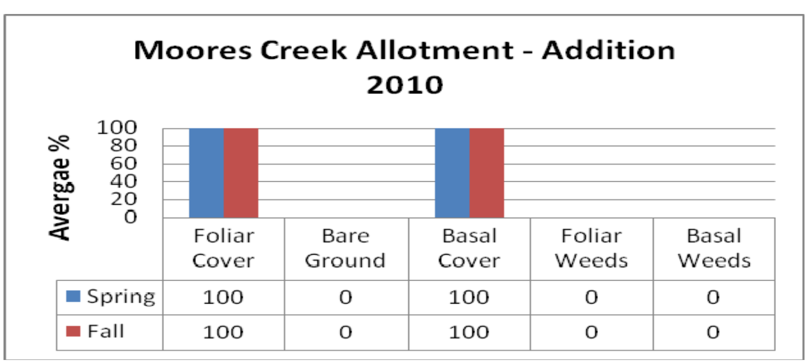


	Foliar Cover	Bare Ground	Basal Cover	Foliar Weeds	Basal Weeds
Spring	99.4	0.6	97.6	4.6	6.2
Fall	100	0	98.2	1.2	11.6

Figure 24. Monitoring results for the Moores Creek Allotment – Fish Gate site

The Fish Gate site is located on a small patch of FS land wedged between two sections of private property with Moores Creek running through it. The western side of the creek is utilized more because of the two gates on either end that are open to allow free passage of cattle and horses between the ownerships. The monitoring plot is located on a terrace that has also been impacted from vehicles that pass through this small patch of Forest Service managed land to get to the private property.

Vegetative cover was satisfactory in the spring but weeds were high at both the foliar and basal level. In the fall, basal weeds almost doubled while foliar levels decreased. At the end of the season vegetation was dense and grasses, which dominate, were on average 6 to 10 inches in the uncut and 1 to 5+ inches in the mowed portion of the monitoring plot. The density of grasses and the fact that they are leaning over made it difficult to always observe underlying basal vegetation but it is fair to say that the weed component in this plot is underestimated. Daisy's and tansies are the main weeds with fresh, small leaf clusters hugging the ground. They are expected to take off again next spring.



	Foliar Cover	Bare Ground	Basal Cover	Foliar Weeds	Basal Weeds
Spring	100	0	100	0	0
Fall	100	0	100	0	0

Figure 25. Monitoring results for the Moores Creek Allotment – Addition site

Addition Site (N 48° 21.607 W 116° 59.505)

This site has just been added to the proposed new allotment management plan. It consists of about 16 acres of FS land adjacent to private property that has not been grazed before. Soils are granular dark brown to black silty clay loams that are not compacted. Towards the center of the meadow soils are wet and consist of black organic silty clay loams.

The transects are located across almost 100% canary grass and no change in cover was detected between the spring and fall besides a dramatic increase in height. The canary grass was between 4.5 to 6 feet tall in the fall and soils were dried out compared to the swampy conditions in the early summer. A distinct change to dry site grasses are present on the westernmost transect as the elevation gently increases to a higher terrace.

3. Allotment Summary

Monitoring on six plots in three allotments showed that vegetation remained relatively stable before and after the grazing season. Little bare soil was discovered and was usually present in the form of gopher piles and established trails or roads that were crossed by transects.

Of greatest concern are weeds which doubled in the fall at all locations except the Moores Creek Addition (currently ungrazed) and Four Corners Upper Meadow sites. The heaviest infestations were present at the Moores Creek Fish Gate and Lamb Creek Forage sites followed by the Four Corners Lower Meadow and Lamb Creek Ford sites.

Stubble height was lowest in the Four Corners and Lamb Creek allotments with the Four Corners Upper Meadow barely exceeding 1 to 3 inches. However, this site also had the lowest weed presence (aside from the ungrazed Moores Addition), very little bare soil, and a continuous dense grass cover despite its heavy grazing and recreational use.

Several recommendations were made for each of the allotments including salt lick locations, ford stabilization, herding requirements, and follow ups on gate closures after the grazing season is over. A need for continuous communication with permittees is evident and enforcement and oversight of some of the grazing requirements is crucial. Granted that funding and personnel are limited, priorities need to be set.

The 2010 Priest Lake allotment monitoring provides the first attempt to establish a collection of data that will help to assess trends in productivity, vegetation patterns, and soil stability.

4. Review of HBO Prescribed Burns

In the fall of 2009, prescribed fires were used for site preparation in Units 12, 13, and 14 of the HBO sale on the Priest Lake Ranger District. A summary comparison of the physical conditions of the burned units was compiled and discussed in the 2009 Forest Plan monitoring report with the caveat to return the following year to monitor for burn disturbance and harvest impacts.

Unit 12

This 16 acre unit is located on flat ground in glacial outwash with the northern boundary running along a slightly elevated bench of <5% gradient. Based on reference checks in adjacent stands (harvested in the past) and unburned spots of generally uniform appearance, organic matter was low to optimal pre-harvest for Unit 12 and continues to follow that trend post-harvest and fire. Weeds were few and most apparent in the northwest corner near the Forest Service road intersections (mostly thistles) and along the Forest Service Road 57UGO (mostly daisies).

The prescribed burn occurred in the fall of 2009 and left behind a mosaic that is heaviest in the northeast and southeastern portion of the unit. Burn patterns generally follow skid trails with heavier fuel presence. In the center of the unit, an increased accumulation of coarse woody debris is present and has also been burned over. Burn impacts are displayed in Table 54 and did not include any severe disturbance.

Only a few bare spots were observed and were usually not extensive in size (~1-4 ft^2). Burned areas are still covered with charred litter and are re-vegetating at variable rates and vigor. It is expected that these patches will likely become invisible over the next 1 to 2 years as vegetation takes over. The unit has also been planted in the early summer of 2010.

Unit 13

Located on generally flat ground, this 19 acre unit was burned when soil moistures measured ~27% underneath a moderately to heavy fuel load. Based on information from fire personnel, the fire in the unit was fueled by winds from the southwest and burned hottest towards the northern half.

The transects encompassed evaluations of logging and burning impacts for a cumulative total of 15% disturbance out of which 4% are associated with the prescribed burn. Hydrophobicity was highest in the southwestern corner below the access road that is located on what appears to be a terrace break. The remainder of the unit had light burn severity devoid of hydrophobic soils with only a few additional high and moderate observations. Approximately 17% bare soils are present while the majority of the unit showed a thin cover of burned litter broken up by occasional unburned patches. These increased in the southeast corner.

The emerging vegetation primarily consists of pine grass, lupine, woods rose, snowberry, and yarrow while much of the surface was also covered by mosses and lichen. The overstory contains of larch, Douglas fir, and a few white pines. Replanting with larch and white pine appears to have just taken place in 2010.

Coarse woody debris is at 13tons per acre and the average size of solid wood is 4 to 6 inches in diameter. A tremendous amount of soil wood is present, especially towards the northern half, and helps increase the numbers. Otherwise this unit does not contain much fine material.

A section in the middle of the unit was also quite barren which really stood out since the freshly emerging green vegetation was visible elsewhere. Soils, however, were not hydrophobic but showed increased sand content. Plenty of roots were also found on the surface so that soils do not appear to have been severely burned but may be affected by something else, including lowered water holding capacity.

Soils were uniformly wet throughout the profile which was no surprise after an increased amount of spring precipitation before the visit. The now open stand may dry out quicker for some time due to lack of overstory and ground vegetation. Based on the regrowth just one season after the prescribed burn, the unit should revegetate nicely over the next few years.

Unit 14

This 14 acre unit is almost adjacent to Unit 13 and contains similar soils, elevation, is flat, and appears a bit drier. However, a difference in burn patterns compared to the other units is apparent throughout since a more patchy distribution of fire could be linked to the fuel load on skid trails. Impacts were estimated to be 14% with 1% associated to burn activities. Despite a less extensive uniform burn, the smaller burn patches were often more bare.

Dominating vegetation consisted of kinnickinick, strawberry, pine grass, vaccinium, and yarrow on unburned while some of the same plus lupine and brackenfern were found on burned patches.

Along the perimeter and the eastern portion of the unit, much smaller regeneration survived and shrubs, though burned, were still present suggesting a light burn. Coarse woody debris is about 7 tons per acre but is considered a minimum based on plentiful soil wood. Much of the duff is still present and continues to protect the soil surface.

Summary

Comparison of the three burned units of the HBO sale revealed an array of different soil moisture and fuel load conditions that resulted in a variety of outcomes (see 2009 Forest Plan monitoring report). Above all, it showed that soil moisture by itself is not a stand-alone prediction for how a burn unit will be affected.

Severely burned soils were minimal and the majority of the units had low burn severity and, with the exception of Unit 13, contained plentiful unburned mosaics. Loss of organic matter left all but Unit 12 with reduced material and will need to build again with time as the undercover fills in. It would be of interest to return to these units in 3 to 5 years to monitor the recovery process.

Table 54. Results of onsite assessment of existing condition following the R1 Soil Quality Monitoring Protocol (2009)

Burn Severity (%)				
Unit	**Unburned**	**Low**	**Moderate**	**High**
12	56	42	2	0
13	9	84	3	4
14	35	63	1	1
Organic Matter (%)				
	<¾ inch - low	**¾ to 1¾ - optimum**	**>1¾ - high**	**Bare**
12	58	36	2	4
13	76	7	0	17
14	81	5	0	14
Coarse Woody Debris				
12	10.8 t/ac			
13	13.0 t/ac			
14	6.7 t/ac			

Unburned: Vegetation shows no impacts of fire.
Low burn severity: Surface organic layers are not completely consumed and still recognizable. Structural aggregate stability is not changed from unburned condition and roots are generally unchanged. The ground surface may appear lightly charred and prevailing color of the site is green.
Moderate burn severity: Up to 80% of the pre-fire ground cover may be consumed. Fine roots may be scorched but are rarely consumed over much of the area. The surface is generally blackened with possible gray patches. The prevailing color of the site is often brown due to canopy needle and other ground vegetation scorch. Soil structure is generally unchanged.
High burn severity: All or nearly all of the pre-fire ground cover und organic matter is generally consumed and charring may be visible on larger roots. Bare soil or ash is exposed and susceptible to erosion and aggregate structure may be less stable. White or gray ash indicates fuels were consumed and large tree roots are often entirely burned. Soil is often gray, orange, or reddish where large fuels were consumed and the prevailing color of the site is black.

5. Review of Lookout Ski Area – 2005/2006 to 2010

The Lookout Ski area has been monitored for several years to evaluate the impacts, recovery, and overall trends from several past timber sales. Continued visits and observations also assess the conditions of the permittee's general operational and maintenance requirements.

The most current sale, Lookout Beetle, occurred in 2010 and focused on the removal of bark beetle infested stands. The Brew-Ski (2006) and Regis T. Runt (2004) timber sales expanded the ski area to the north and to the south, included the installation of several new ski lifts, and created numerous new ski runs. In 1999, snowboarding terrain was opened with the Lookout Pass ½ Pipe Timber Sale.

The following photos taken between 2005 and 2010 highlight several areas around Lookout Pass and provide a visual comparison of trends associated with Best Management Practices (BMPs), roads, pipes, logging and ski management impacts, recovery, and more. A group of resource specialists has utilized this information and identified action items for inclusion into the annual Summer Operating Maintenance Plan. Interaction with the permittee will be ongoing and supplemented with field trips in 2011 and beyond to review progress and to identify additional needs.

