ITEM 3-1
Management Practices and Natural Hazards

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED	REPORTING PERIOD	VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION
Insure management practices minimize hazards from floods, wind, wildfire, erosion, and other natural physical forces.	Annual	Anticipated problem identified in interdisciplinary team review of timber sale.

Introduction: Review of forest silvicultural practices was the major component of this monitoring item for the first ten years of the Lolo Forest Plan. In 1995, the Forest Service Inland Native Fish Strategy (INFISH) modified Region 1 Forest Plans requiring, among other things, that stream crossing structures accommodate the 100 year flood without damage. A recommendation of the 1998 Monitoring Report was to assess the 100-year design flow issue because of a concern that many existing structures may not be capable of accommodating such a flow. The 100-year recurrence interval flood is a discharge value with a one percent probability of occurring in any one year.

Methods: Annual Forest Plan monitoring field trips are a source of information for evaluation of silvicultural practices pertaining to this monitoring item.

In addition, data were collected within the Upper Lolo Ecosystem Analysis area (EMA) to assess stream-crossing capacity relative to the 100-year flood during FY 99. This EMA is roughly the Lolo Creek watershed above Lolo Hot Springs. The assessment focused on perennial fish-bearing streams (streams with a gradient less than 15 percent). At each stream crossing, peak flow discharges at various recurrence intervals were calculated using regional regression coefficients developed by Omang, 1992. These discharges were compared to the capacity of the existing stream crossing structures.

Results: One timber sale was reviewed during the 1999 Forest Plan Monitoring Trips (Dry Camp Timber Sale and Ecosystem Management Burn). The project resulted in a natural pattern and structure of "…snags, fire-killed dead [trees] and coarse woody debris." This vegetative structural condition is more in the natural range of variability and thus less vulnerable to hazards floods, fires, wind, erosion and other natural physical forces. These findings were documented in Forest Supervisor memo 1920 "Annual Forest Plan Project Monitoring Field Trips, FY 99", dated January 31, 2000.

There were 46 stream crossings assessed in Upper Lolo Creek with 11 bridges and 35 culverts. Based on observations, the bridges were evaluated as being able to accommodate calculated 100-year floods. Of the 35 culverts however, less than 20 percent were able to accommodate a 100-year flood. Nearly three quarters of the culverts were at risk in a five-year flood. Other observations made during the assessment substantiate the risk of failure. The "bankfull width" of the stream (roughly the stream width at the average annual peak discharge or the 2 year flood), would rarely pass through a culvert without noticeable constriction.

Evaluation: In the Upper Lolo Creek EMA, most stream crossings other than bridges are at risk of failure in moderate runoff events. Only six of the 35 culverts accommodate a 100-year flood and meet the standards prescribed by INFISH.

Table 3-1A displays the timber sales reviewed during the thirteen years of monitoring silvicultural practices.

Table 3-1A. Field Monitored Timber Sales, 1987-1999.

Year	District	Timber Sale
1999	Plains/T-Falls	Dry Camp T.S. and Ecosystem Maintenance Burn
1998	Seeley Lake	Archibald Morrell
1997	Ninemile Plains/T-Falls Superior	Whitehorse McHenry Salvage Phoebe and Beaufort Ecosystem Maintenance Burn
1996	Missoula Ninemile Plains/T-Falls Superior Seeley Lake	Ambrose Fire Salvage Blue Ridge Insect salvage Hinchwood/Clark Stoneman McCabe, Monture, and Dunham Ditch Watershed Project
1995	East Zone Plains/T-Falls Superior	Road #4328 Cherry Side Big Flat
1994		No sales monitored - extreme fire season
1993	East Zone Plains/T-Falls Superior	Six Roman Glidden Upper-T
1992	Missoula Ninemile Plains/T-Falls Seeley Lake Superior	Kitchen-Gillespie Nine Whitetail North Baldy Big Elk Gilt Edge
1991	Missoula Ninemile Plains/T-Falls Seeley Lake Superior	West Fork Schwartz Riverbank Upper South Rock Belmont II Billy Gulch
1990	Missoula Ninemile Plains/T-Falls Seeley Lake Superior	Tyler Creek Fish Creek Reoffer Coney Sawyer Brown Bear and Keystone
1989	Missoula Ninemile Plains/T-Falls Seeley Lake Superior	Bear Creek Alpine Divide Noble Salvage Reoffer South Lake and Canyon Creek Valet
1988	Missoula Ninemile Plains/T-Falls Seeley Lake Superior	Mormon and Sleeman Favorite Gulch North Fork None this FY Butler/McManus
1987	Missoula Ninemile Plains/T-Falls	West Fork Gold Edith Intermediate Pine Hill

	Seeley Lake Superior	Little Shanley Flat Breen

Recommendations: Based on the Upper Lolo Creek assessment, it is important to address the 100 year design flow issue across the forest because many existing structures are likely incapable of accommodating these flow levels. Structures, whether culverts or bridges, are expensive to install and maintain and have significant affects on water quality, channel stability and fish habitat. Successful design standards incorporate risk, channel characteristics and habitat requirements as well as economics.

