Appendix D

Monitoring and Evaluation Plan

Monitoring would be used to: (1) determine whether the original objectives of the activities were met; (2) determine the need for additional action, and (3) educate and assist in the design of future projects.

Monitoring and evaluation would compare end results to those projected under the project Purpose and Need and to the Goals, Objectives, and Standards of the Lolo National Forest Plan.

For this project, monitoring would be conducted in accordance with the requirements outlined in the Lolo National Forest Plan. Forest Plan monitoring, done on a sample basis, would also determine the overall effectiveness of the project and effectiveness of the design criteria.

Monitoring for sale activities would occur during and immediately following sale implementation. All sale preparation and subsequent project associated operations would be monitored by Forest Service representatives to ensure compliance with specifications. Monitoring for watershed improvement activities would occur during and immediately following these activities.

Vegetation

The evaluation of vegetation management would be based on criteria outlined by Forest Plan monitoring items 3-1 through 3-16.

Silvicultural prescriptions for each unit would require that Lolo National Forest Plan standards be met. A certified silviculturist would assure compliance with the prescriptions during sale preparation, contract administrators, and post-harvest activities including prescribed fire. Timber sale administrations would monitor contractor performance of snag retention, residual tree protection, down woody debris retention, etc.

Whenever possible, coordination with diverse stakeholders would occur including researchers/faculty/graduate students at the University of Montana, to do multiparty monitoring of the effects of timber harvest, fuel reduction effectiveness, road decommissioning, and the ecosystem maintenance burn effectiveness.

Reforestation surveys would be conducted in group tree selection openings and any additional openings created as a result of bark beetle caused mortality, prescribed fire, or other disturbances. Natural regeneration would be tracked in these openings and where insufficient, artificial regeneration would be

Wildlife

Goshawk surveys would be conducted within suitable habitat the year of project activities when these activities coincide with goshawk breeding, nesting and rearing (May 1 – Aug 1). In addition, goshawk surveys would be conducted following project implementation in stands where goshawks had been detected during pre-implementation surveys.

To determine habitat quality and vegetative condition post treatment, wildlife and silviculture would coordinate to sample a minimum of 10% of treated stands using Common Stand Exam methodology. These plots would provide information on parameters such as; basal area, trees per acre, canopy Wildlife staff would coordinate with other resource specialists to monitor the quality and effectiveness of all road closures and decommissioning done under the project.

After treatment, a representative sample of existing old growth stands would be monitored to determine whether they still met old growth criteria, according to Green et al. 2005.

Wildlife staff would coordinate with fire personnel to establish photo points in EMBs and to ensure that these burns met the objectives specified in the NEPA document and burn plan.

Hydrology and Fisheries

Implementation and effectiveness monitoring for all road construction, decommissioning, maintenance, Best Management Practices (BMP) road work, and Riparian Habitat Conservation Areas (RHCA) buffers would be required. The intent of such monitoring would be to ensure protection of water quality as intended by the effective implementation of BMPs and RHCA buffers.

Monitoring a 15-20% sample would be required during implementation of project phases as well as after implementation. Monitoring a 15-20% sample for effectiveness of BMPs would also be required 1 year following implementation after spring runoff.

- If monitoring finds that a practice(s) could adversely affect water quality and continued activity could lead to degraded beneficial uses then a modification to remedy the practice would be required.
- If monitoring finds that a practice has not been applied or incorrectly applied, then contracting adjustments would be made to correct the implementation problem.
- Monitoring would be conducted by hydrology and/or fisheries staff or seasonal crews as directed and supervised by hydrology and/or fisheries staff.
- Monitoring results, any necessary corrective measures, and results of corrective measures would be documented and reported.

Additional information about monitoring water and fisheries resources is found in Tables D-1 through D-5 below.

Table D-1: Road BMP/Maintenance Implementation and Effectiveness Monitoring	
District:	Missoula
Project Name:	Butte Lookout EIS
Site Location:	Project roads
Monitoring Objective:	Determine if road maintenance and road BMP measures were implemented and if so, how effective are they. Include culvert replacements.
Monitoring Type:	Implementation and effectiveness
Priority:	High priority because roads are main source of impact and BMPs are main source of mitigation.
Methodology:	Similar to DNRC audit process. Evaluate several examples (4-5) of each type of BMP (several cross drains, several slash filter wind rows, several catch basins, etc).
Frequency/Duration:	During project; evaluate during haul and determine if preliminary haul measures are implemented and done so effectively. After project; evaluate after haul to determine if measures were maintained after use from haul. After first spring runoff following haul; determine if measures are still