Lookout Mountain Ski Area
2005/2006 - 2010 Photo Comparison

B-52

Fig. 26. 2005-snowboard terrain

Fig. 27. 2010

Fig. 28. 2006-eroding steep waterbar

Fig. 29. 2010

Montana Face

Fig. 30. 2005-steep access route

Fig. 31. 2010

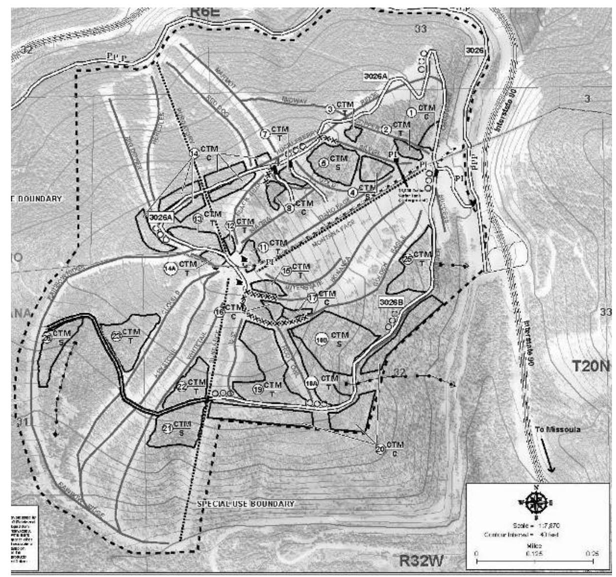


Fig. 32. Ski runs at Lookout Mountain (on Lookout Beetle 2010 sales map)

Idaho Face **Sundance**


Fig. 33. 2005-steep access route


Fig. 34. 2010


Fig. 35. 2005-erosion above road


Fig. 36. 2010

Whitetail


Fig. 37. 2006-erosion on slope


Fig. 38. 2010


Fig. 39. 2006-erosion on slope


Fig. 40. 2010

Fig. 41. 2005-side spur above road Middle Whitetail

Fig. 42. 2010

Near Lodge

Fig. 43. 2005-headcut above lodge on Gold Run

Fig. 44. 2010

Fig. 45. 2010-gullying near Silver Run

Fig. 46. 2010-erosion above Lodge

Lower Lift

Fig. 47. 2005-broken culvert below lower lift

Fig. 48. 2010


Fig. 49. 2005-lower lift terminal near Lodge


Fig. 50. 2010

Upper Red Dog


Fig. 51. 2006-burn pile area after timber sale


Fig. 52. 2010


Fig. 53. 2006-waterbarred skid trail


Fig. 54. 2010

Burn Piles


Fig. 55. 2005-burn pile below B52


Fig. 56. 2010

Marmot

Fig. 57. 2006-skid trail at Lower Marmot

Fig. 58. 2010

Fig. 59. 2006-skid trail at bottom turn of Marmot

Fig. 60. 2010 – still not vegetated

Fig. 61. 2010 – Lower Marmot – much less veg, weeds

Fig. 62. 2010 – bottom of Marmot – no veg.

Purgatory

Fig. 63. 2006 - Lower Purgatory and Hercules Runs

Fig. 64. 2010-excavated run after lift construction

IV. OTHER TOPICS OF INTEREST

The Forest Plan does not require that the information in this section be part of the monitoring report. The information is included because of public interest in these subjects of forest-wide importance. Topics addressed include ecosystem restoration and old growth.

Ecosystem Restoration

Northern Idaho forest ecosystems have undergone enormous changes in the last 150 years. In some cases, these changes have created needs and opportunities for restoration activities.

Many of our forestland restoration needs are a result of problems that include large-scale reductions from historic levels of potentially long-lived, shade-intolerant, tree species, such as white pine, whitebark pine, western larch and ponderosa pine. These are the species best adapted to natural disturbances such as periodic drought and wildfire that are endemic to these ecosystems. If climate change leads to increased risks of drought and other stresses for forests, we might expect to see more forest disturbances from a variety of causes – including insects, pathogens, and wildfire. Ponderosa pine, larch, and white pine are the most disturbance-resilient tree species we have. However, compared to historic levels there is less forest area dominated by these species, and more forest dominated by shade-tolerant species such as grand fir and hemlock, which are more drought and fire sensitive. Besides these reductions in the shade-intolerant, disturbance-adapted tree species dominating upper canopies, there are also large areas with forest understory dominated by shade-tolerant, moisture-demanding grand fir and hemlock.

Due to ongoing forest succession, reduced timber harvests, and fire suppression, we have declining a percent of the landscape with early successional shrub / seedling / sapling stages that provide important components of landscape level diversity. We also have less old growth forest than historic levels. However, the percent of old growth may be poised to increase over the next few decades because of the large amount of mature forest that is continuing to age. We are not removing old growth with timber harvest.

Whitebark pine declines from historic levels have been severe enough that the U.S. Fish and Wildlife Service now classifies it a candidate species for potential listing under the Endangered Species Act. Meanwhile, the Northern Region of the Forest Service now has it classified as a sensitive species. Where we have the opportunity, we are undertaking activities to restore whitebark pine.

Watershed and hydrologic functions can be impaired by weakened stream channel stability interacting with roads and normal flood events. This can result in excessive erosion rates and downstream sedimentation.

Our aquatic resource problems include the loss of quality fish habitat, the introduction of exotic species, such as brook trout, and potential damage from severe fires.

The following are some restoration actions that could be taken to improve the health of our ecosystems:

1) Maintain and increase old forest structures; manage stand densities; increase the proportion of white pine, larch, and ponderosa pine dominated forests; restore whitebark pine; increase patch size of older forest; increase variability in patch size of all forest ages classes; and manage fire to restore landscape-scale diversity of forest structure and species.

    a. To maintain and restore dry site old growth, active management may be needed that focuses on the following elements:

        i. retain the big old trees including some additional trees close to old growth age and size (especially ponderosa pine and larch – but also the older larger Douglas-fir);

ii. reduce the dense ingrowth of smaller trees that can serve as live ladder fuels and that compete for moisture with the big older trees (especially moisture-demanding grand fir and large numbers of smaller Douglas-fir);

iii. reduce excessive amounts of dead fuels while retaining moderate levels of large snags and large down logs;

iv. provide some opportunities for regeneration of shade-intolerant ponderosa pine and larch to provide future old growth cohorts.

2) Restore watershed function and aquatic habitats to provide a connection between aquatic strongholds (existing populations of native fish species).

3) Reduce fire, insect, and disease susceptibility through management of forest tree species composition, stand density, forest stand structure, and landscape patterns.

Idaho Panhandle National Forests Restoration Activities, 1992-2011

The Idaho Panhandle National Forests has been working to address many of these restoration needs. Listed below are some restoration activities the Forest has carried out.

1) Increasing the proportion of white pine, larch, ponderosa pine and whitebark pine

A total of about 1,582 acres were planted to these species in 2010 and 2011. (This includes the new, more blister rust resistant white pine). The first three of these species tend to be best adapted to local climate, and most resilient to droughts, insects and root disease, and fire. Whitebark pine is a keystone component of high elevation forest that has suffered serious declines from historic levels due to blister rust, mountain pine beetle attack, and fire suppression.

2) Restoring White Pine Forests

The major cause of the loss of the white pine forests has been the introduction of the exotic disease, white pine blister rust. The Idaho Panhandle National Forests has a two part long-term strategy to restore these important forests. Natural white pine has a very low level of resistance to the blister rust disease. For the first part of our strategy, the Northern Region of the U.S. Forest Service is using tested, selected rust-resistant white pine trees in a multi-generational breeding program to accelerate the development of blister rust resistance in white pine and to provide rust-resistant white pine seedlings for planting.

- In 2010 and 2011 combined, the IPNF planted approximately 197,210 rust resistant white pine seedlings.
- From 1992 through 2011 the Forest planted over 13,255,400 rust resistant white pine seedlings.

The second part of the IPNF strategy involves maintaining white pine as a forest component while they grow and mature. Where we do management activities we are retaining a landscape-wide, naturally breeding, and genetically diverse population of wild white pine that can develop blister rust resistance through natural selection. The IPNF has cooperated with the U.S. Forest Service, Northern Region, Forest Health Protection Staff in publishing *White Pine Leave Tree Guidelines (Schwandt and Zack, Forest Health Protection Report 96-3*. March 1996). Since the publication of these guidelines, the Forest has also included the pruning of young white pine trees. This practice has been demonstrated to reduce mortality where implemented; thereby increasing the likelihood that more white pine will be maintained during forest development to contribute to future genetic diversity.

- In 2010 and 2011 combined, the Idaho Panhandle National Forests pruned white pine saplings on approximately 6,997 acres.
- From fiscal year 1992 through 2011, the Forest has pruned a total of 46,989 acres.

The implementation of the leave tree guidelines in conjunction with white pine blister rust pruning, and planting rust resistant seedlings ensures that even where we are harvesting trees, we will maintain a naturally breeding white pine population to capture blister rust resistant genes from both the planted and wild populations.

3) Managing tree stocking and forest structure

- In 2010 and 2011 combined, the IPNF pre-commercially thinned or released from competition 5,258 acres of young stands. Most of the thinning and release was to allow young – mostly sapling sized, shade-intolerant larch, white pine, and ponderosa pine to maintain stand dominance, or to reduce density in over-crowded young stands.
- From fiscal year 1992 - 2011, the IPNF has thinned or released 95,701 acres of young trees.

4) Restoring the role of fire in the ecosystem thereby reducing risk of severe fires

- There were 1,782 acres of harvest related natural fuel reduction accomplished fiscal years 2010 and 2011 combined.
- There were 20,767 acres of natural fuel reduction accomplished in fiscal years 2010 and 2011 combined.

5) Watershed Improvement

- There were 1,010 acres of watershed improvement accomplished in fiscal years 2010 and 2011 combined.
- From fiscal years 1992 to 2011 there were 12,122 acres of watershed improvement accomplished.

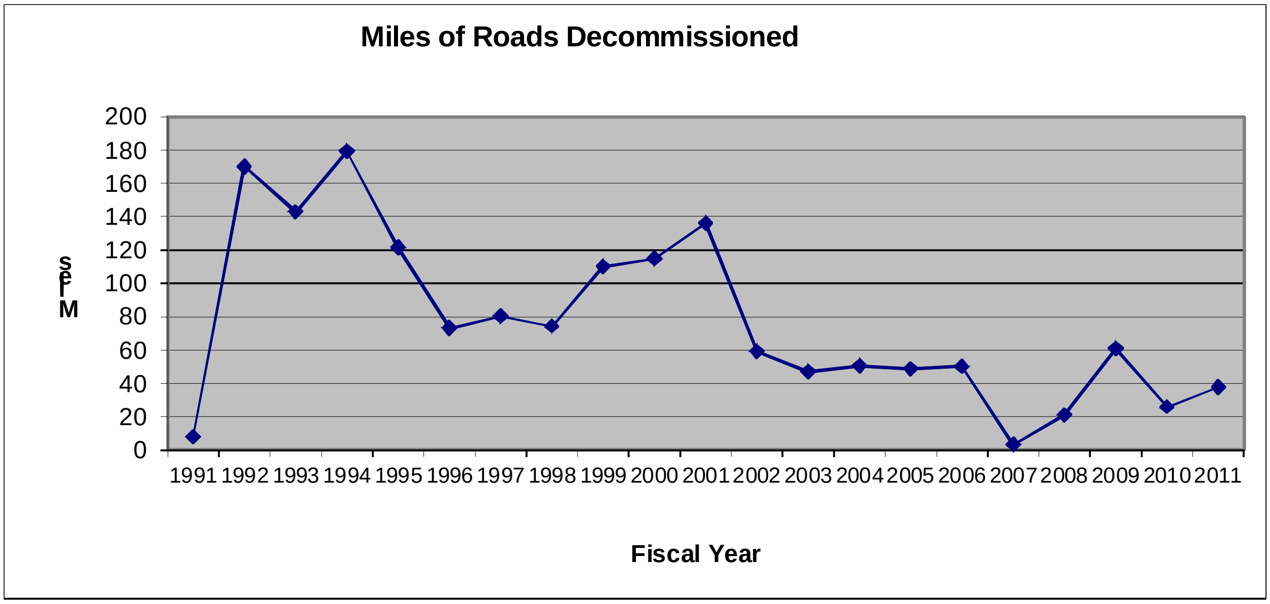
6) Road decommissioning

- There were about 26 and 38 miles, respectively, of road decommissioned in fiscal years 2010 and 2011 as part of ecosystem restoration work, using a variety of funds.
- The following table shows that there were about 1,615 miles of road decommissioning on the Idaho Panhandle National Forests from fiscal years 1991 to 2011. Classified roads are generally the ones that are inventoried, maintained and managed by the forest. The unclassified roads are not.