Engineering and watershed specialists should continue to develop lists of sites that need bridge and culvert capacity evaluations and/or upgrades. Such a list helps prioritize replacement projects when, and if, additional improvement or restoration funding becomes available. The list may also help us determine if the structure is necessary as part of the transportation system (Chief's road policy).

Reference: Omang, R.J. 1992. Analysis of the Magnitude and Frequency of Floods and the Peak Flow Gaging Network in Montana. U.S. Geological Survey, Water Resources Investigations Report 92-4048. 70 pp.

ITEM 3-2
Temporary Road Revegetation

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED	REPORTING PERIOD	VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION
Insure establishment of vegetation on temporary roads within 10 years.	Annual	Departure from management standard to scarify and seed all temporary roads.

Methods: Annual Forest Plan monitoring trips are a source of information for this monitoring item as well as unscheduled forest reviews of timber sale areas. Results of the FY 99 Forest Plan monitoring trip are documented in a Forest Supervisor's 1920 memo dated January 31, 2000. District timber sale assistants also provide the forest timber sale program manager with the number of temporary road miles constructed and reclaimed during FY 99.

Results: In FY 99, timber sale administrators reported that 6.75 miles were reclaimed and reseeded to establish revegetation within ten years.

Evaluation: The management emphasis for at least the last decade has been to reclaim, seed, and fertilize all temporary roads when they are no longer needed. Monitoring has been limited to current road closures and seeding. An assessment to specifically view temporary road reclamation after a 10-year period has not been completed.

Recommendations: An annual sampling of temporary roads constructed 10 years previous could determine the success of revegetation more specific to "the activity to be measured" for monitoring. This would assess how well the initial temporary road revegetation had progressed after 10 years.

ITEM 3-3
Management Practices and Multiple Use

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED	REPORTING PERIOD	VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION
Assure silvicultural prescriptions meet multiple use goals.	Annual	Departure from management direction.

Methods: The forest silviculturist reviews annually a sample of detailed silvicultural prescriptions for proposed new timber sales. A silvicultural team reviews prescriptions written for stands visited during annual Forest Plan monitoring trips. These reviews help to determine if silvicultural prescriptions meet Forest Plan goals for multiple use. Prescriptions reviewed this fiscal year included the Dry Camp Timber Sale, Sunny Side Helo Timber Sale, McCormick Ecosystem Maintenance Burn, and Pattee Blue Restoration and Timber Sale project.

Results: No major departure from management direction which would initiate further evaluation or specified in the environmental assessments or Forest Plan goals were observed within the documented prescriptions or in assessing the implementation of timber sale prescriptions during the annual monitoring review.

Evaluation: Silvicultural prescriptions are prepared to meet specific management goals. Minor deviations have been observed within the 13-year period. All deviations resulted from improper silvicultural prescription implementation. Almost all did not meet Forest Plan requirements for downed woody debris and snag retention. These concerns lead directly to workshops involving silviculturists, researchers and other resource specialist to strengthen the silvicultural diagnosis and prescription documentation process.

Recommendations: Continue the current monitoring effort. Line officer's decisions may specify treatments outside Forest Plan guidelines, such as requiring less than the desired amount of coarse woody debris due to overarching urban interface fuels objectives or where snags are not present in pretreatment areas. In such cases, the silvicultural prescriptions should indicate the reduced guideline numbers, as well as the purpose and benefits of the reduction.

ITEM 3-4
Silvicultural Prescriptions Consider More Than Economics or Outputs

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED	REPORTING PERIOD	VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION
Assure silvicultural prescriptions are not primarily chosen on basis of greatest dollar return or greatest timber output.	2 years	Departure from management direction.

Methods: The forest silviculturist reviews annually a sample of the detailed silvicultural prescriptions for proposed new timber sales. A silvicultural team reviews prescriptions written for stands visited during annual Forest Plan monitoring trips. These reviews help to determine if silvicultural prescriptions meet Forest Plan goals for multiple use. Prescriptions reviewed this fiscal year included the Dry Camp Timber Sale, Sunny Side Helo Timber Sale, McCormick Ecosystem Maintenance Burn, and Pattee Blue Restoration and Timber Sale project.

Results: In fiscal year 1999, no departures from management direction that would initiate further evaluation were observed. Over the years of monitoring, some silvicultural prescriptions implemented the most economically efficient alternative, but the alternative was not selected solely based on the greatest dollar return. These silvicultural prescriptions directly addressed the needs of ecosystem management. Many prescriptions have increased implementation costs, as compared to previous accomplished treatments, in order to restore or maintain the desired ecosystem conditions.

Evaluation: No major departure from management direction occurred in the monitored silvicultural prescriptions over the thirteen-year period. District and forest silviculturist monitoring teams found during Forest Plan timber sale reviews, that some of the silvicultural prescriptions selected an alternative providing the greatest dollar return. However, it did not appear to be the primary reason for selecting the alternative. Monitoring teams have also found that many selected alternatives did not to return the greatest dollar or timber output. Cost effectiveness remains a significant issue to be assessed during the environmental assessment and silvicultural prescriptions process.

Recommendation: Continue the current monitoring effort.