Table D-1: Road BMP/Maintenance Implementation and Effectiveness Monitoring	
	effective. Evaluate 15-20% sample of roads under consideration.
Data Storage:	Photos, data sheets, reports will be stored in “aquatics” area.
Report:	Summary report including monitoring methods, data, maps, photos, summary and recommendations.
Funding Source:	Project funds (NFTM/WFHF)
Projected Costs:	$1,040 = $130/day for GS-5 tech. * 2 techs. * 2 days * 2 years
Personnel Needed:	2 GS-5 Hydrology technicians
Responsible Individual:	Hydrologist/Fisheries Biologist
Prepared By:	Traci Sylte
Date Prepared:	10/26/07

Table D-2: Erosion Control – Units & Landings Implementation & Effectiveness Monitoring	
District:	Missoula
Project Name:	Butte Lookout EIS
Site Location:	Project landings and units.
Monitoring Objective:	Determine if erosion control measures were implemented and if so, how effective are they.
Monitoring Type:	Implementation and effectiveness
Priority:	High priority because erosion control measures mitigate project effects.
Methodology:	Similar to DNRC audit process. Evaluate several examples (4-5) of each type of erosion control measure (several straw bale/wattle applications, several slash filter wind rows applications, several skid trail water bar applications, etc).
Frequency/Duration:	During project; evaluate during timber harvest operations and determine if preliminary erosion control measures are implemented and done so effectively. After project; evaluate after timber harvest to determine if measures were maintained after harvest operations and landing closures

Table D-2: Erosion Control – Units & Landings Implementation & Effectiveness Monitoring	
	are complete. After first spring runoff following operations, determine if measures are still effective. Evaluate 15-20% sample of units under consideration.
Data Storage:	Photos, data sheets, reports will be stored in “aquatics” area.
Report:	Summary report including monitoring methods, data, maps, photos, summary and recommendations.
Funding Source:	Project funds (NFTM/WFHF)
Projected Costs:	$1,040 = $130/day for GS-5 tech. * 2 techs. * 2 days * 2 years
Personnel Needed:	2 GS-5 Hydrology technicians
Responsible Individual:	Hydrologist/Fisheries Biologist
Prepared By:	Traci Sylte
Date Prepared:	10-26-2007

Table D-3: RHCA buffers – Implementation and Effectiveness Monitoring	
District:	Missoula
Project Name:	Butte Lookout EIS
Site Location:	Project units
Monitoring Objective:	Determine if RHCA buffers implemented and if so, how effective are they.
Monitoring Type:	Implementation and effectiveness
Priority:	High priority because RHCA buffers are main source of mitigation.
Methodology:	Visit units with streams and measure buffers with a tape and visually inspect for evidence of effectiveness
Frequency/Duration:	Before project; measure delineated buffers to ensure they are marked correctly. During project; evaluate during timber harvest operations to determine if RHCA buffers are being observed. Also visually inspect for evidence of effectiveness: are there signs of sediment transport from project through buffers? After project; evaluate after timber harvest to determine if

Table D-3: RHCA buffers – Implementation and Effectiveness Monitoring	
	buffers were heeded during timber harvest operations and were effective. After first spring runoff following operations, determine if measures are still effective: is there evidence of sediment transport from units through buffers? Evaluate 20% sample of units under consideration.
Data Storage:	Photos, data sheets, reports will be stored in “aquatics” area.
Report:	Summary report including monitoring methods, data, maps, photos, summary and recommendations.
Funding Source:	Project funds (NFTM/WFHF)
Projected Costs:	$1,040 = $130/day for GS-5 tech. * 2 techs. * 2 days * 2 years
Personnel Needed:	2 GS-5 Hydrology technicians
Responsible Individual:	Hydrologist/Fisheries Biologist
Prepared By:	Traci Sylte
Date Prepared:	10-26-2007

Table D-4: Road decommissioning Implementation and Effectiveness Monitoring	
District:	Missoula
Project Name:	Butte Lookout EIS
Site Location:	Roads to be decommissioned as part of project, in particular roads with stream crossing removals.
Monitoring Objective:	Determine if road decommissioning was implemented and if so, how effective are they.
Monitoring Type:	Implementation and effectiveness
Priority:	High priority because road decommissioning is a main source of mitigation.
Methodology:	Observe if decommissioning was accomplished and if so, was it completed to the intended level standard. Assumes that if decommissioning was implemented to the appropriate level according to definitions/level standards then the decommissioning should meet the intent of and be effective at that designated level.