Table 55. Miles of Roads Decommissioned

Fiscal Year	Classified Roads	Unclassified Roads	All
1991	0	8.0	8.0
1992	141.8	28.3	170.1
1993	115.2	27.6	142.8
1994	119.3	59.9	179.2
1995	95.9	25.7	121.6
1996	58.9	14.3	73.2
1997	79.2	1.1	80.3
1998	71.5	2.8	74.3
1999	51.9	58.3	110.2
2000	91.8	23.0	114.8
2001	107.0	29.2	136.2
2002	40.2	19.0	59.2
2003	22.6	24.6	47.2
2004	48.9	1.6	50.5
2005	30.8	17.9	48.7
2006	24.1	26.1	50.2
2007	3.4	0	3.4
2008	18.3	2.8	21.1
2009	49.2	11.7	60.9
2010	17.5	8.5	26
2011	19.1	18.7	37.8
TOTAL	**1,206.6**	**409.1**	**1,615.7**

Figure 65. Miles of Roads Decommissioned



Restoration Activities

Our ecosystem restoration activities focus on the following types of activities:

- Reducing road densities, especially in areas with high densities.
- Stabilizing and improving channel stability.
- Creating openings for the reintroduction of white pine, ponderosa pine, larch and whitebark pine.
- Concentrating vegetation treatments in larger blocks, coupled with allowing other large blocks to remain undisturbed for longer intervals.
- Increasing the use of prescribed fire to reduce severe fire risk and restore the role of fire in the ecosystem.
- Restoring whitebark pine by two methods: 1) Reintroducing prescribed fire to encourage whitebark pine restoration; and 2) Collecting whitebark pine cones and testing seedlings for blister rust resistance, to begin developing blister rust-resistant whitebark pine seed sources.
- Thinning dense stands to favor white pine, ponderosa pine, and larch, and to promote large trees and reduce competition for moisture on dry sites.
- Restoring riparian areas and protecting inland native fish strongholds.
- Protecting habitat for threatened and endangered species, such as woodland caribou, Canada lynx, and grizzly bear.
- An important aspect of our ecosystem management strategy is to focus restoration activities in priority areas where multiple ecological problems can be addressed. The objective is to improve the condition of several ecosystem components and not just a single one, such as vegetation or aquatics.

Old Growth

The 1987 Idaho Panhandle National Forest (IPNF), Forest Plan, Standard 10.b says the Forest shall: "Maintain at least 10% of the forested portion of the IPNF as old growth". The Forest Plan identified 2,310,000 forested acres on the IPNF. Therefore, the Forest Plan requires maintaining at least 231,000 acres of old growth. Forest Plan Standard 10.a incorporates the definitions of old growth developed by the Regional Old Growth Task Force, documented in: *Green, and others. 1992 (errata corrected 12/11). Old Growth Forest Types of the Northern Region. USDA, Forest Service, Northern Region.*

The IPNF is using a multi-scale approach to monitoring old growth, based on two separate, independent tools. These are:

1) Forest Inventory and Analysis (FIA) data used to calculate IPNF Forest-wide and mid-scale old growth percentages.
2) IPNF stand map displaying all stands allocated for old growth management, with old growth allocation recorded in the FS Veg-Spatial database.

1) Old Growth Estimates from FIA Data

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 branch of the Forest Service, which makes it administratively independent from the National Forest System. The people who administer the FIA inventory on the IPNF are employees of the Interior West Forest Inventory and Analysis work unit, headquartered at the USFS Rocky Mountain Research Station in Ogden, Utah.

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). 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 all measurements are accurate, and that there is no bias in sample design, plot location, trees selected for measurement, or the measurements themselves.

FIA does not provide a 100% annual census of every tree on every acre in a national forest. With approximately 2,500,000 acres on the IPNF alone, and hundreds to thousands of trees per acre, that would not be possible. Rather, the FIA design 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]).

Because FIA data comes from a statistical sample rather than a 100% census, we describe attributes calculated from this data as estimates and the accuracy of these estimates is computed and reported as confidence limits. The Forest Service Northern Region and the IPNF use a 90%-confidence interval for describing the reliability of FIA estimates. The 90% level was chosen to provide a fairly precise level for biological attributes that vary across the landscape. This confidence interval can be understood as indicating that if we had a 100% census of every tree on every acre, there is a 90% probability that the true proportion of old growth for the population would be within this confidence interval. For an approximately normally distributed population, there is a 5% probability that the proportion of old growth would be less than the lower confidence limit. There is an equal 5% probability that the proportion of old growth would be greater than the upper confidence limit.

Using FIA data to assess the percent of old growth allows us to base our monitoring on an unbiased, statistically sound, independently designed and implemented representative sample of forest conditions on the IPNF. This inventory is reasonably current because FIA plots on the IPNF were installed during 2000 to 2004. To remain current, FIA re-measures 10% of its plots every year. As these re-measured plots accumulate, we will periodically update our FIA old growth report. Current FIA old growth estimates are presented at this time.

FIA plot data is tested against the old growth minimum criteria in Table 1 of *Green and others (2011)*. The old growth minimum criteria are the number of trees per acre that meet or exceed old growth minimum ages and diameters, and a minimum forest density measured as basal area per acre. The criteria are specific by Habitat Type and Forest Type combinations. Plots that meet old growth minimum criteria are classified as old growth. Data analysis is automated in the Forest Service, Northern Region FIA Summary Database. The latest FIA old growth estimates for national forests in the Northern Region are documented in Region One Vegetation Classification, Mapping, Inventory and Analysis Reports (available from the USFS Northern Region). The forest-wide results presented here are from Report 07-06 v1.2, dated May 16, 2007, titled "Estimates of Old Growth for the Northern Region and National Forests". The more detailed data for distribution of old growth across geographic areas are from Report # 06-07, dated April 11, 2006, titled "Estimates of Old Growth Percentages and Snag Density on the Idaho Panhandle National Forest".

Based on FIA data, the estimated percent of old growth on the forested lands of the IPNF is 11.8%. The 90% confidence intervals of this estimate are 9.6% to 14.0%. Given these values, we conclude that the IPNF is meeting and exceeding Forest Plan Standard 10.b. that calls for maintaining "10% of the forested portion of the IPNF as old growth".

FIA old growth percentages by Geographic Area also provide evidence that the old growth is well distributed across the IPNF. Note that as the sample size becomes larger, the confidence intervals are tighter. Estimates for the IPNF as a whole provide the tightest confidence intervals, and as we go to smaller geographic areas, the confidence intervals widen. Estimates of percentage Old Growth by IPNF Geographic Areas and associated 90% confidence intervals are as follows:

Table 56. FIA Current Estimated Percent Old Growth by Geographic Area

IPNF Geographic Areas	90% Confidence Interval Lower Bound	Estimate of Percent Old Growth	90% Confidence Interval Upper Bound
Coeur d'Alene	*5.4%*	**9.2%**	*12.7%*
St. Joe	*7.9%*	**12.0%**	*16.5%*
Sandpoint / Pend Oreille	*5.3%*	**11.1%**	*17.6%*
Bonners Ferry / Kootenai	*10.2%*	**15.9%**	*21.9%*
Priest Lake	*6.3%*	**12.5%**	*19.3%*
Total IPNF	***9.6%***	**11.8%**	***14.0%***

2) <u>IPNF Stand-Level Map of Allocated Old Growth</u>

The IPNF stand-level old growth map is a management tool. This stand map represents a census of those stands allocated for old growth retention to meet 1987 Forest Plan standards. The stand-level old growth allocation allows us to distribute old growth across the ranger districts and landscapes in ways that make ecological sense at the landscape scale. This forest-wide stand map also provides a useful starting point when we are considering management activities that have any potential to impact old growth, and need to take a more detailed look at old growth allocations within a potential project area. The stand map also allows us to display to the public that an adequate amount of old growth is allocated and distributed across the landscape.

Figure 66. Stand exam crew taking measurements in potential old growth stand

The IPNF stand-level old growth allocation represents a different approach to monitoring old growth than the FIA sample, and was designed and implemented independently from the FIA inventory. Forest stand information is gathered by ranger district personnel or contractors working for the ranger district. Approximately 98.8% of old growth allocations are based upon field examination. Many old growth stands are examined with a formal systematic grid of stand exam plots that count and measure all designated sample trees on the plots. Allocation decisions for old growth stands utilize the field examination data, but usually also include landscape relationships in making old growth allocation decisions. A smaller proportion of stands were allocated to old growth based on less formal notes and measurements from walk-through, field verification surveys by foresters and forestry technicians knowledgeable about old growth definitions. Only 1.2% of old growth stands are allocated based on photo inventory, and all of these will be field verified before any forest management projects are carried out in those watersheds.

Ranger district stand-level old growth allocation utilizes the latest stand inventory data and field notes to assess how well stands meet the old growth definitions in the IPNF Forest Plan, utilizing criteria in *Green, and others (2011)*. The old growth definitions in *Green and others (2011)* are in two parts. First, there are tables of "Old Growth Type Characteristics". These tables include both "minimum criteria" (minimum age, tree diameter, number of old large trees, and basal area) and "associated characteristics" (ranges of numbers or proportions of broken topped trees, snags, canopy layers, diameter distributions, broken tops, and large down wood). Pages 11 and 12 of *Green and others (2011)* explain that: "The minimum criteria are used to determine if a stand is potentially old growth. Where these values are clearly exceeded, a stand will usually be old growth. The associated structural characteristics may be useful in decision making in marginal cases, or in comparing relative values when making old growth evaluations." *Green and others (2011)* also warns that: "A stand should not be accepted or rejected as old growth simply on the basis of associated characteristics." The associated characteristics are <u>not </u>part of the base old growth definition. Speaking of the minimum criteria, *Green and others (2011)* further states:

> "**Because of the great variation in old growth stand structures, no set of numbers can be relied upon to correctly classify every stand.... Do not accept or reject a stand as old growth based on the numbers alone; use the numbers as a guide.**"

(The previous 2 sentences are the only sentences printed in bold in the entire explanatory text of <u>Green and others (2011)</u>. The purpose of this bold font was to emphasize the importance of what was being said). Second, on pages 11 and 12, *Green and others (2011)* provides guidance for incorporation of landscape ecology considerations, and a full range of resource values (including human values) in the selection of stands to be managed as old growth. Professional consideration of a complex array of factors is necessary to make old growth stand allocations that also make sense at the landscape scale.

When making old growth allocation decisions for individual stands, ranger district personnel use the table of "Northern Idaho Zone Old Growth Type Characteristics" in *Green, and others (2011)* as the starting point, but also incorporate the array of other old growth resource considerations and landscape design criteria, as explained in pages 11 to 12 of the same document. Taking these other considerations into account is fully consistent with Forest Plan standard 10c., which states: "Areas will be selected as old-growth management stands based on a combination of wildlife, cost efficiency, and other resource values (interdisciplinary process)."