ITEM 3-5
Residual Trees and Adjacent Stands

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED	REPORTING PERIOD	VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION
Assure silvicultural prescriptions consider residual trees and adjacent stands.	Annual	Departure from management direction.

Methods: The forest silviculturist reviews annually a sample of the detailed silvicultural prescriptions for proposed new timber sales. A silvicultural team reviews prescriptions written for stands visited during annual Forest Plan monitoring trips. These reviews help to determine if silvicultural prescriptions meet Forest Plan goals for multiple use. Prescriptions reviewed this fiscal year included the Dry Camp Timber Sale, Sunny Side Helo Timber Sale, McCormick Ecosystem Maintenance Burn, and Pattee Blue Restoration and Timber Sale project.

Results: The forest silviculturist's prescription reviews and the silvicultural team review of the silvicultural prescriptions found no major departure from management direction which would initiate further evaluation.

Evaluation: Minor departures from management direction have occurred over the 13-year period. All but one departure was related to diseased tree treatment. The one departure, an implementation deficiency, occurred for failing to retain specific numbers of trees. Almost all departures were documentation omissions. For more detail, refer to Lolo Forest Plan Timber Sale Monitoring 1950/2450 memos dated December 15, 1988; November 14 & 15, 1989; October 30, and November 5 & 6, 1990; November 27, 1991; October 19 & 26, 1992 and November 30, 1993.

Recommendation: Continue the current monitoring effort.

ITEM 3-6
Silvicultural Prescriptions are Practical

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED	REPORTING PERIOD	VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION
Assure silvicultural prescriptions are practical.	Annual	Departure from management direction.

Methods: The forest silviculturist reviews annually a sample of the detailed silvicultural prescriptions for proposed new timber sales. A silvicultural team reviews prescriptions written for stands visited during annual Forest Plan monitoring trips. These reviews help to determine if silvicultural prescriptions meet Forest Plan goals for multiple use. Prescriptions reviewed this fiscal year included the Dry Camp Timber Sale, Sunny Side Helo Timber Sale, McCormick Ecosystem Maintenance Burn, and Pattee Blue Restoration and Timber Sale project.

Results: No major departure from management direction that would initiate further evaluation was observed.

Evaluation: No deviation has occurred within the silvicultural prescriptions monitored during the 13-year period (FY 87 - FY 99).

Recommendation: Continue the current monitoring effort.

ITEM 3-7
Harvest Limit Size

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED	REPORTING PERIOD	VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION
Assure silvicultural prescriptions meet legal size requirements.	Annual	Departure from management standards restricting clearcut to less than 40 acres.

Method: All accomplished silvicultural activities are reported in the Timber Stand Management Record System (TSMRS). The forest silviculturist queries this data for even-aged harvested units exceeding 40 acres reported during FY 99. Regeneration units exceeding 40 acres are evaluated by the Regional Guides, FSM R1 Supplement, 2471, 9/18/96.

Results: Three even-aged harvest units exceeded 40 acres in FY 99. They ranged from 48 to 130 acres. Decision Notices for the *Cave Helio*, 7/18/96 and the *Two Joe Timber Sales*, 10/10/95 projects authorized these units.

Evaluation: Twenty even-aged harvest units have exceeded 40 acres during the monitoring 13-year period (FY 87 - FY 99). All met management standards for units exceeding 40 acres.

Recommendation: Continue the current monitoring effort.

ITEM 3-8
Plant /Animal Community Diversity

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED	REPORTING PERIOD	VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION
Assure selected sale alternative provides for plant/animal community diversity.	5 years	Departure from management direction.

Methods: Annual Forest Plan project monitoring trips provide information for this monitoring item. Monitoring is subjective and involves assessing individual project alternatives in terms of:

1) Did the alternative adequately consider historic conditions?
2) Where major departures from historic conditions were found, did the alternative consider activities to restore missing elements of the environment such as old growth, fire-killed-dead, snags, or coarse, woody debris, at a scale that would have mimicked historic patterns?
3) Were rare landforms or vegetative communities such as sphagnum bogs, caves, or limestone ledges found in the project area and were measures taken to protect them?
4) Were rare plant and animal species inventoried in the project area, and were measures taken to protect them?

The assessment is done in an interdisciplinary team approach and results are recorded.

Results: Plant and animal community diversity was evaluated on three projects in FY 99, Dry Camp Timber Sale, McCormick Ecosystem Maintenance Burn, and Savenac and Big Creek Watershed Restoration projects.

The timber sale and ecosystem maintenance burn applied wildland fire on several sites to mimic historic processes to stimulate fire dependant and adaptable plants. These in turn provided good habitat for early succession animals. Old forest trees were maintained during these projects.

Design of the watershed restoration projects restored natural stream dynamics and streamside vegetation. The Savenac project also restored fish passage for species including cutthroat and threatened bulltrout, to habitat that had been blocked for decades. Native vegetation was planted in the disturbed riparian areas.

Conclusions: Based on this very small sample size, it appears that the forest is considering biodiversity variables in project design. Clearly, efforts are being made to: 1) protect old forest trees in numbers indicative of natural disturbance processes; 2) recognize natural fire regimes and where possible restore fire to the forest; and 3) provide for natural fish passage in areas that had been blocked by man's activities. Areas that have room for improvement include: 1) apply disturbance process such as forest opening and fire at a larger scale that mimics the pattern of historic landscapes, and 2) utilize native vegetation and locally-adapted seed source for restoration projects.