Table D-4: Road decommissioning Implementation and Effectiveness Monitoring	
Frequency/Duration:	After decommissioning is completed. Evaluate 20% roads under consideration and/or 4-5 examples of different levels of decommissioning.
Data Storage:	Photos, data sheets, reports will be stored in “aquatics” area.
Report:	Summary report including monitoring methods, data, maps, photos, summary and recommendations.
Funding Source:	Project funds (NFTM/WFHF)
Projected Costs:	$1,040 = $130/day for GS-5 tech. * 2 techs. * 2 days * 2 years
Personnel Needed:	2 GS-5 Hydrology technicians
Responsible Individual:	Hydrologist/Fisheries Biologist
Prepared By:	Traci Sylte
Date Prepared:	10-26-2007

Table D-5: Road-Stream Crossing Replacement Implementation and Effectiveness Monitoring	
District:	Missoula
Project Name:	Butte Lookout EIS
Site Location:	Culverts to be replaced as part of project.
Monitoring Objective:	Determine if culvert replacement was implemented and if so, how effectively.
Monitoring Type:	Implementation and effectiveness
Priority:	High priority because culvert replacement is a main source of mitigation.
Methodology:	Lolo Crossing Replacement Monitoring Protocol.
Frequency/Duration:	For every culvert to be replaced. Immediately after replacement and/or 1 year following spring runoff following the culvert replacement
Data Storage:	Photos, data sheets, reports will be stored in “aquatics” area.

Table D-5: Road-Stream Crossing Replacement Implementation and Effectiveness Monitoring	
Report:	Summary report including monitoring methods, data, maps, photos, summary and recommendations.
Funding Source:	Project funds (NFTM/WFHF)
Projected Costs:	$520 = $130/day for GS-5 tech. * 2 techs. * (2 hr per site, 2 replacements plus travel = 1 day each year).
Personnel Needed:	2 GS-5 Hydrology technicians
Responsible Individual:	Hydrologist/Fisheries Biologist
Prepared By:	Traci Sylte
Date Prepared:	10-26-07

Soils

Nine harvest units representing a range of treatments and existing conditions have been selected for post-harvest monitoring. The primary objective of the monitoring is to insure that Regional Soil Quality Standards are met. By monitoring a range of activities the effectiveness of proposed mitigation and reclamation effectiveness may also be determined. The units selected for monitoring and certain of their attributes are displayed in the table below.

Unit No.	Harvest System	Area (Acres)	Calculated Detrimental Soil Disturbance After Activity	Comments
15	Skyline	8	11	Past and present harvest
17A	Tractor (Winter)	13	4	Mitigation Effectiveness
22	Tractor (Winter)	32	4	Mitigation Effectiveness
23	Tractor (Winter)	9	4	Mitigation Effectiveness
27	Tractor (Winter)	12	13	Reclamation Effectiveness
27A	Skyline	24	14	Reclamation Effectiveness
36	Skyline	8	14	Reclamation Effectiveness
51A	Tractor (Summer)	10	9	Past and present harvest
53	Tractor (Summer)	15	9	Past and present harvest

Transportation System

Routine monitoring would be conducted to determine the effectiveness of road closures.

Fire, Fuels and Air Quality

All prescribed burning would follow approved prescribed burn plans and would be implemented so that every effort is made to achieve air quality standards and allow for good smoke dispersion. Air quality would be monitored and evaluated during the burning activities and during Forest Plan monitoring.

Burn plans and detailed burn prescriptions would be developed with input from a certified silviculturist. Fuel and soil moisture conditions would be monitored prior to burning to ascertain that the burning window was within prescription objectives for protection of soil quality and fuels reduction.

After prescribed burning is completed, the burned units would be monitored to determine if post-burn objectives such as those for reducing fuels, site preparation and large woody debris retention, wildlife habitat, insect and disease control, species manipulation were met.

Visual Quality

The project area would be monitored after all timber harvesting, burning, and roadwork activities have been completed. This monitoring would determine whether the proposed activities have met the Lolo Forest Plan goals and Visual Quality Objectives and the length of time it took for the visual effects of these activities to begin to blend into the natural forested landscapes.

Noxious Weeds

The effectiveness of the weed treatments would be monitored for three years following initial application to identify new weed infestations along roads or need for additional treatments. If new infestations were identified, plants would be treated with herbicide or hand-pulled.

Compliance with contract requirements regarding herbicide treatments would be monitored by the timber sale administrator.