From 1990 through 1993 the IPNF did a forest-wide inventory of old growth resources, and worked with local public Forest Watch groups to allocate and map old growth. This is the original source of the IPNF stand-level old growth allocation and map. Since that time, we have continued to update our old growth stand allocation and map as the forest has changed by natural events, and as new information has become available.

Starting in 2001 the Idaho Panhandle National Forests did several years of substantial amounts of new field reviews and exams, to incorporate changes in conditions on the ground. Project-level stand examinations also provide ongoing updated information for those parts of the landscape we are actively managing. Ongoing review, monitoring and updating of the old growth stand allocation and map results in some changes in the allocated old growth stand acres reported in annual monitoring reports over the years, in response to changing conditions on the ground and availability of better information. These changes are evidence that we are working to keep the stand-level allocation current as conditions change on the ground. Each year's monitoring report contains the most current old growth stand information available at that time. The stand allocation information below was extracted from our database in January 2012, and reflects our best information at that time. Using this stand-level old growth allocation information together with the FIA old growth estimates provides the most comprehensive picture of old growth amounts on the IPNF.

The IPNF does not do timber harvest or other management that removes allocated old growth stands. We ceased this practice a number of years ago. However, old growth distribution will never be entirely static because forests are living, changing natural communities. Disturbances such as fire, insects, pathogens, and weather events may reduce the amount of old growth in some areas. Meanwhile, other stands will grow and age into old growth status. The IPNF has approximately 550,000 acres of non-lodgepole pine mature forest (forests with the upper canopy dominated by trees 100+ years old), substantial amounts of which have the potential to grow into old growth in the next few decades. We will continue to update our old growth stand data in response to changing conditions on the ground, and as we obtain new information. The priority for our updating efforts will be those watersheds where we are considering management activities.

The IPNF has allocated approximately 6,500 individual old growth stands distributed across 2.5 million acres of National Forest. It is not practical to visit every old growth stand every year. Because natural changes are going on continually (this includes both natural disturbances that remove some old growth, and other stands maturing into old growth), information about some individual allocated stands may be outdated at any given time. However, to ensure that we're meeting Forest Plan old growth standards forest-wide, we use FIA estimates to monitor the amount of old growth across the forest and at other large scales. Ten percent of the FIA plots are re-measured every year. To ensure that all management actions are designed based upon current old growth conditions, whenever any management activity is being considered that could possibly impact old growth, we take a closer look at old growth allocations within that project area

Before making any management decisions that could possibly impact old growth, we take a detailed look at old growth allocations for that project area. The forest-wide stand map provides us with stand-level information that is useful starting point at the project scale when we are considering management activity. We closely review and verify all old growth allocations within the project area, as well as review all potential treatment stands, and look for previously unidentified stands that may now meet old growth criteria. The objectives of this review are to be sure we have the best old growth allocation and landscape arrangement possible within that project area, and to be sure we're not inadvertently, negatively impacting old growth. Where appropriate, project design may also include identification of potential future old growth in the area. Project-scale review often results in changes in old growth status for a few individual stands. We sometimes find that some previous old growth stands no longer meet criteria because of insect, pathogen, or weather mortality. However, because other stands have aged and grown into old growth status, or because we also find previously un-inventoried old growth, this project-scale review often results in a net increase in old growth allocation in the project area.

We record old growth stand allocations in the Forest Service FSVeg-Spatial database, because there are database fields and codes designed for recording stand old growth status. FSVeg-Spatial is a national Forest Service database containing a wide variety of information, and used by national forests across the United State. A database is simply an electronic box with pre-defined fields to store specific information items. It is not possible to make meaningful sweeping general statements about the reliability of such a large, widely used database. The completeness and reliability of any specific data items in any database depends upon the local effort devoted to gathering and maintaining that specific information. The IPNF ranger districts devote substantial time and effort to maintaining and updating (when appropriate) the old growth stand information in our databases. For all potential management projects, FSVeg-Spatial old growth information is subject to additional project area review and validation prior to any management action on the ground. This assures that we don't, inadvertently, take any management action that negatively impacts old growth, and that all our project plans are based on the current old growth status for that project area. Updating old growth allocation information in the Idaho Panhandle National Forests portion of the FSVeg-Spatial Database is ongoing as the forest continues to change and as new information becomes available.

A single observation somewhere in a stand will never be sufficient for determining old growth status. Because internal heterogeneity is a recognized characteristic of many old growth stands, the condition of the stand as a whole, and its context in the larger landscape all need to be considered in making old growth allocations.

The FSVeg-Spatial database contains codes indicating individual stand old growth allocation status. The formal stand examination data that's used in old growth determination is found in the FSVeg database; there may also be field notes and other information in the individual stand folders. This information is updated when new exams are done. Larger scale perspectives about landscape context are also used in making old growth allocation decisions.

The "Special Uses" field in the FSVeg-Spatial database allows us to track old growth in several categories, depending upon how it was identified in the inventory and how it is currently allocated. We separate our old growth into the "allocated" old growth stands that are specifically identified and retained to meet the 231,000-acre forest plan standard, and "additional" old growth that contributes to old growth ecological functions, even though it is not formally allocated.

"Retained Existing Old Growth" (FSVeg-Spatial Special Uses code 9) meets (and often exceeds) *Green and others (2011)* old growth minimum criteria at the stand level. "Ancient Cedar" (Special Uses code 2) is also part of our existing allocated old growth, but we track it separately because we want to take special note and care of these outstanding stands. "Ancient Cedar" stands contain trees over 5 feet in diameter, with estimated ages over 500 years old; they far exceed minimum old growth age and tree size criteria.

"Retained Potential Old Growth" (Special Uses code 11) meets, or comes close to meeting a number of old growth minimum criteria, but is lacking somewhat in at least one criteria. However, if it is listed as "allocated", it does contribute to old growth functions at some scale. The most common situation is that the "potential old growth" has more than enough large trees to meet old growth criteria, but some of the trees are not quite old enough. However, these are usually some of the larger and older trees in a given area, and with some more time can be expected to meet the age criteria as well. Some "retained potential old growth" is included in our old growth allocation because it is close to meeting the minimum criteria, is the best that we have available in an area, and contributes to distribution of old growth characteristics across the landscape. Other allocated "retained potential old growth" stands are small patches that contribute to the integrity of a larger block of old growth, or serve as part of a corridor or as stepping stones, linking two larger old growth blocks. Allocated retained potential old growth contributes to the functional integrity of old growth at the landscape scale, and is managed as part of our old growth allocation. This is consistent with the direction in *Green and others (2011)* about the importance of using the numbers as a guide and incorporating landscape ecology and other resource considerations (as well as individual tree size, age and density attributes) in allocating land as old growth.

Old growth management can be monitored by tallying up acres of stands allocated and mapped as old growth. Totals from the IPNF stand-level map are presented in Table 57. Forest Plan Standard 10b calls for maintaining 10% of IPNF forested acres as old growth (231,000 acres). <u>We have identified and allocated 284,361 acres of forest stands (12.3% of IPNF forested acres) to be retained as old growth.</u> This total includes Special Uses old growth codes 2, 9, 10, and 11. There are 239,582 acres of allocated field identified stands that fully meet old growth minimum criteria (codes 2 and 9) in addition to allocated potential old growth (code 11 – allocated using additional old growth considerations in Green and others). Old growth status in 98.8% of these stands has been field verified at some time by either a stand exam or walk though. Clearly, the IPNF has allocated enough acres of old growth stands to meet and exceed Forest Plan Standard 10b. We also have an additional 5,753 acres (0.2% of forested acres) of previously field examined, unallocated old growth stands (code 12), which potentially provides additional old growth habitat for wildlife and serves other ecological functions.

Table 57. Mapped Allocated Old Growth Stands Acres by River Sub-Basin

Sub-Basin (River)	Allocated Ancient Cedar *(code 2)*	Allocated Field Verified Old Growth *(code 9)*	Allocated Photo Inventory Old Growth *(code 10)*	Allocated Potential Old Growth *(code 11)*	Total Allocated Old Growth *(codes 2, 9, 10, 11)*	Additional Field Verified Old Growth *(code 12)*	Total All Old Growth *(codes 2, 9, 10, 11, 12)*
St. Joe	1,963	59,723	715	13.840	**76,242**	5,646	**81,888**
Coeur d'Alene	207	53,625		12,193	**66,025**		**66,025**
Pend Oreille	53	20,272	266	5,239	**25,829**		**25,829**
Kootenai	516	59,830	156	7,730	**68,232**	107	**68,339**
Priest	2,139	41,255	2,230	2,409	**48,033**		**48,033**
Forest Total	**4,878**	**234,704**	**3,367**	**41,411**	**284,361**	**5,753**	**290,114**

Forest Plan Standard 10.i. presents "goals for lands to be managed as old-growth" within some Forest Plan Management Areas with timber management goals. Only four Management Areas have specific Forest Plan old growth numerical goals. The table below displays both those goals by Management Area, and acres we have currently allocated for old growth in those Management Areas. These old growth allocations meet and far exceed these Forest Plan Management Area goals.

Table 58. Acres of Allocated Old Growth Compared to Management Area Goal

Forest Plan Management Area	Management Area goal: "Maintain approximately *xxxxx* acres"	Allocated Old Growth stand acres
1	25,000	101,586
2	6,000	24,017
3	400	1,671
4	4,000	14,882

Forest Plan Standard 10.e. says: "Old growth stands should reflect approximately the same habitat type series distribution as found on the IPNF." The following table displays habitat type series distribution for old growth compared to all our forested acres.

Table 59. Old Growth Habitat Type Series Distribution

Habitat Type Series	% IPNF Acres by Inventoried Habitat Type Series	Allocated Old Growth Acres by Habitat Type Series	% of Allocated Old Growth Acres by Habitat Type Series
Ponderosa Pine	< 0.1%	0	0.0%
Douglas Fir	7.1%	9,608	3.4%
Grand Fir	14.5%	14,721	5.2%
Western Red Cedar	16.0%	53,183	18.7%
Western Hemlock	37.9%	110,833	39.0%
Subalpine Fir	15.0%	54,144	19.0%
Mountain Hemlock	9.5%	41,189	14.5%
Lodgepole Pine	< 0.1%	0	0.0%

As displayed above, old growth on the IPNF does reflect approximately the habitat type series distribution of the forest. On 78% of the forested land the amount of old growth is proportional to, or more than proportional to the distribution of those habitat type series. Old growth distribution is less than proportional to habitat type series distribution only in the Douglas-fir and grand fir series, which occupy the driest 22% of the land. The dry habitat type group (all of the Douglas-fir and the dry end of the grand fir series) occupies approximately 10% of IPNF land. The moist end of the grand fir series (which is still drier than the rest of the forest) covers another 12 % of IPNF land, and is often found at lower elevations and southerly aspects, and is subject to significant moisture stress during drought years.

The low proportion of old growth in these drier habitat type series is a function of the combined effects of the huge 1910 fire and other large high severity early 20th century fires; subsequent suppression of most low and mixed severity fires that served to maintain resilient old growth; late 19th century and early 20th century timber cutting; root diseases; and bark beetles. Much of the old growth inventoried on these two habitat type series is currently dominated by Douglas-fir or grand fir, which are at risk from bark beetles and root diseases. Where the moister, non-riparian grand fir habitat types are adjacent to dry sites, the fires, root diseases, and bark beetles that strike the dry sites have a high probability of carrying over into adjacent Douglas-fir / grand fir stands. During drought years the larger grand fir growing on upland grand fir habitat types are at risk from *Scolytus* bark beetles. If we want to increase the proportion of old growth on our dry habitat types and adjacent grand fir habitat types, active management will often be required to manage stand density and restore more resilient tree species (ponderosa pine and western larch),

The natural processes that maintained old growth on dry sites were very different than on moister sites. Historically, most of these dry forest habitat types were subject to frequent low-severity underburns and short to medium interval mixed-severity fires that thinned out smaller trees; favored large trees of the most fire-resistant and drought tolerant species (ponderosa pine and western larch); and created a mosaic of stand conditions. These fires reduced the total number of smaller trees (thus limiting moisture stress to large trees on dry sites), and reduced both dead woody fuels and live ladder fuel accumulations (thus reducing the risk of stand-replacing crown fires), as well as creating small openings that limited fire spread. These low and mixed-severity fires were the keystone natural process maintaining dry site old growth forest structures.