Recommendation: Continue the current monitoring effort.

ITEM 3-9
Harvest on Timber-Unsuitable Lands

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED	REPORTING PERIOD	VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION
Assure harvest on unsuitable lands will meet other resource needs.	Annual	Departure from management direction.

Methods: All accomplished silvicultural activities are reported by district personnel in the Timber Stand Management Record System (TSMRS). The forest silviculturist queries this database for harvested units by management area (MA) as reported during FY 99. Harvested acres within unsuitable lands are then reviewed by District Silviculturists to determine if appropriate resource needs were met per the environmental assessment and the Forest Plan.

Results: During FY 99, one harvested stand, 21 acres, occurred on unsuitable lands. Harvest of this stand met Forest Plan big game winter range, MA 19, standard # 3 and #6 by reducing the stocking of conifers to facilitate underburning.

Evaluation: No departure from management direction that would initiate further evaluation occurred within the 13-year reporting period (FY 87 - FY 99). The one stand harvested was consistent with the goals and standards of MA 19, big game winter range.

Recommendations: Continue the current monitoring effort.

ITEM 3-10
Harvest Level

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED	REPORTING PERIOD	VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION
Assure timber sold does not exceed allowable sale quantity for 10-year period	Annual	Departure from 10-year allowable sale quantity

Methods: The FY 99 timber sale volumes reported below were obtained from the periodic timber sale accomplishment report.

Results: The Lolo NF has not exceeded the average annual Allowable Sale Quantity (ASQ) in the 13-year period of the plan; see Table 3-10A. On an average annual basis, regulated volume is 44% of the 107 million board feet (MMBF) ASQ.

Table 3-10A. Outputs or Effects - Actual vs. Projected, 1987-1999.

ACTIVITY	UNIT	Plan Projected Average	Actual Annual Average	Percent of Projected
Regulated Volume Sold	MMBF	107	52	49%
Unregulated Volume Sold	MMBF	15	7	47%

As in previous years, timber sales in 1999 did not exceed the average annual ASQ. Regulated volume sold in 1999 was 14.5 MMBF, 14% of the 107 MMBF average annual ASQ. Table 3-10B displays the ASQ, sell target, and volumes offered and sold in FY 99. Only sawtimber size material harvested from timber-suitable management areas is counted towards the ASQ and the "regulated" timber program. "Unregulated" volume is material smaller than sawtimber. Examples include: firewood; certain cull, dead or non-commercial species or products; and all timber harvested from areas that are not in the commercial timber (suitable) base. This would include fire-killed timber salvaged from a timber-unsuitable management area or timber cut to improve wildlife habitat in an unsuitable area. Unregulated volume is not "charged" to the ASQ.

Table 3-10B. Timber Sale Program for FY 99.

Sell Target	31.3 MMBF
Offered	17.9 MMBF
Sold	17.9 MMBF
Sold Chargeable to ASQ	14.5 MMBF
Sold Non-chargeable	3.4 MMBF

ITEM 3-11
Harvest Unit Restocking

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED	REPORTING PERIOD	VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION
Assure restocking within 5 years.	Annual	Development of regeneration backlog.

Introduction: This monitoring item has two specific areas of concern.

(1) Are we assuring that stands can be restocked within five years after final harvest?
(2) Is a regeneration backlog developing?

The first concern, assure restocking within five years, is defined in Forest Service Handbook 2409.26b-211 as "in accordance with Forest Service policy, Northern Region Timber harvest and regeneration practices shall be designed to assure lands are satisfactorily restocked within five years after final harvest." Final harvest is further defined as clearcutting or final overstory removal of seed tree and shelterwood harvests. NFMA regulations (CFR 219.27 (c)(3)) require that regeneration harvest be implemented only when the technology and knowledge exists to adequately restock the lands within five years after final harvest.

The second concern, the number of acres in failed regeneration status over the years, indicates whether a trend in failed regeneration acres is developing.

Methods: Reports from the Timber Stand Management Record System (TSMRS), *Regeneration Indices and Regeneration Status of Final Harvest Stands*, summarize regeneration success.

Regeneration activities are reported either as certified, progressing, or failed. Stands are adequately or satisfactorily stocked when they meet certified or progressing criteria. Certified stands meet all of the following Regional criteria: 90% of the stand area is within the following standards: regeneration has survived for three growing seasons for natural regeneration or two

growing seasons for plantings, the regeneration is healthy, and the regeneration is a minimum height of six inches. District silviculturists certify stands. Progressing stands should meet certification criteria within the specified time period without further major treatments. Failed stands do not meet certification requirements and may require major treatments such as site preparation or artificial regeneration.

Specific on-site monitoring of all regeneration harvest areas occurs at the end of the first, third and fifth summer growing seasons or until the stand is certified as adequately stocked. These monitoring results are recorded in a computerized database, the Timber Stand Management Record System (TSMRS). Northern Region policy requires that all regeneration harvest stands cut since 1976 are reported by District personnel in TSMRS. Queries of the stocking data from TSMRS are assessed by the Forest Silviculturist to determine if stands are being restocked within five years after final harvest and if failed acres are increasing. Only stands harvested prior to 1994 are used for this report.

Northern Region report from TSMRS, *Regeneration Status of Final Harvest Stands since 1976* summarizes the status of harvested stands five years after harvest. Table 3-11A includes stand acres harvested from 1976 to 1994. The information may be incomplete prior to 1976. Stands harvested after 1994 are not within the five-years-after-harvest time frame.

Results: Results indicate 97% or 28,138 acres are certified or progressing satisfactorily and 87% or 25,268 acres have been restocked within five years after harvest (Table 3-11A).

Additionally, a regeneration backlog is not developing. The total number of failed acres from all regeneration harvests continues to be lower than the 1,760 acres reported in 1987. Currently, 56 acres are listed as regeneration failures for units harvested prior to 1994.

TABLE 3-11A. Regeneration Status 5 Years or More After *Final* Harvest .

YEAR	TOTAL	SATISFACTORILY STOCKED WITHIN FIVE YEARS		PROGRESSING OR CERTIFIED NOW		FAILED or No STATUS*	
	Acres	Acres	%	Acres	%	Acres	%
1976	990	742	75	990	100	0	0
1977	687	438	64	684	100	0	0
1978	300	213	71	300	100	0	0
1979	791	645	82	791	100	0	0
1980	1014	734	72	961	95	53	5
1981	1574	1237	79	1574	100	0	0
1982	745	639	86	737	99	8	1
1983	996	723	73	939	94	57	6
1984	1511	1394	92	1511	100	0	0
1985	1407	1322	94	1352	96	55	4
1986	1656	1525	92	1652	100	4	<1
1987	2485	2202	89	2485	97	0	0
1988	2149	2031	95	2116	96	33	2
1989	4256	4074	96	4256	99	0	0
1990	3217	2862	89	3153	92	64	2
1991	1025	952	84	988	80	37	4
1992	1828	1612	88	1694	81	134	7
1993	1355	1176	87	1208	40	147	11
1994	927	747	81	747	20	180	19
TOTAL	28913	25268	87	28138	97	772	3

(Clearcut and Final Removal Harvests only, from 1976-1994)
(Timber Suitable Areas only)
(TSMRS report as of Jan. 2000)

*** No status** means that although a regeneration activity has been accomplished no regeneration survey is coded in the TSMRS database. The majority of stands with no status is recently regenerated, but has not been through the required growing season before survey. Site preparation by burning has not been completed on the other acres. In many instances, site preparation by burning is delayed due to the required weather and fuel moisture conditions necessary to accomplish a safe and efficient burn. Only 56 of 772 acres listed in table 11A have failed. The remainders have no status coded.

Evaluation: The trend of adequate stocking within five years is positive. Until 1976, only 52% of the acres were reported as adequately stocked within five years. Twenty-four years later, 97% of the final harvest acres, from 1976-1994, are currently reported as adequately stocked (Table 3-11A). Several reasons contribute to this, including but not limited to, improved record keeping and improved application of silviculture treatments.

For stands harvested from 1976 through 1999, the average time from planting, seeding or final harvest to satisfactory stocking is less than four years (Table 3-11B).

Table 3-11B. Average Regeneration Time Frames.

Regeneration Type	Average Time to Satisfactory Stocking
Plantations [1]	3.67 years
Natural Regeneration [2]	3.70 years

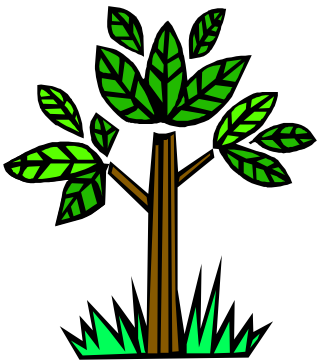
[1] Northern Region reforestation indices report #22, projected as of 1/20/2000, for the Lolo stands planted between 1976 and 1999.

[2] Northern Region reforestation indices report #24, projected as of 1/20/2000, for Lolo stands naturally regenerated between 1976 and 1999.

Forest monitoring indicates that overall, sites being harvested can be assured of restocking within five years given the current technology and knowledge that exists.

Reforestation is successful on the Lolo National Forest. Some failures have occurred due to environmental conditions such as drought, animal foraging, diseases, insects, and to inappropriate application of silviculture practices on some sites. Future regeneration efforts will have some failures mainly due to environmental conditions. Given the current levels of planning, budgeting and implementation, a backlog of areas lacking reforestation should not develop.

Recommendation: Continue the current monitoring effort.



ITEM 3-12
Silvicultural Treatment Projections

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED	REPORTING PERIOD	VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION
Assure silvicultural treatments (harvest, thinning, etc.) are planned and accomplished as projected in Forest Plan.	Annual	Development from 10-year output schedule.

Methods: All accomplished silvicultural activities are reported within the Timber Stand Management Record System (TSMRS). The forest silviculturist queries this database to determine the actual number of acres treated by activity type and management area (MA). Activities, in this report include clearcut, seed tree, shelterwood, selection, commercial thin, and timber stand improvement.