Now, on dry habitat types, approximately 70 years of effective fire suppression has allowed in-growth of dense stands of smaller trees and accumulation of high woody fuel loads. Lack of fire has favored Douglas-fir and grand fir over ponderosa pine and larch. The large number of trees in these denser stands creates higher moisture demands than in the historic, fire-maintained more open stands. This higher moisture demand stresses the old trees during drought years, and predisposes stands to bark beetle outbreaks. During drought years this can result in unusually high levels of mortality amongst old trees in these unnaturally dense stands. Dense Douglas-fir and grand fir are also more susceptible to root diseases and bark beetles than historic forest structures. Compared to the historic forest, dense Douglas-fir / grand fir stands on dry sites have a lower probability of surviving long enough to become old growth. Those dry site fir stands that do old reach old growth age are less likely to be as resilient and persistent as the historic old growth structures. In addition, during fires the dense small trees in the understory serve as fuel ladders that carry flames into the upper canopy of large old trees. This new situation creates an unnaturally high risk of stand replacing crown fire, which will kill old trees that historically were able to survive surface fires. Decades of fire suppression on dry sites has transformed stand structures in a way that threatens the continued persistence of existing old growth on these dry sites, and reduces the chances of current younger stands surviving long enough to become old growth.

On dry sites, hands-off management of existing overly dense mature and immature fir-dominated stands is not likely to increase the amount of future old growth, and likely will lead to a decrease in existing old growth. Active restoration by mimicking of historic disturbance processes may be necessary to meet the Forest Plan standard for maintaining old growth on dry habitat types. In those places where we find dry site old growth stands with unnatural in-growth of dense smaller trees (particularly firs), we may consider restoration opportunities. Restoration may include various mixes of prescribed fire, thinning, and planting of historic shade-intolerant, fire-adapted tree species. Restoration treatments will maintain existing large old trees. In existing old growth, the driving management objectives will be maintenance of old growth characteristics, and restoration of historic old growth structures and processes. In mature and immature stands where old growth and fire-adapted species are lacking, restoration activities may be necessary to create forests that are more likely to survive long enough to become old growth.

Summary -- Comparison of Two Tools for Monitoring Old Growth

As explained above, the IPNF is using a multi-scale approach to monitoring old growth, based on two separate, independent tools. These are:

1) Forest Inventory and Analysis (FIA) data used to calculate IPNF Forest-wide and mid-scale old growth percentages.
2) IPNF stand map displaying all stands allocated for old growth management, with old growth allocation status maintained in the FSVeg-Spatial database.

These two independent tools use significantly different designs, and are carried out by different people. The FIA old growth estimates are based on a statistically sound, representative sample of the entire National Forest, carried out by the Interior West FIA Program of the Rocky Mountain Research Station of Ogden, Utah. This sample is designed to provide unbiased estimates of forest conditions at medium and large scales. The acres of allocated old growth from the IPNF old growth stand-level map are a census of stands allocated for old growth management, based upon examination of individual forest stands for old growth characteristics. Stand examinations and allocations are carried out by IPNF ranger district personnel. The stand-level map is a fine-scale tool that allows us to allocate old growth stands across ranger districts and landscapes in a way that serves as a basis for project planning.

As displayed above, the two independent Forest Service old growth monitoring tools produce remarkably similar results at the national forest scale:

- **Based on FIA data, the current estimate of the proportion of old growth on the forested IPNF lands is 11.8%. (90% confidence intervals of this estimate are 9.6% to 14.0%).**
- **The IPNF total acres of mapped stands allocated and retained for old growth is 12.3% of forested lands.**

Both of the Forest Service old growth monitoring methods and results are fully disclosed and available to the public. FIA old growth estimates are reported annually in our Monitoring Report. FIA design and protocols are public information and are readily available on the FIA website. More detailed reports on methodology for estimating old growth with FIA data are available from the Northern Regional Office of the Forest service in Missoula, Montana.

The entire IPNF stand map and FSVeg database (including stand-by-stand old growth allocations) are available, and are updated regularly to reflect our latest information about these dynamic forests. Project area old growth updates are disclosed in project NEPA documents. More detailed old growth information and stand examination data has been provided numerous times over the past few years in response to various Freedom of Information Act requests by several organizations.

Snags

Snags are standing dead trees. Snags are important for a number of reasons. They are important habitat structures (for nesting, feeding, perching, and/or roosting) for a wide variety of wildlife species. They provide substrate for some mosses and lichens. They also serve to ameliorate environmental conditions on harsh sites. Once they fall, snags become down wood that provide other habitat structures (including den sites) for a different and very wide suite of wildlife species and some plant species. Down wood is also critical for nutrient cycling, moisture retention, safe tree regeneration sites, diversity of soil micro-organisms, and hydrologic function. On the other hand, snags or down wood in excessive numbers can contribute to fire hazard.

The diameter range of snags in an area is limited by the diameter range of live trees potentially available to become snags after they die. The diameter of snags and down wood regulates both the ecological functions they provide, and how long lasting they may be.

Snags are an ephemeral resource that varies greatly throughout the life cycle of a forest stand. If a stand originates following a fire, the resulting young stand may begin under a high number of snags. However, most snags only remain standing for a few years, to a very few decades. How long these snags remain standing is a function of the structure, species composition, and age of the previous stand; the fire severity; snag size; and site factors like soil characteristics, slope position, and landscape position. An insect or disease outbreak may rapidly increase the number of snags. A severe windstorm may rapidly reduce the number of snags (while increasing the amount of down wood). Root pathogens may provide gradual input of snags until all the trees are killed, but depending upon the particular pathogen; these snags may not remain standing for very long. Various severe weather conditions may serve either to increase or decrease snag numbers.

Even at a given time, because of the variety of factors that regulate their numbers and characteristics, snag numbers and size distribution can vary considerably across the length of a stand. This high internal stand level variability in snag numbers and attributes makes it difficult to characterize the snag situation at the individual stand scale. Stand scale snag data tends to reflect high internal variability in wide confidence intervals around mean estimates of snag numbers.

Over time, because of the wide variety of factors that regulate and can rapidly change snag numbers, stand scale snag numbers may also change relatively rapidly. The smaller the spatial scale, the greater the probability of changes in snag numbers over relatively short time periods. However, at larger spatial scales, the variety of factors regulating snag numbers is more likely to balance each other out for longer periods of time. Therefore, it’s important to look at mid and larger scale snag information to provide context for the snag situation in any specific area.

The National Forest Inventory and Analysis (FIA) program provides a congressionally mandated, statistically-based, continuous inventory of the forest resources of the United States. 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). The FIA design provides a statistically sound representative sample designed to provide unbiased estimates of forest conditions at large and medium scales. Among other things, the FIA sample design records all standing dead trees > 5 inches in diameter. This data can be used to provide estimates of snag numbers at several different spatial scales on a National Forest.

Because FIA data comes from a statistical sample rather than a 100% census, we describe attributes calculated from this data as estimates and the accuracy of these estimates is computed and reported as confidence limits. The Forest Service Northern Region and the IPNF use a 90%-confidence interval for describing the reliability of FIA estimates.

The following snag information comes from FIA data collected on the IPNF, and presents estimates of snag numbers by size class at several different spatial scales.

Density and Distribution of Snags on the Idaho Panhandle National Forests

The estimated average number of snags per acre on all forested lands on the IPNF with diameter at breast height (dbh) between 10.0" and 19.9" is 10.4 snags per acre with a 90% confidence interval of 9.2 to 11.8 snags per acre. The average number of snags per acre with dbh of 20" and larger is 1.4 snags per acre with a 90% confidence interval of 1.2 to 1.8 snags per acre. Note: all estimates of snags per acre are rounded down to the nearest 0.1%.

Table 60. Estimates of the number of snags per acre by diameter class for each IPNF Zone

	10.0" – 19.9" DBH				20.0" plus DBH			
IPNF ZONE	Standard Error	90% CI Lower Bound	Estimate of Snags / Acre	90% CI Upper Bound	Standard Error	90% CI Lower Bound	Estimate of Snags / Acre	90% CI Upper Bound
Central	1.399	8.3	10.7	13.0	0.297	1.0	1.4	2 .0
North	1.355	10.7	12.9	15.1	0.288	1.3	1.9	2.2
South	1.061	5.3	7.0	8.9	0.244	0.8	1.0	1.6

Table 61. Estimates of the number of snags per acre by diameter class for IPNF Geographic Areas

	10.0" – 19.9" DBH				20.0" plus DBH			
IPNF ZONE	Standard Error	90% CI Lower Bound	Estimate of Snags / Acre	90% CI Upper Bound	Standard Error	90% CI Lower Bound	Estimate of Snags / Acre	90% CI Upper Bound
Coeur d'Alene	1.399	8.3	10.7	13.0	0.297	1.0	1.4	2.0
St. Joe	1.056	5.4	7.0	8.9	0.244	0.8	1.0	1.6
Sandpoint / Pend Oreille	3.214	10.8	15.7	21.2	0.522	1.1	2.0	2.9
Bonners Ferry / Kootenai	1.548	7.4	9.9	12.6	0.492	0.8	1.6	2.3
Priest Lake	2.388	10.0	13.9	17.9	0.468	1.2	2.0	2.9

Table 62. Estimates of the number of snags per acre by diameter class for IPNF Landscape Areas

	10.0" – 19.9" DBH				20.0" plus DBH			
IPNF ZONE	Standard Error	90% CI Lower Bound	Estimate of Snags / Acre	90% CI Upper Bound	Standard Error	90% CI Lower Bound	Estimate of Snags / Acre	90% CI Upper Bound
Priest Lake South	3.841	8.0	13.9	20.4	0.403	0.8	1.3	2.0
Priest Lake North	2.755	9.4	13.8	18.6	0.874	1.4	2.8	4.2
Selkirks	2.033	6.8	9.9	13.3	0.554	0.1	1.0	2.0
Purcell / Boulder	2.359	6.2	9.9	14.0	0.819	0.9	2.0	3.4
Cabinet / Scotchman	4.393	6.8	13.1	21.0	0.704	0.4	1.3	2.7
Pend Oreille	4.691	10.7	17.9	26.0	0.758	1.3	2.4	3.8
Lakeface / Lower Coeur d' Alene	3.503	5.8	11.0	17.1	0.426	0.8	1.3	2.1
Little North Fork Coeur d'Alene	2.72	7.8	12.0	16.8	0.746	0.7	1.7	3.0
Upper Coeur d' Alene	2.878	4.6	9.0	14.0	0.242	0.2	0.6	1.0
Central North Fork Coeur d'Alene	2.288	7.1	10.8	14.7	0.665	1.0	2.0	3.0
Little N. Fk. Clearwater	1.809	2.8	5.6	8.7	0.535	0.7	1.5	2.4
St. Maries/ Lower. St. Joe	1.969	3.2	6.3	9.7	1.046	0.6	2.0	4.0
West Central St. Joe	1.84	2.0	4.6	7.9	0.351	0.2	0.8	1.3
East Central St. Joe	2.738	6.0	10.3	15.0	0.484	0.2	1.0	1.9
Upper St. Joe	3.311	4.3	9.2	15.2	0.203	0.1	0.4	0.8