Results: The following tables result from the TSMRS data queries. Table 3-12A is a comparison of Forest Plan projected activity acres compared to actual accomplished acres. Tables 3-12B, C, D, E, and F are comparisons of Forest Plan projected acres to actual acres accomplished by MA's for specific activities.

An additional 950 acres of salvage, sanitation, liberation and final removal harvests in FY 99 are not included in the following tables. While this is not an output projected in the Forest Plan, nor an identified monitoring item, it represents a harvest types that have occurred.

Table 3-12A. Outputs - Actual vs. Projected, 1987-1999.

ACTIVITY	**UNIT**	**PLAN PROJECTED AVERAGE**	**ACTUAL AVERAGE TO DATE**	**PERCENT OF PROJECTED**
Silvicultural Exams	acres	62,000	46,000	74%
Clearcut Harvested Seed Tree Harvested CC & ST Harvested	acres acres acres	NA NA 3,700	1,083 1,040 2,123	NA NA 57%
Shelterwood Harvested	acres	10,320	744	7%
Overstory Removal Harvested	acres	NA	364	NA
Selection Harvested	acres	1,670	240	14%
Sanitation/Salvage Harvested	acres	NA	927	NA
Commercial Thinning	acres	200	397	198%
Timber Stand Improvement (appropriated)	acres	773	787	102%

Table 3-12B. Clearcut Acres (Includes Seed Tree Acres).

Mgmt Areas	Average Annual Projected Decade 1	Accomplished FY 99	Average Annual Accomplished FY 1987-1999
MA 1	0	0	2
MA 2	0	0	3
MA 6	0	0	1
MA 7	0	0	1
MA 9	0	0	0
MA 13	0	0	1
MA 14	0	0	14
MA 15	0	0	1
MA 16	2,012	368	1,634
MA 17	526	0	42
MA 18	123	13	68
MA 19	0	0	8
MA 20	86	19	62
MA 20a	0	0	3
MA 21	0	0	25
MA 22	0	0	20
MA 23	0	0	18
MA 24	0	4	38
MA 25	953	19	138
MA 26	0	25	33
MA 27	0	68	14
CC only	N/A	145	1,083
ST only	N/A	371	1,040
TOTAL	3,700	516	2,123

Table 3-12C. Shelterwood Acres.

Mgmt Areas	Average Annual Projected Decade 1	Accomplished FY 99	Average Annual Accomplished FY 1987-1999
MA 16	6,405	220	421
MA 17	565	24	66
MA 18	161	71	110
MA 19	0	0	6
MA 20	444	0	3
MA 20a	0	0	3
MA 21	0	0	6
MA 22	0	0	13
MA 23	201	28	17
MA 24	0	130	30
MA 25	2,544	93	54
MA 26	0	0	7
MA 27	0	47	8
TOTAL	10,320	613	744

Table 3-12D. Selection Acres.

Mgmt Areas	Average Annual Projected Decade 1	Accomplished FY 99	Average Annual Accomplished FY 1987-1999
MA 14	0	0	3
MA 16	0	8	51
MA 17	0	0	3
MA 18	0	5	25
MA 19	0	0	2
MA 20	0	0	0
MA 21	0	0	2
MA 22	556	0	7
MA 23	0	879	97
MA 24	1,114	0	8
MA 25	0	134	39
MA 26	0	32	3
TOTAL	1,670	1,058	240

Table 3-12E. Commercial Thin Acres.

Mgmt Areas	Average Annual Projected Decade 1	Accomplished FY 99	Average Annual Accomplished FY 1987-1999
MA 16	200	265	242
MA 17	0	0	12
MA 18	0	0	25
MA 21	0	0	4
MA 22	0	0	7
MA 23	0	0	31
MA 24	0	0	12
MA 25	0	11	56
MA 26	0	0	1
MA 27	0	78	7
TOTAL	200	354	397

Table 3-12F. Timber Stand Improvement Acres.

Management	Average Annual Projected Decade 1		Accomplished FY 99		Average Annual Accomplished FY 1987-1999	
Areas	Appropriated Funds	KV Funds	Appropriated Funds	KV Funds	Appropriated Funds	KV Funds
MA 9	0	0	71	0	6	0
MA 16	773	0	266	0	360	150
MA 17	0	0	63	0	8	5
MA 18	0	0	248	32	182	10
MA 20	0	0	0	0	24	32
MA 21	0	0	0	0	4	0
MA 22	0	0	18	0	6	1
MA 23	0	0	36	0	44	10
MA 24	0	0	0	12	39	14
MA 25	0	0	15	91	101	42

MA 26	0	0	9	0	13	0
TOTAL	773	0	726	135	787	264

Evaluation: The total acres harvested by all silvicultural methods to date (FY 87 - FY 99) are much less than projected in the Forest Plan. On an average annual basis, silvicultural treatments are below Forest Plan projections.

Clearcut and seed tree harvests continue to decline. Five years ago, 1994, the average was 82% of projected Forest Plan output. Today, the current average is 57% of projected Forest Plan output.

The Lolo has reduced the clearcut and seed tree acreages in timber sales that are currently under preparation. Also, clearcutting no longer removes all of the trees from a stand. Many trees standing, individually or in groups, are retained in "clearcuts," for structural diversity, wildlife habitat, and other resource objectives.