Appendices

A. Forest Plan Monitoring Requirements

B. Programmatic Forest Plan Amendments

C. Summary of Soil Monitoring on the IPNF - 1980s to 2010

D. List of Contributors

Appendix A. Forest Plan Monitoring Requirements

Table 63. Forest Plan Monitoring Requirements

Item Number	Standards, Practices, Activities, Outputs or Effects to be Monitored	Data Source	Frequency of Measurement	Reporting Period	Threshold to Initiate Further Action
A	All RESOURCE ACTIVITIES				
A-1	**Quantitative estimate of outputs and services**	Annual program accomplishment report	Annually	Annually	A trend established after 5 years that indicates less than 80% of Forest Plan goal has been accomplished
A-2	**Effects of other government agency activities on the national forests and the effects of National Forest Management on adjacent land and communities**	Other agency plans	Annually	Annually	When other agency programs affect attainment of Forest Plan Goals
B	TIMBER				
B-1	**Harvested lands restocked within 5 years**	Stand records	1,3,5 years	5 years	10% of harvest lands not adequately restocked 5 years following site preparation
B-2	**Timberland suitability**	Timber stand data base and forest data base, EAs	5 years	5 years	10% change in timberland currently classed as physically suitable
B-3	**Validate maximum size limits for harvest areas**	EAs	5 years	5 years	10% of openings exceed Forest Plan size limits
B-4	**Insect and disease hazard**	Insect and disease surveys	5 years	5 years	Insect and disease conditions are predicted to reach epidemic or serious levels on 5 % of the Forest
B-5	**Road construction**	Timber appraisals, construction contracts	Annually	5 years	Unit costs exceed estimates by 20% in two or more years
B-6	**Actual sell area and volume**	Cut and sold reports	Annually	5 years accumulation	Sell volume and acres less than 75% of FP goal

Item Number	Standards, Practices, Activities, Outputs or Effects to be Monitored	Data Source	Frequency of Measurement	Reporting Period	Threshold to Initiate Further Action
C	VISUAL RESOURCES				
C-1	**Meeting visual quality objectives**	EAs, field sampling	Ongoing	Annually	10% departure from Forest Plan direction after 5 years initiates further evaluation
D	RECREATION				
D-1	**Off-road vehicle effects**	Field evaluation, travel plan	Continuing	Annually	Conflicts with management area goals or between users
E	CULTURAL RESOURCES				
E-1	**Measure potential impacts of land disturbing projects on known cultural resources**	Field monitoring	Annually	Annually	Any unmitigated adverse impact
F	WILDLIFE				
F-1	**Population trends of management indicator species**	State Fish and Game Dept	Annually	5 years	Downward population trends
F-2	**Grizzly bear recovery objectives**	Idaho Fish and Game, USFWS	Annually	Annually	Not working toward recovery
F-3	**Caribou recovery objectives**	Idaho Fish and Game, USFWS	Annually	Annually	Not working toward recovery
G	WATER AND FISH				
G-2	**Are BMPs protecting water quality, are they: implemented as designed; effective in controlling non-point sources of pollution; protecting beneficial uses.**	Baseline stations on 11 streams. Implementation 10% timber sales; Effectiveness on-site 0ff-site measurement;	Annually	Annually	1 – Used for resource characterization and background data for predictive purposes; 2- Evaluate 10% of timber sales per year. Deviation from prescribed BMPs; 3- Ineffective on-site non-point

Item Number	Standards, Practices, Activities, Outputs or Effects to be Monitored	Data Source	Frequency of Measurement	Reporting Period	Threshold to Initiate Further Action
		WATSED validation			source pollution control. Off-site watershed system degrading due to lack of effectiveness of BMPs in use. 4 – Actual more than plus or minus 20% of model prediction
G-3	**Validate fish habitat trends**	Stream surveys	Annually	5 years	A declining trend in habitat quality
G-4	**Fish Population trends – cutthroat trout**	Cooperative with Idaho Fish and Game	2 years	2 years	Downward trend
H	THREATENED AND ENDANGERED PLANTS				
H-1	**Threatened and endangered plants**	Field observations incidental to project planning	Annually	Annually	Any plan adversely affected.
I	MINERALS				
I-1	**Environmental concerns affect operating plans**	Open plan compliance checks	Minimum one inspection of operating plan active season	Annually	Exceeds any Forest Plan Standard; any amend operating plan
J	LANDS				
J-1	**Land ownership adjustments**	EAs for land exchanges, land ownership records	Annually	5 years	Program is not contributing to Forest Plan goals. Less than 75% of program accomplishment.
K	ENVIRONMENTAL QUALITY				
K-1	**Prescriptions and effects on land productivity**	Field reviews	Annually	Annually	Non-compliance with BMPs or significant departure or effects significantly different than predicted

Appendix B. Forest Plan Programmatic Amendments

The Idaho Panhandle National Forests Forest Plan Record of Decision was signed in September 1987. Since then there have been a number of programmatic amendments to the plan. Programmatic amendments change Forest Plan direction for the duration of the Plan. These amendments can be based on a Forest-wide analysis, an area analysis, or a project specific analysis that supports the need for change. Programmatic amendments may be proposed as a result of new information or changed conditions, actions by regulatory agencies, monitoring and evaluation, or landscape analysis. These amendments may affect Forest-wide or management area direction.

The following programmatic amendments have changed the 1987 IPNF Forest Plan. They are listed in chronological order.

1) The first amendment to the Forest Plan was signed on September 8, 1989. The purpose of this amendment was to incorporate the document "Idaho Panhandle National Forests Water Quality Monitoring Program", Appendix JJ, as agreed to with the State of Idaho in the Joint Memorandum of Understanding dated September 19, 1988, and replaced Forest Plan Appendix S (Best Management Practices) with Forest Service Handbook 2509.22 (Soil and Water Conservation Practice Handbook).

2) On March 12, 1991, the Regional Forester issued a Decision to Partition the allowable sale quantity (ASQ) into two non-interchangeable components, the quantity that would come from inventoried roadless areas and the amount that would come from existing roaded areas. This amendment applied to 11 of 13 Forest Plans in Region One.

3) On August 21, 1992, agreement was reached with American Rivers on an amendment that clarified the Forest's intent to protect eligible Wild and Scenic Rivers until suitability studies were completed.

4) The next amendment was signed on December 7, 1994. The purpose of this amendment was to comply with the Arkansas-Idaho Land Exchange Act of 1992. Through this land exchange, the IPNF acquired a total of 10,026 acres of land (9,114.44 acres from the Bureau of Land Management (BLM) and 912.1 acres from Potlatch Corporation). In turn, the Idaho Panhandle National Forests disposed of 7,978.91 acres to Potlatch Corporation. The Act directed the Idaho Panhandle National Forests to manage those lands acquired within the boundaries of the BLM's Grandmother Mountain Wilderness Study Area to preserve the suitability for wilderness until the Forest completes a wilderness study as part of its Forest Plan revision process.

5) Another amendment is associated with the Interim Strategies for Managing Fish-producing Watersheds in eastern Oregon and Washington, Idaho, western Montana and portions of Nevada (Inland Native Fish Strategy). This interim direction is in the form of riparian management objectives, standards and guidelines, and monitoring requirements. This action amends the management direction established in the Regional Guides and all existing land and resource management plans for the area covered by the assessment. The decision notice for the environmental assessment that covered this amendment was signed by the Regional Foresters for the Northern, Intermountain and Pacific Northwest Regions on July 28, 1995.

6) A 1995 amendment updated standards and guidelines for management of the Salmo-Priest Wilderness Area. This amendment applied to both the Colville and Idaho Panhandle National Forests portions of the wilderness area. The decision notice was signed by the Colville National Forest Supervisor on November 20, 1995, and the Idaho Panhandle National Forests Supervisor on January 23, 1996.

7) A 2004 amendment incorporated a set of motorized access and security guidelines into the IPNF, Kootenai and Lolo forest plans to meet our responsibilities under the Endangered Species Act to conserve and contribute to the recovery of grizzly bear. The amendment applied to the Selkirk and Cabinet-Yaak recovery zones as well as grizzly bear occupied areas outside of the recovery zones. The record of

decision was signed by the IPNF, Kootenai, and Lolo Forest Supervisors on March 23rd and 24th, 2004. In subsequent litigation, the U.S District Court for the District of Montana, on December 13, 2006, ordered that the 2002 FEIS/2004 ROD be set aside as contrary to law and that the matter be remanded to the Forest Service for preparation of a new environmental analysis that complied with 40 CFR 1502.22

8) A 2005 amendment modified or removed from the forest plan certain objectives, standards and monitoring requirements pertaining to fry emergence (fish). Forest plan standards #1 and #2 for fisheries and monitoring requirement G-1 were removed in their entirety from the forest plan. The decision notice for this amendment was signed by the IPNF Deputy Forest Supervisor on June 2, 2005.

9) In 2007, the Regional Foresters for the Rocky Mountain, Intermountain and Northern Regions signed a record of decision to amend the forest plans on 18 national forests within those regions to incorporate management direction to conserve Canada lynx and its habitat. The amendment included the IPNF and was signed by the Regional Foresters on March 23, 2007.

Appendix C. Summary of Soil Monitoring on the IPNF - 1980s to 2010[12]

1. Introduction

Monitoring for soil disturbance has been performed on the Idaho Panhandle National Forests (IPNF) over several decades. Monitoring can be separated into two main items:

1. **Evaluation of existing conditions** – primarily driven by NEPA project needs, this evaluation reviews the current disturbance levels in proposed activity units that may have been harvested by different logging systems, displaying variable soil impacts.

   Main objectives:

   - To determine if proposed units are close to or exceed Regional and Forest Plan standards and need special mitigation that would be incorporated into design criteria and contracts. Includes monitoring of compaction, displacement, rutting, erosion, severe burning, coarse woody debris, and organic matter.

     Data collectors: soil scientist and trained personnel.

   - To assess proposed units for potential hazards (e.g. mass failure, erosive soils) or localized topographical and sensitive soil considerations.

2. **Evaluation of post-harvest conditions** – primarily driven by forest-wide annual monitoring requirements to assure that soil quality standards have been met.

   Main objectives:

   - To determine the conditions and trends of a treated activity area and how the outcome compares to desired conditions. Includes monitoring of compaction, displacement, rutting, erosion, severe burning, coarse woody debris and organic matter.

     Data collectors: soil scientist.

   - To project potential impacts associated with different treatments and logging systems that can be used during future NEPA analysis.
   - To assess if current practices are sufficient or if there is a need for change to management actions.

2. Results

Data from past soil monitoring were compiled from 2004 to 2010 for existing conditions and from 1990 to 2010 for post-harvest observations. Data are also available from 1987 to 1989, but provide only limited information. These years are therefore excluded from many of the averages but included during some of the discussions to provide for a comparison. Findings displayed in this document may aid in the prediction of potential disturbance levels for future projects, and yearly updates should provide continuous trends.

2.1 Existing Conditions

A total of 419 units on the IPNF were monitored between 2004 and 2010 with 188 located on the Central Zone (CZ), 148 on the North Zone (NZ), and 83 on the South Zone (SZ). These numbers do not include proposed activity areas that were field verified by other Forest Service personnel to confirm that a potential unit had never been entered and therefore did not need any soil transects.

[12] Authored by Gina Rone, IPNF Forest Soil Scientist, August 2011

Table 64 provides a summary of disturbance ranges for existing soil conditions. The total number of activity areas evaluated was reduced from 419 to 365 because units identified as 100 percent undisturbed were excluded to avoid skewing averages

Results show that only 4 percent of planned management activities proposed to enter units that currently exceed Regional soil quality standards, which, as identified in R-1 Supplement 2500-99-1 (USDA FS 1999), are those with more than 15% disturbance. When units display over 15% disturbance, a net improvement to soils is required after management activities are completed (USDA FS 1999).

Table 64. Summary of disturbance ranges for pre-harvest soil conditions in units monitored from 2004 to 2010

Pre-Harvest	CZ		NZ		SZ		Total	
Range of Disturbance	# of Units	% of total	# of Units	% of total	# of Units	% of total	# of Units	% of total
0 - 5	122	85	60	42	66	88	248	68
6 - 10	14	10	47	32	8	11	69	19
11 - 15	2	1	31	21	1	1	34	9
>15	6	4	8	5	0	0	14	4
Total	**144**		**146**		**75**		**365**	

How long soil disturbance remains on the landscape has been controversial because lingering impacts would indicate that long-term soil quality has been compromised. Observations from countless field visits and monitoring of units that were harvested dating back to the 1930s have consistently shown that many of the soils are recovering with the assumption that they were impacted at various levels during previous entries. In general, main skid trails and landings can remain disturbed while many side skid trails and other disturbances are improving to levels that may still show some impacts but are not to the detrimental level.

For Table 64 and associated data (not shown), further analysis of previously used logging system details and harvest years would be needed to make more specific and statistically solid conclusions. This is not feasible without a major investment of time and research of past harvest information. A publication by Reeves et al. (2011) has provided a general overview of soil impacts by National Forest for Region 1 and may serve as a reference.

2.2 Post-Harvest Monitoring

Post-harvest disturbance on all districts was monitored between 2004 and 2010 and contributed to the estimation of range of detrimental soil disturbance. A total of 80 units on the IPNF were assessed with 29 located on the CZ, 33 on the NZ, and 18 on the SZ.

Monitoring incorporated units that were harvested with various ground-based equipment, skyline and cable yarding, as well as horse logging. More recent methods, such as combinations of feller-bunchers with skyline yarding, were also included.

Once again, the Regional standard requires that 15% detrimental disturbance within an activity area will not be exceeded. Disturbance levels in Table 65 show that impacts in 42% of the visited activity areas remained below 10%. The harvest methods in these units were primarily horse, skyline, and ground-based winter logging operations.

An increase in disturbance can be observed when numerous pieces of equipment enter a unit for harvest and site preparation, primarily feller-buncher, processor, skidder, and grapple piling combinations. An average 1% to 2% reduction in impacts can be seen when a slash mat is utilized. The bulk of disturbance remains with summer ground-based operations and hovers between 11 to 15 percent.

Table 65. Summary of disturbance ranges for post-harvest soil conditions in units monitored from 2004 to 2010

Post-Harvest	CZ		NZ		SZ		Total	
Range of Disturbance	# of Units	% of total	# of Units	% of total	# of Units	% of total	# of Units	% of total
0 - 5	8	28	4	12	5	28	17	21
6 - 10	5	17	6	18	6	33	17	21
11 - 15	10	34	15	45	4	22	29	36
>15	6	21	8	24	3	17	17	21
Total	**29**		**33**		**18**		**80**	

2.3 Summary of Disturbances

2.3.1 Logging Systems

Soil impact averages were summarized by logging system and decade to compare trends over the past 20 years. It is important to note that the amount of monitoring for each logging type varies so that confidence levels differ due to number of observations. It is often also difficult to piece together exact scenarios for each past sale or unit, which adds to the complications of differences in topography, soils, climate, season, and operator skills. Several combinations of one logging type were merged (Table 66) to provide a generalized average so that numbers provide a broad overview but are not statistically sound.

Table 66 shows a coarse comparison of data from the late 1980s and the following decades, indicating a clear improvement over earlier practices. Stricter BMPs, changing equipment, elimination of dozer piling, and a more conservative and conscious approach to decrease logging impacts are responsible for a reduction on resource impacts.

Table 66. Summary of disturbance ranges for post-harvest soil conditions in units monitored between 1990 and 2010

Logging System	Disturbance Range*	20-year Average %	Last 10 Years Average %	Last 5 Years Average %
Skyline	0-7	1	3	N/A***
Cable	3-5	N/A	4	4
Tractor**	10-80	28	11	13
Feller-buncher**	8-30	14	14	14
Feller-buncher winter	0-19	13	13	13
Feller-buncher & Skyline**	4-8	5	6	5
Cut-to-length**	11-16	N/A	13	12
Cut-to-length winter	5-13	8	8	10
Helicopter	0	0	0	0
All Ground-based total (1980s)	36%			
All Ground-based total (1990-2010)	13%			
All ground-based winter total (1990-2010)	10%			

*incl. data from the late 1980s.
**incl. all combinations of no piling, grapple piling, underburning, no burn, slash mat, no slash mat.
***due to minimal impacts skyline is only monitored visually over the past years.

Cut-to-length (CTL) systems show fewer disturbances due to available slash mats from in-woods processing and reduced equipment passes. Generally only two machines are on the ground, the CTL and a skidder or forwarder.

In comparison, a feller-buncher set-up consists of the feller-buncher (which cannot create a slash mat), a processor, and a skidder or forwarder. The additional equipment, in conjunction with no slash mat for at least one of the machines, appears to be the reason for a slight increase in soil impacts (see Table 66). During whole tree yarding, however, an in-woods processor is not needed and trees are de-limbed at the landing.

Winter conditions generally result in reduced disturbances due to protective snow or frozen ground conditions. However, soil impacts can be the worst when winter conditions are deteriorating and as snow or frozen ground thaws. Summer or winter logging under increasingly wet or saturated conditions leads to elevated compaction, rutting, and puddling, and should be avoided under all circumstances by suspending operations during these conditions.

At the end of harvest, the grapple piler is generally the last piece of equipment within a unit. Experienced pilers utilize existing slash mats, work backwards out of the unit, and try to minimize equipment travel on the ground. It is difficult to tease out grapple piling impacts from the overall disturbance after a sale is completed although past observations have shown that piling can add a lot of impacts to an activity area.

2.3.2 Nutrients and Whole Tree Yarding

Harvesting results in the removal of nutrients that have accumulated in the wood and foliage over time. Of concern is the possible loss of potassium in the soil and its effect on forest health, especially the increased susceptibility to insects and disease (Garrison-Johnston et al. 2003) and a possible link between potassium deficiency and the lack of tree resistance to root disease (Garrison-Johnston et al. 2003).

Research (Garrison-Johnston 2003; Garrison-Johnston et al. 2004 and 2007; Moore et al. 2004a; Shen et al. 2001) suggests a complex balance between underlying geology and the natural deficiency of potassium in northern Idaho. Derived primarily from underlying geologic formations, potassium is a product of slow weathering processes (Stark 1979) in comparison to soil nitrogen, which can be replenished more rapidly through nitrogen fixation or atmospheric deposition.

In general, Douglas-fir and grand fir consume and store more potassium than other tree species. Leaving slash for several months on site therefore leaches stored potassium (Baker et al. 1989; Barber and Van Lear 1984; Edmonds 1987; Garrison and Moore, 1998; Jain and Graham 2009; Laskowski et al. 1995; Palviainen et al. 2003), benefiting remaining western larch, ponderosa pine, and western white pine which require less potassium for growth and maintenance.

Whole-tree yarding and removal of treetops can lead to the direct loss of potassium (Morris and Miller 1994). On some sites, ±43 percent of the available potassium is retained in trees, with the remainder being held in subordinate vegetation, forest floor, and soil pools. Within the trees, about 85 percent of the potassium is held in the branches, twigs, and foliage (Garrison and Moore 1998; Jain and Graham 2009; Moore et al. 2004b).

Potential negative effects of whole tree yarding on the long-term soil productivity should be considered when determining harvest methods on potassium deficient soils. Situations where whole tree yarding may be appropriate may include commercial thins where remaining trees provide for an ongoing cycling of nutrients, or in areas where threats to human health or safety or property may occur as a result of leaving an accumulation of fuel material.

Mitigation for whole tree yarding may also be possible. Mastication (the grinding or “chewing” of wood to provide a loose covering for soils) may offer new opportunities for fuel reduction by cutting down submerchantable material and leaving it in the woods. With careful planning and knowledge of onsite stand conditions, it provides a tool that could also reduce grapple piling where material is around 3 inches or less in diameter. Mastication attachments (or small mechanical equipment) are now also considered for pre-commercial thinning. The added impacts from mechanical equipment and unknown existing disturbance levels from past harvest require further evaluation so that activity areas should not be entered without a review, and monitoring should initially be in place to assess impact levels of this method.

2.3.3 Coarse Woody Debris

Management of coarse woody debris (CWD) and organic matter is important to maintaining the soil's most productive layer. Coarse woody debris is defined as material derived from tree limbs, boles, and roots greater than three inches in diameter and in various stages of decay (Graham et al. 1994). It performs many physical, chemical, and biological functions in forest ecosystems and is also a key habitat component for many wildlife species and for stream ecology. Because CWD is such a valuable part of a functioning ecosystem, a portion of the material must be maintained to ensure that organic matter is recycled for long-term productivity. Nevertheless, in natural systems organic matter fluctuates with forest growth, mortality, fire, and decay.

The removal of all or most of the organic material (both duff layers and CWD) from a site can cause temporary nutrient deficits that may affect physical and biological soil conditions. To avoid this, it is important to preserve both fine and CWD on managed sites (Graham et al. 1994; Brown et al. 2003). Allowing the accumulation and decomposition of a range of sizes of woody debris maintains both short-term and long-term soil productivity and provides for the slow, continual release of nutrients.

In forest ecosystems, organic matter can be found in woody debris on the forest floor, in the litter layer as part of the organic horizon, and as soil organic carbon in the mineral soil. The supply, quality, and arrangement of organic matter are also dependent on biologic activity which may vary based on habitat type.

Promoting biologic activity can be used to remediate damaged soils as soil flora and fauna serve to break up compacted soils (Powers 1989) and as it influences many physical characteristics such as soil aggregation, water infiltration, and gas exchange. Soil fungal processes are especially important, primarily mycorrhizal fungi and those associated with organic matter decomposition. The average optimum level of fine organic matter is 21 to 30 percent (Graham et al. 1994), which equates to 1 to 2 inches of surface litter and humus, which provides a good indicator of healthy forest soil (Jain and Graham 2009).

Monitoring of 75 units between 2004 and 2010 (Table 67) shows the general distribution of remaining post-harvest CWD to be heaviest between 6 to 20 tons per acre; however, recommended tons per acre are closely tied to habitat type (Graham et al. 1994; Brown 2002). Table 67 therefore only displays an overview of general amounts left but does not reflect if the recommended amounts were met.

Table 67. Summary of coarse woody debris monitoring for post-harvest units 2004 to 2010

Coarse Woody Debris (tons/acre)	# of Units
0 - 5	4
6 - 10	12
11 - 15	21
16-20	11
16-21	6
26-30	6
31-35	6
36-40	4
41-45	3
46-50	0
51-55	0
56-60	2
Total # of Units	**75**

In general, the overall trend has been quite satisfactory with most of the monitored units retaining CWD within their recommended range. The highest retention recommendation (17 to 33 tons/acre) is for moist cedar/hemlock habitats.

Biomass (forest residues that can either be used directly or converted into other energy products such as biofuel) has also been utilized on the forest, primarily on the North Zone. Retention of fines is difficult to measure but is just as important as coarse material. A very close look needs to be taken at underlying parent material, potential nutrient deficiencies due to the site's geology, and proposed silvicultural prescription to ensure that enough material is maintained for long-term productivity if biomass removal is included in management activities.