ITEM 3-13
Even Aged Harvest

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED	REPORTING PERIOD	VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION
Insure harvest by even-aged management is compatible with other resource values.	Annual	Departure from management direction.

Methods: The forest silviculturist reviews annually a sample of the detailed silvicultural prescriptions for proposed new timber sales. A silvicultural team reviews prescriptions written for stands visited during annual Forest Plan monitoring trips. These reviews help to determine if silvicultural prescriptions meet Forest Plan goals for multiple use. Prescriptions reviewed this fiscal year included the Dry Camp Timber Sale, Sunny Side Helo Timber Sale, McCormick Ecosystem Maintenance Burn, and Pattee Blue Restoration and Timber Sale project.

Results/Evaluation: In FY 99, **f**orest silviculturists did not monitor even-aged harvests during the Forest Plan field review. Harvest cuts were uneven-aged. The silvicultural prescriptions monitored by the forest silviculturist this year during KV/BD reviews were compatible with other resource values and objectives.

Previous monitoring reports emphasized the need to better document the compatibility between even-aged management and other resource values. The forest silviculturist finds that nearly all recent even-aged management units proposed by ecosystem management assessments have been driven by a desire to replicate natural disturbance processes to maintain species diversity and ecological sustainability. Compatible with the other resources is assessed during the interdisciplinary team interaction and line officer decisions.

ITEM 3-14
Disease and Insects

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED	REPORTING PERIOD	VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION
Assure harvest will not promote disease and insect increases.	Annual	Increases in insect/disease problems following logging.

Methods: The forest silviculturist reviews annually a sample of the detailed silvicultural prescriptions for proposed new timber sales. A silvicultural team reviews prescriptions written for stands visited during annual Forest Plan monitoring trips. These reviews help to determine if silvicultural prescriptions meet Forest Plan goals for multiple use. Prescriptions reviewed this fiscal year included the Dry Camp Timber Sale, Sunny Side Helo Timber Sale, McCormick Ecosystem Maintenance Burn, and Pattee Blue Restoration and Timber Sale project.

Annually, the forest health and protection personnel conduct aerial mapping of insect and pathogen tree mortality. These maps and reports are useful in setting priorities for silviculture treatment alternatives.

Results/Evaluation: The forest silviculturist's prescription reviews and the silvicultural team review of the silvicultural prescriptions found no major departure from management direction, which would initiate further evaluation.

Comments under item 3-5 also apply to this monitoring item. In previous years, all departures from management direction that would initiate further evaluation were minor and related to residual tree treatment. In more recent years, silviculturists include better documentation on residual trees. This is a result from: 1) past monitoring reports, 2) New Perspectives emphasis, 3) a memo dated February 11, 1991, from the Forest Supervisor, 4) 2070/2470 Special Grove Management, Legacy Trees and Old Growth Ponderosa Pine Communities, and 5) 2070/1950 Old Growth Strategy memo dated April 29, 1994. Land managers, Silviculturists and other Resource Specialists recognize the importance of insects and disease as a part of a healthy ecosystems. Also see the Lolo Forest Plan Five Year Review dated April 1993.

ITEM 3-16
Timber Suitability Classification

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED	REPORTING PERIOD	VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION
Review timber suitability of lands classified as unsuitable.	10 years	Classification of lands as suitable.

Methods: This review will be conducted during the revision of the Forest Plan.

Results and Evaluation: Review of timber suitability is a function of Forest Plan revision. An interdisciplinary team does examine timber suitability during project level environmental assessments. Site-specific changes and mapping errors are compiled for Forest Plan amendments. See item 14-2.

ITEM 3-EM
Ecosystem Management

ARE PROJECTS ARISING FROM THE NFMA PROCESS USED TO IDENTIFY NEEDS?

Introduction: In the past seven years, the Lolo NF organized its broad-scale NFMA analysis by mapping areas of 15,000 to 60,000 acres called "ecosystem management areas (EMA's)" as units of analysis. Analysis at this scale is also known variously as "integrated resource analysis," "ecosystem analysis at the watershed scale," and "EMA analysis".

Analysis consists of

1. a review of the conditions in the area,
2. a comparison of the current state to conditions under "natural processes" (i.e., before European settlers altered ecological and biological processes),
3. analysis of social objectives, and
4. a list of "opportunities" that are considered desirable to move the area to a better ecological state, to produce commodities and recreation and to meet the social objectives decided on by an interdisciplinary team.

This list of "opportunities" serves as a basis for proposed projects in the analysis area. The context provided by the EMA analysis helps in prioritizing these potential actions. Implementation may be determined by availability of funding or personnel. Should conditions change, new opportunities may be added.

Evaluation: In general, projects that are carried out now have arisen as identified needs during the NFMA analysis. An example in 1999 was the Chain of Lakes project, which was identified as a high priority area for treatment in the Clearwater NFMA process. Wee Tepee Helio was another NFMA-identified project.
An exception in 1999 was the Boyer Fire Salvage project. This project was designed to salvage unplanned mortality from the 1998 Boyer Fire. Salvage projects resulting from fire or beetle infestations often are not tied to NFMA analyses.

Recommendation: If an EMA analysis has been completed for the area, analysis of salvage opportunities should be tiered to its results. New EMA analyses should consider identifying desired levels of mortality so that when unplanned mortality occurs, the appropriateness of salvage activities can be readily determined.

FIRE-KILLED DEAD

Prior to effective fire suppression, fire was very common in the Northern Rockies and post-fire landscapes provided habitat for many species. Some species are closely tied to this habitat and may even be dependent on it. The reduction of early post-fire habitat (through fire suppression and removal of burned trees in "salvage" sales) has caused biologists to become concerned about some of the potentially "fire-dependent" species, especially the Black-backed Woodpecker. This species is a sensitive species in Region 1.

Under NFMA, the Forest Service is charged with maintaining viable populations of all native species. We currently lack (1) quantitative information on the reduction in fire-killed forested habitat, (2) information on the dependency of Black-backed Woodpeckers on fire (as opposed to other insect-infested forest), and (3) data on the species' reproduction in various habitats. In the

absence of this information, biologists on the Lolo NF are finding it difficult to conclude that salvage of burned forest will not contribute to a downward trend for the species.

Recommendations in 1998: It was determined that biologists should analyze the status and habitat of the Black-backed Woodpecker, including the following:

- refine information on historic levels of stand-replacing fire in Black-backed Woodpeckers habitat;
- use information on fire in the recent past to estimate the amount of habitat available for the species in recent years; and
- gather information on past records of Black-backed Woodpeckers to look for range reductions.

Results of 1999 monitoring of Black-backed Woodpeckers: Based on the 1998 evaluation of the availability of fire-killed dead trees, the Lolo NF agreed to limit the salvage of fire-killed stands to a level that would result in *increasing the trend of fire-killed stands closer to the historic average level.* As a result, only 500 acres of 8,250 acres of wildfires occurring in 1998 were identified for salvage harvest in 1999. These 500 acres were on the Boyer Fire on the Plains RD.

Efforts were made to design the 500 acres of salvage harvest to minimize impacts on black-backed woodpeckers. Caton (1996) determined that black-backs tended to avoid high severity burns in lodgepole pine, presumably because the tree cambium was consumed and subsequently provided no habitat for insects. Hejl and McFadzen (in prep) and Powell (in prep) suggested that Caton's findings might not apply to Douglas-fir dominated landscapes such as the Boyer fire. They suggested that since Douglas-fir has thick bark that protects the cambium even during severe fires, insect populations might be very high after severe burns. They also suggested that black-backs might be attracted to large patches of severe burns rather than small pockets of fire-killed dead. The Boyer salvage project concentrated harvest in large patches of high severity burns that had good existing road access.

Monitoring was initiated to determine the effects of salvage logging on black-backed and other woodpeckers. In cooperation with Forest Service Research and the University of Montana, nest searches were conducted across the moderate-to-high severity portions of the burn in 1999.

The results were somewhat surprising. Five of six black-backed nests were located within or adjacent to salvage units suggesting that black-backs selected for both *large patchs* of burned trees and *high severity* burns, as predicted by Hejl and McFadzen, and Powell. Logging will be delayed until summer of 2000, so there has been no adverse effect thus far. However, assuming that logging occurs in 2000, these results suggest that *the salvage sale may have a potentially adverse affect on individual black-backed woodpeckers.*

Recommendations: Continue woodpecker nest searches in the Boyer Burn. Review results with research and the Lolo Leadership Team to see if changes in our fire salvage strategy is warranted.

SNOWMOBILES IN HIGH ELEVATION

At the time the Lolo Forest Plan was written, snowmobiles were unable to travel in deep snow. Disturbance was limited to groomed trails at low elevation. Recently, improvements in technology have allowed these machines to travel in deep snow at high elevation and to enter breeding habitat for some animals that are sensitive to disturbance.

Wolverines den in cirque basins that are popular as "play areas" for snowmobiles. Although information on wolverines is limited because of their rarity and habitation of remote areas, available information indicates that denning occurs in undisturbed areas and that they move young to a new den following even low intensity disturbance.

Grizzly bears den at high elevation. Again, little information is available because of the specie's selection of remote areas. Black bears have left dens in mid-winter and have even abandoned cubs when disturbed. During the South Fork study, bears remained in dens when snowmobiles used an area about 1.2 miles away. However, nothing is known about the reaction of grizzly bears to closer disturbance. Bears remaining in the den may be harmed by increases in metabolic rate and rousing, which would consume fat stores. Since bear cubs are born in early winter and nurse through the denning period, physiological stress or alterations in behavior may reduce reproduction.

Recommendations:

1. Prior to Forest Plan revision, map wolverine and grizzly denning habitat. These should be confirmed by surveying (winter flights to locate wolverine tracks and breeding dens and late spring flights to locate grizzly den sites). Data on the location and intensity of snowmobile use should be collected.

2. Prior to modifying the travel plan for snowmobile travel into roaded or unroaded areas, map existing snowmobile activity using repeated fixed wing flights to establish a baseline of snowmobile use. Continue with annual flights to monitor compliance with regulations and changes in use levels.