2.3.4 Prescribed Fire

High-intensity burns that create high soil surface temperatures, particularly when soil moisture content is low, can result in a complete loss of soil microbial populations, woody debris, and the protective duff and litter layer over mineral soil (Erickson and White 2008; Hungerford 1991; Neary and others 2005). Additional deteriorating effects of fires on soils can include a reduction of water infiltration (Wells and others 1979) that contributes to the risk of soil erosion which increases proportionally with fire intensity (Megahan 1990).

Fire-induced soil hydrophobicity is presumed to be a primary cause of observed post-fire increases in runoff and erosion from forested watersheds (Huffman and others 2001). Though hydrophobicity is a naturally occurring phenomenon that can be found within the mineral soil surface, it is greatly amplified by increased burn severity (Doerr and others 2000; Huffman and others 2001; Neary and others 2005).

Burning under controlled conditions of elevated soil moistures reduces the chance of creating hydrophobic soils (Neary and others 2005; Robichaud 2000; Swanson 1981). Past monitoring of post-burn conditions after prescribed fires has shown that soil impacts are minimal when soil moisture conditions are elevated (Niehoff 1985 and 2002). Drier conditions generally increase the risk of losing organic matter that protects the soil from rain splash impacts, erosion, and increased surface heating. A decrease in soil moisture holding capacity can also be expected as duff is removed to expose bare soils.

Over the years, prescribed fire has been monitored on the IPNF. Gathering data prior to the fire, such as soil moisture readings, is challenging because of their need to be taken right before prescribed burning occurs. Additional details, such as fuel information, are equally important. The following compilations in Tables 68 through 70 show a summary of results for several prescribed fires.

The most detailed results were gathered for three units of the High Bridge Outlet (HBO) sale on the NZ between 2009 and 2010. Soil moistures consequently were not the main driver in the outcome of prescribed fire on these units but appear to be critical when fuel loads are high and fuel moistures are low. The requirement for elevated soil moisture levels should therefore be strongly considered when burning under these conditions takes place.

Table 68. Background information of underburned units on the HBO sale

Unit #	Harvested (Burned)	Soil Moisture (Average)	Fuel Moisture (10 hr. fuels)	Slash Cover	Slash Type	Duff Depths (inches)	Other
12	Winter '07-'08 (10/6/2009)	31% - 39% (34%)	11 – 12%	Pockets of slash	LP/DF/L/ GF	NA	2-4 mph wind
13	Winter '06-'07 (9/27/2009)	18% - 33% (27%)	6 – 8%	Continuous thick cover	LP/L	1¾ to 2¼	3-6 mph gusting to 9 mph
14	Winter '06-'07 (9/27/2009)	8% - 14% (11%)	8 – 9%	Light, less continuous thinner cover	LP/GF/S/ L	¾ to 1½	2-4 mph wind

*GF – Grand fir; DF – Douglas-fir; L – Larch; LP – Lodgepole; S – Spruce

Table 69. Summary comparison of monitoring details for several prescribed burns

Disturbance (%)			
Unit	**Class 0**	**Class 1**	**Class 2**
HBO #12	40	45	15
HBO #13	6	78	15 (4% from burn)
HBO #14	34	52	14 (1% from burn)
Brushy Mission #6	72	18	10 (5% from burn)
Organic Matter (%)			
	<¾ inch - low	¾ to 1¾ - optimum	>1¾ - high
HBO #12	58 (2% bare from burn)	36	2
HBO #13	93 (17% bare from burn)	7	0
HBO #14	95 (14% bare from burn)	5	0
Brushy Mission #6	40 (8% bare from burn)	50	2
Canfield #5*	54	42	4
Canfield #6*	50	38	12
Coarse Woody Debris			
HBO #12	10.8 t/ac		
HBO #13	13.0 t/ac		
HBO #14	6.7 t/ac		
Brushy Mission #6	11.7 t/ac		
Canfield #5	15.0 t/ac		
Canfield #6	9.0 t/ac		
Flatmoore #65	10.1 t/ac		

Class 0: Undisturbed – There is no evidence of past management activities; no depressions or wheel tracks; forest floor intact and present; litter and duff not burned.

Class 1: Faint wheel tracks or slight depressions evident <2 in. deep. Forest floor present and intact; no surface soil displacement; minimal to no mixing of surface soils with subsoil; burning light; compaction concentrated between 0 to 4 in.; platy and massive structure restricted to 0 to 4 in.; platyness non-continuous.

Class 2: Wheel tracks or depressions evident >2 in. deep; Forest floor partially intact or missing; surface soil partially intact or missing and maybe mixed with subsoil; burning moderate to high; compaction concentrated >4 in. deep with platy and massive structure; lack of fine roots but maybe larger ones. Results in this class are considered detrimental.

Detrimental soil disturbance cannot exceed 15% of an activity area – R1 Soil Quality Standards.

*Bare soils were not separated out within the "low" category.

Table 70: Summary of burn severity for several monitored prescribed fires

Unit #	Burn Severity %			
	Unburned	Light	Moderate	Severe
HBO #12	56	42	2	0
HBO #13	9	84	3	4
HBO #14	35	63	1	1
Brushy Mission #6	93	1	1	5
Canfield #5	76	22	2	0
Canfield #6	66	32	2	0
Flatmoore #65	72	12	2	0

Prescribed burning should be done during times when the majority of soil moisture in the upper surface inch of mineral soil is 25+ percent by weight; or 60 to 100 percent duff moisture; or when post-burn conditions would result in no more than 25 to 30 percent bare soils (excluding natural conditions) within an activity area (burn unit).

The desired outcome includes retention of organic matter (generally not much less than ¼ inch) that protects the soil from rain splash impacts, erosion, a decrease in soil moisture holding capacity, and increased solar surface heating, especially on south-facing slopes and in shrub fields. Removal of organic material is of greatest concern on south-facing slopes, exposed ridges, breaklands, and along slopes that still display shrub stages after the 1910 fires.

For landscape sized projects, recommendations suggest utilization of extended burn periods so that only portions of the watershed are incrementally impacted over the intended time frame. This should allow burned areas to recover and potential sediment movement or delivery to be minimal, especially if riparian buffers are maintained.

When prescribed burning is utilized after re-contouring system or temporary roads, the slash and organic material that has been incorporated into the road rehabilitation should not be burned.

2.3.5 Main Causes and Mitigation of Soil Impacts on the IPNF

The key to reducing soil disturbance is to avoid impacts to begin with. Taking care of the soil resource during initial entry or follow-up treatment ensures regulatory compliance, a more rapid recovery, and generally a pleasant visual and productive landscape. Equipment operator expertise and close oversight by a knowledgeable sale administrator are crucial.

Skid Trail Spacing - Based on observations and monitoring results, the most common contributor to elevated disturbance levels is skid trail spacing and associated compaction. With a steady move towards fully mechanized logging practices, trail spacing is generally far less than 100 feet and is dictated by equipment reach, topography, and slope gradient.

Careful review of the operator suggested skids, enforcement of dedicated trails, as well as incorporation of all existing legacy trails and disturbances can eliminate many unnecessary impacts. Skid trails that are spaced less than 20 to 40 feet apart (except where converging), are side by side, or are next to existing old spurs or roads have been encountered and should not occur.

When whole tree yarding is combined with mechanical equipment such as feller-bunchers and skidders, there is no slash mat available. If units already contain elevated levels of legacy impacts, such equipment combinations and their additional disturbance are not desirable. Circumstances such as these are just one example that amplifies the need to properly plan ahead during the analysis and planning stages of a timber sale, primarily through on-site field visits by the interdisciplinary team and through individual reconnaissance.

Travel Patterns - Another great impact stems from sidetracking or turning equipment, especially along slopes. Rutting and displacement can be tremendous, often mixes less fertile substrate with the irreplaceable ash soils, and leaves visible scars that are difficult to heal over. Though it is not always possible to move about in relatively straight lines, sidetracking along slopes and tight turns should be avoided whenever possible.

Grapple Piling - Grapple piling has been an issue during several reviews. Though skids may be laid out nicely during the initial harvest, piling equipment often zigzags all across a unit and can leave behind an array of disturbances.

Steep Slopes - Harvest equipment is usually restricted to operate on slopes <40%. Past monitoring has encountered that equipment working on slopes that exceed >45% can result in deep (1-2 feet) ruts and added compaction. The logging system needs to match the landscape and operators should avoid adverse travel.

Lack of Ground Verification - When proposed activity areas are not properly ground-truthed to ensure that logging systems match the topography and that slopes and slope lengths are able to accommodate mechanical equipment, negative impacts to soils and other resources as well as undesirable economical costs are possible. Maps and GIS provide essential tools for planning but should not be solely relied on without actual on-site visits.

Lack of ground verification during the initial analysis has created unnecessary work and costly expenses in the past and is an ongoing concern as dwindling budgets and personnel present continuing challenges. Spending time and funds up front to thoroughly think projects and prescriptions through are essential for successful completion of projects. This includes up front involvement of sale administrators, clear communication with ID Team members, and annual reviews of projects by all to learn from past successes and mistakes.

2.3.6 Road Rehabilitation and Decompaction

Roads are currently the primary source of erosion and sediment production on the IPNF. The dominant processes are surface erosion from bare soil areas of roads, including the cut slope, fill slope, and travel way. Revegetation of cut slopes and fill slopes is often difficult due to lack of soil moisture, organic material, low productivity potential, and desiccation of seeds and seedlings, especially on south-facing slopes. On moist slopes, revegetation efforts are more successful since erosion of road cut slopes and fill slopes is generally lower.

Road erosion and sediment yield usually decline after construction (Jones 2000; Switalski et al. 2004) but can provide a chronic, long-term source of sediment to streams within a project area. Periodic large pulses of erosion may occur during intense water yield and overland flow events in interaction with road drainage systems.

Roads and landings that remain on the landscape for future use (system roads) are considered irretrievable effects on productivity as these lands become "dedicated" to the permanent transportation system. Temporary roads (i.e., only needed for a project) have detrimental effects initially. Although rehabilitation through decompaction and/or recontouring cannot assume complete reversal to natural conditions, efforts initiate a long-term recovery process.

Restoration of compacted surfaces, such as roads, landings, and skids trails provide net improvements to soil productivity. This is accomplished through decompaction, addition of organic material, revegetation of bare areas, and weed control. Improvements in hydrologic function initiate a recovery process that otherwise may be prolonged as soil compaction persists.

Monitoring of road and trail surfaces consist of an involved process of measuring bulk densities at numerous locations and is often complicated by coarse material that is difficult to sample. Decompaction efforts from several sites on the IPNF have shown to be successful in improving approximately 50 to 60%

of the area when compared to adjacent compacted areas. A conservative value of 30% is therefore used when calculating potential net-improvements to soils from decompaction.

However, decompaction is not always an option to improve a site. Shallow soils, underlying bedrock, less fertile subsoils close to the surface, tree roots, soil texture, and overall feasibility should be considered when making this expensive decision. If more harm than good is done by mixing soils, damaging roots of leave trees, or re-sealing surfaces due to high clay content (primarily a concern around the Coeur d'Alene area below 3,200 ft., in heavy soils of old lakebeds, or in some soils with little to no ash influence), decompaction or subsoiling should not be utilized.

3. Summary

The soils, favorable climate, and differing landscapes of the IPNF have provided the forest with a wealth of vegetation and growing conditions. When utilization of forest products and other management activities include the health of all natural resources, they remain sustainable and offer an ongoing opportunity of beneficial uses. Soil monitoring on the IPNF shows that trends remain favorable and that a lot of good work can be accomplished without compromising the environment. Conversely, there are areas where improvements can and need to be made.

Impacts do occur but time has shown to provide recovery and the resilience of systems offers windows for sound sustainable management. In the meantime, it takes continuous conscious efforts and willingness by leadership, program managers, specialists, and field personnel to try new approaches, improve old practices, as well as knowing when to refrain from adverse activities to ensure that soils will retain their productivity on the IPNF.

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